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FUTURE AT RISK

A study on the Club of Rome

Master´s Thesis
in Futures Studies

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Table of contents

List of figures

List of tables

List of Abbreviations

COR the Club of Rome

LTG the limits to growth

1 INTRODUCTION

This chapter defines the context, purpose, research questions and the research process of this thesis. It starts by describing the conditions and the questions that motivated this research. After this, the choice of the Club of Rome (COR) is justified. Next, there is a discussion on the approach of this research in studying the COR. This discussion also shows the originality and outlines the boundaries of this research. Then, research questions are presented and justified. Finally, there is an illustration of the research process and the structure of this thesis.

1.1 The context and the driving questions

Many believe that humankind is still far from sustainability. It has been now more than 40 years since discussions about it, in its modern meaning, first began. National Environmental Policy Act (NEPA) of 1969 can be identified as the start of the related discussions. Moreover, in 1972, the Club of Rome (COR) mentioned the concept of sustainability in their first report, **THE LIMITS TO GROWTH (LTG)**.[1] Since that time, many researchers studied the concept, and authors wrote several books and reports about it. However, humankind is still far from it, according to the experts. Moreover, they believe humans have done inadequate effort for becoming sustainable. For instance, professor Jorgen Randers (2012, XV) stresses that we still have growth in the greenhouse gas emissions and nothing effective has been done to reduce the emissions after forty years of discussions about the climate change.[2] In the same vein, Dennis L. Meadows (1995) went much further, much earlier by writing an article titled ‘it is too late to achieve sustainable development, now let us strive for survivable development’[3].

Such assertions cause concerns for a person who values life and wants to preserve it. This person needs to identify the preliminary, fundamental, vital topics that are missing from sustainability discussions; the reasons for little actions toward sustainability; and the practical steps for the survival of the human race. The findings of these investiga-

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[1] Where they were talking about ‘a desirable, sustainable state of global equilibrium’ (Meadows, Meadows, Randers & Behrens III 1972, 180)

[2] He adds that the alarming consequences of ecosystem destruction are already visible and not all the damages done to the ecosystem are correctable. For example, he mentions ‘self-reinforcing climate change’ that once started it will not be possible to stop it (Randers 2012, 235).

[3] He still advocates to survivable development and increasing resilience (Dennis Meadows - Club of Rome conference Bucharest 2012, 2014).

tions could be useful for any researcher or association interested in sustainability and its related concepts (e.g., global problems, sustainable development, degrowth and resilient society). Moreover, they could be beneficial for those policy makers and governments who are concerned about the future. Finally, they provide suggestions for those businesspersons who aim to do something meaningful with their money.

Answering these questions is no easy task and requires several studies. Obviously, before analysing the practical steps, it is necessary to address the other two issues. This thesis focuses on missing topics detection by studying the topics and messages of the reports to the COR. These reports represent the sustainability related topics discussed during the last forty years. The choice of the COR is discussed in the next subchapter.

1.2 The Club of Rome (COR)

This section illustrates the justifications for studying the thinking of the COR. The COR was established in Rome, in 1968. The club was formed during a meeting of 30 international specialists from different disciplines (e.g., academia, politics and business)[4]. The executive committee of the COR described its objectives as follows:

> *'To stimulate research and encourage the development of methods to elucidate and delineate the elements and interactions within the problematique[5], to understand better the workings of the world as a finite system and to suggest alternative options for meeting critical needs;*
> *To provoke a dialogue with political decision-makers, industrialists, academics and many groups in many places, to arouse appreciation of the nature of the crisis and the need to consider new policies, attitudes and courses of action to ensure the continuity of mankind and to cultivate a*

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[4] An interested reader could find more information about the history of the COR in the following sources. There are useful information about the mentality and point of view that resulted in the emergence of COR in 'the challenge of 1970s for the world of today' written by Aurelio Peccei, the co-founder of the COR, in 1965. Formation, objectives, functionality and early history of the COR are discussed in 'the Club of Rome - the new threshold' written by the executive committee of the COR in 1973. Finally, Alexander King, the co-founder of the COR, offers the history of its first 12 years (1967-1979) in 'a case study of institutional innovation'. These are all collected and reprinted in 'THE CLUB OF ROME – THE DOSSIERS 1965-1984' (Malaska & Vapaavuori 1984).

[5] The word problematique is a central concept in the COR's thinking and discussed in section 4.2.1.

> *new humanism conducive to world peace, social justice and individual self-fulfillment.'* (Malaska & Vapaavuori 1984, 23)[6]

It is worth mentioning that in their new programme they put more emphasis:

> *'On the root causes of the systemic crisis by defining and communicating the need for, the vision and the elements of a new economy, which produces real wealth and wellbeing; which does not degrade our natural resources and provides meaningful jobs and sufficient income for all people. The new programme will also address underlying values, beliefs and paradigms.'* (About the Club of Rome 2013)

Their unique approach to sustainability is visible through these statements. First, they realize the interconnection between the problems. Second, they direct attention to limits of the world. Third, they seek the survival and the wellbeing of the humankind. Fourth, they aim to affect policies and strategies. Finally, they emphasize the underlying reasons.

The COR is an international organization concerned with the global problematique. According to the COR's website[7], the COR is consisted of full, honorary and associate members.[8] They had limited their membership to 100 full members. These members are from more than 30 countries with the emphasis on maintaining the diversity in nationality, culture, gender and expertise.[9] Honorary members support the COR by their membership. They are well known international individuals (e.g., Queen Beatrix and Mikhail Gorbachev). Associate members are the professionals interested in the works of the COR based on their career or their personal interests. There are *National Associations* in more than 30 countries that are working in collaboration with *European Support Centre* of the COR, which acts as their coordinator and supporter. The *General Assembly* meeting is held once a year to decide on the COR activities and to choose the *Executive Committee* members. The COR also has a secretary general who with his team

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[6] It is worth mentioning that at the time they declared these objectives, they had personal connections to top politicians of several countries, internationally recognized scientists and business people. (Moll 1991, 72; Kanninen 2013, 14-15) Therefore, such objectives were realistic.

[7] http://www.clubofrome.org

[8] The first Finnish member (and later Honorary Member) of the Club of Rome was Pentti Malaska who was the Finnish pioneer of futures research, first president of the Finnish Society for Futures Studies, and director of Finland Futures Research Centre (FFRC), which is now running the International Master's Programme of Futures Studies in the University of Turku.

[9] Both supervisors of this thesis, Professor Sirkka Heinonen and Professor Markku Wilenius, are full members of the Club of Rome.

works in the *International Centre of the COR* (Organization of the Club of Rome, 2013).

The COR has several kinds of products and among them books is one of the most important ones. (Wijkman & Rockström 2012, xiii) The COR has endorsed 32 books titled as *A Report to the Club of Rome* up to the end of 2012. The title *a report to the Club of Rome* means that:

> '*It is peer reviewed by the Club of Rome and its expert members to ensure it is scientifically rigorous, innovative and contributes a new important element to the debate about humanity's predicaments.*' (Wijkman & Rockström 2012, xiii)

What makes studying the COR suitable for the purpose of this thesis is their unique approach to sustainability and the widespread international nature of their activities during the past 40 years. However, in this thesis, the focus is on the messages of the reports to the COR. This approach is discussed in the next subchapter.

1.3 Studying the messages of the reports to the Club of Rome (COR)

At this point, it is important to illuminate the approach of this thesis. The COR can be studied from different perspectives. For example, it is possible to study the impact of the COR on politics (including policies and institutions), environmentalism, futures studies and public awareness. Moreover, one can study the evolution of the COR by incorporating the evolution of the social, political, economic and philosophical conditions. Another approach is to study the impact of the changes happened within the COR (e.g., organizational structure and executive committee changes). In addition, it is possible to focus on their first and influential report **THE LIMITS TO GROWTH**, its impacts, controversies, criticisms, debates and reassessments of its findings. It is also possible to study the reports within a broader context by incorporating the selection process of the reports. Several factors have affected the selection process (e.g., criticisms to the COR or LTG; the social, economic and political situations; the organizational structure; and directors of the COR). It is possible to use any combination of these approaches for studying the COR.[10]

However, the approach of this research is to focus on the messages of the reports. This approach is chosen because the interest of this research is to determine the missing

[10] Three examples of the major studies about COR that more or less adopted some of these approaches are Moll 1991, Churchill 2006, and Kanninen 2013.

topics from the debate about sustainability. Therefore, this research will distance itself, as much as possible, from externalities. Here, "externalities" means everything other than the messages of the reports including the selection process of the reports. This approach is similar to study the evolution of a painter merely by studying his paintings rather than studying his biography and various variables that affected him and his works. Obviously, this metaphor is used to make the approach of this research clear. It does not imply that the COR is like a painter and the reports are like the paintings. This research seeks to analyse the COR from this new perspective in order to answer its main and research questions. In addition, it creates new knowledge about the COR.

1.4 The research questions

This section illustrates the research questions of this thesis and their importance for its purpose. The objective of this research is to study the messages communicated under the label of "A report to the Club of Rome" in order to determine missing topics from the discussions about sustainability. Accordingly, the following research questions are designed.

- How has the agenda of the reports changed from 1972 to 2012?
- How have the characteristics of the COR in being global, long-term and holistic changed in this period according to the messages of the report?
- How have the reports treated free market and growth ideology?
- How have the reports addressed the interconnectivity of the global complex system components (i.e., society, economy and politics)?

The first question seeks to provide the basic understanding necessary to answer the other questions by defining the priorities and attitudes of each report. It is also vital for grasping the evolution of the COR. In addition, this is the most important question for missing topics detection.

The second question relates to the most important characteristics of the COR and the reports. These characteristics are the building blocks of the COR's thinking. Therefore, their evolution indicates the changes in the foundation of the COR's thinking.

The third question is about one of the most important themes in sustainability discussions, which arises several times in this research. There is prevalent belief that growth and free market can and will solve all the global problems. This belief is the main competitor of sustainability concept in addressing global problems. Therefore, special attention should be paid to analysing the approach of the reports toward this belief.

The fourth question is vital because it is unimaginable to move toward sustainability without considering the interconnections between different components of the global complex system. In other words, it is impossible to suggest a change for one component of the global system and expecting a certain outcome without considering the impacts of that change on the other components.

The answers to these questions foster the understanding of the COR's evolution. In addition, they facilitate determining missing topics either directly or indirectly.

1.5 The research process outline

This section defines the steps and structure of this thesis. It is essential to study the original reports because the focus of this research is on the messages of the reports. Therefore, the selected reports are summarized in the first step. In addition, it is necessary to study how these messages and the COR's thinking in general are perceived by academics. Therefore, the first step also includes an analysis of these perceptions. In the second step, first the authors and the supporters of the reports are interviewed in order to foster the understanding of the COR. Then, the gathered materials from the interviews are analysed using *qualitative content analysis* methods. These two steps provide the material of this thesis. Figure 1 illustrates three sources of information used in this thesis.

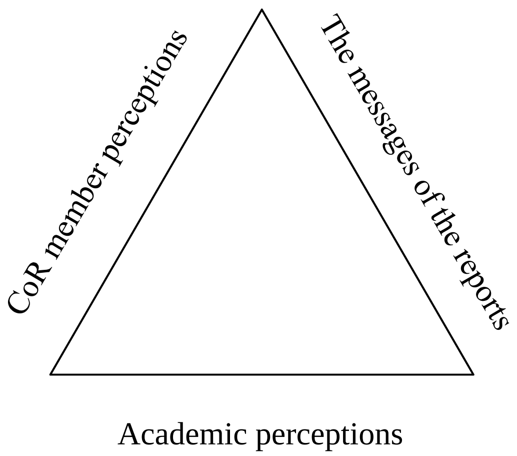

Figure 1 The sources of information

After these two steps, it is logical to collate the messages of the reports with those perceptions in the third step. In the fourth and final step, it is required to combine all the material in order to suggest some answers for the main and the research questions.

Based on these steps, the structure of this thesis is as follows. Chapter 1 has presented the introduction to this research. Chapter 2 covers the theoretical background that starts by presenting the study of the reports and continues by discussing the academic perceptions. Chapter 3 discusses the material and the method that is used for data collection. Chapter 4, first, discusses *qualitative content analysis* method and then presents the analysis of the interviews. The final section of this chapter is a discussion that collates the analysis of the interviews with the original reports. The last chapter, chapter 5, offers a conclusion based on the findings of this thesis.

2 THEORETICAL BACKGROUND

This chapter is divided into two subchapters. The first one discusses the reports. It is structured around the title of the reports. The second one is concerned with the ways that academics perceive the Club of Rome's thinking. The latter subchapter is structured around the title of the main related concepts (i.e., futures studies, sustainability and degrowth).

2.1 Reports to the Club of Rome (COR)

This subchapter presents the study of the reports to the Club of Rome (COR). The portion of the reports (21 out of 33) studied in this subchapter is assumed to sufficiently signify the communicated messages and the evolution process. Each report is introduced based on its objectives, conclusions, as well as its methodologies or their structure.

Several criteria are applied to the choice of the reports. The first one was that the chosen reports should cover different periods of these 40 years. The second one was the reception of the reports, which is estimated, based on their accessibility (i.e. if they are available online or at the University of Turku libraries). The only exception to the second criterion is **FACTOR FOUR**, which was a best seller but still is excluded from this research. This is because **FACTOR FIVE** is presented here, which includes similar contents to those of **FACTOR FOUR** plus some new discussions (e.g., rebound effect). Table 1 shows the full list[11] of the reports to the COR and specifies the reports studied in this thesis.

[11] This list is extracted from the Club of Rome's website, http://www.clubofrome.org, on May 8, 2014.

Table 1 The list of the reports to the Club of Rome (COR)

No.	Name of the report	Publication year	Selected
1	The limits to growth	1972	✓
2	Mankind at the turning point	1974	✓
3	Reshaping the international order	1976	✓
4	Goals for mankind	1977	✓
5	Beyond the age of waste	1979	✓
6	No limits to learning	1979	✓
7	Energy the countdown	1979	
8	Dialogue on wealth and welfare	1980	✓
9	Road maps to the future	1980	✓
10	Tiers monde: trois quart du monde	1980	
11	Microelectronics and society for better or for worse	1982	✓
12	The future of the oceans	1986	
13	The barefoot revolution	1988	✓
14	The limits to certainty	1989	✓
15	Africa beyond famine[12]	1989	✓
16	Beyond the limits to growth	1992	
17	Taking nature into account	1995	✓
18	Factor four	1997	
19	Limits of social cohesion	1998	
20	The oceanic circle	1999	
21	Im netz - die hypnotisierte gesellschaft	1999	
22	Menschlichkeit gewinnt	2000	
23	Capacity to govern	2001	
24	Die Kunst vernetzt zu denken	2002	
25	The future of people with disability in the world	2002	✓
26	The double helix of learning and work	2003	✓
27	Limits to privatization	2005	
28	Global population blow-up and after	2006	✓
29	The employment dilemma and the future of work	2006	✓
30	Factor five	2009	✓
31	The blue economy	2010	✓
32	2052	2012	✓
33	Bankrupting nature	2012	✓

[12] This report is not mentioned in the COR's website, however, according to the other resources (i.e., http://www.bibliotecapleyades.net/sociopolitica/esp_sociopol_clubrome2.htm#Renewal and Markku Wilenius) it is a report to COR.

It is possible to divide the selected reports into two categories. The first category includes the series of reports during the period of Aurelio Peccei's lifetime. This category starts with the first report to the COR, LTG, in 1972 and ends with **ROAD MAPS TO THE FUTURE** in 1980. The second category includes the reports after the death of Aurelio Peccei until 2012. However, the report **MICROELECTRONICS AND SOCIETY FOR BETTER OR FOR WORSE** published during the Peccei's lifetime is presented in the later period because its message better matches with that category.

The basic reason for this categorization is the content of the reports. The messages of the reports obviously change after the death of Aurelio Peccei. The main change is in the holistic approach of the first period's reports, which is much less visible in the second period's reports. Indeed, the dimensions of these changes become more recognizable after studying the reports in this subchapter. Therefore, throughout the following chapters and subchapters especially in *discussion* the logic for this categorization becomes clearer. It is worth mentioning that other researchers (e.g., Moll 1991; Kanninen 2013) divide the history of the COR similarly but mostly based on other reasons. For example, Kanninen (2013, 22) puts the emphasis on Peccei's characteristics. He talks about 'the revitalization of the Club of Rome' after the death of Peccei. He sees the fame and impact of the COR during 70s a result of:

> *'Aurelio Peccei's charisma, vision, persistence, humanistic passion, and contacts with both the US and Soviet leadership as well other world leaders, but essential also were his fundraising skills experience as a major business leader as manager of Fiat and Olivetti.'* (Kanninen 2013, 26)

In addition, Peter Moll (1993, 802) sees him as 'the guiding spirit of the Club' until his death in 1984. Moll describes him as a person who experienced the world and predicaments of people by travelling to several countries, who was dedicated to address *global problematique,* and who believed that these interlocked problems have to be addressed together. He sees the importance and the central role of Peccei to the COR to the extent that he dedicates one subchapter of his book, **FROM SCARCITY TO SUSTAINABILITY**, to study the biography of Peccei. (Moll 1991) In order to emphasize the role of Peccei, he quotes from his interview with Robert Jungk that 'the Club of Rome was really for the most of it the Club of Peccei' (Moll 1991, 90)[13].

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[13] An interested reader about Peccei biography could also refer to his autobiography 'THE HUMAN QUALITY' (Peccei 1977).

2.1.1 The reports of the Peccei period

In the following sections the reports published during the Peccei's lifetime is summarized with emphasis on their objectives, method or approach, and conclusions in order to grasp the messages of the reports. In addition, each section concludes with some remarks regarding the research questions of this thesis.

2.1.1.1 The limits to growth, 1972

Meadows D. H. - Meadows D. L. - Randers J. - Behrens III W. W. - (1972) **THE LIMITS TO GROWTH: A REPORT FOR THE CLUB OF ROME'S PROJECT ON THE PREDICAMENT OF MANKIND**

THE LIMITS TO GROWTH is the non-technical report of the first phase of *the Project on the Predicament of Mankind* and is published as the first report to the COR. This ambitious project was initiated based on the decisions made in the COR's meetings. The objective of the project was to study the set of global problems faced by humankind (e.g., poverty, environmental degradation and job insecurity). (Meadows et al. 1972, 10.) This report aimed to demonstrate the growth trends in global population, pollution, industrial output, food production and resource depletion. In order to do so, the authors used computer simulation to understand the causes and effects of those trends. Moreover, their broader objective was to initiate the debate about the upcoming problems. (Meadows et al. 1972, 23.) Holistic, long-term and global thinking were the fundamental characteristics of the project and the report. (Meadows et al. 1972, 11, 19)

As their method, the authors used a global model to create different scenarios. They created their model, which was based on *system dynamics*, in simulation software. Afterwards, they input different data (i.e. different actions of humankind starting in different times) to their computerised model. Based on the outputs, they created different scenarios. Their world model, Figure 2, was based on the global model of Jay Forrester. (Meadows et al. 1972, 11) The main variables in this model are population, agricultural production, natural resources, industrial production and pollution. Figure 2 is shown here just to make the concept of the *world model* clearer. Detailed analysis of this model lies beyond the scope of this thesis.

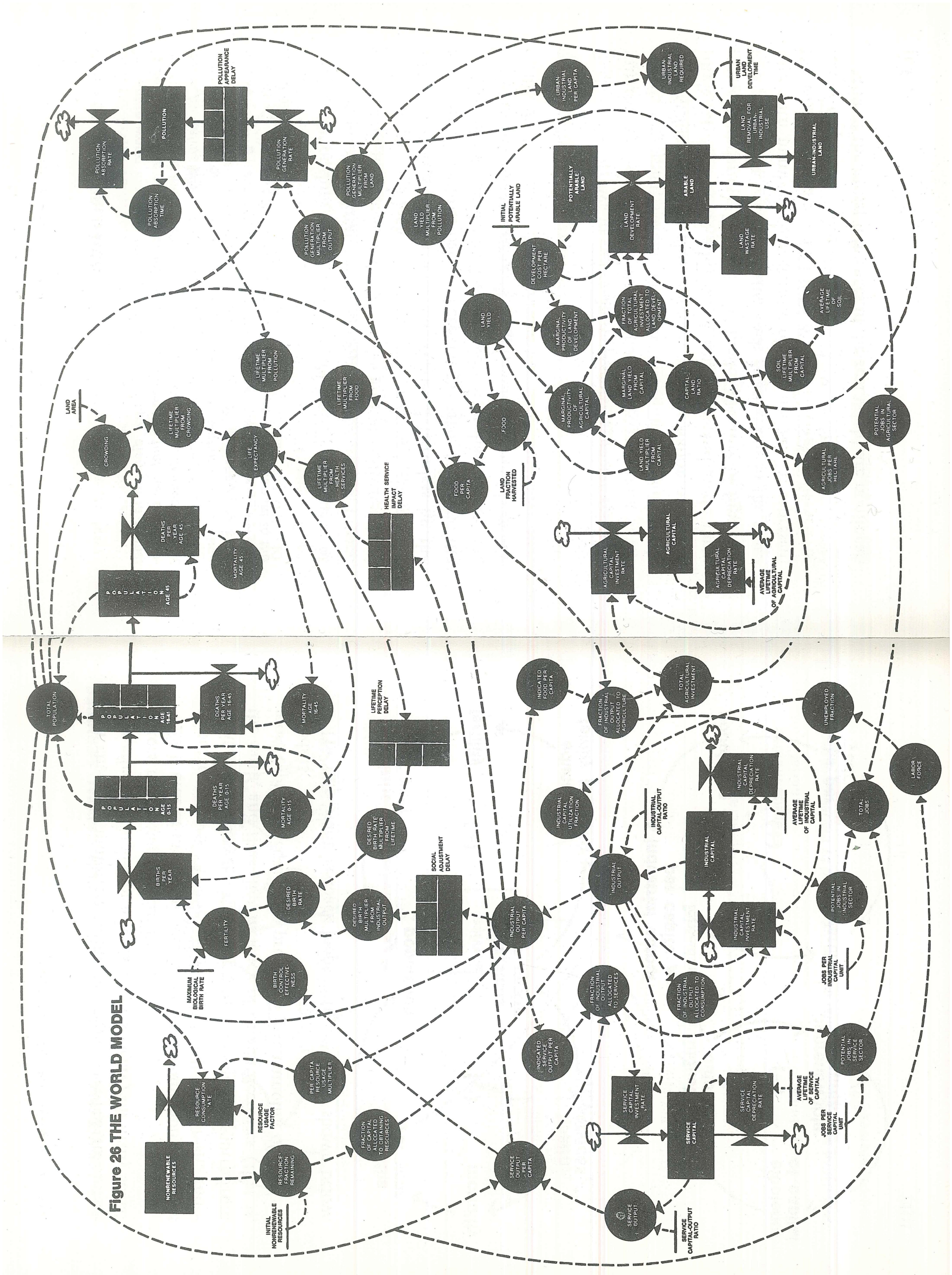

Figure 2 The entire world model with formal System Dynamics notation (Meadows et al. 1972, 103)

In order to create the scenarios, they first input the starting values from 1900 for the variables (i.e., population, food per capita, industrial output per capita, pollution and resources) to their model. Their model projected the values of the variables up to 2100. They observed that the output of their model fits to the available data up to 1970. They called this initial state as *the standard world model run*. In this run, resource depletion will cause a sudden decrease in the value of other variables one after another. (Meadows et al. 1972, 125.) Afterwards, they doubled the value of the resources variable to see if this change can help to avoid the collapse[14]. This was ineffective, and this time pollution would trigger the collapse. Based on the reason of the collapse, they sought to prevent the collapse by assuming some actions, policies, or presumptions in the next run. Finally, they managed to create a scenario based on realistic assumptions with no collapse (i.e. *stabilized world model II)*. This scenario, shown in Figure 3, was created in the process of 'combining technological changes with value changes that reduce the growth tendencies of the system'. (Meadows et al. 1972, 163) In Figure 3, the letters *B, D and S* stand for crude birth rate, crude death rate and services per capita, respectively. However, vertical scales for these variables are different and concealed. (Meadows et al. 1972, 123.)

