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Quantitative Modelling for the Assessment of Organizations' Sustainable Development with the Aim of Formulating Appropriate Decision-making Policies

By

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A Thesis

Under the supervision of

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TABLE OF CONTENTS

In memory of my father.

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CHAPTER 1 - INTRODUCTION

1.1. General definitions of sustainability

The concept of sustainability is based on the interdependence between human societies and the natural environment. Social existence's nature, combined with the perpetual need for economic development, is placing pressures upon natural resources and may threaten the continued health and prosperity of human societies. The most frequently quoted definition of sustainable development comes from the report *"Our Common Future"*, also known as the Brundtland Report: "*Sustainable development is the development that meets the needs of the present, without compromising the ability of future generations to meet their own needs"* (United Nations Report of the World Commission on Environment and Development, 1987).

As a basic principle, sustainable development is a common objective both of the public and the private sector organizations. Due to the vagueness of the Brundtland Report's definition, referring to the adoption of sustainability at the operational level, this thesis will have achieved much of its purpose if it manages to interconnect this definition with procedures, in order to facilitate businesses to form their sustainable development priorities, throughout their operating process.

A popular elucidation of sustainable development consists of the "three circles model" of economic, social, and environmental considerations, often referred to as the three pillars of sustainability and, within the corporate agenda, the "triple bottom line" (Barkemeyer et al., 2011). The triple bottom line is a concept that posits that businesses should commit to measuring their social and environmental impact, in addition to their financial performance. The triple bottom line attempts to measure a business' level of commitment to Corporate Social Responsibility (CSR) and its impact on the environment over time. CSR is an opportunity for enterprises to combine economic, social, and environmental objectives, in order to enhance their sustainable development prospects (Commission of the European Communities, 2009). Since the last decade, sustainable development has gained widespread political and public authority and has arguably become

"the common currency of almost all players in the environmental arena" (Dobson, 1999). Analysis of worldwide media coverage demonstrates the increasing levels of public discourse on either sustainability or sustainable development (Barkemeyer et al., 2009).

On the other side, the concept of sustainability itself has attracted a considerable amount of criticism. In his discussion of key criticisms directed at sustainable development, Robinson (Barkemeyer et al., 2014) focuses on three major aspects. First, the vagueness of the concept of sustainable development, giving room for very different interpretations; second, a hypocritical approach to the label of sustainable development, closely related to the difficulty of measuring whether a specific activity is furthering sustainable development or not; third, that sustainable development, in fact, is an oxymoron, proposing increased industrial output in the light of scarce resources and environmental limits to growth. Additionally, despite the plethora of innovative research frameworks and remarkable accomplishments, the engineering of a lucid vision is still a missing framework in the science of sustainability. Kronenberger points out, "The trouble with our age is all signposts and no destination (Kim & Oki, 2011).

A sustainable future will require a purpose-driven transformation of society at all scales, guided by the best foresight, with insight based on hindsight that science can provide. Donella Meadows (Stutz, 2010) explained the role of vision quite clearly: "Vision is the most vital step in the policy process. If we don't know where we want to go, it makes little difference that we make great progress".

In any case, the promotion of sustainable consumption accompanied by the prevention and reduction of environmental pollution should be a goal, in order to break the link between economic growth and environmental degradation. For this reason, we should ensure that the right business policies are developed, assessed, and implemented on the basis of the best available knowledge with an economic efficiency perspective (European Environment Agency, 2006). This means that, among other things, we should pay attention (Parrado & Löffler, 2010) to targets such as:

- Ensuring efficient, cost-effective, planned, and sustainable maintenance of buildings, offices, and equipment.
- Ensuring efficient, cost-effective, and sustainable use of transport and energy resources.

- Developing an integrated policy for managing physical assets, including their safe recycling/disposal e.g. by direct management or subcontracting.

In any case, it remains a challenge to focus on the correct policy when we are about to come to a decision. As Caldwell (Farrell, 1999) noted, “Policy has several different connotations, but all carry the implication of the choice. Were there no choice, there would be little occasion for policy”.

1.2. Overview of the research and problem statement

The achievement of sustainable development, on an operational, local, national, or global scale, is an extremely complex issue. First of all, the concept of sustainable development itself is characterized by ambiguity and possibly arbitrary decisions. In order to ensure the future generations’ ability to meet their needs, we have to take the "right" decisions in the present. However, adjusting the level of development in the present, so as not to disrupt this potential for the next generations to come, is not only a critical but also a controversial issue.

This can be explained by the fact that the sustainable development goals, even if they are measurable, are not legally binding. At a global level also, there is no universally accepted norm or agreement to serve compulsory sustainability goals. In any case, anyone could say that defining today's needs, is certainly characterized by a degree of subjectivity and depends to a great extent on self-interested goals and on different social, political, and economic perceptions. Needless to say that, decisions at this level are mainly driven by corporate, sectoral, national, or union interests. And it is anything but easy to find a balance between social, political, and economic perceptions, legislation, private and public sector initiatives, and consumer choices. It is also difficult to find the right “mix of sustainability”, either on the local or at the global level. Questions such as, "when is sustainable development achieved", "at what rate", and "how close, or far, are we to sustainability", are always relevant and invite us to give clearer answers.

1.3. Research aim and objectives

The research aim of this thesis is to contribute to the development of a model, for applying the rules of sustainable development in businesses and transform the theoretical principles of sustainability into practical rules at the business (corporate) level.

The business world – ranging from agriculture to fossil fuel exploitation and from transportation to utilities and financial service industries – significantly contributes to the transgression of the nature's limits, so it has an important role to play in overcoming this tragedy (Hummels & Argyrou, 2021). Although the idea of sustainable development is not recent, we strongly believe that there are favourable social and economic conditions as well as critical space for giving a clearer view of sustainability at the business level. Thus, rules will be created to enable companies to set their priorities and shape their sustainable development policy, which may be then adapted to their procedures.

Obviously, the purpose of the aforementioned model is to help businesses discover (time-dependent), the degree of their commitment to sustainability principles. Furthermore, to give indications of the pillars of sustainability (environmental, economic, and social), that progress has been made or to sound an alarm when further progress is vitally important. The creation of this sustainability model, as well as its practical implementation, could potentially qualify it as another tool for decision-making.

In addition, another concern for this model is to emerge into a simple and clear-to-follow guide, which will arouse all the reader's interest. After all, sustainable development as a field of scientific research, refers to all stakeholders and not only to those of the business world.

1.4. Research questions

Trying to answer specific questions such as "whether we are on the path of sustainability", "to what extent" and "what more could we do to achieve it", are some of

the key issues to deal with and address in this thesis. At this point, we must clarify that in the next chapters, we will focus exclusively on the business level. Even though some could claim that the interdependencies between businesses and the sectors they belong are too strong, sustainability at levels beyond the operational one won't be an area of research in this thesis. Nevertheless, for the purposes of this thesis, we will accept that for achieving sustainability at the corporate level, a bidirectional sustainable development relationship between the corporate and the national (or even the international level) should exist. After all, the decisions made at the broadest level (national or international), directly affect the nexus of sustainability at all levels, first and foremost at the business level. Subsequently, it becomes obvious that decisions taken at the national level will significantly determine sustainability's effectiveness in businesses.

Moreover, it is generally accepted that on a personal level, most of us would like to contribute to the protection of the environment. To contribute to maintaining social cohesion, addressing social inequalities, to ensure that resources are saved for the future generations and encourage the use of environmentally friendly energy sources. In brief, to think sustainably and contribute to the safeguarding of the rights of the future generations. In a similar way, that is the main issue for the businesses. So, what's the reason that some businesses do not act in a sustainable way? Are there still businesses in which gender balance in leadership positions is not ensured? Are there still companies where access to education is not a reality for everyone? Why there is still environmental degradation, exploitation and poor working conditions, and why not always fair wages?

In the following chapters, we will shed light on the above "inconsistencies" and will focus on parameters that may provide solutions. Mainly, we will point out the areas that may be improved, from a sustainable development point of view. In order for the future generations to enjoy, what previous generations enjoyed (and even more).

1.5. Motivations, importance, and rationale of the research

Our research is carried out to encourage stakeholders to discover the more practical side of business sustainability principles. Moreover, to give some answers and develop a practical model to help businesses realize how close or far are moving from a "set" target point of sustainability. As a result, we consider that the findings of this research will benefit the scientific community, especially those who work on this specific subject.

It should not be a secret, that the author, as a Ph.D. candidate, got discouraged quite a few times during the writing of this thesis. Tough situations such as intensive working conditions, the last decade's financial crisis, the shift of business interest from a sustainability-driven concept towards the satisfaction of basic needs (due to the crisis), and finally the ambiguity of the core concept of sustainable development, which may be translated into lack of rewarding benefit for the businesses that invest in it, were some of the main challenges that contributed to delaying and bringing doubt for this thesis completion.

However, despite the obstacles, this "journey" was joyful and the desire to get through this intellectual joy, made me defend my Ph.D. Full of insatiable curiosity, which still remains, mainly as to whether this thesis will have the desired impact on the scientific community, we tried to draw novel conclusions about this research topic. In each case, we wish that our research will contribute to a better understanding of the business sustainability case, adding one more tool to the decision-making process.

1.6. Structure of the dissertation

The core of this thesis is the appropriate goals selection, referring to the priorities defined across the SDGs, in order the businesses to gain new growth possibilities while lowering their risk profiles. While developing this thesis, we judged that it would be more productive to divide its contents into 7 main chapters.

The first Chapter is introductory, in which we state the sustainability's definitions, directed mainly to the business level, the research aims and objectives of this thesis as well as the gap this research is intended to cover.

The second Chapter includes the necessary information about the Sustainable Development Goals (SDGs), as well as their evolution, the implementation and the effect the SDGs have in the European Union and Greece level respectively.

The third chapter is dedicated to a survey for sustainability, conducted by the University of Piraeus in 2014, in order to shed light on the opinion of the executives of Greek businesses towards sustainable development. The business executives were also asked to give a weighting factor to a series of sustainability indicators, evaluating them according to their "business sense of importance" and enabling us to create a new coefficient to be used in our model. The results of the survey are presented analytically in the Annex IV of this thesis.

In Chapter 4, we evolve our sustainable development business model with the selection of the appropriate SDG indicators, in order for each business to positively contribute to the sustainable development. The core concept of the theory is that the business attitude towards indicators of interest, should be always superior to the corresponding attitude of an EU average, respecting the business costs that will be incurred from the shift to sustainability.

In Chapter 5, as sustainability is not just environmentalism, profitability or cost reduction, we make a reference to the mixture of the SDGs, which should be evenly distributed to all three pillars of sustainability (economic, environmental, and social), while in the chapter 6 we set our model into practice, using data derived by the Greek Atomic Energy Commission (EEAE).

In Chapter 7, conclusions and points of further research are recorded, while in the Appendix we may find information about the filtering of the SDG indicators in order to be used at the operational level, the business indicators' trend value as well as detailed information on the survey of Chapter 3.

Entering the main body of this thesis, we wish you a pleasant reading.

CHAPTER 2 - LITERATURE REVIEW ON SUSTAINABILITY - THE ROLE OF INDICATORS

2.1. An overview of sustainability

Despite sustainability being a relatively new field, it has influences from older fields of science. Among such traditional scientific fields, we could prioritize "ecology and preservation of the natural environment", "economic development", and "social justice and cohesion". Many of the ideas of "sustainable development" came to the scientific community's attention in 1983, when the United Nations assigned the performance of "The New World Commission on Environment and Development" to the former Norwegian prime minister Gro Harlem Brundtland.

The main issue for Brundtland's Commission was to find a method to balance prosperity combined with ecology, as it seemed that development at the cost of ecology and social equity would not lead to long-lasting prosperity. After four years of research, the Brundtland Commission released its final report, which was named "Our Common Future". In their report, sustainable development is defined as "*the development that meets the needs of the present, without compromising the ability of future generations to meet their own needs"*. Since then, regarding the description of "sustainable development", this definition has prevailed over any other.

In order to give another reference, we could say that sustainability is the capacity to endure. It's not just environmentalism, but also includes the proper use of social and economic resources. Therefore, sustainability, as a holistic approach recognizes the environmental, economic, and social dimensions, as the main pillars of the long-term maintenance of well-being and prosperity.

Thus, these three dimensions (environmental, economic, and social), are defined as the three pillars of sustainability (in Figure 1 we can see the graphic illustration of the three pillars of sustainability).

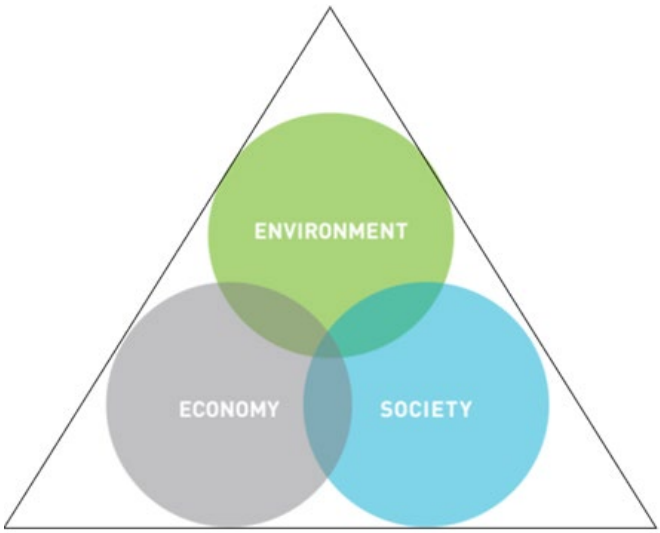

Figure 1: The three pillars of sustainability

2.2. The Sustainable Development Goals (SDGs) evolution and implementation, and how they relate to Business & Policies

Sustainability indicators have received increasing attention during the last decades (since the Rio Earth Summit, June 1992), reflecting growing concern by the public and policymakers over environmental trends. Indicators represent an attempt to quantify these trends, and to determine if the perception that environmental conditions are deteriorating is indeed correct (Sherbinin, 2003). Moreover, indicators translate physical and social science knowledge into manageable units of information, which can facilitate the decision-making (UN Commission on Sustainable Development) while measuring and calibrating progress toward Sustainable Development Goals (SDGs).

As far as sustainable development indicators are concerned, they point to areas where the links between the economy, environment and society are weak (Sustainable Measures). From the perspective of environmental research and regulatory policy, two fundamental questions arise that underscore the need for using indicators to show progress toward sustainability (Kates et al., 2001):

• How can today's operational systems for monitoring and reporting on environmental and social conditions, be integrated or extended to provide more useful guidance for efforts to navigate a transition toward sustainability?

• How can today's relatively independent activities of research planning, monitoring, assessment and decision support, be better integrated into systems of adaptive management and social learning?

According to the International Institute for Sustainable Development (IISD 2003), measurement helps decision-makers and the public define social goals, link them to clear objectives and targets, and assess progress toward meeting those targets (Sherbinin 2003; UN Commission on Sustainable Development). It provides an empirical and numerical basis for evaluating performance, calculating the impact of our activities on the environment and society and connecting past and present activities to attain future goals.

Furthermore, indicators can provide an early warning, sounding the alarm in time to prevent economic, social and environmental damage. They are also important tools to communicate ideas, thoughts and values (UN Commission on Sustainable Development). Based on the three pillars concept, a sustainability indicator can be defined as a measurable aspect of environmental, economic, or social systems, that is useful for monitoring changes in system characteristics relevant to the continuation of human and environmental well-being. The use of sustainability indicators and corresponding metrics is essential for an integrated systems approach to the addressing challenges of sustainability (Fiksel et al., 2012).

When carefully chosen, indicators can help managers and policymakers to:

• Anticipate and assess conditions or historical trends

• Benchmark against other systems

• Track progress

• Provide early warning information to prevent adverse outcomes

• Support decision-making

• Establish improvement goals

• Formulate strategies

The 2030 Agenda for Sustainable Development, which was adopted by all United Nations Member States in 2015, provides a timeless master plan for peace and prosperity on the planet. In order to form a mechanism for the implementation of the 2030 Agenda for Sustainable Development, a solid framework of indicators was required. The global indicator framework was adopted by the General Assembly on 6 July 2017 and is contained in the Resolution adopted by the General Assembly on Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development. According to the Resolution, the indicator framework will be refined annually and reviewed comprehensively by the Statistical Commission. It consists of 17 main Sustainable Development Goals (SDGs), which represent an urgent call for action. The SDGs are defined in a list of 169 SDG targets, while progress toward these targets is monitored by 232 indicators (United Nations, n.d., https://unstats.un.org/sdgs/indicators/Global%20Indicator%20Framework%20after%202022%20refinement_Eng.pdf) as shown in Figure 2.

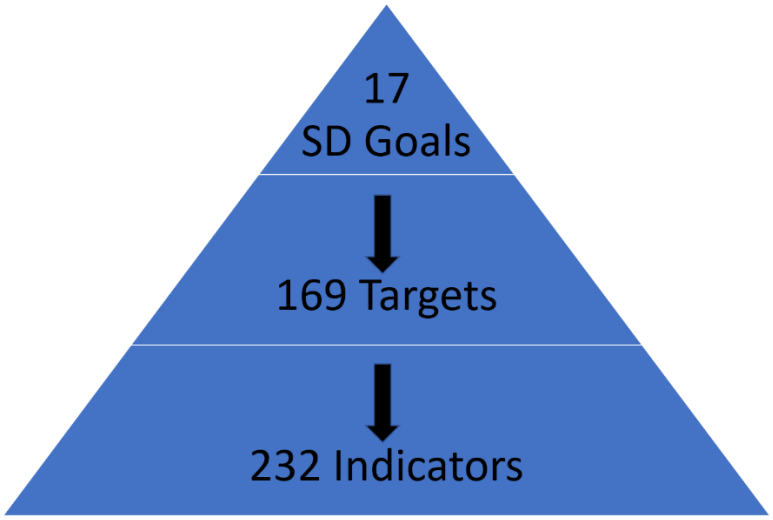

Figure 2: SDGs allocation to Targets and Indicators

As the choice of the appropriate indicators is heavily dependent upon the stakeholder's purposes, worldview, and system of values, it is obvious that the identification and implementation of the appropriate mix of the SDGs can provide a solid basis for decision-making at all levels of an Organization (either of the public or of the private sector).

2.3. Milestones in the pursuit of Sustainable Development - The 2030 Agenda

The World Commission on Environment and Development (WCED) in 1987, where the sustainable development definition was first introduced, was followed by important events as shown in Figure 3. These events depict the milestones in the international pursuit of sustainable development and facilitated the adoption of the Agenda 2030 for Sustainable Development.

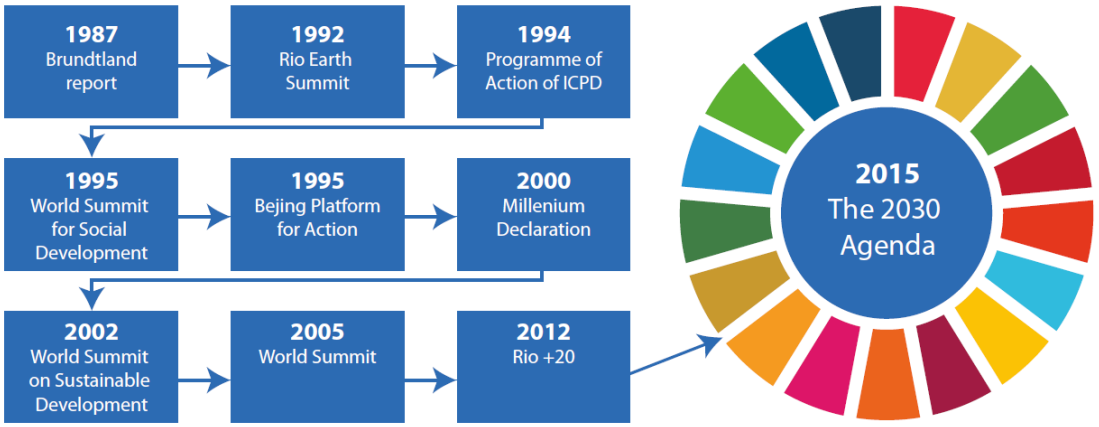

Figure 3: Important milestones on the road to the Agenda 2030 (Eurostat, 2021)

Specifically, in 2015 the UN General Assembly adopted a new global sustainable development agenda under the title "Transforming our World: the 2030 Agenda for Sustainable Development." A total number of 17 main Sustainable Development Goals (SDGs), as depicted in Figure 4 (Dpicampaigns, 2020, http://www.un.org/sustainabledevelopment/%20sustainable-development-goals) combined with 169 quantitative and qualitative linked targets or strategic objectives, form the basis of the 2030 Agenda. These targets aim to end poverty, safeguard the environment, promote prosperity and bring peace, by calling for the implementation of the Agenda at the global level *(UN SDSN Secretariat, Getting Started with the SDG, A Guide for stakeholders, December 2015).* The SDGs expand upon the former eight (8) UN Millennium Development Goals, which were substantiated to fight poverty in any aspect in the world (Goal 1: Eradicate extreme poverty and hunger, Goal 2: Achieve universal

primary education, Goal 3: Promote gender equality and empower women, Goal 4: Reduce child mortality, Goal 5: Improve maternal health, Goal 6: Combat HIV/AIDS, malaria and other diseases, Goal 7: Ensure environmental sustainability, Goal 8: Develop a global partnership for development).

Subsequently, the SDG's broader concept, in terms of importance and scope, urges for global action to achieve the economic, social, and environmental goals. The Agenda emphasizes in forming the appropriate policies, to protect the environment and confront climate change, in combination with policies that will reduce poverty and advance sustainable development for all. Governments are required to take measures and set up national frameworks for achieving the 17 Goals, even if they are not legally binding.

Figure 4: The UN Sustainable Development Goals (United Nations, n.d., https://sdgs.un.org/goals)

The SDGs are monitored at many different levels, including global, regional, national, local, and thematic levels. The UN publishes the report on "Progress Toward the Sustainable Development Goals" on an annual basis, which is followed by a report on the SDGs for the general public. Based on chosen metrics from the global indicator framework, the latter gives a general picture of the 17 SDGs' development. An international collaboration, to mobilize the necessary resources, is essential for the SDGs to be achieved globally.

The mobilization of resources for sustainable development is thus another crucial component of the 2030 Agenda, along with the setting of goals and targets and the creation of a list of global indicators. The Third International Conference on Financing for Development, which took place in July 2015 in Addis Ababa, Ethiopia, was a significant turning point in the intergovernmental negotiations for financing sustainable development. The Conference resulted in a Document, as its final product, which outlines specific initiatives for mobilizing methods of implementation as part of the 2030 Agenda *(https://www.un.org/esa/ffd/publications/aaaa-outcome.html)*. Thus, in order to track the 2030 Agenda's implementation, indicators at the level of UN world regions and at the national level were added to the global indicator framework. For instance, indicator sets have been created for Africa, Latin America, and the Caribbean, as well as the Asia-Pacific area. Based on regional relevance and data accessibility for a recently created UNECE SDG Dashboard, the UN Economic Commission for Europe (UNECE) chose 80 indicators, from a worldwide list, for the European level.

In the Appendix I of this thesis we can see the "Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development", as contained in the Annex of the resolution adopted by the UN General Assembly on 6 July 2017, Work of the Statistical Commission pertaining to the 2030 Agenda for Sustainable Development, annual refinements contained in E/CN.3/2018/2, E/CN.3/2019/2, 2020 Comprehensive Review changes and annual refinements contained in E/CN.3/2020/2, annual refinements contained in E/CN.3/2021/2, annual refinements contained in E/CN.3/2022/2 and decisions (53/101) by the 53rd United Nations Statistical Commission (E/2022/24-E/CN.3/2022/41).

2.4. Sustainable development in the European Union

Since 1997, the European Union (EU) has made sustainable development one of its guiding principles and a top priority for its policy (European Commision, 2011). During the last decades, the Commission and numerous EU Member States have stepped up their efforts to encourage the adoption of Corporate Social Responsibility (European Parliament,

2011) focusing on stakeholder communication (Commission of the European Communities 2009).

According to "The European Green Deal" and the staff working document (SWD) "Delivering on the UN's Sustainable Development Goals — A Comprehensive Approach," the EU has made a firm commitment to achieving the goals of the 2030 Agenda. As a result, the EU welcomed the adoption of the 2030 Agenda, as shown in Figure 5, and declared its commitment to implementing the SDGs and fully incorporating these objectives into the European policy framework. *[Eurostat, Sustainable Development in the EU, Monitoring report on progress towards the SDGs in an EU context (2021 edition]*.

Figure 5: Eurostat adopts the UN Sustainable Development Goals (Eurostat, n.d., https://ec.europa.eu/eurostat/web/sdi)

The EU strategy for implementing the SDGs has been impacted by a number of significant policy texts. A statement from 2016 ‘Next steps for a sustainable European future: European action for sustainability’ formally declared the SDGs' inclusion in the European policy framework. A 2019 paper titled "Towards a Sustainable Europe by 2030" also emphasized the complicated issues the EU is dealing with and identified the competitive advantages that the EU would gain by adopting the SDGs. The European

Consensus on Development, which established the EU common vision and action framework for development cooperation, was agreed in 2017 in response to the 2030 Agenda concerning the EU's external operations. Additionally, since 2017 the EU has been focusing on how the SDGs could be implemented in its annual SDG monitoring report. *[Eurostat, Sustainable Development in the EU, Monitoring report on progress towards the SDGs in an EU context (2021 edition]*.

The EU SDG indicator framework, which is organized along the 17 UN SDGs, encompasses the social, economic, and environmental aspects of sustainability as they are embodied in Agenda 2030. The indicators were chosen based on their policy importance for the EU, subject to data availability for the EU countries. Six main indicators have been allocated to each SDG, chosen to represent the SDG's overall targets and aspirations. Thirty-seven of the indicators are "multi-purpose," which means they are used to track multiple goals, while sixty-seven of them are allocated to a single SDG. This improves the narrative of this monitoring report and enables the connection between several targets to be highlighted. The EU SDG indicator framework is subject to periodical review, so as to be updated in cases of new policy-making, application of different methodologies, and use of new technologies. *[Eurostat, Sustainable Development in the EU, Monitoring report on progress towards the SDGs in an EU context (2021 edition)]*.

2.4.1. Tracking sustainable development in the EU

As it is of the main interest for the EU to track, from an EU point of view, the development towards the SDGs, Eurostat in close collaboration with other Commission services [like the European Environment Agency and Member State organizations in the European Statistical System (ESS), Council Committees and Working Parties, as well as the civil society] has led the development of the SDG indicator framework *(https://ec.europa.eu/eurostat/web/sdi/indicators)*.

The evaluation process considers both the direction and rate of an indicator's change, with respect to the sustainable development objective. The approach emphasizes in changes over time and is typically based on the "compound annual growth rate" (CAGR) formula,

which evaluates the rate and direction of an indicator's evolution. The CAGR uses data from the first and the last year of an examined time period, so as to calculate the indicator's average annual rate of change (in percent).

Depending on whether a quantifiable EU policy aim exists, the assessment of indicator trends is displayed as arrows, as shown in Figure 6. Whether the indicators are progressing in a sustainable direction or not, is shown by the direction of the arrows. At this point, it should be clarified that progress towards the sustainable development is represented with an upward arrow, while a downward arrow shows the opposite.

Symbol	With quantitative target	Without quantitative target
↑	Significant progress towards the EU target	Significant progress towards SD objectives
↗	Moderate progress towards the EU target	Moderate progress towards SD objectives
↘	Insufficient progress towards the EU target	Moderate movement away from SD objectives
↓	Movement away from the EU target	Significant movement away from SD objectives
:	Calculation of trend not possible (for example, time series too short)	

Figure 6: Assessment categories and associated symbols (Eurostat, 2021)

If applicable, indicator trends are evaluated over two time periods:

• The long-term, which is based on how the indicator has changed over the previous 15 years (data mainly refer to 2005-2020 or 2006-2021). If data are available for at least 10 consecutive years, the long-term trend can also be estimated for shorter time series.

• The short-term, which is based on how the indicator has changed over the previous 5-year period (data mainly refer to 2015-2020 or 2016-2021). The short-term trend may, exceptionally, be estimated for shorter time periods provided that data are available for at least three consecutive years.

2.4.2. Indicator's trend evaluating methods in the EU

The assessment method focuses on changes over time while considering whether an indicator has progressed faster or slower, in relation to the sustainable development aim.

The observed values for each indicator should ideally be compared to the theoretical trends required to achieve either a quantitative goal specified or a scientific threshold.

This strategy, nevertheless, can only be used for a selected few indicators, where the EU has a specific quantifiable and measurable aim. To prevent ad hoc value judgments, a plain and straightforward method is used across the remaining indicators. The two strategies are described in greater depth below, in two groups. The first is for indicators with quantitative targets and the latter is for indicators without such targets.

a) Indicators with quantitative targets

In the case of a quantitative target, the theoretical rate of change, necessary to achieve the target in the target year, is contrasted with the actual rate of change of the indicator (based on the CAGR). The indicator indicates considerable progress toward the EU target if the actual rate is 95% or higher than the required rate. If that rate is between 60% and 95%, then the trend indicates moderate progress, and if the ratio falls below 60% then there is no progress made towards the EU target. Negative values indicate that the trend is moving out from the EU target.

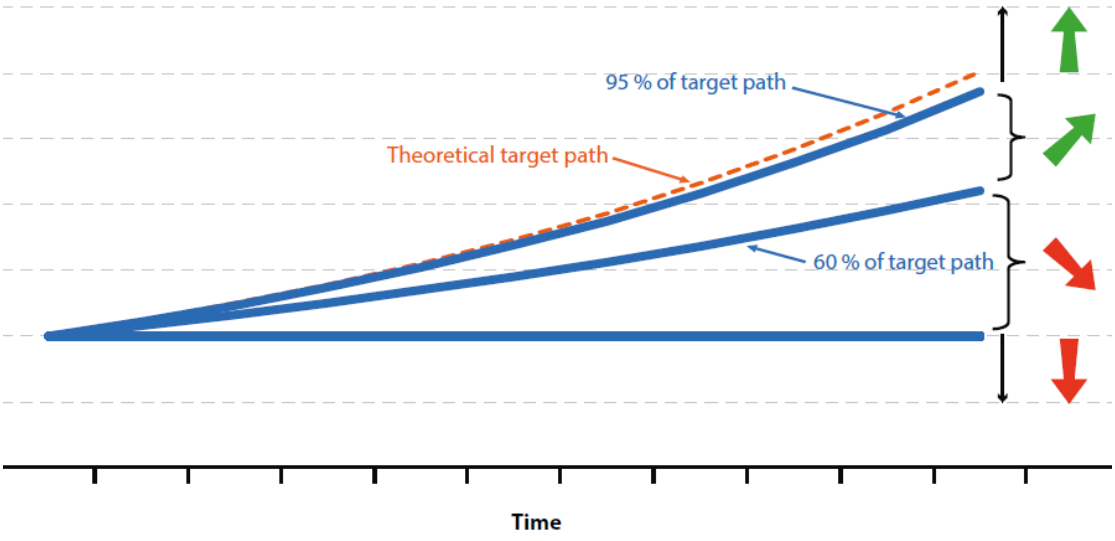

Figure 7: Thresholds for assessing indicators against a quantitative target (example of a target that requires the indicator to increase) [Eurostat, 2021]

The thresholds for comparing an indicator trend to a quantitative goal that calls for a rise in the indicator values are shown in Figure 7 above. This comparison does not take into account the potential future developments of an indicator and is performed for both the long-term (last 15 years) and short-term (past 5 years) periods. The CAGR formula is used to calculate the real and required indicator trends, and includes the following steps (a.1 to a.3):

a.1 ACTUAL (OBSERVED) GROWTH RATE ($CAGR_a$)

$$(a.1)\quad CAGR_a = \left(\frac{y_t}{y_{t_0}}\right)^{\frac{1}{t-t_0}} - 1$$

where:
t_0 = base year
t = most recent year
yt_0 = indicator value in base year
y_t = indicator value in most recent year

a.2 REQUIRED (THEORETICAL) GROWTH RATE TO MEET THE TARGET ($CAGR_r$)

$$(a.2)\quad CAGR_r = \left(\frac{x_{t_1}}{y_{t_0}}\right)^{\frac{1}{t_1-t_0}} - 1$$

where:
t_0 = base year
t_1 = target year
y_{t0} = indicator value in base year
x_{t1} = target value in target year

a.3 RATIO OF ACTUAL AND REQUIRED GROWTH RATE ($R_{a/r}$)

$$(a.3)\quad R_{a/r} = \frac{CAGR_a}{CAGR_r}$$

Figure 8 below shows the thresholds applied for the Ra/r ratio and the resulting symbols.

