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**ORGANIZATIONS ACTIVE WITHIN THE GREEN
ECONOMY:
TOWARD A SUSTAINABLE BUSINESS
ADMINISTRATION**

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INTRODUCTION

Since ancient times, the environment has played a major role in human life and culture. The Latins and Greeks were prolific in their writings on the close interconnection between man and the environment, stressing the importance of using the latter without destroying the natural equilibrium.

The ancient theme is once again highly topical. Human activities, whether in exploiting natural resources or in causing accidents, have altered the natural equilibrium and irremediably damaged the environment (e.g., the Exxon Valdez oil spill).

As a consequence, the “Green economy” and “Sustainable development” have become the focus of many studies and of both national and international directives. The IEA¹ Report presented in 2016 during the COP 22 in Marrakesh, demonstrates that the global economy is becoming “greener”. Because the field is profoundly interdisciplinary, it seems important to approach it initially in a multidisciplinary way, and then to analyze it through the lens of the business administration discipline.

In general, researchers have found substantial evidence of the importance of the Green Economy, but little attention has been paid to the link between it and the discipline of business administration. Therefore, the aim of this work is to answer two fundamental questions:

How are organizations involved in and affected by the Green economy?

¹ International Energy Agency.

What are the factors that influence the performance of a Green Economy Business such as, as the recycling business?

To achieve this aim, there will first of all be an analysis of the main literature on - and the legislation in relation to - the link between the natural environment and organizations, in order to propose an adaptation of the classification of the existing green businesses. Then, using a quantitative methodology, six hypotheses are developed regarding the possible factors that can be correlated with the performance of the recycling business in Italy.

The arguments here are elaborated in the thesis, which is structured as follows.

Chapter one reports on both the first studies of the environment in different eras (e.g., Tacitus or Hesiod), and the more recent literature developed in Italy (e.g., Masini, Miolo Vitali etc.) and abroad (e.g., Boulding, Stern etc.). Evidence of the link between the environment and the social system, and consequently with the economic/business system, is presented. “Non-sustainable development” brings with it environmental issues, such as waste and various kinds of pollution, be it of the air, water, soil, noise, or electromagnetic). In order to analyze the issue comprehensively, an interview was conducted with Dr. Kenneth R. Rafanelli, who explained pollution from the point of view of the discipline of physics. In order to confront environmental issues, international agreements have been signed and organizations must comply with the standards if economic development is to be sustainable.

The second chapter gives an overview of the Green economy, identifying the principal aspects along with the key moments in its development. The Green economy, which *results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities* (UNEP, 2011), affects and is affected by business administration. In order to deal with environmental issues, organizations can implement green practices or start new green business activities The Green economy model here used stresses two aspects:

the green practices implemented by organizations and the green businesses in which organizations can operate.

Chapter three focuses on green businesses and, after an analysis of the existing literature, proposes a “green business classification” adapted from the main business administration literature (e.g., Masini or Richardson) and international organizations (e.g., UNEP or OCSE). *Fondazione per lo Sviluppo Sostenibile* (FSS) demonstrates the positive trend of Italian green organizations during 2015.

Chapters four and five statistically analyse one of the green businesses, namely, the recycling business. To do so, I have used a quantitative method. Therefore, I have selected a sample of 87 Italian organizations whose core business is recycling, and using a model of multiple linear regression, I have studied the variables correlated with and influencing performance. The economic efficiency of a green activity has positive effects on the environment itself. This concept links the economic and environmental performance that organizations active within a green business implement. In fact, Waste management, and in particular the recycling activity, is a concrete application of sustainable development policy. The purpose of these two chapters is to analyze empirically a business that is part of the Green economy model linking business administration and the Green economy.

In summary, this thesis is both theoretically and empirically relevant for several reasons. First, it sums up the literature on the Green economy and analyzes it from a under the lens of the business administration; second, it proposes a classification of the green businesses, adapted from the Green economy and business administration literature and from the relevant legislation; third, it studies the general trend in - and the performance of - the Italian recycling organizations.

CHAPTER ONE

1. The ENVIRONMENT: theory and normative evolution

Since the most ancient of times, nature has been of great significance within human culture. Evidence of this is found in Greek and Latin literature. Here, nature is personified, and various elements are described as divine creatures who determine the variety of natural features and their impact on human life. Some examples are Γεα the earth, Αίολος the wind, Ποσειδών the sea, and the seasonal cycle is explained with the abduction of Proserpine by Pluto, god of Hades. Therefore, the relation between nature and mythology is evident, and the mythological is itself associated with the divine. This affinity is a proof of the importance attributed to nature and the essential connection between nature and human life. Man can alter and transform nature to take vital benefits. However, as Hesiod said, it is necessary to respect nature and to bear in mind that natural phenomena such as planets, stars and constellations cause the changes of the seasons with all their influence on agriculture.

Thus, for centuries humans have tried to achieve a lasting balance that would allow them to survive harmoniously with nature: using it for their own needs while revering it for its unique features and qualities.

1.1 The environment and human beings, a historical background

Animals and plants live in the biosphere, i.e., in an environment surrounding them with a very specific climate condition. No doubt, the environment is evolving significantly, and over time nature itself is changing accordingly. However, the change is not limited to this natural phenomenon. As Hesiod explained in Ἔργα καὶ Ἡμέραι², men can transform the environment to make it usable and exploit it to their advantage. Because of this, human actions have altered the terrestrial biosphere; they have caused changes in the soil, air and water and such transformations may result in environmental deterioration.

But the natural environment can also be changed by the action of endogenous agents such as slow movements of the earth's crust, earthquakes and volcanic eruptions. In addition, several exogenous agents may modify the structure and components of the biosphere, e.g. wind, frost, heat, snow, glaciers, the flow of water, the movements of the seas and rivers. These agents modify the earth destroying one part and forming another, thereby maintaining a certain balance.

When we turn to the classical literature, we find Tacitus in *Germania* (98 D.C.), describing Germany as entirely covered by forests. The Germanic tribes expanded the inhabited spaces by creating glades for both settlements and for the development of agriculture. In the same period, in the classical texts, Egypt and Mauritania are described as the granaries of the Roman Empire. Nowadays, most of this area is desert.

These are examples of changes in the environmental equilibrium: the first, described by Tacitus, was caused by man, and the second by natural events.

Human activity has often transformed the landscape through actions, which have irreversibly compromised the environmental equilibrium. With the beginning of

²Hesiod, Works and Days.

agriculture, humans started causing deep changes to the land. Man has exploited the environment for the sake of his personal livelihood. Because of the relationship between the development of the countryside and the exploitation of the environment, the natural environment has changed more and more. The trend began with the abuse of available resources, as if they were “at no cost” (which was indeed the case from a perspective of sheer economic cost). The ratio is simple to understand: the Earth was offering resources to humans, and the latter were using them.

For many centuries, the justification was founded in the Bible. The first chapter of Genesis commanded man to subdue the earth and to rule over the animals³.

1.1.1 The interconnection among the environment, society and business administration

At a certain moment, scholars started to study the economic effects of the changes in nature. Of immense importance, among others, was Wilson’s (1858) study on the drying up of the earth and the atmosphere. He was concerned about changes in the atmosphere that were slowly drawing close to a state in which it would be impossible for man to live on the earth. *This paper can be said to mark the onset of a truly international environmental debate in which processes operating at a global scale were being considered* (Grove, 1995, p. 159).

Awareness of the environmental evidence becomes prominent particularly during the late 1960s. Private and public entities started to study the regulation of activities causing pollution while at the same time there was a growing appreciation of the beauty of the natural environment.

³ Genesis 1,28: *God blessed them and said to them, “Be fruitful and increase in number; fill the earth and subdue it. Rule over the fish in the sea and the birds in the sky and over every living creature that moves on the ground.”*

During this period, there was no way to block the link between the environment and the economy. Politics began to adapt itself to these new ideas and realizations. Companies began to conform to new policies and new legislative provisions that led to the development of a system where health and environmental integrity acquired an ever-increasing importance.

A famous illustration of the economy-environment relationship is the ‘spaceship metaphor’, offered by the economist Kenneth Boulding (1966). The old open economy saw a world with limitless resources to be exploited, whereas the closed economy of the future, by contrast, could be considered as a “spaceman economy” in which an astronaut lives with very limited resources, finding his place “in a cyclical ecological system.”

Therefore, a new branch of the discipline of economics came into being with a view to studying the interactions between the environment and socio-economic development, setting a limit to the constant growth of production, to the use of resources, and to the amount of waste to be disposed of.

Granovetter (1985) in his well-known paper “Economic action and social structure: the problem of embeddedness”, studied the interconnection between the economy (and, so, organizations) and society. He claims that behaviour and institutions are constrained by ongoing social relations, and he defines embeddedness as the economic relation between individuals or firms that are embedded in actual social networks.

Inevitably, the aforementioned environmental and social aspects have strongly influenced the discipline of business administration.

Within the Italian business administration literature, this leads to the development of environmental and social studies (A.A. V.V., 1998⁴). In line with this, the

⁴ The Accademia Italiana di Economia Aziendale focused the XX National Conference on environmental matters. In fact, a number of Italian scholars have studied the topic. Among others

concept of “organization” has evolved: initially considered exclusively as an economic structure, now it is seen as an economic-social system (Orlandini⁵, 2016).

The Italian precursor was Masini (1955; 1960; 1970). He argues that the main purpose of a company is the promotion of the people involved with the organization (social values) with respect to the environment in which the business operates (Campedelli, 2005; Secchi, 2006). The organization must strive to *satisfy the social system, because only the continuity and development of the social system may enable the organization (in a purely economic sense) to continue its activities* (Gazzola, 2012, p. 29).

In line with this, the socio-economic aspect is highly relevant within the business administration field. In fact, Bruni and Campedelli (1993), studying the value of intangible assets, stress the importance of the relationship between the organization and the environment considered from both a physical and a socio-economical point of view.

More recently, an excellent explanatory framework has come from the study by Jennings and Zandbergen (1995, p. 1018). They proposed a model of sustainability (see figure 1.1), which includes the relationship of ecological⁶ and social systems: *Biosphere ... encompasses all elements of both the social and the ecological system... Sources are the energy and natural resources (also referred to as natural capital), which are transferred from the various ecosystems ... to the economy (a*

Miolo Vitali, (1978). *Problemi ecologici nella gestione delle aziende*; Maticena, (1984). *Impresa ed ambiente, il bilancio sociale*; Ferrara, (1998). *L'etica ambientale nella economia delle imprese tra conflitti e condivisioni*; Catturi, (1990). *Produrre e consumare, ma come? Verso l'ecologia aziendale*, just to mention a few.

⁵ Mentioning the main Italian scholars such as Masini (1970) or Bertini (1990), Orlandini provides evidence of the interconnection between business administration and social aspects.

⁶ The word “ecology” was coined by a German zoologist, Ernst Haeckel (1834 – 1919), who applied the term *oekologie* to the relation of the animal both to its organic as well as its inorganic environment. The word comes from the Greek *oikos*, meaning household, home, or place to live. Thus, ecology deals with the organism and its environment.

R.L.Sm., Ecology, in *Encyclopædia Britannica*, Vol. 6, 1974, p. 197.

subsystem of the social system). The sinks are the physical components of the natural environment (air, land, and water) for the assimilation of ... waste.

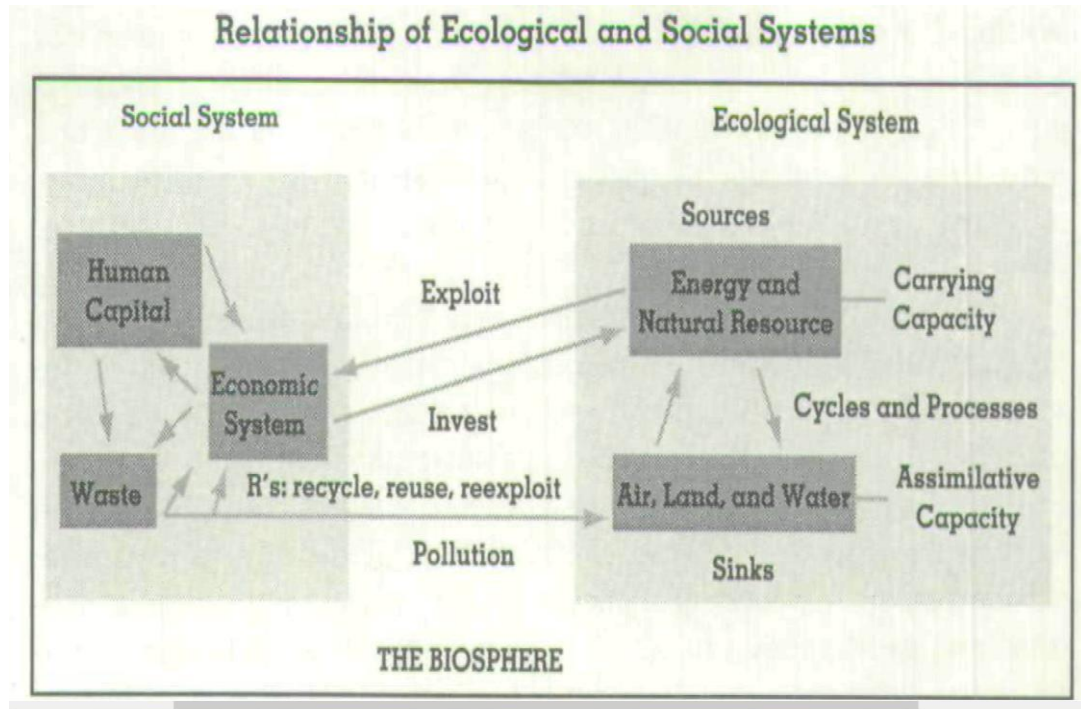


Figure 1.1 Source: Jennings and Zandbergen (1995) p. 1019

Jenning and Zandbergen's model clearly explains the importance of natural sources within the social system, and therefore within the economic system (figure 1.1). In this model, the organizational system has to fit in such a way that each system (i.e., organizational, social and ecological system) contributes to sustainability (Egri & Pinfield, 1999). Jennings and Zandbergen explain how the systems are correlated in various ways. For example, the economic system produces waste that, in the form of pollution, uses the assimilative capacity of nature. Nevertheless, the economic system can consider waste as a resource (through recycling, reusing reexploiting and so on). So, the equilibrium should be achieved by a cooperation of the elements of the systems. If the balance is not achieved and the social system prevails, it will produce pollution that can destroy the ecological system that will, in turn, consequently destroy the social system. This can be called the "*cittadinanza sociale*

*d'impresa*⁷” (Vaccari, 1998) meaning the political, social and environmental relationships that an organization develops by investing, for example, in efficient recycling systems or projects for environmental protection and improvement (Mucelli, 2000).

In summary, the interconnection of business, environment and society is evident (Williamson et al., 2006), and if one aspect - regardless of which – prevails, it can destroy the others.

1.2 Environmental issues

Because of the strong correlation between the environment, the economic and the social systems, it seems mandatory to explain what could be the economic and social consequences of the maladministration of nature.

Accidents caused by economic activities can cause tremendous damage. Exxon Valdez is an extreme example of an accident that caused both economic and environmental damage.

In March 1989, the super-tanker Exxon Valdez crashed onto a reef in Alaska's Prince William Sound and spilled 11 million gallons of crude oil (Hall & Stammerjohan, 1997). The Wall Street Journal (Schmitt, 1989) reported:

Despite multiple insurance coverage, Exxon Corp. and Alyeska Pipeline Service Co. may be on their own in paying for what is likely to be the Alaska oil spill's most costly ripple effect: punitive damages against the two companies. Lawsuits are piling up in state and federal courts in Anchorage, seeking punitive damages against Exxon and the Alyeska consortium, of

⁷ Social corporate citizenship

which Exxon is a member. But many states bar companies from relying on insurance to pay for punitive damages that are the result of "willful misconduct".

The terrible damage caused by Exxon has evident implications for the natural environment (the exact extent of the damage is unknown but includes millions of deaths among sea birds, otters, seals, bald eagles fish and whales). The economic impact amounts to US \$507.5 million⁸. This case study shows the direct impact of human activities on the environment that have had consequences on nature, animals and human health and on the economy. Consequences are evident also for the organization: Exxon had to pay compensatory and punitive damages and the ship was renamed *Exxon Mediterranean*.

However, it is clear that money can compensate only for a part of the real damage: the economic damage, and not the natural one, because the effect on the environment, animals and humans is irreparable.

Even so, the environmental issue is a matter of dispute and not shared by everybody in the same way. It is well known that human activity has an impact on the environment, but the specific effects are not. For example, Stern (2007) and Lawson (2009) have written about climate change.

Stern (2007) stresses the importance of global action to take care of the environment in order not to be overwhelmed by irreparable problems, and highlights the link between organizations and the environment. The latter is particularly influential on economic progress, healthcare and technological innovation. Taking care of the environment, reducing the pollution and contamination is a necessary strategy for survival in the future.

⁸ *The Supreme Court on Wednesday reduced what had once been a \$5 billion punitive damages award against Exxon Mobil to about \$500 million.* Gold, R. & Bravin, J. (2008). Exxon Oil- Spill Damages Slashed by Supreme Court, The Wall street Journal, June 26.
<http://www.wsj.com/articles/SB121439747291503111>.

On the contrary, Lawson (2009) claims that there is no need to worry about this problem, because the importance and urgency accorded to environmental matters are a result of political propaganda.

From the current international agreements (e.g., Paris Agreement, 2015) it is evident that climate change is decisive importance for the environment, humans, and business. Therefore, conflicting visions do not mean totally different problems: the pollution growth is proved, the effects can be different depending on what is contaminated.

1.2.1 Pollution

The term "environmental pollution" is the change in the biosphere composition caused by pollutants and emissions from various human activities in industry, agriculture, and urban areas. This change has a negative connotation because it interferes with the growth rate of the species, and causes damage both to human health and the environment. Therefore, pollution is defined as the introduction by man of substances or energy into the environment liable to cause hazards to human health, harm to living resources and ecological systems, damage to structures or general quality of life, or interference with legitimate use of the environment (Hodgate,1979).

The specific consequences of the different pollutants depends on the quantity of pollution released and on their own characteristics.

There are different types of pollution and for each of them the causes, sources and the effects are different. In particular, they are: air pollution that changes the composition of air; water pollution that modifies the composition of the water; land pollution that changes the composition of the soil; noise pollution that alters the sound in a specific environment; electromagnetic pollution that alters the natural values of the electromagnetic field.

Pollution is an inevitable result of industrial development. Human activities, which are promoted and supported by economic development, produce most of the contaminants. The economic processes (mining, processing or manufacturing, and consumption), necessarily generate waste that inevitably will come back to nature. This involves a biological change and damage to animals, plants, and to the ecosystem⁹, i.e. contamination that is defined as pollution (Turner et al., 1993). The latter has direct effects on the economy. In this field, one of the first researchers was Pigou (1920), who introduced the concept of "externalities": pollution causes external costs that result in a gap between private costs and social costs.

The next sections explain the different types of pollution mentioned above. To define them, I refer mainly to the Encyclopaedia Britannica; after that, there is an explanation of the waste issue, which is the main topic of this work and one of the most dangerous outputs of human activity.

○ **Air pollution**

*Air pollution, release into the atmosphere of various gases, finely divided solids, or finely dispersed liquid aerosols at rates that exceed the natural capacity of the environment to dissipate and dilute or absorb them*¹⁰. This type of pollution exists when the chemical and physical equilibrium, and so the percentage of elements, is changed.

It is caused by human activity, for example during the combustion process of engines, in power plants producing electrical power and in industrial plants, or by nature (e.g. volcanoes, the spread of fires and some biological processes).

⁹ The term "ecosystem" was first proposed by a British ecologist Arthur George Tansley (1871 – 1955) in 1935.

E.P.O., Ecosystem, *Encyclopædia*, Vol. 6, 1974, p. 281.

¹⁰ Air pollution. (2016). In *Encyclopædia Britannica*. Retrieved from Encyclopedia Britannica Online: article 471713.

I have asked to Dr. Kenneth R. Rafanelli, Emeritus Professor of Physic at Queens College, to explain the process that causes pollution.

The byproducts of combustion are Carbon monoxide (CO) and Carbon dioxide (CO₂). CO₂ is stable and will not break down. CO is unstable and seeks an O to make it stable. Both end up in the upper atmosphere.

Now when the sun's radiation (mostly electromagnetic) enters the atmosphere the radiation is high energy (high frequency and low wave length) which easily passes through the CO₂. However, when this radiation scatters from ground objects and gets reflected back its frequency is lower (high wave length). CO₂ reflects this back again, hence heating the surface even more. [This process causes global warming.]

An abundance of trees helps to absorb the CO₂, but deforestation reduces this.

We already discussed the CO seeking another O to form CO₂. It finds this O in the ozone (O₃) layer. Ozone reflects the high energy in coming radiation, so reducing that is dangerous.

Therefore, the main causes of air pollution are closely linked to social development: population growth, urbanization, the increase and concentration of industrial activity, the development of transport and agricultural activities are clear examples. These substances may reach concentrations in the air that cause undesirable health, economic, or aesthetic effects. In particular, it is dangerous because of the carbon monoxide, which hinders the transport of oxygen in the blood, and because of the greenhouse effect that causes global warming:

CO₂ and other things like methane are called greenhouse gases because they do the same thing the glass does in a greenhouse, that is reflect back the radiation. – Professor Rafanelli.

It is important to think about what air pollution can cause: around 6,5 million premature deaths per year (IEA, 2016¹¹).

○ **Water pollution**

Water pollution, is the *release of substances into subsurface groundwater or into lakes, streams, rivers, estuaries, and oceans to the point where the substances interfere with beneficial use of the water or with the natural functioning of ecosystems. In addition to the release of substances, such as chemicals or microorganisms, water pollution may also include the release of energy, in the form of radioactivity or heat, into bodies of water*¹².

Almost 71% of the Earth's surface is covered in water, so how come that it is scarce? We have to consider two main aspects: availability and quality. In fact, 97% is salt, and 2% is unavailable because it is too dirty and polluted. This percentage clearly explains that the “usable water” (just 1%) is really precious and scarce, especially when we consider that it is used for agriculture, industry and human necessity.

○ **Noise pollution**

*Noise pollution, unwanted or excessive sound that can have deleterious effects on human health and environmental quality. Noise pollution is commonly generated inside many industrial facilities and some other workplaces, but it also comes from highway, railway, and airplane traffic and from outdoor construction activities*¹³.

Sound is a vibration that is received and perceived by the brain.

¹¹ World energy outlook special report 2016: Energy and air pollution.

¹² Water pollution. (2016). In *Encyclopædia Britannica*. Retrieved from Encyclopedia Britannica Online: article 473593.

¹³ Noise pollution. (2016). In *Encyclopædia Britannica*. Retrieved from Encyclopedia Britannica Online: article 474197.

Article 2 of the Law 447/1995 defines noise pollution as the introduction of noise in residential or outdoor environments that is annoying or disturbs rest and other human activities, that is a danger to human health, that causes the deterioration of the ecosystem, material goods, monuments, and the residential or outside environment, or that interferes with the normal functions and uses of the various environments themselves.

The pollution caused by noise can disturb the psyche, the nervous system, the endocrine balance apart from hearing loss. Impacting as it does on human health, it is today considered to be one of the main causes of the deteriorating quality of city life.

As in the movie "Back to the Future," if we travelled back two centuries we would certainly be deafened by the silence. But for how long was our habitat permeated by silence? And when did noise begin to accompany our daily lives? First the industrial revolution and then technology introduced noise as one of the most evident signs of "progress advancing." So, between the nineteenth and twentieth centuries, the noise of industry, the roar of cars and airplanes, the din of music and of various media have invaded the world, becoming a kind of secular *religion of modernity* (Dorfles, 2008).

○ **Electromagnetic pollution**

Electromagnetic radiation, *is the flow of energy at the universal speed of light through free space or through a material medium in the form of the electric and magnetic fields that make up electromagnetic waves such as radio waves, visible light, and gamma rays. An electromagnetic wave is characterized by its intensity and the frequency ν of the time variation of the electric and magnetic fields*¹⁴.

¹⁴ Electromagnetic radiation. (2016). In *Encyclopædia Britannica*. Retrieved from Encyclopedia Britannica Online: article 106022.

The so-called "electro-smog" is the alteration of values in the natural electromagnetic field. It can be expressed as the relationship between electromagnetic radiation and health.

Each body emits electromagnetic radiation that depends on the temperature at which it is located. Therefore, there is a natural electromagnetic level. The alteration of this level produces perturbations at generic level and in cells in the human body. The effects depend on the frequency, time of exposure, and intensity, and they can be toxic or carcinogenic depending on whether they occur in short or long periods. The existence of a significant risk to health is complex and controversial. Its characteristic "invisibility and intangibility" makes it less intrusive and so it is taken less into account, which is why awareness campaigns have recently been seeking to draw attention to it.

