Recycling Stock Market
using Information & Communication Technologies

An innovative service to create a micro-trend for the environment

A study submitted in partial fulfillment
Of the requirements for the degree of
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Declaration

All sentences or passages quoted in this thesis from other people's work have been specifically acknowledged by clear cross-referencing to author, work and page(s). I understand that failure to do this, amounts to plagiarism and will be considered grounds for failure in this thesis and the degree examination as a whole.

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I would like to express my sincere appreciation to CITY College Administration Board, who gave me the opportunity to expand my knowledge through study and academic thinking. It is for sure that without this opportunity I wouldn’t be able to study this experience and get the most out of it.

I would like to express my gratitude to relatives, friends and colleagues that have supported me throughout this dissertation as well as during the whole 2-yeared time of the master programme.

This experience have expanded my horizons, made me think differently and have changed my attitude and perception in a number of approaches.

In other words this degree has prepared me for ***innovation*** with the extensive use of ***technology*** in order to foster ***entrepreneurship***.

ABSTRACT

Although the title of this research paper implies a financial attitude, it is true that while it adopts the financial know-how, actually it aims to incorporate it, in a new recycling scheme. Being inspired by the global issue of environment and its sustainability, there is an idea of establishing a service with regional characteristics that could help in a variable extent.

Purpose: The environmental problem of low recycling in the region of European Union is faced, therefore it is introduced a new service which aims to create a micro-trend among inhabitants trying to change their attitude over this issue and attract them to participate more actively in the protection of valuable resources.

Design/Methodology/Approach: A theoretical framework was adopted on three complementary perspectives by integrating technology (ICT theories and practices), economy (finance and stock markets) and environment (waste management & prevention).

Findings: Consumers accept to participate in the new service and find it very interesting, while recycling industry and local authorities might rise obstacles since its introduction consist a threat for the status quo.

Research limitations/implications: The present study provides a starting point for further research in recycling industry section as well as other professional sectors that are involved in the recycling case.

Originality/value: Moreover, the new framework introduced by this service has proven to be useful in improving the recycling percentages in the region. Although side-effects might restrict its primary targets, it might be a promising and notable tool.

Table of Acronyms

RSM	Recycling Stock Market
NPD	New Product Development
SWOT	Strengths-Weaknesses-Opportunities-Threats
ICT	Information & Communication Technologies

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CHAPTER One - Introduction

1.1 Motives of the study

During the last two years the attendance of the specific Masters programme and the involvement in a wide range of literature, mostly from the fields of technology, innovation and entrepreneurship, has cultivated the conditions of start thinking "outside the box". This study was perceived as a challenge for investigating new innovative services that could possibly derive from successful exploitation of new ideas. A significant concern learnt from this programme, was that sometimes there is hidden value in undiscovered paths that are seemingly incompatible or appeared as irrelevant. This innovative concern was the inspiring tool that motivated this study.

Therefore, the initial thought was to bring together different sectors, which although is a tough task to accomplish, is challenging and creative. "Discovering the world" is not the aim; on the contrary, this study is related to the issue of the environment and the saving of its valuable resources. It attempts to investigate whether by giving real value in certain daily habits, this could change individuals' attitude over recycling, create growth for the regions and save resources for the environment.

In response to the above issue, there was an idea of introducing a service which could benefit both individuals and environment based in three different sectors. These sectors are the technology, the economy and the environment thus below it is made a first approach through current literature.

1.2 Previous literature

The literature review of this study, which is presented in the next chapter, includes a wide range of resources. In this section though, there are presented additional resources from all three research areas, which support the analysis of the idea and the motives of the study. Thus, this material could be considered as equally significant due to its contribution in the progress of this study.

1.2.1 Technology

Recent developments in information and communication technologies (ICT), have cultivated an innovation friendly environment according to AT&T and Westech companies. *[1][2]* Such advancements have created a positive framework for the introduction of new tools as well as strong potentials either for incremental or radical innovations. Moreover, European Commission in a recent technical report *[3]* about the mapping of European wireless' trends and drivers, it was identified that new technologies affect people and resources through their direct pervasion in a catalytic way.

In addition, the "Innovision Research Institute" -which is specialized in telecommunications and new technologies- have presented in a white paper *[4] [5]* the results of a very interesting research, recently 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 *[6]*, the catalytic discovery among the new technologies, was the introduction of mobility, which is applied through the wireless communication and the mobile computing. Meanwhile, AT&T and Orange, two of the most popular mobile operators internationally, have already announced *[7] [8]* new services offered to their customers relating to digital payments through their phones, replacement of credit cards, tickets, even e-commerce solutions. It is confirmed that such key events definitely create market trends and define future opportunities according to the "Journal of ISO & Agent" last year. *[9]*

Besides that, several authors *[10][11][12][13][14]* have highlighted the introduction of a new mobile technology, the "Near Field Communication", which is an alternative wireless technology that has been deeply spread in individuals and companies. This technology creates "cutting edge" mechanisms for people interaction. As presented in the "World Forum of NFC" in October 2007 *[15]*, *near-field communication* will be the next challenge of interoperable communication.

In addition, in a report which was prepared and presented some years ago by a team of technology scientists for "3Com Company" *[16]*, it was clearly noted that "proximity" would be the essential item of future technologies as well as one of their future poles.

Therefore, the conclusion is that current business trends are defined by wireless technologies, mobility trends and proximity. By all means, this framework includes people interaction and communication as well as products or services that could be developed for any use.

So far, it was made a reference to what current literature comments on the technological advancements. It is interesting though to continue this approach with recent findings and comments from the economy.

1.2.2 Economy

Similar to the 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, *[17]* technology helped finance to reach the other side of Atlantic implying clearly those new economies emerged due to technological advancements. Also Costas Simitis *[18]*, former Prime Minister of Greece who succeeded in placing Greece in the Euro zone, and George Soros *[19]*, international investor well-known for his successful forecasts, 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 routes, 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. Tourani and Kirkby *[20]* have noted that this move affected people's psychological biases, shaping specific types of behaviors and have directed investors in the effects of overconfidence, socialization and familiarity. George Soros identified the same results *[21]* in terms of overconfidence, regarding current financial crisis. Moreover Costas Simitis in his most recent book *[22]* highlights that people will change behavior after the crisis.

The new era has been characterized by the mobility of capitals through stock markets and "carry trade". Aksoy Lerzan as well as other experts in financial issues *[23]* have assessed that globalization has created the suitable environment for the cultivation of stock market mentality among individuals.

Therefore, from this section it is concluded that mobility of capitals, new digital economies and stock markets philosophy are some of the globalised characteristics of current trends in economy.

Besides what was commented so far in the sectors of technology and economy, in the next section, it would be interesting to identify what are current trends in the sector of environment.

1.2.3 Environment

Current literature and actions has proved that environment is a global capital and is a leading issue. Reduce; reuse and recycle, are the new watchwords for manufacturing managers, looking to set new standards for manufacturing excellence. Kenney Brad in his research about green manufacturing *[24]* claims that just like any other improvement idea, there are benefits of being the first, and the best at implementing it. Both European Union *[25]* and United States *[26]* have set the waste reduction and recycling as crucial parts of a bigger environmental plan for the years to come. It seems that this change of priorities and the set up of environment in the first place, will be the next challenge. Every challenge is an opportunity and every change fosters new powers and re-defines balances.

Penn Aaron in his study "There is substance to recycling" *[27]* concludes 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 *[28]* 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 *[29]* that recycling is growing as a vital component of many business strategies.

1.3 Background of the problem

European Commission in its recent findings regarding a survey about waste management *[30]* 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 *[31]*, it was calculated 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 *[32]*, 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) *[33]* found that between 1990 and 1995, the amount of waste generated in Europe had increased by 10%. The same organisation estimated *[34]* that by 2020, Europe could generate 45% more waste than it did in 1995.

For European Union and OECD *[35]*, human existence overloads the environment. Different aspects of human actions aggravate and gradually diminish raw materials. According to Meneses and Palacio *[36]* in their study about recycling behavior, they argued 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 reported that, different roles with different causal characteristics influence people, regarding their attitudes towards the environment. *[37]*

George Soros, in his recent book about economic crisis *[38]* distinguishes attitude from behavior. He claims *[39]* 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 *[40]* 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 question "Do you know that waste damages the environment?" Robinson and Garratt *[41]* approached the issue from an ethical side. They noted 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 *[42]* 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 *[43]*, people prefer to earn money and live their lives in an undisturbed routine. On the other side, in order to affect peoples' attitudes, there could be given a strong motive. Such motive could be originated from *the sense of reward*. This is related to the meaning of adding value to a practice, and remunerating an achievement. *[44]*

From an ethical point of view, as Robinson and Garrat claimed *[45]*, we could destroy ourselves and our planet quite easily with a combination of ignorant selfishness and lethal technology. But under the same point *[46]* we could also say that we can bring people and technology together to support the "anthropic principle" and demonstrate that the universe was specifically structured to allow human life to evolve successfully. Late capitalism is going to have to find a better balance between economic development and the hunger for profits and environmental needs. *[47]*

So far from the references which describe the problem, it is clear that low percentages of recycling keep up wasting valuable resources of the environment. In European Union through surveys it was calculated that waste will be increased enormously within the next years. On the other side, inhabitants seem that although share the environmental concern they have not changed their attitude, at least in terms of high enough percentages.

1.4 Study significance and benefits

Current trends create an opportunity of investigating ways to minimize human impacts and cultivate sustainable policies for the protection of the environment and its valuable resources. Thereby, this study will investigate the possibility of introducing a service where people will recycle by getting in return some kind of reward. This service could be an innovative utility that will aim to create a micro-trend. Charles Arthur in his recent article published in "Guardian" about "the rule of 1%" *[48]* concluded that there is an emerging rule of thumb which suggests that if you get a group of 100 people online then

one will create content, 10 will "interact" with it (commenting or offering improvements) and the other 89 will just view it.

Mark Penn and Kinney Zalesne have published this year an interesting book about micro trending *[49],* where they defined that micro trends are the small forces behind tomorrow's big changes. Micro trends are based on the idea that the most powerful forces in our society are the emerging, counterintuitive trends that are shaping tomorrow right before us. *[50]*

Moreover in the National Congress of Theater Professionals, organized by Theater Communications Group, which took place the summer of 2009 in Denver-USA, Kinney Zalesne presented her findings - included in the book she co-authored with Penn - and pointed out that tastes and lifestyles of emerging communities are shaping the future. *[51]* In addition she introduced the term of microtrend mindset *[52]* implying that we must be comfortable holding inconsistent ideas in our heads at the same time (trends are going in every direction at a fast pace) while we must respect the true breadth and complexity of human beings.

Therefore, it is an issue to examine whether a successful combination of elements from the *Environment – Technology – Economy*, would create a change-effect through the implementation of a service. That means to investigate its acceptability from the community as well as its sustainability. This innovative service intends to contribute in achieving a balance between human behaviors and waste prevention by incorporating people actively, in an effort to confront with the recycling avert. Understanding the perceptions that might be raised, this study intent to contribute as a pilot for further consideration and may benefit future decision makers.

1.5 Aims and objectives of the study

This study has an initial motive which described earlier and this is to find an innovative way to contribute in saving valuable resources and minimizing the catastrophes caused by human presence. Thus, to eliminate human’s negative impacts to the environment, caused by mass consuming and careless behavior.

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 *[53]* recycling and reuse is one of the three principles in the EU's approach to the waste management policies.

Donald Blumberg *[54]* argues that, as the reserves of raw materials are decreasing, there is a way nothing goes wasted. He claims *[55]* 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. *[56]*

The Committee of the Regions, part of the European Commission responsible for the regional policies within European Union countries, organized a series of events *[57]* 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 *[58]* the increase in the quality of life in regional level and the creation of wealth and prosperity.

On the other side, Kenney *[59]* stresses in a more empirical study that, since environment is a leading issue, especially during late years, "Reduce; Reuse and Recycle" will be the new watchwords. He aims to clarify *[60]* 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.

Additionally, it is within the scope of this study to survey, whether it would be feasible to accomplish a change in the recycling percentages in regional level. The intention is not only to achieve an increase in recycling percentages in the European region but to find ways in creating growth for the local economies. Probably, it would be challenging to cultivate a different approach that would make recycling process more attractive, trying to add value in a simple daily task, enforcing a different attitude and turning negative impacts to positive values. The actual challenge would be to give real value in certain daily habits and transform a seemingly problematic situation to a fine opportunity for multiple benefits. There will be a value-action relationship, which will form the basis of the new service.

Concluding this section, there is one aim and this is to examine the possibility of creating a change-effect in a redefined recycling chain and find out whether this could be sustainable.

1.6 Study propositions and hypotheses

The initial idea and proposition is to create a company which will administer recyclable products (aluminum, glass, paper and plastic) by incorporating the philosophy of auctioning and using the know-how of stock markets and investing. For the effective operation of this effort, it would be considered necessary to depend on information and communication technologies.

In the proposed service the participants could 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.

Consumers will recycle their products; companies will make offers to consumers in return of their increasing recycling participation; recyclables will be sent back for reuse; It is hypothesized that a region-based prototype cell is created which will be supported by the regional authorities, professional associations, participating companies and the consumers. Since the concept incorporates three different sectors, the service is assigned a name: ***"Recycling Stock Market with the use of Information and Communication Technologies (ICT)"*** or simpler Recycling Stock Market (RSM).

1.7 Research area

This study combines the three fields of economy, environment and technology. Therefore, literature review and research has been focused and implemented in the area that is defined by these three fields and only within the limits that are related with the original idea of "recycling", "stock markets" and "information & communication technologies".

1.8 Study outcomes

The outcomes of this study are depended on the aim and intend to create the framework in order to identify the feasibility of the original idea.

Specifically the objectives of this project were:

- 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 was to define the way that this project would run, giving a step-by-step description.

CHAPTER Two - Literature review

Literature review was originally based in thorough and detailed literature taxonomy which is given in the end of the study at *Appendix A*. Moreover, the review has been made in a number of resources from the three sectors (environment-economy-technology) which are presented in the current section. The aim was to collect findings, identify gaps, adopt methodologies and study conclusions from different concepts and theories. As a result, this review enriched the present study with essential and contribution thoughts.

2.1 Literature taxonomy

The literature taxonomy is presented diagrammatically for each resource in *Appendix A*, 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. It was tried to extract meanings in terms of comparisons, similarities and differences remaining always oriented to the aim of this project.

2.2 Environment through reverse logistics, waste management and innovation

European Union supports the aid for environmental protection *[61]* starting from waste management and going further to activities such as re-utilization, recycling and recovery. According to "The Sixth Environment Protection Programme" *[62]* 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. The European Innovation Scoreboard *[63]* benchmarks the relative innovation performance of EU member states according to a specific methodology. In addition it compares *[64]* 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. *[65]* Obviously this incorporates issues of change, change resistance and risk avoidance.

Mark Roseland in his book about sustainable communities *[66]* proposed that whenever it is necessary, we should not be afraid to mandate changes. He argued 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 *[67]* that sustainability can mean less as well as more. Therefore, by doing development differently, this could be a challenge. He additionally argues *[68]* 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 *[69]* clarifies that reverse logistics; modern procurement techniques, supply chain management and current recycling processes can transform a useless product to a priceful piece. However it is identified *[70]* that anything could get a price if applied innovative tools that give value to its existence.

A wide research made from the Organization for Economic Cooperation and Development in 2006 *[71]* presented that recycling markets currently seem to face weaknesses and discrepancies considering their primary mission. In the same research *[72]* it was 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 *[73]* that this is a desired outcome which currently does not exist according to the literature but is expected to be found.

According to Chung Shan-Shan *[74]* 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.

2.3 Economy through investing

Investing incorporates a philosophy with social characteristics. John Nofsinger in “The Psychology of Investing” *[75]* claimed 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 discussed *[76]* that investing leads people to start thinking by developing mental accounting, mental budgeting and by matching costs to benefits. In such a way, he admited *[77]* 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 at the same time contribute in recycling and waste prevention. Moreover the development of other skills such as self-control, self-obedience and effective decision making, might establish a healthy framework within the region that could change its 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. *[78]*
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. *[79]* 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 *[80]* 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. *[81]* Moreover, Kazunori *[82]* in his study about recycling and international trade theory claimed 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. *[83]*

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. *[84]*

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. *[85]*

2.4 Technology through innovation

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 *[86]*. 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. *[87]*

Developing new comparative advantages is the answer to crisis, since this may lead to long-term sustainable growth. *[88]*

CHAPTER Three - Methodology

3.1 Study methodology

In the Research Proposal of this study there was a plan for the suggested methodology to be followed. This plan included a number of different methods in terms of both qualitative and quantitative research. Further analysis and on-going process of research details created the necessity of prioritizing these methods and adopt a main and a back-up plan in order to ensure that adequate information will be collected for the research in any case.

Research questions were the stable guide and their nature affected the final scheme. It was identified that a quantitative method to choose would be of primary concern. As a back-up plan there was a combination of quantitative and qualitative methods which could be activated in case the primary method had been proved inadequate. This did not happen since the primary method proved to be adequate and effective. Therefore, the major contributing method in this research was the implementation of a cross sectional survey.

For this reason, it was adopted the questionnaire research tool. Data collection was an essential parameter for the whole study. Considering that the distribution, filling and collection of the questionnaires was an issue of major importance, a different practice was followed in order to achieve effectiveness. Since the researcher owns a personal web-page (http://www.ergen.gr), that was an opportunity for the study to accommodate a web survey and use an electronic questionnaire.

The intention was to use a common electronic questionnaire for all entities (consumers-researchers-industry experts-environmentalists). Its structure would give the eligibility to be adapted according to each case meaning that each question would be translated under the significance due to the respondent's nature. The questionnaire was designed to be short, easy read and descriptive. The crafting of the questionnaire was based on what the research questions were implied. Regarding the population and sampling, according to the parameters of interest and the research questions explained earlier, it was selected the non-probability sampling. Since questionnaires were addressed to individuals, it was considered right to give equal chance to everybody in the population of being included, with focus in consumers. Followed by the fact that this is a web survey, the number of participants was

expected originally to be more than 50 and from different regions of the world. The web-survey was addressed to the following groups of participants:

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

It was considered that a number between 50 to 100 questionnaires was adequate to extract information regarding the original idea.

3.1.1 Reasons for choosing the current method of study

Most studies are conducted on the basis of certain ideas and then find ways to understand those ideas. In the course of doing this, researchers use approaches termed as quantitative and qualitative methods. *[89]*

Research adopting the quantitative approach is said to be mostly numerical and is designed to ensure objectivity, generalizability and reliability. *[90]* According to Dahlia Zawawi *[91]* one important feature of quantitative techniques is that the process of data collection is distinct from analysis. Moreover, such methods can provide a wide coverage of the range of situations and they are fast and cheap. Usually they are followed when time and other resources are limited. *[92]*

According to what described so far the aim of this study is to investigate a possibility. More precisely it is expected to investigate the value and the sustainability of a new service. Therefore objectivity and reliability are two of the major components that would be considered seriously.

Since time limit of the survey was restricted (approximately three weeks) this method is a good opportunity for fast data gathering. In addition, since the primary target was to measure attitudes and opinions, it was considered that web surveys are descriptive in nature; their findings are descriptive as well and with the suitable process of software tools (SPSS and Web Questionnaire) could provide information that could be generalized.

Although the method of web survey was very recently introduced, although it poses challenges and drawbacks, according to Simsek and Veiga - who both have made a detailed assessment on it - when an unbiased sampling frame exists or can be constructed, it allows researchers to inexpensively gather data with less effort than other available approaches. *[93]* The sampling frame in this research was affected by discussion groups, associations that have presence in the web, e-mail addresses from groups and individuals related to the subject of recycling, academic staff from different areas, industry experts, and consumers from different places.

Moreover, the web survey is a method that guarantees accessibility, time efficiency, money saving and gives the respondents the convenience to study more on the given subject. Moreover, the on-line questionnaire was more impressive and convenient for the respondents. (http://www.ergen.gr/Recycling_Stock_Market.html)

Undoubtedly the electronic questionnaire can reach more groups in less time and can be addressed to a variety of entities making survey's characteristics stronger and the results wider and valid. It supports easy data management, location flexibility and rapid transmission of the survey to all respondents across time and space. *[94]*

Couper and Miller in the introduction of web survey methods pointed out that a key characteristic of web surveys is their diversity. *[95]*

Finally, the disadvantages of quantitative methods were taken under consideration. It was identified that through the web survey there would possible to collect a much narrower and probably superficial dataset. Moreover the results could be limited as they provide numerical descriptions rather than detailed narrative and generally provide less elaborate accounts of human perception. Another issue was that the web survey as a research method is carried out in an unnatural, artificial environment so that a level of control can be applied to the exercise. In addition preset answers will not necessarily reflect how participants really feel about a subject and in some cases might just be the closest match. The development of standard questions by the research could lead to 'structural' bias and false representation, where the data actually reflects the view of the researcher instead of the participating subject.

3.1.2 Why other alternative methods have not been adopted

The backup plan included the implementation of one-to-one unstructured interviews. Interviews would be performed in a very restricted number of individuals. It was targeted to be opinion leaders, academicians, and industry experts. There would have been (6) interviews in 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;

Through this method it was expected to pump useful information from the respondents, regarding attitudes, behaviors and beliefs. The purpose was 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.

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. Therefore, this method selected only as alternative since our main interest was to conclude in results, tensions and attitudes through the study of numbers.

Also, it was decided that in case the primary method of web survey did not get results, we could adopt parallel to interviews three additional methods. The first was the narrative inquiry, which would be used in order to get information through storytelling. Then we would write a narrative of the experience. The second was the short term observations. Originally it was considered that short term unstructured observations, in definite study groups could be a key aspect for this research. Such observations could be planned to be done in individuals in their domestic environment or in their professional environment. The third method was the Ethno-methodology. It 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 selection of web survey as the main method, gave the opportunity to this research to reach different groups and entities from different cultures and different places. Since it was addressed also to industry experts associations, organized groups of citizens with environmental characteristics, recycling industry experts, non-profit organizations, that was practically enough to create a population for experiencing the results.

3.2 Study Design – Research Questions

Research questions have formed the basis of the study design. They depend on 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?

3.2.1 Design of the Questionnaire

The design of the questionnaire was fully depended in the research questions. It was divided in four (4) sections.

- Section 1: Personal details (questions 1-6)
- Section 2: Evaluation of the service (questions 7-16)
- Section 3: Sustainability of the idea (questions 17-24)
- Section 4: Potential obstacles (questions 25-27)

The aim was to get a clear reply from the respondents in three issues (a) the value, (b) the sustainability and the (c) potential obstacles of the idea.

For the construction of the questionnaire it was used the software package of "Web Questionnaire" which is suitable for open web surveys and it supported the researcher with extra tools. It was incorporated in the existed web page of the researcher. This software also administrates responses and creates reports.

3.2.2 Data Collection

3.2.2.1 Phase one – Distributing a Pilot questionnaire

Before activating the questionnaire to all potential participants, it was decided to distribute a pilot version to 20 participants in order to get feedback about its characteristics. Thus, to ensure that the questions were simple and understandable, they were short and clear in their meanings. Keeping in mind that such a service is mostly addressed to individuals as consumers and aiming to investigate this group deeper, most of the questionnaires were given to them. Two types of questionnaires were distributed, either in electronic or in hard copy. Questionnaires have been distributed with explanatory leaflets in both cases. The aim was for the participants to easy understand the idea in a 10-step pathway.

Therefore, phase one included the following steps:

- Create an explanatory web page accommodated in the main web site where respondents before entering the web survey could have an idea of what is the survey about (http://www.ergen.gr/Recycling_Stock_Market.html). *(Appendix B)*
- Design and create the on-line questionnaire which respondents would fill out (http://www.ergen.gr/web_survey/questionnaire.html). *(Appendix C)*
- Create an explanatory leaflet in hard copy version where a 10 step pathway of the idea was illustrated. *(Appendix D)*
- Create a hard copy version of the questionnaire to distribute it in person in a number of participants. *(Appendix E)*

This phase took one week exactly to be completed. The results collected from all participants and they are analysed in the next chapter. In addition some amendments took place in the original questionnaire, since it was identified that through feedback it was necessary to make a re-phrasing in some of questions.

3.2.2.2 Phase two – Distributing the final questionnaire

The revised questionnaire was uploaded in the web site and it was activated for the participants. *(Appendix C)*

The final version was available only through the web site's electronic version. The duration was three (3) weeks. An electronic invitation was sent to more than 300 potential participants in either their personal or professional emails. In addition the web link of the new service (http://www.ergen.gr/Recycling_Stock_Market.html) was sent in a number of European Associations and Organisations that were considered experts in the field of recycling and environment, inviting them to participate. *(Appendix F)*

3.3 Literature support and justification

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.

The research objectives of this project, as described in the beginning, had the character of scrutinizing the possibility of creating a change-effect in the current recycling sector. The literature review made, through its findings and conclusions, intended to examine different models and survey a number of variables in terms of investigating the relation between the new idea/service and current trends.

Therefore, variables investigated both from the literature and web-survey was related to:

- Current trends in technology and people's attitude
- Economic approach and economic rewards in changing lifestyles and thoughts
- Current situation framed by industry players and change resistance
- Attitudes and willingness of people to join micro trends
- Perception of strong market players about new trends and their possible expectations

CHAPTER Four - Results

4.1 Data analysis – Findings of the study

The study is approached under the new-product development scheme. Therefore, the results analysis both in pilot and normal process were investigated thoroughly under the parameters related to the new product development philosophy.

4.1.1 Findings derived from the pilot process (pilot questionnaire)

The pilot process had one week duration. The aim was to perform a first test of the questionnaire and the idea. Feedback gained was important and supportive. In *Appendices P and Q* there are given the results of this process both diagrammatically and numerically. There were 20 participants covered a wide range of ages, almost all of them were employed and of high educational level. The majority were married living with their family. Below it is given the results in terms of adapting the replies to the three categories of research questions.

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

The initial evaluation of the idea was positive	90% respondents found it interesting or very interesting
Concerning the possible participation of the respondents in this service the results were almost balanced	55% were absolutely positive while 35% were likely/moderate and a 10% declared unlikely to participate
Regarding the value of the idea in terms of the environment and saving resources as well as the benefits for the region, replies were absolutely positive	More than 80% agreed in the service's intention
Respondents replied that this service may change current recycling processes	An 80% agreed that this is possible
Regarding people's living standards and attitude more than 50% were positive that this could be happen	A range between 55% and 80% agreed
Participants found the idea a smart way to recycle which includes a sense of reward	More than 85% agreed with these two motives

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

Respondents were not so sure that this service could create growth in the region where it will be applied	A 45% found it definitely possible while the rest 55% declared that it might be possible or impossible
They have identified though that it will bring income to all participants	A 60% found it possible
Companies and households will accept to participate	More than 60% declared that this is possible
Respondents were positive that environmentalists will embrace the idea	A 100% were positive on that
Regarding local authorities, it was proved that they will not be so willing to support the idea	A 40% found it not so possible/moderate while another 40% was positive. At this point there was a balanced reply which created a question in the intentions of governments and authorities

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

Participants found the idea not so easy to be implemented or at least with some difficulties	A 15% replied that this will be almost easy. A 50% replied that this could not be easy / moderate.
There was a negative attitude among participants about the intentions of other groups that could be affected from this service identifying that there will be obstacles and resistance.	It is worth to mention that only a 20% declared that the service will not find any obstacles
Industry and other companies may be the possible enemies in that effort, according to the respondents	A 70% declared that companies from the industry will not participate
Regarding the financial assessment of the service respondents agreed that it might be expensive to be implemented	An 85% found it expensive to be applied
Is it worthy to apply or not this idea. Will this thought considered as a possible barrier?	A 40% replied that comparing to other factors there might be no so obvious benefits for the idea to be applied. A 60% instead agreed that finally it could be feasible to do so.

The results of the pilot process have been extracted and analysed with the help of "Web Questionnaire" which in addition supported the web survey with some useful tools.

4.1.2 Findings derived from the full process (final questionnaire)

Finally there were gathered 80 questionnaires from equal participants from different areas of expertise and different places in the world. The web survey helped the research to reach a high level of diversity in the sample of 80 persons. The statistical process of the questionnaires has been performed with the use of SPSS (v.17).

4.1.2.1 Frequencies (percentages)

In this section are presented the frequencies of categories of the replies for all questions of all groups as processed (whole sample is included). The tables are given according to the research questions distribution, thus in three categories. In the end of each category there are given the statistical comments.

At first, there are illustrated the data extracted by the personal profile of participants. The first seven questions (Q1-Q7) of the questionnaire intended to capture the profile of each respondent. The relevant statistical pies can be found in *Appendix G*.