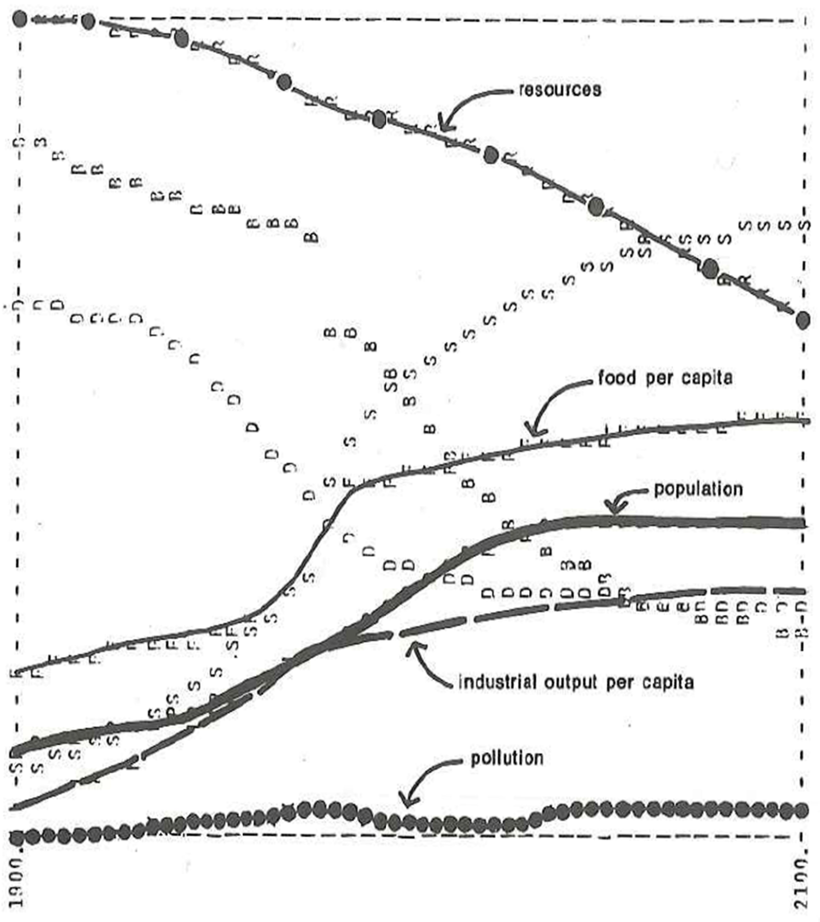

Figure 3 Stabilized world model II (Meadows et al. 1972, 168)

[14] Here *collapse* means a sudden and uncontrollable decline in population or industrial output per capita.

The policies resulted in this run should be introduced in 1975. On population, on average, each family should have two children. In addition, perfect birth control should be accessible for everyone. Regarding industrial output, on average it should be fixed at its 1975 value. (Meadows et al. 1972, 166.) Industrial resource efficiency should be improved by 75% from its 1970s norm. Moreover, economy should be shifted from manufacturing and industrial towards service. Pollution efficiency should be improved by 25% from its 1970s norm in industry and agriculture sectors. In regards to food, the main policy should be *sufficient food for all* even if it is uneconomical. Preserving and enriching soil should also have a high priority in agricultural capital allocation. Moreover, the lifetime of capital industries should be increased to neutralize the effects of other policies that would reduce the industrial capital supply. The design should be improved to increase the lifetime of capital industries. (Meadows et al. 1972, 163-4.)

Finally, in their last scenario, they illustrate that if these policies were introduced in the year 2000 instead of 1975 then a collapse would be unavoidable. In this scenario, the collapse would happen because of food and other resource shortages followed growth in population and industrial output per capita. (Meadows et al. 1972, 169.)

The authors claim that their conclusion is similar with those of other global and long-term studies. Their conclusion is that if the current growth trends continue, humankind will face the limits to the growth in less than a century. When these limits are reached, a sudden and uncontrollable decline will happen in population and industrial output. However, it is possible to reach a globally stabilized condition in which every person would be able to satisfy his or her basic needs and have equal opportunity for self-realization. In order to reach such a stabilized condition, some policies should be implemented. The sooner the policies are introduced the higher the chance of success would be in reaching the stabilized state and avoiding a collapse. (Meadows et al. 1972, 23-24.)

The *executive committee* of the COR wrote a commentary at the end of the book about their objectives, conclusions and the major criticisms of the book. The committee mentions two objectives for this study. The first one was to reflect upon the constraints on population and human activities growth imposed by the limits of our planet. The second one was to identify and discuss the major components of the world systems because these components and their interconnections seriously influence the long-term behaviour of the world systems. (Meadows et al. 1972, 185.) They describe their goal for the project that resulted in publication of LTG as follows:

> *'It was intended to be, and is, an analysis of current trends, of their influence on each other, and of their possible outcomes. Our goal was to provide warnings of potential world crisis if these trends are allowed to continue, and thus offer an opportunity to make changes in our political,*

> *economic, and social systems to ensure that these crises do not take place.'* (Meadows et al. 1972, 185-186)

The *executive committee* concludes its commentary by remarking on the findings of LTG and a road ahead. They believed that LTG has proved that gloomy days are ahead of human race. In addition, it has provided an alternative path in which it would be possible to provide a large number of people with 'a good material life plus opportunities for limitless individual and social development' (Meadows et al. 1972, 195). However, they believe, first, people should completely understand the seriousness of the situation faced by humankind. Only after that, people would agree to sacrifice individually and change the power structure of their society to reach the stabilized state. In addition, they emphasize that if some change is going to happen, it needs political support as well. Therefore, they

> *'will encourage the creation of a world forum where statesmen, policy-makers and scientists can discuss the dangers and hopes for the future global system without the constraints of formal intergovernmental negotiation.'* (Meadows et al. 1972, 197)

The last but not the least, the committee emphasizes the necessity for discussing the goals and values of humankind. They believe the survival of human race is valueless if the human life is meaningless. (Meadows et al. 1972, 197.)

Regarding the research questions of this thesis, first, the main message of the report is that in a finite world a limitless growth is impossible. However, they concluded that it is possible to maintain a good material life and unlimited non-material development. This can happen in a stabilized world in which no collapse would happen. Second, the basic characteristics of the COR's thinking (i.e., holistic, global and long-term) are completely visible in this report. However, their world model, based around five variables, excludes many other important variables especially social ones (e.g., social unrests). Third, on the position of the report on free market and growth ideology, they see the growth in population and industrial output as the main cause of the problems. Naturally, they do not see more growth as a solution. However, they recommend technological improvements in specific directions. Moreover, their recommended policies implementation depends on strong governments rather than on free market. Fourth, the interconnections between different components of the global complex system (i.e., society, economy and politics) are missing from their analysis.

2.1.1.2 Mankind at the turning point, 1974

Mesarovic M. - Pestel E. (1974) **MANKIND AT THE TURNING POINT: THE SECOND REPORT TO THE CLUB OF ROME**

This book is the final report on the project that started three years earlier. The project aimed at analysing global problems by taking into account the differences between different regions of the world in a practical rather than theoretical or abstract manner. The authors share the main message of LTG by asserting that their scientific research shows that there will be a disaster ahead of the world if humankind insists in ignoring certain global issues. At the same time, they differentiate themselves from LTG and other books. For example, they differentiate their model by asserting that it recognizes different regions and has a systemic approach. (Mesarovic and Pestel 1974, VII- IX.)

For their methods, similar to LTG, they used a computer simulation and scenarios. Although their approach is similar to LTG, they claim that the result of a research could be misleading if different regions are not considered, as it is the case with LTG. They based their study on 10 different regions (i.e., North America, Western Europe, Japan, Australia and South Africa, Eastern Europe and the Soviet Union, Latin America, North Africa and the Middle East, Tropical Africa, South and Southeast Asia, and China).

In their model, each region is specified on different interconnected levels called *strata* (i.e., individual, group demo-economic, technology and environment). Each stratum consists of different elements that each of those elements might be a representation of a sub-model. For example, demo-economic stratum consists of the regional microeconomic substratum and the regional macroeconomic substratum. Moreover, the macroeconomic substratum consists of *gross regional product* and *major expenditure components*.

Moreover, they incorporated two features into their model in order to reduce the subjectivity of their study. First, they added some components of the decision-processes to their model including norms and constraints of the decisions. Consequently, their model consists of a *causal model* and a *decision-making model.* Second, the relation between the decision analyst and the computer model in constructing the scenarios is incremental (i.e. it is the interaction between the analyst and the computer that constructs the scenarios rather than just changing the initial data and getting the result from the computer model). This is called *conversational analysis*. The highest level (i.e. without details) of their *world system computer model* is shown in Figure 4. (Mesarovic and Pestel 1974, 39-48.)

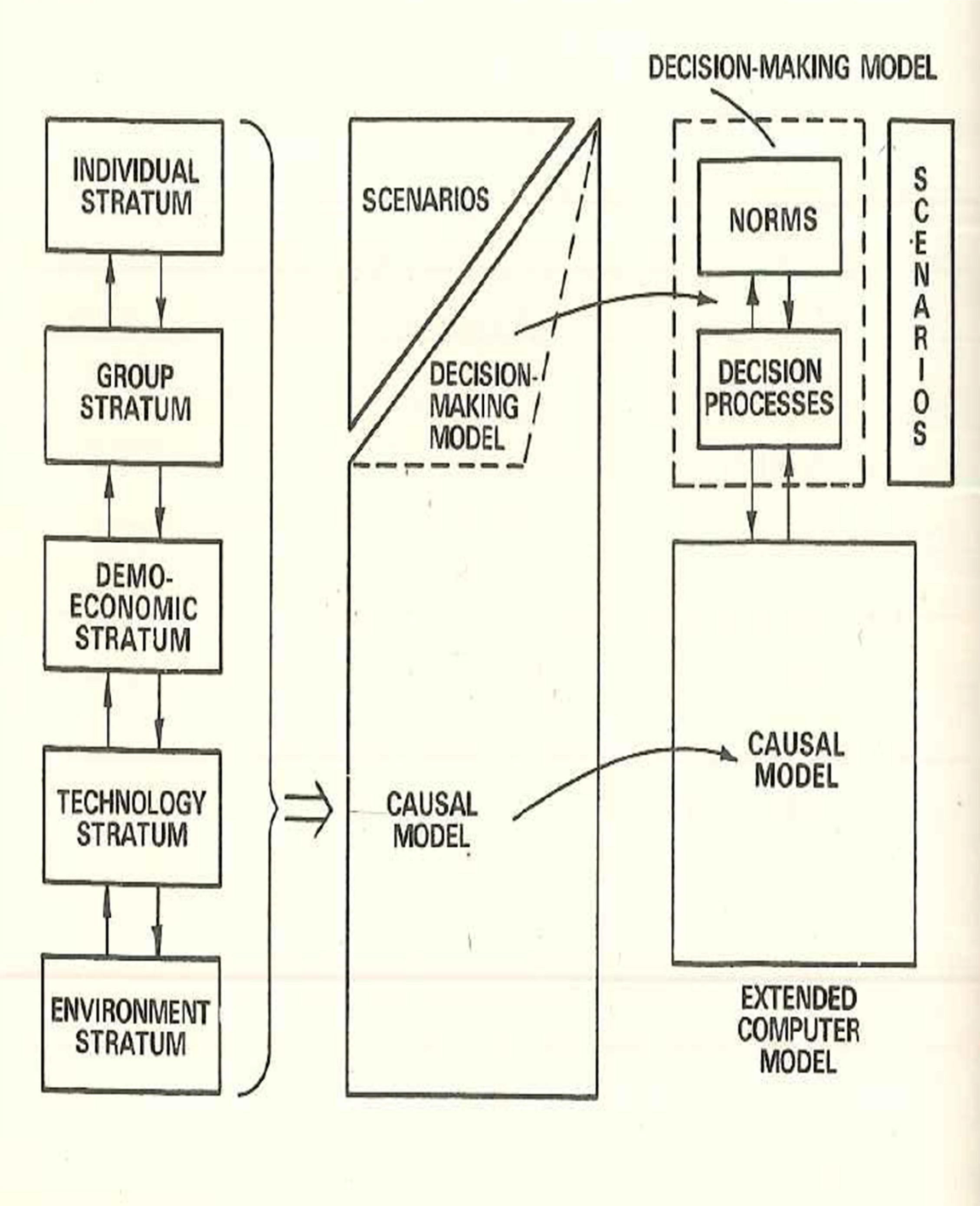

Figure 4 Extended version of the World System Computer Model (Mesarovic and Pestel 1974, 50)

Their methodology is different from those of other studies based on computer world models. First, their approach is qualitative as well as quantitative. Second, they developed a computerized decision support tool. It means that decision makers could use it to project on the consequences of their decisions. Finally, their methodology is based on a belief that a disorder in the system causes its counterintuitive response to the world crises. The problem is not with the complexity of the system. Therefore, this problem should be addressed by restructuring the system. (Mesarovic and Pestel 1974, 49-54.)

For their conclusions, they propose a selective part of their results in five categories. The first category relates to the conditions and strategies. The first conclusion of this category is that crises are the side effects of the world system. Second, solutions should be long-term, global and holistic and include suggestions for new economic and global resource allocation systems. Third, cooperation is the only way to solve these crises.

Second category discusses some essential changes that should happen on societal level. First, long-term and global thinking should become the norm. Second, global and regional structure should be in place for cooperation between countries. Third, *the long-term global development crises* should be accepted as one of the world's most urgent problems.

Third category is about the necessary changes in values and mind-sets of individuals. First, everyone should be concerned globally not locally. Second, individuals should understand that resources are scarce, and therefore they should be used very carefully and economically. Third, the mind-set of conquering the nature should change to being in harmony with it. Forth, the rights of future generations should be recognized and there should emerge a will to preserve it.

In the fourth category, they identify different kinds of limits. First group is outer limits such as water scarcity. Second kind is inner limits. For example, there is a limit to the complexity of humankind created systems. The result of crossing this limit has been confusion about the primary objectives. This confusion has led to mental problems that are nowadays prevalent. Third group is organizational limits. It means the systems will become unmanageable beyond a certain level of complexity. (Mesarovic and Pestel 1974, 143-152.)

Finally, the fifth category discusses regional and global development. First, it should be understood that it is impossible for the south to get where north is now, because of the limits. Therefore, there should be some other way around, and still there is no such a sound way. Second, they emphasize the role of maintaining regional diversity. However, different regions should understand that we have a global common destiny on the survival of humankind. (Mesarovic and Pestel 1974, 153-155.)

Regarding the research questions of this thesis, first, the main message of the report is that a limitless growth is impossible in a finite world, similar to LTG. However, this report broadened the concept of limits by introducing different kinds of limits. Moreover, in its recommended strategies it involved more profound concepts (e.g., ecocentric system of values, resource ethics and the rights of future generations). Second, regarding the basic characteristics of the COR's thinking, they shortened the period from the year 2100, as it was in LTG, to the year 2025. Concerning their global approach, they adopted a more detailed one. At the same time, they became more holistic by incorporating regional perspective about values and rights in their recommendations. Third, this report is definitely not a proponent of growth and free market. Fourth, this report, similar to LTG, does not really incorporate different components of the global complex system and their interconnections. However, it has highlighted the importance of these components and their interconnections by mentioning some profound concepts in the recommendations.

2.1.1.3 Reshaping the international order, 1976

Tinbergen J. 1976, **Reshaping the international order RIO: A report to the club of Rome**

This report is the final report of the *Reshaping the International Order (RIO)* project. The project aimed to contribute to two resolutions of the Sixth Special Session of the United Nations General Assembly (UNGA) related to *establishment of a New International Economic Order and Program of Action*. It was initiated by a request of Dr Aurelio Peccei, the president of the COR, from Jan Tinbergen (1903-1994), the Nobel Prize winner economist, to form a team of specialists to suggest a practical and realistic *new international order* that would satisfy the needs of the current and the future population of the world. (Tinbergen 1976, Preface) Consequently, Tinbergen formed a team that was consisted of 21 specialists from the First, Second and the Third World, and he himself played the role of the coordinator.

Tinbergen mentions three points about the scope and the approach of this report. First, this project and its final report acts as an initiator of the discussion between specialists, politicians and general public rather than recommending the perfect international order. As examples of starting such debates, it is worth mentioning that the draft of the report was circulated globally between about 350 individuals and institutes and 5000 copies of the interim report were distributed during the *Seventh Special Session of the UN General Assembly*. (Tinbergen 1976, Preface.) Second, he mentions that this report is not a quantitative scientific work. However, it has used quantitative data to illustrate the suggestions wherever needed. Third, the authors intentionally chose the name of their report *New International Order* instead of *New International Economic Order*, as it was in the original title of the resolutions because they wanted to emphasize their holistic point of view. (Tinbergen 1976, 4-5.)

The report is structured into four parts. The first part discusses the necessity for introducing a new international order. It relates to the current world disorder state, the current and future problems of humankind, and the state of negotiations on international order.

The second part is titled *The Architecture of the New International Order; Initiating and Steering the Process of Planned Change*. First, it is reflecting on the meaning and the objectives of development. Second, the income difference between poor and rich countries is analysed as one of the main problems. Third, different dimensions of shift toward a new order are discussed from its definition and involved institutions to its required changes in power structure, policies and laws.

The third part is dedicated to *Proposals for Action.* It contains categorized proposals according to their priorities and timing on different areas (e.g., international monetary order, food production and international enterprises). The aim of preparing these packages are initiating the foundations for negotiations rather than providing action plans. (Tinbergen 1976, 176.)

Finally, the fourth part presents ten technical reports prepared by working groups of RIO project. These reports are the foundation of three previous parts of this book. Each report discusses a certain area (e.g., food production, arms reduction and monetary systems). Each report consists of presenting the problems, projecting the future and suggesting solutions. (Tinbergen 1976, 198-317.)

Three packages introduced in the third part can represent the conclusions of this book. In addition, power structure rebalance is in the centre of all the recommendations. Therefore, the following paragraphs will discuss international power structure and those three packages to summarize the conclusions of the report.

The power imbalance between countries should be addressed because the approach of this book toward new international order is founded on equity and negotiations between countries. Therefore, the power structure should be analysed to identify the reasons of the imbalance. The authors suggest manifold solution for the power structure rebalance between the Third World countries and the industrialized countries. First, the poor countries should become less dependent to the rich countries by becoming self-sufficient especially in meeting their basic needs. In addition, mechanisms should be devised that makes the resource transfer from rich countries to poor countries automatic. Second, the Third World countries should gain full control over their natural resource exploitations. Moreover, they should process and review all their contracts regarding their resources. Third, they should enhance their bargaining power by creating coalitions with the aim of strengthening their economic security. Fourth, they should create union between producers with the aim of increasing their collective bargaining power against industrialized countries. Fifth, private transnational corporations should be controlled by means of international regulations. Moreover, to control those corporations, public transnational corporations should be empowered to become competitive. Sixth, the Third World countries should make coalitions with different groups in industrialized countries. Seventh, some international organizations should become responsible to manage resources of the planet. Otherwise, the rich countries would use their technological and investment capabilities to use bigger portion of the shared resources than poor countries. Eighth, international financial organizations (e.g., Bretton Woods institutions) should be democratized in a way that the Third World nations would hold a fair voting right and power. (Tinbergen 1976, 179-180)

The authors propose three main packages for comprehensive negotiations. The first package relates to inequities in economic opportunities and distribution of income across the world. This package focuses on the assistance provided by industrialized nations for poor nations to overcome poverty and provide their basic needs. In order to realize it, the authors emphasize the need for a political will rather than a detailed plan.

The second package focuses on maintaining balanced global growth and has five components. First, international monetary system should radically change to prevent fluctuations (e.g., economic depressions). This change should also support the fulfilment of the Third World nations' growing needs. Second, information in specific fields, such as technology, should be controlled internationally in a way that supports the interests of the Third World. Third, global planning should be substituted for the national planning. Fourth, consumption patterns in poor and rich countries should change (i.e., in poor countries the focus should be on satisfying the basic needs, while in rich countries the focus should be on patterns that are less wasteful, less resource intensive and more service based). Fifth, the balance between food and population should be maintained. International reservoirs should support poor countries whenever they are unable to provide food for their populations.