○ **Land pollution**

Land pollution, is the *deposition of solid or liquid waste materials on land or underground in a manner that can contaminate the soil and groundwater, threaten public health, and cause unsightly conditions and nuisances*¹⁵.

It could be:

- **visual field:** changes in the landscapes caused by any kind of waste;
- **chemical field:** chemical, physical and biological disturbance of the land's essential qualities, affecting the food chain (for example through absorption by plants or aquifers);
- **from pathogenic agents:** coming from decaying organic matter. It can be viral, fungal and parasitic.

The use of raw materials involves a dual balance alteration: on the one hand the extraction, or removal, of some materials from their natural environment resulting

¹⁵ Land pollution. (2016). In *Encyclopædia Britannica*. Retrieved from Encyclopedia Britannica Online: article 474195.

in a diminution of the substance itself; on the other hand the use of these substances requires processing that needs a large amount of energy which in turn produces huge accumulations of waste which will be placed in the surrounding environment. Therefore, human activity uses a quantity of substances that the planet is not able to manage or assimilate because it is higher than its absorption capacity. One of the main causes of this type of pollution is waste, which can be solid, liquid and gaseous fuels, and, if organic, can be biodegradable, otherwise plant protection products, hydrocarbons, dioxins, heavy metals and radioactive waste.

Land pollution can have effects on both human health and on the ecosystem in general. Man's direct contact with contaminated land can cause diseases and infections, but humans can be affected also if they eat vegetables grown on unhealthy land or animals, which have grazed on polluted land. Possible clinical effects depend on the chemical nature of the contaminant, on the mode and duration of exposure and on individual genetic factors. Typical examples, in varying degrees of severity, are damage to the nervous system or the brain, and a higher chance of being affected by leukemia, headaches, nausea, fatigue, skin irritation, or breathing difficulties.

Effects on the ecosystem are chemical changes in the composition of soil, altered metabolism of microorganisms and arthropods and so alteration of the whole food chain, which can result in the extinction of certain animal and plant species.

1.3 Waste

Waste is here studied as both an environmental and an economic problem. It is first given a definition and then the waste management regulations are studied along with the socio-environmental impact.

The definition of waste¹⁶ in this work is the legislative definition found in the Basel Convention: *Waste are substances or objects which are disposed of or are intended to be disposed of or are required to be disposed of by the provisions of national law*¹⁷.

At a European level, the previously mentioned legislation is possibly the first and most exhaustive in the waste field. The Basel Convention was signed in 1989 and came into force on May 5th, 1992. It was arose out of the enormous complexity of waste management: the great diversity of waste, which is of varying degrees of dangerousness, coming either from different human activities or from natural events, that can “be absorbed” by nature or not, and so on.

For these reasons, the aforementioned legislation categorizes waste and regulates how to handle and dispose of it as close as possible to the place of production thereby reducing the environmental risk implicit in transportation to developing countries (Marzetti, 2001).

The Basel Convention made a change in the environmental situation, by now really in danger, that many developing countries or "economies of the transaction" were experiencing. In fact, many large industries are using these countries for waste disposal, because they are less "controlled" and certainly cheaper. As a result, however, not only the environment is threatened but also human health. Therefore, the Convention of 1989 established a genuine system of checks with regard to both imports and exports and the disposal of hazardous and non-hazardous waste.

¹⁶ Thinking about what waste is and how unambiguously to define it is not easy. Is waste a *res nullius*? No, in fact person in possession is liable for its management. Is waste something that nobody wants? No, there is a market for it. At first, the problem may seem trivial. Economic operations such as production, research and development, inevitably create waste products. In the last two decades of the 20th century, waste became a major issue for states and from a political point of view. As a consequence of that, the topic “waste”, is here analyzed from a legislative point of view.

¹⁷ Basel Convention, on the control of transboundary movements of hazardous wastes and their disposal, adopted in 1989, article 2.

The Italian legislation, article 184 of Legislative Decree 205/2010, identifies two categories: one is based on origin (whereby waste is classified as urban or special waste), while the other is according to the dangerous characteristics with waste classified as either dangerous or non-dangerous.

The operation of waste classification is assigned to the producer (or holder), who bears the obligation and thus the responsibility to assess it carefully for the purpose of allocating a code: the CER¹⁸ code.

The importance of such classification lies in both the indication of the type of waste (that can be subjected to different regulation), and in the distinction between “waste” and “non-waste” (i.e. between substances or objects which do not respect anymore the main and substantial waste characteristics and the so-called “end of waste”). This may be identified when waste undergoes specific operations, such as retrieval. What is meant by retrieval activity, as regulated by Legislative Decree 152/2006 in article 181, is the reuse, recycling and other forms of recovery. The result is a departure¹⁹ from the regulations with regard to the type of waste in question.

In the recent period, another important European regulation has been the Directive 2008/98/CE on waste management. The Directive has identified a hierarchical order of priority as to how to handle waste. Specifically, article 4 has established the following order on waste management and prevention:

1. prevention;
2. preparing for re-use;
3. recycling;

¹⁸ *Catalogo europeo dei rifiuti* (acronym CER).

¹⁹ Directive 2008/98/CE of the European Parliament and of the Council of 19th November 2008 on waste defined in art.6 the “End-of-waste status”: the substance or object is commonly used for specific purposes; a market or demand exists for such a substance or object; the substance or object fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products; and the use of the substance or object will not lead to overall adverse environmental or human health impacts.

4. other recovery, e.g., energy recovery;
5. disposal.

It is important that member states try to encourage the best way to avoid damaging the environment. That means that they must ensure that waste management does not jeopardize human health either. Waste can be subjected to a “salvage operation”, when it is no longer considered to be waste and therefore no longer subject to this law.

The Directive lays down measures to protect the environment and human health by preventing or reducing the adverse impacts of the generation and management of waste and by reducing overall impacts of resource use and improving the efficiency of such use²⁰. This refers to the hierarchical priority of waste management that takes into consideration the impact on environmental and human health. Indeed, the legislators, intending to promote an ecological strategy, wanted to stress that certain activities have a lesser impact on the environment and human health, and that they should be favoured over the others.

From the Directive 2008/98/CE, it is clear that recycling is not considered as the first best, which would be prevention. However, if this is impossible, the best way to handle waste is reuse or processing. Subordinately, recycling is the used practice. The last alternative is the disposal of waste in precisely demarcated places, equipped in conformity to the law.

Waste management is strictly interconnected with several matters such as health care, public administration, local legislation, education, philosophy, philanthropy and so on. Inappropriately managed public or private waste can cause health and civic issues. An efficient waste retrieval system, in fact, must involve both citizens and organizations. Suppliers should devise a “sustainable product”; this may facilitate both a lesser waste of resources in the transformation phase and an easier retrieval of the used products. Consumers (and so citizens) may contribute by

²⁰ Directive 2008/98/CE of the European Parliament and of the Council of 19 November 2008, on waste and repealing certain Directives, Art 1, “Subject matter and scope”.

efficiently managing the products capable of being retrieved (for instance through waste separation)²¹.

1.4 Normative reaction to face environmental issues

As we have seen in the waste management field, law has a dominant role within the economic system, and it influences the growth of new businesses and practices. Especially in this context, it has been established that *the more tightly coupled representational, constitutive, and normative rules are to sustainability, the more likely the institution will be perceived as unique and will have an impact on sustainability* (Jennings & Zandbergen, 1995, p. 1036).

One of the first environmental protection law is dated back to 1769, when it was decreed that Mauritius' forests should be safeguarded. Through the cultural development, spread awareness that such resources were not "free of charge". The French environmental protection in Mauritius is the evidence of an important and innovative revolution in thinking: the acknowledgment of a link between deforestation and local climatic changes (Grove, 1996). After all, deforestation²² is made by man, implemented in order to use land for a different aim than the forests'

²¹ Individuals are fundamental in this field. "Organizational citizenship behavior", is defined by Organ as individual behavior that is discretionary, not directly or explicitly recognized by the formal reward system, and that in the aggregate promotes the effective functioning of the organization (1988, p. 4). Organ suggests that such "organizational citizenship behaviors for the environment" are a distinct and important aspect of organizational behavior and there is a strong relation between citizenship behaviors and environmental performance (Organ, 1988; Podsakoff et al., 2000; LePine & Erez, 2002; Boiral, 2009; Daily et al., 2009; Boiral & Paille, 2012).

²² More details of the chemical and social relevance of forests were explained in the 1.2.1 paragraph "air pollution".

preservation, generally by using it first for agricultural and then for industrial purposes. Consciousness was going to change. The development of industrial economy was deemed by many scientists to represent “a threat to mankind’s survival”.

Therefore, legislation, and in particular the international law, has a relevant role in facing the environmental issue. In fact, only measures that involve the entire International context will successfully attenuate the current and future dangerous situation of the polluted environment.

Accordingly, the European Committee, passed the Sixth Environment Action Program (2005) issued six sustainability strategies (Atlas, 2007):

1. **Climate Changes** - with the aim of minimizing gas emissions;
2. **Nature** – with the aim of protecting and restoring the functioning of natural systems;
3. **Biodiversity** – with the aim of limiting the impoverishment of biodiversity;
4. **Health** – to create a quality environment that will no longer expose human health to hazards and risks;
5. **Quality of life** – to guarantee the application of norms that will reduce pollution levels;
6. **Waste** – to control that resource consumption do not outpace the environmental capacity.

European Union, using the six strategies mentioned above, first articulated in 2005 and after reconfirmed by the Road Map released in 2011, aims to carry out a broad but specific analysis of the environmental problems and sustainability topics, specially emphasizing the long-term impact on the society. Since December 21st, 2005, the European Union has adopted waste management practices. More recently, Europe 2020 has showed the intention of the EU to become a smart, sustainable and

inclusive economy. Therefore, sustainable growth leads an efficient use of resources, and it is in line with an international competitive economy.

So, Europe leads to a sustainable development that is defined as the development that meets the present needs without compromising the ability of future generations to meet their own needs. This definition comes from the UN Bruntland Commission, the World Commission on Environment and Development (Bruntland, 1987). By socio economic growth, is meant the business development related to the society values.

European Union has purposed the Directive 2004/35/CE on environmental liability. The aim of the Directive is preventing and remedying, insofar as is possible, environmental damage because there are currently many contaminated sites in the Community, posing significant health risks, and the loss of biodiversity has dramatically accelerated over the last decades. From this introduction, it is clear that the European Union is focused on human and environment healthcare.

The same directive, article 2, in fact, defined several concepts as the followings.

- **Environmental damage** means: damage to protected species and natural habitats, which is any damage that has significant adverse effects on reaching or maintaining the favorable conservation status of such habitats or species. The significance of such effects is to be assessed with reference to the baseline condition;
- **Damage** means: a measurable adverse change in a natural resource or measurable impairment of a natural resource service which may occur directly or indirectly;
- **Occupational activity** means: any activity carried out in the course of an economic activity, a business or an undertaking, irrespectively of its private or public, profit or non-profit character;

- **Emission** means: the release in the environment, as a result of human activities, of substances, preparations, organisms or micro-organisms²³.

More recently, the 2015 United Nations Climate Change Conference, COP²⁴ 21 or CMP²⁵ 11²⁶, was held in Paris from 30 November to 12 December 2015, and entered into force on 4 November 2016.

The agreement brings nations to combat climate change. In particular, it aims at keeping the global temperature rise below 2 C° above pre-industrial levels. To do so, financial flows, a new technology framework and an enhanced capacity-building framework will be put in place.

Therefore, recent normative shows the responsibility of the human and economic activity on the environment.

Starting from the Greeks and Latins respect of the nature, and then considering the legislative evolution and the strong interconnection among natural environment, society and economy, it is evident that the topic has been studied and adopted from a long time and that involves a large number of different fields.

No doubt: the environmental protection is of primary importance and the economy system has to consider it; and this is the focus of the Green economy.

²³ Directive 2004/35/CE, Article 2.

²⁴ Conference of the Parties (COP).

²⁵ Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP).

²⁶ Known also as the “Paris Agreement”.

CHAPTER TWO

2. GREEN ECONOMY for BUSINESS ADMINISTRATION

*As president, I will bring all the parties and stakeholders together.
I am going to come up with a solution that respects the
environment and does not cause an upheaval in the economy.*

- Al Gore

2.1 Definition and phases

There is no internationally-agreed definition of the Green economy. In fact, the Green economy is strongly interconnected with multiple fields and its definition and interest can change depending on the area to which it refers. In this work, it is considered primarily the business-law field and for this reason, definitions made by the United Nations Environmental Programme²⁷ (UNEP) and business administration scholars are here reported.

In fact, the aim of this chapter is to analyse the Green economy from the perspective of business administration. In accordance with the studies by the main scholars and

²⁷The UNEP is the leading global environmental authority that sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development within the United Nations system and serves as an authoritative advocate for the global environment. <http://www.unep.org/>.

international institutions, a Green economy model, including green practices and green businesses is here proposed.

UNEP has defined the Green economy as *one that results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. It is low carbon, resource efficient, and socially inclusive. In a Green economy, growth in income and employment should be driven by public and private investments that reduce carbon emissions and pollution, enhance energy and resource efficiency, and prevent the loss of biodiversity and ecosystem services* (UNEP, 2011²⁸). This is the most widely recognized definition; in fact, the most relevant institutions in the field, such as United Nations Environment Management Group (EMG) and Organisation for Economic Co-operation and Development (OECD), use the same definition. Hence, UNEP has clearly focused its attention on the important consequences of human actions on both the environment and society.

The close interconnection between human life and the environment also extends to such matters as healthcare, politics, philosophy, and socio-economic progress (Lounsbury et al., 2003) and so on.

Analysing UNEP's definition in detail, we see that it focuses on the results of the Green economy and so, it does not specifically highlight concerns from a business point of view.

The aforementioned link is particularly important for human activities, as business activities that inevitably affect the environment and vice versa are influenced by it. No doubt, business is made by human activity, and because of that, it influences and it is influenced by the environment.

²⁸ For other definitions of Green Economy, see UNDESA, (2012). A guidebook to the Green Economy. Issue 1: Green Economy, Green Growth, and Low-Carbon Development – history, definitions and a guide to recent publications, Division for Sustainable Development, p. 63.

To analyse the Green economy from a business administration point of view, it is important to give an overview of the main aspects and the chronological evolution of the field.

UNEP Green Job Report (2011) has pinpointed the key aspects of the Green economy, as here summarized:

1. A Green economy recognizes the value of, and invests in, natural capital;
2. A Green economy is central to poverty alleviation;
3. A Green economy creates jobs and enhances social equity;
4. A Green economy substitutes renewable energy and low carbon technologies for fossil fuel;
5. A Green economy promotes enhanced resource and energy efficiency;
6. A Green economy delivers more sustainable urban living and low-carbon mobility (Nhamo & Pophiwa, 2014).

The most important moments in the history of the Green economy are summarized in the following figure (figure 2.1), which shows the relevant international conferences and agreements.

As we can see, in recent years the number of events rose, proving the increasing importance of the environment.

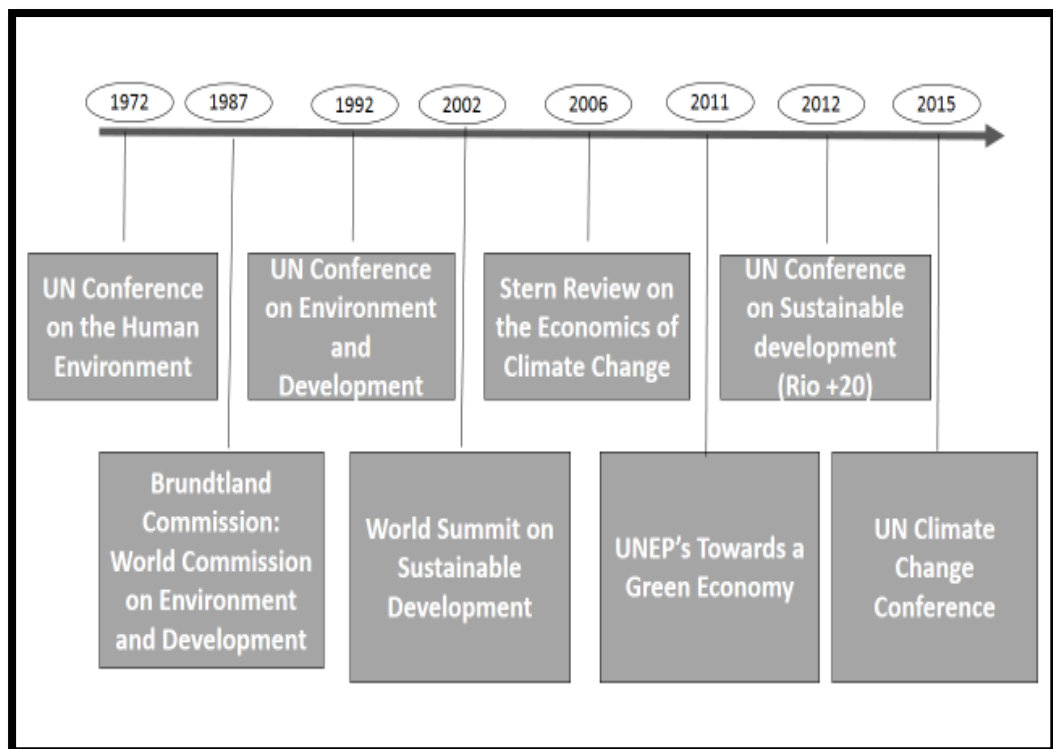


Figure 2.1. Green economy phases. My elaboration from Li et al. (2015)

Where:

- **UN Conference on the Human Environment:** discussion of the state of Global Environment, resulting in the Stockholm Declaration;
- **Brundtland Commission:** World Commission on Environment and Development: definition of ‘sustainable development’;
- **UN Conference on Environment and Development:** plans for sustainable development;
- **World Summit on Sustainable Development:** agreement to focus on threats to sustainable development, resulting in the Johannesburg Declaration
- **Stern Review on the Economics of Climate Change:** Plans to reduce global warming;

- **UNEP's Towards a Green economy:** focus on poverty and the Green economy;
- **UN Conference on Sustainable development (Rio +20):** fixed economic and environmental goals;
- **UN Climate Change Conference:** combating climate change, resulting in the Paris Agreement.

Now, the importance of the environmental aspect within the economic and business field is particularly clear, first because we are living in the “Anthropocene Era”, which *represents a new phase in the history of both humankind and of the Earth, when natural forces and human forces became intertwined, so that the fate of one determines the fate of the other* (Zalasiewicz, et al., 2010, p. 2231). Second, because it represents also a strategic advantage for organizations (Ambec & Lanoie, 2008). For example, more than 300 organizations, asked the then president-elect of the United States Mr. Trump to keep the low carbon policies championed by Mr. Obama. They have written: *failure to build a low carbon economy puts American prosperity at risk*²⁹.

As we can see, scholars in different fields (Zalasiewicz of Geology; Lounsbury of business administration and so on) have focused their attention on the natural interdependence of the environment and human activity. In particular, this link is evident within the business administration field, because organizations can manage their activities according to a sustainable development policy (that means also in compliance with international law), in order to avoid any break of this delicate balance and to gain strategic advantages.

²⁹ Jacopo Prisco and Isa Soares, Ban Ki-moon: 'Trump should work for humanity'. 18 November 2016, CNN.

2.2 Sustainable development and business administration

Proven the close relationship among economy, environment and society (Williamson, Lynch-Wood & Ramsay, 2006) this paragraph analyses the effect of sustainable development on business administration.

Society needs natural resources, which derived from the environment, both to live and to carry out activities, such as economic activity. Therefore, nature has an “own capital” that can be used by man to transform it as an artificial capital.

In fact, goods and services fulfil human’s needs. Fulfilment is strictly linked to resources availability, economic and social development. It has inevitably entailed repercussions on the environmental balance, such as “negative externalities”. Already Malthus (1798) had concerned himself with the limits, which he had termed as absolute and that exist in the relationship between population and economic resources.

The limited availability of resources, gave rise the problem of a sustainable development; in other words, the tendency is to promote social-economic growth that might be sustained over time both by the natural environment and by society. This concept is well known as “*Green Development*” (Adams, 2001) that is the *development that meets the needs of the present without compromising the ability of future generations to meet their own needs* (Brundtland, 1987)³⁰. As a consequence of that, companies have to consider simultaneously their financial, social, and environmental performance (Marshall & Brown, 2003, p. 101), keeping services and quality of natural resources.

³⁰ Released in 1987 by the World Commission on Environment and Development (WCED). It introduces the concept of sustainable development.

Inevitably, economy is linked also to natural resources, which are divided into renewable and non-renewable.

Gray and Hotelling have studied the correlation between economy and non-renewable resources. Referring to the manufacturing industry, it is identified an optimal rate of resources exploitation in order to not affect the future extraction quantity. In order to achieve it, it is identified a value that is the cost of utilizing the non-renewable resource, which includes both the extraction cost and the user cost (Gray, 1914). The latter, however, should increase over time based on the discount (Hotelling, 1931).

Sustainability is achieved when resource extraction occurs within the carrying capacity (or sustainable yield) of the resource base and when waste does not exceed the ecosystems' assimilative capacity³¹ (Bartlett, 1994³²).

³¹ Sustainability can be analyzed also under the lens of the “replaceability scenario” between natural capital and artificial (man-made) capital (Pippo, 2011).

The debate is founded on the question whether the same level of well-being, might be achieved by replacing the natural capital with the artificial (man-made) one.

- According to the “Strong substitutability school”, the artificial capital does not produce the same level of well-being given by natural capital. Therefore, the compensation level is weak and limited. The conservation of the natural capital is irreplaceable by human activities. The risk of damaging environmental resources irreversibly must be reduced. Synthetically, economic growth should be slowed down or stopped in order to preserve the integrity of the environmental capital.
- Instead, “Weak sustainability school”, claims that exists an almost perfect substitution between environmental and human capital, since the satisfaction derived from human can easily equal or exceed the one received by the natural capital. This approach is based on the possibility of decoupling between environmental growth and degradation. Technological progress allows more efficient use of resources and the reduction of human activities.

³² See also Jennings & Zandberger, (1995) and Daly et al., (1994).

In summary, the availability of the natural resource is important for the organizations going concern, but at the same time, it is endangered by the organizations themselves.

The objective of sustainable development is therefore to achieve simultaneously both socio economic growth and environmental care, which lead to emerge the three pillars of the concept of sustainability (Williamson, Lynch-Wood & Ramsay, 2006):

1. Economy;
2. Environment;
3. Society.

The link among these tree aspects is deeply developed in literature. Lounsbury et al. (2003) have found that industries are shaped by social structures of meanings and resources. They have explained that waste management is strongly interconnected with the political, social, and cultural situation. Both Social movement and political practices transform the extant socio-economic practices.

Considering the Green economy as economic activity that improves environmental quality (Chapple, 2008), environmental performance has become a crucial aspect for the success of an organization (Al-Najjar & Anfimiadou, 2012³³).

In line with this, scholars and management studies suggest integrating strategic management with environmental problems (Sharma & Vredenburg, 1998; Aragon-Correa & Sharma, 2003), while looking for economic and financial balance because environmental strategy is a relevant factor for business success (Siegel, 2009). Sustainability has grown to become a major point in the current competitive context (Garzella et al., 2011). In addition, an efficient environmental performance and an appropriate environmental risk management have become crucial aspects of

³³ Previous research on the relation between the organization success and the environmental actions were made, among others by Gouldson, (2004); Ambec & Lanoie, (2008); Anderson & Anderson, (2009).

business functioning, and a way to achieve success (Al-Najjar & Anfimiadou, 2012³⁴). For this reason, more and more organizations are considering incorporating environmental aspect within business strategies, also hoping to improve their competitiveness (Maas et al., 2014).

Therefore, environmental practices have been implemented to try to diminish the level of environmental impact that industries, through their activities, have on the surrounding territory. *Organizations can reach sustainability through the process of adaptation* (Jennings & Zandbergen, 1995, p. 1019).

To conclude, the sustainable development has influenced organizations in a double way: on the one hand, developing sustainable strategy leads organization to success; on the other hand, new businesses are born to face the environmental issues.

2.3 A Green economy model

Previous academic and political research suggests that currently there is a big effort to shed light on the Green economy field in order to help organizations and states to develop sustainable growth³⁵.

In particular, it is interesting to stress and analyse the business implications of it.

The strong link between business and Green economy, has given rise to two different phenomena:

³⁴ Among others see also Gouldson, (2004); Ambec & Lanoie, (2008); Anderson & Anderson, (2009).

³⁵ As mentioned above, the three pillars of sustainability are environment, economy and society (Williamson, Lynch-Wood, & Ramsay, 2006).

1. ad hoc businesses to satisfy the new “environmental needs” caused by other businesses;
2. organization’s environmental strategies: that means that organizations in a “traditional business” start to adopt politics and strategies taking into account the environmental variable, and so start to implement environmental practices.