Ratio of actual and required growth rate	Symbol
≥ 95 %	↑
< 95 % and ≥ 60 %	↗
< 60 % and ≥ 0 %	↘
< 0 %	↓

Figure 8: Thresholds for assessing trends of indicators with quantitative targets (Eurostat, 2021)

b) Indicators without quantitative targets

In contrast to the prior category, in the absence of a quantitative target, it is only possible to compare the indicator trend with the desired direction. If an indicator develops in the proper direction, it is moving towards the SD objectives; if it develops in the incorrect direction, it is moving away from the SD objectives. The CAGR-based observed indicator's rate of change is then contrasted with the following thresholds:

- A change greater of 1% per year is considered 'substantial' and if the change is going in the right direction, "substantial progress toward SD objectives" has been made. If the change is going in the incorrect direction, "substantial movement away from SD objectives" has occurred.
- An annual change in the desired direction which is between 0 and 1% is referred to as "moderate progress towards SD objectives", while a change with these percentages in the opposite direction is considered as "moderate movement away from SD objectives".

Eurostat has been using the 1% limit in its monitoring reports for more than ten years. It has the discernment to guarantee that there has been a major shift in the right direction. Additionally, it enables the presentation of a detailed picture with a sufficient number of indicators belonging to all four categories, as shown in Figure 9. The following method is

used to evaluate trends for indicators without quantifiable targets over both the long-term (15 years) and the short-term (5 years) time frames:

b. COMPOUND ANNUAL GROWTH RATE (CAGR)

$$\text{(b)}\quad CAGR = \left(\frac{y_t}{y_{t_0}}\right)^{\frac{1}{t-t_0}} - 1$$

where:
t_0 = base year
t = most recent year
yt_0 = indicator value in base year
y_t = indicator value in most recent year

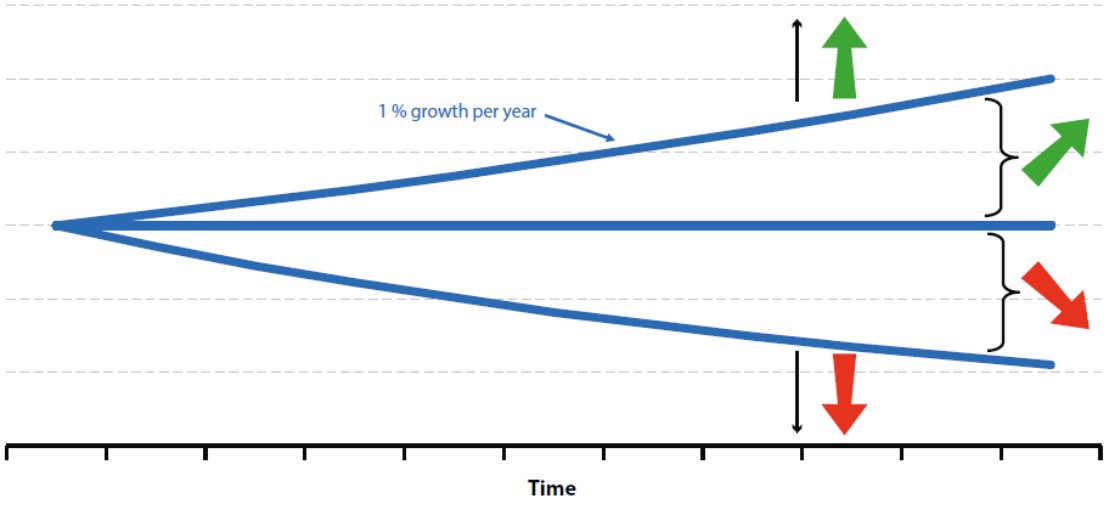

Figure 9: Thresholds for assessing indicators without quantitative targets (Eurostat, 2021)

Figure 9 above depicts the thresholds for evaluating an indicator whose desired direction is upward, while it is reversed for indicators where the desired direction is a decrease.

2.4.3. An overview of the EU's progress toward the SDGs

To form an overall picture of whether the EU has achieved progress towards sustainable development or not (in terms of the objectives and targets defined by the EU),

indicator trends are evaluated based on their average annual growth rate over the previous five years. Referring to the indicators with quantitative EU targets (15 of the total 17), that currently exist in the environmental area, energy consumption, and education, they are evaluated depending on their progress. The other indicators (2 out of the 17) are evaluated based on the direction and pace of change.

Over the period 2015 to 2021 (depending on the data availability), and based on the majority's goal progress as well as mean scores, we conclude that the EU has made progress towards the most SDGs. This progress was not proportional against all indicators, as progress in some goals was significant (6 SDGs), while in others was slower (9 SDGs). The remaining (2 SDGs) are more or less neutral or show a slight removal from the sustainable development objective.

In Figure 10 below, the EU's progress towards the SDGs over the past 5 years is schematically analyzed so as to better understand the trends over the last years (mainly the last five years, depending on the data availability).

Figure 10: Overview of EU progress towards the SDGs over the past 5 years, 2022 (Data mainly refer to 2015–2020 or 2016–2021) [Eurostat, 2022]

2.5. The case of Greece

Greece, as an EU country member since 1981, remains fully committed to the Agenda 2030. The 17 SDGs have been adopted by the Greek Government and are embedded in national policy, in line with European policy. According to the introductory speech of the Prime Minister of Greece in the second voluntary report entitled "Greece's 2022 Voluntary National Review, on the implementation of the 2030 Agenda for Sustainable Development", *all SDGs are monitored equally in order to report progress without shying away from any vulnerabilities*.

For Greece, the SDGs provide an important opportunity for economic growth and transition to a new development model, balancing equally among the three pillars – economic, social and environmental. The SDGs implementation goes far beyond the governmental responsibilities, and embraces all social partners, starting from the local government and the private sector, continuing to the Academic community, NGOs, and civil organizations. The transition to a new development model means that all citizens shall benefit, recognizing the finite nature of certain natural resources.

During the last decade, a major reform took place in Greece, as the share of Renewable Energy Sources in energy consumption – transportation, electricity, cooling and heating – was doubled, from 10.1% in 2010 to 21.7% in 2020. On the other hand, income inequalities were reduced to pre-economic crisis levels of 5.23% in 2020 and poverty declined to 17.7% in 2020, the lowest rate in 11 years (Presidency of the Hellenic Government, 2022). Greece is also reported as one of the two (2021) countries in the European Union (EU) that managed to not move away from any of the 17 Goals, while improving, within a year, its performance in SDGs 2, 7, 10 and 12 (to above the EU average). Policies for clean energy continued to advance largely unretarded and public service digitization accelerated significantly.

On the other hand, the pandemic influenced Greece's efforts to achieve the SDGs, as plans to increase the accessibility and efficacy of health services were negatively impacted. Weak demographic trends, greater female and young unemployment, and a poor record on gender equality are also facts of special concern. Finally, the judicial and waste

management systems have moved beyond their operational limit, causing complications to the society, the economy and the environment.

The Greek Voluntary National Review (VNR) on the implementation of the 2030 Agenda is, to a significant extent, the country's roadmap toward achieving the SDGs. Furthermore, in VNR the progress made at the national level for all 17 Goals is analyzed, while key challenges come to the foreground for each SDG. The progress is mainly assessed through data of relevant SDG indicators that, have been mainly provided by the Hellenic Statistical Authority (ELSTAT).

2.6. Overview of existing academic literature

In Chapter 3 of this thesis, our journey to create a sustainable development business model begins. However, in this section we will review the most relevant scientific literature as well as pay a tribute to all those researchers who have already tackled the issue of sustainability at the operational level. The purpose of our thesis is to supplement these reports so as to further strengthen their arguments, or to shed light on their findings.

The common place of recent sustainability research is that the business leaders are called to support the adoption of sustainable development practices in their operations. Elkington (Elkington, 1999) suggests that businesses have a moral responsibility to ensure that sustainability is on their growth agenda. A few years ago, sustainability was seen by most companies as an issue hardly central to a company's core business. Business managers in the past, were less likely to feel responsible for delivering the SDGs, as they thought that this was a government's territory (United Nations, n.d., http://www.un.org/sustainabledevelopment/sustainable-development-goals/). But nowadays, as companies face a highly unpredictable business landscape, this tends to change. In this sense, businesses have to confront and adapt to a range of urgent matters that include climate change issues, uncertainties associated with rising energy costs, intense competition for raw materials, shrinking natural resources, and financial reforms and

regulations. At the same time, the social and environmental impact of a company is coming under greater scrutiny with demands of higher accountability and transparency from all stakeholders. Hence, embedding sustainability into decision making and formulation of core strategies is becoming a mainstream approach to business-as-usual. Additionally, it is a priority for businesses to bring scalable and profitable solutions to market, in a way to be beneficial for the society and business performance simultaneously (Ghosh & Rajan, 2019). Businesses may be profit-seeking entities, but their long-term profits will not be achievable if their social and environmental issues are not properly managed. Hence, to address the concept of sustainability, the whole company, as well as all its stakeholders in the value chain, should become involved in a new way of thinking and acting (Hilton, 2003).

According to the 2030 Agenda for Sustainable Development, any business plays a critical role in the achievement of these goals (Agarwal et al., 2017). The United Nations Global Compact (UNGC) and the Global Reporting Initiative (GRI) have recently set up a new joint initiative aiming at enabling businesses to incorporate SDG reporting into their existing processes, empowering them to take acion (United Nations Global Compact, 2018).

Moreover, the private sector is under ever-increasing pressure to improve the use of resources on important issues, ranging from climate change to sustainable development (Chakravorti, 2017). A report of the Business and Sustainability Development Commission, lays out the business case for the SDGs and explains why corporations will benefit from factoring the Global Goals into their business strategies (The Business and Sustainable Development Commission, 2016). Particularly, when businesses achieve the Global Goals, they are offered a compelling growth strategy, while the Global Goals need business. Unless private companies seize the market opportunities they open up to themselves, and demonstrate progress on the whole Global Goals package, the abundance of benefits they are offered will not be achieved. Moreover, sustainability opens up new opportunities and big efficiency gains; it drives innovation and enhances reputation. Businesses accompanied by a good reputation for sustainability practices, attract and retain employees, consumers, customers and investors. That is why sustainable companies around the globe are thriving and delivering attractive returns to shareholders.

These optimistic and encouraging voices contradict with many studies which prove that sustainability has a high degree of subjectivity, is often vague in concept and can cause diffusion of interpretation and confusion in practice (Moore et al., 2017). Potentially, this is the reason that Glavic and Lukman suggested that defining sustainable development in a practical way, can be somewhat uncertain, since there are several interpretations that can be deployed (Glavič & Lukman, 2007). Besides, research into the use of the SDG framework has identified that the ammount of the targets (N=169) and indicators (N=232) is numerous and complicated. A research study (Mansell et al., 2019) concluded that a new approach was needed to reduce the scientific and statistical complexity of the SDG measurement framework. In support of the above, the UK's Office for National Statistics (ONS) online portal, responsible for reporting UK's progress against global SDG indicator measurement, showed that, in April 2019, had data only for 163 of the 232 indicators (Mansell et al., 2020).

In conjunction with all these studies and reports, our thesis intends to add its own perspective of sustainability, focusing on the operational level. The challenge is changing business attitudes towards new sustainability practices and business models (Sachs, 2012). And our case is to prove that beyond any obstacles, new opportunities are emerging. We are referring to tangible rules by the model presented in Chapter 4, which when satisfied it is certain that the businesses will move to the right direction, that is towards a sustainable business world.

CHAPTER 3 - A SURVEY FOR BUSINESS SUSTAINABILITY

3.1 The need to use a questionnaire

Corporate Social Responsibility (CSR) is an opportunity for each enterprise to combine economic, social and environmental objectives, in order to enhance their sustainable development prospects (Commission of the European Communities 2009). In this direction, it is important that each enterprise should implement an efficient, cost-effective and sustainable use of physical and non-physical assets, as well as consumables, without ignoring maintenance and safe recycling or disposal. At this point, we should not omit to emphasize the attention that should be paid to human resources, in terms of treating the workforce in a way that its mental balance and physical integrity would be ensured.

Another important factor we should highlight is the interaction between each organization and its stakeholders. Each enterprise is not only committed to its business interests but has to interact flawlessly with a wide nexus in its external surrounding. The surrounding includes the social, cultural, political, economic and technological context and still a group of factors that operate directly or close to the organization, such as clients, suppliers, competitors, unions, NGOs and media. The stakeholders influence each other and their interaction enables the development of common policies and practices against mutual problems or critical issues and abnormalities.

In order we "keep our fingers on the pulse" of what businesses consider as significant relating to sustainability, a survey was conducted in Greece from January to March 2014. Throughout the survey, we expected to perceive the adoption of the principles of sustainable development on the corporate level as well as to generate a new parameter for the SDG indicators, which will be named the "Indicator's Significance Factor (S)" and will be described in detail in the next sections.

For the purposes of the survey, in order to monitor progress toward sustainable development on the corporate level, we decided to use a wide range of indicators that weren't chosen by the current framework of sustainability, as the nowadays framework was adopted later in 2017. For indicators that were not foreseen and weren't included in

our questionnaire, but they are business indicators based on today's framework, values will be given indirectly as will be described later in Section 3.7.

3.2 The questionnaire's preliminary decisions

The construction of the questionnaire had to be preceded by defining the exact information that should be derived from it, as well as to come up with the characteristics of the ideal respondents. Regarding the qualitative characteristics of the respondents, we considered that the ideal target group for our research should consist of a number of managers and senior officers both in public and private entities. Our choice, except for their familiarity with the concept of sustainable development, was especially based on the fact that the senior officer's educational level would be adequate to meet the requirements of our research.

Referring to the information to be collected through the questionnaire, our main concern for our research was to get the real "picture" of the implementation of the principles of sustainable development on the corporate level. To achieve this, we used two different groups of questions. The first group would give information about the knowledge and familiarity of the respondents, regarding sustainable development's definition and principles. Some information would also be drawn relative to the implementation of sustainable development practices, in the organization where each respondent worked. On the other hand, while the first's group questions aimed to give information about the respondent's knowledge of sustainability, the second group's questions aimed to give direct information about the respondent's "corporate attitude" toward sustainable development. Practically, by answering the second group's questions, the respondents would evaluate their business practices toward sustainability. Such assessment, by asking directly the senior officers, would give our research a great advantage that would lie to the fact that we would leverage information directly from those who draw up their corporate's sustainability policy or act on behalf of their management or board of directors.

Having settled down on the exact information to be derived and the respondent's characteristics, it only remained to choose the appropriate method for collecting the data.

As our target was to collect, at least, three hundred answered questionnaires from a wide geographically distributed sample, we ended up that the best method for our case would be to conduct an online survey. The online survey would give us the potential to elaborate to a wider extent than that of a personal interview, reaching our respondents wherever they were, by sending the questionnaire directly to their email (In Section 3.6 "Conducting the survey", a detailed a detailed description of the process is given, regarding the sending of the questionnaire to the respondent's email). This could be practically applied by using a web-based questionnaire, so we just should choose something among the web-based survey tools.

Having conducted market research, we decided that the appropriate software platform was that of the company QuestionPro. Our decision was particularly based on the capability of this tool, to ensure the validity and uniqueness of each response. By characterizing a response as unique, we mean that each respondent won't have the possibility to give multiple answers to each question. The QuestionPro tool would also enable the restriction of multiple responses from the same respondents, ensuring the respondent's authentication and restricting the unauthorized ones to participate. Needless to say, by setting up authentication we ensured our data's validity by keeping away the unrelated respondents (as well as their "junk" responses).

Moreover, a remarkable advantage of the QuestionPro web-based tool was that it would function not only on a PC, but even on a mobile phone or tablet. It would also give the ability for offline use, through an application, gaining in this way an advantage to those who were attracted by cutting-edge technology or wished to respond while commuting.

3.3 Deciding on the form of the questions

By form of the questions, we mean not only the style of each question, but its necessity and its capability to give the appropriate information. For ease of question replying, data processing, coding and analyzing, we resulted to embed Likert-scale questions in our research. Likert-scale questions give the advantage of integrity, limiting the influence of the researcher. On the contrary, they may emerge with some false answers,

for reasons of convenience or for avoiding expressing an opinion. To narrow this phenomenon down, we formed the questions in simple words to make them comprehensible. One other point of interest was each question's order, therefore we decided to place the simpler questions in the beginning, arising in this way the respondent's interest. We also judged that the questions should be divided into sections, grouping together the questions of common interest while for the respondent's convenience, we would embed a short introductory text prior to each group of questions. Finally, the codependent questions would be placed in a row while the most "difficult" questions would be placed at the end of the questionnaire.

3.4 The pretest of the questionnaire

Having stated some important stages, referring to the building of the questionnaire, it would be fundamental for our research that a systematic review should precede its final form. This had to do with the questionnaire's pretesting, to ensure that it would be comprehensible for its readers, bringing to surface problems such as misunderstanding of individual terms or vague questions and concepts.

In our case, we applied the on-field pretesting technique, testing the questionnaire with the aid of twenty reviewers, who were chosen randomly by a sample of university professors, managers and clericals. At the first stage of pretesting, they were asked to answer the questionnaire and to determine whether the questions as well as the whole concept was understandable. In the next stage of pretesting, the reviewers were called to express their opinion about their understanding of the purpose of the questionnaire. Depending on their responses, we were able to decide if some questions were superfluous and should be replaced by others, or even omitted.

3.5 The structure of the questionnaire

The questionnaire, which was designed from scratch, consisted of three main parts. A brief note summary, followed by the main body of the questionnaire and closing with the demographics. In the brief note introduction, the respondents were informed that the questionnaire was a part of a doctoral thesis at Piraeus University, where research was conducted on the application of models of sustainable development in businesses and organizations. They were also informed that their selection was random, by a group of senior officers both in public and private entities. Thus, they were called to give responses to a series of questions, having to do with the understanding and the practical implementation of sustainable development principles. They were also called to evaluate a series of indicators, depending on the importance that their organization gives to each of them. Lastly, the participants were informed of the confidentiality of the survey, emphasizing that the complete data derived from their answers, was intellectual property of the University of Piraeus and would not be used for any other purpose or by a third party.

The next stage of the questionnaire, which was its main part, consisted of a series of questions referring to the concept of sustainable development and was divided into two main parts for ease of management, convenience in data handling and ease of understanding. The first part included general questions which would reveal the participant's knowledge and familiarity with the concept of sustainable development. The questions would also reveal the implementation of sustainable development practices by each respondent's enterprise. On the contrary, the second part would give us information about the "significance" that each respondent's enterprise was giving to a series of sustainability indicators.

To conduct our research, the indicators were divided into four main groups according to the economic, environmental, social or joint dimensions that each of them represented. Our target was to translate physical and social science knowledge into manageable units, so as to facilitate the decision-making process. Moreover, to measure and calibrate progress towards sustainable development goals and provide an empirical basis for evaluating performance, calculating the impact of business activities on the environment and society, and connecting past and present activities to attain future goals.

The last part of the questionnaire consisted of demographic questions. The demographic questions were chosen to give general information for the sample, like gender, age, marital status, level of education, profession, etc. In Appendix II of this thesis, we quote the questionnaire as it was used in our survey.

3.6 Conducting the survey

To determine the extent of the organization's adoption of the principles of sustainable development, a survey was conducted in Greece from January 30th to March 30th, 2014. The survey was conducted online and distributed using email invitations via the QuestionPro website. A number of 405 responses were received, based on a total sample that exceeded 4.500 email invitations.

Regarding the sample of the survey, it consisted of senior officers and assistants in public and private entities and as was previously stated, they were asked to answer the questionnaire by an invitation sent to their email. A serious number of businesses' emails had been collected in the interim period (prior to the conducting of the survey) in direct collaboration with business chambers, which helped us by granting the companies' names, as well as their email. For the purposes of our thesis, it was critical to have a distributed sample, regarding the geographic area of the companies in order to cover the wider possible area of Greece. So, the interaction with the business chambers was characterized as significantly productive, considering the total number of above 4.000 emails we were granted. However, it was not a trouble-free procedure as, due to the legislation, the privacy of data had to be respected. To be more specific, we faced a refusal in being granted personal business emails or even business telephone numbers. This was the main reason that the emails we were granted, mostly included general email addresses instead of the direct email addresses of the representatives or directors of each business. This fact resulted in sending an invitation for the survey to the general email of each business, asking them to fill in our questionnaire. In this case, the recipient of the email had two choices. To reply directly to the questionnaire or to forward the email invitation to his/her manager, in order he/she replied due to competence. This proved to be an ineffective method, considering

that nearly 10% percent of the total replied, from a sample of almost 4.500 email invitations. At this point, we shall clarify that from nearly 4.500 email invitations, only 1.589 recipients viewed the questionnaire and from those who viewed it, only 1.163 started to answer it. Regarding those 426 recipients, who didn't even open the questionnaire, we may explain it as their lack of interest in the concept of sustainable development or their denial of answering any questionnaire.

On the contrary, concerning those 758 recipients who started to answer the questionnaire, but abandoned it before submitting, we may explain it as their refusal to give answers to too many questions (nearly 50) or we may attribute it to their lack of interest in issues addressed in that survey. Needless to say, we were aware of the serious possibility for the respondents to be discouraged due to numerous questions, but we kept the number of questions at that level, as the use of as many sustainability indicators as possible, was critical for our research's conclusions. In Figure 11 below, the survey's statistics are graphically illustrated, while in Appendix II, III and IV of this thesis, we quote the questionnaire (as was used in the survey), and its results as well as its demographics.

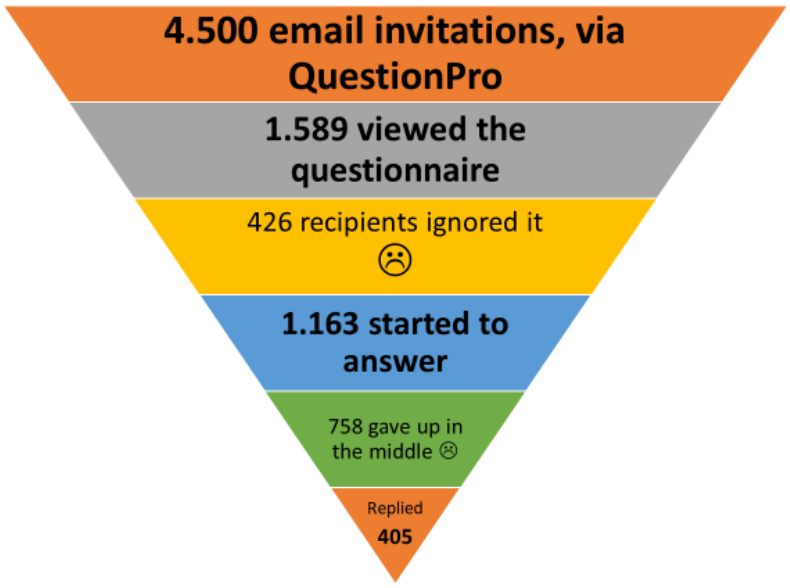

Figure 11: The statistics of the survey

3.7 The results of the survey

By analyzing the answers of the survey, what we mainly extract as information is the attitude of the businesses towards sustainable development principles. Giving businesses the possibility to give a weighting factor to a series of sustainability indicators, evaluating them according to their "business sense of importance", enabled us to create a new coefficient for each sustainability indicator, which was named "Indicator's Significance Factor (S)".

Specifically, the "S" value is a coefficient deriving from the mean value (Boone & Boone 2012) of each indicator, by the respondent's replies to questions 16 to 53 of our questionnaire. For the readers' convenience, in Figure 12 below, we can see for example that the majority of the respondents (35,93%) claimed that the indicator "Participation of women in leadership positions" is considered as "Important" in their business with a mean value of 3,43.

Question-35

Participation of women in leadership positions		
Not at all important	21	5,28%
A little important	46	11,56%
Neutral	129	32,41%
Important	**143**	**35,93%**
Very important	59	14,82%
Total	**398**	

Mean	3,43
Standard Dev.	1,05
Variance	1,10

Figure 12: The prevailing value of the indicators, gives the value of the coefficient "S"

In order to quantify the "S" index, our Likert scale responses were matched with values, ranging from 1 to 5 as follows in Table 1.

Table 1: Quantifying the indicator's importance to form the coefficient "S"

Indicator's importance	Value
Not at all important	1
A little important	2
Neutral	3
Important	4
Very important	5

Calculating each indicator's mean value, what we get is the "Indicator's Significance Factor (S)" for all the sustainable development indicators, as they were recorded in Questions 16 to 53 in our survey. The "S" values for them are imprinted in Table 2 below.

Table 2: The indicator's Significance Factor (S) values

Question	The questionnaire's sustainable development indicator	Indicator's Significance Factor (S)
16	Greenhouse gas emission	2,97
17	Solid waste management / policy	3,56
18	Liquid waste management /policy	3,42
19	Material recycling within the organization, to which you are employed (such as paper collection bins, used batteries cans etc.)	3,91
20	Air quality within the workplace (referring to odors, dust, etc.)	3,73
21	Sound level intensity within the workplace (referring to noise)	3,64
22	Use of ecological materials, environmentally and human friendly as well	3,14
23	Natural heritage protection (referring to natural, not manmade areas)	3,34
24	Employee's net earnings	3,58
25	Employee's additional earnings (for using a private car / paying parking expenses / mobile telephone, etc.)	3,06
26	Employee's participation in the profits of their organization (bonus, shares, bonds etc.)	2,30
27	Innovation's rewarding	3,05
28	Labor's productivity (the results obtained in relation to the number of employees)	3,58
29	Net profit of the organization	3,78

Question	The questionnaire's sustainable development indicator	Indicator's Significance Factor (S)
30	Organization's grant programs (National, E.U or International Grant Programs)	3,05
31	Sponsorships	2,71
32	Investing in research and development	3,19
33	Tertiary education graduate's employment	3,63
34	Disabled people employment, as well as infrastructure development for their access to work	2,89
35	Participation of women in leadership positions	3,43
36	Employee participation in the decision - making process	3,21
37	Service quality	4,24
38	Facilities within the workplace (nursery, restaurant, etc.) and the existence of basic services near the workplace (schools, shops, public services, etc.)	2,51
39	Safety at work (provision of occupational accidents, medical examinations of the workforce)	3,84
40	Safety and quality of the public transport network (accidents restriction, adequate policing etc.)	3,25
41	Social awareness actions	3,04
42	Cultural heritage preservation (monuments, architectural buildings, signs, etc.)	3,00
43	Social partner's (stakeholder's) participation in the decision–making process	2,68
44	Workforce training	3,77
45	Programs to support workforce physical and mental health (in order to reduce work stress and increase efficiency)	2,65
46	Additional insurance or retirement programs	2,61
47	Number of leave days	3,47
48	Corruption and abuse (referring to power and material abuse)	3,80
49	Bureaucracy	3,72
50	Distance travelled to the workplace	3,10
51	Traffic congestion	2,99
52	Quality control	3,88
53	Renewable energy source usage	2,95

At this point, it should be clarified that, though the data we used for calculating the values of the coefficient “S” derive from a survey held in 2014, we strongly believe that, as the social, political and economic conditions since yet in Greece have not changed significantly, the values of the coefficient “S” will not have changed significantly either. For indicators that were not foreseen and weren’t included in our questionnaire, but are business indicators based on today's framework, values shall be given indirectly. For instance, for the health indicators as well as many of the education indicators, which had not been included in the questionnaire, we consider that according to the Greek Constitution, the EU Charter of Fundamental Rights as well as EU and National laws, “Health care” and “Education” are considered as fundamental human rights and consequently the corresponding indicators shall take the maximum “S” value (specifically the value 5).

CHAPTER 4 - A SUSTAINABLE DEVELOPMENT BUSINESS MODEL

4.1. The basic principles of the model

The sustainable development model, applicable to the business level, has been the core purpose of this thesis. Adapting the definition of sustainability at the business level, we could say that "business sustainable development" means adopting business strategies and activities that meet the needs of the enterprise and its stakeholders today while protecting, sustaining, and enhancing the human and natural resources that will be needed in the future (International Institute for Sustainable Development in conjunction with Deloitte & Touche and the World Business Council for Sustainable Development, 1992).

The consideration that if an organization adopts sustainable practices, even on a small scale, can have significant impacts in the long term, has been the strongest motivation to implement such a model in our thesis. After all, it's not a coincidence what the "Friends of the Earth" (an international environmental organization focusing on the United Kingdom) had written: "*if every UK office worker used just one less staple per year, 120 tons of steel would be saved".*

Having settled down to embody such a sustainability model in our thesis, our main concerns for this model were:

a) To build a tool which helps businesses to choose the appropriate SDG indicators, in order to achieve their sustainability goals.
b) To build a model that calls businesses to choose the right mix of SDG indicators, that will cover all three pillars of sustainability.
c) To include another tool in the business decision-making process, through which the businesses as well as stakeholders' interests, concerns and expectations, will be met.
d) To enable a sustainability monitoring process, related to the organization's economic, social and environmental priorities.

e) To enable the sustainability reporting process, regarding the organizations' area of success.
f) To build an easy-to-implement model, which will not necessarily require special software but a commonly used spreadsheet software.

By the implementation of the proposed sustainability business model a significant part of the sequence of the SDG Compass, particularly steps 1 to 4 as presented in Figure 13, will have been achieved, giving an advantage to those businesses which develop such procedures within their operational scope (SDG Compass, 2015). Additionally, the necessary conditions will be created so that business strategies will align with global priorities, while businesses will enjoy the benefits of strengthening their linkage with the stakeholders, capitalizing on new business opportunities, encouraging sectoral synergies, and using a common language for achieving their common goal.

As mentioned before, the aim of proposing this "sustainability" model is to enrich the already existing corporate decision-making tools and when implemented by policymakers, corporate managers, or management engineers, to enable the integration of economic, environmental, and social objectives of their business.

Figure 13: Overview of the SDG Compass.