The third package relates to initiating global planning system, and it includes several recommendations. First, international taxation system should be designed and implemented under the supervision of the World Treasury to support poor nations. Second, international reserve currency should be created and managed fairly. Third, food production and supply systems should be reconsidered. For example, international food reserve should be established to protect poor countries. Fourth, *International Trade and Development Organization* should be established with objective of addressing international trade policy issues. Fifth, several international organizations should be founded with the aim of globally planning and coordinating the economic system. Sixth, United Nations should be redefined with the aim of empowering it economically, politically and socially. (Tinbergen 1976, 181-185)

Regarding the research questions of this thesis, first of all the emphasis of this report is on discussing the proposals rather than projecting the problems. Moreover, this report focuses on international solutions based on the argument that while the nature of the humankind's problems is global the solutions should also be global and international. Furthermore, the suggested strategies are ambitiously founded on the willingness of rich countries to help poor countries. Second, regarding the basic characteristics of the COR's thinking, the longest period for the proposals is up to the year 2000, for *long* *range proposals*. Obviously, based on the approach of this report the global thinking is completely highlighted. Regarding the holistic thinking, although the report adopts this approach, it still excludes the social aspects of the problems. Third, this report is in harmony with previous reports on being against growth ideology and free-market based solutions. Fourth, this report is profoundly concerned about the global politics and economy and their interconnections. However, society and its interconnections with the other two components are still excluded from the study.

2.1.1.4 Goals for mankind, 1977

Laszlo E. (1977) **GOALS FOR MANKIND: A REPORT TO THE CLUB OF ROME ON THE NEW HORIZONS OF GLOBAL COMMUNITY**

This report relates to the goals of humankind in 'the different regions, ideologies, and religions of the world'. It discusses the goals of different groups within each society (e.g., governments, religious groups, and intellectuals). In addition, it analyses the gap between short-term national goals and long-term global goals. Finally, it focuses on the common goals for humankind that can create solidarity. (Laszlo E. et al. 1977, x.)

This report is divided into three parts. The first part of the report, titled *a world atlas of contemporary goals*, is dedicated to discuss the current goals of humankind and is divided into two sections. The first section focuses on national and regional goals of eight different nations or regions (i.e., Canada and United States, Western Europe, the Soviet Union and Eastern Europe, China and Japan, Latin America, Africa and Middle East, India and Southeast Asia, and Australia). The second section analyses *international and transnational goals*. This section focuses on the goals of specific organizations (i.e., United Nations, International Labour Organization, Multinational Corporations, World Council of Churches and the Roman Catholic Church).

In the second part, titled *new horizons through global goals*, the alternative goals are discussed. These goals aim at building a more fair, fulfilling, and sustainable world. These alternative goals are introduced in specific categories (i.e., security, food, energy and resources, and development). The last chapter of this part discusses the gap between current goals and the suggested ones. The author uses a diagram to show the gap between the suggested goals and the goals of the different groups and institutions in a country. Figure 5 shows such a gap diagram for USA. This diagram shows short-term and national goals at the bottom and long-term and global goals at the top. In this diagram, the bigger the circle the more influence the group or institution has on the national goal settings. The acronyms are GOV for government, PEO for people, BUS for business, REL for religion and INT for intellectual.

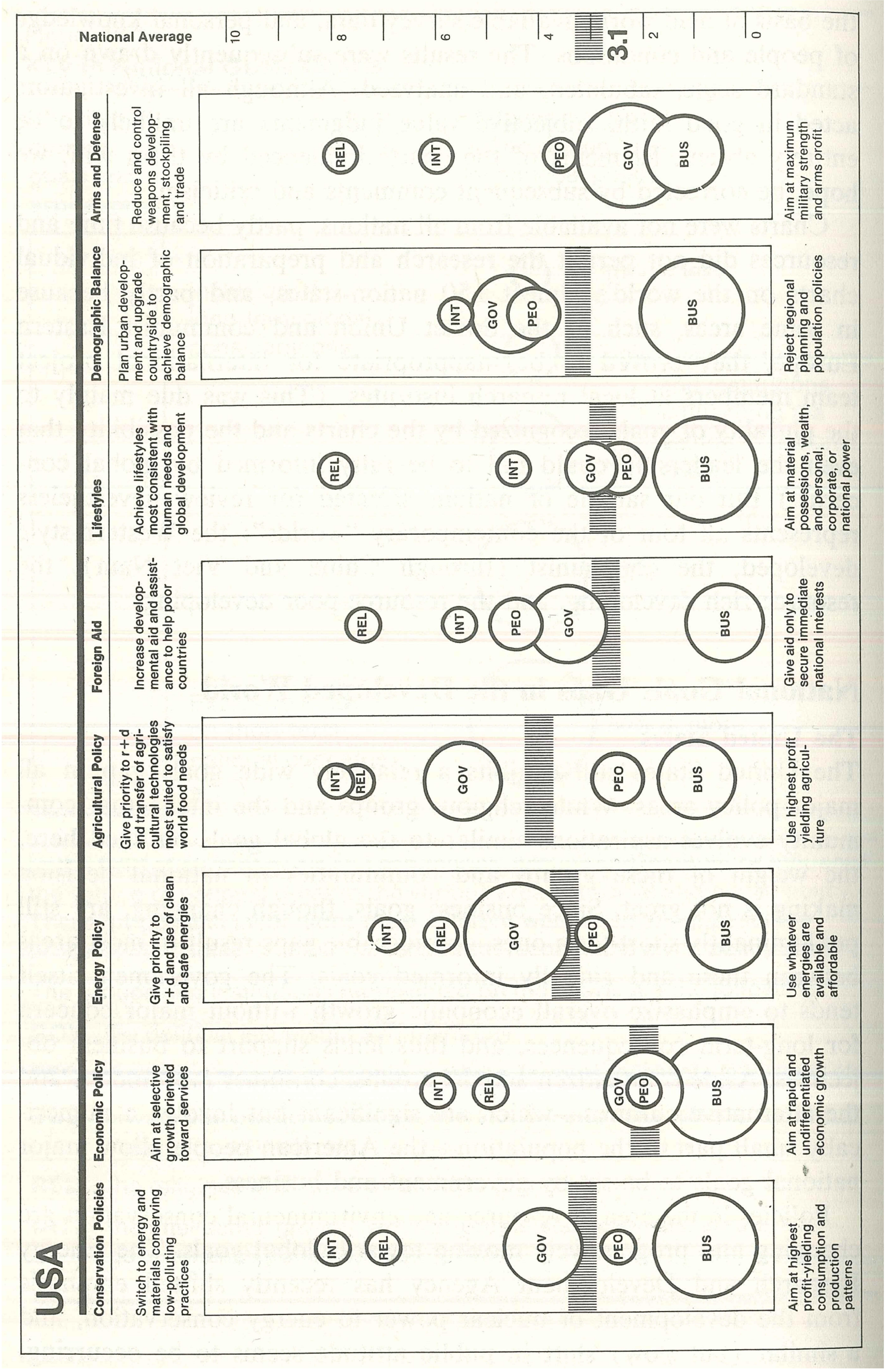

Figure 5 USA gap diagram, showing the gap between the global goals and the goals of different groups and institutions in a country (Laszlo et al. 1977, 326)

Part III focuses on the transition from current goals to the suggested goals. First, there is a discussion about the potential of religions in directing such a transition. Next, there is an analysis of the relation between *modern worldviews* and this gap (i.e. the gap between current goals and the ideal goals). The modern worldviews studied in this section are liberal democracy, Marxist communism and alternative cultures. Finally, the authors propose different scenarios to bridge the gap. In these scenarios, different groups act as a leader to direct the rest of the society toward the long-term global goals. These groups are *religious communities*, *intellectual communities*, *people*, *government* and *business*. (Laszlo E. et al. 1977, 415-416) Figure 6 shows the progression of religion and science-led scenario over time toward the suggested global goals. In this diagram, REL, INT, PEO, GOV and BUS are respectively standing for religion, intellectual, people, government and business. Vertical axis shows how long-range and global the goals are and horizontal axis shows the change process over time.

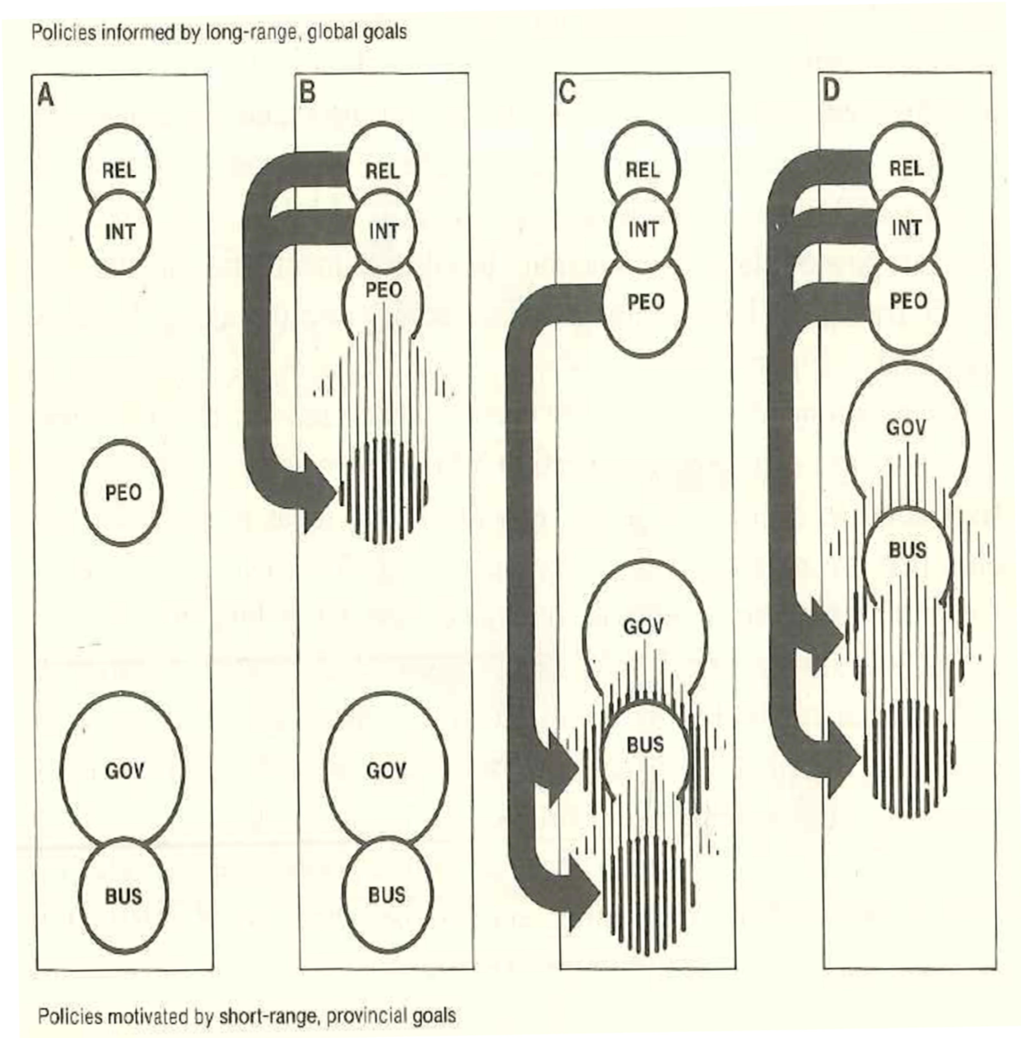

Figure 6 A religion and science-led Scenario (Laszlo et al. 1977, 417)

Regarding the research questions of this thesis, first, this report investigates a deeper subject than previous reports. This report discusses the goals of humankind. It is founded on the assumption that behaviours are the outcomes of goals. Therefore, first, the goals should be studied in order to address global problems. Consequently, the next topic discussed in this report is improving the goals in a way that pursuing them would solve the problems instead of creating them. Second, regarding the basic characteristics of the COR's thinking, this report offers no specific time frame. Nevertheless, it is founded on the long-term thinking. Moreover, this report has global approach because it studies the goals of different regions in the world. It is also holistic because it analyses the goals of different groups in the societies. Third, the suggested global goals are similar to the proposals of the previous reports. Therefore, this report is against growth ideology and free-market as well. Fourth, this report considers different components of the global system by studying the goals of different regions and different groups in each society. However, there is no explicit study of their interconnections in this report.

2.1.1.5 Beyond the age of waste, 1978

Gabor, D. - Colombo, U. - King, A. - Galli, R. (1978) **BEYOND THE AGE OF WASTE**

This report is founded on the technological related criticisms of LTG. According to these criticisms, LTG ignored the capabilities of technological improvements for avoiding the limits to growth or at least delaying them. (Gabor et al. 1978, vii.) Consequently, the idea behind this report was to invite *technological optimists* to define where and how technological development can help with the problems of the humankind (e.g., food, material and energy scarcity). (Gabor et al. 1978, x) However, the report is non-technical because the audiences of this report are general public and policy makers. (Gabor et al. 1978, 4)

The authors of the report used the help of the *working party* that consisted of several specialists from inside and outside of the COR. The *working party* held three general meetings and several specific meetings for discussing special issues. Afterwards, the contributions were organized and the report was written. (Gabor et al. 1978, xiv.)

This report is structured into two parts. The first part is about several problems of the humankind and the ways science and technology could be useful in addressing them. The problems discussed in this report are about energy, materials, food, climate and waste. For each area, first, it is introduced, its current situation is discussed and its problems in the future are projected. Then recommendations are proposed for addressing the problems. However, the recommendations are general and work best as guidelines for policymaking.

The second part relates to the implications of these recommendations. These implications are the concluding chapter of the report under the title *science, technology and institutional implications*. This chapter is concerned with the role of policy makers in leading science and technology in the proposed directions. The discussions in this chapter are structured around self-explanatory titles:

- the need for innovation in the procedures and structures of government
- formulation of national goals
- responsibilities of scientists
- integrated planning
- technology assessment and forecasting
- the short term versus the long term
- structural problems
- the problem of consensus of public opinion
- the need for policy research
- technology in a framework of interdependence
- the approach to global policies (Gabor et al. 1978.)

Regarding the research questions of this thesis, first, the main message of this report is that the existing science and technology could mitigate the problems. Moreover, if science and technology develop in some specific directions, they would become more effective in mitigating the problems. Second, regarding the basic characteristics of the COR's thinking, this report offers no specific time frame. Nevertheless, its message is based on long-term thinking. Moreover, this report holds the global thinking in its approach to the problems. It is holistic only in its concluding chapter. Third, the suggestions of this report have similar foundations to the proposals of previous reports. Therefore, this report is against growth ideology and free-market as well. Fourth, the components of the global system and their interconnections are not the main concern of this report. However, in the last concluding chapter there are some brief remarks related to these components and their interconnections.

2.1.1.6 No limits to learning, 1979

Botkin, J. W. - Elmandjra, M. - Malitza, M. (1979) **NO LIMITS TO LEARNING: BRIDGING THE HUMAN GAP: A REPORT TO THE CLUB OF ROME**

As Aurelio Peccei proposes in the *Foreword* of this report, the objectives of this report are twofold. First, it aims to determine the gap between human understanding and the human created complexity of the world in its current situation. Second, it aims to determine the ways to bridge this gap by learning (i.e. learning in its broad meaning and not only restricted to education or schooling). Peccei describes these objectives in its best way by saying ‘what we all need at this point in human evolution is to learn what it takes to learn what we should learn – and learn it’ (Botkin et al. 1979, xvi). More precisely, this project relates to learning and the future of humanity. It is founded on *innovative learning* and its features. (Botkin et al. 1979, 12.) Its primary features are *anticipation* and *participation*.

The project is founded on the works of three teams and several consultants with different backgrounds, nationalities and specialties. The authors combined all the approaches and contributions of team members to compile the final report. (Botkin et al. 1979 xvi)

Innovative learning has two underlying *value themes*. The first one is that innovative learning investigates fundamental values and goals contrary to the maintenance learning. In maintenance learning, the existing values are taken for granted. For example, if the energy supply were under study, the maintenance learning would seek the ways to supply enough energy, while innovative learning would seek the reasons for the current amount of energy consumption. The second value theme is that innovative learning is normative. It values anticipation and participation. Moreover, its ultimate normative objective is the survival and dignity of humankind. (Botkin et al. 1979, 12-14.)

This report is structured into three chapters. In the first chapter, the authors suggest a conceptual framework for innovative learning. In the second chapter, they present the barriers in the way of innovative learning. In the third and final chapter, they propose recommendations on *the development of innovative learning.* (Botkin et al. 1979, 16.) The authors conclude their report by presenting some remarks from the participants in Salzburg, Austria (June 1979) meeting of the COR on the manuscript of this report. (Botkin et al. 1979, 16)

Regarding the research questions of this thesis, first, this report introduces a learning mode that could enable humankind to understand his own created complex system and its problems. Second, regarding the basic characteristics of the COR’s thinking, this report offers no specific period. Nevertheless, its message is based on long-term thinking. Moreover, this report is global in a sense that it introduces a learning mode that could be used worldwide. It is holistic only in a sense that it aims at solving global problems of humankind. Third, the underlying logic of this report is against growth ideology and free-market. Fourth, the components of the global system are just in the background of this report.

2.1.1.7 Dialogue on wealth and welfare, 1980

Giarini, O. (1980) **DIALOGUE ON WEALTH AND WELFARE: AN ALTERNATIVE VIEW OF WORLD CAPITAL FORMATION: A REPORT TO THE CLUB OF ROME**

The main goal of this report as its author describes in its introduction is:

> *'to undertake an introductory analysis to provide answers for more basic questions, such as:*
> *What is real growth? What is economic value? and What is wealth and welfare?*
> *Under which conditions does investment produce real wealth? and Which type of investment?' (Giarini 1980, xviii.)*

As this statement shows, the objective of this report is to redefine the fundamental economic variables. Moreover, it seeks to identify appropriate investments that would result in *real wealth*. In other words, based on these redefinitions, the author offers recommendations aimed at addressing the existing and preventing the emerging problems caused by population growth. Capital allocation is in the centre of these recommendations. However, the author emphasizes that this study is only an introduction, and it aims at initiating the debate. (Giarini 1980, xix.)

This report is structured into four chapters. In the first chapter, the author introduces the problems and ideas that are analysed throughout the book. The second chapter starts with the discussion on the underlying reasons of the industrial revolution success. Afterwards, the necessity of transition to a post-industrial era is justified. His argument is mainly based on the decreasing efficiency of technology. Finally, wealth and welfare is redefined according to the new values of post-industrial era. (Giarini 1980, xx.) In the third chapter, the author defines the main term in his book *Dowry and Patrimony (D & P)* as:

> *'the stock of natural, biological, cultural and monetarized resources that are available to us and constitute our means of survival and our tool for the enjoyment of life.' (Giarini 1980, xx)*

Afterwards, he discusses the relation between capital and D & P and introduces the notion of deducted value as:

> *'a mean of measuring those investments which increase monetarized income, but do not increase real wealth.' (Giarini 1980, xx)*

The author uses all these notions to define the theory of utilization value and consequently to devise new indicators for wealth and welfare. Utilization value is introduced as a substitute for added value. Figure 7 illustrates different kinds of D & P and its accumulation and depletion.

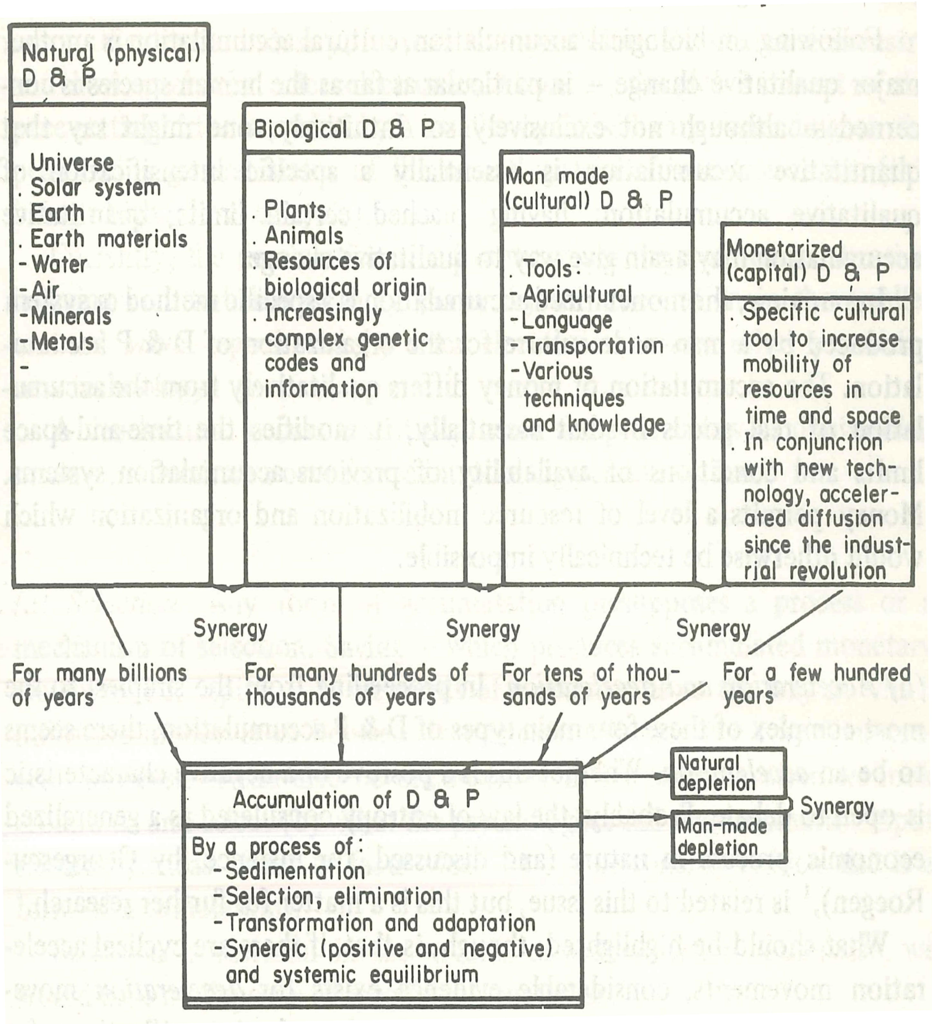

Figure 7 Dowry and Patrimony (D & P) – the source of utilization value (Giarini 1980, 169)

Chapter 4 discusses capital as monetarized part of D & P. This chapter proposes a solution for the needs of the growing population by optimizing capital allocations. This solution is founded on the ideas presented in the previous chapters. (Giarini 1980, xx.)