The dualistic classification mentioned above comes from the distinction between UNEP³⁶ and OCSE³⁷ *Greening industries*, and from the previous academic research (developed on the one hand on green practices and on the other hand on green businesses).

The diagram below (figure 2.2) recaps these concepts.

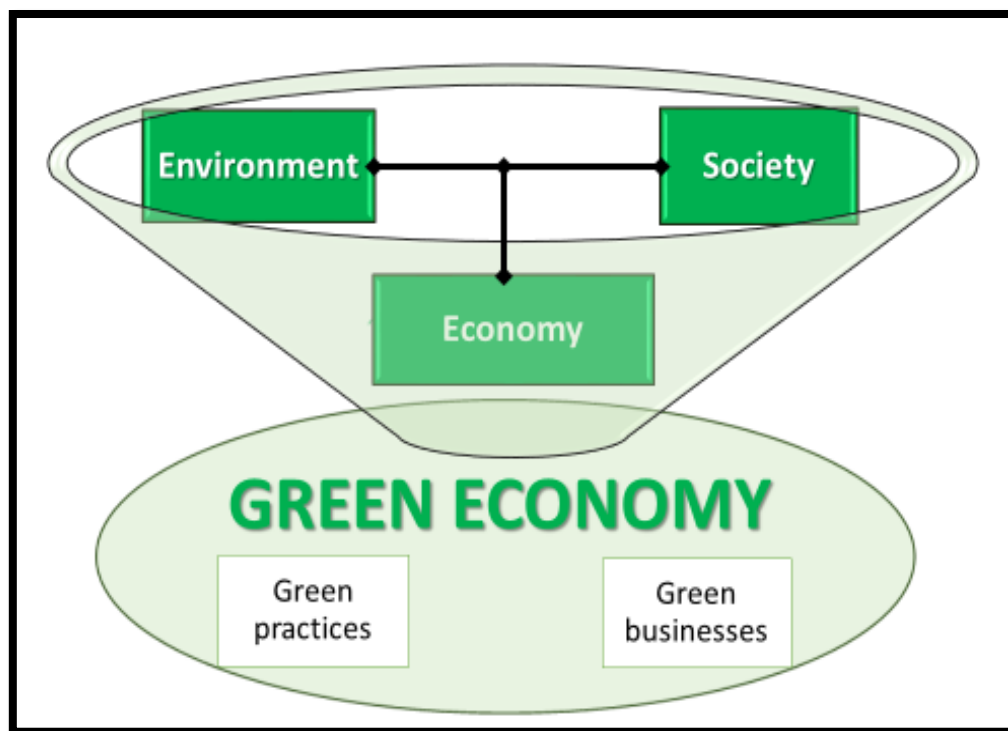


Figure 2.2. Green economy model, my elaboration.

³⁶ See EGSS, Environmental goods on service sector.

³⁷ See Green Growth, 2015. <http://www.oecd.org/greengrowth>.

Figure 2.2 shows the three pillars of the concept of sustainability (environment, society and economy³⁸) that fits with the Green economy discipline. The latter influences and is influenced by the organizations that can develop green practices or be active within green businesses.

Therefore, considering the Model explained above, Green economy does not include only green businesses. For example, organizations that produce renewable energy are certainly included within the Green economy.

However, organizations that produce for example petroleum (that obviously is not a green business) using renewable energy to implement their activities, can be considered part of the Green economy model? Implementing green practices is not enough. It should be a relevant part of the organization activity in terms of “quantity” (for example all energy used is renewable; all materials used is recycled and so on), or in terms of “quality” (that means that the mission, the value on which the organization based its activity, its strength are environmental sustainable). To solve this problem, Fondazione per lo Sviluppo Sostenibile³⁹ has proposed eight filter conditions with the aim of identifying organizations that can be consider part of the Green economy due to their green practices.

Here it is exposed the classification made by Fondazione per lo Sviluppo Sostenibile (FSS, 2015) based on the UNEP and OCSE documents:

- **Core Green** (Green businesses): organizations produce environmental goods or services specifically aimed at high environmental performance.

³⁸ See Williamson, Lynch-Wood, & Ramsay (2006).

³⁹ *Fondazione per lo Sviluppo Sostenibile* is an Italian non-profit organization, with the aim to promote the sustainable development, Green economy and a technological development. It is member of Global Compact Network Italia, ISWA, European Climate Foundation and Transport&Environment; in partnership with Global Reporting Initiative. <http://www.fondazionevilupposostenibile.org/>.

FSS has listed the specific activities (see green business section for in-depth analysis, table 3.1) in which companies must fall;

- **Go Green** (Green practices): organizations adopt green management practices and have to comply at least 8 out of 10 of the indicated filter conditions (see the green practice section for in-depth analysis, table 2.4);
- **Others:** if organizations are not part of core or go green category.

In line with this, Green economy is not only interested in favored sectors of environmental policies (renewable energy, energy conservation, waste cycle), but is configured as a cross-paradigm to different productive sectors.

2.4 Green economy in Italy

The fact that relevant organizations as UNEP, OCSE, EGSS are involved with the Green economy concepts gives evidence of the strong importance of the environmental aspects from a national and international point of view.

Even if the cooperation and coordination among states is of strategic relevance, each State uses to analyze the national Green economy situation, following as much as possible the same international criteria.

Because in the next chapters it is analyzed one green business within the Italian context, it seems mandatory to give an overview of the Italian situation.

The report “*Relazione sullo stato della Green Economy in Italia 2015*”, made by *Fondazione per lo Sviluppo Sostenibile*, is the first Italian study made by using the UNEP and OECD dual classification: “Core green” and “Go green” categories. Organizations that belong to the core green business, produce environmental goods or services, or are specifically aimed to reach relevant environmental performance. Go green organizations, instead, adopt specific green model of management

according at least to the eight filter conditions mentioned by FSS and reported below (see table 2.4).

The survey covers the agriculture, industry, construction, commerce, services and trade sectors. It finds out that 27.5% of Italian companies is Core green, and that of the remaining 14.5% are Go green. Together are the 42% of the Italian companies. Figure 2.3 shows the percentage of Core green, Go green and others classes in general and per sector.

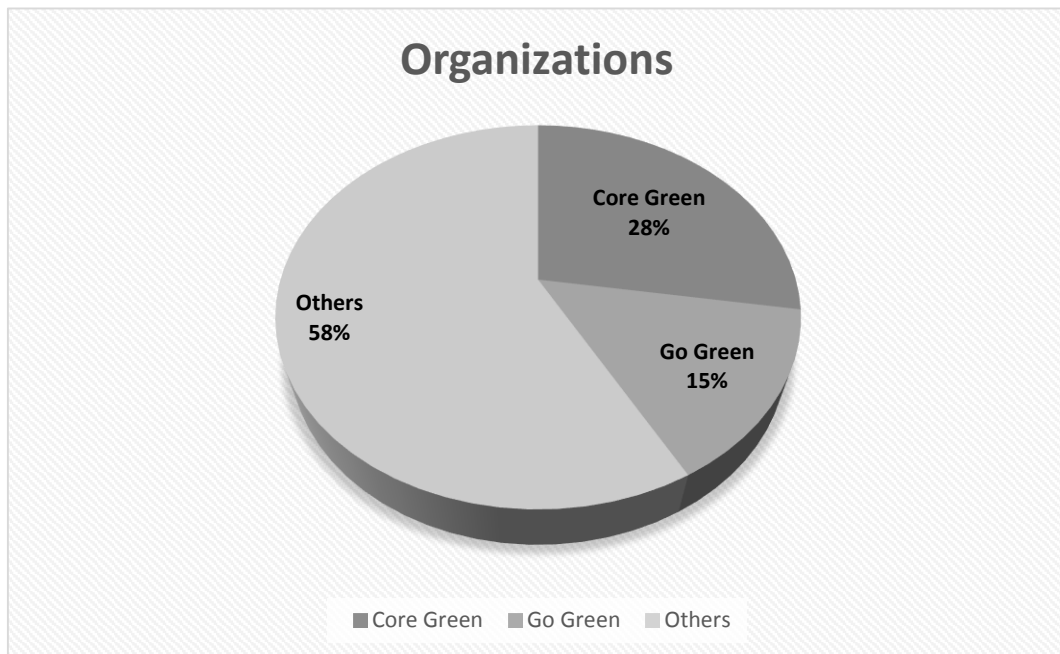


Figure 2.3. Italian organization. Source: FSS (2015)

| | Core green | Go green | Others | Total |
|--|------------|----------|--------|-------|
| Agriculture | 40,6% | 15,5% | 43,9% | 100% |
| Industry | 35,4% | 25,8% | 38,8% | 100% |
| Construction | 38,8% | 12,6% | 48,6% | 100% |
| Commerce | 12,8% | 16,7% | 70,5% | 100% |
| Others (Trade, financial services...) | 19,5% | 5,7% | 74,8% | 100% |
| Total | 27,5% | 14,5% | 58% | 100% |

Table 2.1 Italian Core green and Go green organizations per sector. Source: FSS (2015 p. 12)

The report “*Relazione sullo stato della Green Economy in Italia 2015*” has analyzed the economic performance of the Italian Green organizations (taking into account both Core green and Go green ones). The data show below, came from the fourth section of the report “Economic Performance” (FSS, 2015, pp. 25-28).

In 2014, sales grew by 21,7% for Core green organizations and by 22,1% of the Go green ones (by 10,2% for others organizations). Although 2014 was a year of economic recession in Italy (most of the companies have reduced the revenue), green organizations have reacted in a positive way to the crisis.

The table 2.2 shows the sales trend in 2014 compared to the year before.

| | Core green | Go green | Others | Total |
|-------------------|-------------------|-----------------|---------------|--------------|
| Increased | 21,7% | 22,1% | 10,2% | 15,1% |
| Stationary | 39,4% | 40,7% | 40,1% | 40% |
| Decreased | 31,1% | 31,7% | 40,9% | 36,8% |
| N.A. | 7,8% | 5,5% | 8,8% | 8,1% |
| Total | 100% | 100% | 100% | 100% |

Table 2.2. Sales 2014. Source: FSS, 2015

The report explains that 29.8% of the Core green business has growth expectations about: turnover, orders and employment (2.6% of them bullish and 27.2% moderate), compared to 17.8% of other companies.

Regard to Go green business, the expectation of a bullish or moderate growth is comparable to the other companies (17% versus 17.8%) but the Go green which expect a critical stage are significantly less (28,3% compared to 32,6% of others organizations). More detailed data are shown in the table below.

| | Core green | Go green | Others | Total |
|------------------------|-------------------|-----------------|---------------|--------------|
| Bullish | 2,6% | 0,6% | 3,8% | 3% |
| Moderate-growth | 27,2% | 16,4% | 14,0% | 18% |
| Stationary | 41,4% | 54,7% | 49,6% | 48,1% |
| Critic | 28,8% | 28,3% | 32,6% | 30,9% |
| Total | 100% | 100% | 100% | 100% |

Table 2.3. Growth expectation. Source: FSS (2015)

From the FSS report, and so from the tables here reported, we can see that organizations involved with green aspects have good economic results. This assertion confirms the previous claims, namely that organizations are influenced by the Green economy aspects and that a sustainable business administration can lead competitive advantages for organizations.

2.5 Green practices

Generally, countries are adopting environmental policies to control industrial and social emissions that are regulated by “green legislation” resulting from a modern green consciousness. Companies and individuals are pulling in the same direction and so, according to Siegel (2009), environmentally-conscious strategies have gained more and more relevance. Currently, awareness of the social and environmental dimensions of sustainability appears to be stronger than knowledge about the economic dimensions (Michalos et al., 2011, 2012).

During the 1990s Jennings and Zandbergen (1995) identified four ways to achieve sustainability:

1. Technical innovations;
2. Specific practices;
3. Strategies;
4. Organizational culture.

Implementing **best environmental practices** can improve competitive positions and reduce the organizational impact on the environment (Hart, 1995⁴⁰). However, because there are also local or external contingencies, for example the market structure (Reinhardt, 1998), or product characteristics (Shrivastava, 1995; Stead & Stead, 1995) or complementary assets (Christmann, 2000), environmental strategies can be detrimental.

Within the Italian context, research has been carried out on organizations that have implemented environmental report (Noci, 2000; Riva, 2001; Kolk, 2003), Corporate Social Responsibility (CSR) (Masini, 1970⁴¹), and on voluntary environmental disclosure (Quagli & Teodori, 2005⁴²). Previous research finds that organization CRS and sustainability approach is a consequence of the influence of internal and external drivers (Pistoni et al., 2016)

Another example of environmental practice is to earn Environmental certification. In fact, during the 1990s, certifications were introduced to quantify the impact of organizations on the environment. One of the most famous is the ISO 14001 launched by the International Organization for Standardization in 1996 (ISO, 2010), which assures stakeholders that the environmental impact is being measured and

⁴⁰ See also Cairncross (1992); Schmidheiny (1992); Smart et al. (1992); Shrivastava (1995); Hart (1995).

⁴¹ More recently, see Carroll (1999); Matten & Moon (2008); Fiori et al. (2007); Bisio (2015).

⁴² Among others see also Andrei & Pesci (2009); Garzella et al. (2011).

improved. Another example is a scheme called EMAS, issued in 1995 by the European Union (Lamming & Hampson, 1996⁴³).

However, as mentioned above, not all the organizations that develop environmental practices can be part of the Green economy model, because the green aspect should be of a significant degree. To “quantify the environmental aspect” FSS (2015) has recommended eight filter conditions depending on the sector, here reported in the table below. This means that to be consider a Go green organization, the organization has to develop at least 8 of the following actions.

| INDUSTRY AND CONSTRUCTION | AGRICULTURE | SERVICES AND TRADE |
|--|--|---|
| Focus on environmental quality as a distinguishing and qualifying factor of the activity | Focus on environmental quality as a distinguishing and qualifying factor of the activity | Focus on environmental quality as a distinguishing and qualifying factor of the activity |
| Over the past three years, it has invested in at least one product innovation and / or production process aimed at environmental improvement | Over the past three years, it has made at least one investment for innovation aimed at improving the environmental quality of agricultural vehicles, cultivation techniques and / or agricultural products and / or of farm buildings | Over the past three years, it has made at least one investment for innovation aimed at improving the environmental quality of products/ services |
| Focus on continuous environmental | Adopting measures to reduce waste production, | Focus on continuous environmental |

⁴³ Among others see also Iraldo, Testa, & Freya (2009); Delmas & Montiel (2009).

| | | |
|--|--|---|
| <p>improvement realizing at least one of the following initiatives:</p> <ul style="list-style-type: none"> • setting environmental improvement targets; • adopting the best available technologies; • obtaining an environmental certification; • making annual environmental performance report; • performing an annual review of environmental impacts | <p>to maximize their recycling and to minimize disposal, taking care that these are done correctly</p> | <p>improvement realizing at least one of the following initiatives:</p> <ul style="list-style-type: none"> • setting environmental improvement targets; • adopting the best available technologies; • obtaining an environmental certification; • making annual environmental performance report; • performing an annual review of environmental impact |
| <p>Comply with current environmental legislation (relating to discharges of polluting emissions, etc.).</p> | <p>Water saving initiatives, the correct unloading and / or treatment of their sewage and / or reuse of wastewater</p> | <p>Communication with the staff on measures for environmental protection and the promotion of their participation during the implementation phase</p> |
| <p>Policies to prevent climate warming with the reduction of emissions from fossil fuels by at least one action from the following:</p> <ul style="list-style-type: none"> • saving energy; • improving energy efficiency; | <p>Communication with the staff on measures for environmental protection and promotion of their participation during the implementation phase</p> | <p>Adopting measures for the separate collection and recycling of their own waste</p> |

| | | |
|--|--|--|
| <ul style="list-style-type: none"> • use of renewable energy sources; • initiatives for sustainable mobility of employees and / or cargo | | |
| <p>Adopting at least one measure to reduce the production of waste and / or to maximize their start recycling and least practical initiative of saving water (e.g. the rationalization of the use, reuse of wastewater, separation of rainwater and process, etc.)</p> | <p>It does not cultivate genetically modified products, or use feeds made from genetically modified products</p> | <p>Promotion of sustainable mobility measures for the staff</p> |
| <p>Adopting measures to prevent major accidents and promote job security</p> | <p>Adopting measures to prevent major accidents and promote job security</p> | <p>Participation in initiatives aimed at improving the urban and regional context in which it is located</p> |
| <p>Informing staff about environmental protection measures and promotion of staff participation in their implementation</p> | <p>Focus on high-quality agricultural products and / or on maintaining and enhancing the variety of local products, and / or on attention to farm animals' welfare</p> | <p>Implementing training programs and refreshing courses in environmental matters</p> |
| <p>In market communication (e.g. on network, advertising and other ways</p> | <p>In market communication (e.g. on network, advertising and other ways</p> | <p>In market communication (e.g. on network, advertising and other ways</p> |

| | | |
|--|--|---|
| to promote their products) to emphasize environmental quality | to promote their products) to emphasize environmental quality | to promote their products) to emphasize environmental quality |
| Devoting attention to relations with the community of its area and do not have ongoing conflicts with the local populations. | Interest in the care of land and landscape in which it is located, participation in the local community (e.g. direct sales and / or a short chain of some of its products and / or participating in trade fairs and local markets and / or visits of schoolchildren, etc.) | Implementing at least one energy -saving measure, the use of renewable sources of energy, water saving |

Table 2.4. The ten Green indicator for Go green organizations. Source: elaboration from FSS (2015)

Once the practices that can be implemented by organizations are identified, it is interesting to study what kind of organization can be part of the Green economy. The particular form of an organization is not of decisive importance. For this reason, before examining the green businesses in depth, it seems worthwhile to analyze specific organization types that tend to be part of the Green economy model.

2.6 Green organization types

According to previous research, specific organization types are very active within the Green economy. However, in the following paragraphs it is explained that be a

for-profit, non-profit or Ideological organization and so on, does not affect the membership in this area.

It was already said that to be part of the green model, an organization can be active within green businesses or can develop green practices, but the green activity should be a relevant part in terms of “quantity or quality”. Because of this, there is a large variety of organization types that are part of the Green economy model, in different ways, also due to the specific type of organization.

For example, the for-profit recycling industry that is a green business because of its core, rose thanks to the principles and policies developed by social-movement-inspired non-profit recycles (Weinberg et al., 2000). Therefore, even though the scope or aim of a Green business may seem more related to certain types of organizations, as the ones which aim to achieve social values more than the profit, the Green economy model is not restricted to one organization type only. It could be, as in the recycling example, that the industry came from particular Social movement or non-profit activities, but over time, it has spread out.

To be thorough, the next two paragraphs explain the main differences between for-profit and non-profit organizations and between Social movement and Ideological organization. In particular, for the best of my knowledge, Ideological organizations are not well defined in literature, and so it seems relevant to analyze the phenomenon accurately.

2.6.1 For-profit and non-profit

Green activities are not linked with a specific profit aim: both for-profit and non-profit organizations can have green values and can promote green activities.

In Italy, the number of non-profit organizations and people working in the Third sector increased by 28% and by 39.4%⁴⁴ respectively during the first 10 years of the XXI century. This aspect is particularly relevant considering the financial crisis of the period, which has led to an increase in the unemployment rate.

It seems interesting to explain briefly the main features of non-profit organizations, using the main definitions used in literature that can fit perfectly within the Green Model.

Salamon et al. (1992, p. 135) have focused the attention on the structural/operational aspect. They have defined *the third sector as a collection of organizations that are: formal (that is, institutionalized to some extent); private (that is, institutionally separate from government... so are fundamentally private institutions in basic structure); non-profit-distributing (that is, not returning profits generated to their owners or directors... In this sense, non-profit organizations are private organizations that do not exist primarily to generate profits); self-governing (that is, equipped to control their own activities... and are not controlled by outside entities); and voluntary (that is, involving some meaningful degree of voluntary participation, either in the actual conduct of the agency's activities or in the management of its affairs).*

Italian scholars have defined non-profit as an organization *that protects, defends, and promotes values and rights of individuals and communities, that helps the production of relational and social goods, and helps to create opportunities for participation and integration* (Pucci & Vergani, 2002, p. 10). The definition stresses the importance of the mission that can fit perfectly with the green one, and it does not consider the type of activity carried out that can be also commercial if marginal compared to the corporate purpose (Saita, 2015).

Andreas et al., (2012) focused on the aim that is to pursue economic and management equilibrium for the prosecution of the human needs.

⁴⁴ 4,7 million of volunteers (Istat, 2011).

To conclude, considering that non-profit organizations *protect, defend, promote values and rights of individuals and communities* (Pucci & Vergani, 2002) and pursue economic and management equilibrium for the prosecution of the human needs (Andreaus et al., 2012), it is evident the possible link between sustainable development (and so Green economy) and the non-profit sector.

Comparison between non-profit and for-profit organizations

Euske (2003) has individuated six different areas that make private, public and third sector organizations different:

1. ownership;
2. revenues;
3. scope of impact;
4. markets;
5. performance expectations;
6. incentives.

According to Euske's study, Hull and Lio (2006) have built a three-point model for the evaluation of organizational structure and policy that is related to *strategic controls* (Hitt et al., 2005), *strategic choice theory* (Child, 1972), and *Porter's (1990) discussion on the nature of strategy* (Hull & Lio, 2006, p. 55). They said that vision, strategic constraints and financial constraints are the elements that make non-profit different from for-profit organizations.

Often vision and mission are main aspects in a green business. In this type of business is particularly important to understand how and why an organization acts, for example if the green aspect is the scope of the activity or the way by which the activities are implemented. In the for-profit sector, the mission consists primarily in maximizing shareholder financial value (so profit aim). Non-profit organizations do not consider this aspect (O'Connor & Raber, 2001): vision can *be equated to an organization's ideals and goals, a symbol of what it is and what it does* (Hull &

Lio, 2006, p. 55). In fact, non-profit is a mission-oriented organization (Young, 1999; Francesconi, 2007).

Strategic constraints are linked to the type of actions that organizations can do considering the possible choices they are faced (Hitt et al., 2005), due to the market and the firms' structure. For-profits are *primarily responsible to their shareholders instead non-profits to their supporters and to almost all other stakeholders, more or less equally* (Hull & Lio, 2006, p. 57). Therefore, when non-profits face with a number of possible options, they are more limited in choices, because they need to pursue its own vision and scope, and inform all their supporters and stakeholders because are *multistakeholder* organizations (Borzaga & Mittone, 1997⁴⁵).

Acquiring financial resources is an essential activity for both types of organization, but they differ on the way in which it can be done. So organizations have to consider the financial constraints characteristic of the business. For-profits can raise financial resources by offering products or services, non-profits mainly by fundraising. So, for-profits offer products or services to gain money; non-profits acquire financial resources to follow their mission and so to make the social change possible.

There are other relevant elements that distinguish for-profit and non-profit organizations. Among all, it seems important to mention social capital.

Social capital comprehends the *relations between people, relatively durable, for the promotion of cooperation and so for the production of material and symbolic values. This network is made by formal and informal trust relations that stimulate mutuality and cooperation* (Mutti, 1998). It is fundamental for non-profit organizations and it can be bridging or bonding, that depends on if it brings benefits to all the community or just to the member of the organization (Ecchia & Zarri, 2004). It is evident the link between the social capital and the vision and scope of non-profits that *is to protect, defend, promote values and rights of individuals and communities, to help the production of relational and social goods, and to create opportunities for participation and integration* (Pucci & Vergani, 2002). This

⁴⁵ See also Borzaga & Depedri (2002); Ecchia & Zarri (2004).

aspect can be crucial for implementing green practices, or to be part of a Green business.

Although several aspects, as vision, mission or social capital, can be more similar to non-profit characteristics, and despite the importance of green activity for human health and so to promote a social interest, there is no relation with the typology of organization. In fact, green activities are primarily implemented for public and private needs. For this reason, organizations active in the Green economy field can be both for-profit and non-profit.

2.6.2 Ideological organizations and Social movement

Given Thompson (1960) and Elsbach and Bhattacharya (2001) definition of Ideological organization (table 2.5), identity can be considered as one of the main aspect of this type of organization. In fact, what is tying Ideological organization is the common belief that motivates the development of ideological practices: without a common belief in the objective, there is no Ideological organization (Thompson, 1960).

NIMBY (Not in my back yard), MOMI (Mothers opposed to mass incineration), SIN (Stop incineration now) or CRAP (Citizens reacting against pollution) are all movements that are strongly linked to their own identity (Lounsbury et al., 2003). So identity can be the reason for triggering from which develop Green activities, as the recycling one mentioned above. Social movement and Ideological organizations have several common aspects, as the relevance of identity or social values. These aspects are important also in the Green economy model that is based on social values and environmental respect. Therefore, it seems mandatory to study Social movement and Ideological organization that can be the promoters of a green business or green practices.