4.2. Incentives for aligning businesses practices with the SDGs

The implementation of the SDGs at the national level is without doubt a governmental case. But, it would be impossible to achieve the goals without a meaningful contribution by the business sector. This is justified by the fact that the "UN's 2030 Agenda for Sustainable Development" is calling on businesses "to apply their creativity and innovation to solving sustainable development challenges. Based on another interpretation of why businesses need the SDGs, it has been reported that "*businesses cannot thrive in societies that fail, and long-term success hinges on the SDGs being realized"* (The World

Business Council for Sustainable Development, n.d., https://sdgessentials.org/what-the-sdgs-mean-for-business.html).

Obviously, concerning the adoption of the SDGs, businesses have an enhanced role to play as they contribute to economic expansion. When businesses align themselves with the SDGs, they will most likely prosper in the long run. The SDGs' implementation supports stable societies and markets, two main factors for corporate success as well. According to the Business & Sustainable Development Commission, by implementing sustainable practices cost savings, revenue new streams and millions of jobs can be generated in the long run. Concluding, we could admit that business prosperity and adoption of the SDGs are entirely interconnected.

By the above mentioned, it is implied that the appropriate goal selection, referring to the priorities defined across the SDGs, is essential for the businesses in order to gain new growth possibilities while lowering their risk profiles. By using the appropriate measurable and time frame indicators, businesses can overcome sustainable development challenges and enhance the achievement of their goals. In this Chapter, we will advance new techniques for the SDGs selection at the corporate level, that will enhance the sustainability rule's implementation in the decision-making process.

4.3. Model building steps

The indicator framework of the 2030 Agenda for Sustainable Development, which was adopted by all United Nations Member States in 2015 and by the General Assembly on 6 July 2017, consists of 17 main Sustainable Development Goals (SDGs), which represent an urgent call for action. The SDGs are defined in a list of 169 SDG targets, while progress toward these targets is monitored by 232 indicators, as presented in Appendix I of this thesis.

When looking at the indicators, it is obvious that the majority of them are primarily indicators of national and less of business interest. By making thorough filtering, regarding the indicators that could be used on the business level, we end up with a number of only 76 indicators out of a total number of 232 to be business oriented. In Appendix 1, one can

find the list of the SDGs while the "inappropriate" business indicators are presented in red colour (highlighting in white the reason for their unsuitability for business use). On the contrary, the 76 indicators, which are suitable for business use, are highlighted in green colour.

4.4. Data collection for our model

Having divided the SDG indicators into business-oriented and "non-appropriate" for business use ones, our next step was to focus to the data mining for the 76 business-appropriate indicators. Measuring progress on meeting SDG targets also requires making extra efforts to improve the quality of data, explore new sets of metrics and the use of these to provide indicators of progress that may help to construct impact assessment of different policies (Goyeneche et al., 2022).

For the preparation of our thesis, we decided that the data would refer to the 27 EU countries (excluding the UK, which has not been a member of the Union since 2020). In this way, the data would be relevant to the Greek business reality as Greece adapts to European legislation and generally follows the EU framework. Another benefit, of the use of data referring to all EU countries, has to do with their availability, as the statistical office of the European Union (Eurostat) has a dedicated section on sustainability that provides the key findings of the most recent Eurostat monitoring of the EU's progress towards the SDGs (https://ec.europa.eu/eurostat/web/sdi/database).

Consequently, our main source of data was the database of Eurostat (https://ec.europa.eu/eurostat/web/main/data/database), though not all data were found in it. This means that for the indicators' data that weren't found in Eurostat's database, we turned to mine them in the corresponding database of the United Nations (https://unstats.un.org/sdgs/dataportal/database) as well as that of the Organization for Economic Co-operation and Development (https://www.oecd-ilibrary.org/social-issues-migration-health/the-short-and-winding-road-to-2030_af4b630d-en). At this point, it is worth mentioning that, alongside with these actions, we submitted a written request to the Greek Statistical Authority (ELSTAT) to be granted with further SDG data but such data

were not provided to us. As ELSTAT policy is to always provide such data, especially for research purposes, we assume that no additional data exist (beyond those being published on ELSTAT website).

By the above-described "mining procedure", we eventually found data for 64 of 76 SDG business-oriented indicators, as shown in Table 3. The data, dating upon availability from 2010 to 2021, concerned exclusively the countries of the EU (not including the UK) and were analyzed on an annual basis, using the simple linear regression model (with the help of MS Excel) in order to create the indicator's trends.

Table 3: The 64 indicators where data exist

	SDG indicators (where data exist)
1	1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
2	1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)
3	2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size
4	2.4.1 Proportion of agricultural area under productive and sustainable agriculture
5	3.1.1 Maternal mortality ratio
6	3.1.2 Proportion of births attended by skilled health personnel
7	3.2.1 Under-5 mortality rate
8	3.2.2 Neonatal mortality rate
9	3.3.2 Tuberculosis incidence per 100,000 population
10	3.3.4 Hepatitis B incidence per 100,000 population
11	3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
12	3.4.2 Suicide mortality rate
13	3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders

	SDG indicators (where data exist)
14	3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol
15	3.8.1 Coverage of essential health services
16	3.8.2 Proportion of population with large household expenditures on health as a share of total household expenditure or income
17	3.9.1 Mortality rate attributed to household and ambient air pollution
18	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)
19	3.9.3 Mortality rate attributed to unintentional poisoning
20	4.1.1 Proportion of children and young people (*a*) in grades 2/3; (*b*) at the end of primary; and (*c*) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
21	4.1.2 Completion rate (primary education, lower secondary education, upper secondary education)
22	4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex
23	4.3.1 Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months, by sex
24	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill
25	4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated
26	5.5.2 Proportion of women in managerial positions
27	6.3.1 Proportion of domestic and industrial wastewater flows safely treated
28	6.4.1 Change in water-use efficiency over time
29	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources
30	7.2.1 Renewable energy share in the total final energy consumption
31	7.3.1 Energy intensity measured in terms of primary energy and GDP
32	8.2.1 Annual growth rate of real GDP per employed person
33	8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP

	SDG indicators (where data exist)
34	8.5.1 Average hourly earnings of employees, by sex, age, occupation and persons with disabilities
35	8.5.2 Unemployment rate, by sex, age and persons with disabilities
36	8.6.1 Proportion of youth (aged 15–24 years) not in education, employment or training
37	8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status
38	8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate
39	8.10.1 (*a*) Number of commercial bank branches per 100,000 adults and (*b*) number of automated teller machines (ATMs) per 100,000 adults
40	8.10.2 Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider
41	9.2.1 Manufacturing value added as a proportion of GDP and per capita
42	9.2.2 Manufacturing employment as a proportion of total employment
43	9.3.1 Proportion of small-scale industries in total industry value added
44	9.4.1 CO_2 emission per unit of value added
45	9.5.1 Research and development expenditure as a proportion of GDP
46	9.5.2 Researchers (in full-time equivalent) per million inhabitants
47	10.1.1 Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population
48	10.3.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law
49	10.5.1 Financial Soundness Indicators
50	10.c.1 Remittance costs as a proportion of the amount remitted
51	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
52	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)
53	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
54	12.4.2 (*a*) Hazardous waste generated per capita; and (*b*) proportion of hazardous waste treated, by type of treatment
55	12.5.1 National recycling rate, tons of material recycled
56	12.6.1 Number of companies publishing sustainability reports
57	12.b.1 Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability

	SDG indicators (where data exist)
58	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population
59	13.2.2 Total greenhouse gas emissions per year
60	14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations
61	15.2.1 Progress towards sustainable forest management
62	16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age
63	16.1.3 Proportion of population subjected to (*a*) physical violence, (*b*) psychological violence and (*c*) sexual violence in the previous 12 months
64	16.b.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law

In Figure 14 below we can see the 12 indicators for which no data were found.

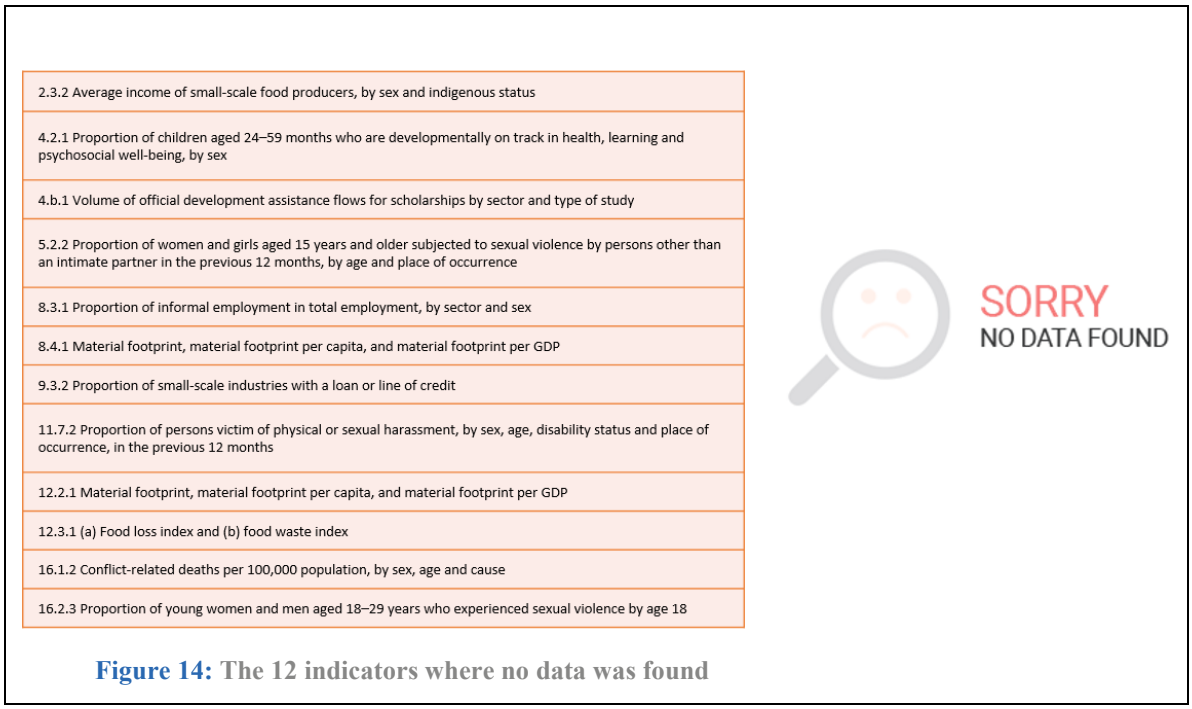

Figure 14: The 12 indicators where no data was found

In order to provide complete information about the source of each indicator's data, we must point out that the Eurostat database was used for the SDG indicators 2.4.1, 3.3.2, 3.3.4, 4.1.2, 4.2.2, 4.3.1, 4.4.1, 5.5.2, 7.2.1, 7.3.1, 8.2.1, 8.6.1, 8.8.1, 8.9.1, 8.10.1, 8.10.2, 9.2.1, 9.2.2, 9.3.1, 9.4.1, 9.5.1, 9.5.2, 10.1.1, 10.3.1, 10.5.1, 10.c.1, 11.5.1, 11.6.2, 12.2.2,

12.4.2, 12.5.1, 12.6.1, 12.b.1, 13.1.1, 13.2.2, 14.3.1, 15.2.1, 16.1.1 and 16.1.3. On the contrary, the OECD database was used for the SDG indicators 3.1.1, 3.9.1, 3.9.2 and 6.3.1 while the UN database was used for the rest of the indicators.

We should also highlight that the COVID-19 pandemic, having a universal effect on several aspects of our life, did have an effect on this thesis too. The pandemic may have revealed new forms of data mining and demonstrated the value of innovation to fill data gaps for greater accuracy, timeliness, and granularity, by the use of non-traditional sources – including citizen science, social media, and earth observation data (Sachs et al., 2022). For our data though, we had to omit the value of SDG indicator 1.5.1 for the year 2020, as it was disproportionately large compared to the values of the previous years. In Figure 15 statistics concerning our data are presented, where we can see that from the total pool of 232 indicators, only 76 are appropriate for use on the corporate level, while data were found for 64. At this point, it should be mentioned that of the 64 indicators, indicators 1.5.1, 11.5.1 and 13.1.1 are identical but allocated to diferrent goals. The same applies to indicators 1.5.2 and 11.5.2, indicators 8.4.2 and 12.2.2 as well as indicators 10.3.1 and 16.b.1.

Figure 15: Statistics concerning our data

4.5. Creation of the indicator's trendlines

In this section we will deal with the relationship of the indicators with the years, specifically to determine the statistical relationship that exists between them. Statistical relationships, although do not provide the precision of a functional one, are the best way to study a phenomenon or problem since phenomena are governed by laws of chance and uncertainties that cannot be expressed in a functional relationship, which always idealizes reality (Papaioannou & Loukas, 2002).

The statistical methodology that uses the relationship between two or more quantitative variables, so that one can be determined by the other is called Regression Analysis. As dependent variable (y), we consider the value of each indicator and as independent value (x), the value of the years. Our purpose is to create a straight line which will graphically represent the general trend with which each indicator evolves over the years, by using the simple linear regression method. This straight line will be an equation of the form $y = b_1X + b_0$ where b_0, b_1 are the unknown parameters of the model, y_i where i=1, 2, ..., 10 are the values of each indicators (the dependent variable), x_i, where i=1, 2, ..., 10 are considered the years (independent value). The parameters b_0 and b_1 of the model are called regression coefficients, where b_1 is the slope of the regression line and shows the change **(Trend)** in the mean value of the distribution of y for each unit increase in value x.

It is understood that a proper methodology for regressing time series would involve collecting large samples of data, testing for stationarity with unit root tests, detrending and stationarizing nonstationary time series depending on the type of nonstationarity, and then estimating regression models on the stationarized variables. Nevertheless, given the extremely small sample sizes available in this section, the naive approach adopted provides a valuable overview.

Using Excel, each indicator's trend is represented in Appendix II, depicting essentially the change in the mean value of the indicator over the years. By having analyzed, individually each one of these indicators, we observed the existence of two different groups of them. The first group of indicators, as shown in Figure 16, includes those whose positive trend states that the correct actions are taken towards achieving the

goals of sustainable development, while the second group, as shown in Figure 17, includes the indicators whose negative trend indicates the correct actions are taken by a business towards sustainability. Referring to the trend value so as to be fully comprehensible, the exact trend value of indicator 2.4.1 in Figure 16 is "0.4097", while the exact trend value of indicator 3.1.1 in Figure 17 is "-0.2108".

Lastly, for this thesis convenience, we name the indicators whose positive trend shows improvement as "Positive trend SDG indicators" while the indicators whose negative trend shows the same, as "Negative trend SDG indicators". It is worth mentioning that the total number of the first group amounts to 28 indicators, while the total number of the second group to 36. As shown in Table 4, the indicators are assorted into groups, with the third column of this table being each indicator's trend value (T_{EU}).

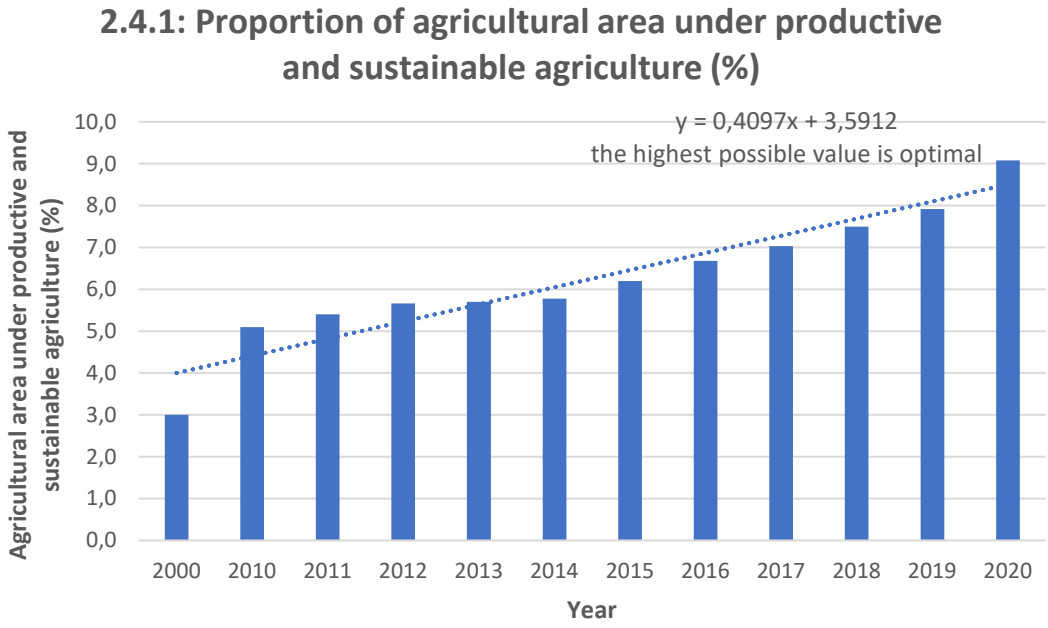

Figure 16: An example of a positive trend indicator

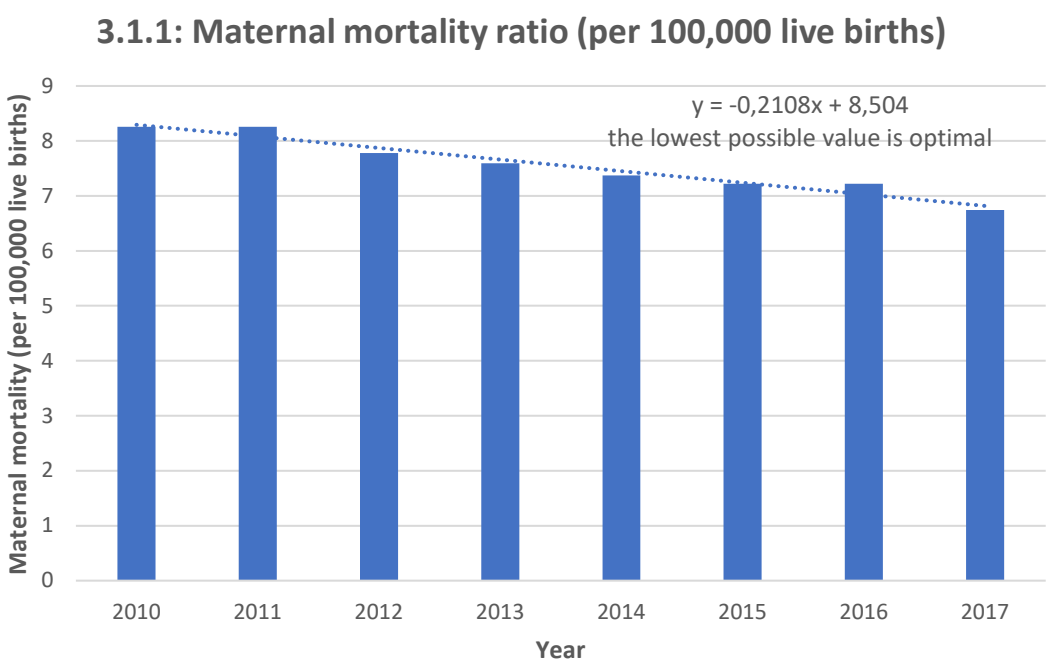

Figure 17: An example of a negative trend indicator

Table 4: Trend values of the SDG indicators

Positive trend SDG indicators	Negative trend SDG indicators	EU Trend Value (T_{EU})
	1.5.1, 11.5.1, 13.1.1	-0.3862
	1.5.2, 11.5.2	0.000008
2.3.1		10,848
2.4.1		0,4097
	3.1.1	-0,2108
3.1.2		-0,0168
	3.2.1	-0,1016
	3.2.2	-0,0534
	3.3.2	-0,749
	3.3.4	-0,0391
	3.4.1	-1,2019
	3.4.2	-1,1907

Positive trend SDG indicators	Negative trend SDG indicators	EU Trend Value (T_{EU})
3.5.1		-1,8403
	3.5.2	-0,0538
3.8.1		1,6296
	3.8.2	0,0767
	3.9.1	2,6667
	3.9.2	3,3437
	3.9.3	-0,1926
4.1.1		-1,04
4.1.2		0,3507
4.2.2		0,2119
4.3.1		0,2266
4.4.1		0,2
	4.5.1	-0,0059
	5.5.2	-1,764
6.3.1		-0,3831
6.4.1		8,531
	6.4.2	-0,2497
7.2.1		0,6648
	7.3.1	-12,398
8.2.1		285,49
	8.4.2, 12.2.2	0.00000001
8.5.1		-0,73
	8.5.2	-0,5032
	8.6.1	-0,2993
	8.8.1	-0,0588
8.9.1		0,2715
8.10.1		-0,7562
8.10.2		2,3125

Positive trend SDG indicators	Negative trend SDG indicators	EU Trend Value (T_{EU})
9.2.1		0,1038
9.2.2		-0,0323
9.3.1		-0,5329
	9.4.1	-0,0034
9.5.1		0,0263
9.5.2		0,0384
10.1.1		0,0108
	10.3.1, 16.b.1	-1,225
10.5.1 (a)		-2,083
	10.5.1(b)	-1,8271
	10.5.1(c)	-0,3978
10.5.1 (d)		-0,0901
10.5.1 (e)		0,7524
10.5.1 (f)		0,0568
	10.c.1	-0,473
	11.6.2	-0,5072
	12.4.2	13,029
12.5.1		1,0191
12.6.1		7,5524
12.b.1		-0,0542
	13.2.2	-1,1209
	14.3.1	0,0019
15.2.1		47,02
	16.1.1	-0,0455
	16.1.3	-0,285

4.6. The main concept of the corporate sustainability model

The core concept of our model is to show progress, as well as areas for improvement. To not simply adjust the metrics of progress, but to open up and make more transparent the debate on what progress is, whose interests it serves, and with what results (Pintér et al., 2018). In our case, progress is assessed from a business perspective, so in order for each business to positively contribute to the sustainable development principles, the business indicator's trend value (T_B) should be superior to the corresponding value of the EU average (T_{EU}). Comparing the two trends, T_B to T_{EU} does not necessarily ensure that business sustainability will be achieved within a certain time horizon. However, since SDGs are still not legally binding and as no specific time point for their achievement has been set, trend comparison is an undisputed method to capture the deviation of each business sustainability performance from an average reference value. Antoine de Saint-Exupéry quoted "the time for action is now and it's never too late to do something" and this is our own worldview as well.

Despite that, though the United Nations' Sustainable Development Goals (SDGs) are an urgent call for action by all countries while balancing social, economic, and environmental sustainability, they are eventually addressed to all actors in society. But, both academia and professionals recognize the particular importance of businesses in order to achieving global development (Mio et al., 2020).

According to the aforementioned, the condition of the T_B being superior to the T_{EU} is satisfied:

a) for the "positive trend SDG indicators", when $T_B > T_{EU}$ while

b) for the "negative trend SDG indicators", when $T_B < T_{EU}$.

In both the above cases, the business moves faster and contributes more to sustainability than the average of the EU countries, thus speeding up the achievement of the common goal.

In the opposite case, that is when:

c) for the "positive trend SDG indicators", when $T_B < T_{EU}$ while

d) for the "negative trend SDG indicators", when $T_B > T_{EU}$.

the business moves slower and contributes less than the average of the EU countries, resulting in delaying the achievement of their common sustainability goal. In Table 5 below, we can see the four cases diagrammatically.

Table 5: The positive and negative trend SDG indicators' cases

For "Positive trend SDG Indicators"	For "Negative trend SDG indicators"	Diagnosis
(a) If $T_{EU} > T_B$	(b) If $T_{EU} < T_B$	The business contributes to sustainability less than the average of the EU countries, resulting in delaying the achievement of their common goal.
(c) If $T_{EU} < T_B$	(d) If $T_{EU} > T_B$	The business contributes to sustainability more than the average of the EU countries, resulting in speeding up the achievement of their common goal.

By the above, it is obvious that in cases "a" and "b" the business needs to adjust the selected indicator's policy, in order to achieve the SDG objectives, while in cases "c" and "d" the business contributes positively to the achievement of the common goal.

Table 6: Values of the positive and negative trend SDG indicators

For "Positive trend SDG Indicators"	For "Negative trend SDG indicators"	Business actions to be taken
(a) If $T_{EU} > T_B$	(b) If $T_{EU} < T_B$	The business needs to adjust its policy (referring to the selected indicator), in order to achieve the SDG objectives
(c) If $T_{EU} < T_B$	(d) If $T_{EU} > T_B$	The business contributes positively to the achievement of the SDG objectives (referring to the selected indicator), so keep up the good work

By the above Table 6, we realize that each business would definitely contribute to the sustainable development goals, even in a small percentage, if it managed to optimize

all its T_B, so as to be superior compared to the general trend value of the corresponding indicator of the EU (T_{EU}). In order for businesses to focus on the right sustainable development indicators, that is to indicators whose trend values must be improved, in our proposed sustainability model, the businesses are called to:

a) **Select a subset from the pool of 64 indicators of Table 3.** The indicators to be chosen should directly relate to their operations activities and should be accompanied by data. These indicators should also be subject to improvement, as indicators for which the optimum value has been achieved or their change is not allowed due to the current institutional framework are not eligible indicators in our model.

b) **Categorize the selected indicators to "Positive" or "Negative trend SDG indicators").**

c) **Calculate their business indicator's Trend (T_B)**. The data for the calculation of the business indicator's trend (T_B) will be collected by the initiative of the businesses themselves. These refer to data from the previous years (in our case since 2010), and according to their nature may be found in sources such as their financial statements or accounting books, business event and log books, administrative or any type of board minutes or any other available sources. For example, the workplace accidents of the previous years are usually recorded in an incident book of the business, under the supervision of a safety technician. On the other hand, the number and gender of the members of the Board of Directors are recorded in the business board minutes, the financial data are recorded in business financial statements, the mass of recycled materials are recorded in the relevant company's statements etc. From the above mentioned, it becomes clear that in case a company cannot find data for some indicators, then it will not be able to calculate that indicator's trend value and consequently choosing such an indicator is of no use.

d) **Compare the selected indicators trends (T_B to the T_{EU}) and allocate them in categories "a" to "d" as described in Table 5** and

e) **Consider as "first line" (eligible) indicators those of categories "a" and "b",** while **set aside those of the categories' "c" and "d" (not eligible).**

Summarizing our thesis so far, by using the EU countries' data which gave us the rate of change of SDG indicators' over time, we may highligh the business indicators which need to be improved. Indicators of categories "a" and "b" (as described in Table 4.8), will be the eligible for our model, which practically means that a business policy readjustment is required in order for the businesses to achieve sustainable development goals. In the next stage of our model, businesses are called to prioritize the eligible indicators in the light of achieving the SDGs at the lowest possible cost.

In Table 7 below, the path to the indicators' eligibility (as described in detail in the previous paragraphs of this section) is summarized, characterizing the indicators (in the first column) as "Low Performance Indicators" or "High Performance Indicators", depending on their performance compared to the EU average trend.

Table 7: Indicator's eligibility rules concerning our model

Indicators Status	**For "Positive trend SDG Indicators"**	**For "Negative trend SDG indicators"**	**Diagnosis**	**Business actions to be taken**	**Indicator's eligibility rule**
Low-Performance Indicators	(a) If $T_{EU} > T_B$	(b) If $T_{EU} < T_B$	The business contributes to sustainability less than the average of the EU countries, resulting in delaying the achievement of their common goal.	The business needs to adjust its policy (referring to the selected indicator), in order to achieve the SDG objectives	This indicator must be selected. It will be further used in our proposed sustainability business model
High-Performance Indicators	(c) If $T_{EU} < T_B$	(d) If $T_{EU} > T_B$	The business contributes to sustainability more than the average of the	The business contributes positively to the achievement	It's not a priority to select this indicator, not

			EU countries, resulting in speeding up the achievement of their common goal.	of the SDG objectives (referring to the selected indicator), so keep up the good work	eligible for our model

4.7. A cost-effectiveness factor in the corporate sustainability model

In the previous section, we have demonstrated that the "Low-Performance Indicators" are the eligible ones, as business indicators that need to be improved prompting businesses to readjust their policy. In this section, the "Low-Performance Indicators" will be further processed, under the prism of economic factors, in order for the businesses to achieve their SDG objectives in a cost-effective way.

As readjusting business policy entails a business process reformation, it is a case of the upper management making the corresponding reforming decisions. Although it is not improbable that these decisions may prove costless, the reforming of the business policy usually involves additional costs (to a greater or lesser extent) and further investments.

In most cases, the costs for business reforms includes the business staff training, new equipment, additional employees, or all of these together. Consequently, it makes perfect sense for a business to focus on improving the "Low-Performance Indicators", but prioritize those that do not increase disproportionately the business costs. In order to achieve this, businesses should prioritize in particular "Low-Performance Indicators", with regard to the principle of cost minimization which is based on the theory that the resources that will be used for improving the indicators should be just the necessary (minimal quantity) and at the most economical price.

This conception becomes even more important if we consider that many businesses are keen to adopt more sustainable ways of working but are fearful of the price tag.

Moreover, the most common tensions that seem to emerge when firms decide to implement sustainable practices in their business networks, are of an economic nature. Economic tensions refer to conflicts among the stakeholders, which involve expectations or demands from one stakeholder to the others, in order to invest or bear the costs into technologies or new processes that would be aligned with specific sustainable business practices. The result is the stakeholders are often perceiving these expectations as asymmetric or unfair. For example, several firms had increased their research and development budgets, or invested into new environmentally friendly or modernized technologies, at the expense of postponing, freezing, or sometimes completely abandoning efforts to develop or expand their current sales, service, or production organizations (Tura et al., 2019).

In addition, uncertainty about regulation and taxation, the high upfront cost of climate investments and the availability of skilled staff are factors that lead firms to cite the upfront costs as an obstacle to investment. At the same time, firms often do not consider climate change investment to be a core business investment activity (European Investment Bank, 2021, https://data.europa.eu/doi/10.2867/904099).

There are various reasons of low sustainability reporting too; high reporting cost, lack of resources, inconsistency in disclosure practices, difficulty in measuring performance and difficulty in rousing the companies to be proactive in sustainability reporting (Shad et al., 2019).

In this section, despite the less optimistic reports that support that in the long run, the current population size and resource use are not sustainable with any one goal or combination of the goals (Henderson & Loreau, 2023), we put measures in place to address sustainable business practices considering financial parameters, such as the rewarding efficiency of a business shift towards the goals of sustainable development, combined with the cost that will be required for their reformation so as to achieve the SDGs. Complementary, we will prove that when further expenses are required for achieving the SDGs, then each business case is to ensure that the benefits associated with their achievement (coming from the business process adjustment) should be at least equal to the cost that was required for it. In each case, when there are both potentially positive and negative outcomes to consider, the businesses are called to choose, including making trade-offs between contradictory goals and business strategies. Moreover, we cannot ignore that

the cost for the SDGs' achievement, combined with their future results, involves elements of risk. The main factors for evaluating risk, apart from its magnitude, consist of financial, sustainability, resilience, ethical and legal criteria, the effectiveness of controls in reducing or managing the risk, the maximum impact if controls are not present or fail, the timing of the consequences, the costs of controls and stakeholder views (IEC 31010:2019, 2019). By the aforementioned, it becomes clear that this wide range of risk evaluating factors, intensified by the fact that the attainable costs and benefits by the achievement of the SDGs may vary among the stakeholders, creates an environment of decision-making under uncertainty. As risk assessment techniques aim to help us understand uncertainty, the business actions towards the SDGs will be evaluated by weighing the risk arising from the estimate of the cost of achieving the Sustainable Development Goals. This will be implemented by a cost-benefit analysis with the help of a risk matrix, where consequence and likelihood can be combined to give a level of risk and put risks in a rank order. The consequence/likelihood matrix will consist of two scales, the first being the impact rating and the second being the likelihood one.