Regarding the research questions of this thesis, first, the main objective of this report is to discuss how capital allocation could play a role in addressing the problems of humankind. In order to do so, first, the economic variables are redefined. After that, the author suggests recommendations for capital allocation. Second, regarding the basic characteristics of the COR's thinking, this report offers no specific period. Nonetheless, its message is founded on long-term thinking. Moreover, this report is global in a sense that the economic variables, the problems of human and recommendations are all global. It is holistic only in a sense that the report is about the interconnected global problems. Third, the underlying logic of this report is against growth ideology and free-market. Fourth, the components of the global system and their interconnections are just in the background of this report. In addition, the society is completely left out from the discussion.

2.1.1.8 Roadmaps to the future, 1980

Hawrylyshyn, B. W. (1980) **ROAD MAPS TO THE FUTURE: TOWARD MORE EFFECTIVE SOCIETIES: A REPORT TO THE CLUB OF ROME**

This book aims to introduce a new world order that is more effective than existing ones. First, the author illustrates the underlying determinants of societies' effectiveness by studying the components of societal orders. After that, the author analyses the current situation of selected countries, based on those components. Then he provides recommendations for them and discusses their future. Finally, a new world order is discussed including the driving forces for its emergence, its preconditions and the probability of its realization. (Hawrylyshyn 1980.)

As the author asserts the report is founded on his insights rather than any specific scientific research. His insights were worth being a report to the COR because he is an academic with experience of visiting and living in several countries, under different political regimes, economic systems and values.

The author distinguishes three components of societal orders for defining, measuring and increasing the effectiveness of societies. These components are values, political governance and economic system. Figure 8 illustrates his overall point of view on the societal orders and their components.

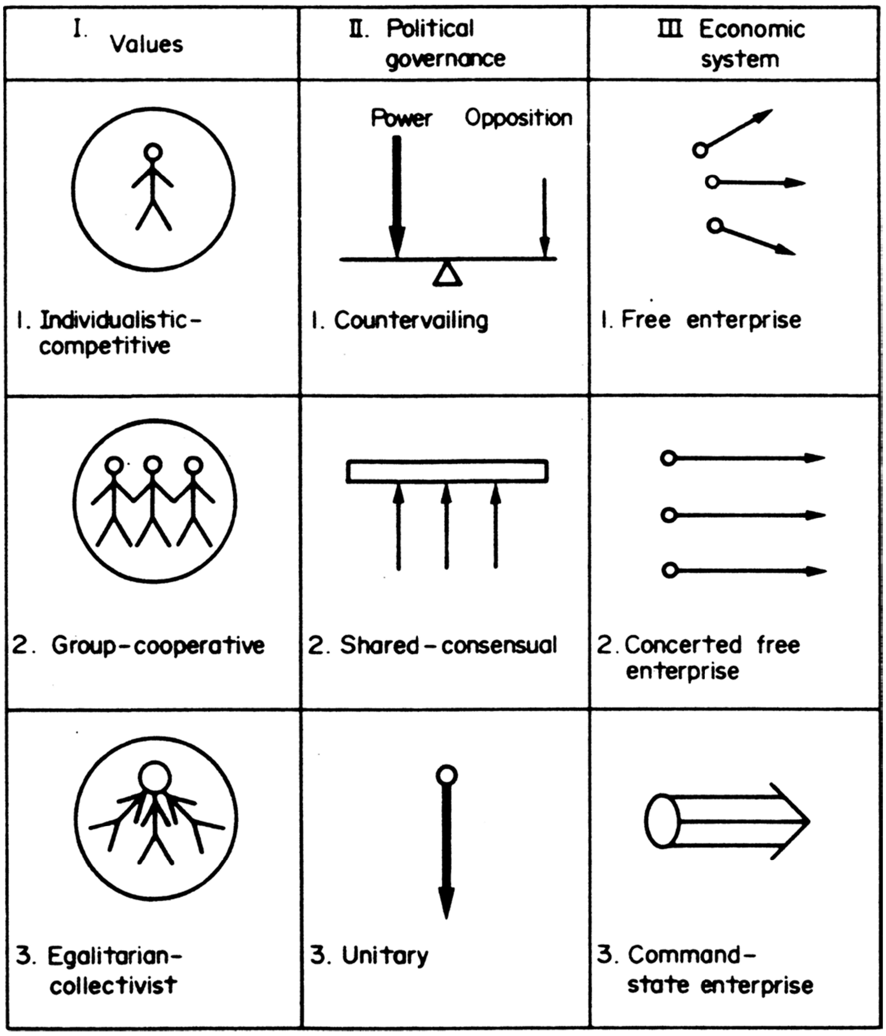

Figure 8 Components of Societal Order (Hawrylyshyn 1980, 5)

This report is structured into five chapters. In the first one, the components of the societies' effectiveness are introduced as the foundation for the whole study. In the second chapter, there is a discussion about the origin of differences in social orders and values. In the third chapter, each of these components and their existing options are analysed in detail. Chapter 4 discusses several countries. These countries are USA, USSR, Japan, China, Western Europe, India and Brazil. This chapter is the largest chapter of the book. For each country, its recent history, current situation and its future options are discussed based on the components of effectiveness. Finally, the report concludes with discussing the ideas of *world integration* as a preferable world order. (Hawrylyshyn 1980.)

The author identifies five vital features of the suggested world order. First, the diversity of cultures, value systems and beliefs should be maintained. Second, the power should be defused in a form of governance that is founded on coalition and cooperation of different stakeholders. Third, political institutions should share the responsibilities and decision-making rights on a truly federal manner at all levels from neighbourhood to global levels. Fourth, power structure should be diffused as much as possible. For example, direct democracy should substitute representative democracy to the possible extent. Fifth, economic system should be planned according to the state of the regions (e.g., the level of economic development and population). (Hawrylyshyn 1980, 168.)

Regarding the research questions of this thesis, first, the main message of this report is that studying different social orders and projecting them is possible by analysing their components (i.e., values, political governance and economic system). Moreover, a new world order is introduced that emphasises the *world integrity*. Second, regarding the basic characteristics of the COR's thinking, this report offers no specific period. Nevertheless, its message is founded on long-term thinking. Moreover, this report is global in a sense that different countries are analysed throughout this report. It is holistic in a sense that the report is founded on the interconnected components of societal orders (i.e., values, political governance and economic system). Third, the underlying logic of this report is against growth ideology and free-market. Fourth, this report discusses the components of the global system and their interconnections to some extent. However, social component is reduced to values, and its other dimensions are left out from the study.

2.1.2 The reports after Peccei

After Peccei, there is a significant change in the topics of the reports. During the presence of Peccei, there was a holistic approach to the predicaments of humankind. After him, the reports become more specialized and less holistic. The probable reasons for this change could be found in the role of Aurelio Peccei in the COR and in the economic, social, political and philosophical state of the world during 1970s and 1980s. However, those reasons and other possible reasons are not studied in this thesis because the focus of this work is on the messages of the reports. Therefore, in this thesis, it suffices to mention the change happened in the messages of the reports.

In the following sections, the reports published after Peccei are summarized with emphasis on their objectives, conclusions and their method or structure. Each section concludes with some remarks regarding the research questions of this thesis. However, the common characteristics of these reports are excluded from the concluding paragraphs. Regarding the basic approaches of the COR's thinking (i.e., global, long-term and holistic approaches), generally, they are just in the background of these reports. Regarding the position on free market and growth ideology, these reports normally avoid explicitly criticizing them. Finally, the components of the global system and their interconnections are just visible in the background of these reports. In addition, the society is usually missing from their analysis.

2.1.2.1 Microelectronics and society for better or for worse, 1982

Friedrichs, G. - Schaff, A. (Eds.) (1982) **MICROELECTRONICS AND SOCIETY: FOR BETTER OR FOR WORSE: A REPORT TO THE CLUB OF ROME**

Alexander King in the first chapter of the book illustrates the importance of microelectronics. In this chapter, he examines whether it is a revolution or just a new technology. He identifies the most important quality of microelectronics to be a flourishing industry that its products are affecting the entire economy and society. Moreover, the role of these products seems promising in improving industrial productivity. He also emphasizes that microelectronics should not be studied merely by itself and its applications. He asserts that this new technological progress should be studied in relation to other major trends in order to fully grasp its impacts on the future societies. Only in this way, it becomes possible to understand the opportunities that it offers for handling major global problems (e.g., population growth, environmental distress and energy problem). Moreover, in this way it becomes possible to detect the new risks it entails. These criteria for studying microelectronics portray the approach of this report. As Friedrichs and Schaff (1982, v) assert the objective of this report is to investigate the development of microelectronics to illuminate the opportunities and threats it entails. (Friedrichs & Schaff 1982, 1-36.)

This report is a collaboration of different authors and portrays different dimensions of microelectronics. The authors of different chapters met three times during the process of writing the report. The report consists of 10 chapters from different authors, but it is possible to categorize them into three parts. The first part of the book provides a description of microelectronics by discussing its history, technology and implications. The second part focuses on socioeconomic dimension by discussing its impacts on enterprises, workers and macroeconomics. Finally, in the third part, there are discussions on several dimensions of microelectronics. First, microelectronics is investigated in relation to the Third World. Second, its application in war is analysed with emphasis on negative possibilities and policy-making necessities. Third, its role in *the information society* is discussed. Fourth and finally, there is a discussion on its global and political impact, especially on worldwide industries distribution. At the end, the report is concluded with a visionary chapter regarding the change in the meaning of work and occupation under the influence of microelectronics in coming decades. (Friedrichs & Schaff 1982.)

Regarding the research questions of this thesis, first, the main message of this report is to emphasize the importance and the large impact of microelectronics on societies. Second, on the long-term thinking, the importance of this report is in recognizing the future magnitude of microelectronics' impacts on societies, so early in 1982. On the global thinking, this report is not limited itself to industrialized world, where microelectronics applications first emerged, and provides some insights about the impacts of microelectronics on the Third World countries as well. On the holistic thinking, the whole topic of the book is far from holistic thinking in studying the global problems of humankind. Nevertheless, this book discusses several topics related to impacts of microelectronics.

2.1.2.2 The barefoot revolution, 1988

Schneider, B. (1988) **THE BAREFOOT REVOLUTION: A REPORT TO THE CLUB OF ROME**

As the author asserts 'the purpose of this book has been to survey a major trend in rural development – the emergence of people-oriented, NGO-sponsored, village-level development initiatives throughout the Third World.' (Schneider 1988, 234)

Regarding the methodology, 'the book is based on the results of surveys of 93 small-scale development projects carried out by six teams of researchers in nineteen countries of Latin America, Africa and Asia from September 1983 to January 1985. Each team was made up of two professionals, one from the social sciences – sociologist, anthropologist, historian – the other an economist, agronomist, or experienced development field-worker.' (Schneider 1988, xiv) First, the teams carried out field research. After that, the study is enriched by other studies of another 227 small-scale projects.

The author divides the book into five parts. The first part is an introduction that starts by explaining the reasons for the misguided and ineffectual development of the Third World in the past two decades. Afterwards, the author introduces microprojects by providing three examples extracted from the fieldworks. Microprojects are defined as 'grassroots initiatives that are springing up in the rural villages of Third World countries'. (Schneider 1988, 9) In the final chapter of this part, he emphasizes the importance of the Third World development as a global *problematique*. The second part focuses on the *factors of impoverishment* in the context of the Third World rural areas. These factors are political instability, indebtedness, land misuse, land misappropriation, uncontrolled migration, uncontrolled population growth, loss or rejection of cultural identity and corruption. The third part categorizes the factors of development into two groups according to their objectives. The first group has the aim of satisfying immediate basic needs. The second group has the objective of awakening and empowering village groups. Moreover, this part illustrates NGOs, their activities, the significance of their activities around the world and their accountability. In the fourth part, the potential of NGOs to *limit the factors of impoverishment* and to *create factors of development* are discussed according to the fieldwork studies. In addition, the barriers to NGO actions are explained in this part. In the fifth and last part, the author provides an analysis to depict the general outcomes of this study. (Schneider 1988.) The author concludes that the rural development and specifically the *people-oriented* ones is proved to have a great potential for solving the problems of the two billion residents of rural areas in a self-sufficient and sustainable manner. (Schneider 1988, 234-235)

Regarding the research questions of this thesis, first, the main message of this report is that the people-oriented rural development has a great potential in addressing the problems of the rural areas especially in the poor countries. Second, on the global thinking, NGOs and their potentials are studied in a global context although the focus of this report is mostly on the rural areas of the Third World.

2.1.2.3 The limits to certainty, 1989

Giarini, O. - Stahel, W. R. (1989) **THE LIMITS TO CERTAINTY: FACING RISKS IN THE NEW SERVICE ECONOMY**

The objective of this report is to provide an analysis on the risk and uncertainty as the characteristics of the service economy as the current economy of the world in the post-industrial era. (Giarini & Stahel 1989) The authors structured the report into four chapters.

The first chapter is an introduction that includes an alternative interpretation of LTG. The authors see the results of LTG as showing the end of hardware economic growth but not the general economic growth (i.e. the end of one form of growth but the beginning of another form). Moreover, they claim that the current economic problems are the consequences of the conflicts between reality and our models. Therefore, they propose rethinking of our models and interpretations for resolving these paradoxes. In addition, they believe such a reform is required for building a more realistic image of the future. In this context, they detect three major issues: first, *recognition of the service economy*; second, *importance and scope of the supply side in the economic process*; and third, *risk as a positive factor and the challenges of uncertainty*.

In the second chapter, the authors illustrate service economy. This chapter discusses the inheritance of the industrial revolution and its pitfalls, the emergence of the service economy, the role of time and value in this economy, and the relation between the service economy and the society.

In the third chapter, they focus on producer and risk taking as the parameters of the supply side of the economy in the service economy. Moreover, they assert that in the service economy the focus is on the quality or the production side rather than on the quantity or demand-side of the economic activities.

In the fourth and final chapter, the authors focus on uncertainty in the current service economy and service society. In addition, they discuss the role of risk and risk taking in service society. In this context, they use the ideas of quantum physics to argue that the current economic science is based on outdated model of physics with the Newton's notion of equilibrium. Based on the quantum physics, uncertainty and probabilities are the natural characteristics of the world. Therefore, risk is unavoidable and should be recognized, controlled and taken. Based on this philosophy, they propose redefining and restructuring the concept of progress. (Giarini and Stahel 1989, 1-6)

Regarding the research questions of this thesis, the main message of this report is that the notions of risk, uncertainty and progress in the service economy are completely different from the ones in the industrial economy. For this reason, our old model of economic thinking is unable to explain current economic realities and requires revision.

2.1.2.4 Africa beyond famine, 1989

Lemma, A. - Malaska, P. (1989) **AFRICA BEYOND FAMINE: A REPORT TO THE CLUB OF ROME**

The objective of this book is to analyse the causal mechanisms of recurrent famine in sub-Sahara Africa and to suggest appropriate solutions for the famine. This report is the outcome of a project that initiated in 1986. The motive of this project was the 1984 famine in Africa that persuaded the COR to start a project about famine in Africa. The research process took three years and involved several contributors.

This report is structured into three parts. The first part is titled *the problematique* to emphasize the interconnections of the problems. Accordingly, the six essays presented in this part adopt a holistic approach. In the first chapter, Alexander King adopts a global and regional perspective. He emphasizes the role of the industrialized countries in Africa during the history. At the end, he concludes that only appropriate, fundamental solutions, and not charity, are able to solve the problematique of Africa. In the second chapter, Aklilu Lemma emphasizes the capabilities of Africa in being self-sufficient according to its history. Paul Psychas and Pentti Malaska, in the third chapter, present the wide range of arguments on the causes of famine in Africa. They systematically illustrate different ideas that have been gathered during the project. In the next two chapters, Aklilu Lemma and Alexander King focus on one of the most important causes, science and technology dependency. They argue that the dependency is increasing as the science and technology gap widens between industrialized countries and Africa. In their conclusion, they focus on indigenous science and technology capabilities rather than transfers from other countries. In the last chapter of this part, Paul Psychas and

Pentti Malaska seek a middle way between adopting a holistic approach and emphasizing specific problems in studying the problematique of Africa. First, they identify two root causes for all other problems that they discuss during this chapter. The first root cause is 'the poverty and marginality of certain rural groups'. (Lemma & Malaska 1989, 81) The second one is the problems with food production and distribution. Then, they introduce and elaborate five major groups of problems as consequences of those root causes. These five groups are *ecological imbalance in a harsh environment, economies of extraction, problems in Urban-Rural relations, shortfalls in science and the debt trap*. (Lemma & Malaska 1989, 1-132.)

Part II presents expert papers. In chapter seven, Richard Pankhurst discusses the recurrent famine in Ethiopia. In his study, he finds evidence of the famines back in the ninth century. He concludes that only based on autonomous character of Ethiopians and development aid, it becomes possible to avoid more famines. In the eighth chapter, Gabre-Sellassie identifies the problems and proposes the solutions of famine in Africa. He concludes that only the combination of the remedies would solve the problems. In addition, he emphasizes the role of government in creating such a synergy between solutions. In the next chapter, Ari Siiriäinen offers a systemic and a historical model for Africa's famine. At the general level, he emphasises the fact that Africa was able to handle its problems independently during its history. At the state level, he focuses on the long-term economic strategies, as well as social and political structures. The tenth chapter discusses drought in Africa. The authors of this paper, D. Rind, C. Rosenzweig and D. Peteet, seek trends by studying the history of drought in Africa. They conclude that most probably greenhouse gas emissions would change the climate trends severely. Accordingly, they propose adjustment of policies and strategies. J. D. H. Lambert, a biologist, analyses the vital role of a traditional farmer in food production in Africa. He concludes with recommendations for engaging farmers in the design and development of new systems. Pincas Jawetz, in the twelfth chapter, discusses the potentials of desert. He focuses on its resources such as water, energy and minerals. In addition, he notices other potentials of deserts, for example, tourism and recreation. He concludes this chapter with some development policy recommendations. In the thirteenth chapter, L. J. Teply and Demissie Habte discuss the importance of nutrition for development in Africa. In addition, they analyse nutrition related problems and offer solutions for them. In the next chapter, Donald Heyneman suggests an intersectoral approach to health improvement. This approach includes local, national and international level of actions. (Lemma & Malaska 1989, 133-288.)

In Part III, the authors present their conclusions. In the fifteenth chapter, Pentti Malaska offers a conceptual framework. This chapter starts by criticizing the current development strategies based on neoclassical economics and Marxist ideologies. After this introduction, Malaska offers his holistic, harmonized conceptual framework for a self-reliant development of Africa. His conceptual framework has two components. The first one is a general model of societies, which emphasizes the harmony between social, economic and cultural orders. The second one outlines the sequence of development in a society. According to this sequence, first the basic needs (e.g., food) should be satisfied in the development process, then tangible needs (e.g., industries) and finally intangible needs (e.g., services). In the last chapter, Aklilu Lemma offers *an agenda for action*. These actions are categorized into three groups: *capacity building for rural development*, *capacity building for industrial development* and *strengthening the African scientific community*. (Lemma & Malaska 1989, 289-333)

Regarding the research questions of this thesis, first, this report analysis various dimensions of the recurrent famine in Africa. Accordingly, it offers suggestions for addressing this problem. Second, on the holistic thinking, the whole topic of the book is merely concerned with the famine in Africa. Nevertheless, several dimensions of this topic are discussed throughout the book.

2.1.2.5 Taking nature into account, 1995

Dieren, W. V. (1995) **TAKING NATURE INTO ACCOUNT: A REPORT TO THE CLUB OF ROME**

This report is another contribution to the debate about the relation between environment and economics. It is the outcome of meetings and discussions between several contributors to this report. (Dieren 1995)

The report is structured into five parts. The first part is focused on the historical study of economic growth, how it became the aim of human and its definition. The second part discusses the undesired side effects of economic growth on environment and welfare. In addition, this part explains the ways by which System of National Accounts (SNA) hides these flaws and corresponding costs. Part 3 is dedicated to the idea of sustainable development. This discussion includes its history, actors and policy implications. In addition, this part discusses its implication for the south countries, and its measurement by the means of existing and alternative indicators. Part 4 describes the possible ways for adjusting GDP to include natural capital. In other words, this adjusted GDP should reflect the side effects of economic activities on natural capital. (Dieren 1995, xii.) The last part offers specific recommendations on:

> *'The improvement of welfare measurement; the improvement of GDP as a measure of economic output; the anticipated resistance to the innovations proposed in the report by statistical offices and politicians; and the*

> *way to strengthen international cooperation among experts.' (Dieren 1995, xii-xiii)*

The recommendations include several concepts and ideas of environmental economy such as:

- comprehensive measures of societal progress
- basket of indicators
- consistent framework of economic, social and environmental indicators for sustainable development
- intra- and intergenerational equity
- Net Domestic Product (NDP) formula
- costs of value changes of nonmarketed nonproduced natural assets
- environmental defensive expenditures
- cost accounting from a responsibility point of view (Dieren 1995, 259-278)

Regarding the research questions of this thesis, the main message of this report is that the economic growth indicators should reflect the changes in natural capital. Current indicators are misleading instead of being informative because they hide realities about natural capital. Moreover, this report has a global approach in a sense that it discusses the internationally accepted system of accounting (i.e. SNA).