As Thompson claimed, Ideological organizations are strongly exposed to the environment, and the nature of exposure tends to erode the identification of the members with the organization (Thompson, 1960). In particular, Thompson is referring to the relationship between organization's members and the organization.

Instead, Social movement organizations stress the importance of dynamicity and movement from an industry to the outside of that industry. This dynamic movement is made by social protests, civil disobedience, protest, boycotts, letters writing campaigns etc. (Lenox & Eesley, 2009; McDonnell & King, 2013) and this is due to the conformity that Social movement organizations look for. By comparison, Ideological organizations do not look for conformity but for identification that does not imply the outside movement to the industry.

Members' internal identification is connected to strategic corporate social responsibility (CSR) (Martinez et del Bosque, 2013) communication via external stakeholders. CSR communication profoundly influences the willingness of managers and employees to identify with their workplace.

Social ideal is one of the main aspect that influence green practices and green businesses. The power of ideology is strongly tied to the *sentiment-based understanding* (Gopaldas, 2014, p. 1007), in fact *ideologies cultivate [...] potent meanings (e.g., clean/dirty, good/bad, possible/impossible) [and] powerful sentiments (e.g., disgust/desire, joy/sadness, hope/despair). While meanings can influence which goals consumers pursue (Fischer, Otnes, & Tuncay, 2007), sentiments can energize consumers to do the mundane work required to achieve those goals* (Gopaldas, 2014, p.1009).

Ideological organizations and Social movement stress the importance of ideology that stems from a personal sentiment that can involve organizations when it is shared with a number of people in the same society. Obviously, the diffusion of the same sentiment can lead a social ideology to become the main value and belief of an Ideological organization. This is coherent with Williams's (1977) concept of a "structure of feeling"— *an emotionally charged ideological conviction that is*

continually reinforced by members of a culture (Thompson, 2005; Gopaldas, 2014, p. 996).

Giving this framework, I can assert that Ideological organizations act by “identity movements” that *consist of a “we-feeling” sustained through interactions among movement participants and are expressed through cultural materials such as names, narratives, symbols, and rituals* (Taylor & Whittier, 1992). *Identity movements [...], aspire to cultural change, and promote new institutional logics* (Gamson, 1995; Rao, Monin & Durand, 2003, p. 796).

In general we can say that the goal of these organizations is not the production of goods or services of the categories listed above⁴⁶ but to influence these categories to become green compatible, and thus, to respect the Green economy principles.

Table 2.5 summarizes the main features of Ideological organizations and Social movement.

| | Ideological organizations | Social movements |
|-------------------|--|---|
| Definition | Organizations whose identities are strongly and saliently linked to a social ideal, rather than organizations whose most salient attribute is the product or service they deliver (Elsbach & Bhattacharya, 2001, p. 408) Their primary purpose is the perpetuation or propagation of certain belief system (Thompson, 1960, p. 397) | Social movement organizations call for fundamental social change and exhibit rhetoric and tactics that are widely viewed as unconventional, inappropriate, or illegitimate and are widely perceived as threatening (Haines, 1988, p. 197; Elsbach & Sutton, 1992, p. 701) |
| Example | Voluntary association as churches (Thompson, 1960) | Earth First!; AIDS Coalition to Unleash Power (Elsbach & Sutton, 1992) |

⁴⁶ Agriculture, industry, construction, commerce, services and trade sectors.

| | | |
|-------------------|---|---|
| Goal | Sustain commitments to social ideals | Performances are intended to raise questions about target's conformity with societal norms, values, or beliefs (King & Soule, 2007). Threaten legitimacy or reputation of target in the eyes of public |
| Supporters | Stakeholders as employees and who has the same belief and value | Activists, radicals, financial supporters |
| Tactics | Promotion of the believe and value | Civil disobedience, protest, boycotts, letter writing campaigns (Lenox & Eesley, 2009; McDonnell & King, 2013) |

Table 2.5. Ideological organization and Social movement, my elaboration

The table shows the differences and analogies of these types of organizations that, for the best of my knowledge, are not well compared in literature.

This paragraph wanted to emphasize that although several green activities, such as waste management, are born from social movement or implemented initially by non-profit organizations (Lounsbury et al., 2003), today however, the green activities are encompassed by any type of organization.

The link between the “green culture” and so the Green economy and the cultural change (Gamson, 1995) is evident and suggest that both Ideological organizations and Social movement can be types of organizations active within the Green economy model.

CHAPTER THREE

3. GREEN BUSINESSES: FOCUS ON RECYCLING

Organizations may play different roles in creating sustainability than they do in the adoption of sustainability as a societal goal. This allows for a diversity of functions and actions on the part of firms in finding an equilibrium for extracting, processing, and recycling resources.

- Jennings, P. D., & Zandbergen, P. A. (1995).

3.1 Green businesses

3.1.1 Classification by Green economy literature

In this chapter the businesses that are part of the Green economy are assessed and presented. In particular, the thesis focuses on the recycling business. To investigate on it, I have analyzed the *economic processes considered within each organization in order to investigate the operation rules*, in other words the business administration (Nobolo, 2016), with the aim of seeking the general rules of the business.

As already mentioned, “*Fondazione per lo Sviluppo Sostenibile*”, the Italian association that has reported the state of Green economy in Italy (FSS, 2015), using the international dual classification (used by: Environmental Goods and Services

Sector [EGSS], UNEP, Eurostat and OECD), distinguishes between green practices and green businesses.

According to the international and national classification, green businesses *consist of activities which produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimize pollution and resource use* (OECD, 1999). The classification showed at table 3.1, came from the 2015 Report made by *Fondazione per lo Sviluppo Sostenibile*.

To be more detailed, among those listed at table 3.1, are considered green businesses those that mainly produce environmental goods and / or environmental services. Therefore, FSS has distinguished the economic sectors (primary, secondary and tertiary economic sector), and has identified the products or services that are considered “green”. So, if an organization implements as core business one of the identified green products or services, is considered part of a green business. To be more detailed is here represented a table summarizing the green activities for each sector of the economy.

| SECTOR OF THE ECONOMY | ACTIVITY |
|---|---|
| PRIMARY SECTOR OF THE ECONOMY: AGRICULTURE, FORESTRY, FISHING AND MINING | 1. Cultivation of agricultural products with certified organic methods |
| | 2. Crops or farming of native species, with good sustainable practices, specifically aimed at the conservation of biodiversity, variety and authenticity, provided or not by certificates of origin ⁴⁷ |
| | 3. Multifunctional agricultural activities and good ecological quality, which aim to protect and enhance the agricultural areas by making them |

⁴⁷ For example: PDO – Protected Designation of Origin; PGI – Protected Geographical Indication introduced by the European Commission Regulation.

| | |
|--|---|
| | green infrastructure that provide environmental services (e.g. maintenance of the hydrographic network, trees and hedges, recreation facilities and training and environmental education, climate mitigation, farm, etc.) |
| SECONDARY SECTOR OF THE ECONOMY: INDUSTRIES, CONSTRUCTION | 4. Production of electric energy and / or fuel and / or heat from renewable energy source |
| | 5. Production of materials from renewable raw materials derived from waste, organic waste or sustainable farming in marginal areas (organic materials) |
| | 6. Production of equipment dedicated to saving, energy efficiency and production of energy and materials from renewable sources |
| | 7. Production of materials and products made from waste recycling (inorganic materials) |
| | 8. Production of vehicles for sustainable mobility (electric vehicles, hybrid, gas, bicycles, vehicles for public transport) |
| | 9. Construction of buildings, components, construction materials for green building or sustainable construction |
| | 10. Production of equipment and facilities dedicated to environmental measures (for purification or reuse of water, for air purification, for reclamation, for the recycling of waste, etc.) |
| | 11. Production of goods, not covered above, but specially designed or modified to have high environmental performance |
| TERTIARY SECTOR OF THE ECONOMY: SERVICES, TRADES | 12. Collection, transport, marketing and sale of organic products, products with the Eco-label, waste for reuse or recycling |
| | 13. Design, consulting and / or support in environmental matters |
| | 14. Pooling of people on road and rail as long as Euro 5, with environmentally friendly vehicles (hybrid, electric or gas) and / or car sharing and / or pooling |
| | 15. Providing innovative financing aimed at improving environmental performance |

| | |
|--|---|
| | 16. Maximize efficiency of resources, energy and the minimization of environmental impacts through ICT (e.g. smart grid, cloud computing, teleconferencing and telecommuting, etc.) |
| | 17. Environmental Communication |
| | 18. Sale and management of services that provide the features and benefits of a product share instead of individual physical product (e.g. coin laundry, communal fridge, etc.) |
| | 19. Environmental recovery, naturalization, nature conservation and / or remediation of contaminated sites |
| | 20. Other environmental services not covered above (e.g. repairing, re-use and sale of used goods) |

Table 3.1. Green business by the economic sectors. Sources FSS (2015)

The FSS classification that is made on the basis of UNEP, EUROSTAT and OCSE documents, tries to give a broad overview about green areas that Green economy covers.

Because the focus of this work is the business area, it seems appropriate to identify others classification that should be consistent with the previous one, but that can fit within the economic/business field.

VedoGreen is an Italian association which aim is *helping Italian green companies to ensure capital growth, list on the stock market, dialogue with the media and communicate their values to stakeholders*.⁴⁸ It was founded in 2011 and it is part of IR Top Group. According to UNEP, VedoGreen believes that Green economy affects both typical sectors of environmental policies and other industries that do not depend on incentives. Furthermore, it studies the Italian Green economy and it

⁴⁸ <http://www.vedogreen.it/>.

has created the first Italian database on Italian green organizations (over 3.000 companies included).

VedoGreen has classified the green businesses in ten groups. Here follows the list of the 10 businesses and the features of each of them, based on VedoGreen classification (all the definitions are quotations of the website).

1. **Agribusiness:** it refers to the business of quality agricultural production, a sustainable food production that uses environmental-friendly fertilizers and agrichemicals;
2. **Eco-building:** it refers to a set of techniques for construction and renovation of buildings according to the green building criteria;
3. **Eco-mobility:** it indicates a new approach to mobility, it means travelling through integrated, socially inclusive, and environmentally friendly transport options, including and integrating walking, cycling and wheeling;
4. **Environmental Services:** it refers to all those procedures and activities aimed at ensuring the best environmental management in order to improve life quality of the community;
5. **Green Chemistry:** it is a philosophy of chemical research and engineering that encourages the design of products and processes that minimize the use and generation of hazardous substances. It aims at reducing and preventing pollution at its source;
6. **Lighting Solutions:** it refers to a set of high energy saving lighting solutions in the field of residential, commercial and public sectors;
7. **Smart Energy:** it comprehends a very broad range of businesses from the production of energy from renewable sources, to solutions and technologies

for smart cities, to systems to improve efficiency and reduce energy consumption in industrial and civil activities;

8. **Waste Management:** it is the set of processes and methodologies to manage the entire cycle of waste, aiming at reducing their effects on human health and their impact on the environment. It comprehends different stages: collection, transportation, treatment (recycling or disposal) and reuse of waste materials;
9. **Water, Air & Noise Treatment:** it is the set of processes, systems and methods for the management of the entire water cycle, the improvement of air quality and the reduction of noise pollution;
10. **Life Sciences & Biotech:** they have applications in health, agriculture, medicine and the pharmaceutical and food science industries with the aim of improving the quality and standard of life⁴⁹.

The approach of the two classifications is different. In fact, the one recommended by FSS and UNEP focuses on the activities classified by the sector of the economy. VedoGreen, instead, does not pay attention on the sector of the economy, but focuses on the core of the activity that means the business-environmental objective.

Robert Richardson (2013), an ecological economist at Michigan State University, argued that the green business sectors should be the ones corresponding to the *Green economy objectives* (Richardson, 2013, p. 9). As a consequence of that, he identifies six economic sectors:

1. **Green energy:** development of renewable sources of energy such as wind, solar, and geothermal energy;

⁴⁹ <http://www.vedogreen.it/>.

2. **Green transportation:** development of renewable fuels, fuel-efficient vehicles, and electric cars; expansion of public and alternative forms of transportation;
3. **Green design and construction:** integrated urban environmental planning; advancements in energy and water efficiency; reusable or recyclable products, materials, and infrastructure;
4. **Green agriculture:** expansion of organic farming, conservation agriculture, and community based food systems;
5. **Green water management:** water reclamation, reuse, and recycling; rainwater catchment systems; low-water landscaping;
6. **Green waste management:** expansion of municipal recycling and composting; recyclable and compostable packaging and products.

Robert Richardson does not consider environmental services, green chemistry, lighting solutions and life sciences and biotech as own businesses. VedoGreen classification is more expanded and it is a middle way between the too specific FSS classification and the too broad Richardson classification. Nevertheless, I think that all the three classifications are difficult to apply within the business administration field: the first two are too broad, and sometimes one activity can be categorized in different classes. For example, using the UNEP one, recycling can be associated to few classes: the numbers 5, 7, 10 and 12. Using Richardson classification, I do not know the membership of life science activities.

Besides, I believe the term “green” used by Richardson is ambiguous because in some fields has already a specific meaning. For example, within the biotech, “Green Biotech” consists of agricultural biotechnology: use of modern biotechnological methods for the production of plants and plant crops for applications in the food, chemical, manufacturing, molecular pharming, tests for the detection of ingredients and contaminant in food products (Saita et al., 2015). Green Biotech does not mean

sustainable agricultural biotechnology, but it describes the scope of application of biotech.

3.1.2 The classification of green businesses under the lens of business administration

For the reasons stated previously, I propose a reclassification that mix the Green economy literature (UNEP, VedoGreen and Richardson) and the “classic business classification” made by *Rivista dell’Accademia Italiana di Economia aziendale* (1985) and report by Masini in *L’economia d’azienda ramo dell’Economia* (1987).

The classification of businesses according to the main scholars of the Italian Academy, divided the production into eight sectors:

1. Industrial;
2. Agriculture;
3. Commerce;
4. Bank;
5. Insurance;
6. Health;
7. Transport and Communication;
8. Others⁵⁰.

Therefore, taking into account of OECD definition of green businesses⁵¹, the main Green economy literature set out above, I propose an adaptation of the green

⁵⁰ See Accademia Italiana di Economia Aziendale (1985) *Economia Aziendale*, Four monthly review.

⁵¹ Consist of activities that produce goods and services to measure, prevent, limit, minimize or correct environmental damage to water, air and soil, as well as problems related to waste, noise and eco-systems. This includes cleaner technologies, products and services that reduce environmental risk and minimize pollution and resource use (OECD, 2011).

businesses classification on the basis of the classic business administration literature:

1. **Eco-building:** techniques for construction and renovation of buildings according to the green building criteria, integrated industrial and environmental planning (it corresponds with the “classic” industrial and construction sectors);
2. **Agribusiness:** agricultural production focuses on a sustainable food production, organic farming, environmental-friendly fertilizers and agrichemicals (it corresponds with the “classic” agriculture sector);
3. **Eco-health:** medicine, chemistry, pharmaceuticals and so life sciences with the aim of improving life quality of the community and minimizing the environmental damage;
4. **Eco-mobility:** renewable fuels, fuel-efficient vehicles, and electric cars; expansion of public, shearing and alternative forms of transportation, walking, cycling, wheeling, and passaging (it corresponds with the “classic” transportation sector);
5. **Smart Energy:** production of energy from renewable sources, development of systems to improve efficiency and reduce energy consumption in industrial and civil saving lighting solutions;
6. **Waste Management:** processes and methodologies to manage the entire cycle of waste, collection, transportation, treatment (recycling or disposal) and reuse of waste materials, expansion of municipal recycling and composting, recyclable and compostable packaging and products;
7. **Management of Air, Water, Land & Noise:** water reclamation, reuse, and recycling; rainwater catchment systems, low-water landscaping,

improvement of air quality and reduction of noise pollution. Those are the field affected by pollution (see the first chapter⁵²).

8. **Others:** activities that are not included in the previous ones but which have the purpose of minimizing the environmental and human damage.

In the classification proposed I have decided to maintain the same number of businesses of the *Accademia Italiana di Economia aziendale* (1985) and I have mixed the classic businesses (Industrial, Agriculture, Health, Transportation) to the ones specifically related to Green economy (Energy, Waste, Air Water Land and Noise).

This classification is useful to give a business administration approach to the Green economy. In fact, the previous chapters suggest the inevitably influence that Green economy has on organizations: first on the green practices adopted by organizations active within the “classical businesses”, and second on the creation of new green businesses.

In the next section, it is analyzed one of the green businesses that belong to the waste management class: recycling.

3.2 Recycling literature

Solutions for environmental issues as recycling have been studied under the lens of different fields as engineering, chemistry, jurisprudence, archaeology (Camilli & Ebert, 1992; Hiscock, 2009; Romagnoli, 2015) etc. Therefore, recycling is a very interdisciplinary practice that has effect on multiple areas of expertise. Even

⁵² It is important to note that the distinction between Waste and Air, Water, Land and Noise is coherent with the distinction between waste and pollution exposed in the first chapter.

referred to one field, “recycling practice” can involve different areas. In fact, the form of recycling depends on which category a certain waste belongs: hazardous waste or solid waste, in particular plastic, metal, wood, paper, food, glass, toxic waste, construction and demolition waste, and so on. The literature on household waste recycling is extensive. Among them, someone focuses on a specific context: Abbott et al. (2011) on the UK situation; Yau (2010) stressed the efficacy of waste recycling for Hong Kong. Ferrara and Missios (2012) have compared ten countries (from Europe, Australia, US, Asia) to examine their waste prevention policies, and the recycling behavior.

The most complete definition of recycling may be drawn from the legislation in force, Directive 2008/98/CE of the European Parliament and of the Council: *‘recycling’ means any recovery operation by which waste materials are reprocessed into products, materials or substances whether for the original or other purposes. It includes the reprocessing of organic material but does not include energy recovery and the reprocessing into materials that are to be used as fuels or for backfilling operations.*⁵³

Therefore, the European directive, that *should help move the EU closer to a ‘recycling society’, seeking to avoid waste generation and to use waste as a resource*⁵⁴, identifies the recycling activity as one of the main paths for a sustainable waste management.

Companies have used recycling as a sustainable strategy. Many studies analyze the effects and reasons for the implementation of environmental strategies. It has been shown that more and more companies implement environmental strategies as a key success factors⁵⁵.

⁵³ Directive 2008/98/CE, article 3.

⁵⁴ Directive 2008/98/CE, introduction.

⁵⁵ A large number of research has demonstrated that relation. Among other, see Maas et al. (2014);

To the best of my knowledge, little attention has been given to the recycling business, and on the fact that its economic performance has a direct effect on the environment⁵⁶. This concept links the importance of good practices within a green business. So, given the aim of the work, which regards the assessment of the business recycling performance, environmental management required considerations too. This assertion is supported by all the studies that use as environmental performance variable the percentage of total waste treated, recycled or recovered (Dobler et al., 2014).

Consistently, Green economy takes into account two different aspects: the green one focuses on environmental protection and so on green actions, the economic one focuses on the economic aspect, so efficiency and organizational performance.

3.3 The Italian context

As explained in the previous chapters, European Union has adopted several environmental strategies, with the aim to safeguard the environment and human health. The General Directorate for Environment, that is the European Commission department responsible for EU policy on the environment, controls that EU Member states apply the law correctly. Italy is a European Member from 1952, and has to apply the European law. However, each member state can do it differently according to national features, and can have very different results. One example is

Siegel (2009); Aragon-Correa & Sharma (2003); Sharma & Vredenburg (1998); Gouldson (2004); Ambec & Lanoie (2008); Anderson & Anderson (2009); Al-Najjar & Anfimiadou (2012).

⁵⁶ In fact, if an organization carries out an activity for environmental protection, the efficiency of the activity will have a positive effect on the environment itself.

the statistical research of Eurostat, which has studied the various municipal waste management in each State.

The picture below is an elaboration of ISPRA (*Istituto Superiore per la Protezione e la Ricerca Ambientale*) basing on Eurostat data and shows the percentage of recycling (marked in green) practices.

The recycling activity, in fact, is considered so important because it is “socially efficient” (D’Amato, 2008), which means that waste management is directly influenced and influenced human activity in turn.

In general: green (the top of the lines in the histogram) represents recycling activity, blue (the second part of the lines from the top) composting, yellow (the second part of the lines from the bottom) incineration and brown (the lower part of the lines) landfill.

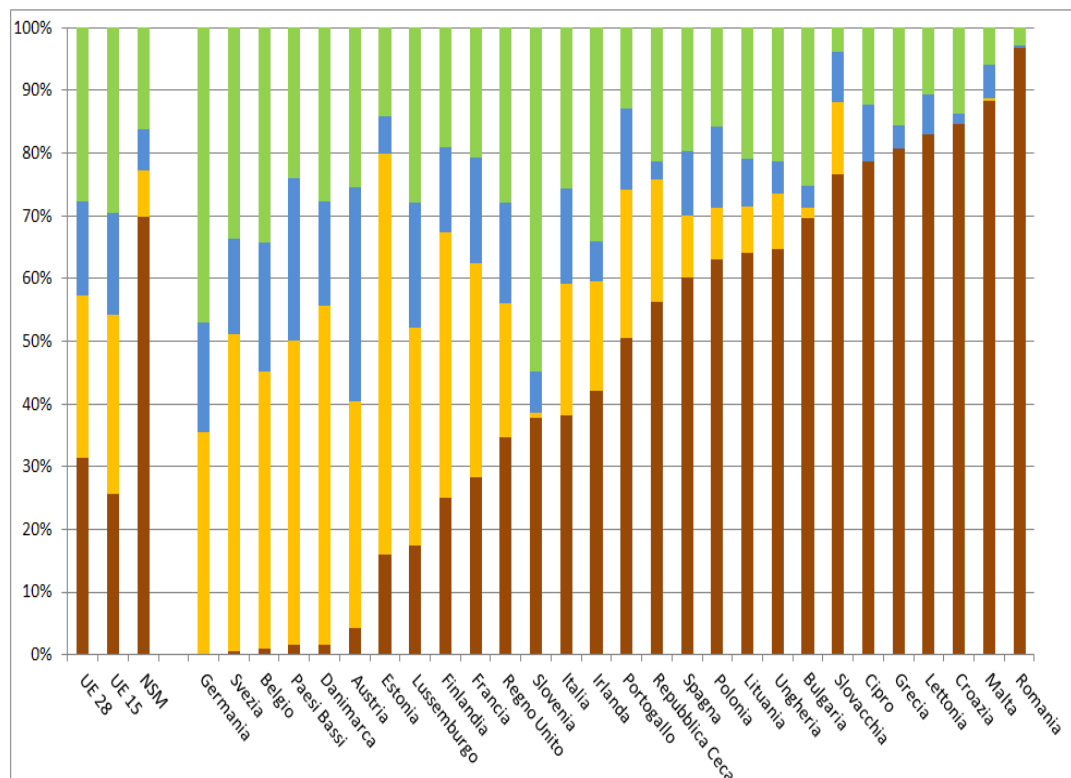


Figure 3.1. Percentage of recycling in UE. Source ISPRA “Rapporto rifiuti urbani 2015” p. 5.

Figure 3.1 shows that every state can develop different strategies and reach varying results. For this reason, this work focused on one single country, given that national politics and culture undoubtedly influence the business.

ISPRA, as shows the table below, has estimated the percentage distribution of municipal waste recycled during the 2014.