The impact rating will reflect the additional business cost of the adoption of new sustainable development practices, by taking into consideration the time of maintaining a positive cash flow so that a business shall be able to continue to pay its operating or other expenses and debts. At this point, we should notice that the main types of a business cash flow consist of operating, investing and financing cash flow. Operating cash flow is the net cash generated from a company's regular business operations. Investing cash flow is cash generated from a company's investment-related activities while financing cash flow is the cash linked to financing activities between a company and its investors, owners, or creditors so as to fund the company. We should also highlight that a cash flow position refers to an organization's level of cash relative to its liabilities. A stable cash position enables a company to cover its current liabilities with a combination of cash and liquid assets. A business' healthy cash position, beyond its current liabilities, means more cash is coming in than going out, which is essential for any business to sustain long-term growth. In our case, business practices towards the SDGs are evaluated in terms of the costs involved by their implementation, in the sense of financial security over time.

Consequently, business actions towards the SDGs, are evaluated according to the effect they will have on the cash reserves of each business.

On the contrary, the likelihood rating will be a combinatory factor, as the product of the assessment of achieving cost savings or revenue growth (by adopting new sustainable development practices) combined with the estimated time of achievement. In this case, the resulting value will essentially be an assessment (by the business policy makers) regarding whether the achievement of the sustainable development goals will bring about cost savings or revenue growth combined with an estimation of the time this will be achieved. By the risk matrix below, a new coefficient which is called the "SDGs cost-effectiveness factor (F)" will be derived. For implementing the "F" coefficient in our model, it is critical to determine particular values such as the estimated cost required for the business reformation (in order to achieve the SDGs), the estimated completion time as well as the financial footprint of such sustainable business practices (which translates to cost savings or revenue growth). In order for the executives of all businesses to be able to implement the model of our thesis, we will consider that the possibility of the businesses engaging to the SDGs practices as well as their probability of achieving the goals is indifferent to the size of the businesses. The same admission applies for the time of achievement, so the time that a business needs to reach its SDGs is indifferent to its size too. We will also consider that critical financial data such as the cost of achieving the objectives of Sustainable Development as well as the potential savings, although they are significantly differrent depending on the business size, they nevertheless can be used commonly for all businesses when expressed as a percentage of their past years' financial data. Concerning cost savings or revenue growth, business executives shall provide an estimate of the change in a given time frame (as a percentage change) either on the cost savings or on the revenue growth, resulted from a set of business actions towards the SDGs, compared to the corresponding data of the previous year. Consequently, the change in cost or profit data will be of the form of a percentage interval with a progressive step of 20%, while the time of achievement will be defined as immediate, short, mid and long term.

The "F" coefficient, which actually express the SDGs business cost footprint versus their potential to bring about savings in a specific time frame, takes values between -4 to 80 as we may see in Table 8 below. As a rule, the smaller the value of the coefficient "F",

the more likely it is that the examined business SDG indicator should be selected, while the higher the value of "F" the lower the probability of the indicator's selection. Consequently, the lower the "F", the better for an indicator's selection, specifying that the negative values of "F" express financial loss so it is vitally important to omit such indicator's selection.

Table 8: A cost effectiveness risk matrix

		IMPACT RATING			
		Review of business practices requiring no investment cost (1)	**Review of business practices requiring low investment cost (2)**	**Review of business practices requiring moderate investment cost (3)**	**Review of business practices requiring high investment cost (4)**
LIKELIHOOD RATING	**Immediate achievement of high scale cost savings or high scale revenue growth (1x1)**	1	2	3	4
	Immediate achievement of relatively high scale cost savings or relatively high scale revenue growth (1x2)	2	4	6	8
	Immediate achievement of moderate scale cost savings or moderate scale revenue growth (1x3)	3	6	9	12
	Immediate achievement of relatively low scale cost	4	8	12	16

	savings or relatively low scale revenue growth (1x4)				
	Immediate achievement of low scale cost savings or low scale revenue growth (1x5)	5	10	15	20
	Short-term achievement of high scale cost savings or high scale revenue growth (2x1)	2	4	6	8
	Short-term achievement of relatively high scale cost savings or relatively high scale revenue growth (2x2)	4	8	12	16
	Short-term achievement of moderate scale cost savings or moderate scale revenue growth (2x3)	6	12	18	24
	Short-term achievement of relatively low- scale cost savings or relatively low scale revenue growth (2x4)	8	16	24	32
	Short-term achievement of low-scale cost savings or low scale revenue growth (2x5)	10	20	30	40

	Mid-term achievement of high scale cost savings or high scale revenue growth (3x1)	3	6	9	12
	Mid-term achievement of relatively high scale cost savings or relatively high scale revenue growth (3x2)	6	12	18	24
	Mid-term achievement of moderate scale cost savings or moderate scale revenue growth (3x3)	9	18	27	36
	Mid-term achievement of relatively low scale cost savings or relatively low scale revenue growth (3x4)	12	24	36	48
	Mid-term achievement of low scale cost savings or low scale revenue growth (3x5)	15	30	45	60
	Long-term achievement of high scale cost savings or high scale revenue growth (4x1)	4	8	12	16
	Long-term achievement of relatively high scale cost savings or relatively high scale revenue growth (4x2)	8	16	24	32
	Long-term achievement of moderate scale cost savings or moderate	12	24	36	48

	scale revenue growth (4x3)				
	Long-term achievement of relatively low scale cost savings or relatively low scale revenue growth (4x4)	16	32	48	60
	Long-term achievement of low scale cost savings or low scale revenue growth (4x5)	20	40	60	80
	Financial loss either on the short or on the long run (-1)	-1	-2	-3	-4

Below, a definition of the alternative options of the matrix is described, which refers to both the impact and the likelihood ratings.

Impact rating definitions

- **Business practices review requiring no investment cost**: A set of business actions towards the SDGs which do not incur additional business cost.
- **Business practices review requiring low investment cost**: A set of business actions towards the SDGs that require additional costs for their implementation, but do not result in business cash shortages for the upcoming twelve or more months.
- **Business practices review requiring moderate investment cost:** A set of business actions towards the SDGs that require additional costs for their implementation, but do not result in business cash shortages for the upcoming six to twelve months.

- **Business practices review requiring high investment cost:** A set of business actions towards the SDGs that require additional costs for their implementation, but do not result in business cash shortages for the upcoming six months.

Likelihood rating definitions

- **Immediate achievement of high scale cost savings or high scale revenue growth:** A set of business actions towards the SDGs which result in immediate cost savings or revenue growth of more than 80% (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Immediate achievement of relatively high scale cost savings or relatively high scale revenue growth:** A set of business actions towards the SDGs which result an immediate cost savings or a revenue growth by 60% to 80% (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Immediate achievement of moderate scale cost savings or moderate scale revenue growth:** A set of business actions towards the SDGs which result an immediate cost savings or a revenue growth by 40% to 60% (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Immediate achievement of relatively low scale cost savings or relatively low scale revenue growth:** A set of business actions towards the SDGs which result an immediate cost savings or a revenue growth by 20% to 40% (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).

- **Immediate achievement of relatively low scale cost savings or relatively low scale revenue growth:** A set of business actions towards the SDGs which result an immediate cost savings or a revenue growth up to 20% (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Short-term achievement of high scale cost savings or high scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth of more than 80% within a year (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Short-term achievement of relatively high scale cost savings or relatively high scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 60% to 80% within a year (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Short-term achievement of moderate scale cost savings or moderate scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 40% to 60% within a year (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Short-term achievement of relatively low-scale cost savings or relatively low scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 20% to 40% within a year (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).

- **Short-term achievement of low- scale cost savings or low scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth up to 20% within a year (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Mid-term achievement of high scale cost savings or high scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth of more than 80% within a period of one to five years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Mid-term achievement of relatively high scale cost savings or relatively high scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 60% to 80% within a period of one to five years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Mid-term achievement of moderate scale cost savings or moderate scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 40% to 60% within a period of one to five years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Mid-term achievement of relatively low scale cost savings or relatively low scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 20% to 40% within a period of one to five years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross

revenue respectively, compared to the corresponding data of the previous year).

- **Mid-term achievement of low scale cost savings or low scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth up to 20% within a period of one to five years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Long-term achievement of high scale cost savings or high scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth of more than 80% within a period of five or more years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Long-term achievement of relatively high scale cost savings or relatively high scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 60% to 80% within a period of five or more years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Long-term achievement of moderate scale cost savings or moderate scale revenue growth:** A set of business actions towards the SDGs which result a cost savings or a revenue growth by 40% to 60% within a period of five or more years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Long-term achievement of relatively low scale cost savings or relatively low scale revenue growth:** A set of business actions towards the SDGs which result in cost savings or revenue growth by 20% to 40% within a period of five or more years (as an assessment of the annual percentage change of

direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).

- **Long-term achievement of low scale cost savings or low scale revenue growth:** A set of business actions towards the SDGs which result in cost savings or revenue growth up to 20% within a period of five or more years (as an assessment of the annual percentage change of direct or indirect costs or of the annual percentage change of the gross revenue respectively, compared to the corresponding data of the previous year).
- **Financial loss either on the short or on the long run:** A set of business actions towards the SDGs which incur financial loss, either on the the short or on the long run.

4.8. The sustainable development business model

Aggregating the data of Section 4.6, by which we obtain values for the "SDGs cost-effectiveness factor (F)", with the data of Section 3.7 and 4.5, by which we get values for the "Indicator's Significance Factor (S)" as well as the values for the indicator's trendlines, in Figure 18 below, we present the formula of our sustainability model, which can be applied by businesses in order they adopt the principles of sustainable development.

$$\mathbf{D} = \frac{|\mathbf{Trend\ EU} - \mathbf{Business\ Trend}|}{\mathbf{SDGs\ cost-effectiveness\ factor\ (F)}}\ \boldsymbol{x}\ \mathbf{Indicator's\ Significance\ Factor\ (S)}$$

Figure 18: The sustainable development business model

By applying this formula, businesses will be able to choose indicators presenting the highest D value, while the specific model ensures the selection of business indicators of sustainable development characterized as:

a) urgent, as they indicate the largest deviation from the values of the corresponding EU indicators (referring to the European Union practices of sustainable development),

b) cost effective, whose choice would bring about the smallest possible cost to the business (or the greatest possible benefit will be obtained), and

c) significant, as they have been ranked by more of 400 executives of Greek businesses (according to their significance).

In Chapter 6 of this thesis, the above model will be applied by using data which were drawn from EEAE, the Greek national authority, responsible for the control, regulation and supervision in the fields of nuclear energy, nuclear technology, radiological and nuclear safety and radiation protection.

CHAPTER 5 – INDICATORS' DISTRIBUTION IN THE DIMENSIONS OF SUSTAINABLE DEVELOPMENT

5.1. Indicators' harmonious combinations

Beyond the measurement and monitoring challenges, a deeper reflection will be needed on how to capture the interlinkages between different goals, targets and indicators and their overall coherence. Most of the goals have economic, social and environmental aspects, yet the targets and indicators often offer a partial perspective on them. While data availability is clearly a major limitation to broadening the scope of some indicators, the framework itself should capture the possible interlinkages between the many goals (OECD, 2022).

Additionally, wondering about the contribution rule-constructing could make to business sustainability, we should highlight that rules have been structured even for the freest expressions of human creation. A source of inspiration, for the completion of our business sustainability model, was a fundamental rule of "painting" theory. It seems like a paradox, but even in the art of painting, which represents the absolute freedom of expression, basic rules exist. In the late 17th century, Sir Isaac Newton, best known for his physics knowledge and his breakthroughs, mapped the colour spectrum into a wheel. This colour wheel was divided into segments, with the primary colours (red, blue, yellow) to be placed exactly at the vertices of an equilateral triangle (at a 120-degree arc). The subdivisions of these segments were essentially the mixtures of each colour with its neighbour colour, while the main purpose of the colour wheel was to show how colours combine well with each other. In Figure 19 we can see the colour wheel with its primary colours (red, blue, yellow) and its subdivisions.

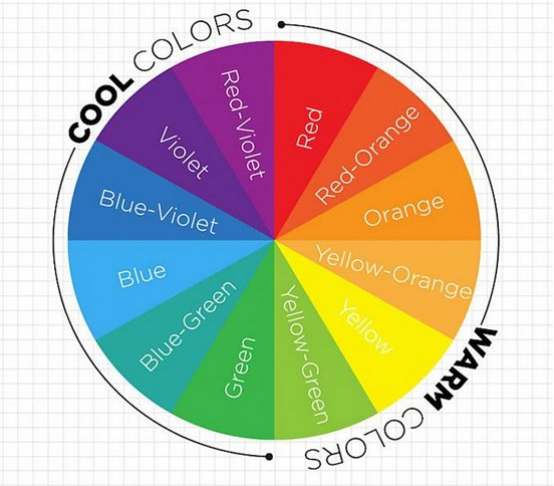

Figure 19: The colour wheel, created by Sir Isaac Newton.

The colour combinations theory was based on the practice of combining colors using a geometric shape within the color wheel, as presented in Figure 20. For artists and designers though, the breakthrough of the wheel is that it gives harmonious colour combinations and determines the colours that are well combined together.

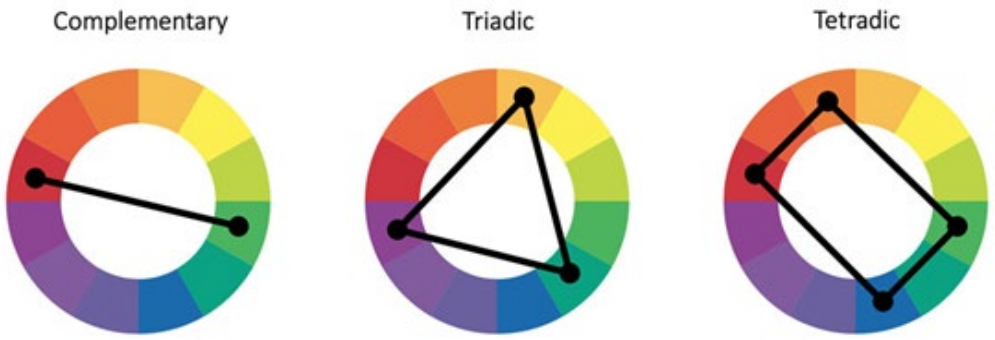

Figure 20: Geometric shapes determining colour combinations.

Specifically, when the geometric shape which intersects the wheel is a straight line, then the two opposite colours at the ends of the line are harmoniously combined with each other. Respectively, when the geometric shape lying on the wheel is a triangle, then the three colours at the triangle's vertices are well combined with each other. Note that this theory applies to rectangular shapes too (either square or rectangle). To form a complete picture of the colour combination theory, we shall note that by rotating the geometric shape

(e.g. the line, triangle, rectangle) into the wheel, then new harmonious colour combinations emerge, as graphically illustrated in Figure 21.

Figure 21: Harmonious triadic colour combinations, deriving from an equilateral triangle.

Giving additional information, we should mention that there are harmonious colour combinations arising from either an equilateral triangle (revolving in the colour wheel as shown in Figure 21) or from an isosceles triangle (revolving in the colour wheel as shown in Figure 22).

Figure 22: Harmonious triadic colour combinations, deriving from an isosceles triangle.

Having analyzed a basic colours theory, the imaginative ones could make deductions between the triadic colour wheel and the so-called "triangle of sustainability" (as shown in Figure 23). Hence, according to the colours theory, the suitable (harmonious) three colours derive from the application of a simple process, specifically by the rotation of a triangle into a classified wheel. By a similar process, harmonious combinations of the SDGs could be defined.

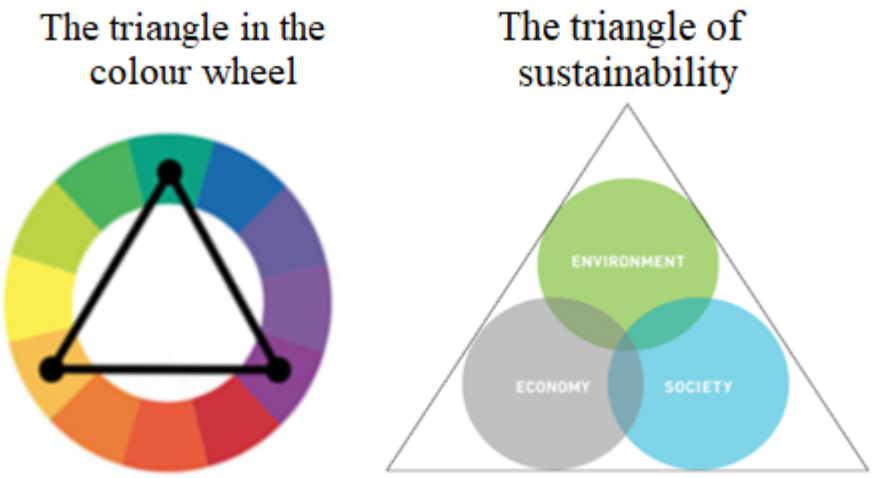

Figure 23: Similarities between two different worlds.

5.2. The appropriate mixture of the SDGs at the business level

In business contexts, sustainability refers to more than just environmentalism. It calls for a shift from traditional to transformational development to occur. Transformational development, in contrast to traditional development, aims to change the current unsustainable (in terms of economic, social, or resource usage) situation into a sustainable (or at least more sustainable), ongoing situation. Traditional development relies on an ongoing flow of external resources to continue improving people's lives or protecting the environment. In other words, it aims to address the core issues and leave behind a resilient legacy that requires little to no more effort and no sustained external input. Traditional development frequently emphasizes creating opportunities for "beneficiaries," or those who gain from development practices, whereas transformational development views people and organizations as crucial partners in the transformation and unquestionably a part of the overall solution because they are seen as an integral part of the system that needs to be transformed (Stibbe & Prescott, 2020).

Harvard Business School lists two ways to measure sustainable business practices: the effect a business has on the environment, and the effect a business has on society, with the goal of sustainable practice being to have a positive impact on at least one of those areas (Harvard Business School Online, 2018, https://online.hbs.edu/blog/post/what-is-sustainability-in-business). In support of the aforementioned, it's not a coincidence what is often mentioned in the relevant scientific literature, that "*sustainability is not just environmentalism"*. Respectively, we could claim that "sustainability is not just profitability or cost reduction" and this justifies that in order for businesses to approach evenly the goals of sustainable development, a mixture of the SDGs, by all three pillars of sustainability (economic, environmental, and social), is wise to be selected.

By supporting this theory, that is, it is wise for a business to have an equable approach to all the pillars of sustainability, we will develop a simple process for selecting the appropriate indicators with social, economic and environmental impact. Observing the newly released United Nations' SDGs allocation, as shown in Figure 24, we notice that the majority of the SDGs belong to the social pillar of sustainability, which numbers 8 of the 17 total goals. The other 8 SDGs have been allocated evenly between the economic and the environmental pillar, while the one remaining SDG (that is SDG 17 which refers to "The partnerships for the Goals") is considered as a transcendental of the three pillars of sustainability. For this particular goal (SDG 17), let the readers forgive us for not dealing with it in this thesis. In order to support our non-engagement with this SDG, we should remind that SDG17 did not give any indicator suitable for use at the business level.

Combining the allocation of the SDGs of Figure 24 with the circular graphic illustration of the SDGs (as shown in the left part of Figure 25), gives a new illustration of the SDGs as presented in the right part of Figure 25.

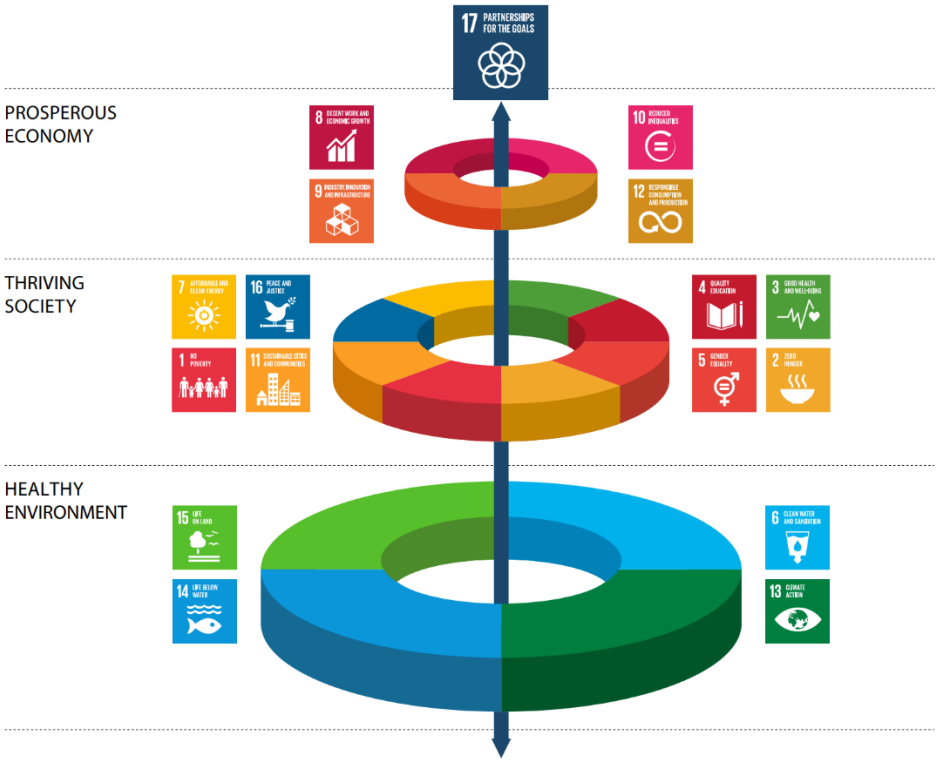

Figure 24: SDGs' allocation to the three dimensions of sustainability, "United Nations, The SDG Partnership Guidebook (2022, First Edition)".

This new segmented wheel would not simply depict the SDGs in ascending order, depending on their given number, but it would also allocate the SDGs to the pillars they belong to (as shown clearly in Figure 26). For instance, by the new segmentation of the SDGs wheel, we can see changes in the SDGs order. Indicatively, we can see that SDG 6, SDG 8, SDG 9, SDG 10, SDG 11, and SDG 16 have been moved to another section of the wheel, forming new groups depending on the pillar they belong to.

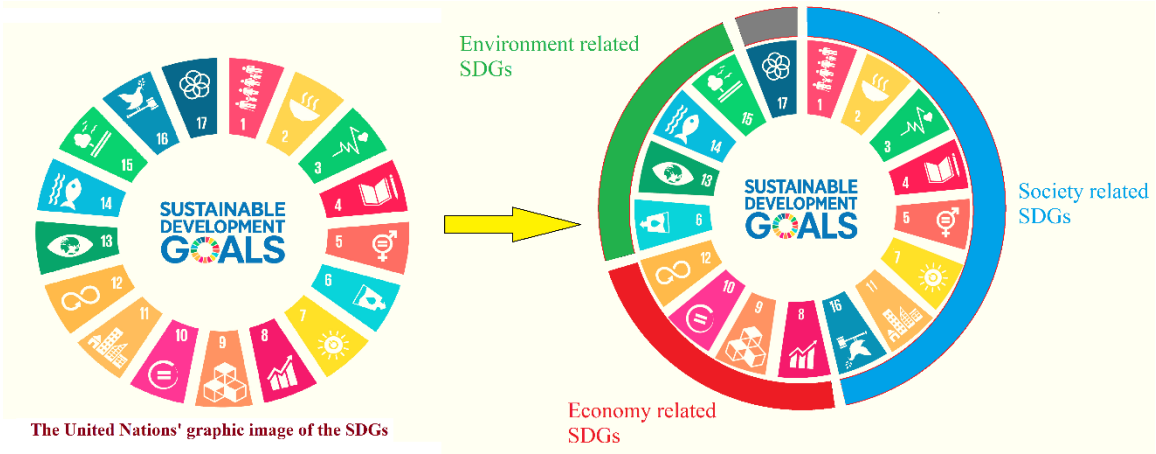

Figure 25: A transformation to the representation of the SDGs.

In the next section, it will be shown that what a business gains using SDGs wheel of Figure 26, is a convenient path for linking the appropriate indicators whose selection was presented in section 4.7 and will come, as far as possible, from all three pillars of sustainability aiming for an even indicators' distribution.

Figure 26: The allocation of the SDGs to three sustainability pillars.

5.3. Mapping the SDG indicators

The initial step for businesses, during the SDGs selection process, is to define priorities and link them to certain goals, related to their business activities. By the term prioritization of the SDGs, we mean examining which of them will have the biggest impact on the business (conceals a great opportunity or a big danger), in the medium- to long term. Once the key SDGs are identified, it is important to link those goals to actual business targets and KPIs (indicators), as well as to monitor and report their progress. The SDGs represent an urgent call to action for business and have been described as a crowded-sourced purchase order from the future: So how should business leaders respond to this call to action? The first option is to defend the status quo: to tell a story about what the company is already doing on topics relating to the SDGs, rather than seeking out opportunities to change. The second option open to business leaders is to be selective and focus on just one or a few of the SDGs (Walker et al., 2019).

In our case, we are now given the opportunity to incorporate a sustainability model into action, which will place businesses one step closer to a holistic approach to business sustainability. By embedding a geometric shape (e.g. line or triangle) into the "SDGs wheel", SDG linkages will emerge and businesses will take advantage of the use of a variety of SDGs (chosen from more than one sustainability pillar). Consequently, we hope that businesses that will use our sustainability tool will contribute multi-dimensionally to their sustainability prospects. They will be given the opportunity to move beyond "just environmentalism", beyond "just financial indicators" and to deal with a complex of goals, creating an impact at a two or at three-pillar level of sustainability.

Having analyzed the basic principles of our sustainability model, in the figure that follows (Figure 27) we can see an example of an organization that defined its SDGs, prioritizing as its primary goal SDG 5. In short, it is about an organization that aims to achieve gender equality, by ending all forms of discrimination, violence, and any harmful practices against women. The choice of this goal will be graphically represented by putting a sphere into the blue-coloured arc of the sustainability wheel, right in front of SDG 5 (as shown in Figure 28). Summarizing, a social-oriented SDG was chosen from the blue arc area (SDG 5). In searching for the rest of the SDGs, in order to achieve the maximum

commitment to the principles of sustainability, the right decision for the business is to add goals either from the red or from the green area (and even better, from both of them).

Figure 27: A social-oriented SDG choice (SDG 5)

Analytically, in order to select multidimensional SDGs, the next chosen SDG would be better among SDG 8 and SDG 12 (the red arc) or/and something among SDG 6 and SDG 15 (the green arc). In our example, let's assume that our business chose as its next two goals SDG 12 and SDG 13. So, we deal with a business that is interested in using the natural environment and resources in a way that discontinues to have destructive impacts on the planet, while taking urgent action to combat climate change and its impacts.

In the figure that follows we can see that the choice of these goals should be graphically represented by putting a sphere into the red-coloured arc (on the sustainability wheel), right in front of SDG 12 and by also putting a sphere into the green-coloured arc, right in front of SDG 13 (as shown in Figure 28). We may also notice that the spheres may move freely into limited arc areas (blue, red, and green arc), and it's not prohibited to have more than one sphere in each arc. These spheres may be linked to each other, forming geometric shapes. A straight line is formed between two SDGs, while a triangular shape is

formed between three SDGs, etc. In a few words, the geometric shapes to be formed have as many sides as the number of the SDGs (3 SDGs=triangle, 4 SDGs=rectangle, etc).

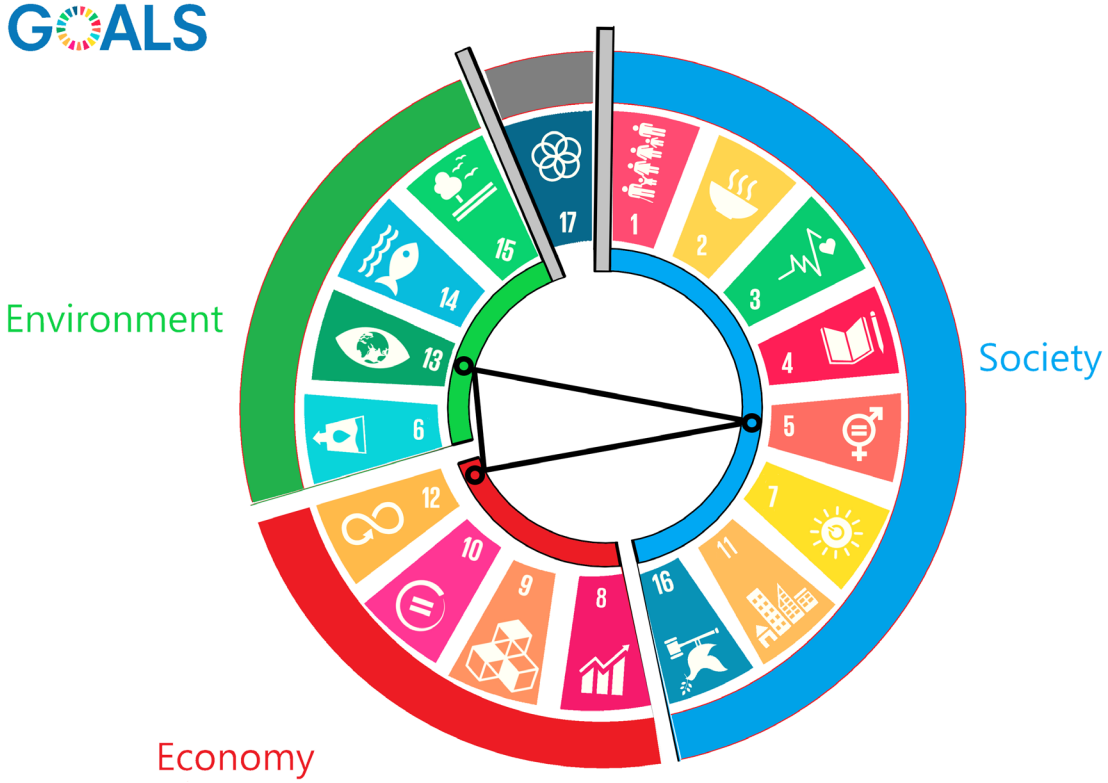

Figure 28: Freely moving spheres into limited arc areas.

What businesses can benefit from the model described, is the choice of a variety of goals, respecting to sustainability's three pillars. According to our model's theory, these goals should be the SDGs with the biggest impact on business operation, that is the indicators showing the highest D value (as presented in section 4.7). In the next Chapter of this thesis, all this information will be gathered and presented in the form of a case study, using data from EEAE, the Greek national authority, competent for the control, regulation and supervision in the fields of nuclear energy, nuclear technology, radiological and

nuclear safety and radiation protection (EEAE, n.d., https://eeae.gr/en/eeae/profile/who-we-are).

CHAPTER 6 - A CASE STUDY FOR SUSTAINABLE DEVELOPMENT

6.1. The implementation of the sustainability model in EEAE

The appropriate goals selection, referring to the priorities defined across the SDGs, is essential for the businesses in order to gain new growth possibilities while lowering their risk profiles. By selecting the right “measurable” and “time frame” SDG indicators, businesses can overcome “sustainable development” challenges and improve their sustainability performance.