2.1.2.6 The future of people with disability in the world, 2002

Garcia-de-Lorenzo, R. (2002) **THE FUTURE OF PEOPLE WITH DISABILITY IN THE WORLD: HUMAN DEVELOPMENT AND DISABILITY: A REPORT TO THE CLUB OF ROME**

Although this report is concerned with disabled people and their future in the world, its more general objective is to suggest a value system based on solidarity. This value system is founded on cooperation and inclusion. Therefore, this research, first, analyses the state of disabled people in the world and then portrays the future in which they are not excluded or discriminated. (GARCÍA 2002, 14)

The manuscript of this report was made from the contributions of several experts. Afterwards, some other experts reviewed this manuscript. Then, some statistics was added to the report. Finally, a technical committee wrote the final report. (GARCÍA 2002, 15)

The report is structured into four sections. The first section offers the overview of disabled people around the world. This overview emphasizes the differences between their situations in developed countries and the rest of the world. The second section discusses possible ways for integrating disabled people in society, economics and politics.

Third section focuses on the values that facilitate the integration of the disabled people into society. This value system is founded on cooperation, competition and social cohesion. The final section offers recommendations for the future. These recommendations aim at providing dignity for human and preventing discrimination and stratification, especially against disabled people. (GARCÍA 2002)

Regarding the research questions of this thesis, the focus of this report is on disabled people and their current difficulties in different societies. This report pays special attention to discriminations against disabled people. The main message of this report is that building a more egalitarian society is possible through solidarity and cooperation.

2.1.2.7 The double helix of learning and work, 2003

Giarini, O. - Malitza, M. (2003) **THE DOUBLE HELIX OF LEARNING AND WORK**

This report studies the relation between work and education in twenty-first century. Initially Professor Malitza introduced the idea of double helix in an article published in 2000. In this report, the authors illustrate that the traditional structured education and traditional retirement age do not fit to the service economy of 21st century. (Giarini & Malitza 2003.)

This report is structured into five chapters. The first chapter focuses on learning. In this chapter, the authors discuss the lifelong learning and interdisciplinarity. In addition, they provide a historical overview of these ideas. Moreover, they analyse the relation between education, individual and society. They conclude that the old perception of education, that *it should prepare an individual for living in the society*, is not adequate anymore. Therefore, they propose a more realistic attitude that system should provide maximum choices for an individual. In addition, it should help the individual to 'find and play a rewarding role, in both moral and material terms' (Giarini & Malitza 2003, 40). Finally, they illustrate the ways that the knowledge economy changes the meaning of learning, work and their relation. They believe that knowledge economy is the new global economy.

In the second chapter, titled *the modular approach*, the authors discuss the need for restructuring the knowledge. They propose a modular approach. They continue by introducing the double helix of learning and work as a project that:

> *'has as a main goal the mapping of knowledge according to the practical criteria of education distribution and use, learning, and training, for which it attempts to produce a modular sequencing operation. The project tends to cover everything that an individual can and must know in order to perform professions and roles, while also accomplishing the*

> *traditional goals of education (personal fulfillment, dignity, productive activity, social roles, conscience).' (Giarini & Malitza 2003, 64.)*

Afterwards, they discuss the vital role of the ICT and the ways of using it in this project. They conclude this chapter by an analysis on the significance of combining work and learning in addressing three major global issues: '**(i)** opportunities for the young; **(ii)** employment; and **(iii)** education'. (Giarini & Malitza 2003, 72.)

The focus of the third chapter is on work. The chapter discusses the evolution of the meaning of work. In addition, it investigates the relation between work and tool throughout the history. Afterwards, the authors describe the transition of economy toward service economy and analyse the consequences of this transition on work and learning. In addition, they illustrate the transitions happened in the attitudes of management, company and legal framework toward work. Finally, the authors offer an extensive discussion on the work and learning by investigating their history and current relation. (Giarini & Malitza 2003, 79-107)

The fourth chapter analyses the relation between work and knowledge economy. The discussion is structured around the ideas of *knowledge as commodity*; *innovation*; *the effect of the market*; *the impact of the relations between democracy, civil society and state on education and learning*; *the importance of work for state*; and *knowledge as self-fulfillment*. (Giarini & Malitza 2003, 107-133.)

In the fifth and last chapter, the authors conclude by offering recommendations about changing the traditional ways of learning and work (Giarini & Malitza 2003). Their solution is:

> *'the modularization of the curriculum with the aim of creating a personal choice system to be constructed by the individual along his or her active life, between the ages of 16 and 76, to consist of alternative sequences of work and learning.' (Giarini & Malitza 2003, 133)*

Regarding the research questions of this thesis, the main message of this report is that the service and knowledge economy imposes certain conditions on the relation between work and learning. Accordingly, learning has to become lifelong and modularized in order to afford equipping an individual with knowledge and skills. These knowledge and skills should meet the work requirements throughout the lifetime of a person.

2.1.2.8 Global population blow up and after, 2006

Kapitza, S. P. (2006) **GLOBAL POPULATION BLOW-UP AND AFTER**

In this book, the author offers an explanation for population growth throughout history in order to forecast its future. The author believes that studying population growth is important because ‘the number of people expresses the sum of all economic, social and cultural activities and is the product of all human development’. (Kapitza 2006, 32) Accordingly, the population could be used as a measure of human development.

This report is founded on quantitative study of global population system. This method contrasts with qualitative methods in an attempt to explain the changes of human population. The author *properly* applies non-linear methods in studying population. (Kapitza 2006, 21-32.)

This report is structured into 10 chapters. After the first introductory chapter, in the second chapter, the author illustrates some dimensions of systems (e.g., stability, self-organization and nonlinear systems). After that, he defines global population dynamic and self-organizing system. In the third chapter, the author introduces his global population model. In the fourth chapter, he describes how this nonlinear model explains human population growth from the beginning of history toward a foreseeable future. In the fifth chapter, the author analyses the meaning of time and the change of time scale in human development based on population. In the sixth chapter, he analyses the information exchange between different agents of population and its effects on growth and development. Moreover, he illustrates the effect of globalization on development and socioeconomic cycles. In the seventh chapter, he discusses *demographic transitions* within countries and the globe. Demographic transitions are defined as ‘the changes in the state of reproduction’ (Kapitza 2006, 139). In the eighth chapter, he explores the stability of population growth and demographic system. The ninth chapter analyses the impacts of energy, resources and environment on population growth. In the tenth and last chapter, the author concludes that the limits to growth is not because of resources or space, but rather the mechanisms of population growth and development are responsible for the limits to growth. Moreover, he explains the ways that demographic transition relates to globalization, information technology and stresses of modern life. Finally, he forecasts that the global population will stagnate at 10-12 billion. In addition, information will govern the future rather than moderating it. Therefore, human resources, education and media will be extremely important in the future. At the end, the author defines the need for more interdisciplinary research. (Kapitza 2006.)

Regarding the research questions of this thesis, first, the main message of this report is that the population growth is a measure for human development. Therefore, it can be used to explain human development during the history of humankind. Moreover, it can be used to determine the limits and, more generally, to forecast the future of human development. Second, on the long-term thinking, this report seeks to explain human development to its foreseeable future. On the global thinking, the approach of this report toward population is completely global. Finally, on the holistic thinking, the author claims that population growth is a holistic indicator of human development.

2.1.2.9 The employment dilemma and the future of work, 2006

Giarini, O. - Liedtke, P. (2006) **THE EMPLOYMENT DILEMMA AND THE FUTURE WORK**

The objective of this report is to investigate the pitfalls of the current ideas and theories of work and economic activities. This report aims at stimulating economic thinkers whether they are public, academics, or politicians. In order to achieve its objective, the report focuses on work and employment, definition of wealth, economic value and human dignity.

This report consists of five chapters. The first chapter discusses the evolution of work and its value from economic and social point of view throughout the history. The history of work is divided to three eras: pre-industrial agricultural society, industrial revolution and service economy.

In the second chapter, the authors analyse work from economic theory perspective. This discussion includes the ideas of Adam Smith, Karl Marx and John Maynard Keynes. This chapter continues by explaining the change from deterministic point of view of classical and neoclassical economics toward uncertainty. At the end of this chapter, the authors analyse the role of demand, science and technology in economic theories.

The third chapter is titled *productive work in industrial revolution system*. First, it provides a historical overview. Then, it discusses work in relation to population, aging population, migration, unemployment, education, lifecycle, women, industrialized and developing countries, intra-generational and inter-generational income differences and transfers, and unemployed.

In the fourth chapter, the authors discuss work within the context of service economy. They investigate the relation between value production and wealth, monetarized and non-monetarized activities, ‘the economic value of non-monetarized activities’ (Giarini & Liedtke 2006, 84), and ‘the transformation of the service sector’ (Giarini & Liedtke 2006, 88). In addition, they discuss the environmental effects of work, basic income, non-monetarised activities, economies in transition from centrally planned to market economy, employment, work and personality, work hours, and work and lifecycle.

In the fifth and final chapter, the authors describe three layers of work: ‘employment (remunerated work), self-production non-monetarised activities, benevolent productive monetarised but non-monetised activities’. (Giarini & Liedtke 2006, 130) They categorize their suggestions into three groups. The first group involves ‘developing an economic environment for a dynamic private initiative development in the key second layer employment strategy’. (Giarini & Liedtke 2006, 139) The second group is about ‘enhancing the value of non-monetarised work’. (Giarini & Liedtke 2006, 140) Finally, the third group consists of ‘possibilities to develop a basic first layer part-time work for all the able population’ (Giarini & Liedtke 2006, 143).

Regarding the research questions of this thesis, the main message of this report is that the current economic theories have serious shortcomings regarding work and economic activities. Accordingly, the report offers some suggestions for policy makers to address these shortcomings.

2.1.2.10 Factor Five, 2009

Weizsacker, E. V. - Hargroves, K. C. - Smith, M. H. - Desha, C. J. K. - Stasinopoulos, P. (2009) **FACTOR FIVE: TRANSFORMING THE GLOBAL ECONOMY THROUGH 80% IMPROVEMENTS IN RESOURCE PRODUCTIVITY**

As the name of the book implies, its objective is to propose solutions for reaching 80 percent efficiency improvement in resource usage. In addition, it aims at offering practical, whole system solutions rather than merely presenting the technologies that would create such productivity, as the authors assert in the introduction of the book. Accordingly, the book is divided into two parts. Part I illustrates the existing technological solutions for the most responsible sectors of resource usage (i.e., buildings, heavy industry, agriculture and transport). The second part is dedicated to suggest practical ways for realizing factor five. This part discusses several topics, for example, regulations, economic instruments, rebound effect, *long-term ecological tax reform*, the balance between public and private sector, and *sufficiency in a civilized world*. (Weizsacker et al. 2009.)

The first part is structured into five chapters. The first chapter discusses the approach of sector studies. Sector studies are built on the *whole system approach* and around the *Industrial mitigation matrix* of *IPCC 4th assessment*. The whole system thinking emphasizes the interconnections between systems and the solutions. These solutions can address several problems simultaneously. The key strategies are selected from *Industrial mitigation matrix* for structuring the material for each sector. These key strategies are energy efficiency, fuel switching, heat and power recovery, renewable energy, feedstock change, product change, materials efficiency and non-CO2 greenhouse gases reduction.

The second chapter analyses building sector. Two kinds of buildings are studied separately: residential, and office and commercial. For each kind of buildings, the discussion is structured around three topics: potentials for 80 percent productivity improvement, some of the best practices and a whole system approach. The other chapters of the sector studies are structured similarly.

The third chapter focuses on steel and cement industry as representatives of heavy industry. The fourth chapter is about agriculture sector and divides the sector into water and energy consumption in agriculture. The fifth and final chapter of this part, *transport sector*, is divided into *light vehicles*, *heavy freight trucks* and *air travel*. (Weizsacker et al. 2009.)

In the second part, the authors focus on the potential political actions that can realize sustainable development. They start their exploration with discussing regulations. In chapter six, they offer an overview on some of the direct regulations concerning pollution, energy efficiency, wasteful technologies, water, public procurement and cyclical society. However, they conclude that these regulations do not address the consumptive behaviours. Therefore, these regulations are vulnerable to rebound effect. In other words, their success in increasing efficiency might cause an increase in consumption. The authors suggest economic instruments for shifting consumptive behaviours toward less consumption.

In chapter seven, the authors discuss different economic instruments. First, they offer an overview of corporate social responsibility (CSR) commitments. Then, they present a synopsis of *economic instruments for the environment* from 1970s to date. Finally, the authors discuss some of these instruments (i.e., *carbon trading*, *ecological tax reform* (ETR), *water pricing* and *feed-in tariffs for renewable energies*) in details.

In the eighth chapter, the authors first define the rebound effect, then discuss some of its instances and suggest some recommendations to address it. The rebound effect focuses on the fact that increased efficiency will create consumption growth, which is more than the efficiency gain. Therefore, the outcome of the rebound effect is more net resource consumption. The authors suggest a threefold solution. First, the damage of resource consumption should be reduced as much as possible. Second, capital should be saved for the time that the effects of resource depletion start to hit. Third, resources should become ever more expensive. The last part of the solution is elaborated in chapter nine.

Chapter 9 is titled *a long-term ecological tax reform*. The main idea is to introduce long-term policies to increase the resource prices. First, the authors offer an overview on the history of the concept. Then, they discuss its implementations and criticisms. Finally, they offer a clear outlook of its implementation in market economies.

In chapter ten, the authors argue that it is essential to rebalance the public and private goods for gaining 80% resource efficiency. First, they offer a historical overview on emergence of market economy. Then, they elaborate the ways that civil society and global rules can support public goods.

In chapter eleven, the last chapter, the authors discuss the idea of sufficiency. They start with discussing IPAT formula. After that, they develop the discussion to measuring happiness. They also discuss the importance of community in increasing happiness.

Finally, they conclude that it is essential to reconsider and rebalance jobs, time and growth, according to happiness measurement. (Weizsacker et al. 2009.)

Regarding the research questions of this thesis, first, the main message of this report is that it is possible to increase efficiency by factor five in resource usage and consumption with the existing technologies. However, using these technologies would not automatically cause the reduction in consumption of resources. Therefore, the barriers are studied and corresponding solutions suggested for realizing the reduction in resource consumption. Second, on the holistic approach, this report discusses several interconnected topics around the resource consumption reduction.

2.1.2.11 The blue economy, 2010

Pauli, G. A. (2010) **BLUE ECONOMY-10 YEARS, 100 INNOVATIONS, 100 MILLION JOBS**

In this report, Pauli defines *blue economy* as an economy that leads to sustainability without imposing excessive cost on investors and consumers. He believes those costs were the pitfall of the green economy. (Pauli 2010, xxix.) Pauli describes this book, its 100 innovations and Blue Economy as follows:

> *'This short list of 100 innovations drew inspiration from the ability of ecosystems to always evolve to higher levels of efficiency, to cascade nutrients and energy, to leave nothing to waste, to utilize the abilities of all contributors, and to respond to the basic needs of all. Such insights into ecosystems logic have crystallized into the underpinnings of this book, allowing me to establish the framework for a Blue Economy.' (Pauli 2010, xxix)*

In other words, the author uses 100 innovations to illustrate the ways that human can learn from ecosystems logic to become sustainable. These understandings are the foundations of the blue economy.

This report consists of 13 chapters. All the chapters are categories of the ways that ecosystem logic can help human to become sustainable except for the last conclusive chapter that explains *blue economy*. These ways, and their related innovations and practices are explained in each chapter. The ideas that are discussed in these 12 chapters are as follows:

- Using waste to address resource scarcity
- Using ecosystems as model
- Learning resource efficiency from nature

- Creating jobs based on blue economy within the context of current business environment
- Learning adaptability from nature
- Using waste as raw material for other products and its economic benefits
- Using silk
- Using miniscule inventions
- Using natural colours from waste, in cosmetics production
- Using new energy alternatives
- Using mines and their waste
- Designing buildings

The innovations are illustrated with basic diagrams throughout the book. Figure 9 and Figure 10 are examples of such diagrams for one of the innovations (i.e. rainforest regeneration in Gaviotas, Colombia). These two figures show the ways that it is possible to address numerous sustainability issues just by using waste and innovation. Figure 9 shows the way to regenerate forests by the innovation (i.e. Mycorrhizal fungi). In addition, it presents other products and outcomes of the process.

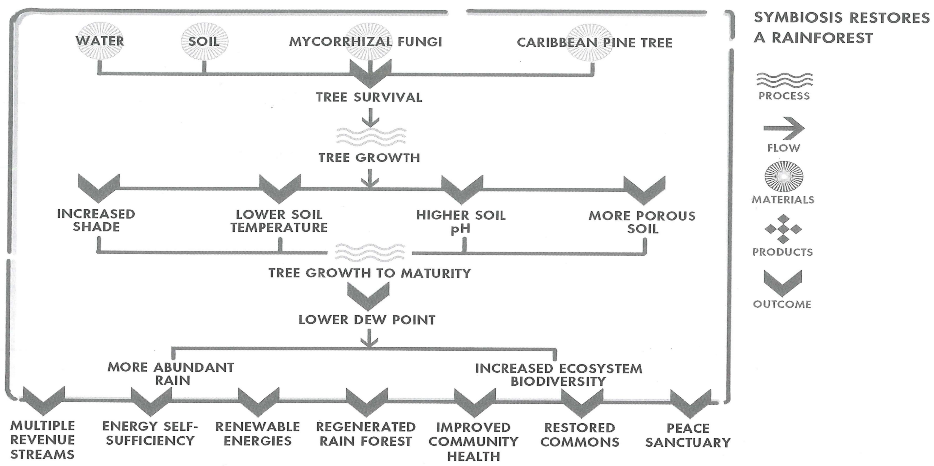

Figure 9 Symbiosis restores a rainforest, (Pauli 2010, 17)

Figure 10 shows the ways that regenerated forests contribute to materials and products generation. In addition, it illustrates the outcomes of the increase in those materials and products generation.

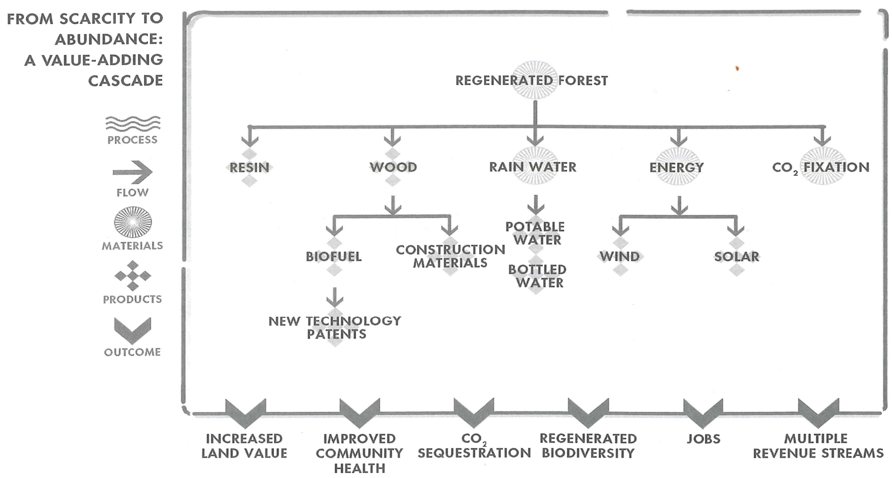

Figure 10 From scarcity to abundance: a value-adding cascade (Pauli 2010, 18)

At the end of the book, there is a ranked list of the 100 innovations, as an appendix. This list identifies potential opportunities, research and business locale, developer and involved species. In addition, all the innovations are listed with a short explanation in the second appendix of the book that can be used as a quick reference.

Regarding the research questions of this thesis, the main message of this report is that humankind should learn the logic of nature in using resources. This would make it possible to satisfy the basic needs of everyone. In addition, this report is extremely attractive for politicians, economists, entrepreneurs and the society as a whole because it suggests that it is possible to create 100 million jobs in 10 years by using these 100 innovations.

2.1.2.12 2052: A global forecast for the next forty years, 2012

Randers J. (2012) **2052: A GLOBAL FORECAST FOR THE NEXT FORTY YEARS**

The author of this report, Jorgen Randers, is one of the co-authors of LTG, the first report to the COR. As he mentions in the preface of the book, here he seeks to make a *prediction* or as he calls it an *educated guess* about the future of the world. In this book, he uses the opinions of experts on different issues, available facts and computer modelling. Figure 11 shows the basic cause and effect relationships that is used in this book. (Randers 2012)

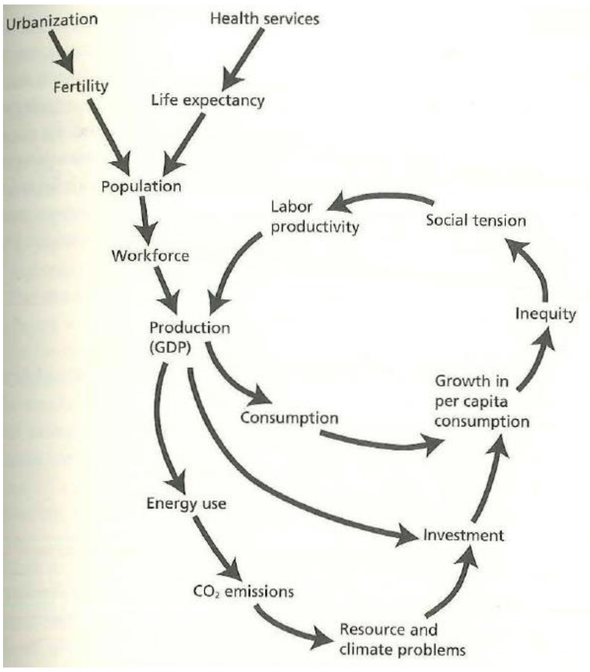

Figure 11 The main cause and effect relationships behind the 2052 forecast (Randers 2012, 57)

The book is structured into three parts. The first part provides some background information and illustrates five big systemic problems (i.e., capitalism, economic growth, slow democracy, generational harmony and stable climate). The second part starts by explaining the logic of his forecasts. It continues by describing the focuses of the forecasts: population and consumption, energy and co2, food and footprint, and some non-material dimensions (e.g., government, GDP and cities). This part finishes by a chapter on the spirit of 2052, called *the zeitgeist in 2052*. In this chapter, the author discusses several topics: the *focus on local solutions*, a paradigm shift from economic growth, a new capitalism, Internet based *collective creativity* and *intergenerational equity*. The third part is dedicated to analysing the forecasts and providing suggestions. In this part, first, the global forecast is analysed and then the five regions of the world (i.e., US, China, OECD less US, BRISE and Rest of the world). After that, the results are compared to other forecasts (e.g., the forecasts of LTG). The author concludes this chapter by some recommendations on the global and personal level.