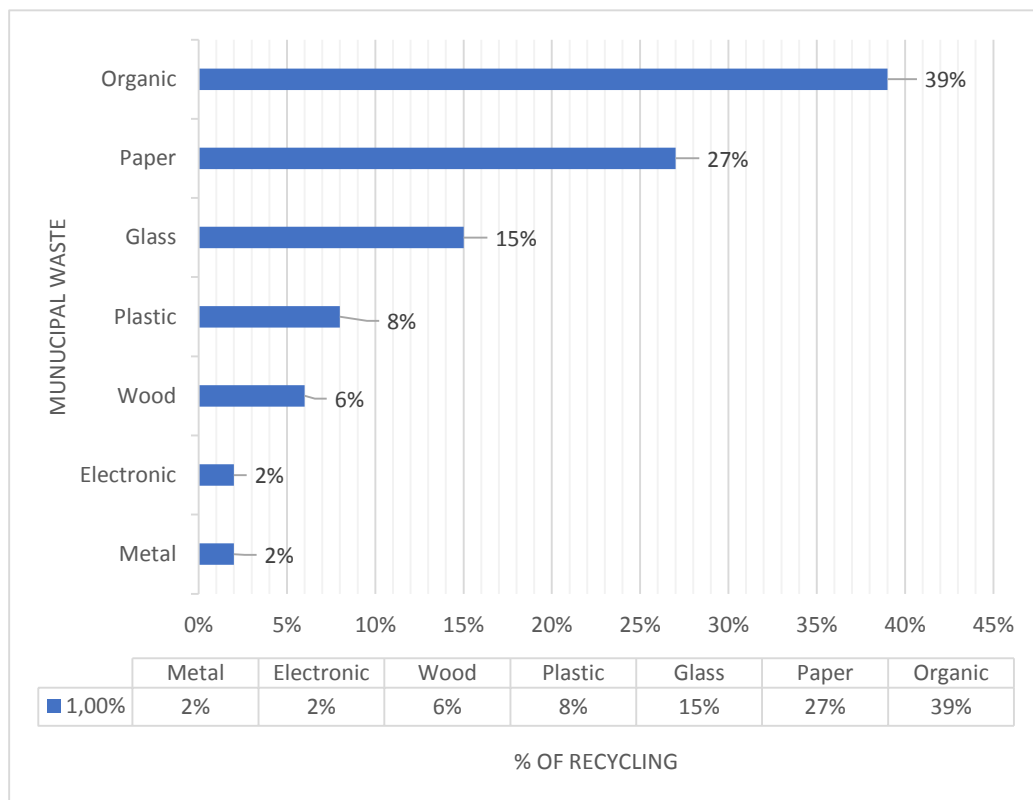


Figure 3.2. Percentage distribution of municipal waste recycled during the 2014. Source ISPRA

Waste is also object of economic transactions. The commerce of waste is a very dangerous and corrupted sector⁵⁷, especially in Italy. “*Italia del Riciclo*” have

⁵⁷ A number of news and articles speak about the corruption of the waste sector. Among others see:

analyzed the Italian waste import and export basing on Italian Regions (North and Centre-south) and geographic area. The results of the research are presented in table 3.2 and table 3.3.

| Flow | North | Centre-south |
|--------|-------------|--------------|
| Import | 5.644.974 t | 220.180 t |
| Export | 2.401.742 t | 1.394.519 t |

Table 3.2. Tons of waste. Source *Italia del Riciclo*, (2015, p. 32)

| Flow | Europe | Extra Europe |
|--------|-------------|--------------|
| Import | 5.784.482 t | 80.672 t |
| Export | 2.904.470 t | 891.791 t |

Table 3.3. Tons of waste. Source *Italia del Riciclo*, (2015, p. 32)

3.4 Hypotheses

After giving an overview of the Italian situation, this section aims to stress some important features of the organizations that are active in the recycling industry and that are interesting to analyze.

In fact, in the previous sections, evidence has been highlighted about the green aspect of waste management and in particular the recycling activity, which the authorities previously mentioned (UNEP, FSS and Richardson) recognize as a green business. The general Italian results of this business have been reported, thanks to the work of a number of organizations, such as *Italia del Riciclo*.

TGCOM 24, *'ndrangheta, Calabria: sindaco arrestato per corruzione nella gestione della raccolta rifiuti*, December 7, (2016); AMSA, *Corruzione, arrestato direttore Ato Toscana sud*, November 11, (2016).

But analyzing a business does not mean only knowing about general results, effects on the environment and so on, it means also studying the activities and economic performance of every single organization. Many aspects influence economic performance: such as age, size, and propensity for innovation.

It has been said that the recycling industry is a highly interdisciplinary business, involving very different aspects and subjects. For example, it is interesting to study if an organization controlled by public entities is more profitable or not, or if an organization active in a green business pays attention also to socio-environmental aspects.

In this section, I develop hypotheses regarding direct effects on economic performance; then I develop hypotheses on qualitative variables that, given previous research, I consider interesting. The last hypothesis I formulate refers to the relation between the performance variables chosen and the outcome of different possible evaluations.

Organization age is often an important variable to consider during the analysis of an organization. It can influence strategies and activities. Brynjolfsson et al (2011, p. 7) claim that *firm age, as a proxy for firm experience, has been suggested to have two opposing effects in the literature*. The first effect is organizational inertia, which makes it difficult to change strategy and to face environmental changes (Hannan & Freeman, 1984; Nelson & Winter, 1982); the second effect is the generation of higher quality of innovation made by young firms.

In general, organization age may have a positive effect on productivity by learning-by-doing, because firms accumulate production experience with age (Brynjolfsson et al., 2011⁵⁸).

⁵⁸ Previous research on the relation between organization age and productivity was done by several authors. Among others Levitt & March, (1988); Cohen & Levinthal (1989); Argote et al. (2003).

Within the green business here analyzed, the idea underlying the recycling activity is not particularly new and innovative. It is argued that Plato, in the 4th century BC, urged recycling in times of need, such as during wars. Therefore, on the one hand the business is really ancient, and old organizations have more specialized know-how gained from long-term activity. Furthermore, the organizations active in the recycling business primarily use long lifecycle machinery. So old organizations should have already finished paying the expenses incurred during the initial phase of a business (Amaduzzi, 2014).

On the other hand, the recycling business is very dynamic. The ratio and the needs linked to recycling activity have changed. The emergence of new necessities, the obligation of compliance with national and international standards, have meant that the business has had to evolve to meet the new requirements. Modern organizations may be better suited to satisfy the modern requirements: they can enter the market by directing their activities at the exact needs of that place at that time.

According to the above arguments, and considering that on the one hand the recycling business is not based on a new idea (waste recycling), and on the other hand organization productivity increases with age through learning-by-doing, I expected that the older an organization, the higher the economic performance.

H1: Organization performance is positively associated with organization age.

Organization size naturally influences the economic result and so has effects on profitability (Dahmash, 2015). It is often interpreted differently: as a source of organizational cost (Shepherd, 1972), for example caused by monitoring activity and agency problems, or a measure of diversification (Hansen & Wernerfelt, 1989). It can affect the way organizations design and use managerial systems (Burns & Stalker, 1961; Woodward, 1965). Furthermore, skilled managers are usually attracted by large organizations offering a higher level of managerial ownership (Himmelberg et al., 1999).

Therefore, the organization's growth can create several problems. In addition to the above concerns, numerous accounting studies have found that large organizations have to face communication and control problems (Merchant, 1981; 1984) and as a consequence of that the larger an organization the more specialized and sophisticated become the accounting and control processes (Burns & Waterhouse, 1975; Ezzamel, 1990; Libby & Waterhouse, 1996).

Nevertheless, large organizations present several advantages. For example, large organizations achieve economies of scale, which can bring down production costs. Previous research shows that the larger an organization, the more managerial stakes are reduced the (Himmelberg et al., 1999). Hoque and James (2000), measuring organization size using the number of employees and the organization performance using balanced scorecards (BSC⁵⁹), find that there is a positive relation between the two variables. As a consequence of that, *as size increase, organizations find it more practical and useful to place greater emphasis on the BCS that supports strategic decision, as the BSC incorporates much broader measures of the performance of organization* (2000, p. 11).

In line with the above arguments, previous research⁶⁰ found a positive relationship between profitability and company size.

The preceding discussion can be summarized with the following hypothesis:

H2: Organization performance is positively associated with organization size.

Researchers have found substantial evidence that **innovation** leads to good economic performance (Vrontis et al., 2016). Innovative capabilities of

⁵⁹ The BSC measures performance through four dimension: financial (or shareholders), customers, internal business process, and learning and growth (Hoque & James, 2000, p. 1).

⁶⁰ There is extensive literature about the consequences of organization size. Among others Alexander (1949); Stekler (1964); Hall & Weiss (1967); Scherer (1973); Ravenscraft & Scherer (1987); Fiegenbaum & Karnani (1991); Helfat et al. (2007); Dogan (2013).

organizations are a critical determinant of both organization performance and competitive advantage (Bettis & Hitt, 1995; Helfat & Peteraf, 2003). The extent and the duration of the advantages depend on the type of innovation and on the way that it has been obtained. In particular, the main point of contention on the relation between innovation and organizational performance is the value of innovation. In fact, it is not always equal to each organization, and it can be difficult to understand the real value (Greve, 2011).

Then, innovation is linked with at least three factors: first, innovation can be linked also with organization age. Previous research shows that young organizations generate higher quality innovations (e.g. Henderson & Clark, 1990; Balasubramanian & Lee, 2008).

Second, innovation depends also on the scale of the *market because the innovation or invention costs must be incurred only once and after success the discovered new idea can be used for the production of infinite units* (Brynjolfsson et al., 2011, p. 7).

Third, the number of patents, that in this research represents the degree of innovation (Ahuja, 2000), can have an *economically and statistically significant impact on firm-level productivity and market value* (Bloom & Reenen, 2002).

The ability to create new products or processes is particularly important within the Green economy field. As a matter of fact, Jennings and Zandbergen (1995) claim that innovation is one of the strategies used to achieve sustainability. The Italian Council for the Green Economy considers eco-innovation a top priority, in particular the transition to the Green economy implies the ability to innovate production cycles and consumption through the development and implementation of eco-innovation that takes into account the economic, socio-environmental dimensions as essential components of sustainable development (Consiglio nazionale della Green economy, 2015).

According to previous studies, and the specific relevance of innovation within green businesses, it is expected that patents are positively related to performance.

The preceding discussion can be summarized with the following hypothesis:

H3: Organization performance is positively associated with the organization degree of innovation.

In addition to the previous three hypotheses, it is interesting to study the effects and correlations of some qualitative⁶¹ variables that are particularly relevant in a green context.

It has been argued previously that the recycling business involves various areas. If the matter is analyzed from a business ethics point of view, waste is really dangerous for human health. This aspect is particularly relevant in states where healthcare is public, as it is in Italy. In such countries, environmental protection has not only a direct effect on human health, but also on public spending. As the figure below shows, the current public health spending is increasing (ISTAT⁶²).

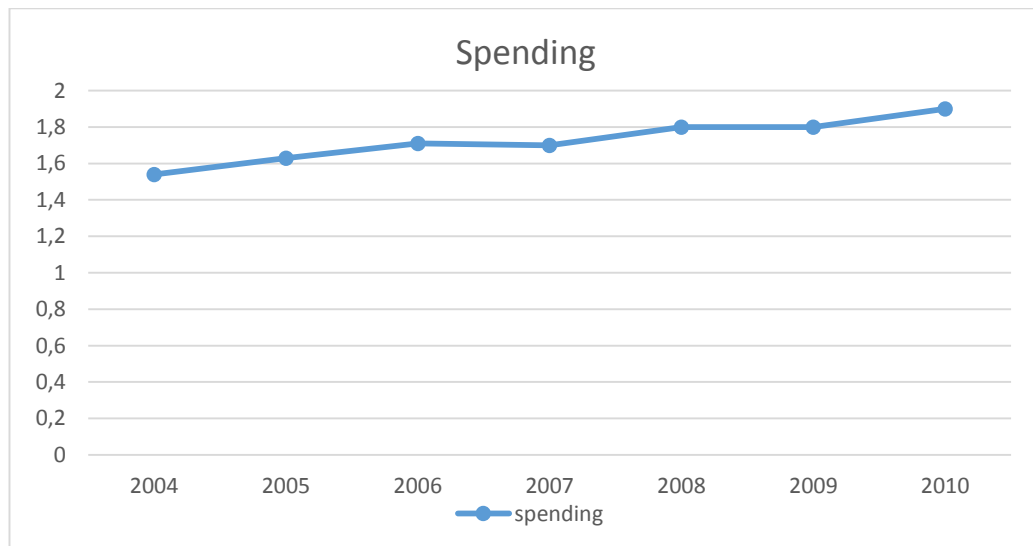


Figure 3.3. Italian public health spending. Source ISTAT

⁶¹ The “qualitative” feature comes from statistic that consider qualitative to all the dummy variables.

⁶² www.istat.it.

For these reasons, public entities should be particularly interested in the efficiency and profitability of organizations that can help to diminish or control the waste issue for two main reasons. The first reason is that the better managed the recycling organizations, the fewer people risk illness; the second reason is that in a country where the healthcare system is public, the fewer people get sick, the less government spends.

These aspects can influence the governance of recycling organizations. In fact, waste management is strongly related to the public sector, and as a consequence, *poor management of waste led to contamination of water, soil and atmosphere and to a major impact on public health* (Giusti, 2009, p. 2230).

Institutional shareholding, therefore must be particularly careful about the performance of recycling organizations (Hood et al, 1999) because governance can impact on *good performance* (Magli, Nobolo, Ogliari, Arienti, & De Toni, 2011).

The preceding discussion can be summarized with the following hypothesis:

H4: There is a correlation between organization performance and the presence of public authorities in the shareholding structures of Italian recycling organizations.

Corporate social responsibility (CSR) refers to a company's performance on a range of social and environmental issues over time (Briscoe & Safford, 2008). This assertion stresses the connection between social and environmental aspects, and the fact that CSR evaluates both of them.

Social and environmental aspects should be integrated with business management (Wagner, 2007). This integration has effects on both economic and environmental performance (Wagner, 2011).

Although environmental and social aspects should be considered together and are part of CSR, this work analyzes the two aspects through different variables because they refer to different aspects. In fact, especially analyzing a green business, socio and economic variables can be expressions of two distinct interests.

The relationship between environmental performance and economic success can vary (Schaltegger & Synnestvedt, 2002). Ameer and Othman (2012) studying global sustainable corporations find that the more organizations implement sustainability practices, the greater the financial performance and growth. The same positive correlation is found by other authors (e.g. Weber, et al., 2008). One possible explanation is that individuals are willing to pay more for products or services that do not have an environmental impact (Rosewicz, 1990).

The ISO 14001 certification is a way to implement the environmental management system and *it is a determinant of environmental performance* (Klassen & McLaughlin, 1996, p. 1212). Environmental management affects both corporate and functional strategies and environmental performance affects an organization's financial performance (Klassen & McLaughlin, 1996)

Because recycling organizations, by their nature, implement environmental activities, it is possible that they pay more attention to extra environmental practices, and are willing to certify the organization.

The effect of social responsibility on an organization's performance is ambiguous. During the 1980s, there were two opposite views (Frederick, 2006). The first view is that organizations have to choose between looking for social responsibility or financial performance. The second view, instead, is that organizations benefit from the development of social responsibility strategies (McGuire et al., 1988).

Several organizations, to demonstrate their attention to the social aspect, have promoted gender diversity. Consistent with previous findings, *greater female representation on corporate boards of large European firms can increase firm value indirectly* (Isidro & Sobral, 2015, p. 1).

As demonstrated by previous research, often social and environmental practices are implemented together, so maybe there is a correlation between organizations that develop environmental strategies and the development of social practices.

Because of the inherent and unavoidable attention to the environment by recycling organizations, it is interesting to study whether correlations exist between green organizations and the implementation of socio-environmental practices.

The preceding discussion can be summarized with the following hypothesis:

H5: There is a positive correlation between green organization performance and the development of social or environmental practices.

Financial performance can be measured by various variables. It happens also within environmental analyses (Molina-Azorin et al., 2009). It is hard to choose the best variable that can measure the economic or financial performance, or maybe there is not one that is absolutely the best. For this reason, because the aim of this paragraph is to analyze deeply the performance of a green business, it is interesting to develop different models using different performance measures. It is interesting to analyze if, using different dependent variables, the results are or are not the same. In fact, different financial performance variables identify various business features.

H6: Organization performance is correlated with the performance variable used in the analysis.

Table 3.4 summarizes the hypotheses analyzed in the next chapters.

| Hp number | Hypothesis | Variables |
|------------------|---|------------------|
| H1 | The organization performance is positively associated with organization age | Performance; age |

| | | |
|----|--|---|
| H2 | The organization performance is positively associated with organization size | Performance; size |
| H3 | The organization performance is positively associated with the organization's degree of innovation | Performance; innovation |
| H4 | There is a correlation between organization performance and presence of public authorities in the shareholding structures of Italian recycling organizations | Performance; governance |
| H5 | There is a correlation between green organization performance and the development of social or environmental practices | Performance; social and environmental practices |
| H6 | Organization performance is correlated with the performance variable used in the analysis | Performance variables |

Table 3.4. Hypotheses

CHAPTER FOUR

4. The RECYCLING BUSINESS ANALYSIS

4.1 Methods

This chapter focuses on the analysis of recycling organizations that are part of the waste management business.

To develop a deep analysis of the current situation of the Italian recycling organizations, I have collected quantitative and qualitative data referred to those companies which recycling is the core business.

In fact, a large number of companies implement recycling activity as secondary business.

I have selected the organizations thanks to a classification code, in particular the US SIC code. This code was chosen because the corresponding Italian code, does not give the chance to focus only on the recycling business. In fact, the Italian Ateco 2007 code 383230 includes organizations which the main economic activity consists in the retrieval and preparation for recycling of solid urban, industrial and biomass waste.

More specifically:

- Crushing, cleaning and sorting of glass;

- Crushing, cleaning and sorting of other kinds of waste, such as demolition waste (rubble), in order to obtain secondary raw materials;
- Transformation of cooking oils and fats into secondary raw materials;
- Transformation of other types of waste relating to food, drinks, tobacco and residual substances in secondary raw materials.

Thus, I have preferred to use an international code that allows to focus only on the recycling business. I believe that this choice is suited to this academic work.

Once I have selected the organizations coded as 495 US SIC code, I have developed a quantitative analysis, presented in the fifth chapter.

First, I have implemented a descriptive analysis, studying the frequencies and the composition of the sample and a cluster analysis. These kind of analyses are necessary to test the hypotheses number 4 and 5. In fact, those hypotheses refer to qualitative variables that cannot be consider as independent variables within the regression analysis.

Then I have selected some economic and qualitative data relevant for the development of this study. Most of the data come from the financial statement; others come from a check made personally to each organization. In fact, I have manually checked on the web site if recycling was really the core activity of each organization; then I have collected new data (e.g. whether the organization has an environmental certification or whether the CEO is a woman).

Once collected the data and created the database, I have done an econometric analysis (OLS) to test the first three hypotheses. Finally, to test the hypothesis number 6, I have compared the results of the models that have used different performance variables.

The collected data relate to the year 2015, and the model utilized for the analysis of these variables is a model of multiple linear regression:

$$y_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \dots + \beta_n X_{ni} + \varepsilon_i$$

Where:

- Y_i = Dependent variable, i.e. the performance of Italian retrieval and recycling companies;
- $X_1 \dots X_n$ = Independent variables;
- $\beta_1 \dots \beta_n$ = Regression coefficients;
- ε = Stochastic error.

The model of multiple linear regression is the main model (model 1 and 4⁶³) developed in this work. The main model followed by two additional models that analyze two moderator effects (Baron & Kenny, 1986) of size one on the environmental variables (model 2; model 5⁶⁴) and the other on the social variables (model 3; model 6⁶⁵).

$$y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{1i} x_{2i} + \varepsilon_i$$

The quantitative method is a good way to examine the relationship between the economic and the environmental performance (Molina-Azorin et al., 2009), and it fits particularly in this analysis because the object of the study are “green organizations”. As a consequence, a good economic performance means a good recycling activity, which means a good environmental performance, in turn.

⁶³ As will be explained in the next chapter, I have test performance with two variables (ROA and EBITDA) and for each variable I have developed one main model (model 1 using ROA and model 4 using EBITDA).

⁶⁴ Model 2 using ROA as dependent variable and model 5 using EBITDA as dependent variable.

⁶⁵ Model 3 using ROA as dependent variable and model 6 using EBITDA as dependent variable.

The following sections describe the situation of waste and waste management in the national context focusing on statistical data.

Then, econometric and multivariate analyses on the quantitative and qualitative data collected are reported.

4.2 Data collection

4.2.1 Sample

The sample includes 87 Italian organizations which core business is waste recycling. To collect all these organizations, it was used the database Amadeus. In particular, I have chosen the 495 code that comprehends different activities as Sanitary Services, Refuse System and Hazardous Waste Management. Evidently, the activity of each organization can be diverse. In fact, among all, the computer search was made for only the organizations which core business is recycling. I did not choose just one of this code as the US SIC code 4955 “Hazardous Waste Management” because I do not want to focus on one waste type only. To have a complete overview it is important to consider the largest number of companies in the recycling sector, regardless of the type of waste treated. From the European database Amadeus, Italian organizations were selected.

Because the aim of this work is to analyze the business from a business administration point of view, were selected only the organizations of which financial position were dated 2015. In fact, a good comparative analysis can just compare data of the same year: this time period assumption is necessary.

This work focuses on Green economy and on organizations involved with it. For this reason, it seems logical to consider the economic performance suitable variable

to measure the economic aspect: the “green” feature is given by the recycling, and the “economic” one by the business trends.

Because this work analyzes financial performances and environmental practices, were chosen the variables used in the international works that have compared these two phenomena. In this choice were particularly relevant Molina-Azorin et al (2009), which review the literature on green management and financial performance identifying 32 quantitative studies from 1995 to 2008.

In this work is considered environmental management and not environmental performance because it seems more interesting within a green business analysis (as the recycling one). In fact, by the nature of the business itself, a good business performance also means a good environmental performance.

To synthesize Molina-Azorin et al paper, tables 4.1 and 4.2 show the different financial performance and environmental management variables used, if are used, in the 32 studies. Analyzing Molina-Azorin et al research was useful to choose the best variables to test financial performance and the environmental variable.

| Financial performance | Number of studies |
|--------------------------------------|--------------------------|
| ROA (Return on Asset) | 7 |
| ROE (Return on Equity) | 7 |
| ROI (Return on Investment) | 4 |
| ROS (Return on Sales) | 3 |
| ROCE (Return on Capital Employed) | 3 |
| Tobin's q | 5 |

Table 4.1. Financial performance variables, my elaboration from Molina-Azorin et al. (2009)

| Environmental management | Number of studies |
|--|--------------------------|
| Emission (different types of emission) | 7 |
| ISO14.001 | 4 |
| TRI ⁶⁶ Toxic Release Inventory | 4 |
| EMS (Environmental Management System) | 3 |

Table 4.2. Environmental management variables, my elaboration from Molina-Azorin et al. (2009)

As we can see from tables 4.1 and 4.2, most of the work, use ROA or ROE as economic variables and emission or ISO 14.001 or TRI as environmental variables, to test financial and environmental aspects.

The explanation of the variables used in this study is explained in the following paragraphs.

4.2.2 Variables

Performance variables

Correct evaluation of performance is essential for stakeholders (Gervasio & Montani, 2013). Because business performance can be measured by different

⁶⁶ Toxic Release Inventory. By TRI it is meant *tracks the management of certain toxic chemicals that may pose a threat to human health and the environment. U.S. facilities in different industry sectors must report annually how much of each chemical is released to the environment and/or managed through recycling, energy recovery and treatment. A "release" of a chemical means that it is emitted to the air or water, or placed in some type of land disposal.* <https://www.epa.gov>.

variable depending on what do you want to test, I have decided to measure financial performance through two dependent variables: ROA and EBITDA.

ROA, in fact, was really used in this type of studies that compare environmental management and financial performance (Molina-Azorin et al., 2009).

However, because ROA is a measure of a company's profitability and it is equal to a fiscal year's earnings divided by its total assets (Weber et al., 2008), it seems very interesting to compare it with another kind of performance measure, as EBITDA. The latter is a measure of cash flow and because *depreciation and amortization are non-cash expenses, EBITDA is a good way to know how much cash a company is generating – cash that can be used to pay dividends or reinvest in the company EBITDA is the preferred metric. Furthermore, EBITDA mitigates the distortions to operating income caused by arbitrary asset depreciation schedules* (Becker-Blease, et al., 2010).

Quantitative variables

- **Age**

For the sake of a complete business analysis, it is important to study the organizations' age. In fact, the relation between age and performance is not that evident, in literature.

On the one hand, "old companies" have a competitive advantage: the knowhow that is acquired over time. On the other hand, new organizations can start the business being aware of the most current needs and being less linked to past constraints.

In the literature, the age variable has often been considered during the assessment of a business (Campa & Kedia, 2002; Villalonga, 2004; Radipere & Dhliwayo, 2014).

The sample of this study, in which the most ancient organization was born in 1963 and the youngest during the 2012, is composed as follows:

| Date of incorporation | Number of organizations | Percentage |
|------------------------------|--------------------------------|-------------------|
| Before 1969 | 1 | 1% |
| From 1970 to 1979 | 8 | 9% |
| From 1980 to 1989 | 21 | 24% |
| From 1990 to 1999 | 26 | 30% |
| From 2000 to 2010 | 29 | 33% |
| After 2010 | 2 | 2% |
| Total | 87 | 100% |

Table 4.3. Aging of the sample

The table shows that the business is young; in fact, most of the companies were born during the beginning of the XXI century (29 organizations from 2000 to 2010). Although the recycling business is not a new one, the current legislation and social preferences have led to the creation of companies. This confirms the thesis that Green economy, and in particular green businesses thanks to their role as environmental and social protectors, are having greater attention and value.

Consequently, it seems interesting to study if the correlation between the economic performance and the organizations' age exists.

- **Size (Number of employees)**

The company size is measured by the number of employees because of three main reasons: first a large number of previous studies have used this variable to measure organization size⁶⁷. Second the European legislation (in particular the Directive

⁶⁷ Examples of the existing literature, among others, are Cavusgil & Nevin (1981); Kaynak & Kothari (1984); Mugler & Miesenbock (1986); Burton & Schlegelmilch (1987); Cavusgil & Naor (1987); Holzmuller & Kasper (1991); Bonaccorsi (1992); Bilkey & Tesar (1997).