In this section, we will focus on a case study, conducted by the authors in Greek Atomic Energy Commission (EEAE). The required data were provided by EEAE financial and administrative services during February 2023. EEAE story goes back to 1954 when for the first time an organization was founded in Greece in order to promote peaceful nuclear energy and technology applications, under the name "Greek Atomic Energy Commission”. In 2014, with the introduction of Law 4310/2014, EEAE took the form of a Legal Entity of Public Law, acquiring an enhanced supervisory and regulatory role.

The selection of EEAE, as a business suitable for conducting our case study, was mainly based on the fact that the author of this thesis, as the CFO in EEAE would have direct access to the data needed, in a reasonable time. Secondly, the Chairman of EEAE agreed to perform the study and showed particular enthusiasm for the sustainability matter in EEAE. As already mentioned in the previous chapters of this thesis, a critical milestone for each business dealing with the sustainability matter is the selection of the appropriate SDG indicators. However, the process of selecting indicators presupposes a holistic study of the organization's purpose and responsibilities. In our case, EEAE is the authority, competent for the control, regulation and supervision in the fields of nuclear energy, nuclear technology, radiological and nuclear safety and radiation protection in Greece and is supervised by the Minister of Development and Investments. EEAE responsibilities include:

- Regulatory – legislative work.

• Inspections for radiation protection and safe operation.

• In situ measurements of electric and magnetic fields emitted by electric power installations (power lines, transformers etc), and of electromagnetic fields in the vicinity of antenna base stations.

• Personal dosimetry of the occupationally exposed workers to ionizing radiation in Greece and update of the national dose registry.

• Coordination of the environmental radioactivity monitoring program in Greece, operation of the telemetric environmental monitoring network, conduction of spectroscopic analyses in food and consumer goods and radon measurements.

• Operation of an ionizing radiation calibration laboratory, which has developed the national dosimetry standards and provides calibration services of ionizing radiation devices.

• Preparation of and response to radiological/nuclear emergencies.

• Contribution to combating illicit trafficking in radioactive materials.

• Training in radioprotection and nuclear protection at national and international levels.

• Update of the national data base related to radioprotection issues.

• Representation before – participation in committees of national, European and international organizations.

• Participation in European and national research and development programs and

• Public information (EEAE, n.d., https://eeae.gr/en/eeae/responsibilities).

Having thoroughly described the profile and the purpose of EEAE, in the next section we will delve into the process of selecting the EEAE-appropriate SDG indicators.

6.2. The EEAE SDG indicators selection

In order for each business to focus on the right sustainable development indicators, that is to indicators whose trend values must be improved, we remind that the businesses

are firstly called to select a subset from the pool of 64 indicators of Table 3. These indicators should directly relate to each business activity and should also be accompanied by data. They should also be subject to improvement, as the indicators for which the optimum value has already been achieved, or their change is not allowed due to the institutional or legislative framework, are not eligible for our model.

Scrutinizing EEAE operations, procedures, its purpose and responsibilities, we came to the selection of 13 indicators as shown n detail in Table 9 below.

Table 9: SDG indicators selected in EEAE

	SDG indicators	Description
1	5.5.2	Proportion of women in managerial positions
2	7.2.1	Renewable energy share in the total final energy consumption
3	7.3.1	Energy intensity measured in terms of primary energy and GDP
4	8.5.1	Average hourly earnings of employees, by sex, age, occupation and persons with disabilities
5	8.8.1	Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status
6	9.5.1	Research and development expenditure as a proportion of GDP
7	9.5.2	Researchers (in full-time equivalent) per million inhabitants
8	10.3.1	Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law
9	10.5.1	Financial Soundness Indicators
10	12.2.2	Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP
11	12.5.1	National recycling rate, tons of material recycled
12	12.6.1	Number of companies publishing sustainability reports
13	16.1.3	Proportion of population subjected to (a) physical violence, (b) psychological violence and (c) sexual violence in the previous 12 months

Having settled down with the thirteen EEAE SDG indicators, it proved that two of them are not applicable for our model. Particularly, as indicators should be both accompanied by data and be subject to improvement, we observed that the SDG indicator 8.5.1 "Average hourly earnings of employees, by sex, age, occupation and persons with disabilities" is not subject to improvement due to the inflexible regime of the payroll in a Legal Entity of Public Law (the legislative framework of payroll in Public Entities is determined at the national level, and is not subject to modifications by the EEAE Board of Directors). Accordingly, for the SDG indicator 9.5.1 "Research and development expenditure as a proportion of GDP", no sufficient data were available.

Apart from these two non-applicable indicators, we 've noticed that the SDG indicator 10.3.1 "Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law" as well as the indicator 16.1.3 "Proportion of population subjected to (a) physical violence, (b) psychological violence and (c) sexual violence in the previous 12 months" are not subject to improvement, as an optimum value has already been achieved for both of them. Consequently, SDG 10.3.1 and 16.1.3 are not eligible for our model too, though EEAE should be proud for the achievement and therefore could directly include them in a business sustainability report, in case such a report is released.

To summarize, we end up with 9 eligible SDG indicators, as shown in Table 10, so as to be further examined using our model.

Table 10: The eligible EEAE SDG indicators to be examined with our model

	SDG indicators	Description
1	5.5.2	Proportion of women in managerial positions in EEAE
2	7.2.1	Renewable energy share in the total final energy consumption in EEAE
3	7.3.1	Energy intensity in EEAE
4	8.8.1	Fatal and non-fatal occupational injuries in EEAE
5	9.5.2	Researchers (in full-time equivalent) in EEAE

	SDG indicators	Description
6	10.5.1	Liquid assets to short term liabilities in EEAE
7	12.2.2	Material consumption per employee in EEAE
8	12.5.1	Tons of material recycled in EEAE
9	12.6.1	Sustainability reports published in EEAE

6.3. Calculating EEAE indicators' trend value (T_B)

Having settled down with the eligible EEAE indicators, the next step is to categorize the eligible indicators to "Positive" or "Negative trend SDG indicators", as it has been described in Section 4.5 and calculate their Trend (T_B). For calculating the T_B, we used data that were derived from the financial statements, the payroll statements, the incident's book as well as the decisions of the Board of Directors. The data referred to years between 2016 and 2021 so as to have the same range as the data of the corresponding EU indicators.

In Table 11 below, we may see the classification of the indicators into the two categories, "Positive" or "Negative trend indicators".

Table 11: Classification of the "positive" and "negative trend" EEAE SDG indicators

	SDG indicators	Description	Positive trend / Negative trend
1	5.5.2	Distance for a fair distribution of women in managerial positions in EEAE	↓
2	7.2.1	Renewable energy share in the total final energy consumption in EEAE	↑
3	7.3.1	Energy intensity measured in EEAE	↓
4	8.8.1	Fatal and non-fatal occupational injuries in EEAE	↓
5	9.5.2	Researchers (in full-time equivalent) in EEAE	↑

	SDG indicators	Description	Positive trend / Negative trend
6	10.5.1	Liquid assets to short term liabilities in EEAE	↑
7	12.2.2	Material consumption per employee in EEAE	↓
8	12.5.1	Tons of material recycled in EEAE	↑
9	12.6.1	Sustainability reports published in EEAE	↑

On the following pages, we will state the above indicator's data, as well as their trends (T_B), by using Excel. In detail, for each indicator we have:

- **DISTANCE FOR A FAIR DISTRIBUTION OF WOMEN IN MANAGERIAL POSITIONS IN EEAE (5.5.2)**

Table 12: Number of women in managerial positions in EEAE

Year	Women in managerial positions	Total managerial positions	Percentage	Deviation from the optimal value (50%)
2016	4	11	36,36%	**13,64%**
2017	4	11	36,36%	**13,64%**
2018	4	11	36,36%	**13,64%**
2019	4	11	36,36%	**13,64%**
2020	5	11	45,45%	**4,55%**
2021	5	11	45,45%	**4,55%**

By Table 12, we conclude that EEAE applies a relatively fair distribution between men and women in managerial positions, however, although not much, there is still room for improvement. Regarding the T_B of the indicator 5.5.2 in EEAE, as we may see in Figure 29 below, it takes the value -0,0208, thus meaning $T_{B\,(5.5.2)} = -0{,}0208$.

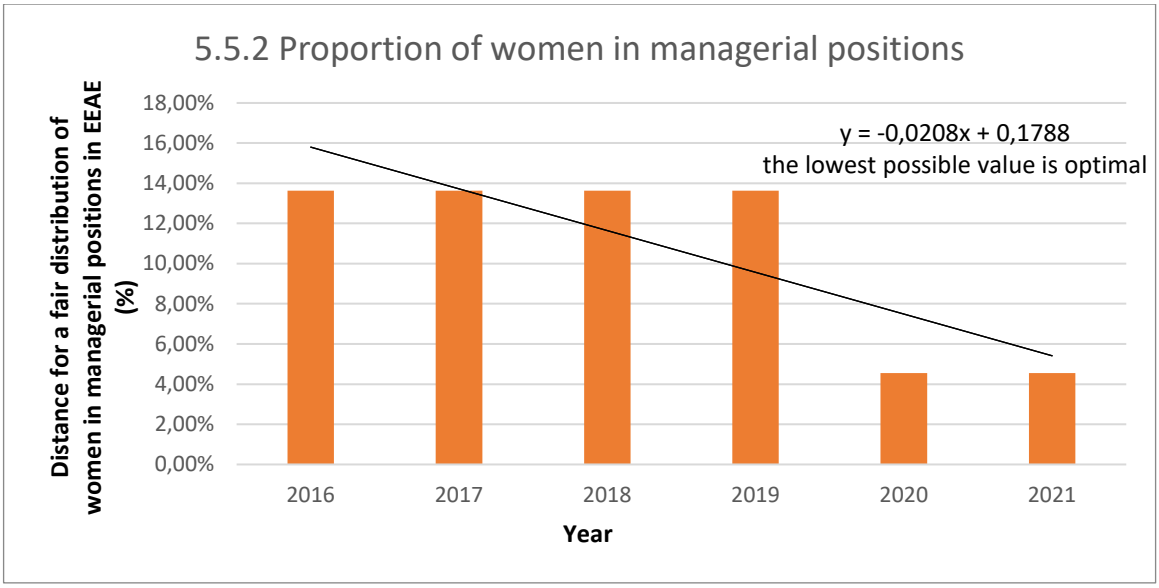

Figure 29: Calculating the SDG indicator's 5.5.2 trend value (T_B) in EEAE.

- **RENEWABLE ENERGY SHARE IN EEAE TOTAL FINAL ENERGY CONSUMPTION (7.2.1)**

Table 13: Renewable energy share in the total final energy consumption in EEAE

Year	Renewable energy share in the total final energy consumption
2016	0,00%
2017	0,00%
2018	0,00%
2019	0,00%
2020	0,00%
2021	0,00%

By Table 13, we may see that EEAE has not yet switched to renewable energy sources in order to become energy independent, by producing a part of its own consumption. The advantages of renewable energy use are significant, including financial savings, especially at a time when energy prices are unstable and constantly increasing. Another advantage is that renewable energy brings about improvement in the image of the business, while it causes its carbon footprint reduction.

Concluding, it is obvious that due to the non-existence of renewable energy sources policy in EEAE, the T_B value of SDG 7.2.1 is null, thus meaning $T_{B\,(7.2.1)} = 0$.

- **ENERGY INTENSITY IN EEAE (7.3.1)**

Table 14: Energy consumption for profits in EEAE

Year	Energy Consumption (kW)	Profit (in €)	Energy intensity
2016	242819	1.863.661,61 €	**0,1303**
2017	225185	2.384.203,82 €	**0,0944**
2018	235357	2.064.380,59 €	**0,1140**
2019	234420	2.804.267,08 €	**0,0836**
2020	230619	2.109.782,34 €	**0,1093**
2021	234761	1.681.974,18 €	**0,1396**

Energy intensity is indeed a measure of the energy efficiency of an economy and is calculated as units of energy per unit of GDP. High energy intensities indicate a high cost of converting energy into GDP, while low energy intensity indicates a lower price of converting energy into GDP. In order to apply something equivalent in the business level, we took into account the EEAE energy consumption as well as its net results for the years 2016-2021. Consequently, we come up to the data as stated in the column named "Energy intensity" in Table 14 above, while the T_B of the SDG 7.3.1 is $T_{B(7.3.1)} = -0,0008$ as shown in Figure 30.

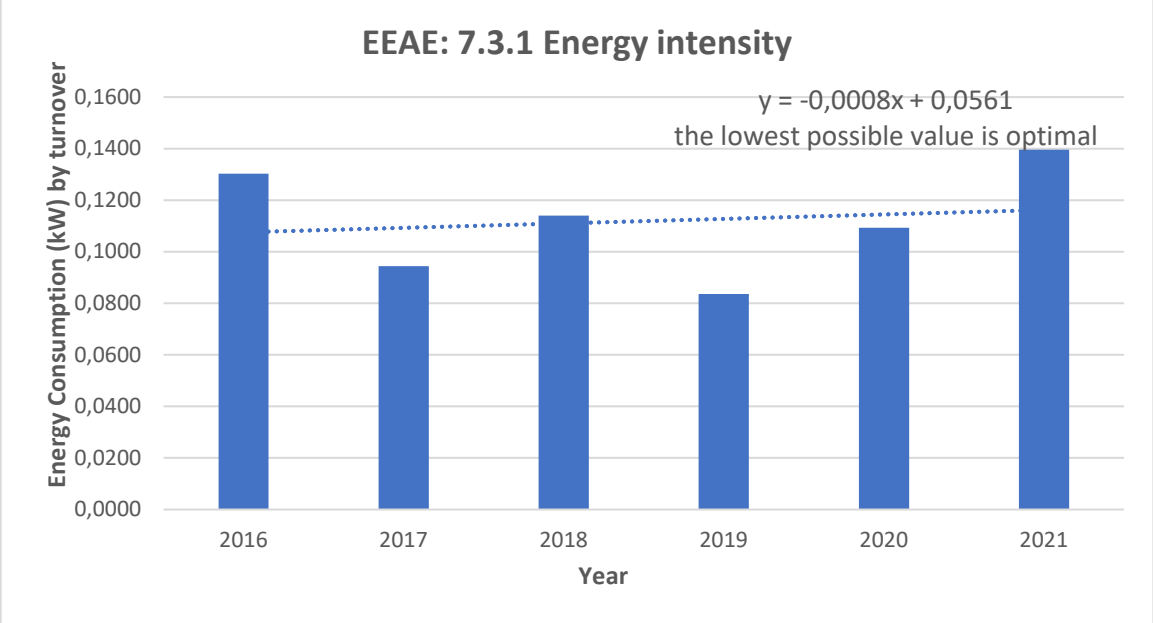

Figure 30: Calculating the SDG indicator's 7.3.1 trend value (T_B) in EEAE.

- **FATAL AND NON-FATAL OCCUPATIONAL INJURIES (8.8.1)**

Although EEAE is s undoubtedly a safe working environment, as safety culture is a priority at all levels of decision-making and exercise of functions (EEAE, n.d., https://eeae.gr/en/eeae/profile/safety-is-our-priority), in the years 2017-2019 minor accidents occurred at work, characterized by the Greek Legislation as non-fatal occupational injuries.

The exact figures are shown in Table 15 where in years 2016, 2017 and 2021 no occupational injuries have occurred. By using Excel we then get the value of T_B for the SDG 8.8.1 to be TB (8.8.1) = 0,0012 as shown in Figure 31.

Table 15: Occupational injuries in EEAE

Year	Fatal and non-fatal occupational injuries	Total number of employees	Percentage
2016	0	78	**0,00%**
2017	0	78	**0,00%**
2018	1	74	**1,35%**
2019	1	74	**1,35%**
2020	1	72	**1,39%**
2021	0	71	**0,00%**

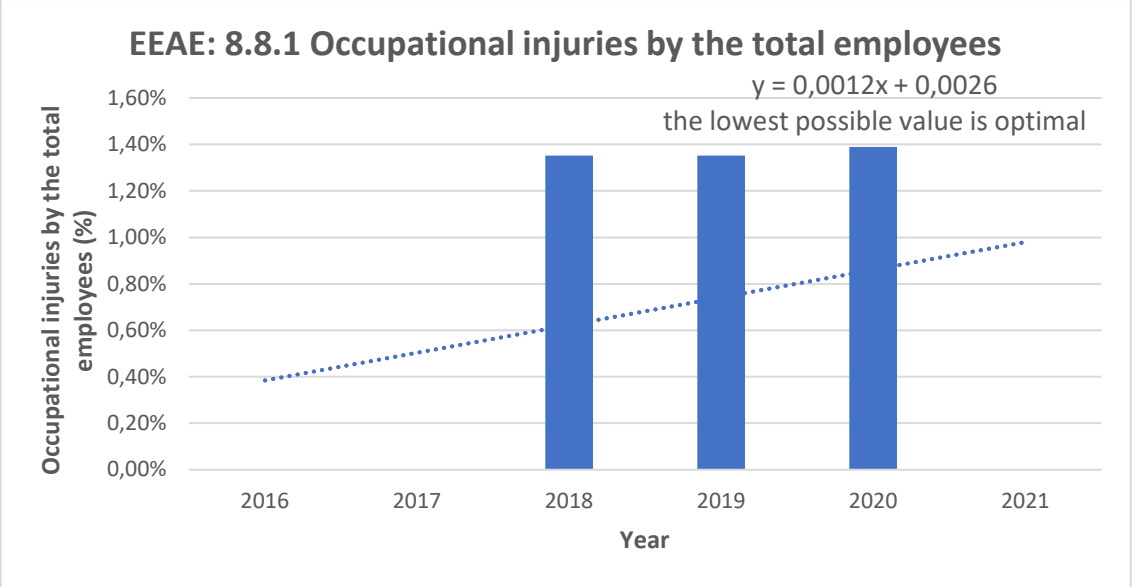

Figure 31: Calculating the SDG indicator's 8.8.1 trend value (T_B) in EEAE.

- **RESEARCHERS (IN FULL-TIME EQUIVALENT) PER THE TOTAL NUMBER OF EMPLOYEES (9.5.2)**

EEAE is currently employing nearly 70 qualified persons; most of them hold higher education degrees, postgraduate qualifications and specialization skills in scientific knowledge and expertise. Researchers in EEAE are considered the special scientific personnel, in accordance with article 16 of the national Law No 4386/2016. The exact number of them as well as their percentage to the total number of employees is recorded in Table 16, while by using Excel we get that $T_{B\,(9.5.2)} = 0{,}0099$ as shown in Figure 32.

Table 16: Researchers (in full-time equivalent) in EEAE

Year	Researchers (in full-time equivalent)	Total number of employees	Percentage
2016	10	78	**12,82%**
2017	10	78	**12,82%**
2018	10	74	**13,51%**
2019	12	74	**16,22%**
2020	12	72	**16,67%**
2021	12	71	**16,90%**

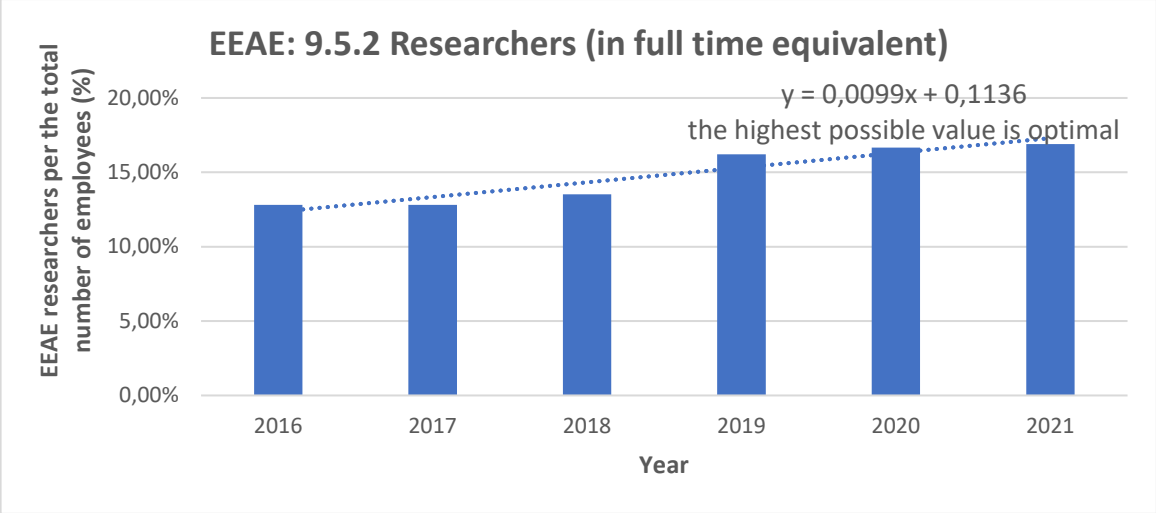

Figure 32: Calculating the SDG indicator's 9.5.2 trend value (T_B) in EEAE.

- **FINANCIAL SOUNDNESS INDICATORS (10.5.1)**

Although EEAE, as a Legal Entity of Public Law, is a non-profit organization, its cash reserves should be sufficient to ensure its viability for the years to come. For this reason, we chose as an economic indicator of sustainability, the particular SDG indicator "Liquid assets to short-term liabilities", with its values recorded in Table 17.

Table 17: "Liquid assets to short term liabilities" and "Return on assets" in EEAE

	Liquid assets to short term liabilities	Return on assets (%)
2016	**23,33**	8,24%
2017	**19,03**	8,62%
2018	**19,06**	6,92%
2019	**19,27**	8,57%
2020	**29,91**	8,23%
2021	**32,65**	5,04%

The first column of the above table shows that the cash deposit of EEAE is able to cover the short-term obligations, while the second the percentage of profit derived from the exploitation of its assets.

By using Excel, we get that $T_{B\,(10.5.1)} = 2,27$ as shown in Figure 33.

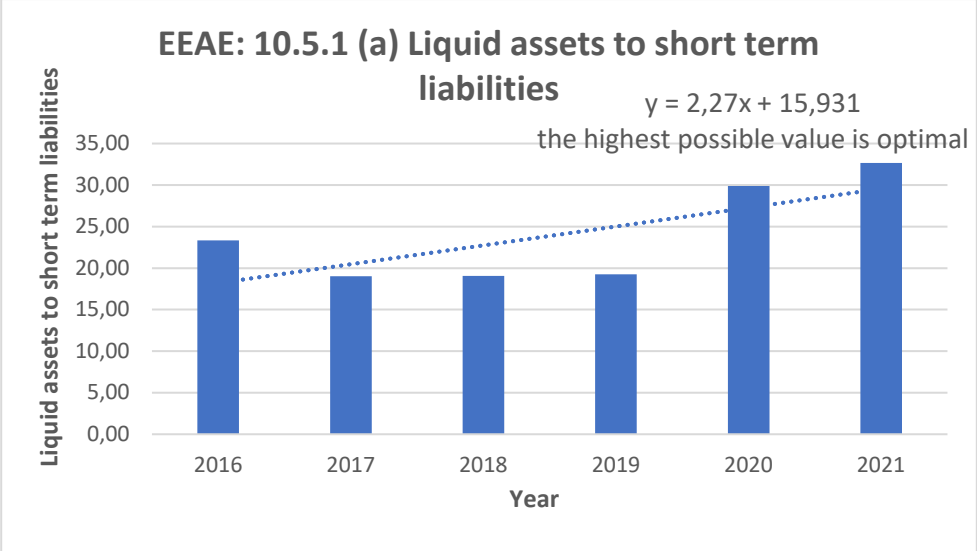

Figure 33: Calculating the SDG indicator's 10.5.1 "Liquid assets to short term liabilities" trend value (T_B) in EEAE.

- **DOMESTIC MATERIAL CONSUMPTION / CONSUMPTION PER EMPLOYEE (12.2.2)**

The main materials used by all the employees in EEAE are mainly A4 paper, printer toners and disposable plastic cups for water. As their possible overconsumption would place an increasing strain on the environment, it was crucial for our thesis purpose to gather these particular materials' consumption data during the years 2016 to 2021.

Considering the absolute numbers of the three tables below, anyone could argue that the materials' consumption trend is declining. However, we should not overlook that, due to the Covid-19 pandemic, during the years 2020 and 2021 a large part of the employees in EEAE worked from home. This fact urges us to suggest the use of additional data in order reach to safe conclusions. This is particularly concerning A4 paper and plastic cups, as on the contrary the toner consumption in the year 2020 shows clearly an increasing trend, regardless of the reduction of the employees.

By Tables 18 to 20, we can see the data for A4 paper, printer toners and disposable plastic cups for water, while in Figure 34 to 36 the trendlines for each material, with the values of their T_B to be as follows:

$T_{B\ (12.2.2,\ A4\ paper)} = -0,0067$ (more data needed in order to reach to safe conclusions)

$T_{B\ (12.2.2,\ Toner)} = 0,0491$

$T_{B\ (12.2.2,\ Plastic\ cups)} = -2,5264$ (more data needed in order to reach to safe conclusions)

Table 18: A4 paper consumption in EEAE

Year	A4 paper (packs)	Total number of employees	A4 paper packs / employee
2016	95	78	**1,22**
2017	90	78	**1,15**
2018	95	74	**1,28**
2019	90	74	**1,22**
2020	90	72	**1,25**
2021	80	71	**1,13**

At this point, it is worth mentioning that from 2022 onwards, EEAE exclusively uses single-use paper cups, instead of plastic ones. This is a very important information, not only for the environmental awareness in EEAE but mainly because it is proven that the quantity alone does not always reflect the reality. In other words, the material that burdens the environment should be taken into account.

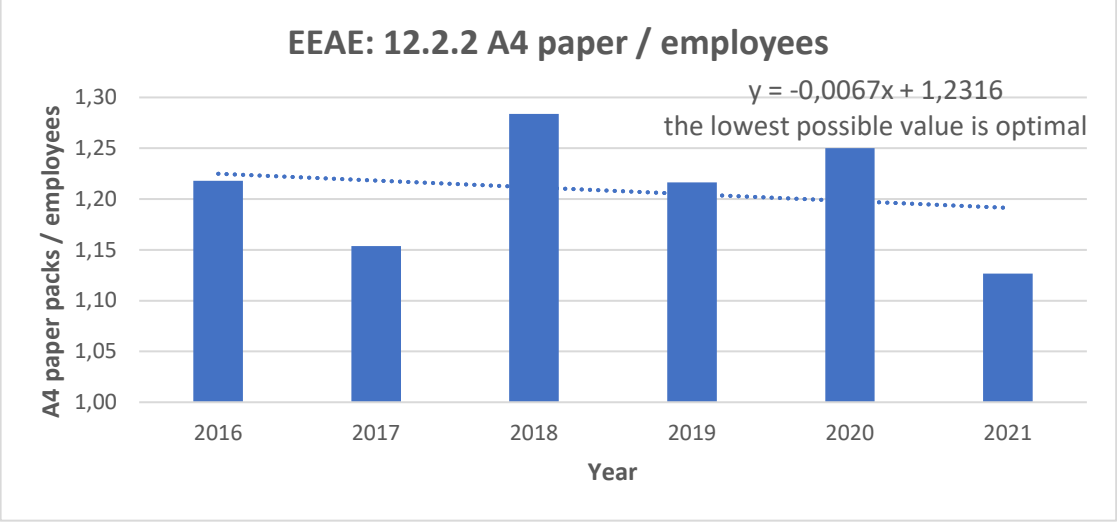

Figure 34: Calculating the SDG indicator's 12.2.2 (A4 paper consumption) trend value (T_B) in EEAE.

Table 19: Toner consumption in EEAE

Year	Toner (number)	Total number of employees	Toner / employees
2016	141	78	**1,81**
2017	71	78	**0,91**
2018	142	74	**1,92**
2019	136	74	**1,84**
2020	133	72	**1,85**
2021	114	71	**1,61**

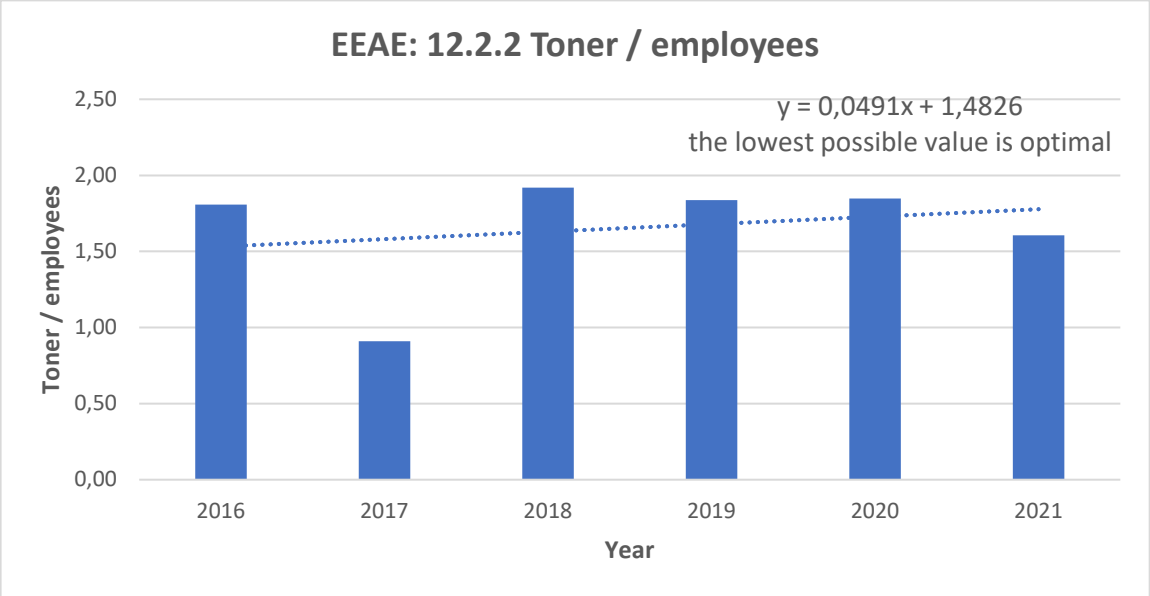

Figure 35: Calculating the SDG indicator's 12.2.2 (toner consumption) trend value (T_B) in EEAE.

Table 20: Plastic cups consumption in EEAE.

Year	Plastic cups (number)	Total number of employees	Plastic cups / employees
2016	11.000	78	**141**
2017	16.500	78	**212**
2018	15.000	74	**203**
2019	15.000	74	**203**
2020	9.750	72	**135**
2021	12.000	71	**169**

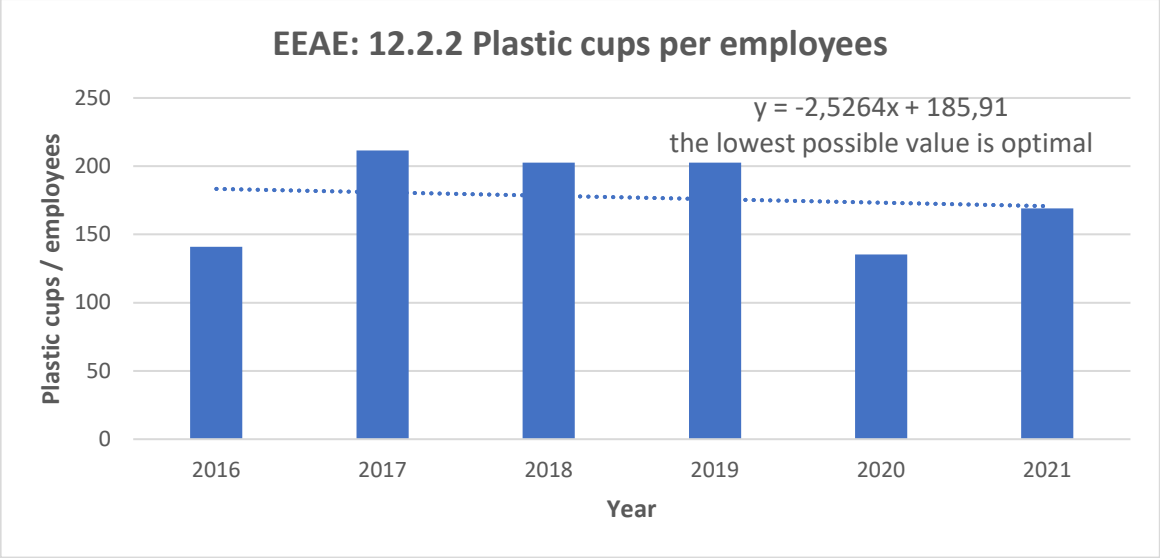

Figure 36: Calculating the SDG indicator's 12.2.2 (plastic cups consumption) trend value (T_B) in EEAE.