You are participating in this survey as:

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A consumer	56	70.0	70.0	70.0
	A member of a non-governmental institute / Environmentalist	5	6.3	6.3	76.3
	A researcher	12	15.0	15.0	91.3
	An industry expert	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

Table 1. Groups of participants/frequencies

Gender

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	39	48.8	48.8	48.8
	Male	41	51.2	51.2	100.0
	Total	80	100.0	100.0	

Table 2. Gender of participants

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	18-29	20	25.0	25.0	25.0
	30-39	27	33.8	33.8	58.8
	40-49	26	32.5	32.5	91.3
	50-59	6	7.5	7.5	98.8
	60-69	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

Table 3. Age of participants

What is your educational background?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High School Graduate	6	7.5	7.5	7.5
	Holder of a Master/PhD Degree	54	67.5	67.5	75.0
	Secondary Education	2	2.5	2.5	77.5
	University Graduate	18	22.5	22.5	100.0
	Total	80	100.0	100.0	

Table 4. Educational background of participants

Marital Status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Divorced	4	5.0	5.0	5.0
	Married	42	52.5	52.5	57.5
	Single	33	41.3	41.3	98.8
	Widowed	1	1.3	1.3	100.0
	Total	80	100.0	100.0	

Table 5. Marital status of participants

Living status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Living alone	24	30.0	30.0	30.0
	Living with your family/others in your household	34	42.5	42.5	72.5
	Living with your spouse/partner	22	27.5	27.5	100.0
	Total	80	100.0	100.0	

Table 6. Living status of participants

Professional status

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Employed	67	83.8	83.8	83.8
	Student - Not yet in the market	6	7.5	7.5	91.3
	Unemployed	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

Table 7. Professional status of participants

The vast majority of the participants were employed (over 80%), living either with their family or at least with someone else (approx. 70%), a 52% of them are married and a 90% are at least University graduates. Regarding their age, a 65% come from the range of 30-49 which could be translated as the group with the most active people in terms of social and professional life. Hopefully the gender was almost balanced, 48% females-52 males, while a 70% of the respondents declared consumers. The rest 30% were industry experts, researchers and environmentalists which could be considered an adequate percentage to extract conclusions. In any case the primary target for investigation in this survey was the consumers, since the service is addressed mostly to them and their lifestyle. Changing their lifestyles is expected to create pressures and reveal a micro trend.

Therefore, the typical profile of the respondent, based on the highest percentages gathered in each question, at this stage, is the following: *a male/female consumer, aged 30-49, employed and married, with high educational background, living with others in the same household.* In *Appendix G*, are illustrated the statistical pies of personal data of respondents showing the frequencies of each category in a graphical format.

Questions 8 to 21 are depended to the evaluation of the service. Below are given the tables of frequencies of replies. In *Appendix H*, are given the relevant statistical pies.

How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) Not interesting	1	1.3	1.3	1.3
	(3) Of low interest	1	1.3	1.3	2.5
	(4) Moderate	2	2.5	2.5	5.0
	(5) Of some interest	12	15.0	15.0	20.0
	(6) Interesting	37	46.3	46.3	66.3
	(7) Very interesting	27	33.8	33.8	100.0
	Total	80	100.0	100.0	

Table 8. Evaluation of the service at a first glance

Do you intend to participate in RSM when applicable?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Extremely unlikely	1	1.3	1.3	1.3
	(2) Very unlikely	2	2.5	2.5	3.8
	(3) Unlikely	3	3.8	3.8	7.5
	(4) Moderate	10	12.5	12.5	20.0
	(5) Likely	20	25.0	25.0	45.0
	(6) Very likely	29	36.3	36.3	81.3
	(7) Extremely likely	15	18.8	18.8	100.0
	Total	80	100.0	100.0	

Table 9. Intention to participate in the service

Recycling Stock Market will benefit the environment

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(4) Moderate	4	5.0	5.0	6.3
	(5) Agree	22	27.5	27.5	33.8
	(6) Agree very much	32	40.0	40.0	73.8
	(7) Strongly agree	21	26.3	26.3	100.0
	Total	80	100.0	100.0	

Table 10. Possible benefit for the environment

Recycling Stock Market will save valuable resources

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(4) Moderate	6	7.5	7.5	8.8
	(5) Agree	20	25.0	25.0	33.8
	(6) Agree very much	32	40.0	40.0	73.8
	(7) Strongly agree	21	26.3	26.3	100.0
	Total	80	100.0	100.0	

Table 11. Saving of valuable resources

It will give incentives to consumers for recycling more and more

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	1	1.3	1.3	2.5
	(4) Moderate	7	8.8	8.8	11.3
	(5) Agree	28	35.0	35.0	46.3
	(6) Agree very much	23	28.7	28.7	75.0
	(7) Strongly agree	20	25.0	25.0	100.0
	Total	80	100.0	100.0	

Table 12. Incentives for the consumers

It may change current recycling processes followed

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	1	1.3	1.3	2.5
	(4) Moderate	20	25.0	25.0	27.5
	(5) Agree	30	37.5	37.5	65.0
	(6) Agree very much	18	22.5	22.5	87.5
	(7) Strongly agree	10	12.5	12.5	100.0
	Total	80	100.0	100.0	

Table 13. Possible change in current recycling processes

It will help people to change attitude

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(2) Very much disagree	4	5.0	5.0	6.3
	(3) Disagree	3	3.8	3.8	10.0
	(4) Moderate	17	21.3	21.3	31.3
	(5) Agree	25	31.3	31.3	62.5
	(6) Agree very much	21	26.3	26.3	88.8
	(7) Strongly agree	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 14. Change attitude possibility

RSM will affect the living standards of participants

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Low possibility	2	2.5	2.5	2.5
	(2) With little possibility	4	5.0	5.0	7.5
	(3) Not so possible	12	15.0	15.0	22.5
	(4) Moderate	17	21.3	21.3	43.8
	(5) Possible	27	33.8	33.8	77.5
	(6) Very possible	13	16.3	16.3	93.8
	(7) High possibility	5	6.3	6.3	100.0
	Total	80	100.0	100.0	

Table 15. Possible affection in people's living standards

RSM will benefit the region that will be applied

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	1	1.3	1.3	2.5
	(4) Moderate	18	22.5	22.5	25.0
	(5) Agree	29	36.3	36.3	61.3
	(6) Agree very much	22	27.5	27.5	88.8
	(7) Strongly agree	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 16. Beneficial for the region that will be applied

The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(4) Moderate	4	5.0	5.0	6.3
	(5) Agree	31	38.8	38.8	45.0
	(6) Agree very much	25	31.3	31.3	76.3
	(7) Strongly agree	19	23.8	23.8	100.0
	Total	80	100.0	100.0	

Table 17. Participants have benefits from recycling

The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	8	10.0	10.0	11.3
	(4) Moderate	14	17.5	17.5	28.7
	(5) Agree	23	28.7	28.7	57.5
	(6) Agree very much	22	27.5	27.5	85.0
	(7) Strongly agree	12	15.0	15.0	100.0
	Total	80	100.0	100.0	

Table 18. Garbage has value because you can earn money

The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	7	8.8	8.8	10.0
	(4) Moderate	21	26.3	26.3	36.3
	(5) Agree	25	31.3	31.3	67.5
	(6) Agree very much	14	17.5	17.5	85.0
	(7) Strongly agree	12	15.0	15.0	100.0
	Total	80	100.0	100.0	

Table 19. There is a sense of a game in this service

The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	3	3.8	3.8	5.0
	(4) Moderate	2	2.5	2.5	7.5
	(5) Agree	25	31.3	31.3	38.8
	(6) Agree very much	28	35.0	35.0	73.8
	(7) Strongly agree	21	26.3	26.3	100.0
	Total	80	100.0	100.0	

Table 20. This is a smart way to recycle

The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Strongly disagree	1	1.3	1.3	1.3
	(3) Disagree	2	2.5	2.5	3.8
	(4) Moderate	6	7.5	7.5	11.3
	(5) Agree	25	31.3	31.3	42.5
	(6) Agree very much	29	36.3	36.3	78.8
	(7) Strongly agree	17	21.3	21.3	100.0
	Total	80	100.0	100.0	

Table 21. There is a reward for recycling

It is significant to mention that a percentage of more than 80%, of the participants found the idea of the new service as interesting or very interesting. Regarding the issue of potential participation in the service, percentages were encouraging but not in an immense way. A 55% claimed that would definitely participate, a 25% declared that would just participate while a 20% were negative in the idea of participation. There was no doubt that this service could help the environment and save valuable sources in an extent. In both cases the positive percentages were over 90%. Also, it may work as an initiative for people to recycle more but it is not so sure that would change people's attitude. There is a 30% who believes that people will not be affected to change their routines. The same occurs with the case of living standards. There is a 44% who believes that living standards will

not be affected. Obviously, this service may benefit the region/s where it will be applied and there is a strong sense among participants about that (over 70% positive).
Finally, respondents declared that RSM is a smart way to recycle (over a 92%), giving at this service a value and expectation. At least, there is a kind of service where people have some kind of direct tangible benefits (over a 92%).

Questions 22 to 29 are depended to the sustainability of the idea. Below are given the frequencies of replies while the analysis follows right after. The statistical pies can be found in *Appendix I*.

The implementation of RSM is expected to create growth in the region that will be applied

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Impossible	1	1.3	1.3	1.3
	(2) Almost impossible	4	5.0	5.0	6.3
	(3) Rather impossible	5	6.3	6.3	12.5
	(4) Moderate	25	31.3	31.3	43.8
	(5) Almost possible	21	26.3	26.3	70.0
	(6) Possible	19	23.8	23.8	93.8
	(7) Highly possible	5	6.3	6.3	100.0
	Total	80	100.0	100.0	

Table 22. RSM will create growth in the region

The implementation of RSM will bring income both to consumers and companies

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Impossible	1	1.3	1.3	1.3
	(3) Rather impossible	3	3.8	3.8	5.0
	(4) Moderate	21	26.3	26.3	31.3
	(5) Almost possible	20	25.0	25.0	56.3
	(6) Possible	28	35.0	35.0	91.3
	(7) Highly possible	7	8.8	8.8	100.0
	Total	80	100.0	100.0	

Table 23. RSM will bring income to consumers and companies

The service may penetrate in households

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Low pervasion	1	1.3	1.3	1.3
	(3) Rather low pervasion	6	7.5	7.5	8.8
	(4) Moderate	15	18.8	18.8	27.5
	(5) Adequate pervasion	28	35.0	35.0	62.5
	(6) Rather high pervasion	24	30.0	30.0	92.5
	(7) High pervasion	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

Table 24. The service may penetrate in households

Companies will accept to participate in order to contribute in the philosophy of recycling

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Low possibility	4	5.0	5.0	5.0
	(2) With little possibility	1	1.3	1.3	6.3
	(3) Not so possible	2	2.5	2.5	8.8
	(4) Moderate	14	17.5	17.5	26.3
	(5) Possible	28	35.0	35.0	61.3
	(6) Very possible	25	31.3	31.3	92.5
	(7) High possibility	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

Table 25. Companies will accept to participate

Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) With little possibility	1	1.3	1.3	1.3
	(3) Not so possible	4	5.0	5.0	6.3
	(4) Moderate	2	2.5	2.5	8.8
	(5) Possible	28	35.0	35.0	43.8
	(6) Very possible	33	41.3	41.3	85.0
	(7) High possibility	12	15.0	15.0	100.0
	Total	80	100.0	100.0	

Table 26. RSM will be a marketing tool for companies

Companies will see this service as an opportunity for expansion

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) With little possibility	1	1.3	1.3	1.3
	(4) Moderate	21	26.3	26.3	27.5
	(5) Possible	25	31.3	31.3	58.8
	(6) Very possible	24	30.0	30.0	88.8
	(7) High possibility	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 27. RSM is an opportunity for expansion for companies

Environmentalists will embrace the idea

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(3) Not so possible	1	1.3	1.3	1.3
	(4) Moderate	3	3.8	3.8	5.0
	(5) Possible	19	23.8	23.8	28.7
	(6) Very possible	34	42.5	42.5	71.3
	(7) High possibility	23	28.7	28.7	100.0
	Total	80	100.0	100.0	

Table 28. Environmentalists will embrace the idea

Local authorities will contribute to the implementation of it

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) With little possibility	5	6.3	6.3	6.3
	(3) Not so possible	9	11.3	11.3	17.5
	(4) Moderate	13	16.3	16.3	33.8
	(5) Possible	33	41.3	41.3	75.0
	(6) Very possible	14	17.5	17.5	92.5
	(7) High possibility	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

Table 29. Local authorities will support the idea

A 43% of the respondents are not sure that the service could create growth in the region/s that will be applied although in the previous section a 70% were positive that could benefit the region/s. Participants do not see the service as an economic tool but mostly as a social initiative. Moreover, they are not so sure that this could bring income to them, only a 43% were positive about that. The penetration of the service in households seems to be an issue. An approximate of 37% declared that there would be high or rather high penetration while the rest bigger percentage declared adequate and not adequate.

People are positive that companies will participate, if they see it as a marketing tool and an opportunity for expansion. Environmentalists will definitely embrace the idea while there is a question mark on local authorities, since there is a 41% who see it possible to help, there is a 25% who agrees that they will help and there is a 34% - not low – that expect local authorities to be negative.

Questions 30 to 37 are depended to the potential obstacles that are identified in this effort. Below are given the frequencies of replies. In *Appendix J*, there are given the corresponded pie charts.

Do you think that it could be easy to implement the idea of RSM?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Definetely not easy	2	2.5	2.5	2.5
	(2) Almost not easy	3	3.8	3.8	6.3
	(3) Probably not easy	19	23.8	23.8	30.0
	(4) Moderate	22	27.5	27.5	57.5
	(5) Probably easy	20	25.0	25.0	82.5
	(6) Almost easy	8	10.0	10.0	92.5
	(7) Definitely easy	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

Table 30. Ease of implementation

Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) Almost no	2	2.5	2.5	2.5
	(3) Probably no	10	12.5	12.5	15.0
	(4) Moderate	8	10.0	10.0	25.0
	(5) Probably yes	38	47.5	47.5	72.5
	(6) Almost yes	8	10.0	10.0	82.5
	(7) Definitely yes	14	17.5	17.5	100.0
	Total	80	100.0	100.0	

Table 31. Barriers/obstacles from other parties

A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) With little possibility	1	1.3	1.3	1.3
	(3) Not so possible	9	11.3	11.3	12.5
	(4) Moderate	7	8.8	8.8	21.3
	(5) Possible	34	42.5	42.5	63.7
	(6) Very possible	14	17.5	17.5	81.3
	(7) High possibility	15	18.8	18.8	100.0
	Total	80	100.0	100.0	

Table 32. Possible conflict with the current situation

A possible barrier in the implementation of RSM could be the raise of legislation issues

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid		1	1.3	1.3	1.3
	(2) With little possibility	2	2.5	2.5	3.8
	(3) Not so possible	8	10.0	10.0	13.8
	(4) Moderate	12	15.0	15.0	28.7
	(5) Possible	28	35.0	35.0	63.7
	(6) Very possible	20	25.0	25.0	88.8
	(7) High possibility	9	11.3	11.3	100.0
	Total	80	100.0	100.0	

Table 33. Raise of legislation issues

A possible barrier in the implementation of RSM could be the avoidance of companies to participate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) With little possibility	3	3.8	3.8	3.8
	(3) Not so possible	9	11.3	11.3	15.0
	(4) Moderate	15	18.8	18.8	33.8
	(5) Possible	38	47.5	47.5	81.3
	(6) Very possible	11	13.8	13.8	95.0
	(7) High possibility	4	5.0	5.0	100.0
	Total	80	100.0	100.0	

Table 34. Companies participation

A possible barrier in the implementation of RSM could be the avoidance of individuals to participate

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Low possibility	1	1.3	1.3	1.3
	(2) With little possibility	3	3.8	3.8	5.0
	(3) Not so possible	8	10.0	10.0	15.0
	(4) Moderate	13	16.3	16.3	31.3
	(5) Possible	36	45.0	45.0	76.3
	(6) Very possible	13	16.3	16.3	92.5
	(7) High possibility	6	7.5	7.5	100.0
	Total	80	100.0	100.0	

Table 35. Individuals participation

A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(2) With little possibility	1	1.3	1.3	1.3
	(3) Not so possible	6	7.5	7.5	8.8
	(4) Moderate	8	10.0	10.0	18.8
	(5) Possible	31	38.8	38.8	57.5
	(6) Very possible	21	26.3	26.3	83.8
	(7) High possibility	13	16.3	16.3	100.0
	Total	80	100.0	100.0	

Table 36. The idea is expensive

A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(1) Low possibility	13	16.3	16.3	16.3
	(2) With little possibility	11	13.8	13.8	30.0
	(3) Not so possible	19	23.8	23.8	53.8
	(4) Moderate	13	16.3	16.3	70.0
	(5) Possible	9	11.3	11.3	81.3
	(6) Very possible	7	8.8	8.8	90.0
	(7) High possibility	8	10.0	10.0	100.0
	Total	80	100.0	100.0	

Table 37. Benefits from the application of the service / Are there any?

Last section related to possible barriers and obstacles, added to this survey valuable feedback. It is worthy to mention that a 55% of the respondents were either moderate or pessimist regarding the implementation of idea and how easy this could be. They have identified that obstacles will be raised by organizations, governments, companies and experts. An approximate of 80% agreed that current market will be a possible source of conflict. In addition the environment may not be friendly since legislation issues could be raised as well. Among these, an approximate of 60% claimed that companies and consumers may not participate since the conditions will not be suitable to accommodate such a service. Moreover, it is possible for the idea to be expensive. A 20% only declared that there are no obvious benefits from this service while on the contrary, an 80% agreed that the service has obvious benefits.

4.1.2.2 Other descriptive statistics

Further to the examination of frequencies, where actually it was given a strong feedback regarding the service, there is a number of correlations that are examined as well, based in the relation of some parameters considered as significant. By applying *crosstabs analysis* on them there are extracted statistics and measures of association. For example in the intention to find how the participants have evaluated – per group – the new service (*Appendix K*), it is presented that consumers are more positive comparing to environmentalists and industry experts. In addition researchers seem to be positive as well and have found the idea interesting. On the other side, consumers and environmentalists

found to have less positive opinions. In addition, the chi-square test which had a value of 0.01 proves that the difference of opinions is not due to chance variation, which implies that each category has a different range of opinions and depending in the specific sample we may generalize the outcomes. The chi-square test measures the discrepancy between the observed cell counts and what we would expect if the rows and columns were unrelated.

With the help of descriptive statistics it is intended to reveal some hidden information and extract feedback from factors that contributed essentially in this survey. In *Appendix L* is given the detailed analysis of *means* of the values. In addition, there are included the standard deviation as well as the minimum and maximum value that each question received accordingly. Almost in all questions (excluding 2) the standard deviation appeared to be bigger than 1, implying that there was a distance in opinions in the sample.

Respondents seemed to converge only in questions regarding (a) that the idea is interesting and (b) that environmentalists will support it. The biggest deviation appeared in the last question, where it is declared that there are no obvious benefits from the implementation of the service. Respondents identified this fact as a possible barrier but the opinions found to be much diverted (*SD 1,867*). Another significant deviation has been identified in the question about the ease of implementation of the idea. Although it was expected a negative result in this question (*SD 1,371*), it seemed that there were respondents that either believed in the implementation of it with no serious barriers or not.

Most of the results analysis, have been performed in terms of the (4) groups of participants, since it was considered of major interest to investigate the possible different approaches, attitudes and lifestyles of such groups.

4.1.2.3 Methods ANOVA and Means Comparison

In continuous there was an analysis performed in terms of comparing 5 different variables regarding the service, based on the collected results.

(a) the evaluation of the service (Q8)
(b) the intention of participation (Q9)
(c) the affection in living standards (Q15)

(d) the benefit to the region (Q16)

(e) the most popular characteristic of this service (smart way to recycle) (Q20)

The two tables given in *Appendices M and N* are very interested as they illustrate the means comparison and the ANOVA case. It is proved that there is a linear relationship between the groups of participants in all five questions. Since (siq.) were less than 0.05 in all cases that means that there are significant differences among groups in terms of the responses to the specific questions.

As this result was really interesting, the ANOVA case was applied to the whole questionnaire using as a factor of research the group that each participant belonged to. On the contrary in *Appendix O*, the analysis of variance shows that there are a number of questions that have no significant differences regarding the responses. Environmentalists will definitely embrace the idea and this is a common evaluation within the 4 groups, although there will be raised obstacles from different parts in the effort to implement the idea. Moreover, it is possible that both consumers and companies will avoid participating, giving the fact of legislative issues, the conflict with the "status quo" of recycling industry and the high cost of idea's implementation.

4.2 Summary of Results

From the statistical analysis the idea of Recycling Stock Market proved to be interesting and attractive, but not easy to be implemented. There is a positive attitude and willingness to participate and support the new service but current situation will probably raise obstacles. This possibly is a case of resistance to a new service which although may be challenging is usually faced as a threat. As discussed in the literature review, obviously there is a distance between what people want or expect and what actually could do. A well-established network of companies and organisations is difficult to be changed. Radical innovative approaches are not easily implemented beyond the given conditions either in market or society.

4.3 Comparison of findings and literature review

In this section it is compared the study results with issues discussed both in the sections of previous literature and literature review. On the left side are given parts from the literature and on the right side the corresponded finding from the study.

Findings from literature	Relation with findings from the study
• People follow a behavior that is irrelevant to environment's sustainability [36] • Attitude from behavior are distinguished [38]	• *Although a percentage of more than 70% of the participants agreed that RSM will benefit the environment and will save valuable resource, there was a 20% which declared that will not participate while another 25% was not so sure about its participation*
• There is a difference among what people perceive and what actually do [39]	• *There is a 30% of respondent that expect non participation from the consumers*
• Whenever this is necessary we should not be afraid to mandate changes [66] • This concerns sustainability	• *Over a 70% argues that industry will raise obstacles trying to keep current situation unchanged*
• Anything could get a price if applied innovative tools that give value to its existence [70]	• *Over an 80% found RSM a smart way for recycling since there is a tangible reward*
• OECD presents that recycling industry suffers from failures and discrepancies. A possible re-design should be considered seriously [71][72]	• *An approximate 80% foresees that the new service will have conflict with recycling industry*
• There is a value-action gap in waste recycling which could be filled by developing awareness among targeted groups [74]	• *Over 70% believes that RSM could change current recycling processes. Another 60% accept that this service will make them increase the frequency of recycling*
• Innovative community-based tools introduced by the World Bank [79]	• *Over a 70% agrees that RSM will benefit the region where it will be applied*
• Economic benefits may be a significant factor that affects recycling behavior [80][81] • Subsidies in the recycling sector are a strategy that aims to strengthen local economies and change the direction to a higher recycling ratio [81]	• *A 70% of the participants declared that RSM is a smart service because you can earn money from garbage*
• Recycling sector could become a significant factor for a region if adopt simple procedures and find minimum obstacles from legislation and paperwork	• *More than 60% believe that RSM will face legislation issues and it would be affected by the negative attitude from local authorities*
• Developing new comparative advantages in the period of crisis with the use of clean technology may lead to sustainable growth	• *Over 60% of the respondents see this service as a game*

4.4 Conceptual Framework - Significance and Transferability of the findings

Results from the statistical processes of pilot and full questionnaire, were evaluated and used to construct the conceptual framework of this service. The specific information was transferred in a model of service that is expected to operate effectively in order to support the primary aim of this study.

More specific this is a step-by-step analysis of how the service could work, if it would be implemented in a region.

4.4.1 Operation of the service

- People consume products;
- These products could be recycled (aluminum, glass, paper and plastic);
- These recyclables will be collected in quantities from certain collection points;
- Consumers in return will get a receipt, as a proof for what they have recycled each time; this will be received through their mobile phones; registration is necessary;
- 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);
- Every transaction will be available on-line in order to secure clarity;
- 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.);

While the process described above covers the inter-companies network, on the other side consumers who keep a receipt of the recyclables that have recycled, and they are registered to the company's central system (information database) 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 the number of his/her shares and their current value;
- He/She can keep the shares as an investment and wait, expecting their value to increase, or he/she 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 under the form a coupon;

- 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 is given a diagrammatic illustration of the service in two figures which intend to present a clear image of how the suggested service is expected to work.

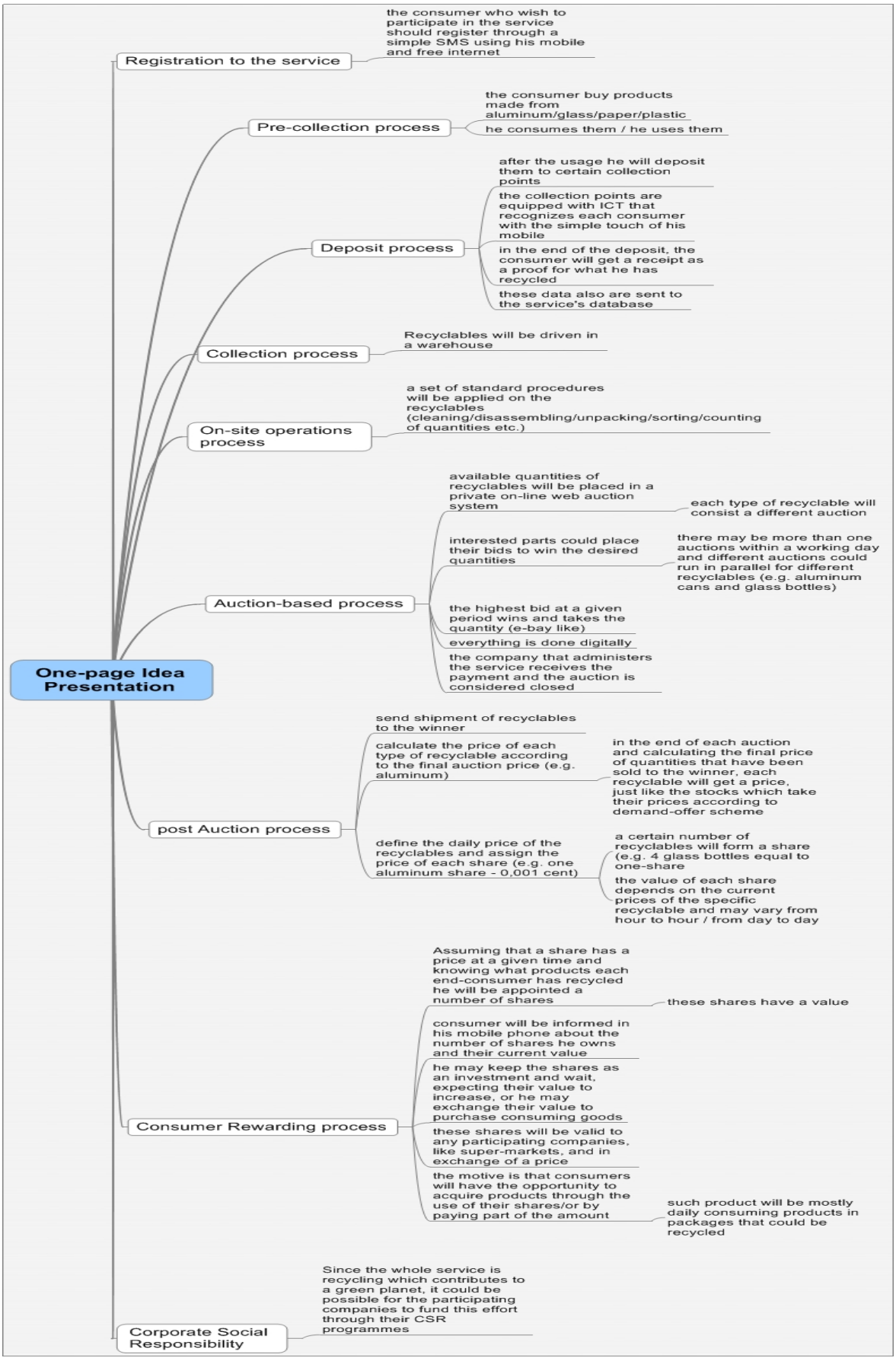

Figure 1. One-page idea presentation

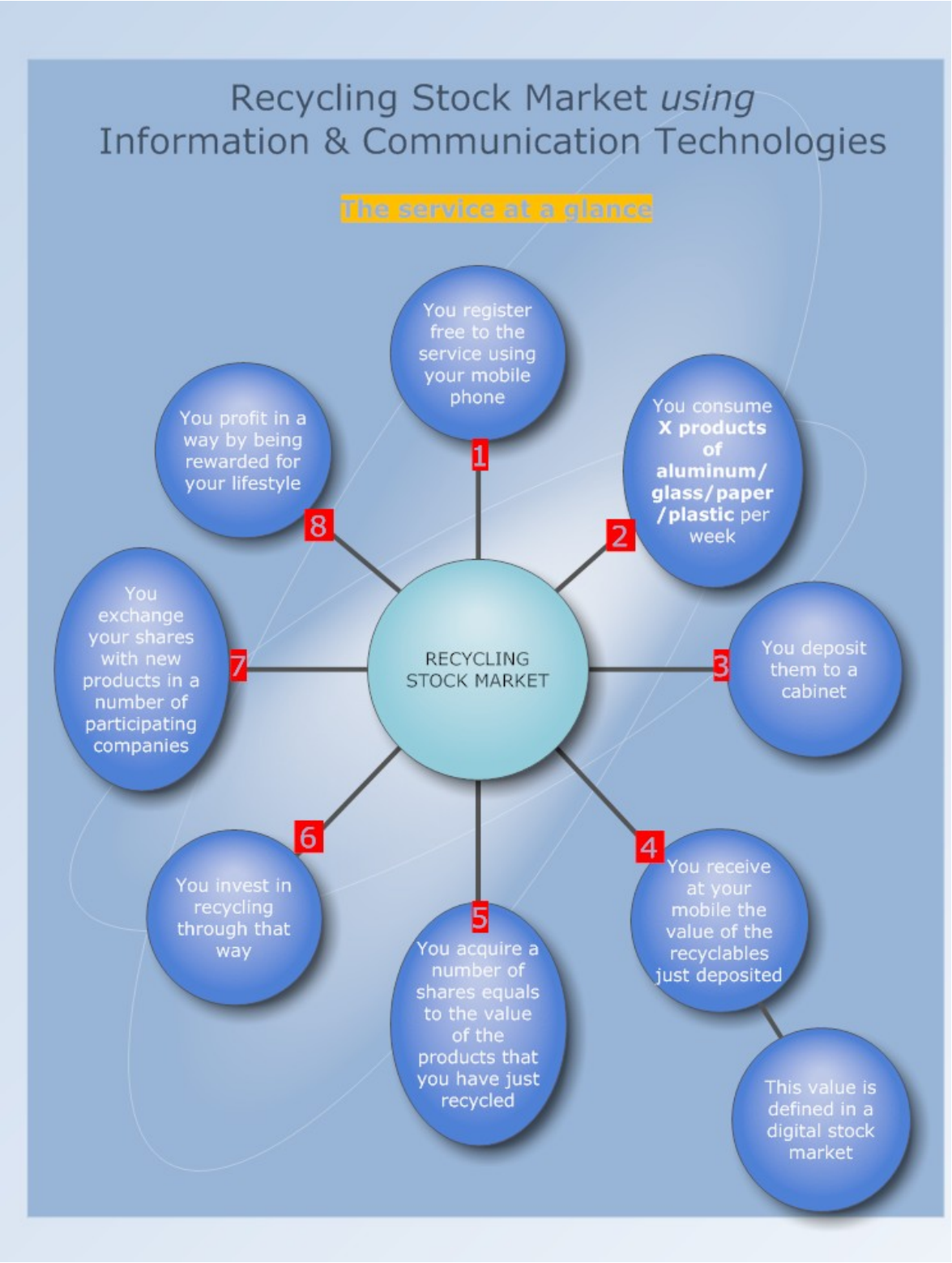

Figure 2. The service at a glance

CHAPTER Five - Conclusions

5.1 Overall conclusions

The idea found to be very interesting though might be difficult to be implemented. The survey which took place in 80 participants from various fields showed that people are willing to participate and to embrace the new service. On the other hand, it is possible to face difficulties from other players of the same market as well as current industry. Recycling industry, their affiliate companies and local authorities that exploit recyclables, are expected to raise issues against or at least not to support the new service.