Figure 12, Figure 13 and Figure 14 show the summary of the predictions in the global level. (Randers 2012)

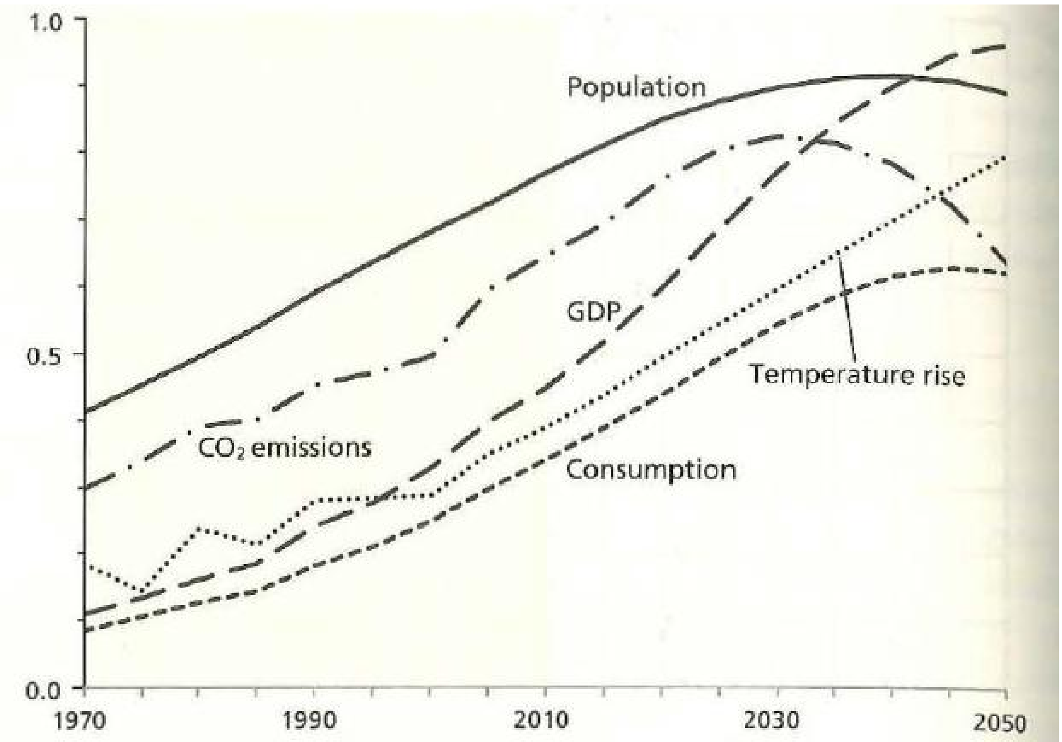

Figure 12 World states of affairs, 1970-2050 (Randers 2012, 232)

Scale: Population (0-9 billion people); GDP and consumption ($0-$150 trillion per year); CO2 emissions (0-50 billion tonnes CO2 per year); temperature rise (0°C- 2.5°C). (Randers 2012, 232)

As Figure 12 shows, the population will peak around 8.1 billion and then starts to decline. According to Randers, this happens because of the decline in fertility rate, which itself is a result of urbanization. In addition, GDP grows slowly because of the decline in population growth and productivity growth rate. Slower productivity growth rate is because of the social unrests and extreme climate disruptions. In addition, the consumption grows less than GDP because of the increasing percentage of GDP spent on environmental and social problems. (Randers 2012, 355) According to Randers, global temperature will peak at plus 2.8 centigrade in 2080 because of the delayed effect of the response to the peak of CO2 emissions. This peak will happen around 2030. CO2 emissions will decline to zero in 2100. (Randers 2012, 233.)

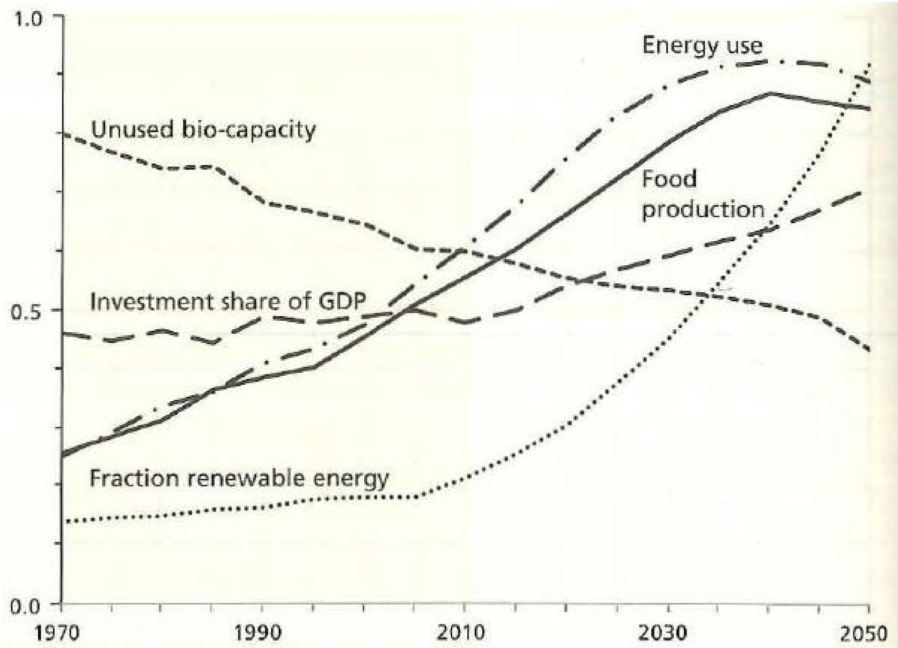

Figure 13 World Production, 1970-2050. (Randers 2012, 232)

Scale: Food production (0-12 billion tonnes per year); energy use (0-20 billion tonnes of oil equivalents per year); fraction renewable energy (0%-40%); unused bio-capacity (0%-50%); investment share of GDP (0%-50%). (Randers 2012, 232)

As Figure 13 displays, energy use will peak around 2042 and then starts to decline as a result of energy efficiency efforts. Investment share of GDP will continue increasing to address environmental problems and social unrests. In addition, food production will stagnate around 2040 because of the climate change and the effect of CO2 emissions on food production. (Randers 2012, 231.)

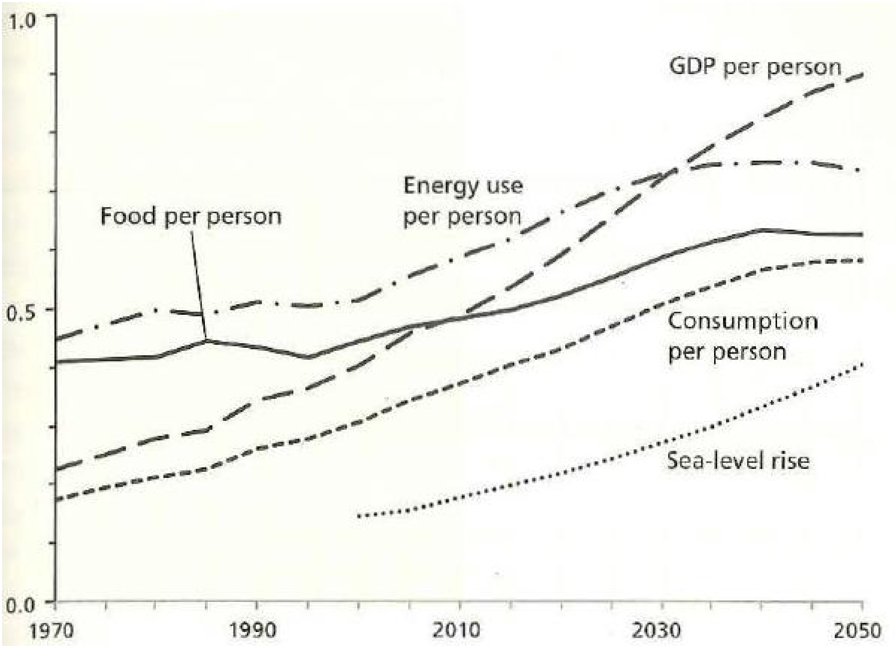

Figure 14 World Standard of Living, 1970-2050. (Randers 2012, 233)

Scale: GDP per person and consumption per person ($0-$20,000 per person-year); food per person (0-2 tonnes per person-year); energy use per person (0- 3 tonnes of oil equivalents per person-year); sea-level rise (0- 1.4 meters).

As Figure 14 shows, the growth of consumption per person lags behind the growth in GDP. The reason for this slower growth is the increase in investment share of GDP. In addition, the consumption per person will peak at 2050. *Energy use per person* peaks around 2035 because energy efficiency investments start to affect consumption. *Food per person* stagnates around 2040 almost at the same time as food production. (Randers 2012, 233-234.)

The author describes his forecast toward 2052 as a gloomy one. The future is gloomy for several reasons. First, huge number of people will live in poverty. Second, real income of average citizens will stagnate in rich countries. Third, transition toward cleaner energies imposes costs. These costs include expensive energy and the costs of required modifications in energy usage, for example, in buildings and factories. Fourth, there are costs imposed by climate change effects such as storms and drought. Fifth, humankind is unable to make appropriate decisions on time in order to stop or at least seriously address the upcoming global problems. Sixth and finally, there is a threat of self-reinforcing climate change for the second half of the century (Randers 2012, 323-324.)

Regarding the research questions of this thesis, first, the main message of this report is that the future of humankind in this century will be gloomy. However, there are certain strategies to cope with such a reality. Second, on the long-term thinking, the period of this report is up to 2052 and at some points to the end of the century. On the global thinking, this report adopts global as well as regional perspective. This report takes holistic approach by discussing the systemic problems of several areas including philosophy, policy, economy, environment, and to some extent society.

2.1.2.13 Bankrupting nature: denying our planetary boundaries, 2012

Wijkman, A. - Rockström, J. (2012) **BANKRUPTING NATURE: DENYING OUR PLANETARY BOUNDARIES**

This report starts with an introductory chapter that explains the objectives of the book. General objective of this book is to contribute to the discussions about the relation of human and nature including problems, favourable future and transition path.

In the first chapter, the authors also analyse reasons for inadequate efforts of humankind to prevent the bankruptcy of nature. These reasons are listed here because of their importance for this thesis. First, there has been inadequate education about the role of environment on well-being and welfare. Second, people have been conservative. Third, progress has been measured with wrong indicators such as GDP. Fourth, businesses have been conservative because of their previous investments. Fifth, nature is introduced as a tool for humankind in religions, and they permit its exploitation. Sixth, specialization has been overemphasised. Consequently, systemic and holistic approaches have been marginalized. Seventh, researchers have been unwilling to share their findings of threats. Eighth, there has been no understanding between business and environmentalists. Ninth, our economic system has been relying on the assumption of endless resources. (Wijkman & Rockström 2012, 6-7.)

This report consists of 19 chapters. Three categories of chapters are recognizable. The first category mostly relates to the problems. The second one focuses on climate change and its related issues. The last category suggests a wide range of solutions.

The first category includes chapter two to eight. In the second chapter, Andres Wijkman discusses the current problems of politics based on his experiences in politics (i.e., eight years in the Swedish Parliament and ten years in European Parliament). These problems include short termism and GDP as an accepted growth indicator. (Wijkman & Rockström 2012, 9-18.)

The third chapter argues that the current disciplines of science and education are inadequate for addressing global problems. Such a fundamental change in disciplines would take a long time. Therefore, it is needed to discuss immediate responses to urgent global problems. (Wijkman & Rockström 2012, 19-28.)

In the fourth chapter, the authors review United Nations climate change negotiations. They conclude that they should be complemented by other solutions because these negotiations led to no agreement until now, and their pace is too slow. (Wijkman & Rockström 2012, 29-35.)

In the fifth chapter, they study climate change in relation to other natural systems. They conclude that the problem of climate change should be considered in a broader context, which includes biosphere. (Wijkman & Rockström 2012, 36-48.)

In the sixth chapter, the authors analyse food production and the possible ways to feed around 9 billion people in the near future. They conclude that different issues of food production should be addressed simultaneously. (Wijkman & Rockström 2012, 49-58.)

In the seventh chapter, the authors discuss several dimensions of energy: the importance of energy for our current standard of life, energy availability for the developing and underdeveloped countries, limits of energy supply especially oil, alternatives to oil and gas, and the future of energy. In the eighth chapter, they focus on *the forgotten issue* of population growth. (Wijkman & Rockström 2012, 59-78.)

The second category is consisted of the chapters nine to thirteen. The next three chapters (i.e., 9, 10 and 11) are dedicated to the criticisms about the climate change. In these chapters, different dimensions of the criticisms are discussed (e.g., scientific facts vs. ideologies, respond to the arguments of deniers, motivations of deniers, CO_2 contribution to the natural greenhouse effect and causes of climate change). (Wijkman & Rockström 2012, 59-115.) In the twelfth chapter, the authors argue that the Arctic is suffering from climate change more than any other part of the environment. In the thirteenth chapter, the authors point out several flaws in the calculation of CO_2 emissions by studying the case of Sweden. (Wijkman & Rockström 2012, 79-122.)

The third category includes chapters fourteen to nineteen. In the fourteenth chapter, the authors discuss the shortcomings of the current economic system from different perspectives. The subjects discussed in this chapter include UNEP green economy report, old theories of economy, shortcomings of GDP as a measure for progress, alternatives for GDP, shortcomings of the current economic model and the need for new approach to economy. (Wijkman & Rockström 2012, 123-136.)

The fifteenth chapter illustrates several topics related to the financial sector. These topics include politicians' inadequate knowledge of the ways that financial markets work, the criticisms of the financial market, pitfalls of growth and suggestions for a reform in financial sector. (Wijkman & Rockström 2012, 137-148.)

In the sixteenth chapter, the authors investigate the issues related to growth. For example, they discuss the relation between growth and consumption, the rebound effect, the problems of green growth and some suggestions for these issues. (Wijkman & Rockström 2012, 149-159.)

In the seventeenth chapter, the authors describe circular economy, as well as its components and requirements. This discussion includes topics such as efficiency, recycling, waste-free manufacturing, new business models and policy requirements. (Wijkman & Rockström 2012, 1160-169.)

In the eighteenth chapter, the authors focus on addressing the problems that exist between human and nature (e.g., the climate change and the resource scarcity). In this chapter, the authors briefly consider the required changes in different practices (e.g., politics, economic, global governance and education). (Wijkman & Rockström 2012, 170-175.)

In the nineteenth chapter, the authors offer some concluding remarks. First, they mention some of the positive environmental efforts. Then, they illustrate the need for transformative solutions and suggest a framework for these solutions. This framework suggests that the solutions should meet at least factor of five in resource efficiency; they should be founded on low-carbon and resource-efficient infrastructure; they should be effective, systemic and holistic; and they should be creative. Finally, they emphasize the necessity for the change of political and economic institutions. (Wijkman & Rockström 2012, 176-185.)

Regarding the research questions of this thesis, first, the main message of this report is that the environmental issues have several dimensions. The authors provide some insights and recommendations about these dimensions. Second, this report adopts a holistic approach by discussing these dimensions and their interconnections. This book explicitly criticizes free market and growth ideology and identifies *endless material growth* as a myth.

2.2 Academic perceptions of the Club of Rome (COR)

The objective of this subchapter is to demonstrate the concepts related to the COR's thinking briefly. Thoroughly studying the relation between these concepts and the COR deserves a separate research for each concept. However, it is vital to refer to them. Accordingly, introducing them is sufficient for the purpose of this research.

2.2.1 Futures studies and the long-term perspectives

Moll (1991, 150-151) reports the roots of the relation between the COR and *futures studies* in the interest of Aurelio Peccei and Alexander King, the co-founders of the COR, in the field of futures studies. They were engaging themselves in futures studies by visiting RAND and Stanford, and through the initiatives of OECD. Moreover, they were in contact with the early futurists of Europe (e.g., de Jouvenel, Gabor, Thiemann, Berger, Ozbekhan and Dror). In addition, many futurists later became members of the

COR. It was also promising for the European branch of futures studies to be taken seriously and being invited to the first meeting of the COR at Academia dei Lincei, Italy. It was promising because at that time European Futures Studies was in its infancy as compared to the Futures Studies of the USA.

Moll also emphasizes the roll of the COR and LTG in the field of global modelling. He describes the role of LTG in this context as follows:

> *'Limits to Growth especially established the hope that from now on large scale modelling tools could be applied without hesitation to more interrelated modelling treatments of environmental, economic, development and political aspects.' (Moll 1991, 152)*

Another dimension of the relation between the COR and Futures Studies is through the futures networks (e.g., World Futures Society (WFS), founded in 1966 and World Futures Studies Federation (WFSF), founded in 1973). Involvement of the COR in these networks was based on fundraising activities, the speeches of Peccei in their conferences and the involvement of the COR members in these networks (e.g., Eleonora Masini as the president of WFSF and Majhadi Elmandjra, who was a member of the COR until 1989, as the secretary general of WFSF). (Moll 1991, 164.) Moreover, Peccei was friend with some of these members. For example, Stevenson (2006, 1146) reports a close friendship between Masini[15] and Peccei and claims that her way of thinking was influenced by Peccei. In addition, Masini (2001) approves the role of Peccei, the COR and LTG in the development of Futures Studies.

Moll summarizes the relation between the COR and Futures Studies as follows:

> *'The Club, as it were, was born out of the general interest into the future and the particular economic and political situation of the 1960s. But it was not before the 1970s that the Club took an active share in the development of extrapolative, as well as normative and pragmatic futures studies. And even then, the Club did not function as a body for futures studies professionals, but was mainly active in funding and catalysing activities in these areas. This is what made CoR into a futures studies network.' (Moll 1991, 151.)*

2.2.2 Sustainability and sustainable development

As it is mentioned in the introduction, the main objective of the COR was to address global problematique. Obviously, the goal of addressing global problems is to gain sus-

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[15] the mother of Futures Studies as he entitles her

tainability. This close relation between the COR and sustainability is clear in all of the reports. Before investigating this relation, it is necessary to define sustainability and sustainable development.

These are no easy concepts to define (see, for example, Mebratu 1998; Robinson 2004; Harding 2006; Gończ et al. 2007). Mebratu (1998) claims 'the key statement of sustainable development' (Mebratu 1998, 501) comes from the report of the World Commission on Environment and Development (WCED): **OUR COMMON FUTURE**. This report also known as the Brundtland report and Brundtland commission suggests the following definition for sustainable development and its two key concepts:

> *'Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs. It contains within it two key concepts:*
>
> - *the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given;*
> - *and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.' (Bruntland 1987, 41.)*

All the reports to the COR relate to this definition directly or indirectly. For example, the main objective of LTG is to show that if the current practices continue, the future generations would become unable to satisfy their needs. In addition, several reports to the COR relate to the problems of the world's poor in satisfying their needs (e.g. **BAREFOOT REVOLUTION** and **AFRICA BEYOND FAMINE**).

Several authors (see, for example, Mebratu 1998, 501; Harding 2006, 232) acknowledge the role of the COR and especially LTG in introducing the concept of sustainable development. Umberto Colombo (2001, 10) asserts that the activities of the COR has provoked the research in the field of sustainable development.

Mentioning some of the issues related to sustainable development is useful for identifying the gaps in sustainability discussions. John Robinson (2004) points out three categories of issues: vagueness, hypocrisy and delusion.

Regarding the vagueness, different interpretations and applications of the concept proves its vagueness. Robinson believes this vagueness might be constructive because it has created diversity.

The issue of hypocrisy is noticeable in the practices that are unsustainable but they are done in the name of sustainable development. This is mainly because there are no standards and measurements for evaluating the sustainability of a practice.

Finally, there are two categories of delusions related to sustainable development. The first illusion is about the possibility of sustainable development. In other words, the physical, social, political and institutional limits create serious doubt about the possibility of having more industrial output after a certain level. This means that sustainable development probably has some limits. The second delusion is the assumption that sustainable development is the right agenda. In other words, maybe the main problems and their sources are not related to sustainability. For example, sustainable development concept is completely anthropocentric, while being anthropocentric might be the main source of the problems. Another example is that maybe some of the social and political systems and approaches should necessarily change for the purpose of human well-being. For example, globalization might be one of those approaches. (Robinson 2004, 373-377.) In other words, maybe these systems and approaches are the source of the problems.

2.2.3 Zero-growth and degrowth

First, it is necessary to define degrowth. Van den Bergh (2011, 881) categorizes them into five major groups, but some of the definitions still fit in none of the groups. Some of these definitions are mentioned in the following paragraphs.

Garcia (2012) in 'Degrowth, the past, the future, and the human nature' defines the notion and its origin as follows:

> *'The degrowth notion is drawn from the perception that natural limits to growth have already been surpassed, that the planet's carrying capacity has either been reached or that we are so close that overshooting it is no longer avoidable. Thus, the inevitable establishment of a new balance at a sustainable scale will take place through a more or less prolonged phase of demographic and economic decline.' (Garcia 2012, 546.)*

Kallis (2011) suggests the following definition for sustainable degrowth:

> *'Sustainable degrowth can be defined from an ecological–economic perspective as a socially sustainable and equitable reduction (and eventually stabilisation) of society's throughput. Throughput refers to the materials and energy a society extracts, processes, transports and distributes, to consume and return back to the environment as waste[16]' (Kallis 2011, 874.)*

Another definition that is simpler in the language is as follows:

> *Sustainable degrowth may be defined as an equitable downscaling of production and consumption that increases human well-being and en-*

[16] Kallis in his definition uses Daly's definition of *throughput* (Daly, H. E. (1996) *Beyond growth: the economics of sustainable development*. Beacon Press.)