- **TONS OF MATERIAL RECYCLED (12.5.1)**

Since the past two decades, EEAE has implemented a material recycling program. This recycling program includes paper, plastics, metals, toner and batteries. Unfortunately, data is kept only from 2020 onwards, while data for the previous years were given to us as an estimate as shown in Table 6.21. Similarly to the previous indicator, relative caution should be required before drawing conclusions about the materials' recycling trend, as Covid-19 pandemic has also affected this indicator's rate.

Using Excel, the $T_{B\,(12.5.1)} = -0{,}0234$ as shown in Figure 37, but more data are required in order to reach into more safe conclusions.

Table 21: Materials recycled in EEAE

Year	Materials recycled (in kg)	Materials recycled (in tons)
2016	1380 (in estimate)	**1,38 (in estimate)**
2017	1400 (in estimate)	**1,4 (in estimate)**
2018	1420 (in estimate)	**1,42 (in estimate)**
2019	1450 (in estimate)	**1,45 (in estimate)**
2020	1125	**1,125**
2021	1375	**1,375**

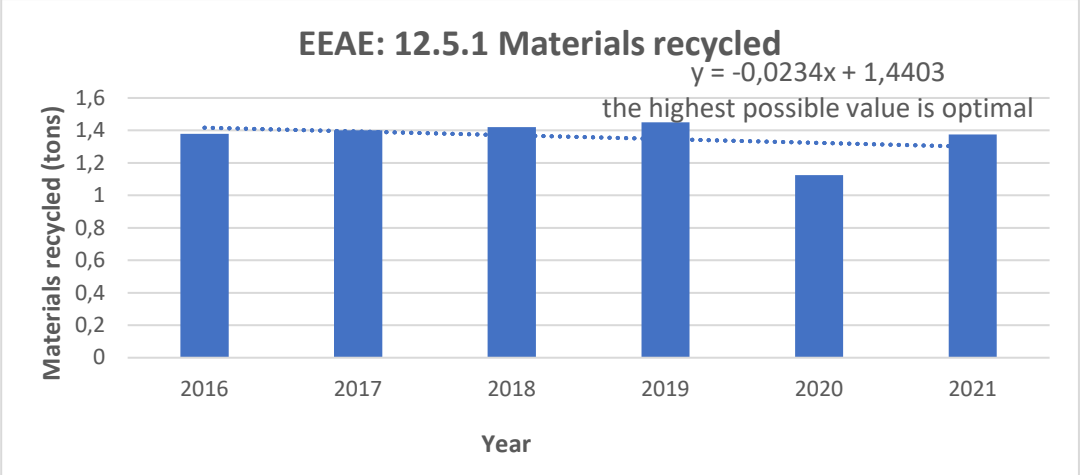

Figure 37: Calculating the SDG indicator's 12.5.1 trend value (T_B) in EEAE.

- **SUSTAINABILITY REPORTS PUBLISHED (12.6.1)**

Table 22: Sustainability reports published in EEAE

Year	Sustainability reports published
2016	0
2017	0
2018	0
2019	0
2020	0
2021	0

By Table 22, we may see that EEAE has not ever published sustainability reports, so the T_B value of SDG 12.6.1 is stable as $T_{B\,(12.6.1)} = 0$.

Having calculated the EEAE selected indicators Trend Value (TB), in Table 23 below we may see the indicators classification (please see Section 4.5 for reference), as well as the EEAE and EU Trend Value.

Table 23: Classification and trends of the SDG indicators (T_B, T_{EU})

	SDG indicators	Positive or Negative Trend SDG indicator	EEAE Trend Value (T_B)	EU Trend Value (T_{EU})
1	5.5.2	⇩	-0,0208	-1,764
2	7.2.1	⇧	0	0,6648

	SDG indicators	Positive or Negative Trend SDG indicator	EEAE Trend Value (T_B)	EU Trend Value (T_{EU})
3	7.3.1		-0,0008	-12,398
4	8.8.1		0,0012	-0,0588
5	9.5.2		0,0099	0,0384
6.i	10.5.1		2,27	-2,083
7.i	8.4.2 / 12.2.2		-0,0067	0.00000001
7.ii	8.4.2 / 12.2.2		2,5264	0.00000001
7.iii	8.4.2 12.2.2		-0,0491	0.00000001
8	12.5.1		-0,0234	1,0191
9	12.6.1		0	7,5524

In the next section, we will compare the selected indicators trends (T_B to the T_{EU}) so as to allocate them in categories "a" to "d" (as described in Section 4.6). Subsequently, after we have calculated the above indicators' values "F" (as detailed in sections 4.6) and assigned them the value "S" (as detailed in section 3.7 respectively), our model could be implemented to reveal the first-line indicators, as indicators of immediate priority in terms of implementation of business sustainable development practices.

6.4. The results from the application of the sustainability model

Having calculated the $T_{EU,}$ by using EU data which performs the rate of change of SDG indicators over the last years, as well as the T_B by using EEAE data, in Table 24 below we highlight the EEAE indicators which need to be improved. Low-performance indicators (as described in Section 4.5), will be eligible for our model, which practically means that EEAE policy readjustment is required in order to achieve its sustainable

development goals. At this point, we should notice that more data are required for the SDG indicator 12.2.2, which is A4 paper as well as plastic cups consumption, as the Covid-19 pandemic contributed to a large part of the employees working from home during the years 2019 and 2020. It is obvious that in case that additional data prove the opposite in the future, the SDG indicator's 12.2.2 eligibility status should change.

Table 24: Eligibility status of the SDG indicators

	SDG indicators	Positive or Negative Trend SDG indicator	T_B	T_{EU}	Indicators Status	Eligibility Status
1	5.5.2	↓	-0,0208	-1,764	Low-Performance	Yes
2	7.2.1	↑	0	0,6648	Low-Performance	Yes
3	7.3.1	↓	-0,0008	-12,398	Low-Performance	Yes
4	8.8.1	↓	0,0012	-0,0588	Low-Performance	Yes
5	9.5.2	↑	0,0099	0,0384	Low-Performance	Yes
6.i	10.5.1	↑	2,27	-2,083	High-Performance	No
7.i	8.4.2 / 12.2.2	↓	-0,0067	0,00000001	High-Performance	No
7.ii	8.4.2 / 12.2.2	↓	2,5264	0,00000001	High-Performance	No
7.iii	8.4.2 12.2.2	↓	-0,0491	0,00000001	Low-Performance	Yes
8	12.5.1	↑	-0,0234	1,0191	Low-Performance	Yes

	SDG indicators	Positive or Negative Trend SDG indicator	T_B	T_{EU}	Indicators Status	Eligibility Status
9	12.6.1	↑	0	7,5524	Low-Performance	Yes

By the information of Table 24, we arrive at the conclusion that the SDG indicator 10.5.1, which represents the financial soundness of EEAE should be omitted, yet EEAE's employees may feel secure about the Agency's viability for many years to come. The same happens with the SDG indicator 12.2.2 referring to the A4 paper and the plastic cups.

Two steps before the end, the "F" values of the eligible indicators should be calculated. Using the consequence/likelihood matrix of Section 4.6, and with the assistance of financial services of EEAE, a cost-benefit analysis was conducted for each of the eligible indicators. We remind you that the analysis is focused on EEAE's stable cash position beyond its liabilities, combined with an assessment of the achievement of cost savings or revenue growth by the estimated time of achievement.

Particularly, referring to the "F" values of the SDG indicators:

- 5.5.2, "Distance for a fair distribution of women in managerial positions in EEAE", although there is little room for improvement, as 5 out of 11 managerial positions in EEAE are occupied by women, we may see that a transformation to a fairer distribution would cause low scale cost savings in the long run, which corresponds to value 20, that is $F_{5.5.2} = 20$.
- 7.2.1, "Renewable energy share in the total final energy consumption", judging by the fact that EEAE has the potential to place Solar PV panels on its roof, which is nearly 500m^2 and taking into account that the annual electricity demand would be covered by the solar energy would be nearly the one-third of the total final energy consumption. However, we must not overlook the fact that this is an expensive investment which takes nearly ten years to pay back so we deal with an investment which causes low-scale cost savings in the long run, which corresponds to a value of 40, that is $F_{7.2.1} = 40$.

- 7.3.1, “Energy intensity in EEAE”, we could suggest the use of smart automation in the corridors, i.e. motion detection systems that will turn off the lights in case there are no employees present. Acquiring such systems is not an expensive investment, so we deal with an investment which causes low-scale cost savings in the long run, which corresponds to a value of 40, that is $F_{7.3.1} = 40$.
- 8.8.1, “Fatal and non-fatal occupational injuries in EEAE”, we should first clarify that EEAE is a very safe place to work. Safety is a priority at all levels of decision-making and exercise of functions (EEAE, n.d., https://eeae.gr/en/eeae/profile/safety-is-our-priority) while EEAE provides the means which enable the employees to safely exercise their duties. However referring to safety there is always room for improvement, so we would recommend strengthening of the employees’ safety culture with the appropriate training programs as well as the maintenance of the scientific equipment, the means used by the employees as well as the facilities, at the highest possible levels. These are actions that require a large cost, however, the benefit will be even greater since it contributes to ensuring the physical integrity of the employees that are the main asset in EEAE. Consequently, we could claim that we deal with a review of business practices requiring moderate investment cost, which causes an immediate achievement of high-scale cost savings which corresponds to value 3, that is $F_{8.8.1} = 3$.
- 9.5.2, “Researchers (in full-time equivalent) in EEAE”, we should note that nearly 70 employees work in EEAE, while most of them hold higher education degrees, postgraduate qualifications and specialization skills in scientific knowledge and expertise. During 2021, there were 12 researchers (in full-time equivalent) in a total number of 71 employees in EEAE. Increasing the number of researchers will cause average costs to the budget of the Organization, with little impact on the EEAE revenues in the long run, especially since EEAE is a non-profit organization. This fact returns a value of $F_{9.5.2} = 48$ as it is about a low-scale revenue growth in the long run.
- 12.2.2 (or 8.4.2) “Toner consumption per employee in EEAE” as well as 12.5.1 “Tons of material recycled in EEAE”, these are two indicators whose improvement can only be achieved through targeted programs, mainly by training the employees

to act with a more ecological culture. These actions do not cost much, but they do not bring much savings. As a result, we could assign the indicators a value of 10, that is $F_{12.2.2} = F_{12.5.1} = 10$, as an immediate achievement of low scale cost savings, requiring low investment cost

- 12.6.1, "Sustainability reports published in EEAE", we deal with a long-term achievement of low scale cost savings, requiring low investment cost that is $F_{12.6.1} = 40$.

One step by the end, the eligible indicators should be mapped with the "significance" values of Table 2, so as to derive their "S" values. This proved to be an easy procedure for the SDG indicators 5.5.2, 7.2.1, 8.8.1, 9.5.2, 12.2.2 and 12.5.1 as were included as indicators in our 2014 questionnaire. On the contrary, for SDG indicators 7.3.1, 10.5.1 and 12.6.1 that were not included in our questionnaire, we had to make reasonable deductions in order to give them a significance ("S") value. Consequently, as indicator 7.3.1 "Energy intensity in EEAE" resembles to our questionnaire's 28th indicator "Labor's productivity" we will give it an equal value which is 4, while for the indicator 10.5.1 "Liquid assets to short-term liabilities in EEAE" which resembles our questionnaire's 29th indicator "Net profit of the organization" we will give it an equal value, which is also 4. Finally, for indicator 12.6.1 "Sustainability reports published in EEAE", it would be unrealistic, since we consider that the issue of sustainable development in business is of the utmost importance, not to give it the value 5.

Summarizing all the above information in order we implement our model for the eligible indicators, we aggregate the data in Table 25 below.

Table 25: Summarizing the values of the eligible SDG indicators

SDG indicators	T_B EEAE	T_{EU}	Indicators Status	"F" value	"S" value
5.5.2	-0,0208	-1,764	Low-Performance	20	3,43
7.2.1	0	0,6648	Low-Performance	40	2,95
7.3.1	-0,0008	-12,398	Low-Performance	40	3,58
8.8.1	0,0012	-0,0588	Low-Performance	3	3,84
9.5.2	0,0099	0,0384	Low-Performance	48	3,19
8.4.2 / 12.2.2	0,0491	1E-08	Low-Performance	10	3,56
12.5.1	-0,0234	1,0191	Low-Performance	10	3,91
12.6.1	0	7,5524	Low-Performance	40	5

By applying the formula of Section 4.7 for each indicator, which is:

$$\mathbf{D} = \frac{|\mathbf{Trend\ EU - Business\ Trend}|}{\mathbf{SDGs\ cost - effectiveness\ factor\ (F)}}\ \boldsymbol{x}\ \mathbf{Indicator's\ Significance\ Factor\ (S)}$$

we get the value "D" as detailed in Table 26 below.

Table 26: "D" values of the eligible SDG indicators

SDG indicators	Description	"D" value
5.5.2	Distance for a fair distribution of women in managerial positions in EEAE	0,2989588

SDG indicators	Description	"D" value
7.2.1	Renewable energy share in the total final energy consumption	0,049029
7.3.1	Energy intensity in EEAE	1,1095494
8.8.1	Fatal and non-fatal occupational injuries in EEAE	0,0768
9.5.2	Researchers (in full-time equivalent) in EEAE	0,001894063
8.4.2 / 12.2.2	Toner consumption (per employee in EEAE)	0,017479596
12.5.1	Tons of material recycled (EEAE)	0,4076175
12.6.1	Sustainability reports published (EEAE)	0,94405

Listing the indicators in descending order, according to their "D" value, we may draw conclusions about the EEAE's priority indicators, as shown in Table 27 below.

Table 27: Prioritizing the eligible SDG indicators

SDG indicators	Description	"D" value
7.3.1	Energy intensity in EEAE	1,10955
12.6.1	Sustainability reports published (EEAE)	0,94405
12.5.1	Tons of material recycled (EEAE)	0,40762
5.5.2	Distance for a fair distribution of women in managerial positions in EEAE	0,29896
8.8.1	Fatal and non-fatal occupational injuries in EEAE	0,0768
7.2.1	Renewable energy share in the total final energy consumption	0,04903
8.4.2 / 12.2.2	Toner consumption (per employee in EEAE)	0,01748
9.5.2	Researchers (in full-time equivalent) in EEAE	0,00189

From Table 27 we conclude that in order for EEAE to enhance its sustainable development prospects, it is an immediate priority to deal with SDG 7.3.1 "Energy intensity", followed by indicator 12.6.1 "Sustainability reports published", followed by SDG 12.5.1 "Tons of material recycled" and in like manner. Finally, considering the sustainability wheel of Figure 26, in order for EEAE to implement a balanced policy towards the three pillars of sustainability, it would be "sustainable" to choose not only the

best “D” value indicators, but also indicators from different pillars. In our case, it happens that SDG 7.3.1 as well as SDG 12.6.1 belong to two different pillars, which are the society and economy related ones, so these two SDGs, in the absence of indicators from the environment’s pillar, constitute our final choice, as shown in Figure 38.

Figure 38: EEAE SDG pillars selection.

In any case, however, the upper management of each Organization with the assistance of their financial and technical teams, will make the final decision of the indicators’ selection, weighing the distance they wish to cover, the investment costs as well as risk involved in this change effort. It is our hope that the management of each Organization will show the required goodwill to implement our model. And we take it for granted that the EU will assist, providing incentives and significant de-risking and

coinvestment vehicles to encourage private investment in sustainable assets (United Nations, 2018). The same for the World Bank, which has already implemented the cost, related to SDGs, in its Agenda as well as measures that include shifting the financing debate from simply more spending to ensuring spending efficiency, as well as building recognition for the vital role of policy reforms and cross-sectoral synergies in the development of strategy to achieve the SDGs (Vorisek & Yu 2020).

CHAPTER 7 – CONCLUSION

As the "UN's 2030 Agenda for Sustainable Development" is calling on businesses to apply their creativity and innovation for solving sustainable development challenges, it is important for businesses to act urgently. Antoine de Saint-Exupéry quoted "the time for action is now and it's never too late to do something" and this is our own worldview as well. If all businesses operated sustainably, consider the overall impact this would have on establishing just and equitable societies.

The main consideration of our thesis was to create a sustainability model that would demonstrate the businesses' sustainability status, as well as highlight the business "areas" that need to be improved. A careful and thorough examination in general scientific areas, combined with the sustainability practices was the source of our model creation in order to give evidence, even if this was done unintentionally, of the implementation of the principles of sustainability in the business level.

In cases where corrective measures are required, businesses should readjust their policy to become sustainable. On the contrary, if business practices are consistent with those of sustainable development, businesses are given a good opportunity to issue a sustainability report and take advantage of new business opportunities. By launching initiatives on sustainability related issues, businesses may show that they are not only part of the problem but an essential part of solution, since they may contribute to solve sustainability issues (International Training Center of the ILO, 2019).

It is a reality that to the path of the creation of our model, we met obstacles. The main challenge in monitoring progress relates to the lack of adequate data available to develop indicators, including the gender dimension, and to assess progress for more than half of the environment-related indicators. Another challenge to SDG realization is the lack of analytical tools robust enough to both bring together new datascience techniques such as artificial intelligence, new technologies such as cloud computing, and big data to generate knowledge (UN Environment Programme, 2021, https://www.unep.org/resources/publication/measuring-progress-environment-and-sdgs). But as an epilogue, we are happy with our model. It's about the joy of creating and giving

to the businesses something tangible to deal with, in order to fulfill their sustainability interests enabling them to select indicators characterized as:

a) urgent, as they indicate the largest deviation from the values of the corresponding EU indicators (referring to the European Union practices of sustainable development),

b) cost effective, whose choice would bring about the smallest possible cost to the business (or the greatest possible benefit will be obtained), and

c) significant, as they have been ranked by more of 400 executives of Greek businesses (according to their significance).

However, although contented, we cannot rest on our laurels. There are points for further research and investigation, as particularly listed below.

• Sustainability data need to be periodically updated, based on relevant business data, or on sectoral data or even better on sectoral data by business size class (though such data are difficult to be found). In case of the existence of sectoral data by business size class, our model corresponds perfectly as a "tug of war" between the average target value and the corresponding business one.

• For sustainability indicators for which a company has achieved values close to the optimal possible value (the successive last years), the rate of these indicators will not change in a similar grade compared to the average. This will give a distorted state, that the business index should be significantly improved and consequently that business action is required in the direction of sustainable development. In this case, our model should not be implemented, so this should be a case of the business executives to initially assess the room for sustainable improvement.

• Important events, such as the Covid-19 pandemic, should be seriously considered as they affect the data disproportionately, resulting in the model returning distorted values. We are also aware that the data of the questionnaire were not analyzed in depth and in some cases the data samples for calculating regression trends were not big enough to allow for a proper data analysis. It should be pointed out however, that data analysis was not the main goal in this thesis, but the focus was to highlight and implement the proposed sustainability model, in a manner easily understood and possibly adopted by businesses.

• Last but not least, as the number of business indicators (76) out of the total number of UN indicators (232), is relatively small, the competent authorities such as the UN or the

International Labour Organization (ILO) should reconsider the enrichment and the standardization of the UN indicators, in a manner to make them plentiful for business use.

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APPENDICES

Appendix I – The 2030 Agenda goals and targets

Goals and targets (from the 2030 Agenda for Sustainable Development)	Indicators	
Goal 1. End poverty in all its forms everywhere		
1.1 By 2030, eradicate extreme poverty for all people everywhere, currently measured as people living on less than $1.25 a day	1.1.1 Proportion of the population living below the international poverty line by sex, age, employment status and geographic location (urban/rural)	Not applicable in a high-income economy
1.2 By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	1.2.1 Proportion of population living below the national poverty line, by sex and age	Not applicable at the business level
	1.2.2 Proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions	Not applicable at the business level
1.3 Implement nationally appropriate social protection systems and measures for all, including floors, and by 2030 achieve substantial coverage of the poor and the vulnerable	1.3.1 Proportion of population covered by social protection floors/systems, by sex, distinguishing children, unemployed persons, older persons, persons with disabilities, pregnant women, newborns, work-injury victims and the poor and the vulnerable	Not applicable at the business level
1.4 By 2030, ensure that all men and women, in particular the poor and the vulnerable, have equal rights to economic resources, as well as access to basic services, ownership and control over land and other forms of property, inheritance, natural resources, appropriate new technology and financial services, including microfinance	1.4.1 Proportion of population living in households with access to basic services	Not applicable at the business level
	1.4.2 Proportion of total adult population with secure tenure rights to land, (*a*) with legally recognized documentation, and (*b*) who perceive their rights to land as secure, by sex and type of tenure	Not applicable at the business level

1.5 By 2030, build the resilience of the poor and those in vulnerable situations and reduce their exposure and vulnerability to climate-related extreme events and other economic, social and environmental shocks and disasters	1.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	
	1.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)	
	1.5.3 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030	Not applicable at the business level
	1.5.4 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	Not applicable at the business level
1.a Ensure significant mobilization of resources from a variety of sources, including through enhanced development cooperation, in order to provide adequate and predictable means for developing countries, in particular least developed countries, to implement programmes and policies to end poverty in all its dimensions	1.a.1 Total official development assistance grants from all donors that focus on poverty reduction as a share of the recipient country's gross national income	Not applicable at the business level
	1.a.2 Proportion of total government spending on essential services (education, health and social protection)	Not applicable at the business level
1.b Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions	1.b.1 Pro-poor public social spending	Not applicable at the business level
Goal 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture		
2.1 By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round	2.1.1 Prevalence of undernourishment	Not applicable at the business level
	2.1.2 Prevalence of moderate or severe food insecurity in the population, based on the Food Insecurity Experience Scale (FIES)	Not applicable at the business level

2.2 By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age, and address the nutritional needs of adolescent girls, pregnant and lactating women and older persons	2.2.1 Prevalence of stunting (height for age <-2 standard deviation from the median of the World Health Organization (WHO) Child Growth Standards) among children under 5 years of age	Not applicable at the business level
	2.2.2 Prevalence of malnutrition (weight for height >+2 or <-2 standard deviation from the median of the WHO Child Growth Standards) among children under 5 years of age, by type (wasting and overweight)	Not applicable at the business level
	2.2.3 Prevalence of anaemia in women aged 15 to 49 years, by pregnancy status (percentage)	Not applicable at the business level
2.3 By 2030, double the agricultural productivity and incomes of small-scale food producers, in particular women, indigenous peoples, family farmers, pastoralists and fishers, including through secure and equal access to land, other productive resources and inputs, knowledge, financial services, markets and opportunities for value addition and non-farm employment	2.3.1 Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size	
	2.3.2 Average income of small-scale food producers, by sex and indigenous status	
2.4 By 2030, ensure sustainable food production systems and implement resilient agricultural practices that increase productivity and production, that help maintain ecosystems, that strengthen capacity for adaptation to climate change, extreme weather, drought, flooding and other disasters and that progressively improve land and soil quality	2.4.1 Proportion of agricultural area under productive and sustainable agriculture	
2.5 By 2020, maintain the genetic diversity of seeds, cultivated plants and farmed and domesticated	2.5.1 Number of (*a*) plant and (*b*) animal genetic resources for food and agriculture secured in either	Not applicable at the business level

animals and their related wild species, including through soundly managed and diversified seed and plant banks at the national, regional and international levels, and promote access to and fair and equitable sharing of benefits arising from the utilization of genetic resources and associated traditional knowledge, as internationally agreed	medium- or long-term conservation facilities	
	2.5.2 Proportion of local breeds classified as being at risk of extinction	Not applicable at the business level
2.a Increase investment, including through enhanced international cooperation, in rural infrastructure, agricultural research and extension services, technology development and plant and livestock gene banks in order to enhance agricultural productive capacity in developing countries, in particular least developed countries	2.a.1 The agriculture orientation index for government expenditures	Not applicable in a high-income economy
	2.a.2 Total official flows (official development assistance plus other official flows) to the agriculture sector	Not applicable in a high-income economy
2.b Correct and prevent trade restrictions and distortions in world agricultural markets, including through the parallel elimination of all forms of agricultural export subsidies and all export measures with equivalent effect, in accordance with the mandate of the Doha Development Round	2.b.1 Agricultural export subsidies	Not applicable at the business level
2.c Adopt measures to ensure the proper functioning of food commodity markets and their derivatives and facilitate timely access to market information, including on food reserves, in order to help limit extreme food price volatility	2.c.1 Indicator of food price anomalies	Not applicable at the business level
Goal 3. Ensure healthy lives and promote well-being for all at all ages		

3.1 By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births	3.1.1 Maternal mortality ratio	
	3.1.2 Proportion of births attended by skilled health personnel	
3.2 By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	3.2.1 Under-5 mortality rate	
	3.2.2 Neonatal mortality rate	
3.3 By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	3.3.1 Number of new HIV infections per 1,000 uninfected population, by sex, age and key populations	Not applicable at the business level
	3.3.2 Tuberculosis incidence per 100,000 population	
	3.3.3 Malaria incidence per 1,000 population	Malaria has been eradicated in Europe
	3.3.4 Hepatitis B incidence per 100,000 population	
	3.3.5 Number of people requiring interventions against neglected tropical diseases	Not applicable at the business level
3.4 By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being	3.4.1 Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease	
	3.4.2 Suicide mortality rate	
3.5 Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol	3.5.1 Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders	
	3.5.2 Alcohol per capita consumption (aged 15 years and older) within a calendar year in litres of pure alcohol	
3.6 By 2020, halve the number of global deaths and injuries from road traffic accidents	3.6.1 Death rate due to road traffic injuries	Not applicable at the business level
3.7 By 2030, ensure universal access to sexual and reproductive health-	3.7.1 Proportion of women of reproductive age (aged 15–49 years) who have their need	Not applicable in a high-income economy

care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes	for family planning satisfied with modern methods	
	3.7.2 Adolescent birth rate (aged 10–14 years; aged 15–19 years) per 1,000 women in that age group	Not applicable at the business level
3.8 Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	3.8.1 Coverage of essential health services	
	3.8.2 Proportion of population with large household expenditures on health as a share of total household expenditure or income	
3.9 By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	3.9.1 Mortality rate attributed to household and ambient air pollution	
	3.9.2 Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (exposure to unsafe Water, Sanitation and Hygiene for All (WASH) services)	
	3.9.3 Mortality rate attributed to unintentional poisoning	
3.a Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate	3.a.1 Age-standardized prevalence of current tobacco use among persons aged 15 years and older	Not applicable at the business level
3.b Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the	3.b.1 Proportion of the target population covered by all vaccines included in their national programme	Not applicable at the business level
	3.b.2 Total net official development assistance to medical research and basic health sectors	Not applicable at the business level
	3.b.3 Proportion of health facilities that have a core set of relevant essential medicines available and affordable on a sustainable basis	Not applicable at the business level

provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all		
3.c Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States	3.c.1 Health worker density and distribution	Not applicable in a high-income economy
3.d Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks	3.d.1 International Health Regulations (IHR) capacity and health emergency preparedness	Not applicable at the business level
	3.d.2 Percentage of bloodstream infections due to selected antimicrobial-resistant organisms	Not applicable at the business level
Goal 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all		
4.1 By 2030, ensure that all girls and boys complete free, equitable and quality primary and secondary education leading to relevant and effective learning outcomes	4.1.1 Proportion of children and young people (*a*) in grades 2/3; (*b*) at the end of primary; and (*c*) at the end of lower secondary achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex	
	4.1.2 Completion rate (primary education, lower secondary education, upper secondary education)	
4.2 By 2030, ensure that all girls and boys have access to quality early childhood development, care and pre-primary education so that they are ready for primary education	4.2.1 Proportion of children aged 24–59 months who are developmentally on track in health, learning and psychosocial well-being, by sex	
	4.2.2 Participation rate in organized learning (one year before the official primary entry age), by sex	
4.3 By 2030, ensure equal access for all women and men to affordable and quality technical,	4.3.1 Participation rate of youth and adults in formal and non-formal education and	

vocational and tertiary education, including university	training in the previous 12 months, by sex	
4.4 By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship	4.4.1 Proportion of youth and adults with information and communications technology (ICT) skills, by type of skill	
4.5 By 2030, eliminate gender disparities in education and ensure equal access to all levels of education and vocational training for the vulnerable, including persons with disabilities, indigenous peoples and children in vulnerable situations	4.5.1 Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated	
4.6 By 2030, ensure that all youth and a substantial proportion of adults, both men and women, achieve literacy and numeracy	4.6.1 Proportion of population in a given age group achieving at least a fixed level of proficiency in functional (*a*) literacy and (*b*) numeracy skills, by sex	Not applicable at the business level
4.7 By 2030, ensure that all learners acquire the knowledge and skills needed to promote sustainable development, including, among others, through education for sustainable development and sustainable lifestyles, human rights, gender equality, promotion of a culture of peace and non-violence, global citizenship and appreciation of cultural diversity and of culture's contribution to sustainable development	4.7.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment	Not applicable at the business level
4.a Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all	4.a.1 Proportion of schools offering basic services, by type of service	Not applicable at the business level

4.b By 2020, substantially expand globally the number of scholarships available to developing countries, in particular least developed countries, small island developing States and African countries, for enrolment in higher education, including vocational training and information and communications technology, technical, engineering and scientific programmes, in developed countries and other developing countries	4.b.1 Volume of official development assistance flows for scholarships by sector and type of study	
4.c By 2030, substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing States	4.c.1 Proportion of teachers with the minimum required qualifications, by education level	Not applicable at the business level
Goal 5. Achieve gender equality and empower all women and girls		
5.1 End all forms of discrimination against all women and girls everywhere	5.1.1 Whether or not legal frameworks are in place to promote, enforce and monitor equality and non-discrimination on the basis of sex	Not applicable at the business level
5.2 Eliminate all forms of violence against all women and girls in the public and private spheres, including trafficking and sexual and other types of exploitation	5.2.1 Proportion of ever-partnered women and girls aged 15 years and older subjected to physical, sexual or psychological violence by a current or former intimate partner in the previous 12 months, by form of violence and by age	Not applicable at the business level
	5.2.2 Proportion of women and girls aged 15 years and older subjected to sexual violence by persons other than an intimate partner in the previous 12 months, by age and place of occurrence	