2013/34/UE of the European Parliament and Council, dated 26 June 2013) considers the number of employees one of the three possible measure of the organization's size. Third the characteristics of the business. In fact, organizations active within the waste management business can be considered service companies (Saita & Franceschelli, 2017) and for this kind of companies, the number of employees is considered as the *most significant size parameter* (Saita, 2012, p. 23).

In addition, the business is not very homogeneous, because organizations can manage several types of waste that need very different equipment and tools. So, using sales as a size measure, it is not considered the best choice because organizations of the sample can manage very different types of waste (as paper or electronic ones) that give rise to totally different sales values. Therefore, the sales in this business, which includes the service companies that can handle completely different types of waste, is considered a measure not suitable for measuring the size of the company.

Following the Italian Directive 139/2015 (that is the adoption of the European Directive 34/2013/UE) organizations, basing on size, are divided in 4 groups:

| Category | Parameters | D.lgs. 139/2015 |
|----------------------|-----------------------------|--|
| Micro organizations | Average number of employees | Not over 5 |
| | Net turnover | Not over 175.000 euro |
| | Balance sheet total | Not over 350.000 euro |
| Small organizations | Average number of employees | From 5 to 50 |
| | Net turnover | From 175.000 to 4.400.000 euro |
| | Balance sheet total | From 350.000 euro to 8.800.000 euro |
| Medium organizations | Average number of employees | From 50 to 250 |
| | Net turnover | From 4.400.000 euro to 20.000.000 euro |
| | Balance sheet total | From 8.800.000 euro to 40.000.000 euro |
| Large organizations | Average number of employees | Over 250 |
| | Net turnover | Over 20.000.000 euro |
| | Balance sheet total | Over 40.000.000 euro |

Table 4.4. Directive 34/2013/UE

Therefore, the number of employees is one of the parameters used by the European law. In the sample, organizations are divided in the previous groups as follow using the number of employees.

| Category | N. of organizations in the sample | Percentage |
|----------------------|-----------------------------------|------------|
| Micro organizations | 7 | 8% |
| Small organizations | 56 | 64% |
| Medium organizations | 19 | 22% |
| Large organizations | 5 | 6% |
| Total | 87 | 100% |

Table 4.5. Size of the organizations of the sample

The table above shows that the 86% of the sample are small-medium companies.

○ **Innovation (Number of patents)**

Innovation is an important aspect of a business. If it is hard to create innovative ideas and practices, is hard to survive. Innovative aspect is particularly important in a dynamic business as the recycling one. Because waste issue is a very dangerous problem, it seems essential to invest in R&D and try to develop new ideas and practices.

To evaluate the level of innovation of each organization, it is used the number of patents (Ahuja & Katila, 2001⁶⁸). *Patents are a meaningful measure of innovation* (Ahuja, 2000).

⁶⁸ Number of patent is a common measure to evaluate the degree of innovation and it is broadly used in literature. Among other see Griliches (1984); Henderson & Cockburn (1996); Katila & Ahuja (2002).

- **Net income**

Net income is strongly important for the evaluation of a financial performance. Its information is very different from the ROA and the EBITDA, because ROA is a relation between income and total asset (and so the asset component is significant) and the EBITDA is not influenced by many relevant value as interest, tax, depreciation and amortization. For this reason, it is an important variable to add in the model to have a complete overview (Becker-Blease, et al., 2010).

Qualitative variables

- **Governance (Shareholder type)**

Recycling business is thoroughly interconnected with many public aspects as:

- Healthcare: the impact of waste pollution has effect on lifestyle and citizen health care that can have consequences on public healthcare costs and on life expectancy;
- Government: new law and legislation, continuous update at national and international level to stop the ecosystem contamination;
- Business: organizations must follow the government regulations and new consumer desirability criteria.

The link between the public sector and recycling business is strong and delicate (Folz, 1999). Thus, in order to conduct a deep analysis of this business, it is necessary to study the equity participation by public Authorities, State and Government.

To test the governance of the sample a dummy variable is employed: 1 if public entities are present in the shareholding structures, 0 otherwise.

○ **Area**

Sustainable values or practices tend to be local because are linked the local communities.

The distribution of the recycling organization has been studied by differentiating two areas: north and centre-south, in accordance with the following distribution:

- What is meant by north are the companies situated in the following regions: Emilia Romagna; Friuli Venezia Giulia; Liguria; Lombardia; Piemonte; Trentino Alto Adige; Valle d'Aosta and Veneto.
- What is meant by centre-south are the companies situated in the following regions: Lazio; Marche; Toscana; Umbria; Abruzzo; Basilicata; Calabria; Campania; Molise; Puglia; Sardegna and Sicilia.

Current debate and news show that the recycling practices are strongly different between north and south (ISPRA, 2015; L'Italia del riciclo, 2015). For this reason, it seems important to consider the area within the model.

Furthermore, also the analysis of "Italia del Riciclo" to analyze import and export, has divided Italy between north and center-south.

To test the area, it is created a dummy variable: 1 if the organization has its headquarters in one of the regions cited in the north area, 0 otherwise.

○ **Environmental aspect (ISO 14.001)**

As mentioned above, the recycling business is a green business that means that a good performance has positive effect on the environment. Environmental management can be testes used the certification ISO 14.001 (Molina-Azorìn et al., 2009). The variable ISO 14.001 is used majorly in the more update works (the first one is dated 2006). By "emission" they consider different type of it as: ozone emissions, emissions of toxic chemical, COD emissions, total emissions etc. For

this reason, I believe that the certification ISO 14.001 is a modern and efficient variable to measure the environmental management especially in this study. Furthermore, the variable emission is not considered the best way to measure the economic aspect for this sample because it can take on too different values depending on the type recycling activity done by the organization.

Since the database used, Amedeus, does not give this kind of information, to acquire it, I have personally checked every single organization to find if they have obtained the environmental certification.

As an environmental management variable was created a dummy variable: 1 if the organization is ISO 14001 certificated, 0 otherwise.

- **Social aspect (Woman presence in the Board of Director as CEO)**

Often organizations that implement environmental practices, develop also social practices (Pullman et al., 2009).

The female presence within the board of director (Isidro & Sobral, 2015) is a way to measure it. For this reason, I believe that it is interesting to study whether there is a correlation between the social attention and the environmental practices. Furthermore, in a green business as the recycling one, this relation can be very relevant. Unfortunately, many of the organizations do not show all the component members of the Board of Director but only the CEO.

For this reason, I have tested if the Chief Executive Officer (CEO) is a woman, variable that was studied also in the previous research (Oakley, 2000).

Therefore, it was created a dummy variable: 1 if the CEO is a woman, 0 otherwise.

Moderator effects

In addition, within the regression analysis, two moderator effects have been tested. Two OLS regression analyses have been carried out in order to verify first the moderator effect of size on the relationship between Certification ISO 14.001 and performance, and after the moderator effect of size on the relationship between social variable (female as CEO) and performance.

CHAPTER FIVE

5. EMPIRICAL ANALYSIS

5.1 Descriptive analysis

The sample is composed by 87 Italian organizations involved in the recycling business. They differ in several aspects such governance, area, environmental and social aspects, innovations and dimension.

It seems mandatory to deeply analyze the sample, and thus study its composition and the frequencies. To implement a descriptive analysis, the software SPSS has been used.

Because the descriptive analysis is different depending on the qualitative or quantitative nature of the variable, it is first implemented the study of the qualitative variables (that are governance, area, environmental and social aspects, all dummy variables⁶⁹).

⁶⁹ A dummy variable is a Nominal variable that can take on either 0 or 1.

| Statistics | | | | | |
|------------|---------|------------------|------|-----------|--------|
| | | Shareholder Type | Area | ISO 14001 | Gender |
| N | Valid | 87 | 87 | 87 | 87 |
| | Missing | 0 | 0 | 0 | 0 |
| Mode | | 0 | 1 | 1 | 0 |

Table 5.1. Statistics of qualitative variables

Table 5.1 shows that considering the qualitative variables, there are no missing values in the sample and so the valid data are 87 on 87, which means the 100%. The mode anticipates what will be the largest category of each dummy variable.

The following tables and figures illustrate detailed data on the composition of each qualitative variable.

○ **Governance (Shareholder type)**

| Governance | | | | |
|------------|---------------------------|-----------|-------------|-------------------|
| | | Frequency | Percent (%) | Valid Percent (%) |
| Valid | No public entities (0) | 76 | 87,4 | 87,4 |
| | Public entities (1) | 11 | 12,6 | 12,6 |
| | Total | 87 | 100,0 | 100,0 |

Table 5.2. Governance variable: frequency and percentage of public entities on the shareholder structure.

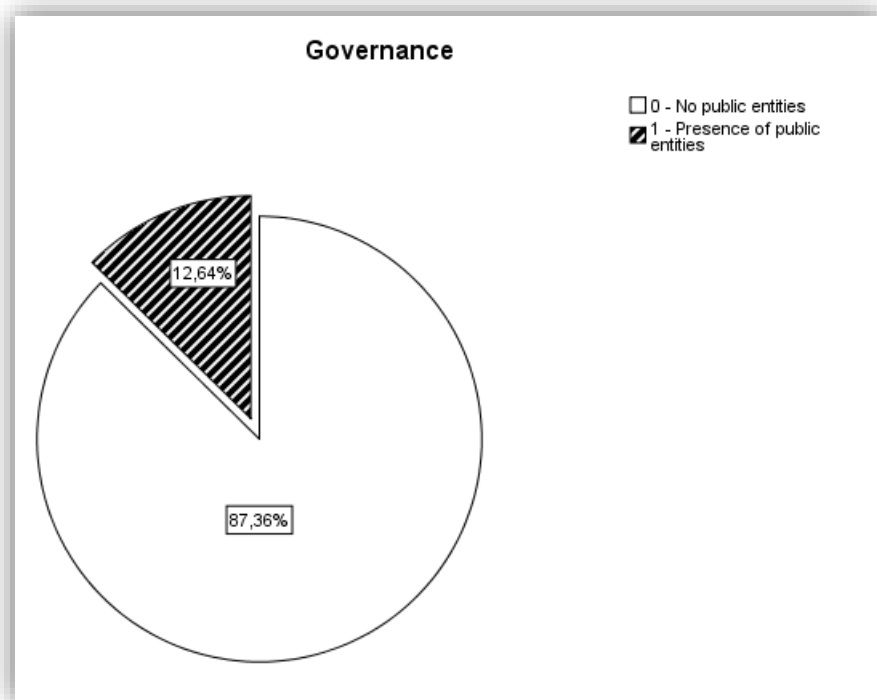


Figure 5.1. Governance pie

Table 5.2 and figure 5.1 show that most of the Italian recycling organizations are governed by private entities. In fact, the value 1 was given when, within the shareholder, there is at least one public entity, regardless of whether the majority is public or private: that means that it is stressed just the public presence within the ownership.

In the Italian context, we can see that governmental entities do not participate much in the recycling business.

This data is very relevant because if we consider the strong impact of waste on human health (Giusti, 2009), it seems important that governmental entities take part of this business. In fact, there are evidences about the dangerous consequence of a bad waste management on human health.

○ **Area**

| Area | | | | |
|-------|------------------|-----------|-------------|-------------------|
| | | Frequency | Percent (%) | Valid Percent (%) |
| Valid | Centre-South (0) | 28 | 32,2 | 32,2 |
| | North (1) | 59 | 67,8 | 67,8 |
| | Total | 87 | 100,0 | 100,0 |

Table 5.3. Area variable: frequency and percentage of the localization of recycling organizations

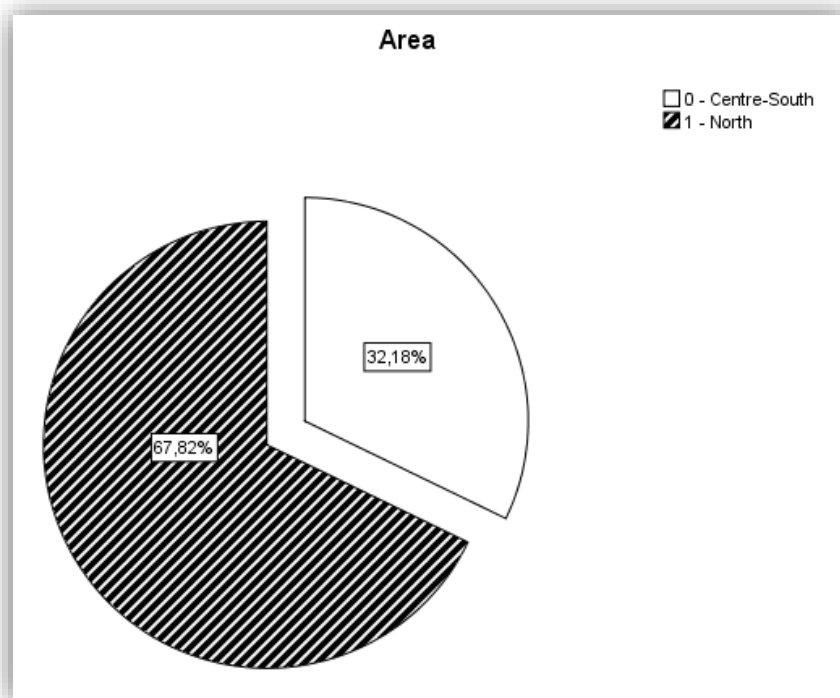


Figure 5.2. Area pie

Table 5.3 and figure 5.2 show that most of the organizations are located in the north of Italy. This information is not in contrast with the general Italian situation, where most of the organizations are in the north (ISTAT). However, for this type of business, is important to stress that Region is the competent authority for waste management in Italy (Decreto Ronchi⁷⁰).

⁷⁰ Legislative Decree number 22, February 5, 1997.

○ **Environmental aspect (ISO 14001)**

| ISO 14001 | | | | |
|-----------|----------------------|-----------|-------------|-------------------|
| | | Frequency | Percent (%) | Valid Percent (%) |
| Valid | No certification (0) | 40 | 46,0 | 46,0 |
| | ISO 14001 (1) | 47 | 54,0 | 54,0 |
| | Total | 87 | 100,0 | 100,0 |

Table 5.4. Environmental variable: frequency and percentage of Certification ISO 14001

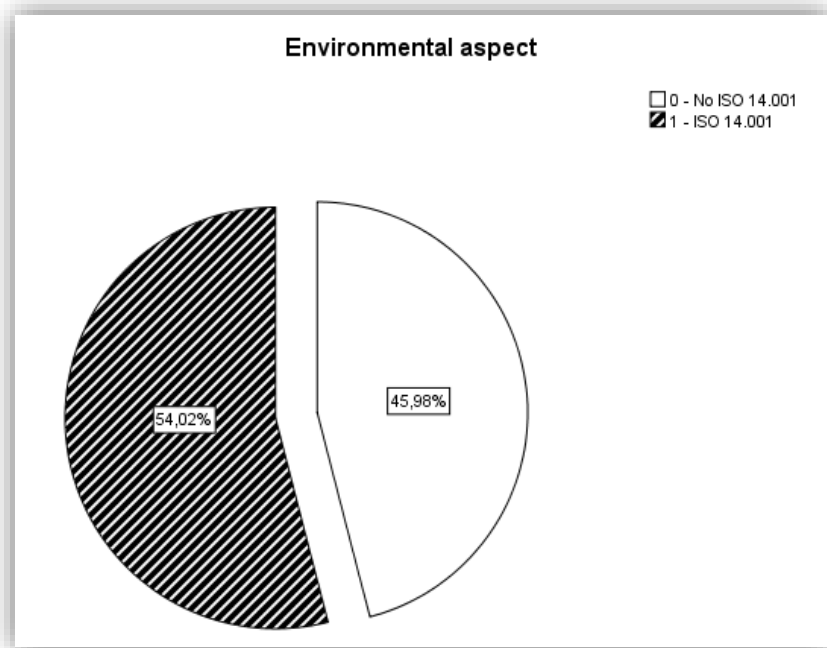


Figure 5.3. Environmental certification pie

Table 5.4 and figure 5.3 show if the recycling companies have the environmental certification ISO 14001.

It seems logical that organizations that are active in a green business, which mission is inevitably based on environmental care, use to obtain even a legal recognition of

the respect and attention that they have for the environment. However, data indicate that only about half of the organizations hold the ISO 14001 certification.

- **Social aspect (Gender diversity)**

| Gender diversity | | | | |
|------------------|------------|-----------|-------------|-------------------|
| | | Frequency | Percent (%) | Valid Percent (%) |
| Valid | Male (0) | 70 | 80,5 | 80,5 |
| | Female (1) | 17 | 19,5 | 19,5 |
| | Total | 87 | 100,0 | 100,0 |

Table 5.5 Social variable: frequency and percentage of woman as CEO

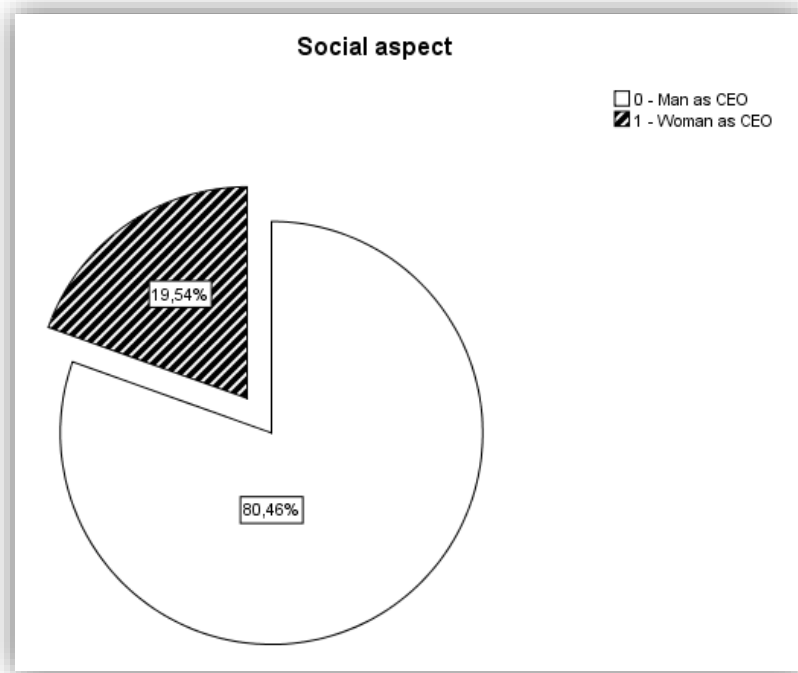


Figure 5.4 Social aspect pie

Green activities have inevitably social implication. In fact, if the environment is clean and pleasant, lifestyle is higher (Simon, 1965). Furthermore, previous

research has demonstrated that most of the time, if an organization is interested to environmental aspect, puts attention also in social aspect (Waddock & Graves, 1997; Turban & Greening, 1997). The presence of woman in the board is certainly one of that (Bear et al., 2010).

Accordingly, I have analyzed whether organizations that are active in a green business as waste recycling, take care also of social aspect as gender diversity. Because it was impossible to get the name of all the members of the board of director, I have studied the CEO gender. Inevitably, this situation is even more rare and specific, than “just” the presence in the board. From the data, we can see that almost the 20% of the chief of the board of director are women.

○ **Economic data**

Among the quantitative variables analyzed in this study on the Italian recycling business, I have chosen a number of economic data taken from the financial statement.

The organization’s financial performance can be measured by different economic data, e.g. ROA, ROE (Molina-Azorin et al., 2009), and EBITDA (Becker-Blease, et al., 2010).

| | N | Minimum | Maximum | Mean | Std. Deviation |
|---------------|----|-------------|--------------|---------------|----------------|
| ROA | 87 | -30.82 | 14.743 | 1.56 | 5.86 |
| ROE | 87 | -88 | 48 | 5.56 | 17.988 |
| EBITDA | 87 | -1.027.505* | 116.503.139* | 2.723.404,5*1 | 12.878.754,83* |
| *Data in Euro | | | | | |

Table 5.6. Performance

Table 5.6 shows that organizations in this business can be really different in terms of performance. In fact, it depends on the type of waste managed by the organization. As it happens often, there are organizations that are profitable and others that are on the brink of failure.

| | | Size | Net income | Capital | Cash flow | Aging | Number of patents |
|--|---------|--------|-----------------------|-------------|----------------------|--------------------|-------------------|
| N | Valid | 87 | 87 | 87 | 87 | 87 | 87 |
| | Missing | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | | 142,24 | 272738,15* | 3854474,92* | 2000769,83* | 20,7931 | ,26 |
| Mode | | 13 | -2428023 ^a | 100000* | -795912 ^a | 13,00 ^a | 0 |
| Minimum | | 1 | -2428023* | 7743* | -795912* | 3,00 | 0 |
| Maximum | | 7924 | 9436082* | 182436916* | 82917253* | 52,00 | 8 |
| *Data in Euro | | | | | | | |
| a. Multiple modes exist. The smallest value is shown | | | | | | | |

Table 5.7. Quantitative variables' statistics

The quantitative variables' statistics explain that all the data in the database are correct, and so there are no missing and that the business includes very large companies. This can be seen by both the maximum number of employees (7.924) and the average number of employees (142).

In general, analyzing the sample, 13 organizations out of 87 have a negative ROA; 12 organizations out of 87 have a negative ROE; 6 organizations out of 87 have a negative EBITDA. Therefore, the business performance is good because the 85% of the sample has positive economic performance.

The Net income, Capital and Cash Flow are consistent with the financial data, and denote that the economic conditions are various in quantity.

○ **Innovation (Number of patents)**

| Number of patents | | | | | |
|-------------------|-------|-----------|-------------|-------------------|------------------------|
| | | Frequency | Percent (%) | Valid Percent (%) | Cumulative Percent (%) |
| Valid | 0 | 77 | 88.5 | 88.5 | 88.5 |
| | 1 | 6 | 6.9 | 6.9 | 95.4 |
| | 2 | 2 | 2.3 | 2.3 | 97.7 |
| | 5 | 1 | 1.1 | 1.1 | 98.9 |
| | 8 | 1 | 1.1 | 1.1 | 100.0 |
| | Total | 87 | 100.0 | 100.0 | |

Table 5.8. Innovation variable: frequency and percentage of the number of patents

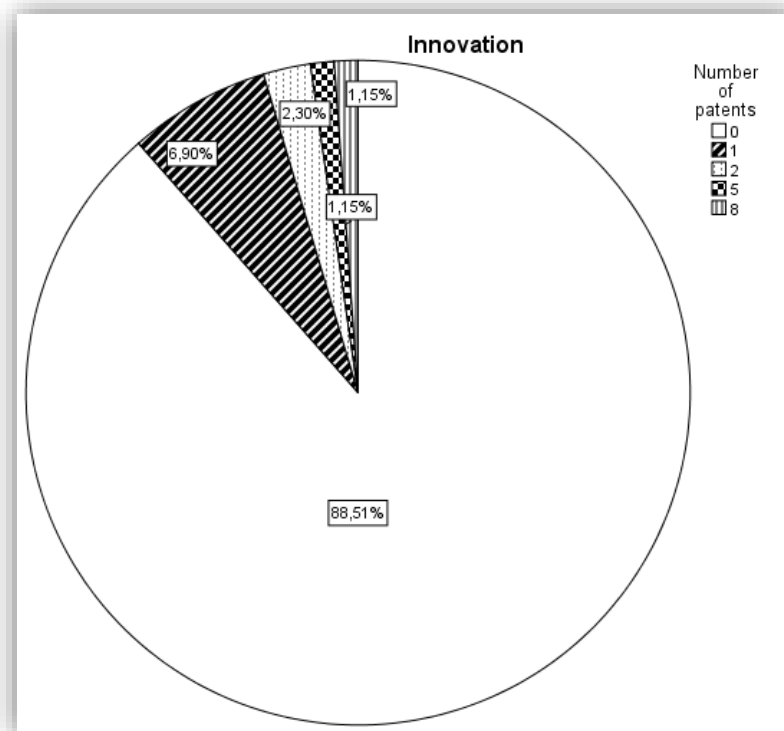


Figure 5.5. Innovation pie

The number of patents shows the level of innovation. Table 5.8 shows that just 10 companies out of 87 have invested in innovation processes. Six companies have one patent, two have two patents. There are only two companies that have more than five patents.