Considering that most of the participants were consumers, this conclusion might be their perception since they are based in experiencing personal facts. Probably it would be a good opportunity to continue this survey specializing within local authorities and recycling industries in order to extract specific results.

People accepted the service as a smart way for recycling which could help them in recycling more, showing their care for the environment and saving valuable resources. At least, this is what the survey has concluded from the consumers' point of view.

5.2 Interpretation of the findings

The interpretation of findings has been done in the framework of new product development. Not all parts of NPD covered but it was tried to identify and translate the results in terms of giving answers to crucial parameters related to how the idea is valued and accepted by the community.

Moreover it is intended to create an adequate conclusive section which could be used in the future as the basis for a business plan of the specific idea.

Through findings, it was tried to adapt Porter's five sources in the proposed service, in an effort to focus in their identification and analysis.

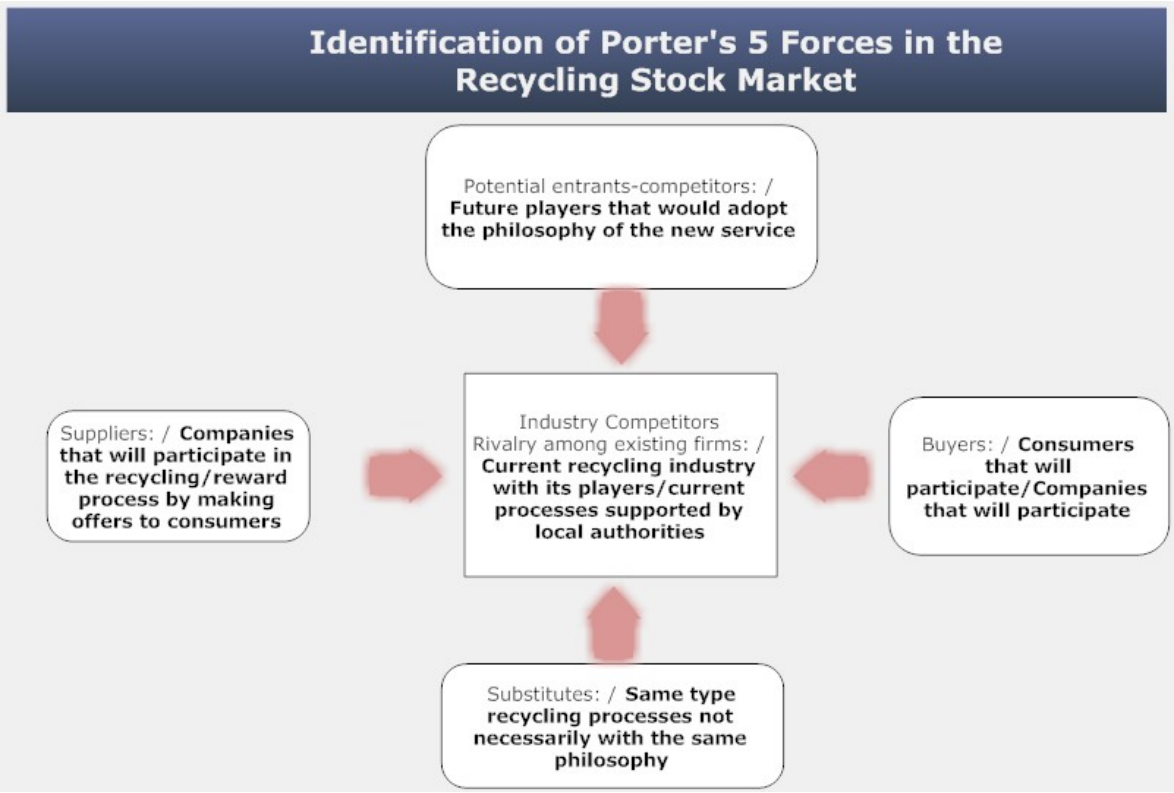

Figure 3. Identification of Porter's 5 Forces in the Recycling Stock Market

Recycling industry remains in the center of the competition as the main force with local authorities and every other player in the same field. The industry attractiveness which is presented in the next figure is based in the negative results taken from the survey in terms of this competition.

It is identified that the power of participating companies, the power of existing recycling industry and any other company/organization involved create the threat matrix on the new service. This analysis though, raised the issue of the power of participating companies, which has not been identified earlier. Therefore, except consumers, it seems that there is another group of professionals that could possibly be approached and investigated for their attitude and willingness to support Recycling Stock Market.

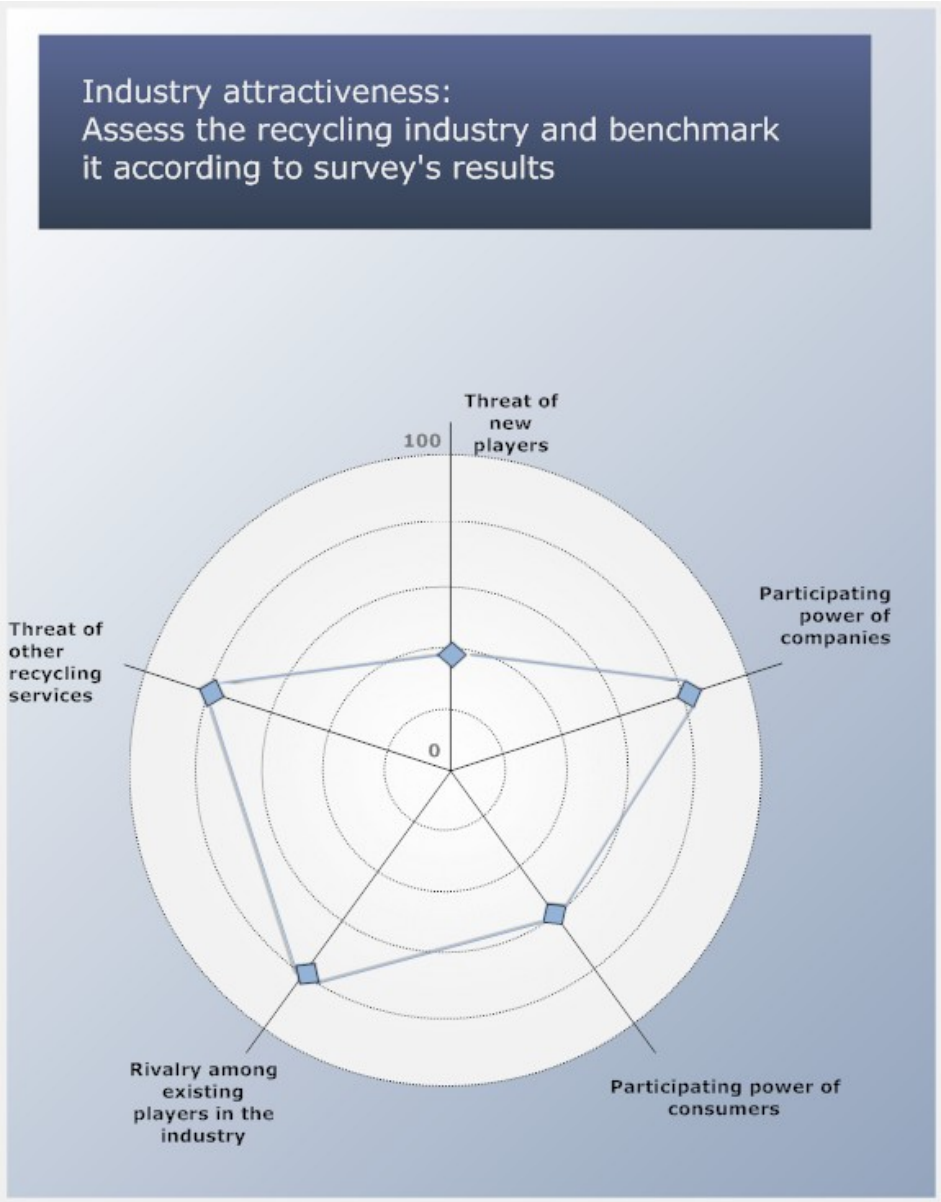

Figure 4. Industry attractiveness – Assess the recycling industry and benchmark it according to survey's results

Finally, in the next figure it is given a SWOT analysis of the new service. The aim was to adapt the results in a scheme where to better register and identify the strengths, the weaknesses, the opportunities and the threats.

Figure 5. Recycling Stock Market SWOT analysis

5.3 Aims and Objectives – Research questions and the extent to which these have been answered

The three parts of research questions have been answered clearly. The service was evaluated positively as an interesting one. Regarding its sustainability, it was identified that there will be some issues of concern, such as difficulty in its application as well as possible problems with legislation and local authorities. In terms of obstacles, there were identified as possible enemies the recycling industry and other participants in the market that will be threatened by the introduction of this service.

The aim of investigating the possibility to create a change-effect in a region, about recycling, seems that it could be possible from the consumers' side. It would be tough though to contradict with the current situation. Probably it would be challenging to further investigate the idea of incorporating RSM in the existed recycling industry rather than opposing to it as a different new service.

5.4 Recommendations for further research

It is recommended to extend the survey to more participants from recycling industry and local authorities. Current thesis has dedicated its resources mostly to consumers. It would be valuable to continue and investigate any other possibilities that could help the idea to be implemented easily.

It would be an alternative to examine, with the help of industry experts, the scenario of merging the idea's characteristics to other existed services. In this effort, it could be an asset to include the participating companies, since it has been proved that their power might be significant in terms of accepting and supporting the service through their consumers.

5.5 Limitations of the study

The number of questionnaires collected was within the initial target of 50-100. Although that met the target, finally it was considered an issue. The introduction of a new service requests much more period of surveying therefore time was a restriction in this research.

REFERENCES

[1] 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".***

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

[20] 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.

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

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

[23] 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.

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

[25] Official web site of the European Commission, ***"Environment: Waste",*** http://ec.europa.eu/environment/waste/index.htm

[26] Official web site of the US Environmental Protection Agency, ***"Preserving recources, preventing waste"***, http://www.epa.gov/epawaste/partnerships/wastewise/index.htm

[27][28][29] Penn Aaron, ***"There's substance to Recycling",*** Journal of Brand Packaging, Ascend Media, pp. 16-17.

[30][31][32][33][34][35] Official web site of the European Commission, ***"Environment: Waste",*** http://ec.europa.eu/environment/waste/index.htm

[36][37] 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.

[38][39] Soros George, ***"The Financial Crisis of 2008 and what it means",*** First edition, 2008, Livanis Publications *(original book in Greek),* p. 10.

[40] 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.

[41][42][43] Robinson Dave and Garratt Chris, ***"Introducing Ethics",*** Icon Books, UK, 1999, pp. 31-35.

[44] 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).

[45][46][47] Robinson Dave and Garratt Chris, ***"Introducing Ethics",*** Icon Books, UK, 1999, pp. 31-35.

[48] Charles Arthur, ***"What is the 1% rule",*** The Guardian, 2006, http://www.guardian.co.uk/technology/2006/jul/20/guardianweeklytechnologysection2

[49][50] Mark J. Penn and E. Kinnney Zalesne, ***"Microtrends: The Small Forces Behind Tomorrow's Big Changes",*** Twelve Publications, June 2009, pp. 1-5.

[51][52] Kinney Zalesne, ***"Notes from the National Conference"***, TCG Opening Plenary Session, http://www.tcg.org/events/conference/2009/index.cfm

[53] Official web site of the European Commission, ***"Environment: Waste",*** http://ec.europa.eu/environment/waste/index.htm

[54][55][56] Blumberg F. Donald, ***"Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes",*** CRC Press, USA, 2005, pp. 5-6.

[57][58] European Commission, Committee of the Regions, InfoRegio, http://ec.europa.eu/regional_policy/conferences/od2008/docu_t2.cfm?nmenu=3&sub=2&smenu=271

[59][60] Kenney Brad, ***"Green Manufacturing: The Zero How to Green",*** Journal of Industry Week, Penton Publishing, July 2008, pp. 36-43.

[61] 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.

[62] 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.

[63][64][65] 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.

[66][67][68] Roseland Mark, ***"Toward Sustainable Communities: Resources for Citizens and their Governments",*** New Society Publishers, Vancouver Canada, 2005.

[69][70] Blumberg F. Donald, ***"Introduction to Management of Reverse Logistics and Closed Loop Supply Chain Processes",*** CRC Press, USA, 2005.

[71][72][73] OECD - Organization for Economic Co-operation and Development, ***"Improving Recycling Markets",*** OECD Publications, 2006.

[74] 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.

[75][76][77] Nofsinger R. John, ***"The Psychology of Investing",*** Second Edition, Prentice Hall, USA, 2005.

[78][79] 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.

[80][81] Morgan W. Fred and Hughes V. Margaret, ***"Understanding Recycling Behavior in Kentucky: Who recycles and why",*** JOM, August 2006, pp. 32-35.

[82][83] Tanigaki Kazunori, ***"Recycling and International Trade Theory",*** Review of Development Economics, Volume 11 (1), 2007, pp. 1-12.

[84][85] 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.

[86][87] Commission of the European Communities, ***"Cohesion Policy: Investing in the real economy",*** Communication from the Commission to the European Parliament, Community Publication, 2008.

[88] 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.

[89][90][91][92] Zawawi Dahlia, ***"Quantitative versus Qualitative methods in Social Sciences: Bridging the Gap",*** Journal of Integration & Dissemination, May 2008, pp. 3-4.

[93][94] Simsek Zeki and Veiga F. John, ***"The Electronic Survey Technique: An integration and assessment",*** Journal of Organizational Research Methods, Vol. 3, No. 1, January 2000, pp. 93-115.

[95] Couper P. Mick and Miller V. Peter, ***"Web Survey Methods: Introduction",*** Journal of Public Opinion Quarterly, Vol. 72, No. 5, 2008, pp. 831-835.

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.

- Bekkers V.J.J.M. et al, ***"Information and Communication Technology And Public Innovation: Assessing the ICT-driven Modernization of Public Administration (Innovation and the Public Sector)",*** IOS Press 2006.

- 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.

- 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.

- Fontanills George and Gentile Tom, ***"The Stock Market Course",*** John Wiley & Sons Publishing, USA-Canada 2001.

- Fusaro Peter and Yuen Marion, ***"Green Trading Markets: Developing the Second Wave",*** Elsevier Publishing, UK 2005.

- Fox Jezz, Murray Craig and Warm Anna, ***"Conducting research using web-based questionnaires: practical, methodological and ethical considerations",*** International Journal of Social Research Methodology, Vol. 6, No. 2, 2003, pp. 167-180.

- Galesic Mirta and Bosnjak Michael, ***"Effects of questionnaire length on participation and indicators of response quality in a web survey",*** Journal of Public Opinion Quarterly, Vol. 73, No. 2, Summer 2009, pp. 349-360.

- Gomez Ana Maria Davila and Crowther David, ***"Ethics, Psyche and Social Responsibility",*** Ashgate Publishing 2007.

- 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.

- Hancock John, ***"Investing in Corporate Social Responsibility: A Guide to Best Practice, Business Planning & the UK's Leading Companies",*** Kogan Page Publishing, USA-UK 2005.

- Harden Leland and Heyman Bob, ***"The Auction-App: How companies tap the power of on line auctions to maximize revenue growth",*** McGraw Hill Publications, 2002.

- 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.

- Kotler Philip and Lee Nancy, ***"Corporate Social Responsibility: Doing the Most Good for your Company and your Cause",*** John Wiley & Sons publishing, USA-Canada 2005.

- 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.

- 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.

- Huub Meijers, Bernhard Dachs and Paul J.J. Welfens, ***"Internationalisation of European ICT Activities: Dynamics of Information and Communications Technology",*** Springer Publications, Berlin 2008.

- Manfreda Lozar Katja, Bosnjak Michael et al, ***"Web surveys versus other survey modes",*** International Journal of Market Research, Vol. 50 Issue 1, 2008, pp. 79-104.

- Mezgar Istvan, ***"Integration of ICT in Smart Organizations",*** Idea Group Publishing, UK-USA, 2006.

- Milgrom Paul, ***"Putting Auction Theory to Work",*** Cambridge University Press, UK, 2004.

- 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.

- 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.

- Peytchev Andy, Couper P. Mick et al, ***"Web Survey Design: Paging versus Scrolling",*** Journal of Public Opinion Quarterly, Vol. 70, No. 4, Winter 2006, pp. 596-607.

- 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.

- Sale E. Joanna, Lohfeld H. Lynne and Brazil Kevin, ***"Revisiting the Quantitative-Qualitative Debate: Implications for Mixed-Methods Research",*** Journal of Quality and Quantity, Vol. 36, 2002, pp. 43-53.

- 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.

- WebSM site: http://www.websm.org (a website dedicated to the methodology of web surveys).

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).*

- Infocom World, 11th International Conference in Telecommunications, found at: http://www.info-com.gr/?action=article&id=196
  (Web site in Greek and English)

- 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

Appendix A1

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.

Appendix A2

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.

Appendix A3

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.

Appendix A4

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.

Appendix A5

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.

Appendix A6

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

Appendix A7

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.

Appendix A8

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.

Appendix A9

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.

Appendix A10

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.

Appendix A11

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.

Appendix A12

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"

Appendix A13

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.

Appendix A14

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.

Appendix A15

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.

Appendix B: Description of the service / Explanatory web page

www.ergen.gr — Recycling Stock Market The idea–The Research

Home | My CV | Blogs | Links | Contact me

What is behind this research ?

recycle — The possibilities are endless.

This research intends to investigate whether the introduction of the specific new 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 achieve a pervasive impact at 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.

What is the 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.

Who will participate?

- 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.

"RECYCLING STOCK MARKET" How it works

You buy and consume a product which could be recycled in the end.

After the consumption you may leave it in a recycling cabinet.

You will register in this recycling service through your mobile phone.

We will get the information of what you have recycled each time.

The recyclables will be driven in a recycling centre.

They will be placed in an on-line auction system.

The highest bid wins.

You will get value shares.

You may exchange the shares in super-markets and other stores participating in the service.

The more you recycle the more shares you get the more products you may acquire.

In case you 'd like to see an additional explanatory booklet please click on the link below:

RECYCLING STOCK MARKET brief brochure Download

Recycling Stock Market at a glance

PLEASE JOIN THE WEB SURVEY here

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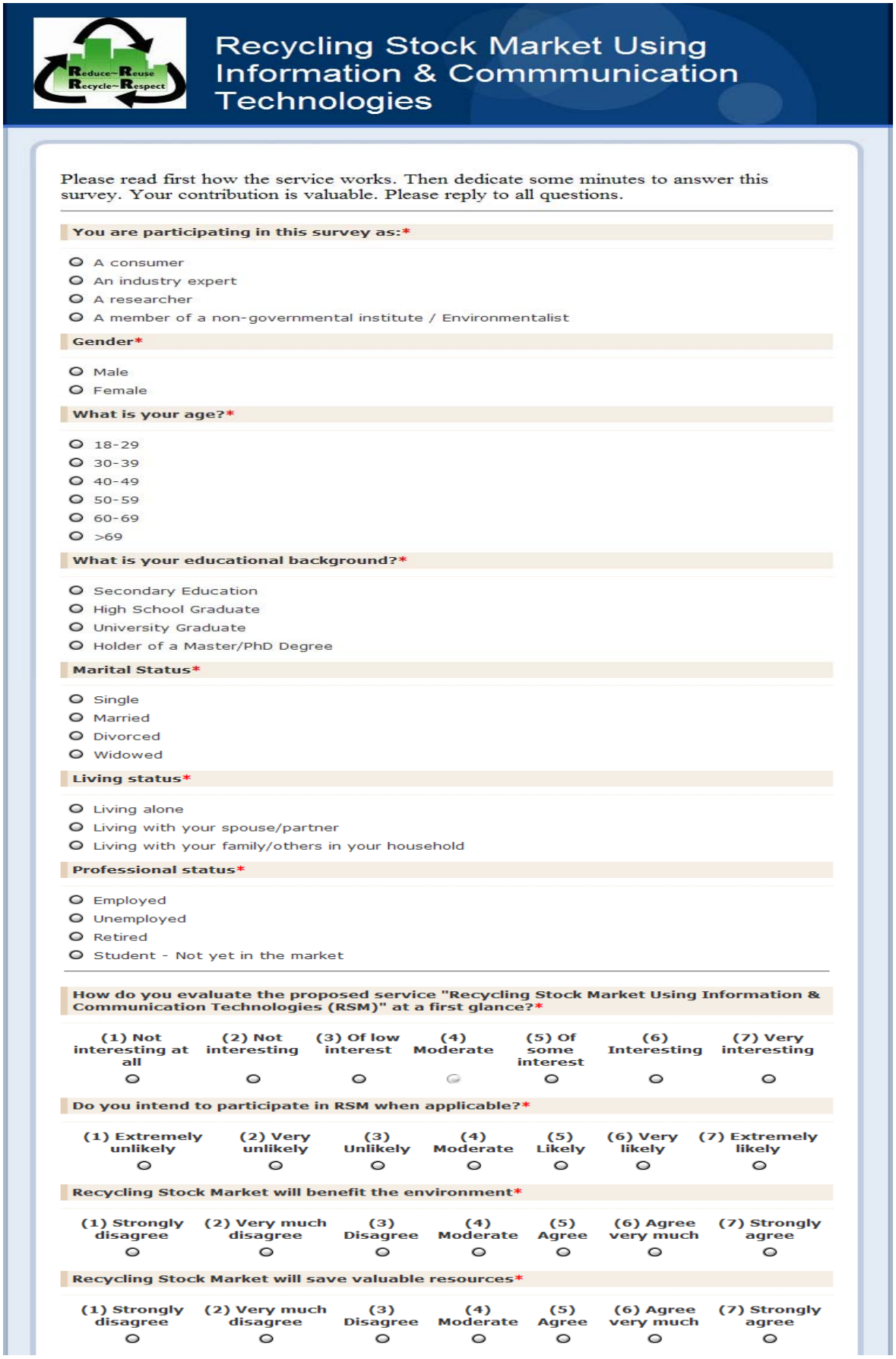
Appendix C: The PILOT-FULL Questionnaire / On-line version



Recycling Stock Market Using Information & Commmunication Technologies

Please read first how the service works. Then dedicate some minutes to answer this survey. Your contribution is valuable. Please reply to all questions.

You are participating in this survey as:*

- A consumer
- An industry expert
- A researcher
- A member of a non-governmental institute / Environmentalist

Gender*

- Male
- Female

What is your age?*

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

What is your educational background?*

- Secondary Education
- High School Graduate
- University Graduate
- Holder of a Master/PhD Degree

Marital Status*

- Single
- Married
- Divorced
- Widowed

Living status*

- Living alone
- Living with your spouse/partner
- Living with your family/others in your household

Professional status*

- Employed
- Unemployed
- Retired
- Student - Not yet in the market

How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance?*

(1) Not interesting at all	(2) Not interesting	(3) Of low interest	(4) Moderate	(5) Of some interest	(6) Interesting	(7) Very interesting
○	○	○	○	○	○	○

Do you intend to participate in RSM when applicable?*

(1) Extremely unlikely	(2) Very unlikely	(3) Unlikely	(4) Moderate	(5) Likely	(6) Very likely	(7) Extremely likely
○	○	○	○	○	○	○

Recycling Stock Market will benefit the environment*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

Recycling Stock Market will save valuable resources*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

It will give incentives to consumers for recycling more and more*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

It may change current recycling processes followed*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

It will help people to change attitude*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

RSM will affect the living standards of participants*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

RSM will benefit the region that will be applied*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling*

(1) Strongly disagree	(2) Very much disagree	(3) Disagree	(4) Moderate	(5) Agree	(6) Agree very much	(7) Strongly agree
○	○	○	○	○	○	○

The implementation of RSM is expected to create growth in the region that will be applied*

(1) Impossible	(2) Almost impossible	(3) Rather impossible	(4) Moderate	(5) Almost possible	(6) Possible	(7) Highly possible
○	○	○	○	○	○	○

The implementation of RSM will bring income both to consumers and companies*

(1) Impossible	(2) Almost impossible	(3) Rather impossible	(4) Moderate	(5) Almost possible	(6) Possible	(7) Highly possible
○	○	○	○	○	○	○

The service may penetrate in households*

(1) Low pervasion	(2) Almost low pervasion	(3) Rather low pervasion	(4) Moderate	(5) Adequate pervasion	(6) Rather high pervasion	(7) High pervasion
○	○	○	○	○	○	○

Companies will accept to participate in order to contribute in the philosophy of recycling*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

Companies will see this service as an opportunity for expansion*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

Environmentalists will embrace the idea*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

Local authorities will contribute to the implementation of it*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

Do you think that it could be easy to implement the idea of RSM?*

(1) Definitely not	(2) Almost not easy	(3) Probably not easy	(4) Moderate	(5) Probably yes	(6) Almost easy	(7) Definitely yes
○	○	○	○	○	○	○

Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?*

(1) Definitely not	(2) Almost not	(3) Probably not	(4) Moderate	(5) Probably yes	(6) Almost yes	(7) Definitely yes
○	○	○	○	○	○	○

A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

A possible barrier in the implementation of RSM could be the raise of legislation issues*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

A possible barrier in the implementation of RSM could be the avoidance of companies to participate*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

A possible barrier in the implementation of RSM could be the avoidance of individuals to participate*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service*

(1) Low possibility	(2) With little possibility	(3) Not so possible	(4) Moderate	(5) Possible	(6) Very possible	(7) High possibility
○	○	○	○	○	○	○

END OF QUESTIONNAIRE

Thank you very much for your time. It is much appreciated.

The questionnaire will be sent anonymously to (ergen@ergen.gr) for process.

Please press the SUBMIT button and wait for a while until the final confirmation appeared.

Submit Reset

Appendix D: Description of the service / Hard copy explanatory leaflet

What is behind this service?
There is a company which will administer four types' recyclable products (aluminum, glass, paper and plastic) incorporating the philosophy of auctioning and using the know-how of stock markets and investing. The aim is to create a micro-trend and make people recycling. To achieve this, information and communication technologies will be exploited. It is expected this service to create value in the region, contribute in achieving growth through the exploit of current resources and guarantee sustainability. Moreover, we anticipate it to operate as a motive among individuals changing their attitudes over recycling as a daily habit.
Why should I participate?
There is a sense of a game!
You ebay your garbage!
You help your region to differentiate!
You are rewarded for your habits!
The service at a glance for the consumer:
1. You buy and consume a product which could be recycled in the end.
2. After the consumption you may leave it in a recycling cabinet.
3. You will register in this recycling service through your mobile phone.
4. We will get the information of what you have recycled each time.
5. The recyclables will be driven in a recycling centre.
6. They will be placed in an on-line auction system.
7. The highest bid wins.
8. You will get value shares.
9. You may exchange the shares in super-markets and other stores participating in the service.
10. The more you recycle the more shares you get the more products you may acquire.
Become an Effective Seller
LONDON
NEW YORK

Appendix E: The PILOT Questionnaire / Hard copy version

The University Of Sheffield.