5.3 Eliminate all harmful practices, such as child, early and forced marriage and female genital mutilation	5.3.1 Proportion of women aged 20–24 years who were married or in a union before age 15 and before age 18	Not applicable at the business level
	5.3.2 Proportion of girls and women aged 15–49 years who have undergone female genital mutilation/cutting, by age	Not applicable at the business level
5.4 Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate	5.4.1 Proportion of time spent on unpaid domestic and care work, by sex, age and location	Not applicable at the business level
5.5 Ensure women's full and effective participation and equal opportunities for leadership at all levels of decision-making in political, economic and public life	5.5.1 Proportion of seats held by women in (*a*) national parliaments and (*b*) local governments	Not applicable at the business level
	5.5.2 Proportion of women in managerial positions	
5.6 Ensure universal access to sexual and reproductive health and reproductive rights as agreed in accordance with the Programme of Action of the International Conference on Population and Development and the Beijing Platform for Action and the outcome documents of their review conferences	5.6.1 Proportion of women aged 15–49 years who make their own informed decisions regarding sexual relations, contraceptive use and reproductive health care	Not applicable at the business level
	5.6.2 Number of countries with laws and regulations that guarantee full and equal access to women and men aged 15 years and older to sexual and reproductive health care, information and education	Not applicable at the business level
5.a Undertake reforms to give women equal rights to economic resources, as well as access to ownership and control over land and other forms of property, financial services, inheritance and natural resources, in accordance with national laws	5.a.1 (*a*) Proportion of total agricultural population with ownership or secure rights over agricultural land, by sex; and (*b*) share of women among owners or rights-bearers of agricultural land, by type of tenure	Not applicable at the business level
	5.a.2 Proportion of countries where the legal framework (including customary law) guarantees women's equal rights to land ownership and/or control	Not applicable at the business level

5.b Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women	5.b.1 Proportion of individuals who own a mobile telephone, by sex	Not applicable in a high-income economy
5.c Adopt and strengthen sound policies and enforceable legislation for the promotion of gender equality and the empowerment of all women and girls at all levels	5.c.1 Proportion of countries with systems to track and make public allocations for gender equality and women's empowerment	Not applicable at the business level
Goal 6. Ensure availability and sustainable management of water and sanitation for all		
6.1 By 2030, achieve universal and equitable access to safe and affordable drinking water for all	6.1.1 Proportion of population using safely managed drinking water services	Not applicable in a high-income economy
6.2 By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations	6.2.1 Proportion of population using (*a*) safely managed sanitation services and (*b*) a hand-washing facility with soap and water	Not applicable in a high-income economy
6.3 By 2030, improve water quality by reducing pollution, eliminating dumping and minimizing release of hazardous chemicals and materials, halving the proportion of untreated wastewater and substantially increasing recycling and safe reuse globally	6.3.1 Proportion of domestic and industrial wastewater flows safely treated	
	6.3.2 Proportion of bodies of water with good ambient water quality	Not applicable at the business level
6.4 By 2030, substantially increase water-use efficiency across all sectors and ensure sustainable withdrawals and supply of freshwater to address water scarcity and substantially reduce the number of people suffering from water scarcity	6.4.1 Change in water-use efficiency over time	
	6.4.2 Level of water stress: freshwater withdrawal as a proportion of available freshwater resources	

6.5 By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate	6.5.1 Degree of integrated water resources management	Not applicable at the business level
	6.5.2 Proportion of transboundary basin area with an operational arrangement for water cooperation	Not applicable at the business level
6.6 By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes	6.6.1 Change in the extent of water-related ecosystems over time	Not applicable at the business level
6.a By 2030, expand international cooperation and capacity-building support to developing countries in water- and sanitation-related activities and programmes, including water harvesting, desalination, water efficiency, wastewater treatment, recycling and reuse technologies	6.a.1 Amount of water- and sanitation-related official development assistance that is part of a government-coordinated spending plan	Not applicable at the business level
6.b Support and strengthen the participation of local communities in improving water and sanitation management	6.b.1 Proportion of local administrative units with established and operational policies and procedures for participation of local communities in water and sanitation management	Not applicable at the business level
Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all		
7.1 By 2030, ensure universal access to affordable, reliable and modern energy services	7.1.1 Proportion of population with access to electricity	Not applicable in a high-income economy
	7.1.2 Proportion of population with primary reliance on clean fuels and technology	
7.2 By 2030, increase substantially the share of renewable energy in the global energy mix	7.2.1 Renewable energy share in the total final energy consumption	
7.3 By 2030, double the global rate of improvement in energy efficiency	7.3.1 Energy intensity measured in terms of primary energy and GDP	
7.a By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy	7.a.1 International financial flows to developing countries in support of clean energy research and development and renewable energy production, including in hybrid systems	Not applicable at the business level

efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology		
7.b By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States and landlocked developing countries, in accordance with their respective programmes of support	7.b.1 Installed renewable energy-generating capacity in developing countries (in watts per capita)	Not applicable in a high-income economy
Goal 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all		
8.1 Sustain per capita economic growth in accordance with national circumstances and, in particular, at least 7 per cent gross domestic product growth per annum in the least developed countries	8.1.1 Annual growth rate of real GDP per capita	Not applicable at the business level
8.2 Achieve higher levels of economic productivity through diversification, technological upgrading and innovation, including through a focus on high-value added and labour-intensive sectors	8.2.1 Annual growth rate of real GDP per employed person	
8.3 Promote development-oriented policies that support productive activities, decent job creation, entrepreneurship, creativity and innovation, and encourage the formalization and growth of micro-, small- and medium-sized enterprises, including through access to financial services	8.3.1 Proportion of informal employment in total employment, by sector and sex	

8.4 Improve progressively, through 2030, global resource efficiency in consumption and production and endeavour to decouple economic growth from environmental degradation, in accordance with the 10-Year Framework of Programmes on Sustainable Consumption and Production, with developed countries taking the lead	8.4.1 Material footprint, material footprint per capita, and material footprint per GDP	
	8.4.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	
8.5 By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value	8.5.1 Average hourly earnings of employees, by sex, age, occupation and persons with disabilities	
	8.5.2 Unemployment rate, by sex, age and persons with disabilities	
8.6 By 2020, substantially reduce the proportion of youth not in employment, education or training	8.6.1 Proportion of youth (aged 15–24 years) not in education, employment or training	
8.7 Take immediate and effective measures to eradicate forced labour, end modern slavery and human trafficking and secure the prohibition and elimination of the worst forms of child labour, including recruitment and use of child soldiers, and by 2025 end child labour in all its forms	8.7.1 Proportion and number of children aged 5–17 years engaged in child labour, by sex and age	Not applicable in a high-income economy
8.8 Protect labour rights and promote safe and secure working environments for all workers, including migrant workers, in particular women migrants, and those in precarious employment	8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers, by sex and migrant status	
	8.8.2 Level of national compliance with labour rights (freedom of association and collective bargaining) based on International Labour Organization (ILO) textual sources and national legislation, by sex and migrant status	

8.9 By 2030, devise and implement policies to promote sustainable tourism that creates jobs and promotes local culture and products	8.9.1 Tourism direct GDP as a proportion of total GDP and in growth rate	
8.10 Strengthen the capacity of domestic financial institutions to encourage and expand access to banking, insurance and financial services for all	8.10.1 (*a*) Number of commercial bank branches per 100,000 adults and (*b*) number of automated teller machines (ATMs) per 100,000 adults	
	8.10.2 Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider	
8.a Increase Aid for Trade support for developing countries, in particular least developed countries, including through the Enhanced Integrated Framework for Trade-related Technical Assistance to Least Developed Countries	8.a.1 Aid for Trade commitments and disbursements	Not applicable in a high-income economy
8.b By 2020, develop and operationalize a global strategy for youth employment and implement the Global Jobs Pact of the International Labour Organization	8.b.1 Existence of a developed and operationalized national strategy for youth employment, as a distinct strategy or as part of a national employment strategy	Not applicable at the business level
Goal 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation		
9.1 Develop quality, reliable, sustainable and resilient infrastructure, including regional and transborder infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all	9.1.1 Proportion of the rural population who live within 2 km of an all-season road	Not applicable at the business level
	9.1.2 Passenger and freight volumes, by mode of transport	Not applicable at the business level
9.2 Promote inclusive and sustainable industrialization and, by 2030, significantly raise industry's share of employment and gross domestic product, in line with national circumstances, and	9.2.1 Manufacturing value added as a proportion of GDP and per capita	
	9.2.2 Manufacturing employment as a proportion of total employment	

double its share in least developed countries		
9.3 Increase the access of small-scale industrial and other enterprises, in particular in developing countries, to financial services, including affordable credit, and their integration into value chains and markets	9.3.1 Proportion of small-scale industries in total industry value added	
	9.3.2 Proportion of small-scale industries with a loan or line of credit	
9.4 By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities	9.4.1 CO_2 emission per unit of value added	
9.5 Enhance scientific research, upgrade the technological capabilities of industrial sectors in all countries, in particular developing countries, including, by 2030, encouraging innovation and substantially increasing the number of research and development workers per 1 million people and public and private research and development spending	9.5.1 Research and development expenditure as a proportion of GDP	
	9.5.2 Researchers (in full-time equivalent) per million inhabitants	
9.a Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States	9.a.1 Total official international support (official development assistance plus other official flows) to infrastructure	Not applicable at the business level

9.b Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities	9.b.1 Proportion of medium and high-tech industry value added in total value added	Not applicable at the business level
9.c Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020	9.c.1 Proportion of population covered by a mobile network, by technology	Not applicable in a high-income economy
Goal 10. Reduce inequality within and among countries		
10.1 By 2030, progressively achieve and sustain income growth of the bottom 40 per cent of the population at a rate higher than the national average	10.1.1 Growth rates of household expenditure or income per capita among the bottom 40 per cent of the population and the total population	
10.2 By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status	10.2.1 Proportion of people living below 50 per cent of median income, by sex, age and persons with disabilities	Not applicable at the business level
10.3 Ensure equal opportunity and reduce inequalities of outcome, including by eliminating discriminatory laws, policies and practices and promoting appropriate legislation, policies and action in this regard	10.3.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law	
10.4 Adopt policies, especially fiscal, wage and social protection policies, and progressively achieve greater equality	10.4.1 Labour share of GDP	Not applicable at the business level
	10.4.2 Redistributive impact of fiscal policy[2]	Not applicable at the business level
10.5 Improve the regulation and monitoring of global financial markets and institutions and strengthen the	10.5.1 Financial Soundness Indicators	

implementation of such regulations		
10.6 Ensure enhanced representation and voice for developing countries in decision-making in global international economic and financial institutions in order to deliver more effective, credible, accountable and legitimate institutions	10.6.1 Proportion of members and voting rights of developing countries in international organizations	Not applicable at the business level
10.7 Facilitate orderly, safe, regular and responsible migration and mobility of people, including through the implementation of planned and well-managed migration policies	10.7.1 Recruitment cost borne by employee as a proportion of monthly income earned in country of destination	Not applicable at the business level
	10.7.2 Number of countries with migration policies that facilitate orderly, safe, regular and responsible migration and mobility of people	Not applicable at the business level
	10.7.3 Number of people who died or disappeared in the process of migration towards an international destination	Not applicable at the business level
	10.7.4 Proportion of the population who are refugees, by country of origin	Not applicable at the business level
10.a Implement the principle of special and differential treatment for developing countries, in particular least developed countries, in accordance with World Trade Organization agreements	10.a.1 Proportion of tariff lines applied to imports from least developed countries and developing countries with zero-tariff	Not applicable in a high-income economy
10.b Encourage official development assistance and financial flows, including foreign direct investment, to States where the need is greatest, in particular least developed countries, African countries, small island developing States and landlocked developing countries, in accordance with their national plans and programmes	10.b.1 Total resource flows for development, by recipient and donor countries and type of flow (e.g. official development assistance, foreign direct investment and other flows)	Not applicable at the business level
10.c By 2030, reduce to less than 3 per cent the transaction costs of	10.c.1 Remittance costs as a proportion of the amount remitted	

migrant remittances and eliminate remittance corridors with costs higher than 5 per cent		
Goal 11. Make cities and human settlements inclusive, safe, resilient and sustainable		
11.1 By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums	11.1.1 Proportion of urban population living in slums, informal settlements or inadequate housing	Not applicable at the business level
11.2 By 2030, provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons	11.2.1 Proportion of population that has convenient access to public transport, by sex, age and persons with disabilities	Not applicable at the business level
11.3 By 2030, enhance inclusive and sustainable urbanization and capacity for participatory, integrated and sustainable human settlement planning and management in all countries	11.3.1 Ratio of land consumption rate to population growth rate	Not applicable at the business level
	11.3.2 Proportion of cities with a direct participation structure of civil society in urban planning and management that operate regularly and democratically	Not applicable at the business level
11.4 Strengthen efforts to protect and safeguard the world's cultural and natural heritage	11.4.1 Total per capita expenditure on the preservation, protection and conservation of all cultural and natural heritage, by source of funding (public, private), type of heritage (cultural, natural) and level of government (national, regional, and local/municipal)	Not applicable at the business level
11.5 By 2030, significantly reduce the number of deaths and the number of people affected and substantially decrease the direct economic losses relative to global gross domestic product caused by disasters, including water-related disasters, with a focus on protecting	11.5.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	
	11.5.2 Direct economic loss attributed to disasters in relation to global gross domestic product (GDP)	
	11.5.3 (*a*) Damage to critical infrastructure and (*b*) number	Not applicable at the business level

the poor and people in vulnerable situations	of disruptions to basic services, attributed to disasters	
11.6 By 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management	11.6.1 Proportion of municipal solid waste collected and managed in controlled facilities out of total municipal waste generated, by cities	Not applicable at the business level
	11.6.2 Annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities (population weighted)	
11.7 By 2030, provide universal access to safe, inclusive and accessible, green and public spaces, in particular for women and children, older persons and persons with disabilities	11.7.1 Average share of the built-up area of cities that is open space for public use for all, by sex, age and persons with disabilities	Not applicable at the business level
	11.7.2 Proportion of persons victim of physical or sexual harassment, by sex, age, disability status and place of occurrence, in the previous 12 months	
11.a Support positive economic, social and environmental links between urban, peri-urban and rural areas by strengthening national and regional development planning	11.a.1 Number of countries that have national urban policies or regional development plans that (*a*) respond to population dynamics; (*b*) ensure balanced territorial development; and (*c*) increase local fiscal space	Not applicable at the business level
11.b By 2020, substantially increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, mitigation and adaptation to climate change, resilience to disasters, and develop and implement, in line with the Sendai Framework for Disaster Risk Reduction 2015–2030, holistic disaster risk management at all levels	11.b.1 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030	Not applicable at the business level
	11.b.2 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	Not applicable at the business level
11.c Support least developed countries, including through financial and technical assistance, in building sustainable and resilient	*No suitable replacement indicator was proposed. The global statistical community is encouraged to work to develop an indicator that could be proposed for the 2025*	

buildings utilizing local materials	*comprehensive review. See E/CN.3/2020/2, paragraph 23.*	
Goal 12. Ensure sustainable consumption and production patterns		
12.1 Implement the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns, all countries taking action, with developed countries taking the lead, taking into account the development and capabilities of developing countries	12.1.1 Number of countries developing, adopting or implementing policy instruments aimed at supporting the shift to sustainable consumption and production	Not applicable at the business level
12.2 By 2030, achieve the sustainable management and efficient use of natural resources	12.2.1 Material footprint, material footprint per capita, and material footprint per GDP	
	12.2.2 Domestic material consumption, domestic material consumption per capita, and domestic material consumption per GDP	
12.3 By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses	12.3.1 (*a*) Food loss index and (*b*) food waste index	
12.4 By 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment	12.4.1 Number of parties to international multilateral environmental agreements on hazardous waste, and other chemicals that meet their commitments and obligations in transmitting information as required by each relevant agreement	Not applicable at the business level
	12.4.2 (*a*) Hazardous waste generated per capita; and (*b*) proportion of hazardous waste treated, by type of treatment	
12.5 By 2030, substantially reduce waste generation through prevention, reduction, recycling and reuse	12.5.1 National recycling rate, tons of material recycled	

12.6 Encourage companies, especially large and transnational companies, to adopt sustainable practices and to integrate sustainability information into their reporting cycle	12.6.1 Number of companies publishing sustainability reports	
12.7 Promote public procurement practices that are sustainable, in accordance with national policies and priorities	12.7.1 Number of countries implementing sustainable public procurement policies and action plans[3]	Not applicable at the business level
12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature	12.8.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment	Not applicable at the business level
12.a Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production	12.a.1 Installed renewable energy-generating capacity in developing countries (in watts per capita)	Not applicable in a high-income economy
12.b Develop and implement tools to monitor sustainable development impacts for sustainable tourism that creates jobs and promotes local culture and products	12.b.1 Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability	
12.c Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their	12.c.1 Amount of fossil-fuel subsidies (production and consumption) per unit of GDP	Not applicable at the business level

development in a manner that protects the poor and the affected communities		
Goal 13. Take urgent action to combat climate change and its impacts[4]		
13.1 Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	13.1.1 Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population	
	13.1.2 Number of countries that adopt and implement national disaster risk reduction strategies in line with the Sendai Framework for Disaster Risk Reduction 2015–2030	Not applicable at the business level
	13.1.3 Proportion of local governments that adopt and implement local disaster risk reduction strategies in line with national disaster risk reduction strategies	Not applicable at the business level
13.2 Integrate climate change measures into national policies, strategies and planning	13.2.1 Number of countries with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change	Not applicable at the business level
	13.2.2 Total greenhouse gas emissions per year	
13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	13.3.1 Extent to which (i) global citizenship education and (ii) education for sustainable development are mainstreamed in (*a*) national education policies; (*b*) curricula; (*c*) teacher education; and (*d*) student assessment	Not applicable at the business level

13.a Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible	13.a.1 Amounts provided and mobilized in United States dollars per year in relation to the continued existing collective mobilization goal of the $100 billion commitment through to 2025	Not applicable at the business level
13.b Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	13.b.1 Number of least developed countries and small island developing States with nationally determined contributions, long-term strategies, national adaptation plans and adaptation communications, as reported to the secretariat of the United Nations Framework Convention on Climate Change	Not applicable in a high-income economy
Goal 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development		
14.1 By 2025, prevent and significantly reduce marine pollution of all kinds, in particular from land-based activities, including marine debris and nutrient pollution	14.1.1 (*a*) Index of coastal eutrophication; and (*b*) plastic debris density	Not applicable at the business level
14.2 By 2020, sustainably manage and protect marine and coastal ecosystems to avoid significant adverse impacts, including by strengthening their resilience, and take action for their restoration in order to achieve healthy and productive oceans	14.2.1 Number of countries using ecosystem-based approaches to managing marine areas	Not applicable at the business level
14.3 Minimize and address the impacts of ocean acidification, including through	14.3.1 Average marine acidity (pH) measured at agreed suite of representative sampling stations	

enhanced scientific cooperation at all levels		
14.4 By 2020, effectively regulate harvesting and end overfishing, illegal, unreported and unregulated fishing and destructive fishing practices and implement science-based management plans, in order to restore fish stocks in the shortest time feasible, at least to levels that can produce maximum sustainable yield as determined by their biological characteristics	14.4.1 Proportion of fish stocks within biologically sustainable levels	Not applicable at the business level
14.5 By 2020, conserve at least 10 per cent of coastal and marine areas, consistent with national and international law and based on the best available scientific information	14.5.1 Coverage of protected areas in relation to marine areas	Not applicable at the business level
14.6 By 2020, prohibit certain forms of fisheries subsidies which contribute to overcapacity and overfishing, eliminate subsidies that contribute to illegal, unreported and unregulated fishing and refrain from introducing new such subsidies, recognizing that appropriate and effective special and differential treatment for developing and least developed countries should be an integral part of the World Trade Organization fisheries subsidies negotiation[5]	14.6.1 Degree of implementation of international instruments aiming to combat illegal, unreported and unregulated fishing	Not applicable at the business level
14.7 By 2030, increase the economic benefits to small island developing States and least developed countries from the sustainable use of marine resources,	14.7.1 Sustainable fisheries as a proportion of GDP in small island developing States, least developed countries and all countries	Not applicable in a high-income economy

including through sustainable management of fisheries, aquaculture and tourism		
14.a Increase scientific knowledge, develop research capacity and transfer marine technology, taking into account the Intergovernmental Oceanographic Commission Criteria and Guidelines on the Transfer of Marine Technology, in order to improve ocean health and to enhance the contribution of marine biodiversity to the development of developing countries, in particular small island developing States and least developed countries	14.a.1 Proportion of total research budget allocated to research in the field of marine technology	Not applicable at the business level
14.b Provide access for small-scale artisanal fishers to marine resources and markets	14.b.1 Degree of application of a legal/regulatory/ policy/institutional framework which recognizes and protects access rights for small-scale fisheries	Not applicable at the business level
14.c Enhance the conservation and sustainable use of oceans and their resources by implementing international law as reflected in the United Nations Convention on the Law of the Sea, which provides the legal framework for the conservation and sustainable use of oceans and their resources, as recalled in paragraph 158 of "The future we want"	14.c.1 Number of countries making progress in ratifying, accepting and implementing through legal, policy and institutional frameworks, ocean-related instruments that implement international law, as reflected in the United Nations Convention on the Law of the Sea, for the conservation and sustainable use of the oceans and their resources	Not applicable at the business level
Goal 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss		
15.1 By 2020, ensure the conservation, restoration and sustainable use of	15.1.1 Forest area as a proportion of total land area	Not applicable at the business level

terrestrial and inland freshwater ecosystems and their services, in particular forests, wetlands, mountains and drylands, in line with obligations under international agreements	15.1.2 Proportion of important sites for terrestrial and freshwater biodiversity that are covered by protected areas, by ecosystem type	Not applicable at the business level
15.2 By 2020, promote the implementation of sustainable management of all types of forests, halt deforestation, restore degraded forests and substantially increase afforestation and reforestation globally	15.2.1 Progress towards sustainable forest management	
15.3 By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world	15.3.1 Proportion of land that is degraded over total land area	Not applicable at the business level
15.4 By 2030, ensure the conservation of mountain ecosystems, including their biodiversity, in order to enhance their capacity to provide benefits that are essential for sustainable development	15.4.1 Coverage by protected areas of important sites for mountain biodiversity	Not applicable at the business level
	15.4.2 Mountain Green Cover Index	Not applicable at the business level
15.5 Take urgent and significant action to reduce the degradation of natural habitats, halt the loss of biodiversity and, by 2020, protect and prevent the extinction of threatened species	15.5.1 Red List Index	Not applicable at the business level
15.6 Promote fair and equitable sharing of the benefits arising from the utilization of genetic resources and promote appropriate access to such resources, as internationally agreed	15.6.1 Number of countries that have adopted legislative, administrative and policy frameworks to ensure fair and equitable sharing of benefits	Not applicable at the business level
15.7 Take urgent action to end poaching and trafficking of protected species of flora and fauna and address both demand	15.7.1 Proportion of traded wildlife that was poached or illicitly trafficked	Not applicable at the business level

and supply of illegal wildlife products		
15.8 By 2020, introduce measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems and control or eradicate the priority species	15.8.1 Proportion of countries adopting relevant national legislation and adequately resourcing the prevention or control of invasive alien species	Not applicable at the business level
15.9 By 2020, integrate ecosystem and biodiversity values into national and local planning, development processes, poverty reduction strategies and accounts	15.9.1 (*a*) Number of countries that have established national targets in accordance with or similar to Aichi Biodiversity Target 2 of the Strategic Plan for Biodiversity 2011–2020 in their national biodiversity strategy and action plans and the progress reported towards these targets; and (*b*) integration of biodiversity into national accounting and reporting systems, defined as implementation of the System of Environmental-Economic Accounting	Not applicable at the business level
15.a Mobilize and significantly increase financial resources from all sources to conserve and sustainably use biodiversity and ecosystems	15.a.1 (*a*) Official development assistance on conservation and sustainable use of biodiversity; and (*b*) revenue generated and finance mobilized from biodiversity-relevant economic instruments	Not applicable at the business level
15.b Mobilize significant resources from all sources and at all levels to finance sustainable forest management and provide adequate incentives to developing countries to advance such management, including for conservation and reforestation	15.b.1 (*a*) Official development assistance on conservation and sustainable use of biodiversity; and (*b*) revenue generated and finance mobilized from biodiversity-relevant economic instruments	Not applicable at the business level
15.c Enhance global support for efforts to combat poaching and trafficking of protected species, including by increasing the capacity of local communities to pursue sustainable livelihood opportunities	15.c.1 Proportion of traded wildlife that was poached or illicitly trafficked	Not applicable at the business level

Goal 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels		
16.1 Significantly reduce all forms of violence and related death rates everywhere	16.1.1 Number of victims of intentional homicide per 100,000 population, by sex and age	
	16.1.2 Conflict-related deaths per 100,000 population, by sex, age and cause	
	16.1.3 Proportion of population subjected to (*a*) physical violence, (*b*) psychological violence and (*c*) sexual violence in the previous 12 months	
	16.1.4 Proportion of population that feel safe walking alone around the area they live after dark	Not applicable at the business level
16.2 End abuse, exploitation, trafficking and all forms of violence against and torture of children	16.2.1 Proportion of children aged 1–17 years who experienced any physical punishment and/or psychological aggression by caregivers in the past month	Not applicable at the business level
	16.2.2 Number of victims of human trafficking per 100,000 population, by sex, age and form of exploitation	Not applicable at the business level
	16.2.3 Proportion of young women and men aged 18–29 years who experienced sexual violence by age 18	
16.3 Promote the rule of law at the national and international levels and ensure equal access to justice for all	16.3.1 Proportion of victims of violence in the previous 12 months who reported their victimization to competent authorities or other officially recognized conflict resolution mechanisms	Not applicable at the business level
	16.3.2 Unsentenced detainees as a proportion of overall prison population	Not applicable at the business level
	16.3.3 Proportion of the population who have experienced a dispute in the past two years and who accessed a formal or informal dispute resolution mechanism, by type of mechanism	Not applicable at the business level
16.4 By 2030, significantly reduce illicit	16.4.1 Total value of inward and outward illicit financial	Not applicable at the business level

financial and arms flows, strengthen the recovery and return of stolen assets and combat all forms of organized crime	flows (in current United States dollars)	
	16.4.2 Proportion of seized, found or surrendered arms whose illicit origin or context has been traced or established by a competent authority in line with international instruments	Not applicable at the business level
16.5 Substantially reduce corruption and bribery in all their forms	16.5.1 Proportion of persons who had at least one contact with a public official and who paid a bribe to a public official, or were asked for a bribe by those public officials, during the previous 12 months	Not applicable at the business level
	16.5.2 Proportion of businesses that had at least one contact with a public official and that paid a bribe to a public official, or were asked for a bribe by those public officials during the previous 12 months	Not applicable at the business level
16.6 Develop effective, accountable and transparent institutions at all levels	16.6.1 Primary government expenditures as a proportion of original approved budget, by sector (or by budget codes or similar)	Not applicable at the business level
	16.6.2 Proportion of population satisfied with their last experience of public services	Not applicable at the business level
16.7 Ensure responsive, inclusive, participatory and representative decision-making at all levels	16.7.1 Proportions of positions in national and local institutions, including (*a*) the legislatures; (*b*) the public service; and (*c*) the judiciary, compared to national distributions, by sex, age, persons with disabilities and population groups	Not applicable at the business level
	16.7.2 Proportion of population who believe decision-making is inclusive and responsive, by sex, age, disability and population group	Not applicable at the business level
16.8 Broaden and strengthen the participation of developing countries in the institutions of global governance	16.8.1 Proportion of members and voting rights of developing countries in international organizations	Not applicable in a high-income economy
16.9 By 2030, provide legal identity for all,	16.9.1 Proportion of children under 5 years of age whose	Not applicable at the business level

including birth registration	births have been registered with a civil authority, by age	
16.10 Ensure public access to information and protect fundamental freedoms, in accordance with national legislation and international agreements	16.10.1 Number of verified cases of killing, kidnapping, enforced disappearance, arbitrary detention and torture of journalists, associated media personnel, trade unionists and human rights advocates in the previous 12 months	Not applicable at the business level
	16.10.2 Number of countries that adopt and implement constitutional, statutory and/or policy guarantees for public access to information	Not applicable at the business level
16.a Strengthen relevant national institutions, including through international cooperation, for building capacity at all levels, in particular in developing countries, to prevent violence and combat terrorism and crime	16.a.1 Existence of independent national human rights institutions in compliance with the Paris Principles	Not applicable at the business level
16.b Promote and enforce non-discriminatory laws and policies for sustainable development	16.b.1 Proportion of population reporting having personally felt discriminated against or harassed in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law	
Goal 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development		
Finance		
17.1 Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection	17.1.1 Total government revenue as a proportion of GDP, by source	Not applicable at the business level
	17.1.2 Proportion of domestic budget funded by domestic taxes	Not applicable at the business level
17.2 Developed countries to implement fully their official development assistance commitments, including the commitment by many developed countries to achieve the target of 0.7 per cent of gross national income for	17.2.1 Net official development assistance, total and to least developed countries, as a proportion of the Organization for Economic Cooperation and Development (OECD) Development Assistance Committee donors' gross national income (GNI)	Not applicable in a high-income economy

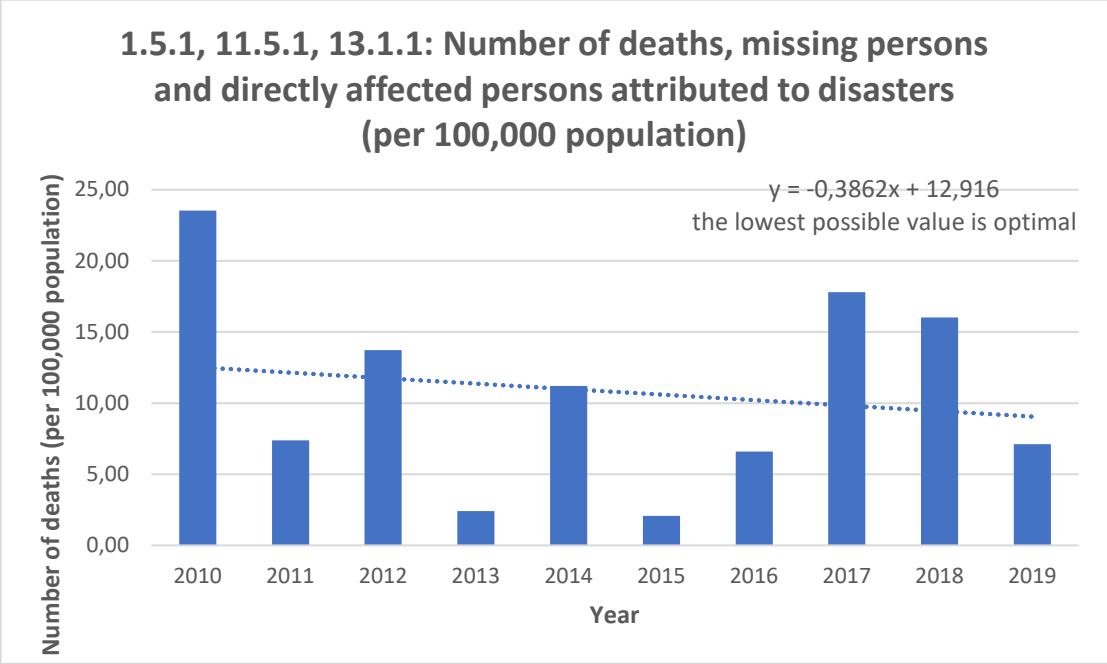
official development assistance (ODA/GNI) to developing countries and 0.15 to 0.20 per cent of ODA/GNI to least developed countries; ODA providers are encouraged to consider setting a target to provide at least 0.20 per cent of ODA/GNI to least developed countries		
17.3 Mobilize additional financial resources for developing countries from multiple sources	17.3.1 Additional financial resources mobilized for developing countries from multiple sources	Not applicable in a high-income economy
	17.3.2 Volume of remittances (in United States dollars) as a proportion of total GDP	Not applicable in a high-income economy
17.4 Assist developing countries in attaining long-term debt sustainability through coordinated policies aimed at fostering debt financing, debt relief and debt restructuring, as appropriate, and address the external debt of highly indebted poor countries to reduce debt distress	17.4.1 Debt service as a proportion of exports of goods and services	Not applicable at the business level
17.5 Adopt and implement investment promotion regimes for least developed countries	17.5.1 Number of countries that adopt and implement investment promotion regimes for developing countries, including the least developed countries	Not applicable at the business level
Technology		
17.6 Enhance North-South, South-South and triangular regional and international cooperation on and access to science, technology and innovation and enhance knowledge-sharing on mutually agreed terms, including through improved coordination among existing mechanisms, in particular at the United Nations level, and through a	17.6.1 Fixed Internet broadband subscriptions per 100 inhabitants, by speed[6]	Not applicable at the business level