The table below summarizes the descriptive analysis of the variables used in this study.

| Descriptive Statistics | | | | | |
|------------------------|----|-----------|------------|-------------|----------------|
| | N | Minimum | Maximum | Mean | Std. Deviation |
| ROA | 87 | -30.822 | 14.743 | 1.55899 | 5.857640 |
| ROE | 87 | -88 | 48 | 5.56 | 17.988 |
| EBITDA | 87 | -1027505* | 116503139* | 2723404.51* | 12878754.833 |
| Aging | 87 | 3.00 | 52.00 | 20.7931 | 10.12726 |
| Size | 87 | 1 | 7924 | 142.24 | 847.120 |
| Governance | 87 | 0 | 1 | - | .334 |
| Area | 87 | 0 | 1 | - | .470 |
| Innovation | 87 | 0 | 8 | .26 | 1.062 |
| Environmental aspect | 87 | 0 | 1 | - | .501 |
| Social aspect | 87 | 0 | 1 | - | .399 |
| Net income | 87 | -2428023* | 9436082* | 272738.15* | 1194812.342 |
| Capital | 87 | 7743* | 182436916* | 3854474.92* | 20266635.593 |
| Cash flow | 87 | -795912* | 82917253* | 2000769.83* | 9234814.961 |
| *Data in Euro | | | | | |

Table 5.9. Descriptive statistics

5.2 Cluster analysis and correlations

To develop a deep sample analysis and to test hypotheses 4 and 5, I have implemented a cluster analysis. Generally, within a specific business, some organizations differ from others because of their size or quantity of transactions or economic results. In particular, the recycling business here considered, comprehends organizations that can recycle very different types of waste. Therefore, these differences can be relevant in the sample analyzed because, depending on the category of waste recycled, the economic values (as sales, cash flow etc.) may vary consistently.

Statistical analyses show one company that is totally outside from the standard of the business. This company is the biggest one (almost 8.000 employees and sales significantly higher compared to others) and as a consequence, many other values are out of the box.

The same occurred in the opposite situation: two organizations are in a very critical economic condition, and so their economic data are very far from the other ones. Therefore, I have opted to not consider these three cases in the clusters and regression analysis and analyze the others 84 organizations, because these organizations are statistically considered as “outliers”.

The cluster analysis is based on economic and financial data coming from the Amedeus database.

| Number of cases in each Cluster | | | |
|---------------------------------|---|----|------|
| Cluster | 1 | 21 | 25% |
| | 2 | 25 | 30% |
| | 3 | 37 | 44% |
| | 4 | 1 | 1% |
| Valid | | 84 | 100% |
| Missing | | 0 | 0% |

Table 5.10. Four clusters

As we can see from the table above, using four clusters is not the best way to have an overview of the business. In fact, the first three groups are homogeneous but the last cluster is composed by only one organization that can be consider as an outlier. In fact, looking at this specific organization, its economic performance is exceptionally profitable (in particular for EBITDA, capital, cash flow, working capital and sales). Because the scope of this kind of analysis is to study and understand the recycling business in general, and specifically the organizations' features, it is a good idea to continue the analysis not considering this organization.

To sum up, the cluster analysis comprehend 83 organizations and so four of them were excluded because their values and standards were too different from the other organizations of the business.

So using the *k mean cluster* it is possible to create three different clusters composed by 21, 25 and 37 organizations.

| Number of Cases in each Cluster | | | |
|---------------------------------|---|----|------|
| Cluster | 1 | 25 | 30% |
| | 2 | 37 | 45% |
| | 3 | 21 | 25% |
| Valid | | 83 | 100% |
| Missing | | 0 | 0% |

Table 5.11. Three clusters

This classification is a good way to have a complete and uniform overview of the organizations active in the Italian business of recycling because they are allocated homogeneously. The largest group is the second one, with 37 organizations and the smallest one is the last group with 21 organizations.

To obtain the final cluster centers, were required eight iterations. The final cluster center shows the means of the three clusters compared to the thirteen variables⁷¹. This means that the values of the table are not absolute variables but are the expression of the deviation from the sample mean. This is an important concept for the development of the clusters, which do not give information on absolute values but relative to the sample itself. In fact, the absolute values were analyzed previously with descriptive analysis.

⁷¹ ROA; ROE; EBITDA; Aging; Size; Capital; Cash flow; Total assets; Shareholders funds; Working capital; Sales; Added value; EBIT Margin %.

| Final Cluster Centers | | | | |
|------------------------------|---------------------------------|----------------|----------------|----------------|
| | | Cluster | | |
| | | 1 | 2 | 3 |
| | Number of Cases in each Cluster | 25 | 37 | 21 |
| Zscore: <u>ROA</u> | | .07573 | -.31222 | .88763 |
| Zscore: <u>ROE</u> | | .20141 | -.31638 | .78590 |
| Zscore: <u>EBITDA</u> | | -.15282 | -.13680 | -.08795 |
| Zscore: <u>Aging</u> | | 1.15795 | -.52132 | -.41216 |
| Zscore: Size | | -.11493 | -.10321 | -.11170 |
| Zscore: <u>Capital</u> | | -.18101 | -.04603 | -.16690 |
| Zscore: <u>Cash flow</u> | | -.15269 | -.13900 | -.09007 |
| Zscore: <u>Total assets</u> | | -.13079 | -.09830 | -.12573 |
| Zscore: Shareholders funds | | -.15540 | -.08821 | -.13675 |
| Zscore: Working capital | | -.16072 | -.11504 | -.04608 |
| Zscore: Sales | | -.07323 | -.12221 | -.14685 |
| Zscore: Added value | | -.12313 | -.11176 | -.11131 |
| Zscore: <u>EBIT Margin %</u> | | -.17236 | -.33746 | .90835 |

Table 5.12. Final Cluster center, deviation from the sample mean

From the table above, the structure of the business is clear. In the first group, that comprehends the 30% of organizations, there are the oldest companies. Age variable has a particularly high value, which means that the group is particularly old compared to the sample average. This group, however, is not characterized by particular economic values; in fact, no value is significantly different from the average (table 5.13 ANOVA). To be more precise, we can see that, compared to the others, organizations in this group are characterized by high sales and an inefficient working capital but those values are not significantly relevant. This is confirmed by table 5.13 where the economic values that characterized the first cluster have a no significant p-value.

The second cluster, which is the most numerous, is characterized by organizations with economic results (e.g. ROA, ROE and EBIT Margin) below the average. It is interesting to note that these organizations use to have a significant capital and shareholders fund. However, these variables, as we can see in the table below, are not really important for the classification of this cluster analysis⁷².

This result does not mean that the most of the organizations have negative economic results (in fact have already see that the economic performance of the business is good in general) but that, compared to the sample mean, many organizations reach economic results below the average.

| ANOVA | | | | | | |
|----------------------------|-------------|----|-------------|----|--------|-----------|
| | Cluster | | Error | | F | P. value. |
| | Mean Square | df | Mean Square | df | | |
| Zscore: ROA | 9.662 | 2 | .247 | 80 | 39.090 | .000 |
| Zscore: ROE | 8.262 | 2 | .220 | 80 | 37.505 | .000 |
| Zscore: EBITDA | .026 | 2 | .008 | 80 | 3.117 | .050 |
| Zscore: Aging | 23.566 | 2 | .441 | 80 | 53.378 | .000 |
| Zscore: Size | .001 | 2 | .007 | 80 | .162 | .851 |
| Zscore: Capital | .171 | 2 | .064 | 80 | 2.654 | .077 |
| Zscore: Cash flow | .025 | 2 | .009 | 80 | 2.780 | .068 |
| Zscore: Total assets | .009 | 2 | .007 | 80 | 1.358 | .263 |
| Zscore: Shareholders funds | .037 | 2 | .046 | 80 | .817 | .445 |
| Zscore: Working capital | .075 | 2 | .164 | 80 | .459 | .633 |
| Zscore: Sales | .033 | 2 | .036 | 80 | .924 | .401 |
| Zscore: Added value | .001 | 2 | .003 | 80 | .333 | .718 |
| Zscore: EBIT Margin % | 11.110 | 2 | .543 | 80 | 20.478 | .000 |

Table 5.13. ANOVA. Clusters analysis

⁷² Capital p-value > .05 and shareholder funds p-value > 1.

The smallest cluster is composed by 21 organizations out of 83, and it is characterized by stability. In fact, the values of ROA, ROE, EBITDA, cash flow and EBIT Margin are distinctly higher than the average.

Summarizing the analyses made, two very big companies and two that show very serious economic problems were excluded from the cluster analysis of this work. Therefore, considering 84 organizations, among three groups, one cluster is characterized by old organizations, another cluster is characterized by economic performance below the mean, and the last one, the least numerous, from a particularly positive economic situation.

It seems interesting to study whether there is a relation between the clusters and other variables as the ISO certification and the typology of shareholders. For the analysis it is uses the Cross table⁷³.

First, it is important to understand whether there is any correlation between environmental aspect and economic performance.

| Chi-Square Tests (Environmental aspect) | | | |
|--|------------|-------|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 2,113 | 2 | ,348 |
| Likelihood Ratio | 2,116 | 2 | ,347 |
| N of Valid Cases | 83 | | |
| Symmetric Measures | | | |
| | | Value | Approx. Sig. |
| Nominal by Nominal | Phi | ,160 | ,348 |
| | Cramer's V | ,160 | ,348 |
| N of Valid Cases | | 83 | |

Table 5.14. Correlation between clusters and environmental aspect

⁷³ Cross tables are table where facts are divided on the basis of dimension values.

The Chi-square tests and the Phi and Cramer's V, suggest that the correlation is not significant (p-value is > .1). This is a good outcome because it means that the environmental attention does not depend on age or on economic performance.

The crosstab above shows that the majority of the ancient organizations and the ones that have worse economic results are ISO 14001 certified. This is not true for organizations that have better economic results.

| Crosstab (Environmental aspect) | | | | |
|---------------------------------|----------------------------------|-----------|------------|-------|
| Count | | | | |
| | | ISO14001 | | Total |
| | | No (0) | Yes (1) | |
| Cluster Variable | Cluster1: Ancient organizations | 9 | 16 | 25 |
| | Cluster2: Lower Economic results | 16 | 21 | 37 |
| | Cluster3: Hager Economic results | 12 | 9 | 21 |
| Total | | 37 | 46 | 83 |

Table 5.15. Cross table: Clusters and ISO 14001

The cluster analysis here studied shows that there is no correlation⁷⁴ between the performance and the development of environmental practices of the Italian recycling organizations. In general, the result shows that the implementation of environmental practices (as the Certification 14001) for green organizations does not depend on the economic performance.

After have tested also the social aspect, which shows the same results, we can say that the cluster analysis does not suggest any correlation between socio-environmental aspect and performance.

⁷⁴ P-value is not significant.

It is now interesting to assess the relation between the **Shareholder type** and the three clusters, because Pearson Chi-Square test and Phi and Cramer's V determine the statistical significance (p-value <.05).

| Chi-Square Tests (Governance) | | | |
|--------------------------------------|------------|-------|-----------------------|
| | Value | df | Asymp. Sig. (2-sided) |
| Pearson Chi-Square | 8,290 | 2 | ,016 |
| Likelihood Ratio | 10,302 | 2 | ,006 |
| N of Valid Cases | 83 | | |
| Symmetric Measures | | | |
| | | Value | Approx. Sig. |
| Nominal by Nominal | Phi | ,316 | ,016 |
| | Cramer's V | ,316 | ,016 |
| N of Valid Cases | | 83 | |

Table 5.16. Correlation between clusters and shareholder type

The cross table is more detailed. It shows that in almost all the organizations which governance is influenced by public entities have economic results below the average (8 organizations out of 9). Therefore, this evidence shows that the presence of public authorities in the shareholding structures leads to economic results lower the mean.

| Crosstab (Governance) | | | | |
|------------------------------|-------------------------|------------------|------------|-------|
| Count | | | | |
| | | Shareholder Type | | Total |
| | | No (0) | Yes (1) | |
| Cluster Variable | Ancient organizations | 25 | 0 | 25 |
| | Lower Economic results | 29 | 8 | 37 |
| | Higher Economic results | 20 | 1 | 21 |
| Total | | 74 | 9 | 83 |

Table 5.17. Crosstab: Clusters and shareholders type

The cluster analysis tests the hypothesis number 4, showing the existing correlation between performance and the public authorities in the shareholding structures of Italian recycling organizations. However, to be more specific and to test the hypotheses number 4 and 5, it is important to consider also the correlation table (table 5.18).

Here below is showed the correlation table that sheds light on the correlation⁷⁵ among all the variables.

| | | Correlations | | | | | | | | | | | | | | |
|------------|---------------------|--------------|--------|--------|-------|--------|------------|------------|-------|----------------------|---------------|------------|----------------|-------------|-----------------|-----------|
| | | ROA | ROE | EBITDA | Aging | Size | Innovation | Governance | Area | Environmental aspect | Social aspect | Net income | Size Environem | Size-Social | Working capital | Cash flow |
| ROA | Pearson correlation | 1 | ,895** | .023 | ,225* | -.019 | -.004 | -.075 | -.016 | .136 | .128 | ,405** | .118 | ,226* | .026 | .031 |
| | Sig. (2-tailed) | | .000 | .832 | .036 | .859 | .969 | .491 | .886 | .209 | .238 | .000 | .278 | .036 | .810 | .777 |
| ROE | Pearson correlation | ,895** | 1 | .006 | .165 | -.027 | .024 | -.062 | -.002 | .103 | .100 | ,330** | .114 | .169 | .010 | .014 |
| | Sig. (2-tailed) | .000 | | .960 | .126 | .807 | .825 | .571 | .983 | .344 | .359 | .002 | .294 | .117 | .924 | .896 |
| EBITDA | Pearson correlation | .023 | .006 | 1 | .105 | ,964** | -.039 | ,348** | -.130 | -.065 | -.060 | .131 | .065 | -.043 | ,912** | ,999** |
| | Sig. (2-tailed) | .832 | .960 | | .332 | .000 | .719 | .001 | .232 | .552 | .582 | .226 | .552 | .692 | .000 | .000 |
| Aging | Pearson correlation | ,225* | .165 | .105 | 1 | .124 | -.100 | -.136 | -.119 | .116 | .059 | .027 | .046 | .093 | .075 | .106 |
| | Sig. (2-tailed) | .036 | .126 | .332 | | .253 | .358 | .208 | .271 | .284 | .587 | .804 | .670 | .390 | .490 | .328 |
| Size | Pearson correlation | -.019 | -.027 | ,964** | .124 | 1 | -.033 | ,297** | -.154 | -.094 | -.063 | -.103 | -.026 | -.031 | ,908** | ,957** |
| | Sig. (2-tailed) | .859 | .807 | .000 | .253 | | .762 | .005 | .153 | .385 | .565 | .343 | .811 | .777 | .000 | .000 |
| Innovation | Pearson correlation | -.004 | .024 | -.039 | -.1 | 0.33 | 1 | -.095 | .079 | .053 | .069 | .026 | .045 | .067 | .003 | -.039 |
| | Sig. (2-tailed) | .969 | .825 | .719 | .358 | .762 | | .380 | .465 | .626 | .528 | .813 | .678 | .540 | .975 | .717 |

⁷⁵ Pearson correlation

| | | | | | | | | | | | | | | | | | |
|--|---------------------|--------|--------|--------|------|--------|------|--------|------|--------|------|--------|--------|--------|--------|--------|------|
| Governance | Pearson correlation | - | - | .348** | - | .297** | - | 1 | - | .004 | - | .118 | .096 | - | .307** | .358** | |
| | Sig. (2-tailed) | .491 | .571 | .001 | .208 | .005 | .380 | | .319 | .971 | .356 | .276 | .374 | .480 | .004 | .001 | |
| Area | Pearson correlation | - | - | - | - | - | .079 | - | 1 | - | .029 | .037 | .047 | .090 | - | - | |
| | Sig. (2-tailed) | .886 | .983 | .232 | .271 | .153 | .465 | .319 | | .692 | .788 | .733 | .665 | .406 | .065 | .231 | |
| Environmental aspect | Pearson correlation | .136 | .103 | - | .116 | - | .094 | - | .004 | - | 1 | .152 | .461** | - | - | - | |
| | Sig. (2-tailed) | .209 | .344 | .552 | .284 | .385 | .626 | .971 | .692 | | .526 | .159 | .000 | .365 | .351 | .555 | |
| Social aspect | Pearson correlation | .128 | .100 | - | .059 | - | .063 | - | .100 | .029 | - | 1 | .046 | .154 | .693** | .014 | - |
| | Sig. (2-tailed) | .238 | .359 | .582 | .587 | .565 | .528 | .356 | .788 | .526 | | .673 | .155 | .000 | .897 | .590 | |
| Net income | Pearson correlation | .405** | .330** | .131 | .027 | - | .103 | - | .118 | .037 | .152 | .046 | 1 | .305** | .022 | .056 | .158 |
| | Sig. (2-tailed) | .000 | .002 | .226 | .804 | .343 | .813 | .276 | .733 | .159 | .673 | | .004 | .839 | .608 | .145 | |
| Size - Environment | Pearson correlation | .118 | .114 | .065 | .046 | .026 | .045 | .096 | .047 | .461** | - | .305** | 1 | - | .022 | .074 | |
| | Sig. (2-tailed) | .278 | .294 | .552 | .670 | .811 | .678 | .374 | .665 | .000 | .155 | .004 | | .310 | .838 | .498 | |
| Size-social | Pearson correlation | .226* | .169 | - | .093 | - | .031 | - | .067 | - | .077 | .090 | - | 1 | - | - | |
| | Sig. (2-tailed) | .036 | .117 | .692 | .390 | .777 | .540 | .480 | .406 | .365 | .000 | .839 | .310 | | .707 | .710 | |
| Working capital | Pearson correlation | .026 | .010 | .912** | .075 | .908** | .003 | .307** | - | - | .014 | .056 | .022 | - | 1 | .911** | |
| | Sig. (2-tailed) | .810 | .924 | .000 | .490 | .000 | .975 | .004 | .065 | .351 | .897 | .608 | .838 | .707 | | .000 | |
| Cash flow | Pearson correlation | .031 | .014 | .999** | .106 | .957** | - | .358** | - | - | - | .158 | .074 | - | .911** | 1 | |
| | Sig. (2-tailed) | .777 | .896 | .000 | .328 | .000 | .717 | .001 | .231 | .555 | .590 | .145 | .498 | .710 | .000 | | |
| **. Correlation is significant at the 0.01 level (2-tailed). | | | | | | | | | | | | | | | | | |
| *. Correlation is significant at the 0.05 level (2-tailed). | | | | | | | | | | | | | | | | | |

Table 5.18. Correlation table

Developing a business study means also analyzing the relation among some economic variables. Some correlations are justified by an economic *ratio* as the significant correlation between ROE and ROA (.895**) or EBITDA and Cash flow

(,999**) or Total assets and number of Employees (,992**) that are two size measures.

To develop the main OLS models, ROE is not used as dependent variable because, as we can see in table 5.18, it is very correlated with ROA (Pearson correlation is 0,895*). Therefore, it is better to choose ROA and EBITDA as dependent variables for the two different models, because they are not correlated (Pearson correlation is 0,023).

5.3 OLS: regression analysis

To test the first three hypotheses, I have developed six models: model 1 and 4 comprehend one dependent variable (ROA for model 1 and EBITDA for model 4) and the quantitative and qualitative variables.

Within these two models, the quantitative variables are aging, size and innovation and are considered as independent variable. Instead, governance, area, social and environmental aspects and net income as control variables.

Model 2 and 5 test the moderator effect of size on environmental aspect, and model 3 and 6 the moderator effect of size on social aspect. For each dependent variable are developed the three models. Based on previous research, this study separately entered each interaction term into the main model (Cohen et al., 2003; Lichtenthaler, 2009).

The main models are the first and the fourth (model 1 use ROA as dependent variable, and model 4 using EBITDA). The other models are useful to test the effect of size on the socio-environmental variables.

In brief, and to clarify what will be analyzed in the following paragraphs, is here depicted a scheme of the models.

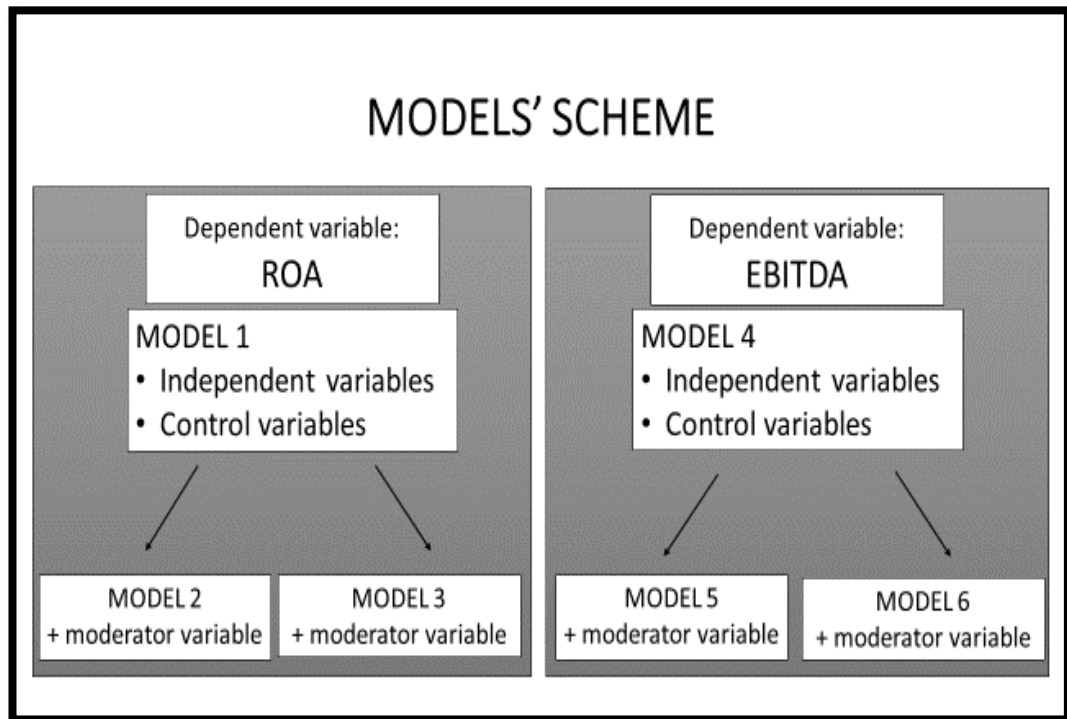


Figure 5.6. OLS Models

The ROA model

Finally, regression analyses are developed. Considering ROA (return on asset) as dependent variable, means that the performance of the business is measured by ROA. Here are developed three models: the first one comprehends just the dependent and control variables, and it is considered the “basic model”.

The other two models are used to measure two different moderation effects. Model 2 size and environmental aspect; model 3 size and social aspect. This analysis aims at exploring the effect of size on the relation between ISO 14001 or gender diversity and performance.

| ROA Models Summary | | | | | | | |
|-------------------------|------|----------|-------------------|----------------------------|---------------|-------|---------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson | F | P-value |
| 1 | ,482 | ,232 | ,154 | 5,388474 | 2,529 | 2,953 | 0,006 |
| 2 | ,483 | ,233 | ,143 | 5,421678 | 2,525 | 2,599 | 0,011 |
| 3 | ,518 | ,268 | ,183 | 5,294721 | 2,409 | 3,14 | 0,003 |
| Dependent Variable: ROA | | | | | | | |

Table 5.19. ROE models Summary

The model summary gives an overview of the three models that express ROA as the performance indicator. Obviously the more are the variables, the more the model explains the reality, and this is confirmed by the R square (.232 in the first model and .268 in the last one).