CITY COLLEGE
International Faculty of the University of Sheffield

MSc in Technology, Innovation & Entrepreneurship

Recycling Stock Market
using Information & Communication Technologies

A brief description of the service and the Questionnaire

(additional explanatory leaflet included)

A questionnaire prepared as a part of the Master thesis by Evangelos ERGEN

Thesis Supervisor: Dr P. Ketikidis

Thessaloniki - September 2009

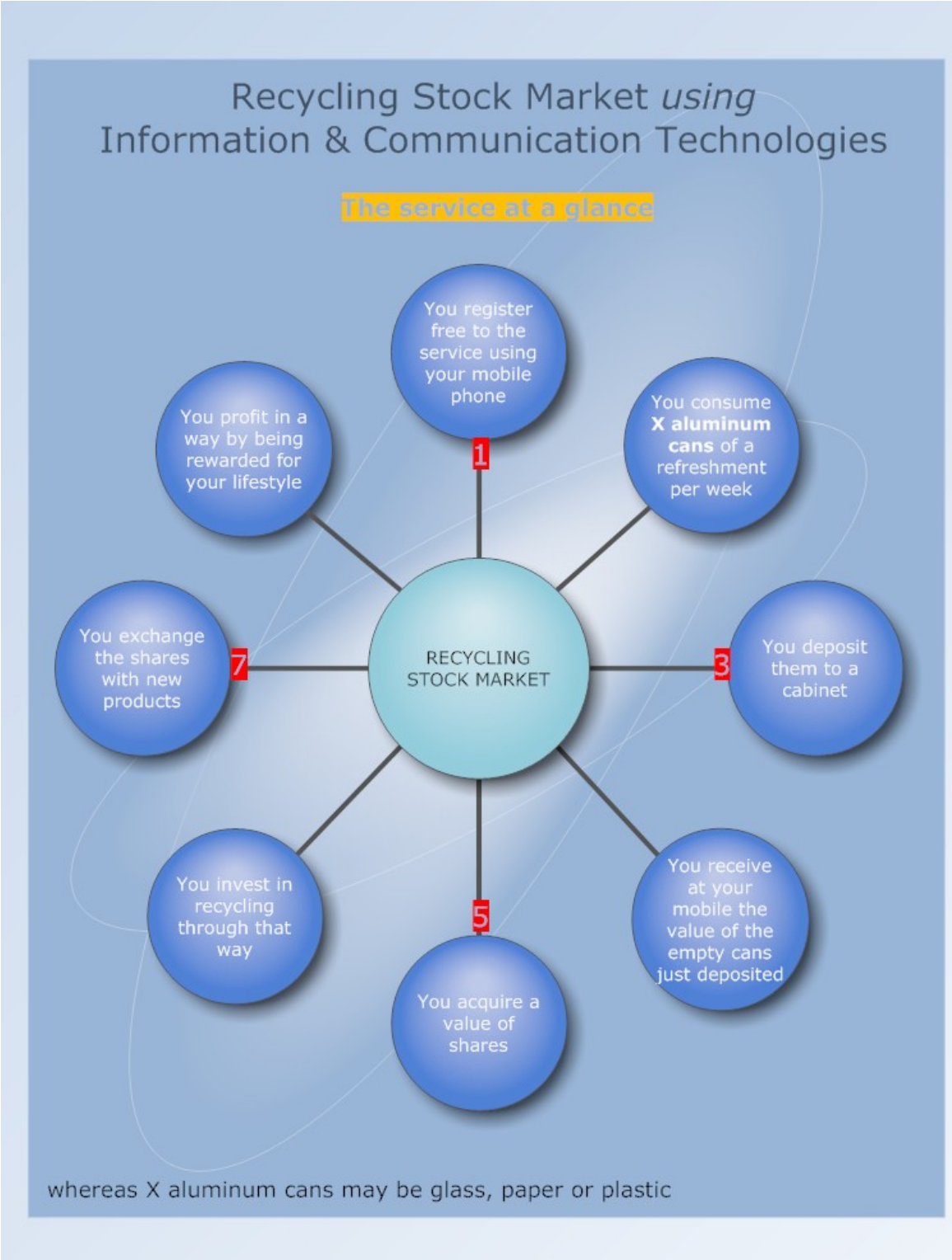
The service and how it works:

We intend to create a company which will administer four types' recyclable products (aluminum, glass, paper and plastic) incorporating the philosophy of auctioning and using the know-how of stock markets and investing. The aim is to create a micro-trend and make people recycling. To achieve this, information and communication technologies will be exploited assisting in this effort. It is expected this service to create value in the region, contribute in achieving growth through the exploit of current resources and guarantee sustainability. Moreover, it is expected to operate as a motive among individuals changing their attitudes over recycling as a daily habit.

It is worthy to mention that the wealth produced, will be returned in the individuals and companies who will participate in the service through a procedure that follows the stock market's operation.

How the service will operate: *(It is in our intention not to give full details of the operational scheme since this would be too complex. The purpose is for the reader to easily understand the general framework of this service in order to be able to reply in the questionnaire).*

- People buy products to consume which could be recycled (e.g. aluminum);
- Consumers will leave them in collection points where will be collected;
- The collection points will be electronically connected to a main database so they will recognize each consumer (through the use of mobile phone);
- Consumers had to register first;
- Recyclables will be driven in a warehouse where will be processed;
- Quantities of the available recyclables will be placed in a private on-line web auction system (like eBay);
- Interested parts may place their bids; such parts could be other recycling companies, packaging companies or the original companies (e.g. Coca-Cola cans);
- The highest price at a given time period wins; Company receives the payment; Shipment of the winning recyclables will be sent to the winner;
- Moreover, it is possible to negotiate directly with specific big companies (industries) for the return of their used products (reverse logistics);
- In the end of auction each recyclable will have a price, in the same way that stocks take prices or change prices according to "demand and offer" scheme;
- This price is the share price;
- Consumer will be informed in his/her mobile phone about the number of his/her shares and their value; this value may vary according to current prices;
- The shares could be used in exchange of their value to purchase consuming goods; these shares may be valid in super markets or other participating companies;
- 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 advertise offers on their products;


Recycling Stock Market *using*
Information & Communication Technologies
The service at a glance
You register free to the service using your mobile phone
1
You consume **X aluminum cans** of a refreshment per week
3
You deposit them to a cabinet
You receive at your mobile the value of the empty cans just deposited
5
You acquire a value of shares
You invest in recycling through that way
7
You exchange the shares with new products
You profit in a way by being rewarded for your lifestyle
RECYCLING STOCK MARKET
whereas X aluminum cans may be glass, paper or plastic

The Questionnaire

Dear participant,

The following questionnaire was designed to assess and evaluate the idea of "Recycling Stock Market" in terms of its acceptance and applicability. You are asked to give your opinion having read first the concept of the service and how is intended to operate. Your contribution is valuable and your replies will be treated in strict confidence.

You are participating in this survey as: *(please tick one)*

	A consumer
	An industry expert or professional in the area of economy or technology
	A researcher / academic expert
	A member of a non-governmental institute/association related to the environment

Section 1: Personal questions

(Tick as appropriate)

1. Gender

Male		Female	

2. Age

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

3. Educational background

Secondary Education		High School Graduate		University Graduate		Holder of Master/PhD degree	

4. Marital status

Single		Married		Divorced		Widowed	

5. Living status

Living alone		Living with your spouse/partner		Living with your family/others in your household	

6. Professional status

Employed		Unemployed	

Section 2: Evaluation of the service

(Circle your choice, only one please; grading scale followed where 1 is the lowest and 7 the highest)

7. How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance?

1	2	3	4	5	6	7
Not interesting at all						Very interesting

8. Do you intend to participate in RSM when applicable?

1	2	3	4	5	6	7
Extremely unlikely						Extremely likely

9. Recycling Stock Market will benefit the environment.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

10. Recycling Stock Market will save valuable resources.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

11. It will give incentives to consumers for recycling more and more.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

12. It may change current recycling processes followed.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

13. It will help people to change attitude.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

14. RSM will affect the living standards of participants.

1	2	3	4	5	6	7
Low possibility						High possibility

15. RSM will benefit the region that will be applied.

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

16. The characteristic that makes "Recycling Stock Market" attractive is that:

a. Participants have benefits from recycling

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

b. Garbage has value because you can earn money

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

c. There is a sense of a game in this service which is interesting

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

d. This is a smart way to recycle

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

e. After all there is a reward for recycling

1	2	3	4	5	6	7
Strongly disagree						Strongly agree

Section 3: Sustainability of the idea

(Circle your choice, only one please; grading scale followed where 1 is the lowest and 7 the highest)

17. The implementation of RSM is expected to create growth in the region that will be applied.

1	2	3	4	5	6	7
Impossible						Highly possible

18. The implementation of RSM will bring income both to consumers and companies.

1	2	3	4	5	6	7
Impossible						Highly possible

19. The service will pervade in households.

1	2	3	4	5	6	7
Low pervasion						High pervasion

20. Companies will accept to participate in order to contribute in the philosophy of recycling.

1	2	3	4	5	6	7
Low possibility						High possibility

21. Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers.

1	2	3	4	5	6	7
Low possibility						High possibility

22. Companies will see this service as an opportunity for expansion.

1	2	3	4	5	6	7
Low possibility						High possibility

23. Environmentalists will embrace the idea.

1	2	3	4	5	6	7
Low possibility						High possibility

24. Local authorities will contribute to the implementation of it.

1	2	3	4	5	6	7
Low possibility						High possibility

Section 4: Potential Obstacles

(Circle your choice, only one please; grading scale followed where 1 is the lowest and 7 the highest)

25. Do you think that it could be easy to implement the idea of RSM?

1	2	3	4	5	6	7
Definitely not						Definitely yes

26. Will there be any barriers or obstacles in the implementation of it from other parties?

1	2	3	4	5	6	7
Definitely not						Definitely yes

27. Possible barriers in the implementation of RSM could be:

a. Conflict with the current situation of recycling industry and market

1	2	3	4	5	6	7
Low possibility						High possibility

b. Legislation issues

1	2	3	4	5	6	7
Low possibility						High possibility

c. Avery of the companies to participate

1	2	3	4	5	6	7
Low possibility						High possibility

d. Avery of individuals to participate

1	2	3	4	5	6	7
Low possibility						High possibility

e. The idea may be expensive to apply

1	2	3	4	5	6	7
Low possibility						High possibility

f. No obvious benefits

1	2	3	4	5	6	7
Low possibility						High possibility

END OF QUESTIONNAIRE

Thank you very much for your contribution

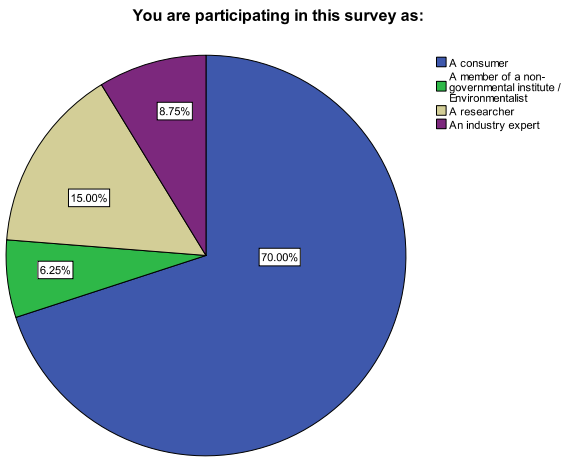
Appendix F

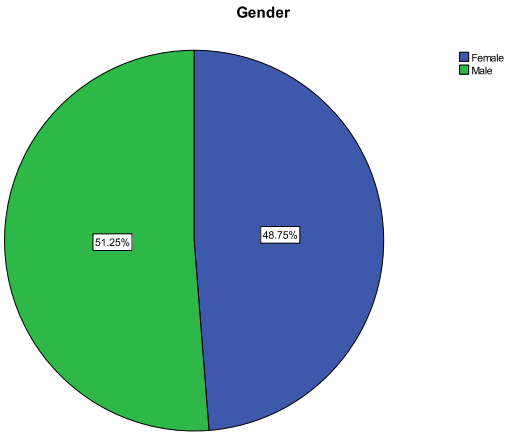
European Recycling Associations / Web sites and contact information

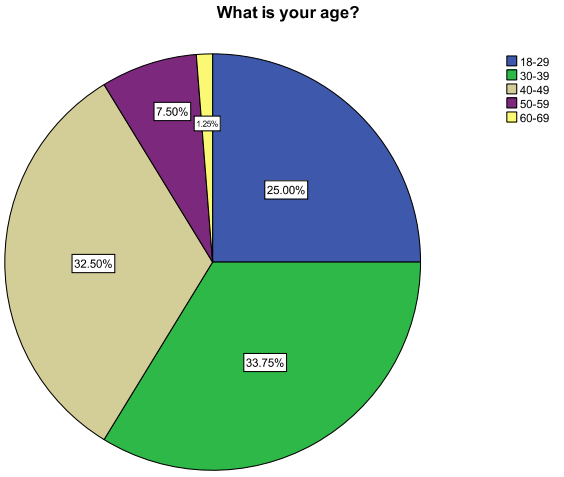
- EUROPEN - The European Organization for Packaging and the Environment, www.europen.be
- EuPF - European Plastic Films, www.europeanplasticfilms.eu
- EuPC - European Plastic Converters, www.plasticsconverters.eu
- ProEurope - Packaging Recovery Organisation Europe, www.proeurope.be
- Plastics Europe, www.plasticseurope.org
- European Association of Plastics Recycling and Recovery Organisations (EPRO), http://www.epro-plasticsrecycling.org
- Institute of Scrap Recycling /industries, http://www.isri.org
- Bureau of International Recycling, http://www.bir.org
- European Portable Battery Association, http://www.epbaeurope.net
- ABC (Alliance for plastic Beverage Containers sustainability)
- EPRO (European Association of Plastic Recycling & Recovery Organisations), www.epro-plasticsrecycling.org
- EuPR (European Plastics Recyclers), www.plasticsrecyclers.eu
- Petcore (PET containers recycling Europe), www.petcore.org
- Recycle.cc is McEntee Media Corporation's Web headquarters for market intelligence in the recycling and composting businesses, http://www.recycle.cc

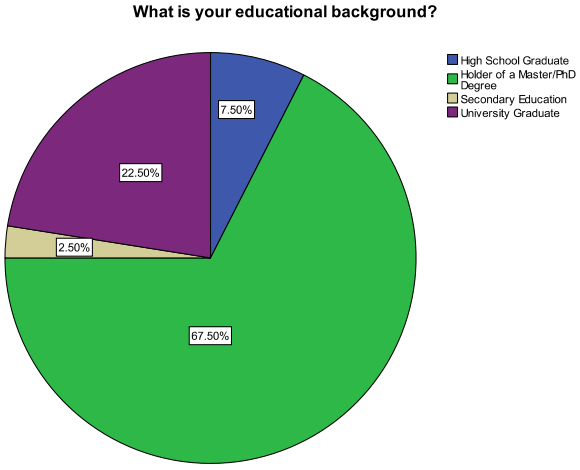
Appendix G

Personal data of respondents-Frequencies / Graphs

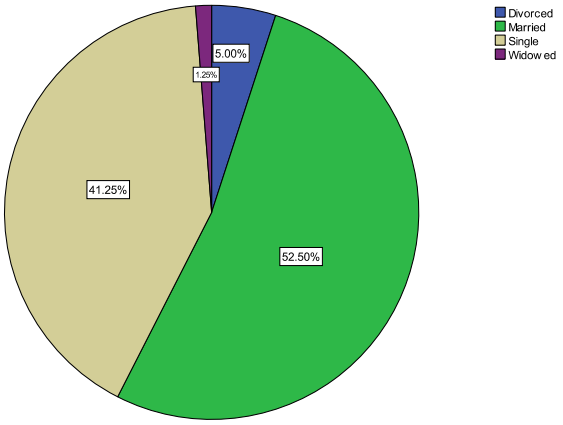




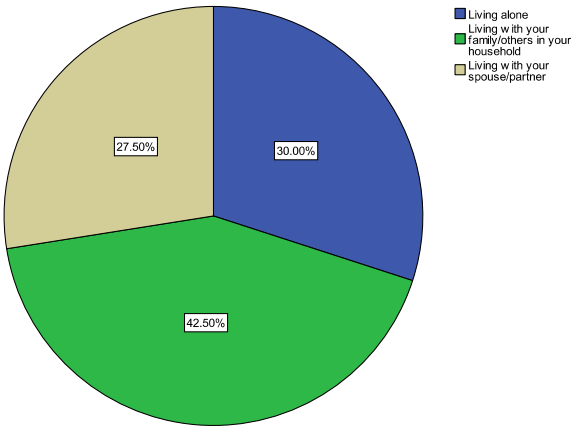




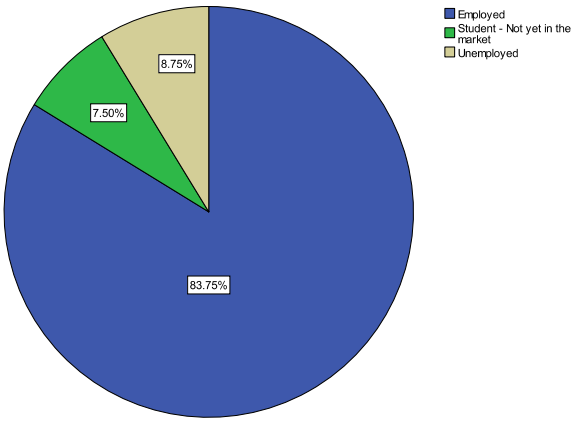
Marital Status



Living status



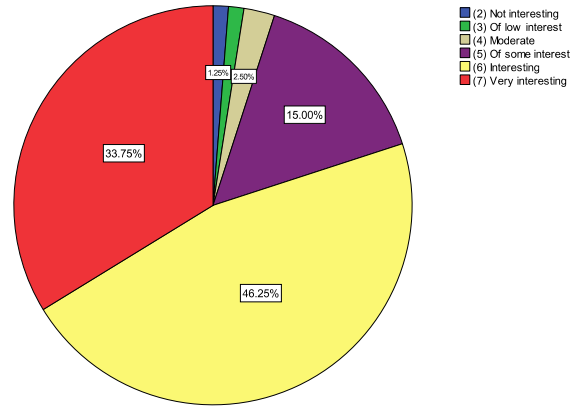
Professional status



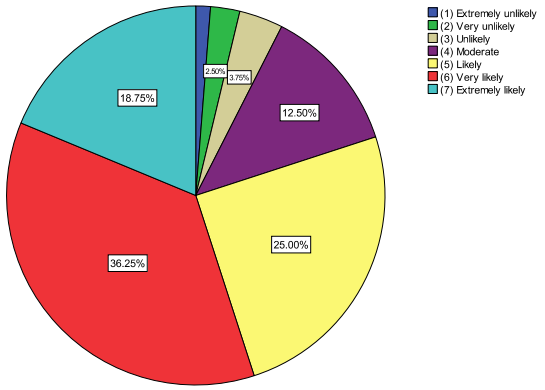
Appendix H

Evaluation of the service-Frequencies / Graphs

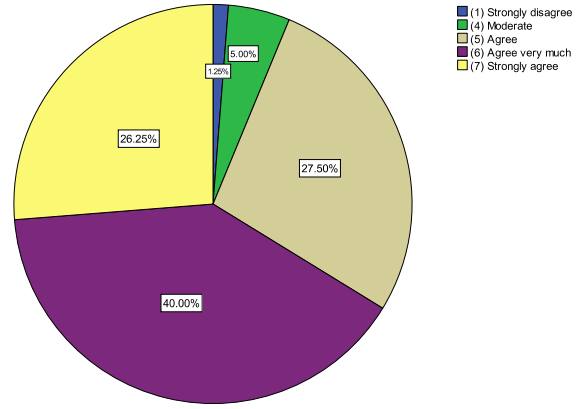
How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance?



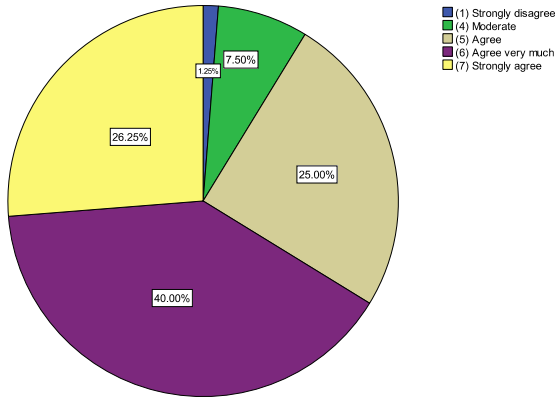
Do you intend to participate in RSM when applicable?



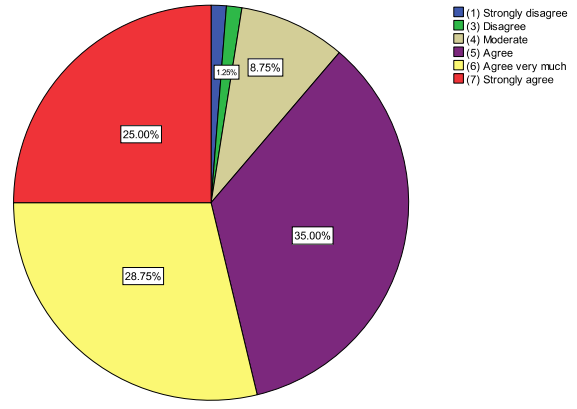
Recycling Stock Market will benefit the environment



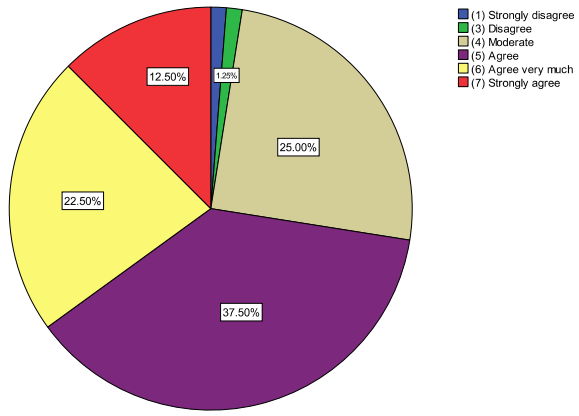
Recycling Stock Market will save valuable resources



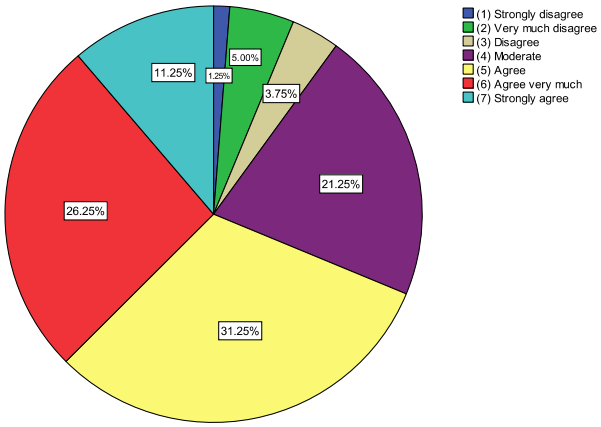
It will give incentives to consumers for recycling more and more



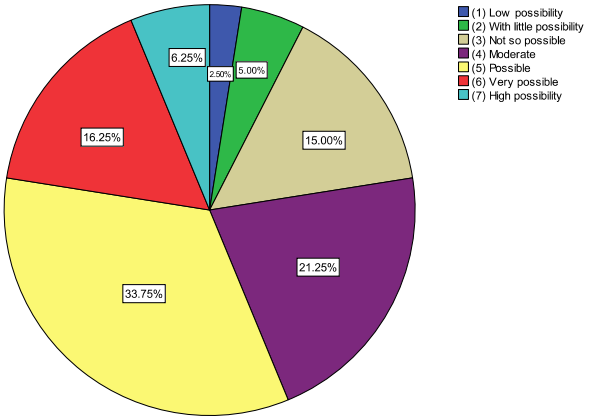
It may change current recycling processes followed



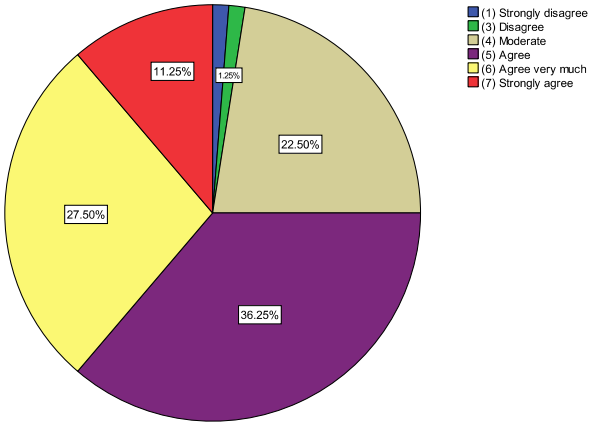
It will help people to change attitude



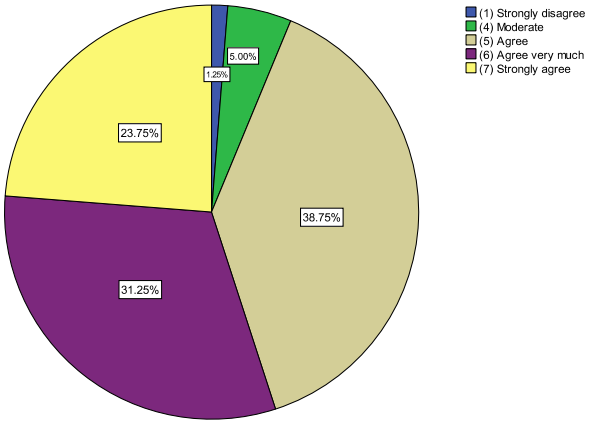
RSM will affect the living standards of participants



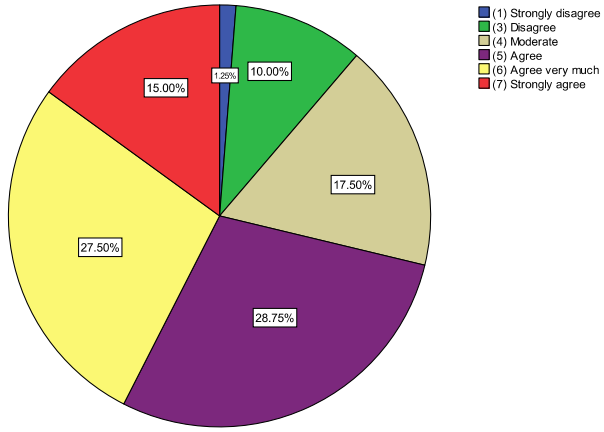
RSM will benefit the region that will be applied



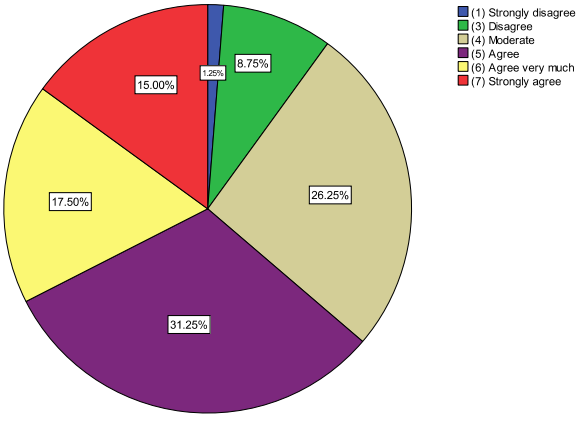
The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling



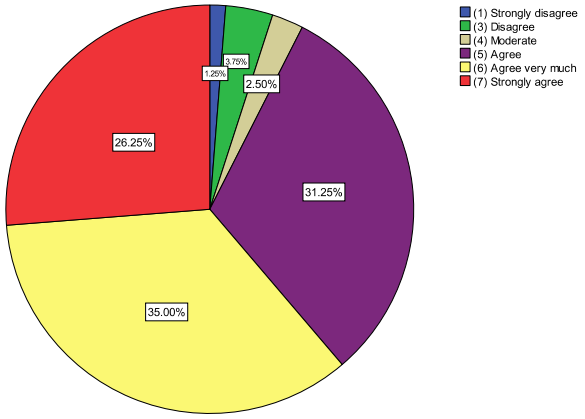
The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money



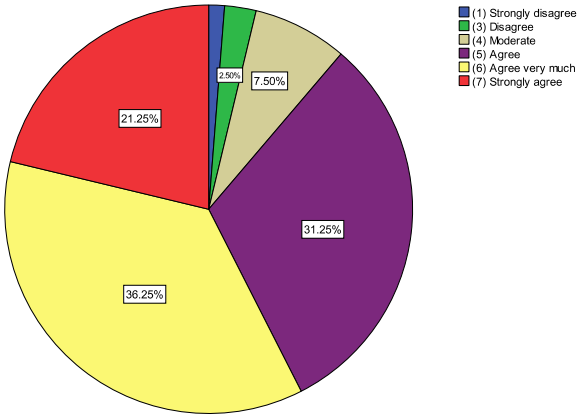
The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting



The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle



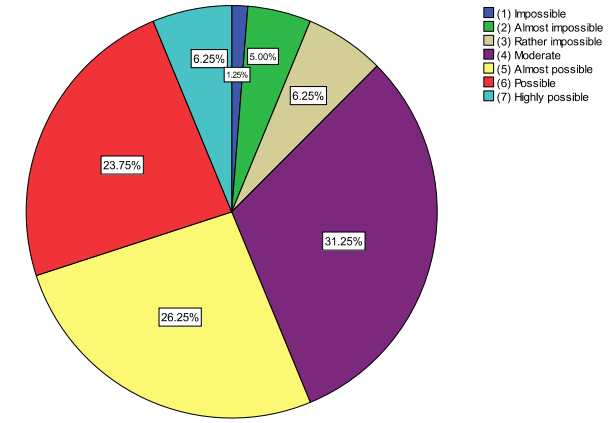
The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling



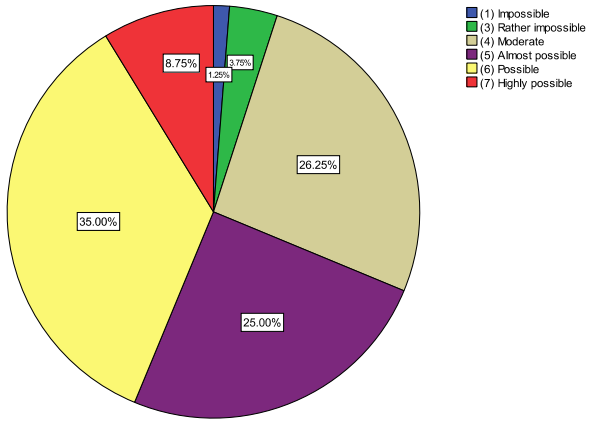
Appendix I

Sustainability of the idea-Frequencies / Graphs

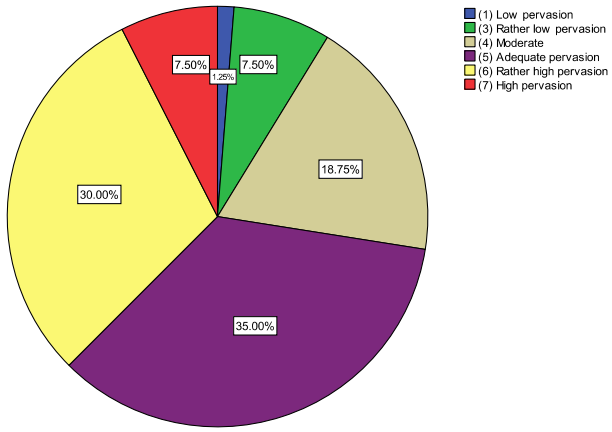
The implementation of RSM is expected to create growth in the region that will be applied



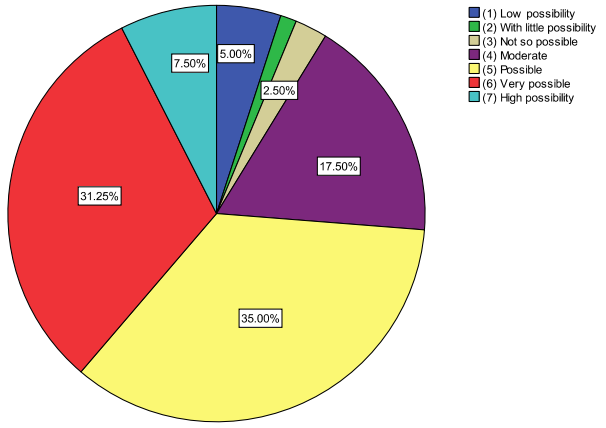
The implementation of RSM will bring income both to consumers and companies



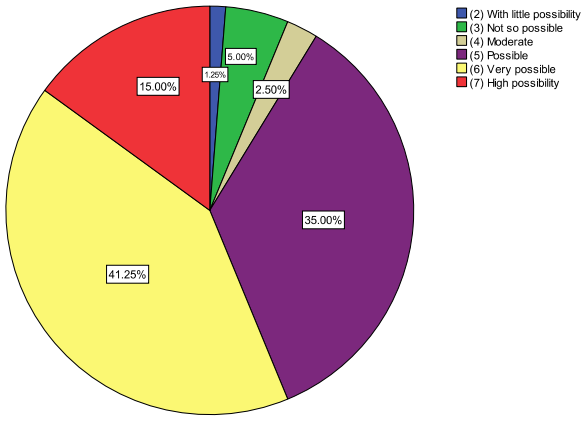
The service may penetrate in households



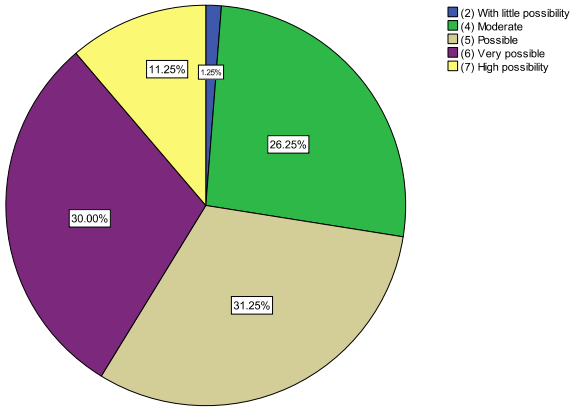
Companies will accept to participate in order to contribute in the philosophy of recycling



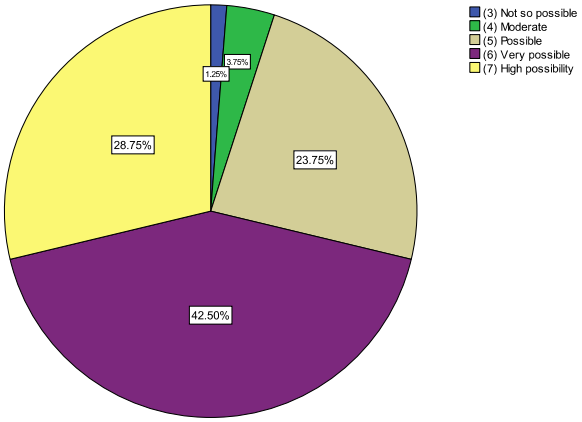
Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers



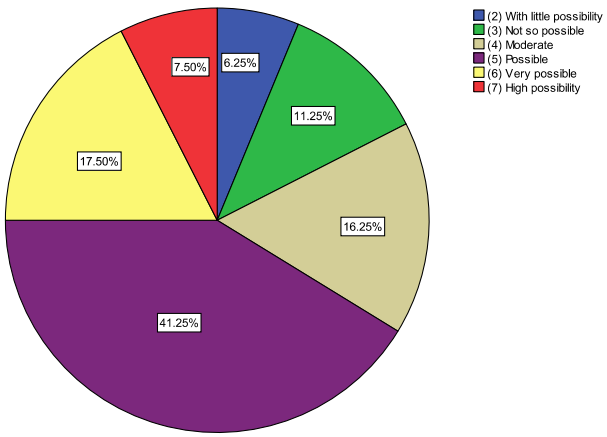
Companies will see this service as an opportunity for expansion



Environmentalists will embrace the idea



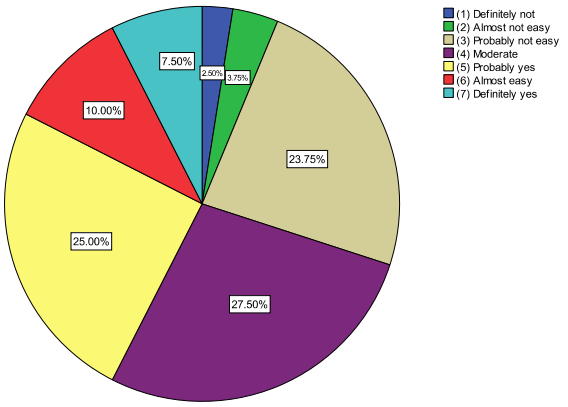
Local authorities will contribute to the implementation of it



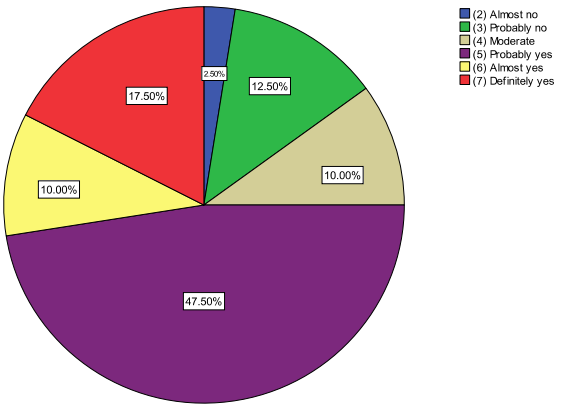
Appendix J

Potential obstacles-Frequencies / Graphs

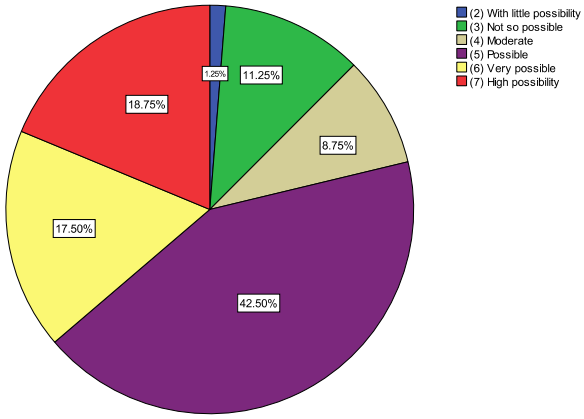
Do you think that it could be easy to implement the idea of RSM?



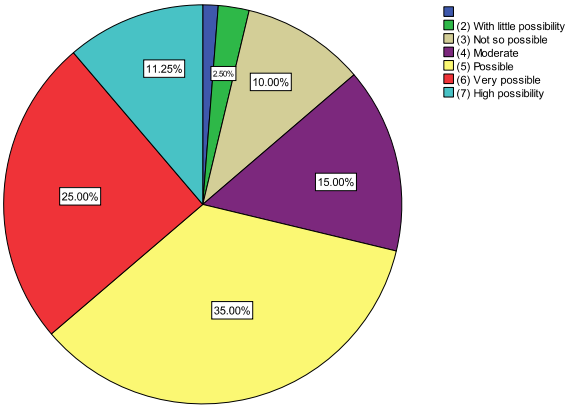
Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?



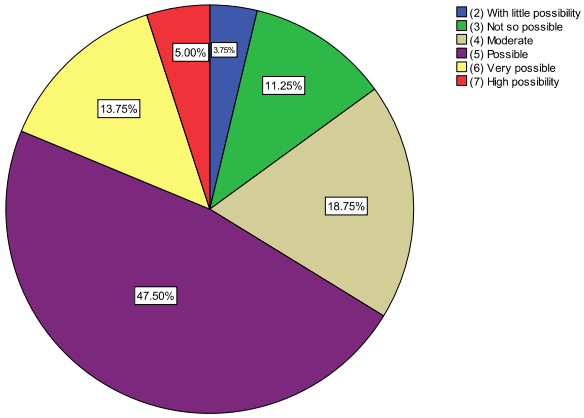
A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market



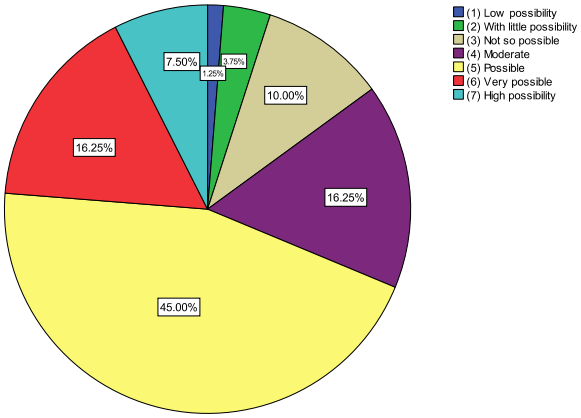
A possible barrier in the implementation of RSM could be the raise of legislation issues



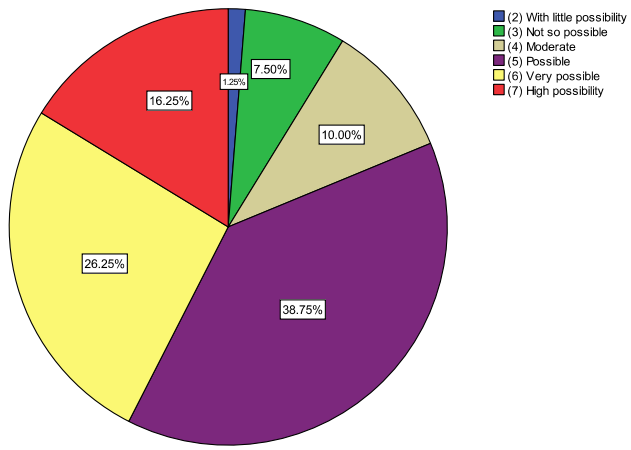
A possible barrier in the implementation of RSM could be the avoidance of companies to participate



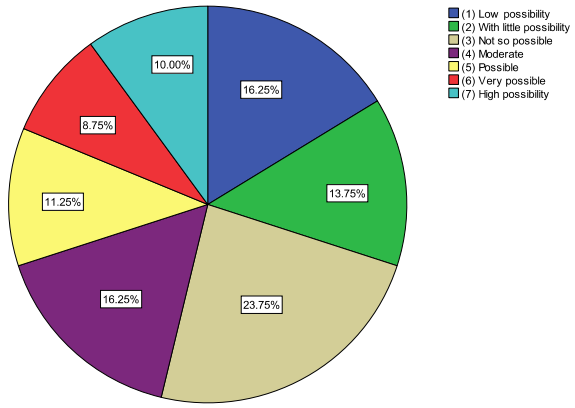
A possible barrier in the implementation of RSM could be the avoidance of individuals to participate



A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply



A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service



Appendix K

Crosstab analysis – Relation between Group of participants and Evaluation of the service

You are participating in this survey as: * How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance? Crosstabulation

Count

		How do you evaluate the proposed service "Recycling Stock Market Using Information and Communication Technologies (RSM)" at a first glance?						
		(2) Not interesting	(3) Of low interest	(4) Moderate	(5) Of some interest	(6) Interesting	(7) Very interesting	Total
You are participating in this survey as:	**A consumer**	0	1	1	4	25	25	56
	A member of a non-governmental institute / Environmentalist	1	0	0	2	2	0	5
	A researcher	0	0	0	5	5	2	12
	An industry expert	0	0	1	1	5	0	7
Total		1	1	2	12	37	27	80

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	38.080[a]	15	**.001**
Likelihood Ratio	29.295	15	.015
N of Valid Cases	80		

a. 20 cells (83.3%) have expected count less than 5. The minimum expected count is .06.

Appendix L

Analysis of Means (standard deviation / minimum-maximum values)

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
How do you evaluate the proposed service "Recycling Stock Market Using Information and Communication Technologies (RSM)" at a first glance?	80	2	7	6.05	**.953**
Do you intend to participate in RSM when applicable?	80	1	7	5.41	1.290
Recycling Stock Market will benefit the environment	80	1	7	5.83	1.016
Recycling Stock Market will save valuable resources	80	1	7	5.80	1.048
It will give incentives to consumers for recycling more and more	80	1	7	5.63	1.118
It may change current recycling processes followed	80	1	7	5.15	1.104
It will help people to change attitude	80	1	7	5.00	1.322
RSM will affect the living standards of participants	80	1	7	4.53	**1.368**
RSM will benefit the region that will be applied	80	1	7	5.20	1.084
The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling	80	1	7	5.69	1.026
The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money	80	1	7	5.15	1.284
The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting	80	1	7	4.99	1.268
The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle	80	1	7	5.73	1.125
The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling	80	1	7	5.61	1.108
The implementation of RSM is expected to create growth in the region that will be applied	80	1	7	4.72	1.283
The implementation of RSM will bring income both to consumers and companies	80	1	7	5.14	1.145
The service may penetrate in households	80	1	7	5.06	1.140
Companies will accept to participate in order to contribute in the philosophy of recycling	80	1	7	5.00	1.350
Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers	80	2	7	5.55	1.030
Companies will see this service as an opportunity for expansion	80	2	7	5.23	1.043
Environmentalists will embrace the idea	80	3	7	5.94	**.891**
Local authorities will contribute to the implementation of it	80	2	7	4.75	1.268
Do you think that it could be easy to implement the idea of RSM?	80	1	7	4.29	**1.371**
Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?	80	2	7	5.03	1.283
A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market	80	2	7	5.20	1.247
A possible barrier in the implementation of RSM could be the raise of legislation issues	80	2	7	5.06	1.226
A possible barrier in the implementation of RSM could be the avoidance of companies to participate	80	2	7	4.71	1.116
A possible barrier in the implementation of RSM could be the avoidance of individuals to participate	80	1	7	4.79	1.240
A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply	80	2	7	5.30	1.163
A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service	80	1	7	3.59	**1.867**

Appendix M

Comparison of Means – (5 questions)

Report

You are participating in this survey as:		How do you evaluate the proposed service "Recycling Stock Market Using Information and Communication Technologies (RSM)" at a first glance?	Do you intend to participate in RSM when applicable?	RSM will affect the living standards of participants	RSM will benefit the region that will be applied	The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle
A consumer	Mean	6.29	5.70	4.95	5.54	5.93
	N	56	56	56	56	56
	Std. Deviation	.825	1.174	1.197	.873	1.024
A member of a non-governmental institute / Environmentalist	Mean	4.80	4.60	3.20	4.00	4.60
	N	5	5	5	5	5
	Std. Deviation	1.643	1.517	.447	.000	.894
A researcher	Mean	5.75	4.83	3.50	4.42	5.67
	N	12	12	12	12	12
	Std. Deviation	.754	1.030	1.314	.669	.778
An industry expert	Mean	5.57	4.71	3.86	4.71	5.00
	N	7	7	7	7	7
	Std. Deviation	.787	1.799	1.574	1.976	1.826
Total	Mean	6.05	5.41	4.53	5.20	5.73
	N	80	80	80	80	80
	Std. Deviation	.953	1.290	1.368	1.084	1.125

Appendix N

ANOVA case – (5 questions)

ANOVA Table

			Sum of Squares	df	Mean Square	F	Sig.
How do you evaluate the proposed service "Recycling Stock Market Using Information and Communication Technologies (RSM)" at a first glance?	Between Groups	(Combined)	13.607	3	4.536	5.924	**.001**
	Within Groups		58.193	76	.766		
	Total		71.800	79			
Do you intend to participate in RSM when applicable?	Between Groups	(Combined)	15.253	3	5.084	3.327	**.024**
	Within Groups		116.135	76	1.528		
	Total		131.388	79			
RSM will affect the living standards of participants	Between Groups	(Combined)	34.454	3	11.485	7.690	**.000**
	Within Groups		113.496	76	1.493		
	Total		147.950	79			
RSM will benefit the region that will be applied	Between Groups	(Combined)	22.526	3	7.509	8.121	**.000**
	Within Groups		70.274	76	.925		
	Total		92.800	79			
The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle	Between Groups	(Combined)	12.369	3	4.123	3.578	**.018**
	Within Groups		87.581	76	1.152		
	Total		99.950	79			

Appendix O

ANOVA case – (full questionnaire)

ANOVA Table[a]

			Sum of Squares	df	Mean Square	F	Sig.
How do you evaluate the proposed service "Recycling Stock Market Using Information and Communication Technologies (RSM)" at a first glance?	Between Groups	(Combined)	13.607	3	4.536	5.924	.001
	Within Groups		58.193	76	.766		
	Total		71.800	79			
Do you intend to participate in RSM when applicable?	Between Groups	(Combined)	15.253	3	5.084	3.327	.024
	Within Groups		116.135	76	1.528		
	Total		131.388	79			
Recycling Stock Market will benefit the environment	Between Groups	(Combined)	13.143	3	4.381	4.867	.004
	Within Groups		68.407	76	.900		
	Total		81.550	79			
Recycling Stock Market will save valuable resources	Between Groups	(Combined)	14.139	3	4.713	4.930	.004
	Within Groups		72.661	76	.956		
	Total		86.800	79			
It will give incentives to consumers for recycling more and more	Between Groups	(Combined)	24.337	3	8.112	8.285	.000
	Within Groups		74.413	76	.979		
	Total		98.750	79			
It may change current recycling processes followed	Between Groups	(Combined)	19.214	3	6.405	6.323	.001
	Within Groups		76.986	76	1.013		
	Total		96.200	79			
It will help people to change attitude	Between Groups	(Combined)	31.873	3	10.624	7.608	.000
	Within Groups		106.127	76	1.396		
	Total		138.000	79			
RSM will affect the living standards of participants	Between Groups	(Combined)	34.454	3	11.485	7.690	.000
	Within Groups		113.496	76	1.493		

	Total	147.950	79			
RSM will benefit the region that will be applied	Between Groups (Combined)	22.526	3	7.509	8.121	.000
	Within Groups	70.274	76	.925		
	Total	92.800	79			
The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling	Between Groups (Combined)	9.530	3	3.177	3.278	.025
	Within Groups	73.657	76	.969		
	Total	83.187	79			
The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money	Between Groups (Combined)	41.679	3	13.893	11.928	.000
	Within Groups	88.521	76	1.165		
	Total	130.200	79			
The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting	Between Groups (Combined)	18.330	3	6.110	4.274	.008
	Within Groups	108.657	76	1.430		
	Total	126.987	79			
The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle	Between Groups (Combined)	12.369	3	4.123	3.578	.018
	Within Groups	87.581	76	1.152		
	Total	99.950	79			
The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling	Between Groups (Combined)	21.803	3	7.268	7.346	.000
	Within Groups	75.185	76	.989		
	Total	96.988	79			
The implementation of RSM is expected to create growth in the region that will be applied	Between Groups (Combined)	39.251	3	13.084	10.963	.000
	Within Groups	90.699	76	1.193		
	Total	129.950	79			
The implementation of RSM will bring income both to consumers and companies	Between Groups (Combined)	26.259	3	8.753	8.614	.000
	Within Groups	77.229	76	1.016		
	Total	103.487	79			
The service may penetrate in households	Between Groups (Combined)	23.953	3	7.984	7.707	.000
	Within Groups	78.735	76	1.036		

	Total	102.687	79			
Companies will accept to participate in order to contribute in the philosophy of recycling	Between (Combined) Groups	24.869	3	8.290	5.288	.002
	Within Groups	119.131	76	1.568		
	Total	144.000	79			
Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers	Between (Combined) Groups	22.136	3	7.379	9.094	.000
	Within Groups	61.664	76	.811		
	Total	83.800	79			
Companies will see this service as an opportunity for expansion	Between (Combined) Groups	15.186	3	5.062	5.436	.002
	Within Groups	70.764	76	.931		
	Total	85.950	79			
Environmentalists will embrace the idea	Between (Combined) Groups	4.274	3	1.425	1.854	**.145**
	Within Groups	58.413	76	.769		
	Total	62.687	79			
Local authorities will contribute to the implementation of it	Between (Combined) Groups	29.187	3	9.729	7.559	.000
	Within Groups	97.813	76	1.287		
	Total	127.000	79			
Do you think that it could be easy to implement the idea of RSM?	Between (Combined) Groups	46.774	3	15.591	11.661	.000
	Within Groups	101.613	76	1.337		
	Total	148.388	79			
Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?	Between (Combined) Groups	4.393	3	1.464	.886	**.452**
	Within Groups	125.557	76	1.652		
	Total	129.950	79			
A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market	Between (Combined) Groups	6.187	3	2.062	1.344	**.266**
	Within Groups	116.613	76	1.534		
	Total	122.800	79			
A possible barrier in the implementation of RSM could be the raise of legislation issues	Between (Combined) Groups	6.959	3	2.320	1.578	**.202**
	Within Groups	111.729	76	1.470		

	Total	118.687	79			
A possible barrier in the implementation of RSM could be the avoidance of companies to participate	Between Groups (Combined)	4.307	3	1.436	1.160	**.331**
	Within Groups	94.081	76	1.238		
	Total	98.388	79			
A possible barrier in the implementation of RSM could be the avoidance of individuals to participate	Between Groups (Combined)	3.602	3	1.201	.775	**.512**
	Within Groups	117.786	76	1.550		
	Total	121.387	79			
A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply	Between Groups (Combined)	1.826	3	.609	.441	**.725**
	Within Groups	104.974	76	1.381		
	Total	106.800	79			
A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service	Between Groups (Combined)	43.974	3	14.658	4.814	.004
	Within Groups	231.413	76	3.045		
	Total	275.388	79			

Appendix P

Results of the PILOT process / Percentages

Appendix Q

Results of the PILOT process / Graphs

Questionnaire Result: Questionnaire ID: 1257868931

Start Date/Time	End Date/Time	Open Duration	Total Replies	Author
2009/11/10 18:2:12	2009/12/11 18:2:12	31 days 0:0:0	20	ergen@ergen.gr

Questionnaire Title:	Recycling Stock Market Using Information & Commmunication Technologies
Built By:	Created By CompressWeb.

You are participating in this survey as:

Answer	Number of Answers	Percentage	Graph
A consumer	14	70.00%	
An industry expert	1	5.00%	
A researcher	5	25.00%	
A member of a non-governmental institute / Environmentalist	0	0.00%	

Gender

Answer	Number of Answers	Percentage	Graph
Male	9	45.00%	
Female	11	55.00%	

What is your age?

Answer	Number of Answers	Percentage	Graph
18-29	2	10.00%	
30-39	7	35.00%	
40-49	9	45.00%	
50-59	2	10.00%	
60-69	0	0.00%	
>69	0	0.00%	

What is your educational background?

Answer	Number of Answers	Percentage	Graph
Secondary Education	0	0.00%	
High School Graduate	2	10.00%	

University Graduate	2	10.00%
Holder of a Master/PhD Degree	16	80.00%

Marital Status

Answer	Number of Answers	Percentage Graph
Single	5	25.00%
Married	14	70.00%
Divorced	1	5.00%
Widowed	0	0.00%

Living status

Answer	Number of Answers	Percentage Graph
Living alone	3	15.00%
Living with your spouse/partner	6	30.00%
Living with your family/others in our household	11	55.00%

Professional status

Answer	Number of Answers	Percentage Graph
Employed	19	95.00%
Unemployed	1	5.00%
Retired	0	0.00%
Student - Not yet in the market	0	0.00%

How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance?

Answer	Number of Answers	Percentage Graph
(1) Not interesting at all	0	0.00%
(2) Not interesting	0	0.00%
(3) Of low interest	0	0.00%
(4) Moderate	0	0.00%
(5) Of some interest	2	10.00%
(6) Interesting	11	55.00%

(7) Very interesting	7	35.00%

Do you intend to participate in RSM when applicable?

Answer	Number of Answers	Percentage Graph
(1) Extremely unlikely	0	0.00%
(2) Very unlikely	0	0.00%
(3) Unlikely	2	10.00%
(4) Moderate	4	20.00%
(5) Likely	3	15.00%
(6) Very likely	8	40.00%
(7) Extremely likely	3	15.00%

Recycling Stock Market will benefit the environment

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	0	0.00%
(5) Agree	4	20.00%
(6) Agree very much	10	50.00%
(7) Strongly agree	6	30.00%

Recycling Stock Market will save valuable resources

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	0	0.00%
(5) Agree	3	15.00%
(6) Agree very much	12	60.00%
(7) Strongly agree	5	25.00%

It will give incentives to consumers for recycling more and more

Answer	Number of	Percentage Graph

	Answers	
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	0	0.00%
(5) Agree	9	45.00%
(6) Agree very much	7	35.00%
(7) Strongly agree	4	20.00%

It may change current recycling processes followed

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	4	20.00%
(5) Agree	8	40.00%
(6) Agree very much	6	30.00%
(7) Strongly agree	2	10.00%

It will help people to change attitude

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	2	10.00%
(3) Disagree	0	0.00%
(4) Moderate	2	10.00%
(5) Agree	6	30.00%
(6) Agree very much	8	40.00%
(7) Strongly agree	2	10.00%

RSM will affect the living standards of participants

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	2	10.00%

(3) Not so possible	3	15.00%
(4) Moderate	4	20.00%
(5) Possible	7	35.00%
(6) Very possible	3	15.00%
(7) High possibility	1	5.00%

RSM will benefit the region that will be applied

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	4	20.00%
(5) Agree	7	35.00%
(6) Agree very much	7	35.00%
(7) Strongly agree	2	10.00%

The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	2	10.00%
(5) Agree	6	30.00%
(6) Agree very much	7	35.00%
(7) Strongly agree	5	25.00%

The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	4	20.00%
(4) Moderate	3	15.00%

(5) Agree	5	25.00%
(6) Agree very much	7	35.00%
(7) Strongly agree	1	5.00%

The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	3	15.00%
(4) Moderate	4	20.00%
(5) Agree	7	35.00%
(6) Agree very much	5	25.00%
(7) Strongly agree	1	5.00%

The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	0	0.00%
(4) Moderate	2	10.00%
(5) Agree	5	25.00%
(6) Agree very much	9	45.00%
(7) Strongly agree	4	20.00%

The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling

Answer	Number of Answers	Percentage Graph
(1) Strongly disagree	0	0.00%
(2) Very much disagree	0	0.00%
(3) Disagree	1	5.00%
(4) Moderate	2	10.00%
(5) Agree	4	20.00%
(6) Agree very much	9	45.00%

(7) Strongly agree	4	20.00%

The implementation of RSM is expected to create growth in the region that will be applied

Answer	Number of Answers	Percentage Graph
(1) Impossible	0	0.00%
(2) Almost impossible	2	10.00%
(3) Rather impossible	0	0.00%
(4) Moderate	3	15.00%
(5) Almost possible	6	30.00%
(6) Possible	9	45.00%
(7) Highly possible	0	0.00%

The implementation of RSM will bring income both to consumers and companies

Answer	Number of Answers	Percentage Graph
(1) Impossible	0	0.00%
(2) Almost impossible	0	0.00%
(3) Rather impossible	0	0.00%
(4) Moderate	4	20.00%
(5) Almost possible	4	20.00%
(6) Possible	11	55.00%
(7) Highly possible	1	5.00%

The service may penetrate in households

Answer	Number of Answers	Percentage Graph
(1) Low pervasion	0	0.00%
(2) Almost low pervasion	0	0.00%
(3) Rather low pervasion	2	10.00%
(4) Moderate	3	15.00%
(5) Adequate pervasion	6	30.00%
(6) Rather high pervasion	7	35.00%
(7) High pervasion	2	10.00%

Companies will accept to participate in order to contribute in the philosophy of recycling

Answer	Number of	Percentage Graph

	Answers	
(1) Low possibility	2	10.00%
(2) With little possibility	0	0.00%
(3) Not so possible	0	0.00%
(4) Moderate	2	10.00%
(5) Possible	5	25.00%
(6) Very possible	9	45.00%
(7) High possibility	2	10.00%

Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	0	0.00%
(3) Not so possible	2	10.00%
(4) Moderate	0	0.00%
(5) Possible	9	45.00%
(6) Very possible	7	35.00%
(7) High possibility	2	10.00%

Companies will see this service as an opportunity for expansion

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	0	0.00%
(3) Not so possible	0	0.00%
(4) Moderate	6	30.00%
(5) Possible	6	30.00%
(6) Very possible	7	35.00%
(7) High possibility	1	5.00%

Environmentalists will embrace the idea

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	0	0.00%

(3) Not so possible	0	0.00%
(4) Moderate	0	0.00%
(5) Possible	4	20.00%
(6) Very possible	9	45.00%
(7) High possibility	7	35.00%

Local authorities will contribute to the implementation of it

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	2	10.00%
(3) Not so possible	3	15.00%
(4) Moderate	3	15.00%
(5) Possible	4	20.00%
(6) Very possible	7	35.00%
(7) High possibility	1	5.00%

Do you think that it could be easy to implement the idea of RSM?