> *hances ecological conditions at the local and global level, in the short and long term. (Schneider et al. 2010)*

There is a controversy about the relation between the COR and the concepts of zero-growth or degrowth. Although this section has no intention to enter to this controversy, it is necessary to introduce it. On one hand, it is a fact that the stabilized world model of LTG (Figure 3) presents a zero-growth state as the final preferable state. The authors acknowledge that they are proposing ‘some sort of nongrowing state for human society’ (Meadows et al. 1972, 170). More importantly, the main message of LTG is very close to the definition of degrowth suggested by Garcia and mentioned in the beginning of this section. In addition, the fact that they are suggesting zero-growth and not degrowth makes no difference because they claim that the level of their five variables at which they are stabilized defines the longevity of equilibrium society (Meadows et al. 1972, 172). On the other hand, Umberto Colombo (2001, 8) asserts that LTG was ignored by politicians because of ‘its implication of a “zero growth” economy, which many interpreted (and this was not the Club of Rome’s intention) as the underlying thesis of the report’ (Colombo 2001, 8).

Another aspect of the relation between degrowth and the COR is the relation between the COR and the proponents of degrowth e.g., Georgescu-Roegen[17]. Although Levallois (2010, 2277) claims that the relation between Georgescu-Roegen and the COR was a strategic move for mutual benefits, he provides some evidence that Dennis Meadows declared that **THE ENTROPY LAW AND THE ECONOMIC PROCESS**[18] by Georgescu-Roegen ‘has had a substantial influence on the thinking of the members of’ (Levallois 2010, 2275) LTG group. However, his conclusion about the relation between the COR and Georgescu-Roegen is that:

> *‘Beyond a shared acknowledgment that economic and biologic systems were interdependent, technological optimism and ambitions for the global management of growth were central to the Club of Rome, while Georgescu-Roegen's personal history led him to ignore those practicalities and judge that de-growth was inescapable.’ (Levallois 2010, 2271)*

None of the reports to the COR studied in this thesis mentions the idea of degrowth or even zero-growth explicitly or even implicitly, except for LTG. However, they are not proponent of growth. Therefore, they suggest their solutions cautiously. For exam-

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[17] As Garcia claims ‘theoretically, the foundations of degrowth are found in the bioeconomics of Georgescu-Roegen‘ (Garcia 2012, 547).

[18] This book and Georgescu-Roegen himself repeatedly appear in the discussions about degrowth and its origins (e.g. Schneider et al. 2010, Martínez-Alier et al. 2010, Levallois 2010, Van den Bergh 2011, and Garcia 2012).

ple, **FACTOR FIVE**, first, provides solutions for getting 80 percent more efficiency in resource usage and then immediately discusses the rebound effect, and the necessity and policies for the reduction in resource consumption. (Weizsacker et al. 2009) The reduction in resource consumption is discussed because if the book was only about the improvements in resource efficiency, it could be interpreted as a proponent of growth.

There is an inherent conflict between degrowth and the current forms of democracy. This is one of the reasons that degrowth is so condemned that leaves Georgescu-Roegen isolated and makes others to avoid supporting the concept. As Deriu (2012) describes, economic and business freedom is important part of the current theories and practices of democracy, mainly, because it is an expression of freedom from the dictatorship of central political and religious systems. However, the real power has been moving from political and religious institutions to economic ones in the current state of the world. Therefore, there is a need for reformation of democracy, including its theories and institutions. This reformed democracy should protect people against the economic dictatorship. Such a democracy that takes into account social, ecological and anthropological dimensions would become compatible with degrowth. (Deriu 2012, 533)

3 MATERIAL AND METHODS

This chapter discusses the material and methods of this thesis. They are introduced, choice of them is justified, and their application in this research is elaborated. The method used for data collection is discussed in this chapter, but the method used for analysing the material is discussed in the beginning of the next chapter.

3.1 The in-depth interview with experts

A variation of the Delphi method called 'in-depth interviews' (Gordon 2009, 5) is used in this thesis for data collection. Gordon (ibid) introduces this variation as one of the successful modern applications of Delphi. Its main objective is to find significant ideas for further analysis. In this variation, in-depth interviews substitute questionnaires. It is possible to have one or two rounds of interviews. However, Gordon (ibid) reports that one round of interviews is more common. In two-round version, feedbacks should be provided and in one-round version feed-forwards. Feed-forward includes the main points of the previous interviews, and it should be sent to each interviewee before the interview. (Gordon 2009, 5-6.) This variation is a combination of Delphi and in-depth interview. In the following paragraphs, these two methods are briefly introduced. In addition, a discussion is offered about the disagreement over calling one-round version of this method a variation of Delphi method.

Boyce and Neale (2006, 3) define in-depth interviews as 'a qualitative research method that involves conducting intensive individual interviews with a small number of respondents to explore their perspective on a particular idea, program or situation'. In-depth interviews aim at exploring the thoughts of interviewee in details. Accordingly, open-ended questions are one of its characteristics. Open-ended questions usually ask why and how to provide the opportunity for the respondent to talk about his opinions freely. The other characteristics of in-depth interviews are having semi-structure format, seeking comprehension and clarification, and recording responses. These characteristics facilitate the achievement of the main goal that is exploring the thoughts of interviewee in depth. (Boyce & Neale 2006.) Interviewer has a significant role in these interviews and is not only responsible for discovering meaning but also contributes to construct meaning. (Legard, Keegan & Ward 2003)

Concerning Delphi method, it is a popular method and has been used frequently. Therefore, its numerous applications hardly fit to any definition. However, the following general definition is offered in 1975:

> '*Delphi may be characterized as a method for structuring a group communication process so that the process is effective in allowing a group of*

> *individuals, as a whole, to deal with a complex problem.' (Linstone & Turoff 1975, 3)*

Linstone and Turoff (1975, 5-6) recognize four phases in Delphi applications. The first one aims at exploring the problem by gathering the perspectives of participants. The goal of the second phase is to share the gathered information with the participants. The third phase provides an opportunity for discussing the underlying reasons of radical disagreements and possibly evaluating those perspectives. The fourth phase involves reconsideration of the answers based on the initial analysis and evaluations that has already been sent to the participants.

These two methods introduced, it is now possible to discuss the controversy over using one-round version of this method as a variation of Delphi. Before starting the discussion, it is important to mention that Gordon (2009, 5) clearly claims that one-round version is a variation of Delphi, but he did not discuss this controversy.

The following discussion aims at initiating the debate on that claim, as well as justifying the decision for having one round of interviews in this thesis. Having iterations is an important feature of Delphi method. Moreover, the method is mostly about group communication. The problem is that one-round version lacks iterations, and the group communication is missing. It is possible to argue that the main purpose of a Delphi study is to identify different perspectives and their underlying reasons. (Gordon 2009, 4-5) Therefore, group communication and iterations are tools to achieve this objective. In-depth interviews not only collect different perspectives but also deeply investigate their underlying reasons. Therefore, there is no need for having several rounds of interviews to achieve the main objective of Delphi method. Maybe this is the reason that most of the studies using this variation conduct only one round of interviews. In addition, in this variation, group communication happens in a different format. Feed-forwards serve the same function as feedbacks. The difference is that in this format the last interviewee receives more feeds than the first one. However, this difference does not compromise the function of group communication in achieving the main objective of Delphi study. These arguments are from the perspective of this thesis. Experts of Delphi method or other users of this variation may offer different arguments.

In this thesis, material is gathered through semi-structured interviews. Therefore, some broad and open questions are provided in order to structure the interviews to some extent. Appendix 1 presents the questions sent to the interviewees.

The interviewees are the members of the Club of Rome (COR), the member of the executive committee, the staff of the international centre, or the author of some reports to the COR. They are experts in different fields, but all of them have the common concerns for humankind problems and sustainability. They always have had these concerns during their long work history. Having these concerns is the key in recognizing them as experts. Table 2 shows the number of the interviewees and their status. The list of the interviewees is presented in Appendix 3. However, their responses are kept anonymous to comply with the Delphi method standard.

Table 2 Interviewees status matrix

No.	Full Member of the COR	Member of the Executive committee of the COR	Author of some reports to the COR	Staff of the International Centre of the COR	Highly involved with current activities of the COR
1	✓	✓	✓		✓
2	✓	✓	✓		✓
3	✓		✓		
4	✓	✓		✓	✓
5				✓	✓

3.2 The procedure of choosing the methods and material

The choice of the methods and material is discussed in this subchapter. First, it is vital to discuss the reasons for the choice of Delphi method. Linstone and Turoff (1975, 4) identify some criteria for employing Delphi method. Accordingly, the following reasons justify this choice for this thesis. First, the main objective of this study is to investigate ideas about the topics missing from the debate on sustainability and the problems of humankind. Obviously, this objective could not be accomplished merely by analysis, and it is useful to have subjective judgments of experts. Second, conducting several group meetings with the experts was impossible because they are in different countries and have a limited time for contributing to this thesis. Third, considerable disagreements were expected to exist between the experts.

Second, it is necessary to justify the choice of this variation. According to Gordon (2009, 5) this method is designed to identify significant ideas that can be used for further analysis rather than being designed to be statistically significant. Therefore, this method matches perfectly to the approach of this thesis. In this thesis, the gathered material is going to be collated with the study of the reports and with the academic perceptions of the COR. Moreover, as Bogner, Littig and Menz (2009, 17) claim interviewing experts, in general, is popular in social sciences and is a ‘quick, easy and safe’ approach for obtaining practical information. Therefore, it is reasonable to use expert interviews in this thesis because it has a practical main question.

Third, the interviewees are selected according to the following criteria. First, the interviewee should be a member of the COR. This decision was made based on two reasons. The first one is to avoid all the controversies around the COR and their activities. The ideas supported by the COR in the reports affect the interests of extremely powerful and various groups (e.g., transnational energy companies and governments). These conflicts of interests have created a hostile environment. Therefore, it is decided to confine the interviewees to the members of the COR to avoid these controversies. The second reason is that the focus of this thesis is on the essence of the reports' messages rather than on their correctness. Therefore, for understanding these messages, it is more appropriate to interview the writer rather than the critics. The second criterion is concerned with selecting the final list of the interviewees from the list of the members. It is necessary for interviewees to have a history with the COR because this thesis is about the evolution of the COR. Equally important, it was necessary to include the current members who are making decision and executing them because this thesis seeks for a roadmap to the future. Therefore, the final list of the interviewees includes people from both groups.

Fourth, it is important to discuss the format of the interviews. The interviewees are experts, and they have different opinions. Therefore, it is logical to let them have their freedom during the interviews. Therefore, the structured interview format is not suitable. On the other hand, open interviews would rather lead to chaos. Therefore, it is reasonable to have some basic framework in the format of a semi-structured interview. Moreover, according to Guion, Diehl and McDonald (2011) semi-structured format is one of the characteristics of the in-depth interviews.

Fifth, there should be a logical connection between the interview questions and the research questions. The interview questions 1-4 relate to agenda, methods and technology. They seek answers to the first and second research questions concerned with agenda and basic approaches of the COR. The interview questions 5-8 investigate economic, political and social systems. They seek answers to the research question concerned with the components of the global system and the question about free market and growth ideology (i.e., third and fourth research questions). The last interview question is about missing topics. It relates to the main question of this research. Although the interviews are semi-structured, these links were helpful in conducting the interviews.

3.3 The implementation of the method

This section discusses the details of data collection process in this thesis. The in-depth interviews are conducted according to the guidelines provided by Boyce and Neale (2006) for conducting in-depth interviews. In addition, the criteria of Delphi method are adopted in the process.

First, the interviews were planned. This included identifying the interviewees and the questions as discussed in the previous sections. In the second step, interview protocol was developed. This protocol consists of different steps:

- The request for interview
- Initiating interview
- Interview
- Concluding interview
- After interview

The request for interview has different parts. First, it has a brief introduction to the thesis. Second, there is an explanation about the choice of the person for the interview. Third, it includes a short description on the method of the thesis and the procedure of interview. Fourth, it concludes with the request for interview and mentioning references.

Initiating interview has two elements. First, it has an introduction about the interviewer. Second, it includes a question to check if the interviewee read the feed-forward. This check is necessary because it affects the procedure of interview.

The procedure of interview has several characteristics. First, the interviews are conducted via telephone calls because it was more convenient for the interviewees. Second, the interviews are audio recorded therefore taking notes are limited to some details. Third, if the interviewee has not read the feed-forward, its content should be discussed before the interview begins. Fourth, interviewer should be flexible by reacting according to situation. For example, the interviewer should frame his questions on the details of previous answers in order to grasp the depth of meanings. Fifth, the interviewer should mostly listen and only interfere when the interview is losing its focus. Interviewer should effectively interfere with the aim of comprehending and generating the ideas.

Concluding interviews includes three steps. First, the interviewees are offered an opportunity to make their final comments. Second, the interviewer should appreciate the contribution of interviewee. Third, the interviewer promises to send them the final version of the thesis.

The procedure for after interview starts with transcribing the main points of the interview. After that, the interviewer should verify the claims of the interviewees. Finally, the interviewer should prepare the feed-forward for the next interview.

After designing the protocol, there are other steps as follows. First, the interviewer should become familiar with the interviewing instructions and tips. Second, the interviewer should set up the interviews and act according to the plan. Third, the interviewer should analyse the data using the chosen method (i.e. qualitative content analysis). Finally, the interviewer should write the analysis of the interviews.

There are some comments about the implementation of the method that is worth mentioning. First, six out of seven experts who were asked for being interviewed agreed to give an interview. The only person who refused to be interviewed offered some documents as his contribution to this thesis. Second, the interviewees were kept anonymous during the interviews and analysis according to Delphi criteria. Third, each interview took 30 to 60 minutes, while the required time mentioned in the request for the interview was around 40 minutes. However, the time for each interview was enough, and all the interviewees answered all the questions. Fourth, in some of the interviews the interviewee tended to talk about externalities or about the COR and its evolution in general rather than focusing on the messages of the reports. This issue was noticeable when the interviewee was disconnected from the COR and the reports to the COR for some periods. This problem was addressed by extending the list of interviewees to include experts with longer history with the COR or with more involvement with the activities of the COR. Moreover, the interviewer guided the interviewee to focus on the messages of the reports. Fifth, the present and past involvement of the interviewee with the COR was the weighing factor in the conclusion (i.e. the conclusion mostly relies on the comments of the interviewees more involved with the activities of the COR).

4 ANALYSIS AND DISCUSSION

In this chapter, the analysis of the material gathered through the interviews is presented. First, the *qualitative content analysis* method is discussed. Then, the analysis of the material is presented.

4.1 Definition, concepts and procedure

The qualitative content analysis is used for analysing the material. The definitions and the concepts of the method are adopted from Graneheim and Lundman's (2004) article, qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness.

Before starting analysis, it is needed to define the concepts of the method. First, data has two dimensions: *manifest content* and *latent content*. Manifest content is 'the content aspect and describes the visible, obvious components'. (Graneheim & Lundman 2004, 106) On the other hand, latent content is 'the relationship aspect and involves an interpretation of the underlying meaning of the text' (Ibid). In this research both kind of contents will be analysed, however, the emphasis will be on manifest content.

The next component is *unit of analysis*. In this research, the unit of analysis is the whole interviews as suggested by Graneheim and Lundman:

> *'The most suitable unit of analysis is whole interviews or observational protocols that are large enough to be considered a whole and small enough to be possible to keep in mind as a context for the meaning unit, during the analysis process.' (Ibid)*

As they define, *meaning units* are 'words, sentences or paragraphs containing aspects related to each other through their content and context' (Ibid). For example, an interviewee talks for five minutes around the idea that in 70s the problems were not as obvious as today, and therefore the reports of 70s were more concerned with elaborating problems, while recent reports are more concerned with providing solutions. The whole five-minute speech will be one meaning unit. Therefore, the first step in analysing the material is to recognize the meaning units.

The next step is to summarize each meaning unit. However, Graneheim and Lundman prefer to use the word condensation. They define it as 'a process of shortening while still preserving the core' (Ibid). The outcomes of this process are called condensed meanings. For example, the five-minute speech mentioned previously is condensed to *"40 years ago the problems were hypothetical future ones but now they are actual existing problems. Therefore, the focus of the reports is more on solutions than on the problems."*

The next step is creating categories. ‘Creating categories is the core feature of the qualitative content analysis’ (Graneheim & Lundman 2004, 107). In categorizing data, no relevant data should be excluded, and no data should appear in more than one category (Ibid). The categories of the interview questions are used in analysis as well. There are seven categories: agenda, methods, technology, economic system, political system, society and missing. For example, the condensed meaning from the previous example is categorized as agenda because it is obviously explaining the change of the reports’ agendas.

The final step is to identify themes. Themes are underlying meaning of the condensed meaning units or categories (Ibid). Moreover, categories and condensed meanings may have several underlying meanings. Therefore, they may belong to more than one theme. In this thesis, themes are used for grouping condensed meanings, and not categories. For example, the following condensed meaning relates to problems and solutions: “*it is still necessary to make people understand the seriousness of the existing and upcoming problems because lots of people still do not understand their seriousness*”. Finally, based on the answers five themes were recognized: solutions/problems, holistic/specialized, overall thinking of the COR, future evolution/suggestions and finally no evolution/no trend/different directions.

4.2 Analysis

This subchapter is divided into five sections according to the identified themes. In each section, a table presents condensed meanings, their categories and the theme of the section. It is important to notice that all the data under the title of condensed meanings are summaries of the interviews. Moreover, each section starts with a text that consists of an introduction paragraph and a cohesive presentation of the material displayed in the tables. In this subchapter, some sentences are quoted from the interviews, whenever it was needed. However, the quotes have no reference to the interviewee to preserve their anonymity.

4.2.1 Suggesting solutions for upcoming or existing problems

One of the main themes of the reports was projecting on problems and providing solutions for them. Most of the reports only illuminate problems and propose solutions. In addition, whenever methods are used, they are just tools to project problems or to prove the functionality of solutions. For example, LTG uses simulation to project problems.

In addition to the messages of the reports, there are other remarks about the central role of the problems and solutions in the COR's thinking. Moll (1991, 66-70) claims that the *problematique* concept has such a fundamental role in the COR's thinking that without it the essence of the COR would be completely different. As he describes, Aurelio Peccei, Erich Jantsch and Hasan Ozbekhan developed this concept in the COR. The emphasis of *problematique* is on the interconnectivity of global problems. Consequently, it is essential to adopt a holistic approach to be able to address them. However, Moll (1991, 226-229) reports that after the death of Peccei this holistic approach changed, and the focus of the COR was moved to some specific aspect of *problematique* (i.e. governability).

During the last 40 years, the balance between illustrating problems to providing solutions has changed in favour of providing solutions because of some external changes (e.g., the change in the type of the problems from the hypothetically upcoming problems to the actually existing ones). As one of the interviewees assert 'over time solutions have become both more urgent and more natural to try to focus on'. However, there is still a need to discuss their existence. There is still resistance against accepting their existence and the seriousness of the threats. This is still the 'original challenge' as one of the interviewees puts it.

Moreover, the underlying logic of the solutions has changed during this period. For example, LTG solutions are founded on the assumption that industrial output is linked with pollution. While as one of the interviewees claim:

> *'In America through the Clean Air Act and several regulations in Japan and in Europe an almost perfect decoupling has been achieved and of course the Club of Rome learned about those successes and any newer report find it ridiculous to assume a perfect coupling between industrial output and pollution'.*

Consequently, in the later reports not only it is accepted that industrial output can be decoupled from pollution but also reports such as Factor Five sought solutions to decouple industrial output from resource usage. Table 3 depicts all the condensed meanings related to this theme in different categories.

Table 3 Solution / Problem

Condensed meaning	Category	Theme
40 years ago, the problems were hypothetical and in future, but now they are actual, existing problems. Therefore, the focus of the reports is more on solutions than on the problems.	Agenda	Solution/Problem
It is still necessary to make people understand the seriousness of the existing and upcoming problems because many people still do not understand their seriousness.		
Reports by Meadow and 2052 use mathematical methods but other reports are only illustrating the problems and then suggesting solutions without using any specific method.	Methods	
Methods are just tools for the main objective that is presenting issues and finding solutions. Therefore, there is no trend in kind of methods that is used in the reports.		
In LTG, industrial output and pollution were linked, but Clean Air Act and similar laws proved that it is possible to decouple them. Moreover, the later reports such as **FACTOR FOUR** and **FACTOR FIVE** sought to present the ways that technology can help to decouple industrial output from resource usage.	Technology	

4.2.2 Adopting holistic or specialized approach

In this text, *holistic* approach means considering interconnections between different components. It is founded on the idea that the whole is more than just sum of the elements. Holistic approach is one of the main characteristics of the COR. Naturally, it is frequently mentioned in the interviews. Therefore, one of the themes is dedicated to this approach.

The first reports were holistic. They were systematically including different elements. However, they were taking several systems or parts of them for granted. ‘Systems thinking and systems planning was basically discontinued and disassembled during the Reagan-Thatcher era as one of the interviewees asserts. Market thinking substituted system thinking. Nonetheless, holistic and systemic thinking have become popular again in recent years. The reason is that market failed to handle several issues (e.g., environmental problems).

After LTG, the reports were becoming more holistic by questioning and discussing the premises (e.g., economic system). Although, there are many determinants excluded from the agendas or at least discussed very briefly (e.g., value systems). As one of the interviewees describes:

> *'If we don't have that conversation [about the values] a lot of the other conversations on technical frontiers and even economic frontiers will be wasted because if they are not driven by our beliefs and value systems we are not going to change'.*

Table 4 presents all the condensed meanings related to this theme in different categories.

Table 4 Holistic / Specialized

Condensed meaning	Category	Theme
The reports have become more holistic.	Agenda	Holistic/ Specialized
During Reagan-Thatcher era, system thinking was substituted by market thinking, but the failures of market thinking brought system thinking back to the agenda. Market thinking failed in addressing many issues (e.g., climate change).	Methods	
In the latter reports, technological improvement growth is considered exponential, in contrast to its linear growth in LTG.	Technology	
In the LTG, economic system is taken for granted, but later reports start to criticize the economic system. In addition, the Club of Rome (COR) organized series of meetings to address the issues of financial market.	Economic System	
LTG was a mathematical model, but after that, there were more emphasis on social and political aspects of the issues. It is also true that the main problem of the sustainability is that the focus is on one aspect. There is a strong need for a systemic solution that includes all interconnected aspects such as welfare, society, economy and policy.	Society	

4.2.3 The evolution of the overall thinking

There were many remarks in the interviews concerning the overall thinking of the COR. These remarks are not directly related to the reports, but they are helpful in grasping a whole picture. This theme incorporates these remarks.