Durbin-Watson confirms that there are no multi-collinearity problems. In fact, the p-value is always $< ,05$. This result means that in each model there are one or more variables that are statistical significant, and that have effects on the dependent variable. This concept is clear in the coefficients table below.

| Coefficients | | | | | | | | |
|--------------|----------------------|-----------------------------|------------|---------------------------|-------|-------------|-------------------------|-------|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | P-value | Collinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 1 | (Constant) | -1,604 | 1,851 | | -,866 | ,389 | | |
| | Aging | ,106 | ,060 | ,183 | 1,759 | ,083 | ,907 | 1,102 |
| | Size | ,000 | ,001 | ,040 | ,366 | ,716 | ,843 | 1,186 |
| | Governance | -1,728 | 1,903 | -,099 | -,908 | ,367 | ,834 | 1,199 |
| | Area | -,193 | 1,268 | -,015 | -,152 | ,879 | ,952 | 1,051 |
| | Innovation | ,153 | ,557 | ,028 | ,274 | ,785 | ,967 | 1,034 |
| | Environmental aspect | ,761 | 1,194 | ,065 | ,637 | ,526 | ,943 | 1,060 |
| | Social aspect | 1,438 | 1,480 | ,098 | ,972 | ,334 | ,970 | 1,031 |
| | Net income | ,000 | ,000 | ,403 | 3,933 | ,000 | ,938 | 1,066 |
| 2 | (Constant) | -1,617 | 1,864 | | -,868 | ,388 | | |
| | Aging | ,106 | ,061 | ,183 | 1,747 | ,085 | ,907 | 1,102 |
| | Size | ,000 | ,001 | ,042 | ,382 | ,703 | ,836 | 1,197 |
| | Governance | -1,713 | 1,916 | -,098 | -,894 | ,374 | ,833 | 1,200 |
| | Area | -,167 | 1,281 | -,013 | -,131 | ,896 | ,944 | 1,060 |
| | Innovation | ,149 | ,560 | ,027 | ,266 | ,791 | ,966 | 1,035 |
| | Environmental aspect | ,890 | 1,339 | ,076 | ,665 | ,508 | ,758 | 1,319 |
| | Social aspect | 1,387 | 1,506 | ,094 | ,921 | ,360 | ,947 | 1,056 |
| | Net income | ,000 | ,000 | ,409 | 3,817 | ,000 | ,867 | 1,154 |
| | Size - environment | -,002 | ,009 | -,026 | -,218 | ,828 | ,698 | 1,432 |
| 3 | (Constant) | -1,317 | 1,825 | | -,722 | ,473 | | |
| | Aging | ,096 | ,059 | ,165 | 1,610 | ,112 | ,900 | 1,111 |
| | Size | ,000 | ,001 | ,037 | ,353 | ,725 | ,843 | 1,186 |
| | Governance | -1,756 | 1,870 | -,100 | -,939 | ,351 | ,834 | 1,199 |
| | Area | -,457 | 1,253 | -,037 | -,365 | ,716 | ,941 | 1,063 |
| | Innovation | ,185 | ,547 | ,033 | ,337 | ,737 | ,966 | 1,035 |
| | Environmental aspect | ,933 | 1,176 | ,080 | ,793 | ,430 | ,938 | 1,066 |
| | Social aspect | -1,230 | 1,998 | -,084 | -,615 | ,540 | ,513 | 1,948 |
| | Net income | ,000 | ,000 | ,404 | 4,018 | ,000 | ,938 | 1,066 |
| | Size - social | ,077 | ,039 | ,266 | 1,946 | ,055 | ,508 | 1,969 |

Table 5.20 Coefficients ROA models

To avoid possible multi-collinearity on the interaction variables in the regression analysis, I have tested the inflation factors values (VIF) on all independent, control and moderator variables to fall below 10 (Hair et al 2006). These results indicate adequate OLS regression.

The EBITDA model

This section analyzes the same relations and thus the same three models but using a different economic performance variable: EBITDA. In fact, considering a different measure of performance, we can have different results. The same process developed above is here exposed using EBITDA as dependent variable.

| EBITDA Model Summary | | | | | | | |
|----------------------------|------|----------|-------------------|----------------------------|---------------|---------|---------|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Durbin-Watson | F | P-value |
| 4 | ,992 | ,985 | ,983 | 1668697,748 | 2,196 | 630,576 | ,000 |
| 5 | ,993 | ,986 | ,985 | 1595365,836 | 2,313 | 614,151 | ,000 |
| 6 | ,992 | ,985 | ,983 | 1663949,512 | 2,088 | 563,876 | ,000 |
| Dependent Variable: EBITDA | | | | | | | |

Table 5.21. EBITDA models Summary

The model summary gives an overview of the three models that use EBITDA as the performance indicator. Durbin-Watson confirms that there are no multi-collinearity problems. Furthermore, the p-value is always < ,00 means that in each model there is one or more variables that are statistical significant, and so that have effects on the dependent variable.

The value of the R square is very high, confirming that the models are statistically relevant.

| Coefficients | | | | | | | | |
|--------------|----------------------|-----------------------------|------------|---------------------|--------|-------------|-------------------------|-------|
| Model | | Unstandardized Coefficients | | Standardized Coeff. | t | P-value. | Collinearity Statistics | |
| | | B | Std. Error | Beta | | | Tolerance | VIF |
| 4 | (Constant) | 53805,972 | 573309,361 | | ,094 | ,925 | | |
| | Aging | -20723,789 | 18655,342 | -,016 | -1,111 | ,270 | ,907 | 1,102 |
| | Size | 14943,940 | 231,360 | ,983 | 64,592 | ,000 | ,843 | 1,186 |
| | Governance | 1079580,232 | 589387,035 | ,028 | 1,832 | ,071 | ,834 | 1,199 |
| | Area | 405409,583 | 392536,564 | ,015 | 1,033 | ,305 | ,952 | 1,051 |
| | Innovation | -19943,519 | 172337,028 | -,002 | -,116 | ,908 | ,967 | 1,034 |
| | Environmental aspect | -127956,529 | 369665,091 | -,005 | -,346 | ,730 | ,943 | 1,060 |
| | Social aspect | -194267,571 | 458194,174 | -,006 | -,424 | ,673 | ,970 | 1,031 |
| | Net income | 2,478 | ,156 | ,230 | 15,934 | ,000 | ,938 | 1,066 |
| 5 | (Constant) | 3861,576 | 548387,862 | | ,007 | ,994 | | |
| | Aging | -20793,763 | 17835,538 | -,016 | -1,166 | ,247 | ,907 | 1,102 |
| | Size | 15003,562 | 222,154 | ,987 | 67,537 | ,000 | ,836 | 1,197 |
| | Governance | 1138359,408 | 563853,748 | ,030 | 2,019 | ,047 | ,833 | 1,200 |
| | Area | 504864,823 | 376864,006 | ,018 | 1,340 | ,184 | ,944 | 1,060 |
| | Innovation | -34295,804 | 164838,552 | -,003 | -,208 | ,836 | ,966 | 1,035 |
| | Environmental aspect | 375627,403 | 394118,774 | ,015 | ,953 | ,344 | ,758 | 1,319 |
| | Social aspect | -389834,627 | 443264,846 | -,012 | -,879 | ,382 | ,947 | 1,056 |
| | Net income | 2,601 | ,155 | ,241 | 16,817 | ,000 | ,867 | 1,154 |
| | Size - environment | -7938,018 | 2749,464 | -,046 | -2,887 | ,005 | ,698 | 1,432 |
| 6 | (Constant) | -1941,499 | 573554,961 | | -,003 | ,997 | | |
| | Aging | -18728,745 | 18676,107 | -,015 | -1,003 | ,319 | ,900 | 1,111 |
| | Size | 14946,642 | 230,712 | ,983 | 64,785 | ,000 | ,843 | 1,186 |
| | Governance | 1084959,186 | 587726,975 | ,028 | 1,846 | ,069 | ,834 | 1,199 |
| | Area | 456700,195 | 393737,073 | ,017 | 1,160 | ,250 | ,941 | 1,063 |
| | Innovation | -26160,297 | 171924,408 | -,002 | -,152 | ,879 | ,966 | 1,035 |
| | Environmental aspect | -161295,714 | 369654,550 | -,006 | -,436 | ,664 | ,938 | 1,066 |
| | Social aspect | 323698,507 | 627944,007 | ,010 | ,515 | ,608 | ,513 | 1,948 |
| | Net income | 2,476 | ,155 | ,230 | 15,969 | ,000 | ,938 | 1,066 |
| | Size - social | -14895,570 | 12388,070 | -,024 | -1,202 | ,233 | ,508 | 1,969 |

Table 5.22. Coefficients EBITDA models

Also for EBITDA models I have tested if the inflation factors values (VIF) on all independent, control and moderator variables fall below 10 (Hair et al 2006), indicating that there are no multi-collinearity problems.

Model 4 tests the linear regression of EBITDA and independent and control variables. Models 5 and 6 test the moderating effect of size on the environmental aspect and on social aspect, respectively. While the model 5 does not identify moderating effects, adding the interaction term of size on environmental practice within model 6, the interaction is negatively and significantly related to EBITDA ($p = .005$; Beta $-.046$).

5.4 Discussion of results and implications

The empirical analysis of this work examines the organizations active within the recycling business in Italy. The sample is composed of 87 organizations. Most of them are located in the northern area and are considered small organizations (with from 5 to 50 employees). **Public entities** are not very relevant within the shareholding (87% of the sample is totally owned by private entities).

Most of the organizations are **ISO 14001** environmentally certified and this aspect is relevant considering that the object of the study is organizations active within a green business.

Although it is a young business (most of the companies were established between 1990 and 2010, and in particular at the beginning of the 21st century), it is not very **innovative**. In fact, just 11,5% of the companies have invested on patents, and most of them have only one patent.

Economic data show positive **economic performance**. Looking at the correlation table, it is possible to notice that the performance variables are related with some other economic variables that are an expression of business aspects. For example, EBITDA is correlated with cash flow (.999**) and working capital (.912**), ROA with ROE (.895**). In fact, those correlations are caused by normal economic factors.

Age

Referring to the ROA model, the economic performance is influenced only by age and net income (Pearson Correlation = .225*). Therefore, age is positively and significantly related to an organization's performance. This means that the older the organization, the better the economic performance (Brynjolfsson et al., 2011⁷⁶).

However, if EBITDA is considered the measure of profitability, organization age does not have impact on the recycling business performance. In fact, for example, new organizations can be more compliant with current needs because they can build their own business *ex novo* and direct activities according to the market preferences.

In summary ROA is positively associated with organization age (*p-value* = .083⁷⁷) and the correlation is significant at the 0.05 level (Pearson correlation = .225*). Instead EBITDA is not correlated with organization age (the *p* value of size in the EBITDA model is .270 and Pearson correlation is not significant).

Important economic features of the profitability variables can explain this different impact. In fact, considering ROA as the performance indicator means that amortizations are included in the analysis. So, the older a company the higher the ROA. This can occur because generally, old organizations have already amortized the investments: the earlier the asset was bought, the earlier it is amortized. This

⁷⁶ This result confirms previous studies, such as Levitt & March, (1988); Cohen & Levinthal (1989); Argote et al. (2003).

⁷⁷ Is possible to consider significant *p-value* < 0,1 because the sample is small, under 100 companies.

consideration is very true in the case of assets with a long lifecycle, as are those used in the recycling industry. But the correlation is also a measure of innovation and investment shortages because it shows that old organizations do not buy or invest in new assets, since once they have amortized the necessary assets bought at the beginning, seemingly they are no longer interested in investing in new assets.

Moreover, looking at the final cluster analysis, the one referring to old organizations, it reports ROA and ROE results a bit higher than the business average⁷⁸. Therefore, there is evidence of the age effect in the business performance that is supported by the schools of thought that firms gain experience thanks to the flow of time and following, thus, the principle of learning by doing (Arrow, 1971).

Size

ROA is definitely not correlated with an organization's size. In fact, the p-value is .716 and the Pearson correlation is not significant. Furthermore, because ROA gives information about the capital intensity of an organization, it is logical that it is not related to the number of employees (labour intensive), which have been chosen as a measure of the size in this work.

Referring to the EBITDA model it seems that economic performance is influenced only by organization size ($p < .1$). Therefore, organization EBITDA is positively associated with size. This result suggests that large recycling organizations are more efficient in generating cash than their assets are in generating profit. The fact that two models using different dependent variables, do not give the same results is normal. For example, Artz et al (2010), measuring organization performance using ROA and sales growth, find that firm size is not related to sales growth.

⁷⁸ See table 5.12. Within the cluster 1 ROE and ROA have positive value that means that they are over the mean of the business.

Studying the moderator effect it has been found that size can affect socio-environmental variables: the CEO gender, within the ROA model, and the ISO 14001 certification within the EBITDA model.

Adding the interaction term of size and environmental aspect to the main ROA model, explains just an additional 1 percent of the variance ($R^2 = .233$, $\Delta R^2 = .01$) and size does not moderate the relationship between environment and economic performance. Instead, ROA model 3 tests the moderation effect of size on the relation between social aspect and ROA and it explains an additional amount of variance ($R^2 = .268$, $\Delta R^2 = .35$, $p = .003$). The beta coefficient of the interaction term is positive and significant ($p = .05$ and beta standardized $.266$). In fact, size affects the relationship between CEO gender diversity and ROA of recycling organizations.

Developing the same models for EBITDA, it is found that, due to the moderator effect of size, the EBITDA is negatively and significantly affected by environmental aspect. This means that the number of employees negatively influences the relationship that the environmental certification has on profitability.

The ability of recycling organizations to generate cash is positively associated with organization size.

Innovation

Another important element is that innovation is not significant in ROA or EBITDA models. It can be explained by the fact that many patents provide limited protection (Griliches et al., 1991). The variable innovation confirms the lack of creativity in the recycling business. Besides the fact that the variable is not correlated with any of the two performance variables, only 10 organizations out of 87 invest in new patents.

From a statistical point of view, this data is not so very significant because the variable innovation can be considered statistically as a dummy variable, as almost

90% of the sample do not have patents. But this is the main point: in a business that should be investing in R&D to confront a current issue that is and will become more and more important in terms of human healthcare, politics, and the law, most of the companies, even though at present in good economic shape, do not invest in the future.

Within the recycling business, organizational performance is not associated with an organization's degree of innovation. So hypothesis 3 is not confirmed.

Governance (Shareholder type)

The correlation table and previous research show that institutional shareholdings are likely to depend on company size (Himmelberg et al., 1999).

There are no unanimous views on the relationship with the profitability. Referring to the EBITDA models the public entities within the shareholders ($p < .1$) is positively and significantly related to organization performance. This means that the more the shareholders are influenced by public entities, the better the economic performance (the Correlation table shows that governance is positive and significantly correlated with EBITDA: Pearson correlation = ,348**, p-value = .001). Instead, public influence in the shareholding does not affect the ROA (Pearson correlation = -,075, p-value = .491).

Within the recycling business this aspect is particular important. It was previously said that waste management can affect human health and, because of that, public shareholding should be both particularly involved in this kind of activity and careful about the performance of recycling companies.

The fact that the presence of public authorities in the shareholding structures of Italian recycling organizations influences EBITDA, and so the ability to generate cash, is really important, first, because cash information is useful for enterprise performance evaluation (Saracino, 2007), second because cash can be used to reinvest (Becker-Blease, et al., 2010) in order to continue or improve the activity.

Nevertheless, while considering the high performance of the business, the cross table developed in the cluster analysis, shows that the economic performance of 8 organizations out of 9 that have public entities among the shareholders, is below average. Taken together these two results demonstrate that public ownership can lead to good performance that is not particularly high, but always positive. In fact, analyzing the specific data of the nine organizations, only one has negative EBITDA, ROE and ROA, and one slightly negative of ROA and ROE.

Therefore, the presence of public authorities in the shareholding structures of Italian recycling organizations positively influence EBITDA.

Environmental and social aspects (CSR)

As argued above, recycling is a green business that naturally influences environmental performance: a high profitability level has a direct impact on environmental performance.

Developing an OLS model, it is noted that both ROA and EBITDA are influenced neither by environmental practices nor by their level of social attentiveness ($p > .1$). Therefore, implementing social and environmental practices in a green business, does not allow the achievement of positive economic results. Alternatively, it can be stated that good environmental and social practices do not result in the performance indicators.

However, previous research shows that CSR helps organizations to achieve competitive advantages and a high level of financial performance (McWilliams & Siegel, 2000; Wagner, 2011). As a consequence, this assertion supports the thesis that CSR is an important aspect to consider during a business evaluation.

Within the Italian recycling business, there is no evidence of a relation between economic performance and CSR. Actually, adding the moderator effect of size, results show a negative effect of the environmental certification on EBITDA.

Therefore, the outcome of the statistical analysis does not confirm the hypothesis that a green business is even more attentive to CSR variables.

Performance

The difference between the ROA and the EBITDA models has an economic reason. Evaluating performance through different indicators, leads to different results because each indicator considers different aspects. Therefore, hypothesis 6 is confirmed. To support this assertion, it is interesting to study the differences between ROA and EBITDA in the business analysis.

The results show that ROA is correlated with the company's age, a correlation that does not exist within the EBITDA model.

By comparison, measuring performance by EBITDA shows other correlations. EBITDA is correlated with size and governance. In the same way, governance (and so shareholder type) is correlated with organization size. The last correlation explains that the larger an organization the more probably there are public entities on the board of shareholders. Therefore, because the correlation confirms that governmental entities are often part of large organizations, it makes sense that both size and shareholder types are related with EBITDA.

In conclusion, using two different performance indicators is a good way to make a deep analysis of the business. Each variable points out important features, and in general in every analysis it is essential to consider which dependent and independent variables are used.

CONCLUSION and LIMITATIONS

In this thesis, I have attempted to explain the profound importance of the environment and its interconnection with humanity and the economy. In particular, starting with Latin and Greek literature⁷⁹, I have given examples of how the natural equilibrium should be preserved in order not to destroy either society or business⁸⁰.

In fact, with the support of sacred texts and the necessity to satisfy human needs, people have exploited the earth causing irreparable accidents, damage,⁸¹ and changes.

However, at a certain moment, scholars⁸² started to study how nature can affect economic development and how business can impact on the natural environment; and governments and private organizations⁸³ started to promote sustainable development, promulgating environmental laws⁸⁴ against pollution and regulating waste production.

As a consequence, a new “green consciousness” led to the formulation of the theory of the Green economy, which also concerns the activities of various organizations. Since the Green economy is closely interconnected with multiple fields, this work

⁷⁹ E. g. Γεα the earth, Αίολος the wind, Ποσειδῶν the sea, the seasonal cycle explained with the kidnapping of Proserpine by Pluto, god of Hades; or Esiodo in “Εργα και Ημέραι and Tacitus in Germania.

⁸⁰ E. g. Williamson at al., (2006); Vaccari, (1998); Jennings & Zandbergen, (1995).

⁸¹ E. g. Exxon Valdez.

⁸² Among others Wilson (1858), Kenneth Boulding (1966), Mataracena, (1984), Miolo Vitali (1987), Bruni & Campedelli (1993) and so on.

⁸³ UNEP, OCSE, EGSS just to mention a few.

⁸⁴ Legislative Decree 152/2006; Basel Convention (1989); Directive 2008/98/CE; Legislative Decree n. 205/2010.

aims to stress the relevance of it within the business administration field. In fact, organizations can adopt green practices⁸⁵ in accordance with national and international law, or can develop *ad hoc* businesses to satisfy the new environmental needs. The third chapter proposes an adaption of the existing green businesses through the lens of business administration. The businesses identified are the following:

1. Eco-building;
2. Agribusiness;
3. Eco-health;
4. Eco-mobility;
5. Smart Energy;
6. Waste Management;
7. Management of Air, Water, Land & Noise;
8. Others.

This classification takes into consideration principally the reports and studies made by OCSE, *Fondazione per lo Sviluppo Sostenibile*, UNEP, *VedoGreen*, Robert Richardson, *Rivista dell'Accademia Italiana di Economia aziendale* (1985).

Therefore, organizations started to develop and implement innovative activities focused on environmental care and respect. Sometimes these new activities can be implemented as a secondary business or a core business. Nevertheless, the influence that the Green economy has had on organizations is evident.

The thesis has proceeded focusing on one of the green businesses: waste management.

After analyzing the Italian recycling situation, I have tested six hypotheses on the recycling business. In fact, the aim of the last chapters is to analyze it in depth,

⁸⁵ Organizations understand that developing green strategies represents a strategic advantage. Among others see Ambec & Lanoie (2008); Gouldson (2004); Ambec & Lanoie (2008); Anderson & Anderson (2009).

studying in particular the variables that can influence economic performance⁸⁶. To do so, I have considered a sample of 87 Italian recycling companies. Descriptive analysis and OLS models have highlighted that most of the Italian recycling organizations are small, young, and located principally in the northern area, and that public entities do not play a very major role in their governance. Furthermore, most of them are ISO 14001 environmentally certified but the business does not invest a lot in innovation.

Economic results show a general positive economic performance: ROA, ROE and EBITDA mean are high and positive⁸⁷. And this is in line with *the Fondazione per lo sviluppo sostenibile* report (2015) and *VedoGreen* report showing that green organizations have reacted positively to the crisis, thanks to sales, turnover, orders and employment growth (FSS, 2015).

The economic performance can be measured by different variables demonstrating that performance depends on various elements. In fact, the two main models (model 1 using ROA variable and model 4 using EBITDA) show different results. This evidence confirms the assumption according to which performance can be measured by a number of variables that can stress different interesting factors. In line with this, I consider that a complete and thorough business analysis should take into account more than one variable.

From the empirical analysis it can be seen that age is positively correlated with ROA and this can be caused by the fact that ROA takes into consideration the amortization of fixed assets. As a consequence, the older an organization is, the more the fixed assets have been amortized, especially in a business where long lifecycle assets are predominant. In addition, the cluster analysis⁸⁸, which refers to

⁸⁶ We have already noted that the good economic performance of a green business has direct effects on the environment.

⁸⁷ See table 5.9. Furthermore, over 87, 74 organizations have a positive ROA, 75 a positive ROE and 81 a positive EBITDA. Therefore, 85% of the sample has positive economic performance.

⁸⁸ See table 5.12.

both ROA and EBITDA, confirms that old organizations have a higher level of performance.

To conclude, hypothesis 1 is confirmed: organization performance is positively associated with the age of the Italian recycling organization.

EBITDA is positively and significantly correlated with size. That means that the more employees in an organization, the higher the EBITDA performance. This is not true for the ROA variable, which means that large recycling organizations are more efficient in generating cash. Therefore, arguments have been made for both positive impacts of size on performance and no-correlation between them.

However, because there are no particular elements of the specific business that confirm that performance, in general, is linked to the size of an Italian recycling organization, hypothesis 2 cannot be confirmed. In fact, the justification of the correlation can be given from a strictly economic point of view⁸⁹ and not from specific characteristics of the business. Consequently, I cannot claim that organization size has a significant effect on performance in general, but it can have effect the ability to generate cash.

Innovation is definitely not significant within the Italian recycling business. This is proven by the two OLS models⁹⁰, the Pearson correlation⁹¹, and also by the fact that, because ROA is correlated with organization age, old organizations do not buy or invest in new assets. Therefore, hypothesis 3 is not confirmed.

⁸⁹ We have seen that organization size can influence the ability in generating cash, more than the general economic results; See also Artz et al., (2010).

⁹⁰ See table 5.20, table 5.22.

⁹¹ Table 5.18.

The presence of public authorities in the shareholding structures of Italian recycling organizations positively influences EBITDA⁹² but not ROA. Because of this, public entities can influence the ability to create cash. However, the cluster analysis shows that these organizations have an economic performance a bit below average of the business (that is in absolute high⁹³). Consequently, I cannot claim that a governance influenced by public entities can have significant and positive effects on performance in general, but can do so on the ability to generate cash.

The empirical analysis shows that the CSR aspects do not influence the performance of the Italian recycling organizations.

However, the moderator effects show that large organizations have a positive relationship between female CEO and ROA, and a negative relationship between ISO 14001 and EBITDA.

To summarize, this means that if organizations promote CSR practices (in this case, gender diversity and environmental certification) they do not necessarily reach high performance levels. In particular, big organizations can have better ROA results when promoting social action, and can have lower EBITDA levels when they promote environmental action.

To conclude, a green business is not more attentive to CSR variables, and so hypothesis 5 is not confirmed.

This work also provides practical implications. Old organizations demonstrate better economic results because of ‘learning by doing’ (Arrow, 1971) and because

⁹² Table 5.18.

⁹³ The business has a high level of performance, see table 5.9.

the types of assets used in the business are principally long lifecycle machinery (Amaduzzi, 2014). This suggests that in a sector of this kind it could be better to restore old organizations than to start new ones. Moreover, the ability of the Italian recycling organizations to generate cash is positively correlated with size. These two aspects can be considered together. In fact, the statistical analysis suggests that good economic performance is achieved by large and old organizations, and so, in order to reach such a result, mergers and acquisitions, incorporation or joint ventures could be recommended. We have also seen that the presence of public entities among the shareholders is positively and significantly correlated with EBITDA, but in particular it is correlated with the organization's size. Therefore, the study suggests that public participation is desirable in this business, for both economic and health reasons.

To conclude, this work has policy implications. It suggests that for an efficient recycling activity the Italian business should be composed of large and old organizations where the public authorities are involved.

Certainly, the study suffers from a few limitations. The fact that the empirical analysis has been conducted in a national context, namely the Italian one, means that the results cannot be generalized and applied to other states although they can be useful for comparisons. Moreover, reliance was placed exclusively on results from one financial year, which was negatively influenced by the current financial crisis. Furthermore, exclusive reliance was placed on the data available from the Amadeus database. It could be interesting to outline some possible future research on this topic. First, the same analysis can be applied to each of the green businesses. In fact, it would be interesting to see whether there are elements in common among the various green businesses. Second, taking into account the Green business classification, future research could analyze the presence of the green practices identified in the second chapter in order to study a possible correlation between green practices and green businesses.

In general, this thesis integrates theory on and empirical analysis of green business, and demonstrates the importance of the Green economy within the business administration field. In fact, our society has gradually become more interested in developing an eco-sustainable economic model. *With increasing awareness of environmental issues, there has been rising demand for environmental - friendly business practices* (Gadenne et al., 2009). Socio-economic growth encourages organizations to be receptive to sustainable alternatives, since these options are now perceived as offering extremely interesting opportunities.

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LEGISLATION

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