Answer	Number of Answers	Percentage Graph
(1) Definitely not	0	0.00%
(2) Almost not easy	0	0.00%
(3) Probably not easy	4	20.00%
(4) Moderate	6	30.00%
(5) Probably yes	7	35.00%
(6) Almost easy	3	15.00%
(7) Definitely yes	0	0.00%

Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?

Answer	Number of Answers	Percentage Graph
(1) Definitely not	0	0.00%
(2) Almost not easy	1	5.00%
(3) Probably not easy	3	15.00%

(4) Moderate	3	15.00%
(5) Probably yes	8	40.00%
(6) Almost easy	2	10.00%
(7) Definitely yes	3	15.00%

A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	0	0.00%
(3) Not so possible	3	15.00%
(4) Moderate	3	15.00%
(5) Possible	8	40.00%
(6) Very possible	4	20.00%
(7) High possibility	2	10.00%

A possible barrier in the implementation of RSM could be the raise of legislation issues

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	2	10.00%
(3) Not so possible	1	5.00%
(4) Moderate	4	20.00%
(5) Possible	4	20.00%
(6) Very possible	6	30.00%
(7) High possibility	3	15.00%

A possible barrier in the implementation of RSM could be the avoidance of companies to participate

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	1	5.00%
(3) Not so possible	2	10.00%
(4) Moderate	3	15.00%
(5) Possible	10	50.00%

(6) Very possible	4	20.00%
(7) High possibility	0	0.00%

A possible barrier in the implementation of RSM could be the avoidance of individuals to participate

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	1	5.00%
(3) Not so possible	2	10.00%
(4) Moderate	3	15.00%
(5) Possible	8	40.00%
(6) Very possible	5	25.00%
(7) High possibility	1	5.00%

A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply

Answer	Number of Answers	Percentage Graph
(1) Low possibility	0	0.00%
(2) With little possibility	0	0.00%
(3) Not so possible	2	10.00%
(4) Moderate	1	5.00%
(5) Possible	7	35.00%
(6) Very possible	6	30.00%
(7) High possibility	4	20.00%

A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service

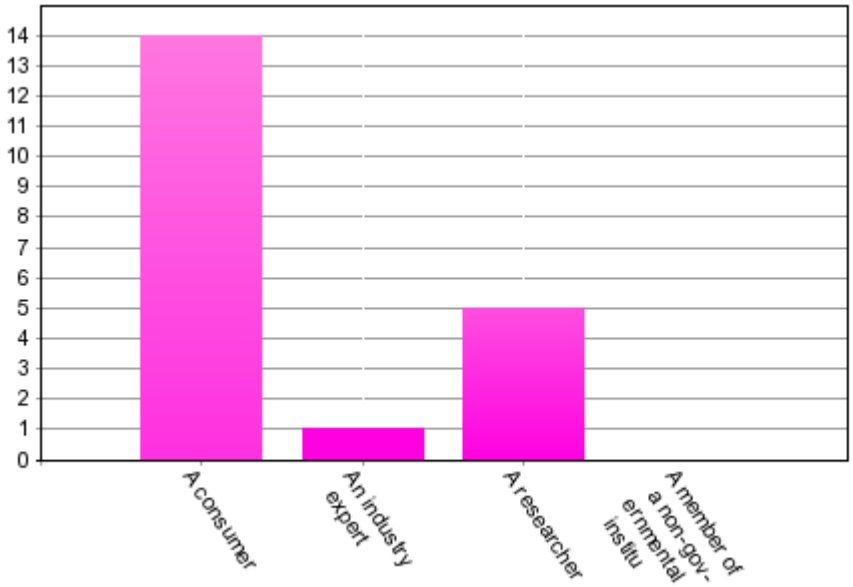
Answer	Number of Answers	Percentage Graph
(1) Low possibility	4	20.00%
(2) With little possibility	3	15.00%
(3) Not so possible	5	25.00%
(4) Moderate	3	15.00%
(5) Possible	3	15.00%
(6) Very possible	1	5.00%
(7) High possibility	1	5.00%

Questionnaire Result: Questionnaire ID: 1257868931

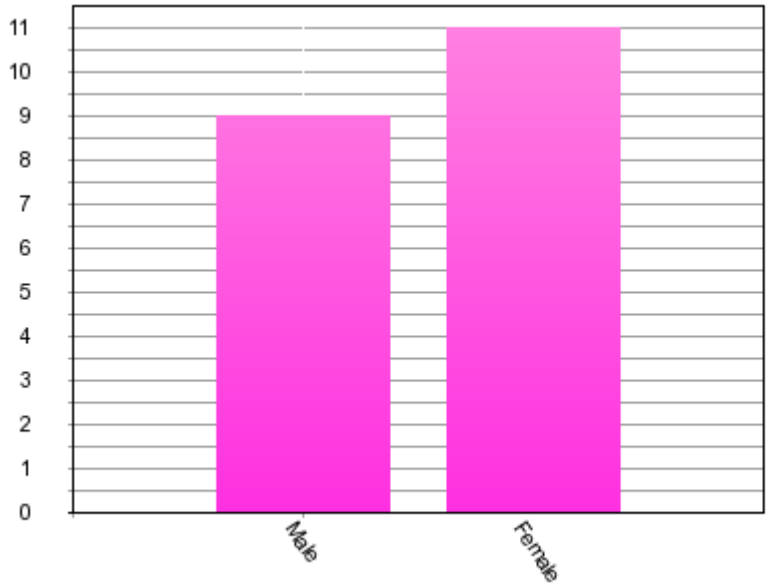
Start Date/Time	End Date/Time	Open Duration	Total Replies	Author
2009/11/10 18:2:12	2009/12/11 18:2:12	31 days 0:0:0	20	ergen@ergen.gr

Questionnaire Title:	Recycling Stock Market Using Information & Commmunication Technologies
Built By:	Created By CompressWeb.

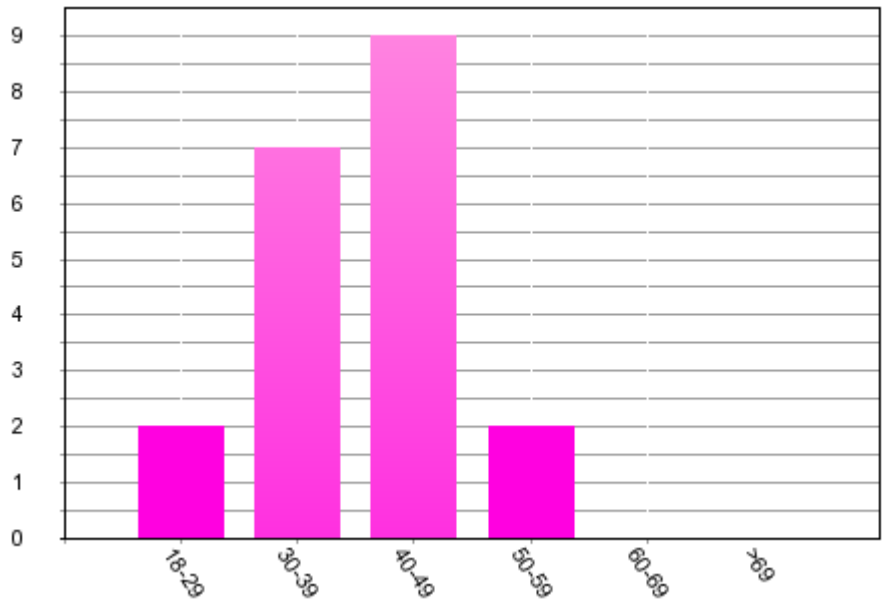
You are participating in this survey as:



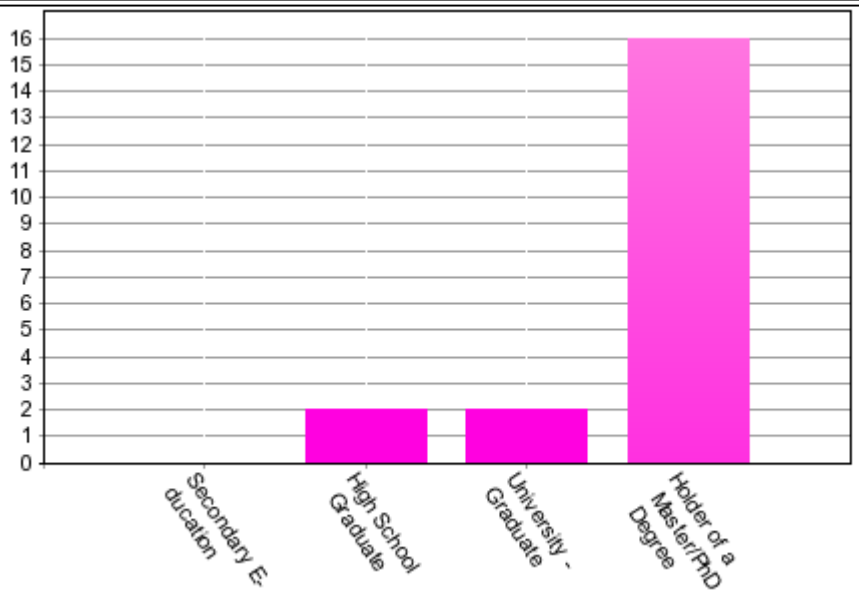
Gender



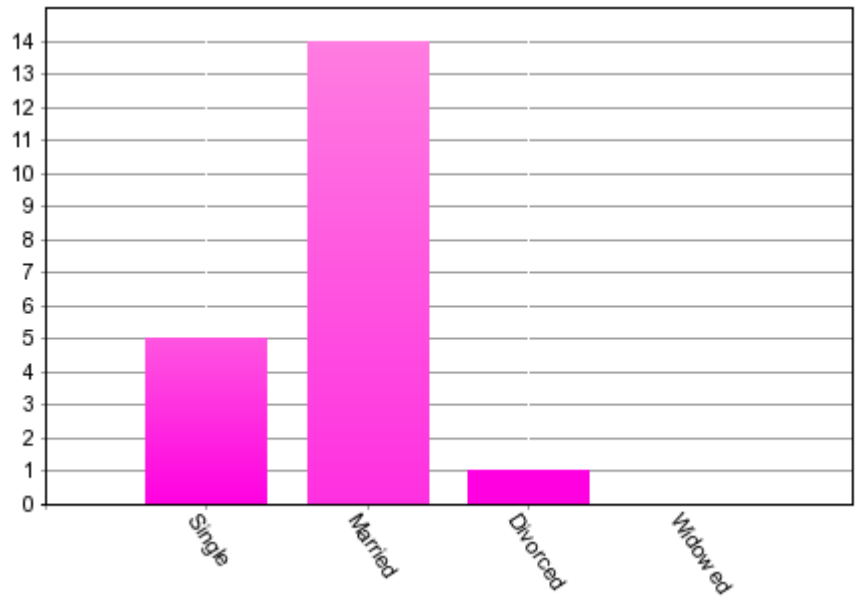
What is your age?



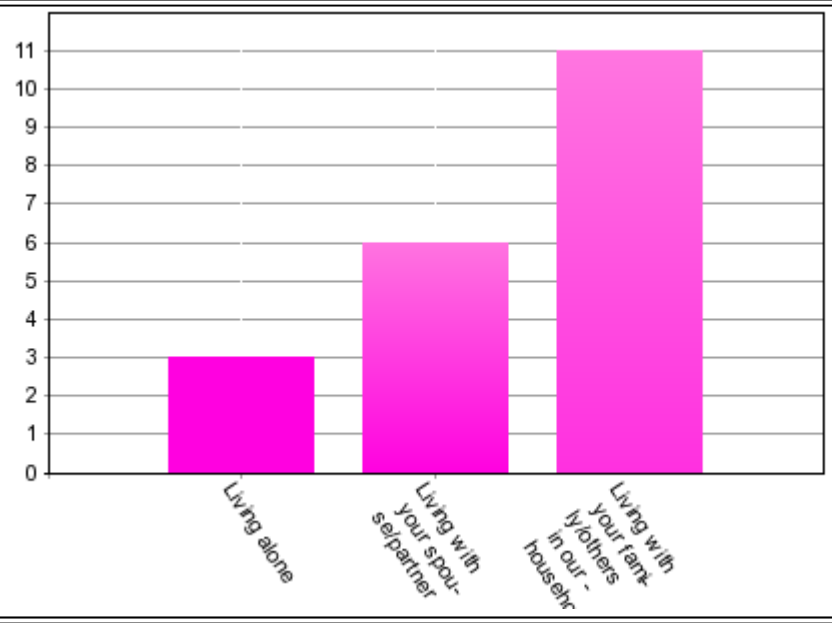
What is your educational background?



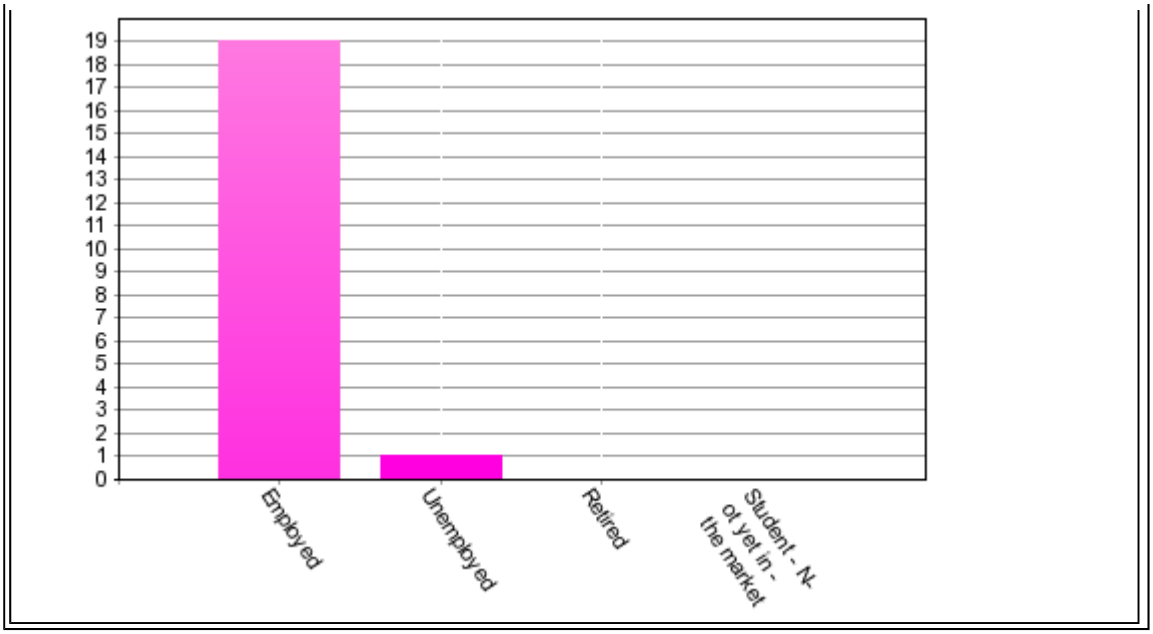
Marital Status



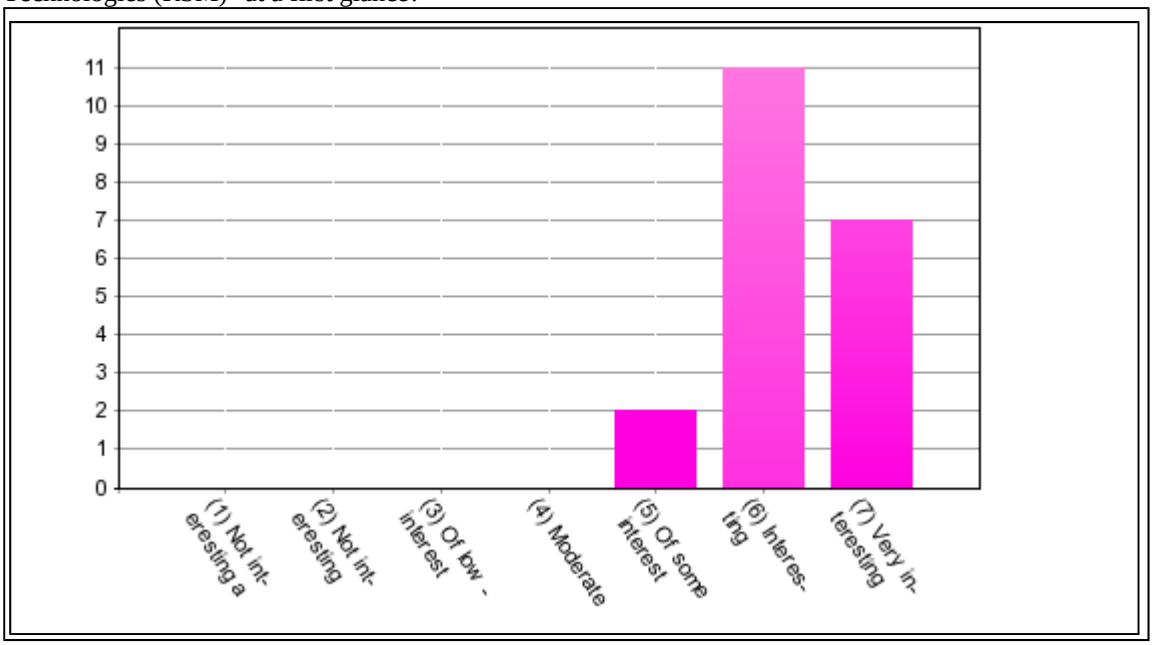
Living status



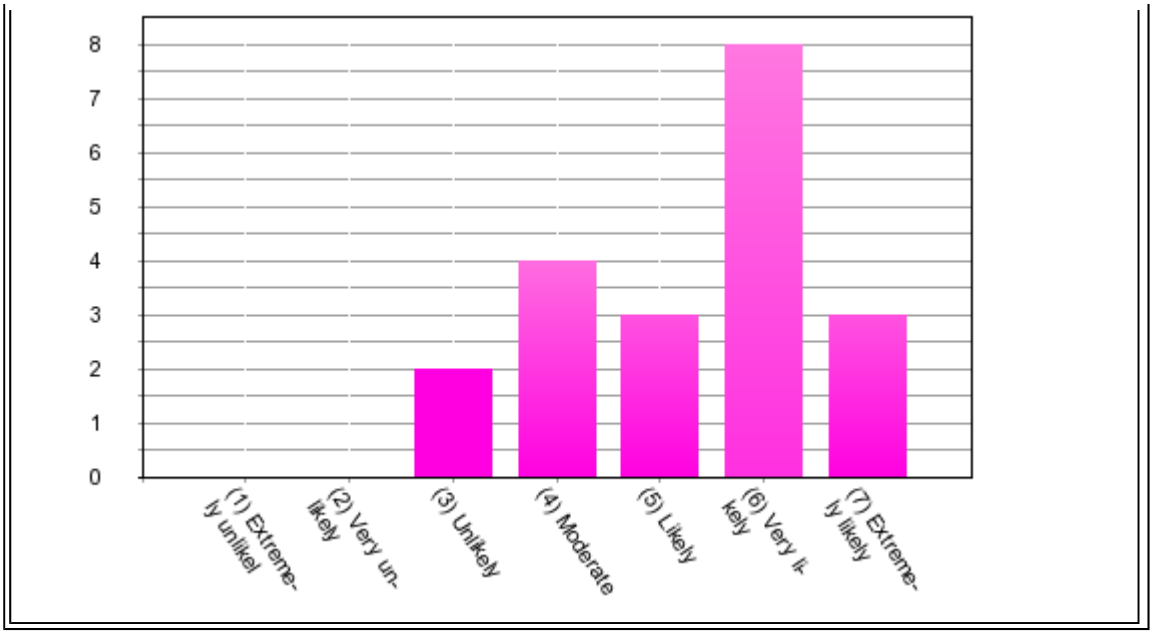
Professional status



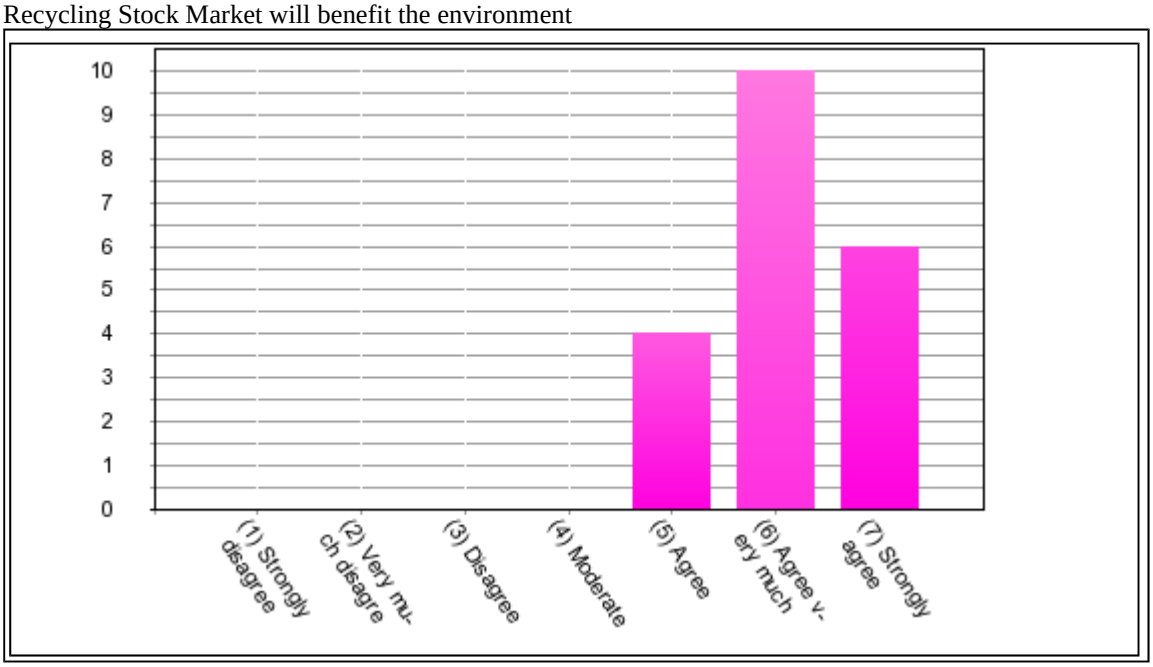
How do you evaluate the proposed service "Recycling Stock Market Using Information & Communication Technologies (RSM)" at a first glance?



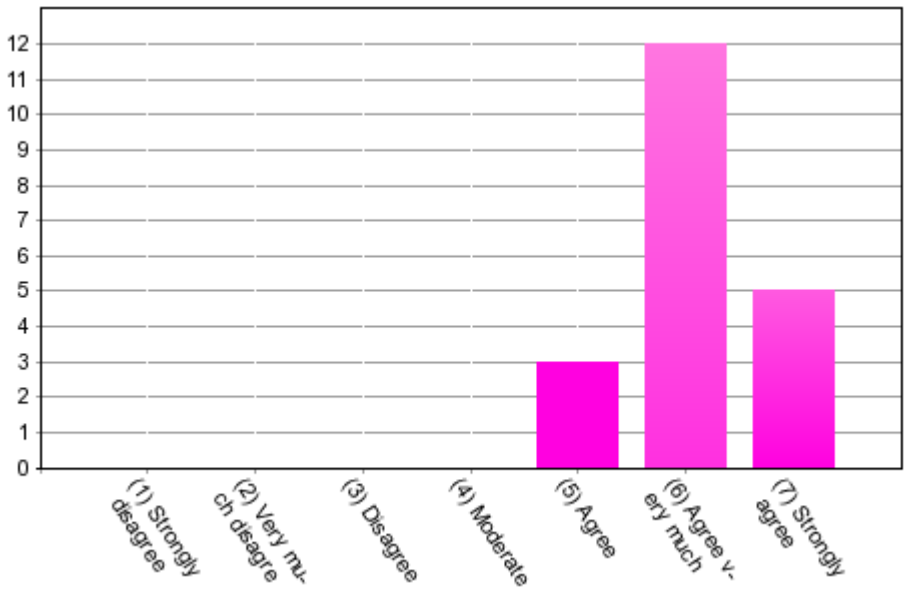
Do you intend to participate in RSM when applicable?