The reports to the COR could be described as 'popular science books' with serious scientific base. They are intended to bring upcoming or existing human problems and solutions into the public's attention. Consequently, they would get into the political discussion agenda.

As one of the interviewees assert, the communication has become much more complex and 'you have to be much smarter at how you communicate'. Therefore, they have started to update their communication channels. Nowadays, the COR seeks to work more directly with political systems both in national and global levels. However, some interviewees believe that the COR were more politically active during the presence of Peccei through his personal connections.

The agenda of the COR has changed for different reasons. First, 'in over the last five also ten years there has becoming an increasing recognition that LTG was right in some broad sense', as one of the interviewees claim. Second, the understanding of the economic growth is improved. Third, the attention to social factors is increased. Nowadays, in the agenda of the COR, there is an emerging emphasis on underlying reasons and especially on the values and beliefs of people.

The overall thinking of the COR was also affected by economic, social and political externalities. As one of the interviewees assert, the capital owners have to cooperate with governments during the cold war because they needed their support. Consequently, there was a balance of power between capital owners and the governments. After that era, a shift happened in favour of the capital owners because they did not need that support anymore. Consequently, the public good in many dimensions has been suffering seriously because the capital owners merely care about the profit and they have short-term attitude. One solution for this issue is to restore the balance in power distribution between governments and capital owners by making governments stronger. However, many people in the COR disagree with this solution. On the other hand, some of the interviewees believe that the solution is non-democratic strong government. This group argues that the democratic systems are slow in decision-making, while there is an urgent need for some decisions to address the global or national issues. Therefore, there is no other way than non-democratic strong government. The reports have clues about this problem and its changes from cold war era until now. Some of the reports are discussing in favour of stronger governments and some even go further toward non-democratic strong ones. However, there is nothing near a consensus among the members of the COR over the degree of governments' strength and interference. Moreover, as one of the interviewees suggests it is still a question whether strong government is the only way to handle the existing and upcoming global and national problems. In other words, as the interviewee puts it, 'is it only governments that can do public policy or are there other means to begin thinking about collective global public good policy or even national public good policy?' Table 5 shows all the condensed meanings related to this theme in different categories.

Table 5 Overall thinking of the COR

Condensed meaning	Category	Theme
Some major changes that have happened during these years are as follows. First, in the last 5-10 years it became obvious that LTG was true. Second, there is a better understanding of economic growth (e.g., its difference from wealth creation). Third, there is more attention to social factors such as jobs.	Agenda	Overall thinking of the COR
The COR was a meeting place for discussions between well-educated, concerned elites rather than being a mediator.		
Three changes are worth mentioning: using different communication channels (e.g., blog[19]), working with political systems in national and global levels, emergence of new emphasis on the values and beliefs of people.		
All the reports have scientific background. However, they may not present a scientific method and just discuss problems and solutions.	Method	
During the cold war, it was in the interest of capital owners to cooperate nicely with governments, but after 1990, a power shift happened, and state became so weak in comparison to capital owners. The only way to become sustainable is to rebalance this power structure because capital owners do not care about sustainability, and they merely care about profit. In order to rebalance, strong state and international laws are needed. However, this still is not the mainstream thinking of the COR.	Political System	
Although strong state is part of the solutions, totalitarian regimes are not favourable. Moreover, it is completely democratic to prevent individuals from depleting the resources of earth.		
There is the problem of short-termism within the democratic political systems, while it is much easier to make long-term decisions within dictatorships. Moreover, it is possible to find hints in the reports in favour of non-democratic governments for their ability in making long-term decisions. Although, there is the question whether the only way of making long-term decisions is due to government or there are some other ways.		

[19] http://www.clubofrome.org/?p=4806

4.2.4 The hints for the future evolution of the Club of Rome (COR)

The main objective of this thesis is to identify missing topics from the debates about sustainability. Accordingly, the final objective is to suggest the favourable future paths for the Club of Rome. Consequently, these subjects were referred repeatedly during the interviews.

For technology, it is proposed that different dimensions of technologies should be considered in suggesting a solution (e.g., full cost cycle of the technology including natural, physical and social costs, and the first and second order feedback loops). Next remark is about the limitations of technology in solving the problems. For example, 100 percent efficiency is impossible. Another example of these limitations is that there will be no long-lasting outcome from technological improvements in the state of unlimited economic growth.

In regards to economy and politics, the main problem is linear thinking in classical economics in contrast to the nonlinear reality. Moreover, it is important to identify the underlying reasons of the economic and political systems' failure in addressing sustainability issues. Some examples of such underlying reasons are short termism, values, beliefs and philosophies, and priority of private good over public good. In addition, the focus should be directed toward human fulfilment rather than economic growth.

It is essential to thoroughly understand and study the transition toward sustainability. As different interviewees assert, for such a transition, it is vital to change the mind-set of the powerful people. In democratic systems, the change in majority of people's mind-set is equally important for that transition. Moreover, there are dimensions that should be thoroughly analysed before the transition starts. For example, it is vital to analyse the ways that a sustainable society would function. As an interviewee claimed, such ambiguities about sustainable society scare politicians from initiating the transition. In addition, some urgent social aspects need special attention. Table 6 presents all the condensed meanings related to this theme in different categories.

Table 6 Future Evolution/ Suggestions

Condensed meaning	Category	Theme
Full cost cycle of technological improvements should be taken into account. Such costs include natural, physical and social, and first and second order feedback loops. Such considerations in the studies are now possible due to the improvements in modelling software and processing capabilities.	Technology	Future Evolution/ Suggestions
Although the real potential of technological improvements has not been discovered yet, we should take into account that 100 percent efficiency is not possible and not everything is substitutable. In addition, the growth in the economy erodes the benefits of technological improvements.		
There is a problem of linear thinking in classical economics, while the reality is nonlinear.	Economic System	
There is a need for a new conversation that includes underlying causes (e.g., short termism, priority of private good over public good, and values and beliefs).		
Underlying causes and philosophical aspects need more attention. The COR is starting to move in this direction.	Political System	
We are much into technical solutions rather than societal issues and solutions. Related to this issue, instead of economic growth we should seek human fulfilment within the natural limits. This debate is starting.	Society	
It is not enough to have good analysis. It is more important to change the mind-sets of the powerful ones and the society to be able to have democratic majority on sustainability side.	Missing	
The following questions should be answered: How does the sustainable society work? How would the transition happen? How should the education and especially education of economists change?		
In democratic societies, people and their mind-sets are very important. People have short-term perspective, and they would rather buy the cheap good, which destroys the environment, instead of the expensive one, which saves the environment. Similarly, they vote for a party, which promises lower taxes and flexible regulations. Business or politics can do nothing to change the course, while people are thinking and behaving in this way. Therefore, changing short-termist mind-set of people should be in the centre of attention in an attempt to make the world sustainable.		

The biggest issue that needs special attention is job. Jobs should be provided for everyone within the context of natural limitations.		

4.2.5 No evolution or fluctuated changes

According to the interviewees, there has been no change in several aspects of the reports (e.g., the anthropocentric view of the reports). Likewise, some aspects have changed in several directions. Therefore, it is impossible to identify them as a trend or evolution. For example, the change in the agenda of the reports shows no trend. The reason is that the agendas have been mostly influenced by externalities (e.g., criticisms of LTG, oil crisis, end of cold war and private vs. public good). Table 7 depicts all the condensed meanings related to this theme in different categories.

Table 7 No evolution/ No trend/ Change in different directions

Condensed meaning	Category	Theme
There are certain milestones that have changed the agendas of the reports during these years. They started with publication of LTG and continued by answers to its criticisms, oil crisis, end of Cold War and market vs. public conflict.	Agenda	No evolution/ No trend/ different directions
There is no trend because there was no central decision-making process happening in the COR, and authors decided about the agenda of their books. The only main common theme was unpopular solutions for unpopular issues and being so early in talking about the upcoming issues.		
The facts that technological improvement can help to solve the issues but it costs and takes time have not changed.	Technology	
There is no trend, but there is a discussion between neoclassical economics and ecological economics, as always has been. However, neoclassical economics has won this debate during the last forty years.	Economic System	
Even though the reports to the COR are anthropocentric, they are more eco-centric than mainstream political analysis.	Political System	
Philosophical foundation of the COR is the same as the society. Therefore, the ratio is something like 95% anthropocentric to 5% eco-centric. Consequently, it is possible to say that there is no trend in this aspect.		
Initially, there was emphasis on the social aspects (e.g., social welfare, social well-being, life satisfaction and happiness). The LTG changed the focus to environmental and ecological aspect, and after that many reports, but not the mainstream, went back to focus on the social dimensions.	Society	

4.3 Discussion

In this section, the analysis is compared to the messages of the reports. In the cases that they agree, some examples are provided to explain it. In the cases that they disagree, more explanations are provided to suggest possible reasons. These discussions are structured into the identified themes.

4.3.1 Problem/solutions

Investigating the reports approves the assertion of the interviewees that the main theme of the reports to the COR is identifying existing or upcoming problems and providing solutions for them. In addition, the reports evolved towards laying emphasis on suggesting solutions. For example, in **LTG**, the main objective is to present the upcoming problems, while providing solutions is just a modest part of the report. On the other hand, providing solutions for the problems became the main objective of the later reports (e.g., **FACTOR FIVE** and **BLUE ECONOMY**). Finally, some other reports fall between these two extremes in a way that first, they identify the problems or threats, and then they provide solutions and suggestions. For example, **MICROELECTRONICS AND SOCIETY FOR BETTER OR FOR WORSE** starts with the history of microelectronics then identifies the opportunities and threats and finally offers some suggestions.

The essence of the issues discussed in the reports varies from one report to another. For example, the main issues discussed in **LTG** are about the relation between the growth of population, pollution, industrial output, resource usage and food consumption, but **THE FUTURE OF PEOPLE WITH DISABILITY IN THE WORLD** discusses the issues of disabled people. It is possible to categorize the problems discussed in the reports into cases, systems and ideologies. Based on this grouping, a few of the reports relate to the issues of systems, for example, **LTG**, **MANKIND AT THE TURNING POINT** and **RESHAPING THE INTERNATIONAL ORDER**. One or two reports discuss underlying reasons or ideologies to some extent, for example, **ROAD MAPS TO THE FUTURE** and **GOALS FOR MANKIND**. The rest of the reports are mostly about cases, for example, **MICROELECTRONICS AND SOCIETY FOR BETTER OR FOR WORSE**, **THE BAREFOOT REVOLUTION** and **THE FUTURE OF PEOPLE WITH DISABILITY IN THE WORLD**. In general, the early reports mainly discuss systems and underlying reasons, but starting from 1980, most of the reports focused on cases, and just a few reports discussed systems.

The solutions have evolved parallel to the problems. Solutions openly criticizing the whole system were the norm in the early reports (e.g., **MANKIND AT THE TURNING POINT**). Those reports criticized systems by showing the casual relationship between them and the problems. Naturally, most of their solutions involved systemic changes. In contrast, solutions compatible with current systems became favoured in the later reports (e.g., **FACTOR FIVE**). Obviously, the latter approach attracted less criticism. However, its pitfall is that it might neglect the underlying reasons of the problems.

4.3.2 Holistic/specialized

Studying the reports shows a more holistic approach in the 1970s. Starting from 1980, a long period of specialized approach is recognizable. However, recent reports yield some clues of a return to holistic approaches. Previous section provided more explanation and examples of these changes.

The study of the reports confirms the assertion of the interviewees that the belief in market economy affected the agenda of the reports. According to this belief, market will automatically solve all the problems. Therefore, governments should stop interfering in it. Market economy is a characteristic of Reagan-Thatcher era. Before this period, the reports investigated the systems and the underlying reasons of the problems, as discussed in the previous section. Starting from 1980s, the reports mostly discuss cases. In addition, their suggestions are more compatible with the current systems. Obviously, it was hard to compete with the growing belief in market economy. Therefore, the agenda of the reports evolved to be more compatible with this belief. Later, the popularity of market economy declined due to its failure in solving many global and national problems. Consequently, an opportunity has emerged for other perspectives and approaches (e.g., holistic approach). This explains the adoption of more systemic and holistic approaches by the recent reports (e.g., **2052: A GLOBAL FORECAST FOR THE NEXT FORTY YEARS** and **BANKRUPTING NATURE**).

4.3.3 Overall thinking of the Club of Rome (COR)

Investigating the reports approves the claim of the interviewees that the reports have scientific background. The authors of the reports are usually academics. In addition, reports frequently refer to scientific researches.

According to the interviewees, one of the main objectives of the reports is to bring the discussions into public and political agenda. Several reports directly mentioned this objective, including **LTG** and **RESHAPING INTERNATIONAL ORDER**.

Regarding the strength of government, interviewees incline towards the view that strong government is needed to solve the problems. Such a tendency is also visible in the reports. However, implementing the recommendations of different reports requires different levels of strength. For example, **LTG** suggests fixing the industrial output on average at its 1975 value. Obviously, applying such a policy needs extremely strong government, both in national and international levels. Stronger government is required for implementing this suggestion than those provided in **THE EMPLOYMENT DILEMMA AND THE FUTURE OF WORK**. As one of the interviewees asserts, during 1970s the question was about the ways that the government should interfere to prevent the upcoming global problems. He continues that during Reagan-Thatcher era, the question was that whether government should interfere or just let the market handle everything. Studying the reports shows that the tendency toward strong government is more visible in the reports published during the 1970s than in the later reports. However, the recent reports openly criticize the slow-decision making in democratic societies. These kinds of criticisms are noticeable in **2052: A GLOBAL FORECAST FOR THE NEXT FORTY YEARS.**

4.3.4 Future evolution

Regarding technology, the interviewees suggest that the studies should include the full cost cycle analysis of technological solutions. It is noticeable that reports suggesting technological solutions offered no such analysis.

Regarding political and economic system, interviewees suggested non-linear approach to economy. Such an approach is not visible in the existing reports. Moreover, interviewees suggest that the underlying reasons of problems should be discussed more. Studying the reports shows that there are only few reports that discuss the underlying reasons. Examples of such reports are **GOALS FOR MANKIND** and **ROAD MAPS TO THE FUTURE.**

The interviewees suggest that it is required to have a roadmap toward a sustainable society, and a clear understanding of a sustainable society and its functionality. The problem is with the ambiguity of the few roadmaps provided in the reports (e.g., in **GOALS FOR MANKIND** or in **RESHAPING THE NEW INTERNATIONAL ORDER**). Moreover, none of the reports provides a holistic big-picture about the functionality of a sustainable society.

4.3.5 No evolution/ No trend/ Different directions

Regarding the mainstream anthropocentric point of view, the interviewees claim that no change has happened. Studying the reports approves this claim, and it is noticeable that only few reports discuss this issue very briefly. One of such reports is **MANKIND AT THE TURNING POINT.**

Moreover, the study of the reports approves the statement that the agendas of the reports were affected by externalities (e.g., criticisms of LTG, oil crisis, end of cold war and market vs. public war). There are several examples of the reports affected by externalities. **MANKIND AT THE TURNING POINT** is the answer to a criticism of LTG. **RESHAPING THE INTERNATIONAL ORDER** is a contribution to the resolutions of the United Nations General Assembly. **BEYOND THE AGE OF WASTE** is an answer to the criticisms of LTG that it ignored the potential of technological improvements in solving the global problems. Finally, **ROAD MAPS TO THE FUTURE** is a contribution to discussions related to the cold war. However, some reports were less influenced by externalities, for example, **LTG**, and many other reports published after 1980 such as **MICROELECTRONICS AND SOCIETY FOR BETTER OR FOR WORSE**.

5 CONCLUSION

This final chapter seeks to answer the main and research questions of this thesis. First, the research questions and then the main question are discussed.

The agenda of the reports has become less cohesive during the years. The agenda of the Peccei period reports are more cohesive than the later reports, and they portray a logical path. After the Peccei period, the agenda of the reports are still about the interconnected, long-term and global problems, but they are fragmented and jump from one topic to another.

The basic characteristics of the COR's approach has changed in different directions. All the reports have the long-term thinking approach. However, it is in the background in most of the reports, and only in a few reports, the period is explicit, for example in **LTG** and **2052**. All the reports also have a global approach at least in the background. The holistic approach is also dominant in the reports of the Peccei period. After this period, most of the topics have a narrow scope, and their holistic approach is limited to their scope. Nevertheless, holistic thinking has become dominant again in the recent reports such as **BANKRUPTING NATURE** and **2052**.

The reports take a similar position on the free market and growth ideology. However, there are differences in their expressions. The first report to the COR, **LTG**, was explicitly against growth ideology. However, the later reports express their disagreement less explicitly. Especially, after Peccei, such disagreement went almost completely to the background. Reports were discussing issues from other perspectives (e.g., resource efficiency). In addition, they were cautious in asserting anything against growth ideology. Nevertheless, recent reports have started to criticize the growth ideology again.

In this thesis, three components of the world system are economy, politics and society. Almost all the reports focus on economy and politics. There are only few hints in the reports concerning the role of society in the global problems. The reports adopt different positions on economy, politics and their relation. However, on politics, most of the reports manifest a tendency towards strong government, which has the power to protect public good. In addition, an anthropocentric point of view is common in all the reports. On economy, the reports display a tendency towards ecological economics. From the evolution point of view, the reports of the Peccei period more radically criticize the existing economic and political systems. In addition, their suggestions are systemic. Later reports and their suggestions are more compatible with the existing systems. Nevertheless, the recent reports have started to criticize the existing systems again.

Finally, there are several important topics missing from the debate. In general, studies on fundamental and underlying reasons are missing. There is no study on the determinants of the human behaviours that have resulted in global problems of humankind. For example, values, beliefs, ethics, emotions, culture, authority and persuasion are among the most important determinants of human behaviours. These determinants are one major category of the underlying causes of the global problems. In other words, in the debate about the global problems and sustainability, the suggestions are mostly concerned with the symptoms rather than the real causes. For example, in discussions about climate change the focus is on reducing greenhouse gas emissions, which is only a symptom. This conclusion is reached from the discussions presented in this thesis[20].

Regarding this missing topics, some remarks are worth mentioning. First, the reasons for this neglect should be studied to eliminate similar shortcomings from future studies about sustainability. Second, one should be cautious about complexity of these underlying reasons. In addition, it is vital to adopt a holistic approach for studying these reasons. For example, values and beliefs of humans are prone to adapt with the existing behaviours that have some other reasons for their existence. Therefore, only studying values and beliefs could lead to misleading conclusions. Third, one could find a common ground for successfully handling the complexity of studying the underlying reasons. For example, escaping from pain and suffering seems to have the potential to be used as such a common ground.

This thesis and its conclusions have some limitations. First, the reports to the Club of Rome (COR) do not necessarily include all the topics discussed in the debate about the global problems. Nevertheless, the background studies on the academic perceptions sought to address this limitation. Second, the focus of this thesis was on the messages of the reports, while other aspects of the COR were excluded. Therefore, it is a mistake to rely only on this thesis for understanding the evolution of the COR. Third, the results of the in-depth interviews with experts are not generalizable. Nevertheless, the conclusions of this thesis are reliable because they are supported by the study of the original reports and other researches.

This thesis provided some guidelines for addressing the global problems of humankind. Obviously, without such guidelines, many decisions would lead to ineffective efforts. In addition, misguided decisions might create new problems. The main message of this thesis is that it is vital to analyse the problems deeply before suggesting or implementing any solutions.

[20] Especially discussions presented in sections 2.1, 2.2.2, 2.2.3 and 4.2

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APPENDIX 1: THE QUESTIONS OF THE SEMI-STRUCTURED INTERVIEWS

The following questions are used to structure the interviews to some extent.

- Agendas

- Question 1: The reports have different agendas ranging from projection on the sustainability problems to providing solutions from different aspects such as economic, social and political aspects. Do you see any trend in these changes of the agendas of the reports?

- Question 2: How do you see the change in the role of the club as a mediator between different stakeholders (as this was one of the goals of the club at the beginning) (e.g., in north-south discussion)?

- Methods

- Question 3: Different methods have been used in different reports from simulation, scenarios and providing case studies, to even prediction. Do you see any trend in the change of the methods that is used in the reports?

- Technology

- Question 4: How has the approach of the reports toward technological improvements been changing?

- Economic system

- Question 5: The question is about the ability of an economic system to handle environmental issues including pollution and scarcity. Do you see any evolution happening in the approach of the reports toward current economic system or proposing new economic systems? Why is that?

- Political system

- Question 6: Tax reform or other solutions that is provided in the reports needs strong government. Do you see any evolution in the political system that reports have been suggesting? Why is that?

- Question 7: Do you see any change in the philosophical base of the reports from anthropocentric-ecocentric division point of view? Why is that?

- Society

- Question 8: **THE LIMITS TO GROWTH** left out society in their model. On the other hand in **2052** and **FACTOR FIVE** there is more attention to society, for example, the ideas of sufficiency and happiness as they are mentioned in **FACTOR FIVE**. Do you see any trend in the approach of the reports toward society? Why is that?

- Missing
  - Question 9: What do you think that is missing from this evolution in order to make sustainability happen? Why is that?

APPENDIX 2: PRIMARY AND SECONDARY SOURCES

In this text, primary sources are identified as the interviews with experts, the reports to the Club of Rome and the documents published by the Club of Rome. Consequently, other sources discussing the Club of Rome are identified as secondary sources. This group of sources includes journal articles. The last category presented in this section, titled other, consists of those sources that are not about the Club of Rome (e.g., sources about the methods). These categories encompass all the sources used in this thesis.

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APPENDIX 3: LIST OF THE INTERVIEWEES

Ian Johnson, Secretary General of the Club of Rome
Jørgen Randers, Writer of several reports to the Club of Rome
Karl Wagner, Director of External Relations of the Club of Rome
Ernst Ulrich von Weizsäcker, Co-President of the Club of Rome
Anders Wijkman, Co-President of the Club of Rome