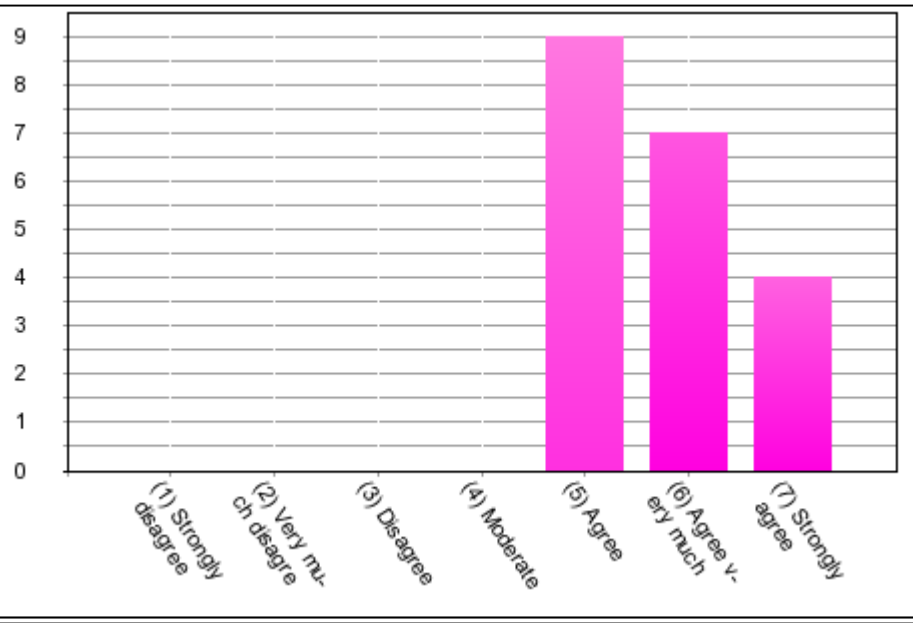
Recycling Stock Market will benefit the environment



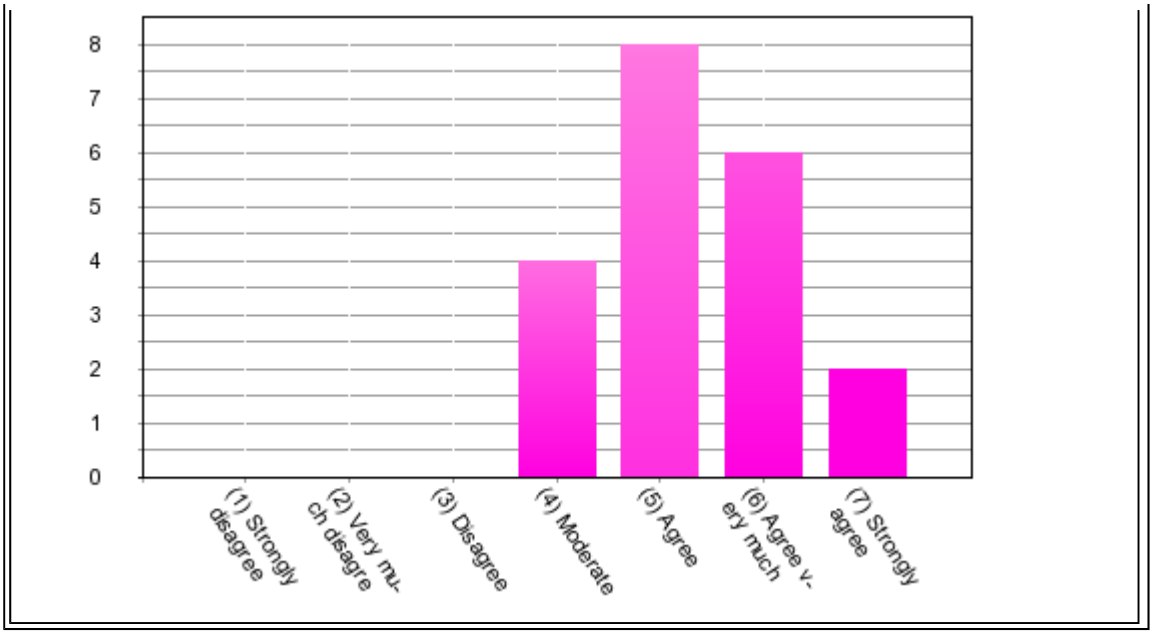
Recycling Stock Market will save valuable resources



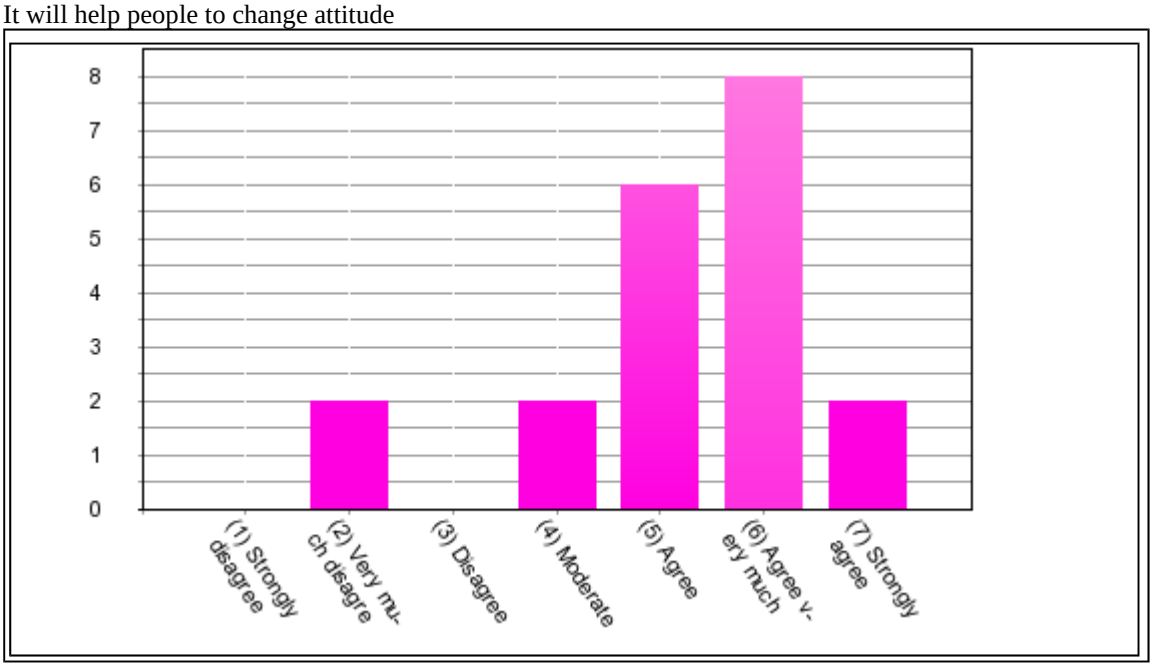
It will give incentives to consumers for recycling more and more



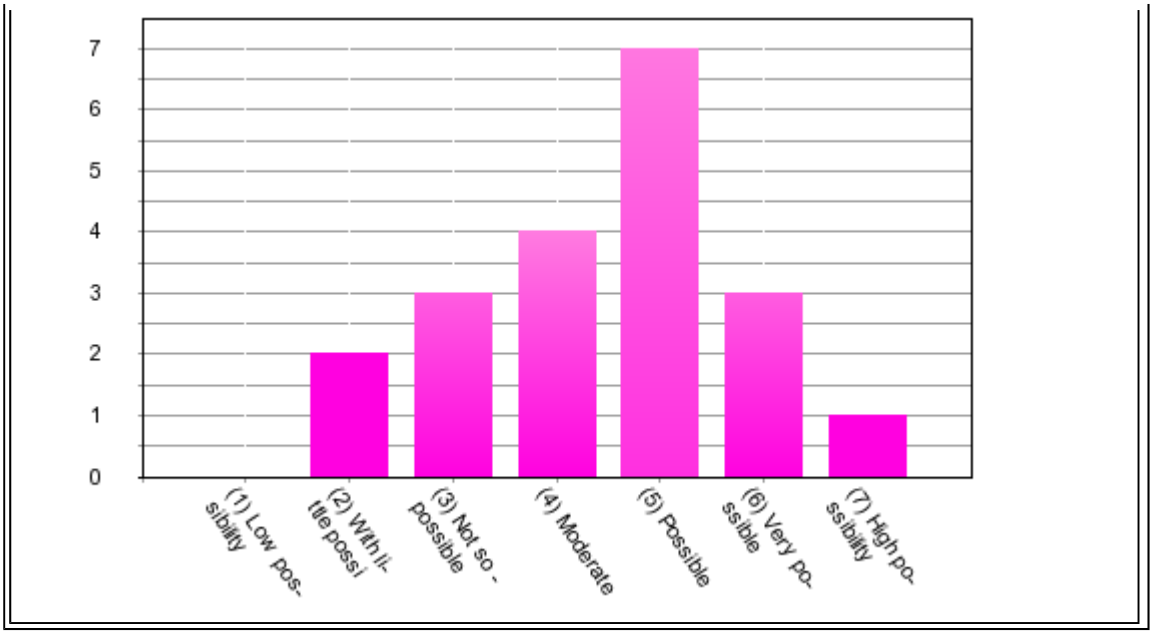
It may change current recycling processes followed



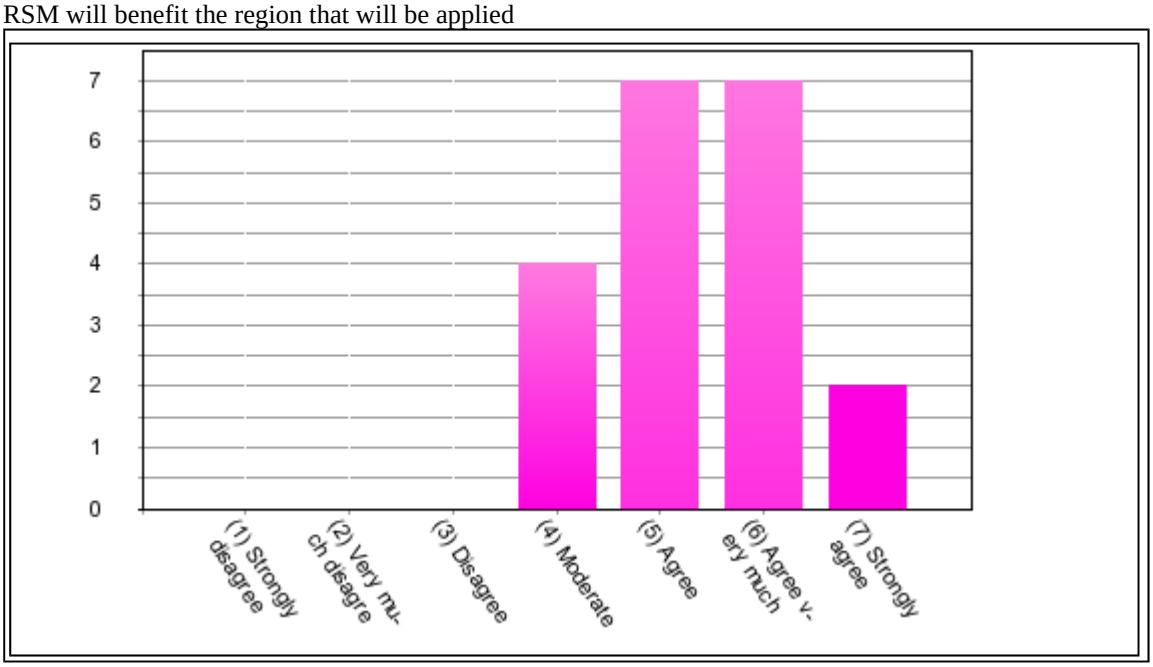
It will help people to change attitude



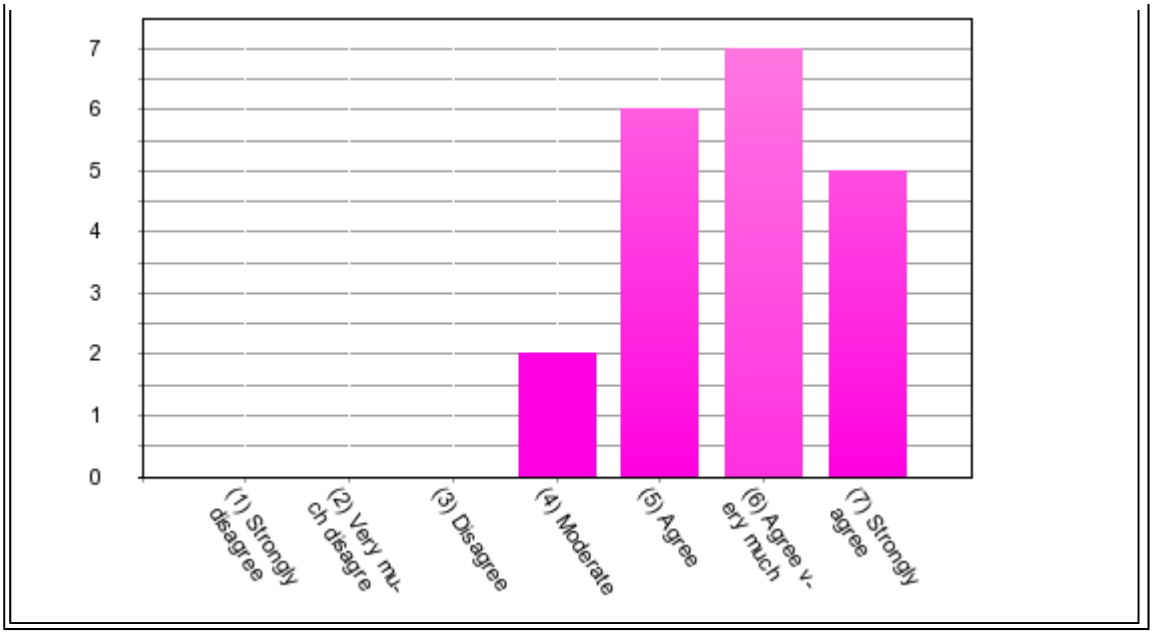
RSM will affect the living standards of participants



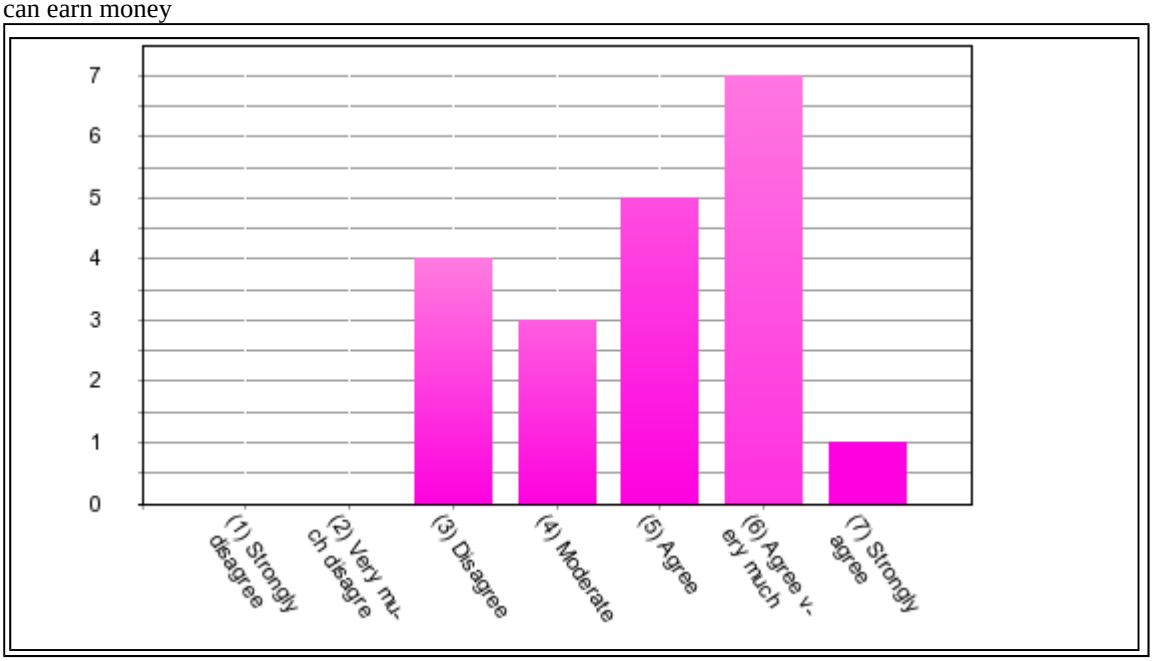
RSM will benefit the region that will be applied



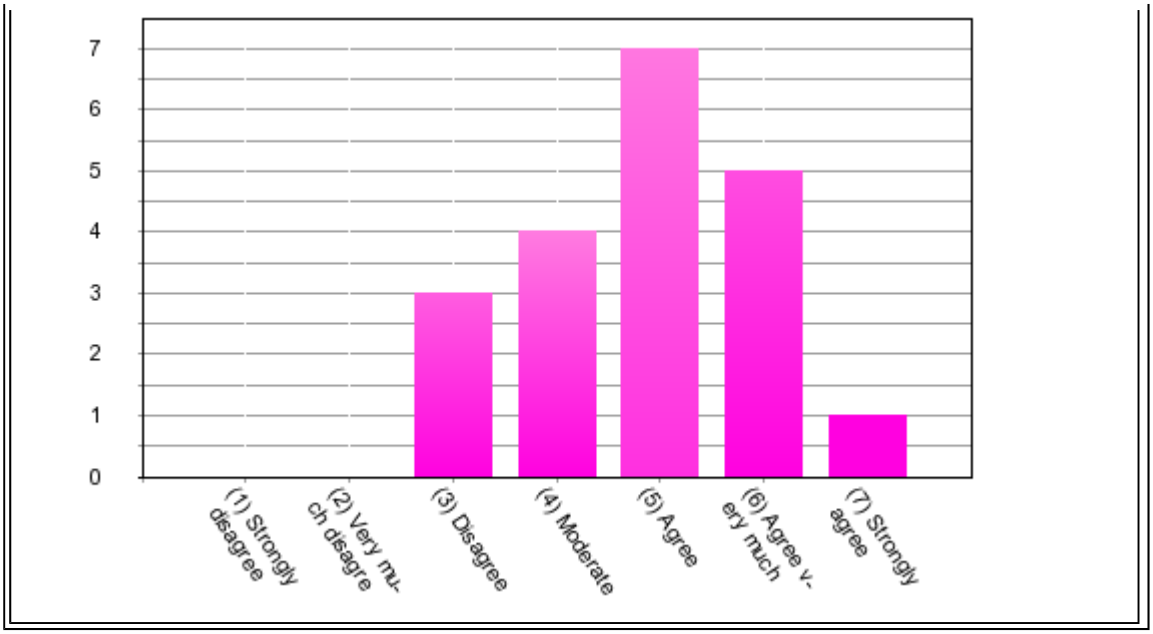
The characteristic that makes "Recycling Stock Market" attractive is that: Participants have benefits from recycling



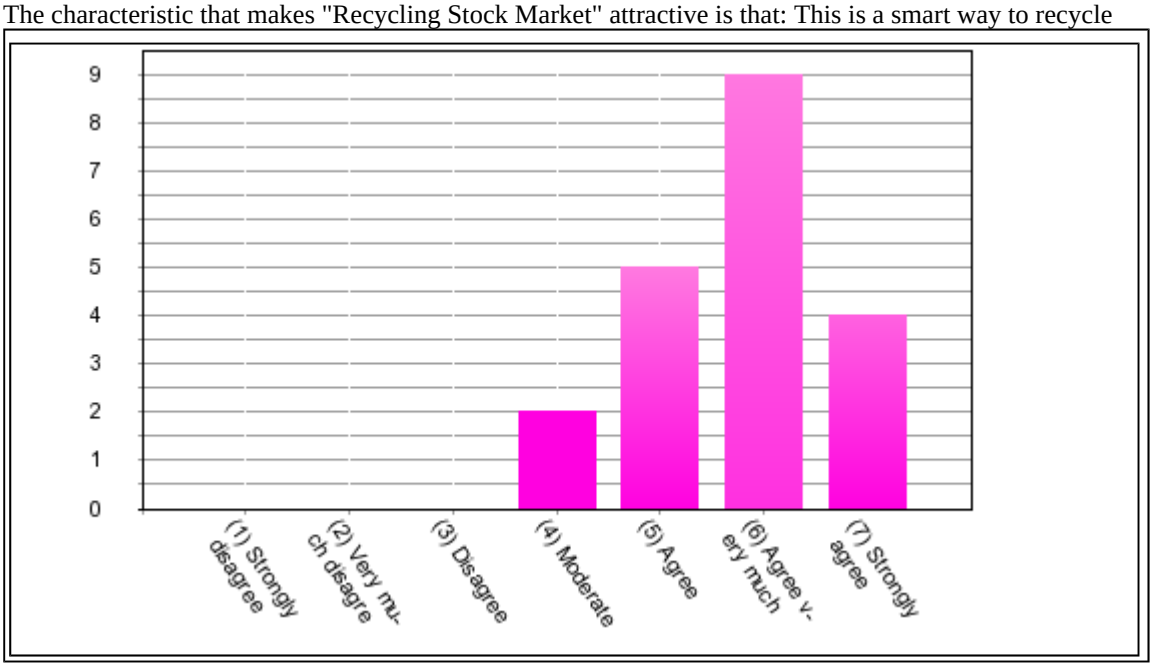
The characteristic that makes "Recycling Stock Market" attractive is that: Garbage has value because you can earn money



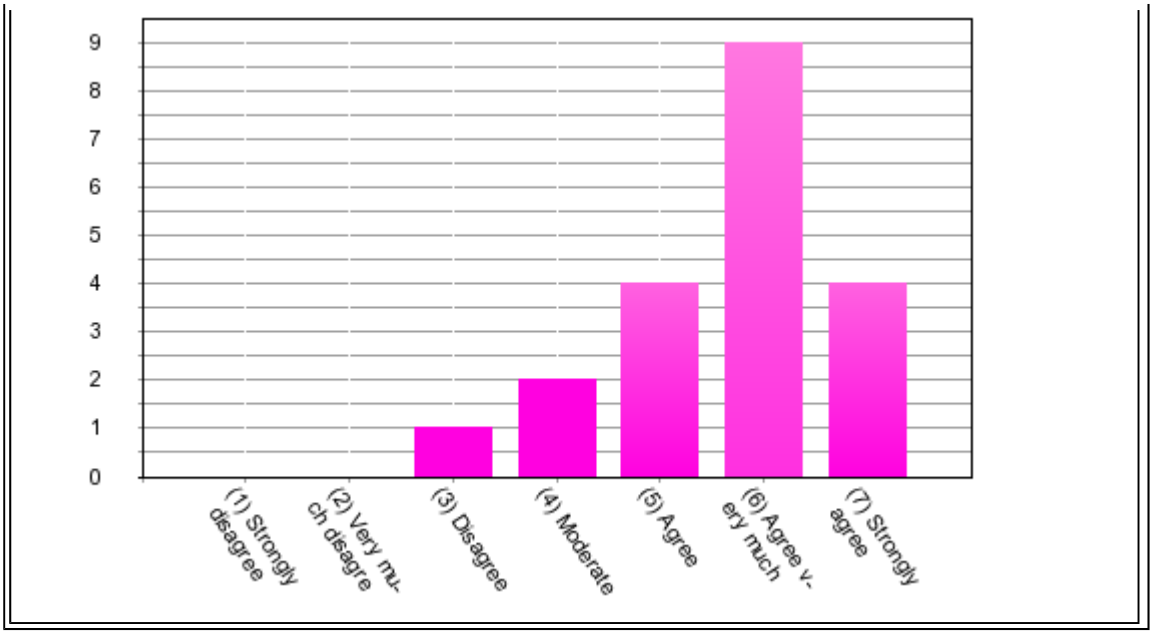
The characteristic that makes "Recycling Stock Market" attractive is that: There is a sense of a game in this service which is interesting



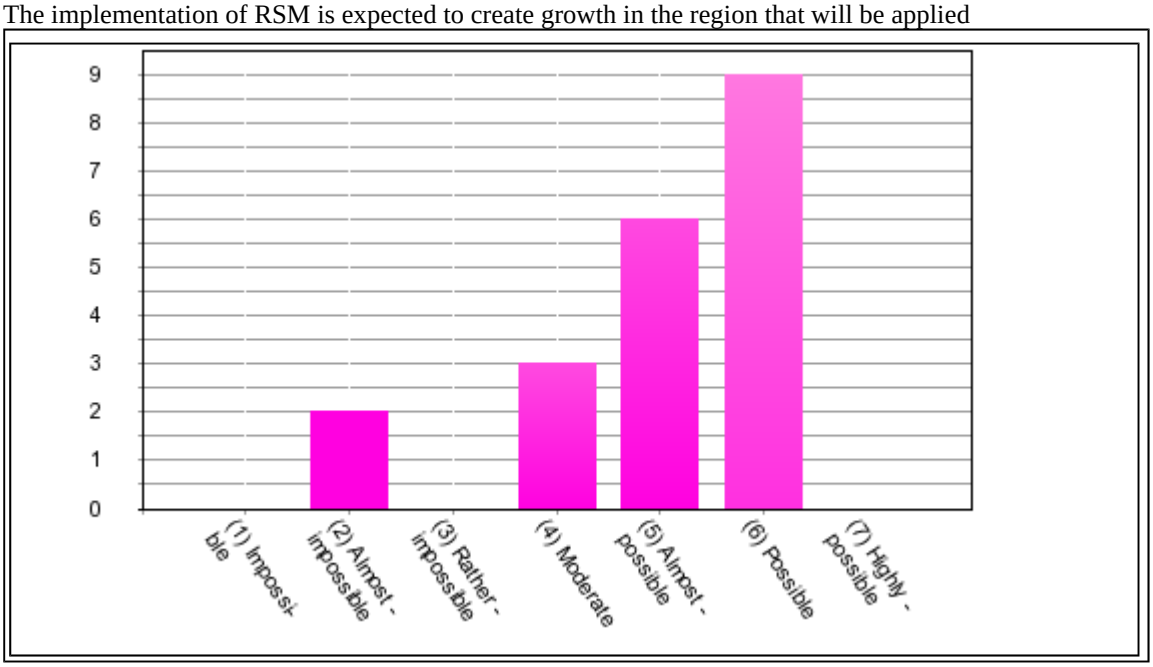
The characteristic that makes "Recycling Stock Market" attractive is that: This is a smart way to recycle



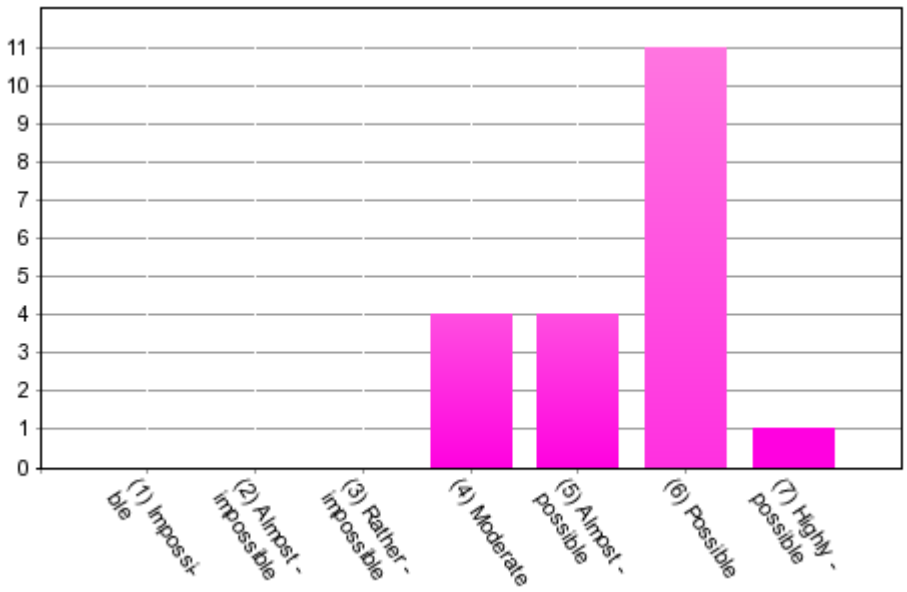
The characteristic that makes "Recycling Stock Market" attractive is that: After all there is a reward for recycling



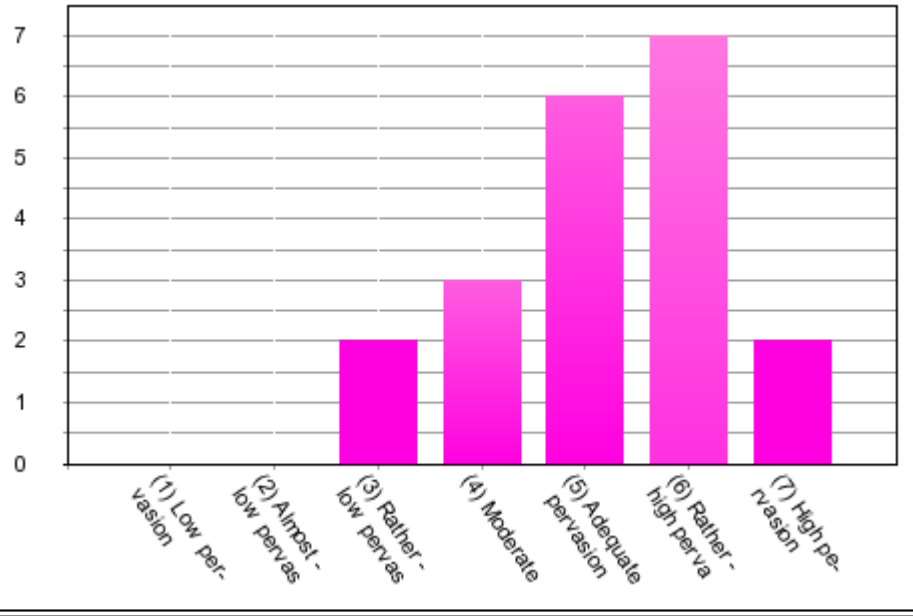
The implementation of RSM is expected to create growth in the region that will be applied



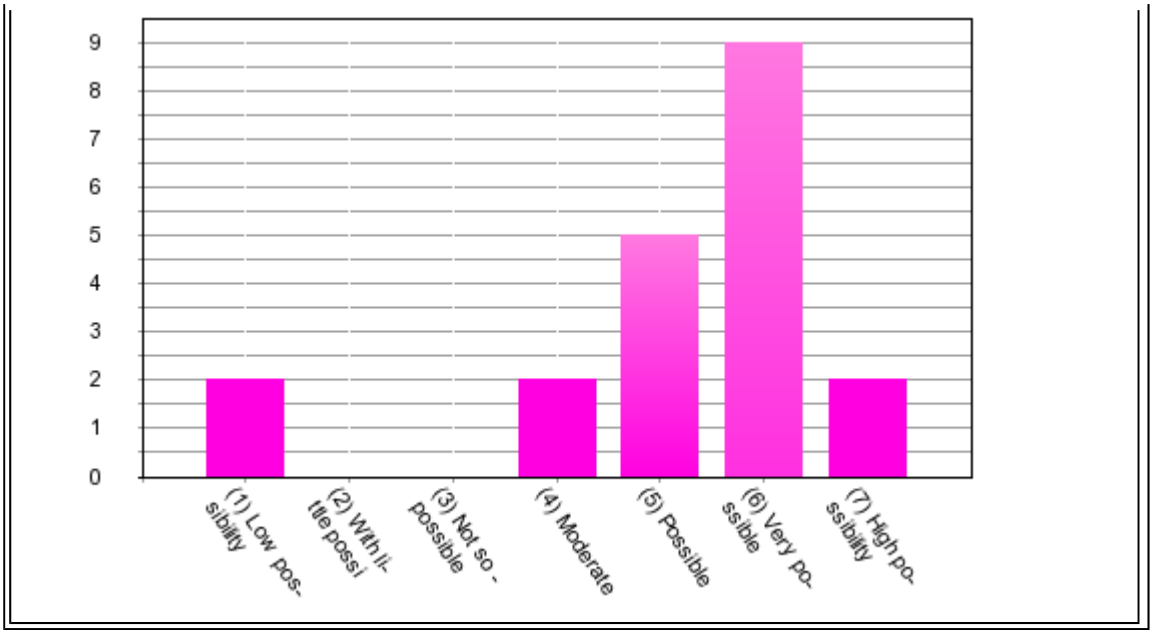
The implementation of RSM will bring income both to consumers and companies



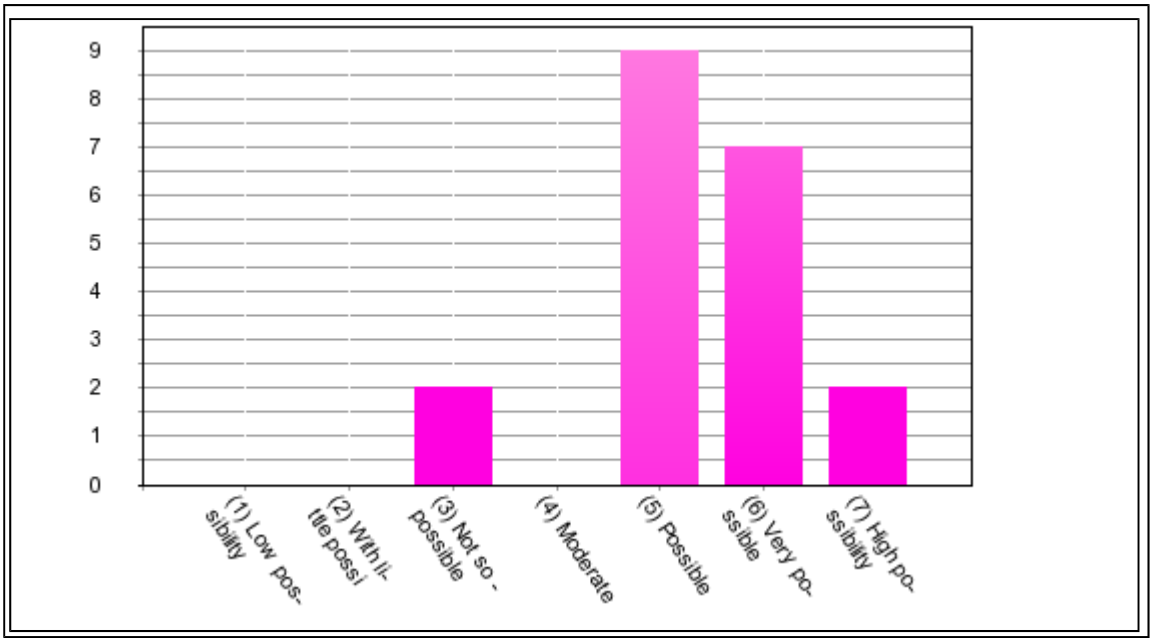
The service may penetrate in households



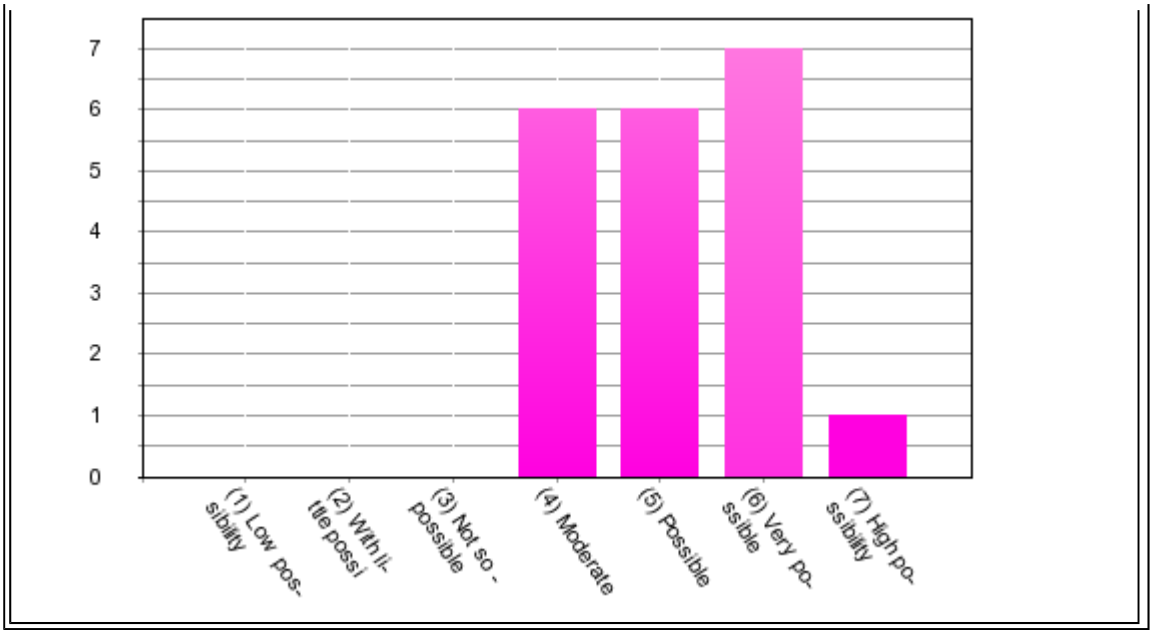
Companies will accept to participate in order to contribute in the philosophy of recycling



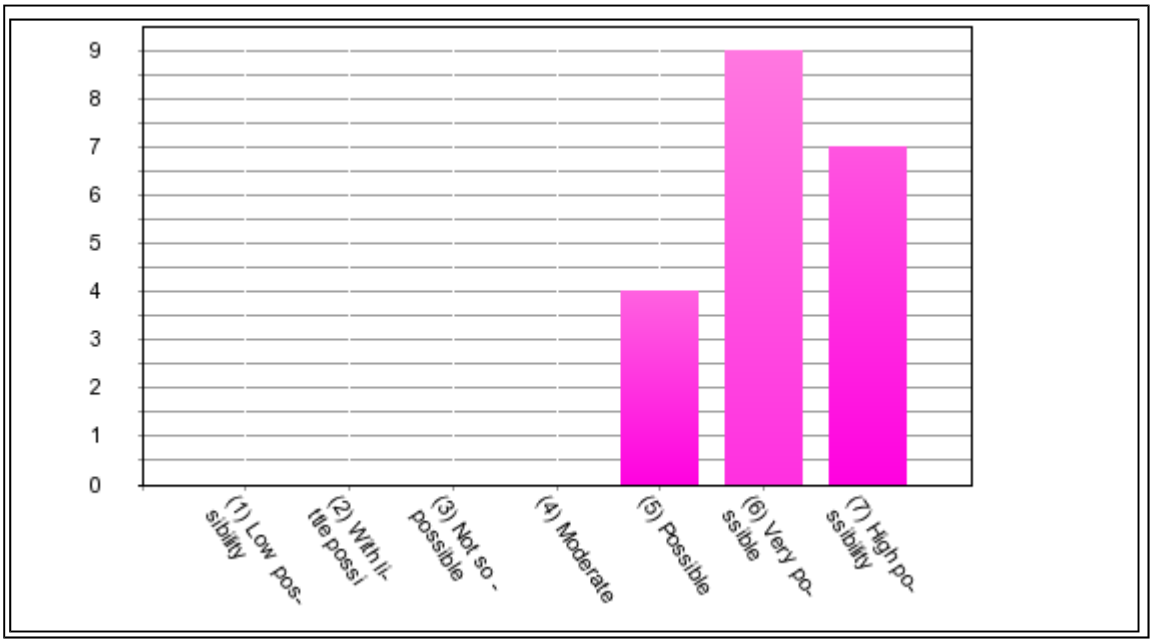
Companies will accept to participate because the service could be a marketing tool for them in order to attract more customers



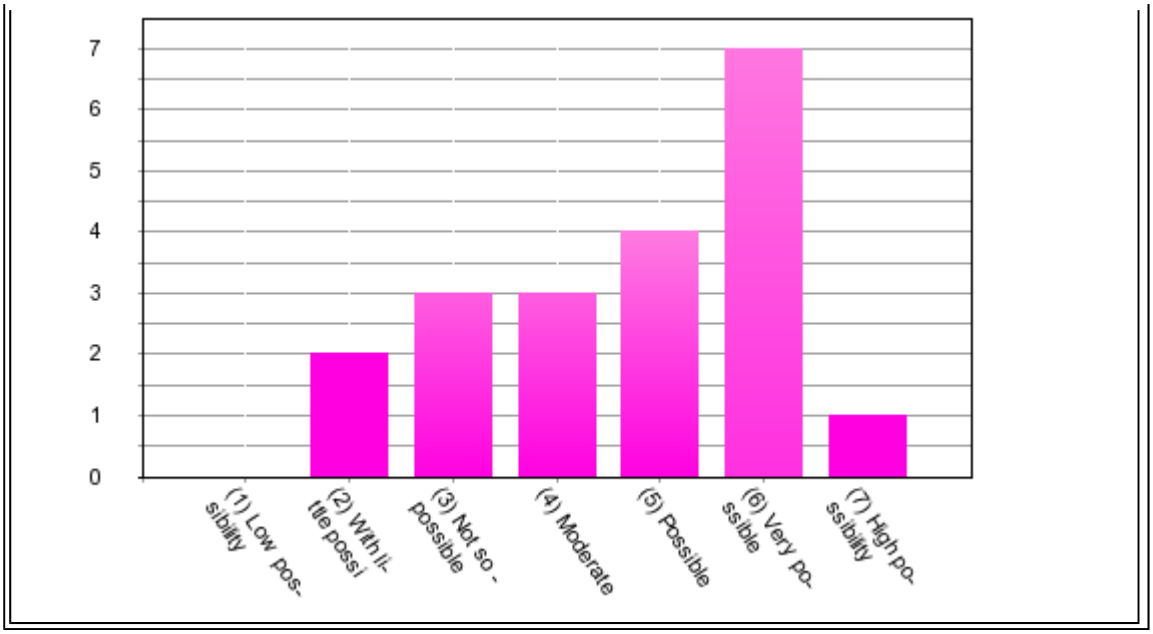
Companies will see this service as an opportunity for expansion



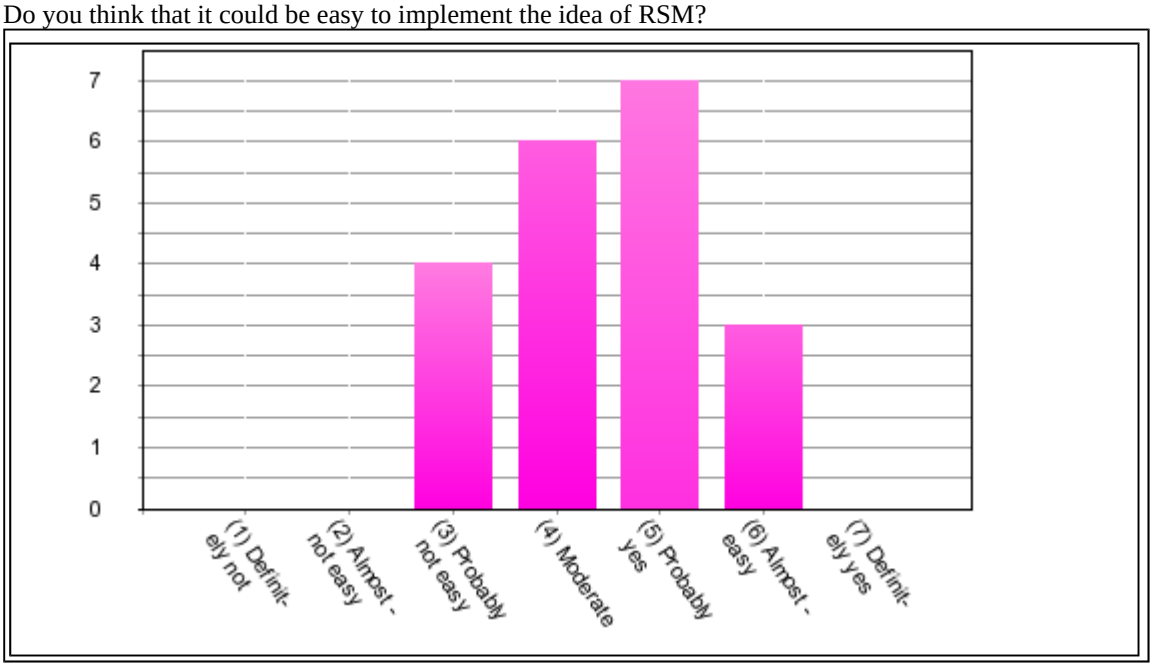
Environmentalists will embrace the idea



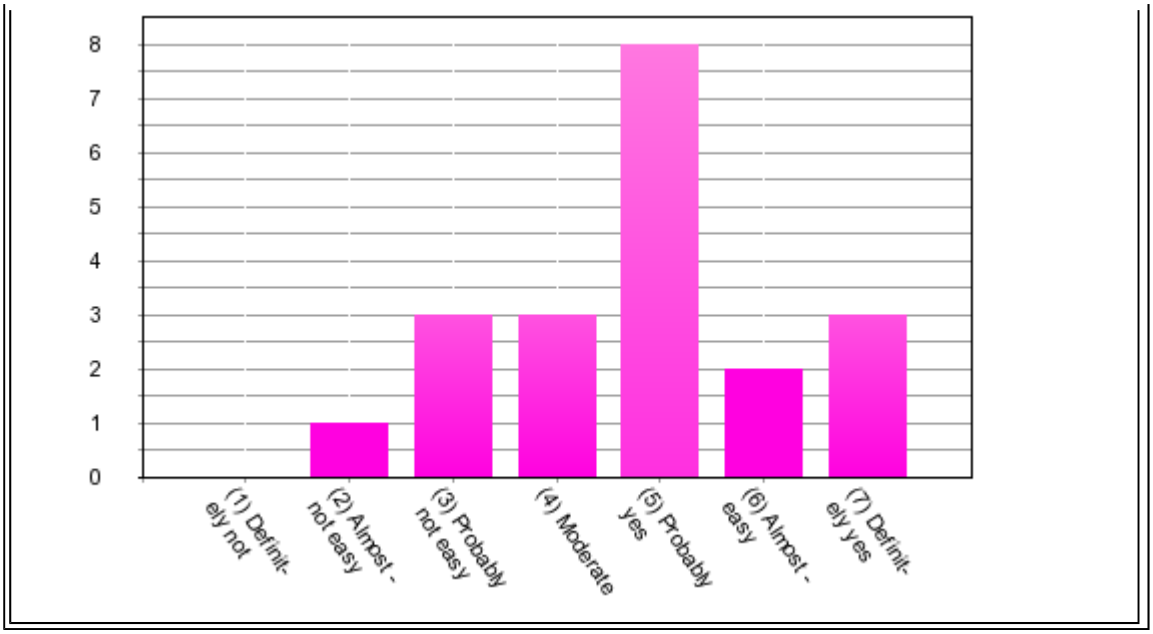
Local authorities will contribute to the implementation of it



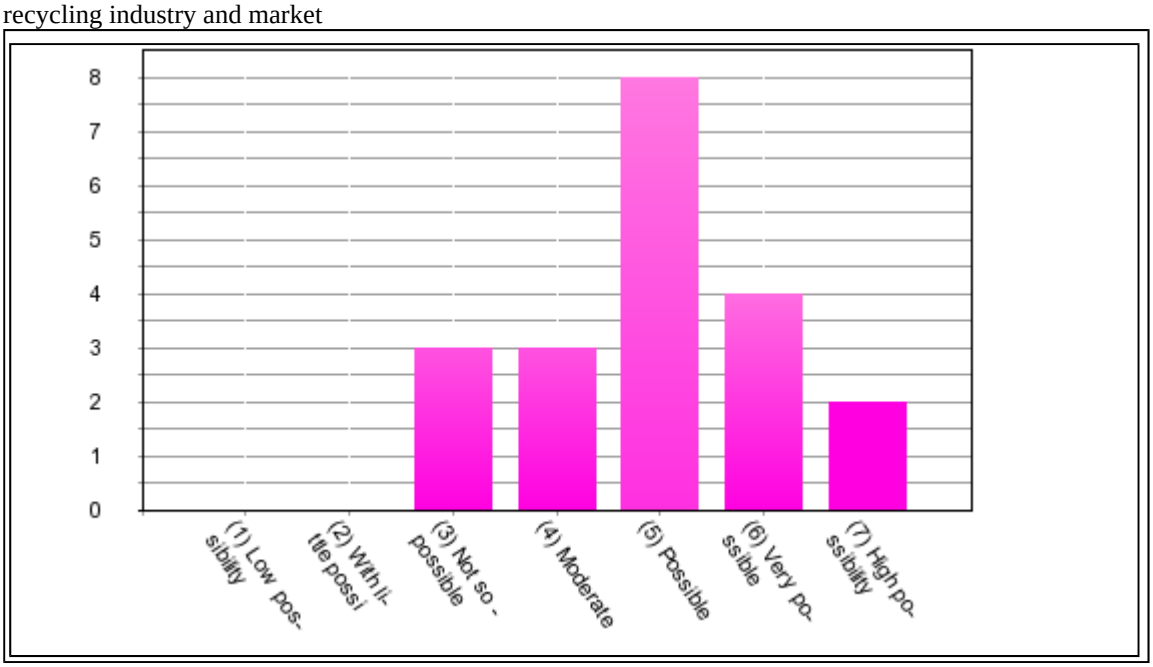
Do you think that it could be easy to implement the idea of RSM?



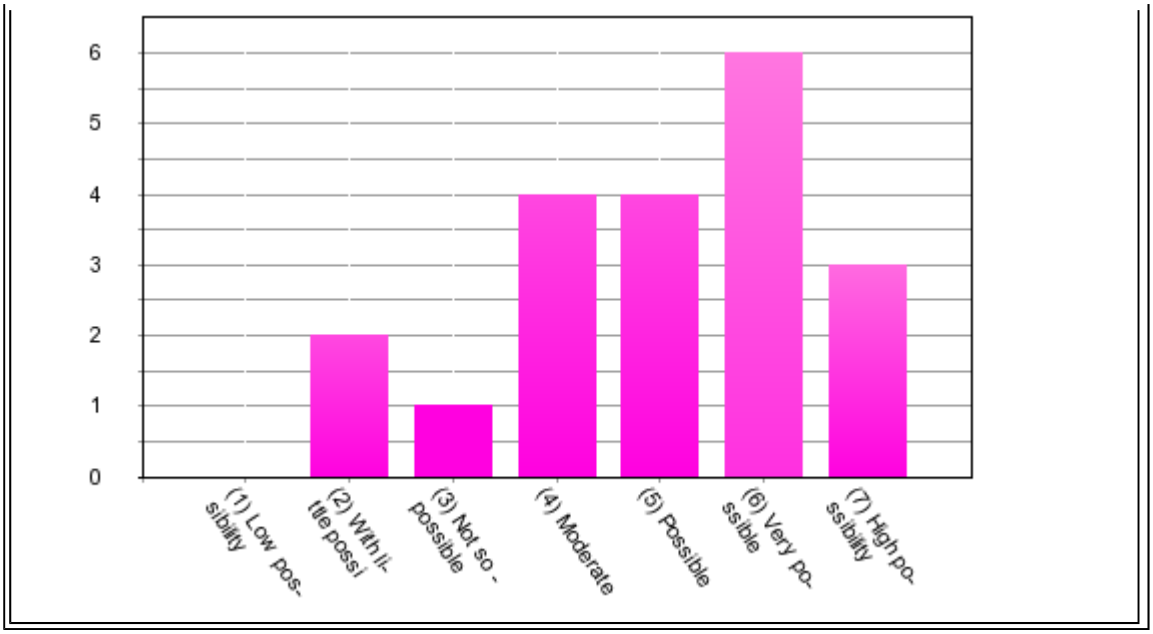
Do you think that there will be any barriers or obstacles in the implementation of RSM from other parties such as professional organizations, companies, experts, governments?



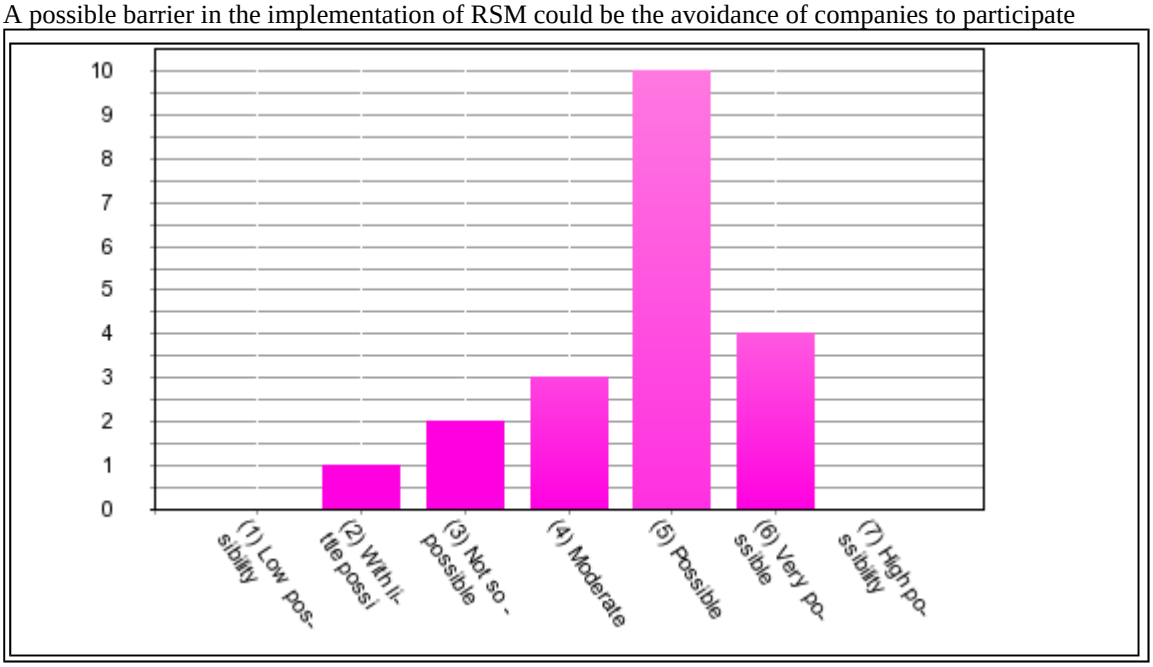
A possible barrier in the implementation of RSM could be the conflict with the current situation of recycling industry and market



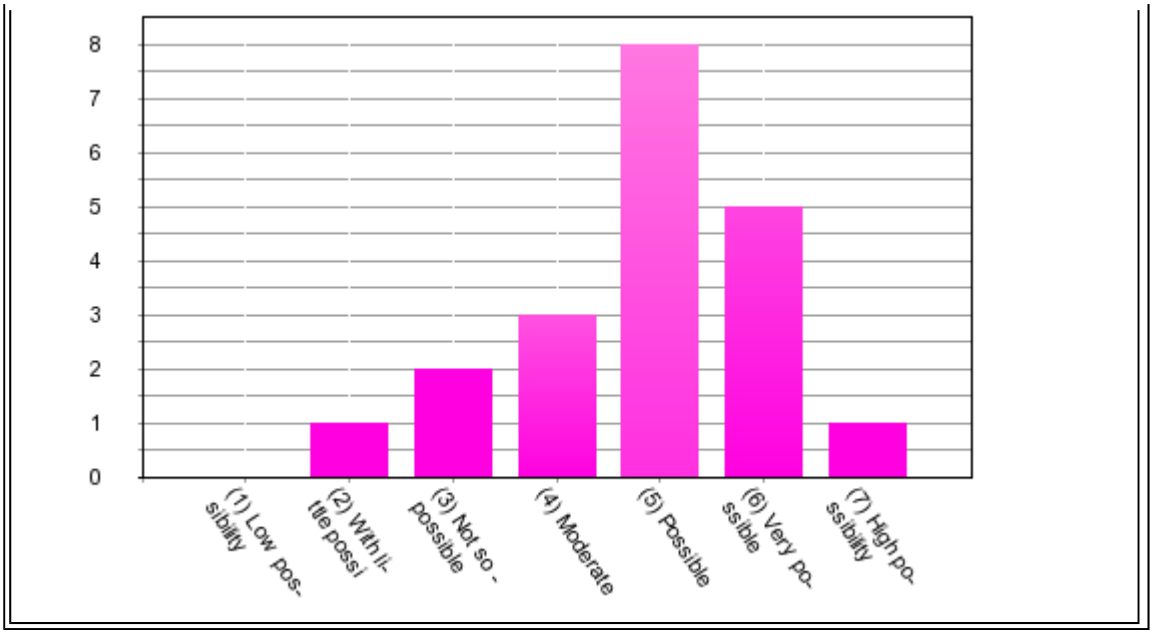
A possible barrier in the implementation of RSM could be the raise of legislation issues



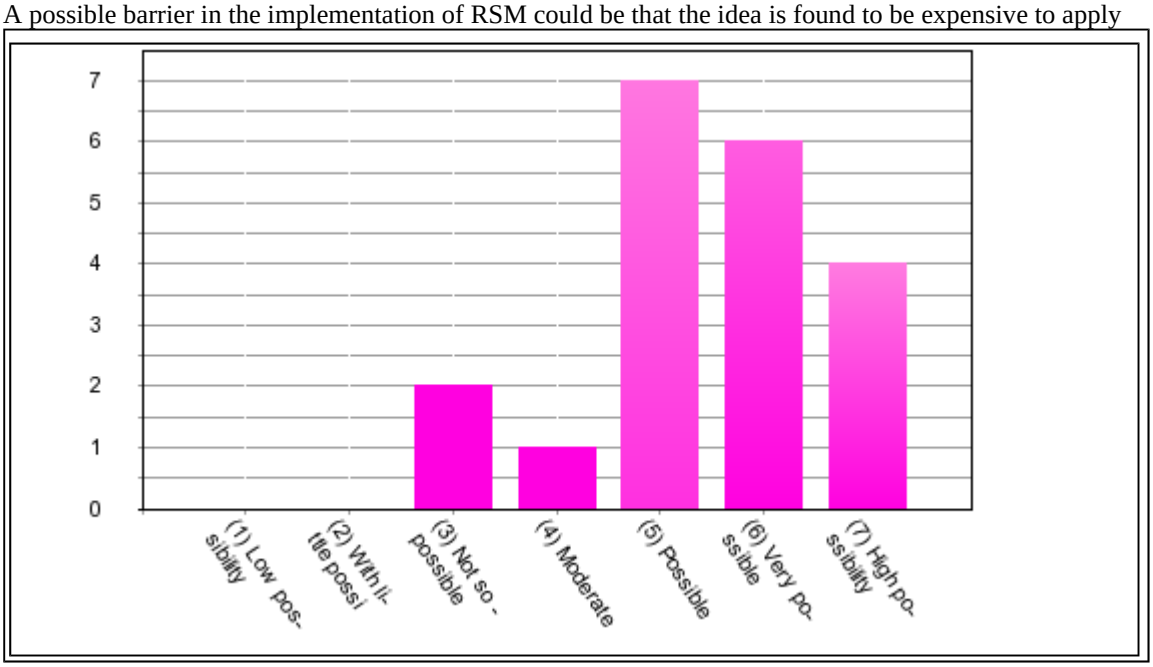
A possible barrier in the implementation of RSM could be the avoidance of companies to participate



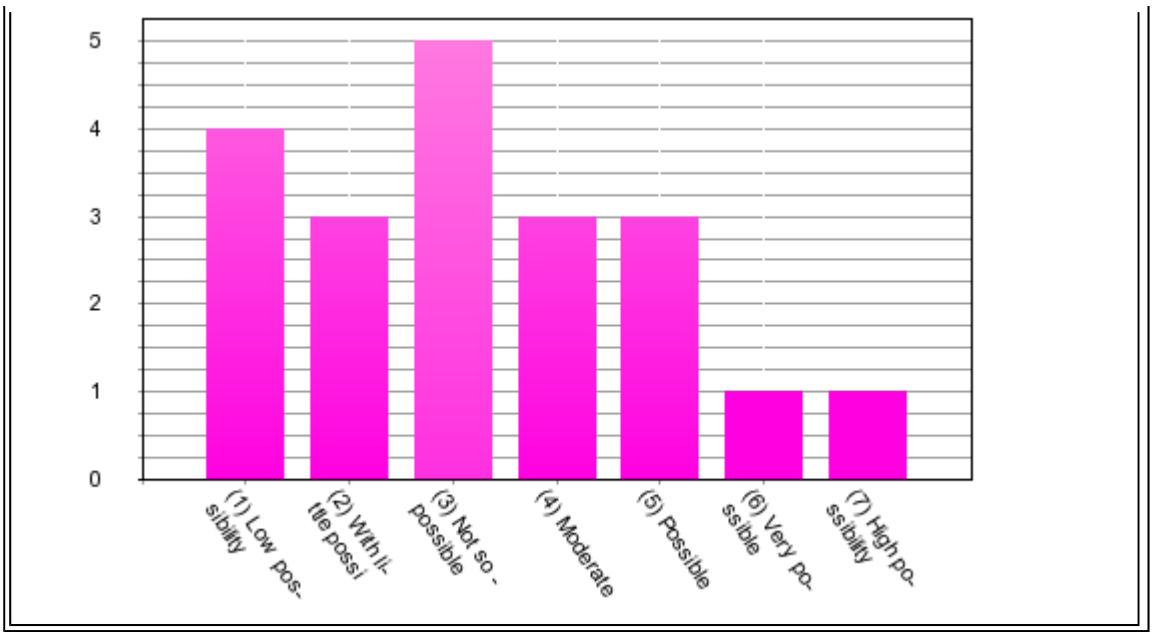
A possible barrier in the implementation of RSM could be the avoidance of individuals to participate



A possible barrier in the implementation of RSM could be that the idea is found to be expensive to apply



A possible barrier in the implementation of RSM could be the thought that there are no obvious benefits applying this service


5
4
3
2
1
0
(1) Low possibility
(2) Withlittle possi
(3) Not so possible
(4) Moderate
(5) Possible
(6) Very possible
(7) High possibility