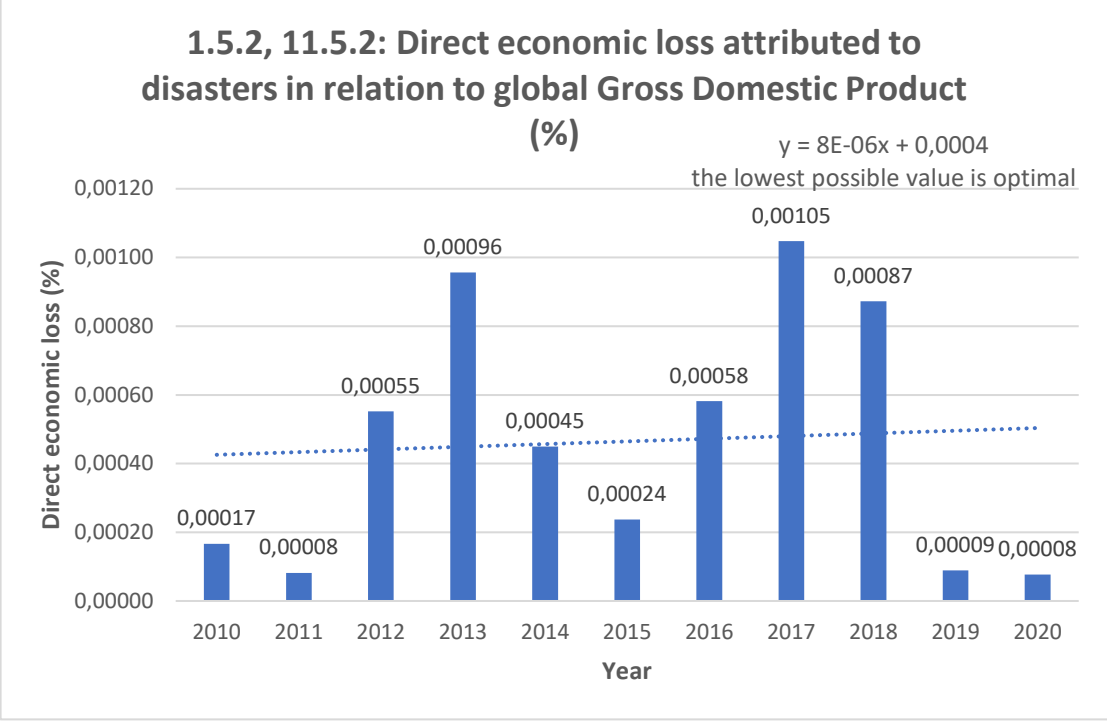
global technology facilitation mechanism		
17.7 Promote the development, transfer, dissemination and diffusion of environmentally sound technologies to developing countries on favourable terms, including on concessional and preferential terms, as mutually agreed	17.7.1 Total amount of funding for developing countries to promote the development, transfer, dissemination and diffusion of environmentally sound technologies	Not applicable at the business level
17.8 Fully operationalize the technology bank and science, technology and innovation capacity-building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology	17.8.1 Proportion of individuals using the Internet	Not applicable at the business level
Capacity-building		
17.9 Enhance international support for implementing effective and targeted capacity-building in developing countries to support national plans to implement all the Sustainable Development Goals, including through North-South, South-South and triangular cooperation	17.9.1 Dollar value of financial and technical assistance (including through North-South, South-South and triangular cooperation) committed to developing countries	Not applicable at the business level
Trade		
17.10 Promote a universal, rules-based, open, non-discriminatory and equitable multilateral trading system under the World Trade Organization, including through the conclusion of negotiations under its Doha Development Agenda	17.10.1 Worldwide weighted tariff-average	Not applicable at the business level

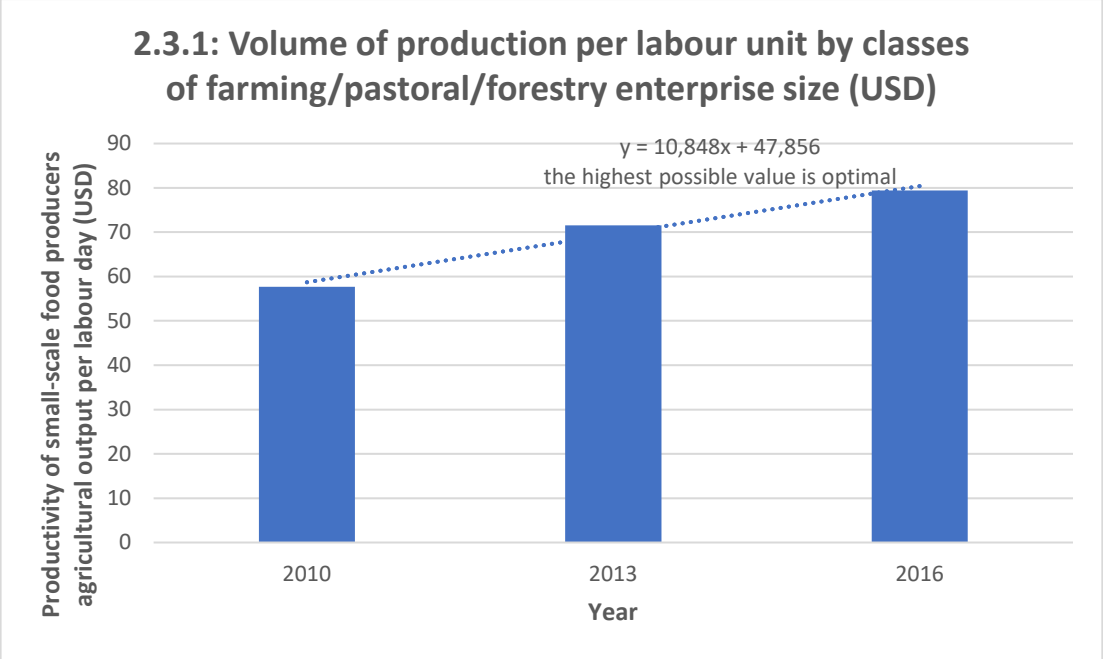
17.11 Significantly increase the exports of developing countries, in particular with a view to doubling the least developed countries' share of global exports by 2020	17.11.1 Developing countries' and least developed countries' share of global exports	Not applicable in a high-income economy
17.12 Realize timely implementation of duty-free and quota-free market access on a lasting basis for all least developed countries, consistent with World Trade Organization decisions, including by ensuring that preferential rules of origin applicable to imports from least developed countries are transparent and simple, and contribute to facilitating market access	17.12.1 Weighted average tariffs faced by developing countries, least developed countries and small island developing States	Not applicable in a high-income economy
Systemic issues		
Policy and institutional coherence		
17.13 Enhance global macroeconomic stability, including through policy coordination and policy coherence	17.13.1 Macroeconomic Dashboard	Not applicable at the business level
17.14 Enhance policy coherence for sustainable development	17.14.1 Number of countries with mechanisms in place to enhance policy coherence of sustainable development	Not applicable at the business level
17.15 Respect each country's policy space and leadership to establish and implement policies for poverty eradication and sustainable development	17.15.1 Extent of use of country-owned results frameworks and planning tools by providers of development cooperation	Not applicable at the business level
Multi-stakeholder partnerships		
17.16 Enhance the Global Partnership for Sustainable Development, complemented by multi-stakeholder partnerships that mobilize and share knowledge, expertise, technology and financial resources, to support the	17.16.1 Number of countries reporting progress in multi-stakeholder development effectiveness monitoring frameworks that support the achievement of the sustainable development goals	Not applicable at the business level

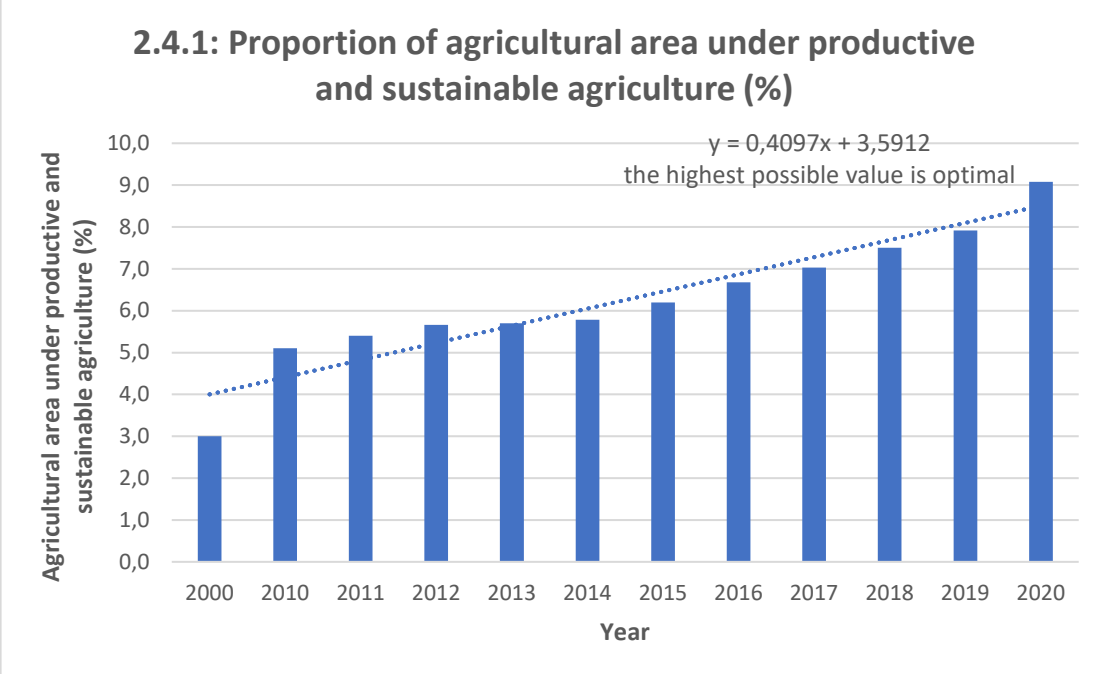
achievement of the Sustainable Development Goals in all countries, in particular developing countries		
17.17 Encourage and promote effective public, public-private and civil society partnerships, building on the experience and resourcing strategies of partnerships	17.17.1 Amount in United States dollars committed to public-private partnerships for infrastructure	Not applicable at the business level
Data, monitoring and accountability		
17.18 By 2020, enhance capacity-building support to developing countries, including for least developed countries and small island developing States, to increase significantly the availability of high-quality, timely and reliable data disaggregated by income, gender, age, race, ethnicity, migratory status, disability, geographic location and other characteristics relevant in national contexts	17.18.1 Statistical capacity indicator for Sustainable Development Goal monitoring	Not applicable at the business level
	17.18.2 Number of countries that have national statistical legislation that complies with the Fundamental Principles of Official Statistics	Not applicable at the business level
	17.18.3 Number of countries with a national statistical plan that is fully funded and under implementation, by source of funding	Not applicable at the business level
17.19 By 2030, build on existing initiatives to develop measurements of progress on sustainable development that complement gross domestic product, and support statistical capacity-building in developing countries	17.19.1 Dollar value of all resources made available to strengthen statistical capacity in developing countries	Not applicable in a high-income economy
	17.19.2 Proportion of countries that (*a*) have conducted at least one population and housing census in the last 10 years; and (*b*) have achieved 100 per cent birth registration and 80 per cent death registration	Not applicable at the business level

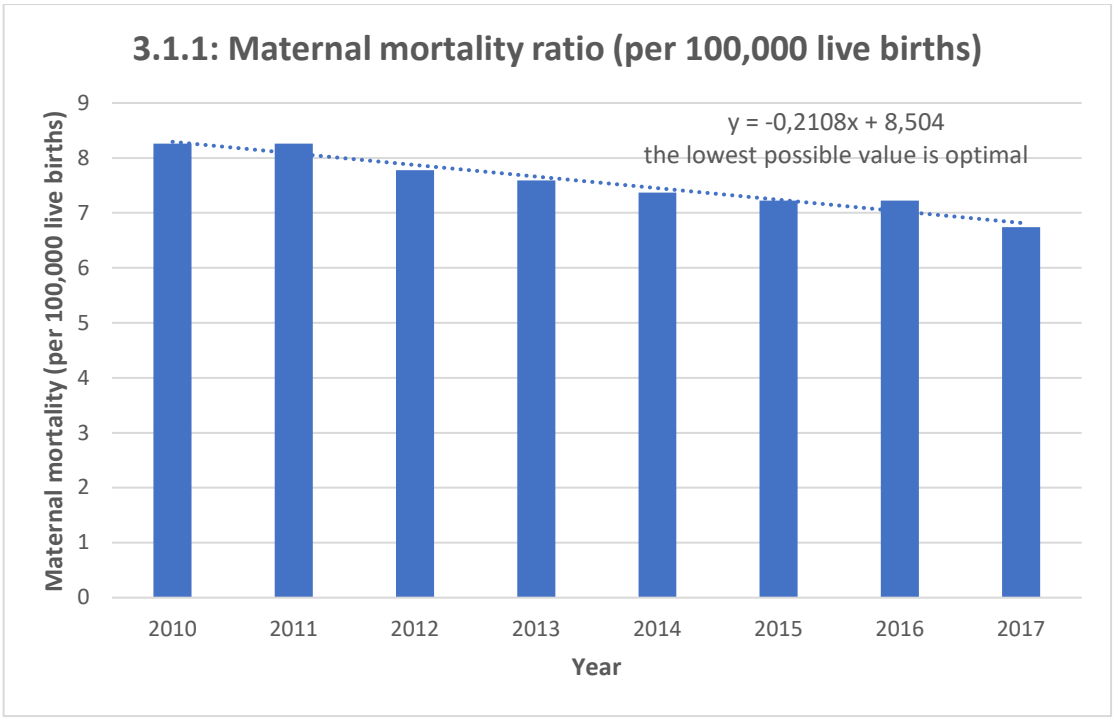
Appendix II – The indicators' trend value

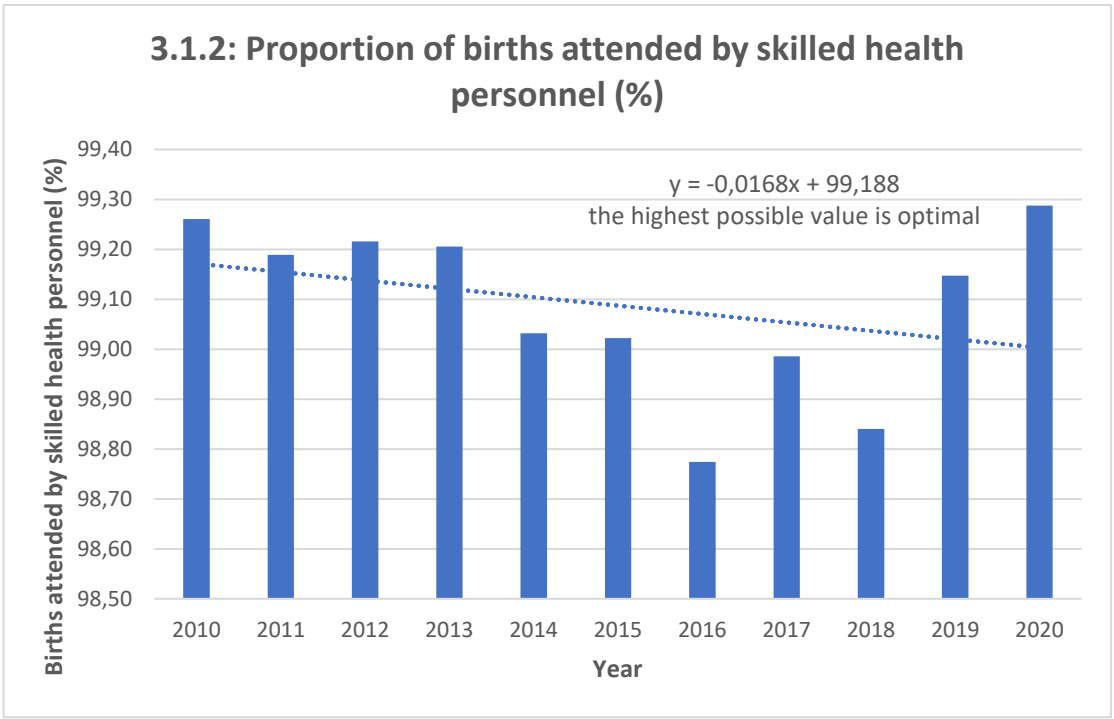


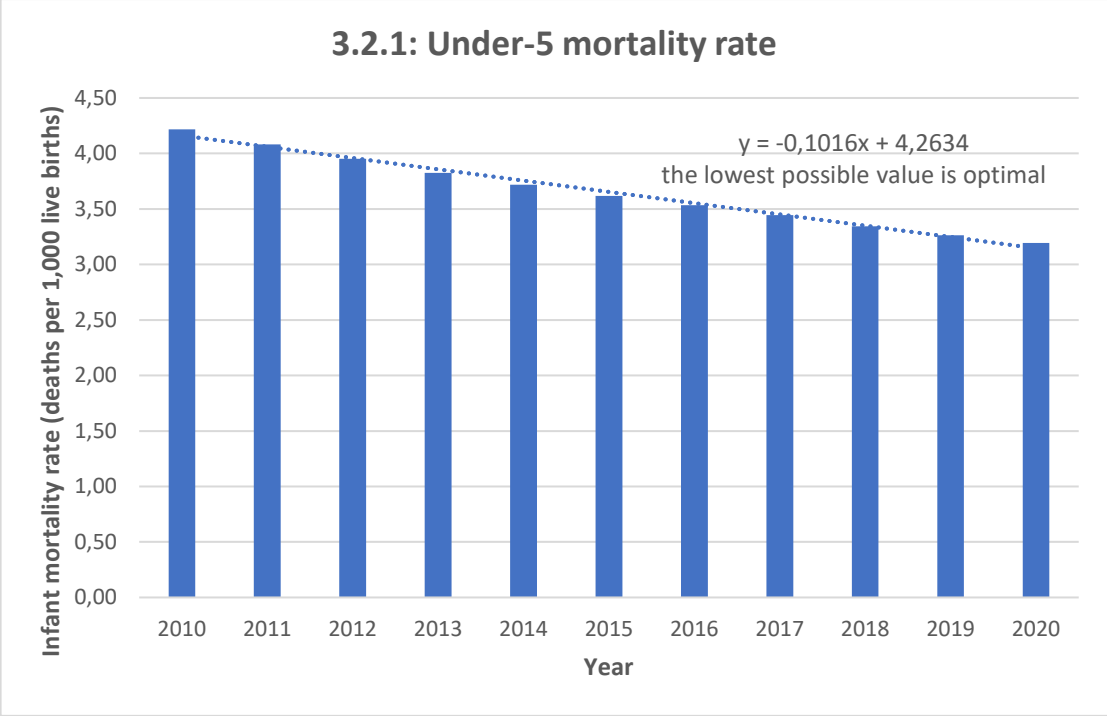


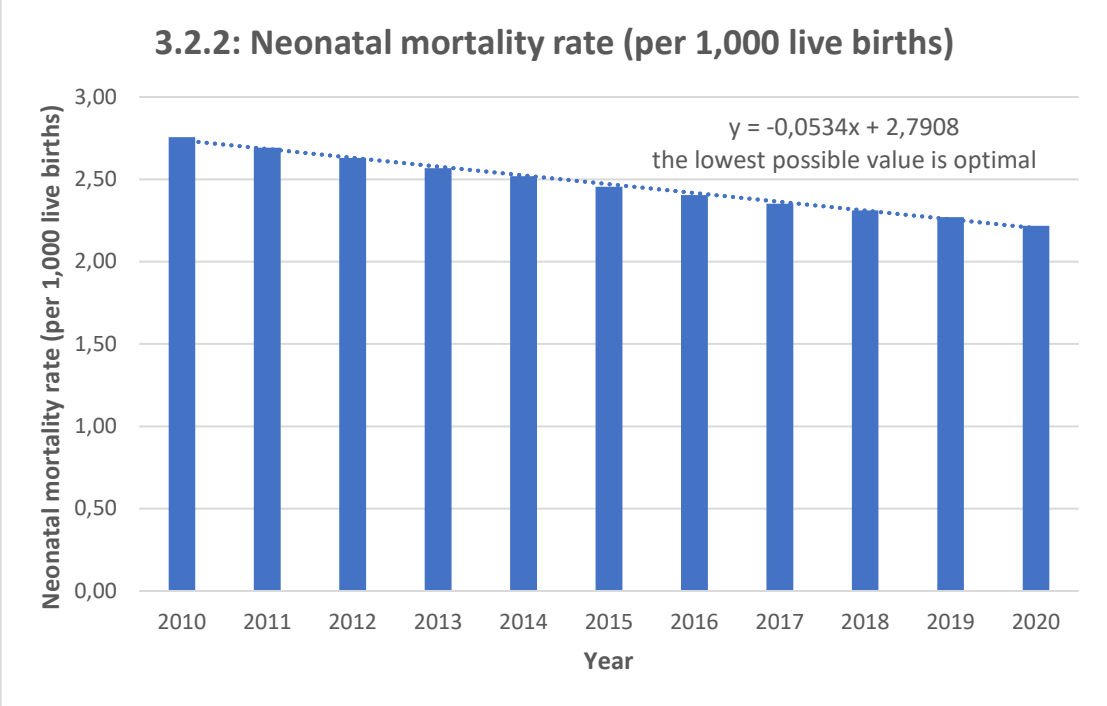

2.3.1: Volume of production per labour unit by classes of farming/pastoral/forestry enterprise size (USD)
Productivity of small-scale food producers agricultural output per labour day (USD)
y = 10,848x + 47,856
the highest possible value is optimal
90
80
70
60
50
40
30
20
10
0
2010
2013
2016
Year

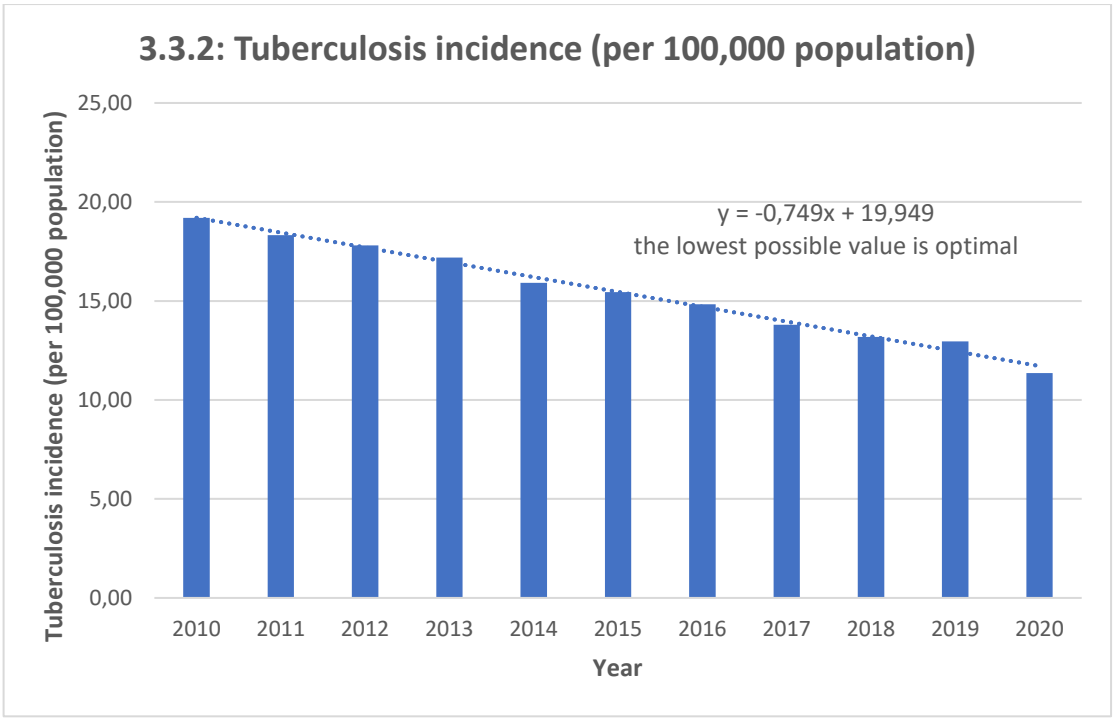

2.4.1: Proportion of agricultural area under productive and sustainable agriculture (%)
Agricultural area under productive and sustainable agriculture (%)
y = 0,4097x + 3,5912
the highest possible value is optimal
10,0
9,0
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
2000
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

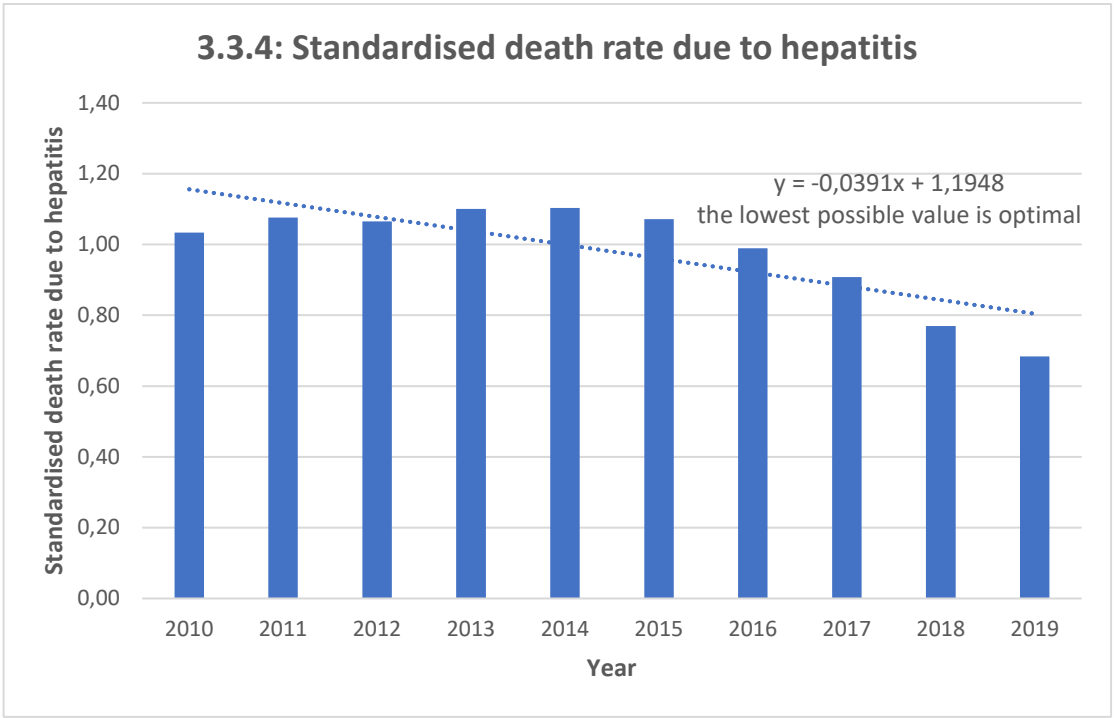

3.1.1: Maternal mortality ratio (per 100,000 live births)
y = -0,2108x + 8,504
the lowest possible value is optimal
Maternal mortality (per 100,000 live births)
9
8
7
6
5
4
3
2
1
0
2010
2011
2012
2013
2014
2015
2016
2017
Year

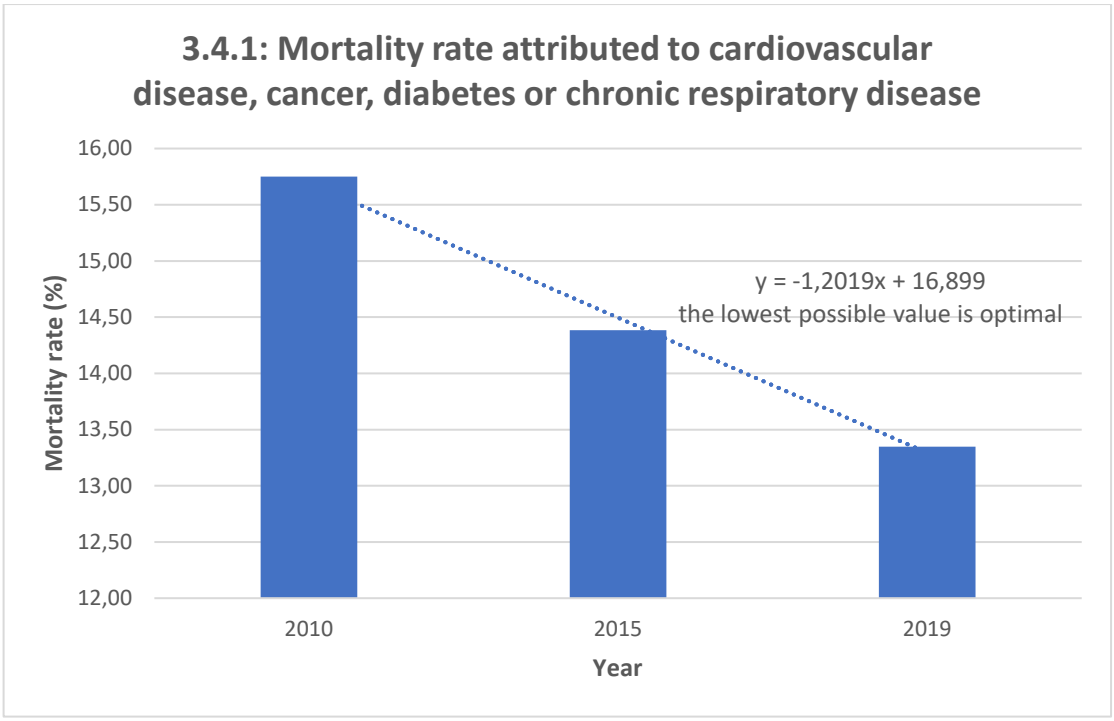

3.1.2: Proportion of births attended by skilled health personnel (%)
y = -0,0168x + 99,188
the highest possible value is optimal
Births attended by skilled health personnel (%)
99,40
99,30
99,20
99,10
99,00
98,90
98,80
98,70
98,60
98,50
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

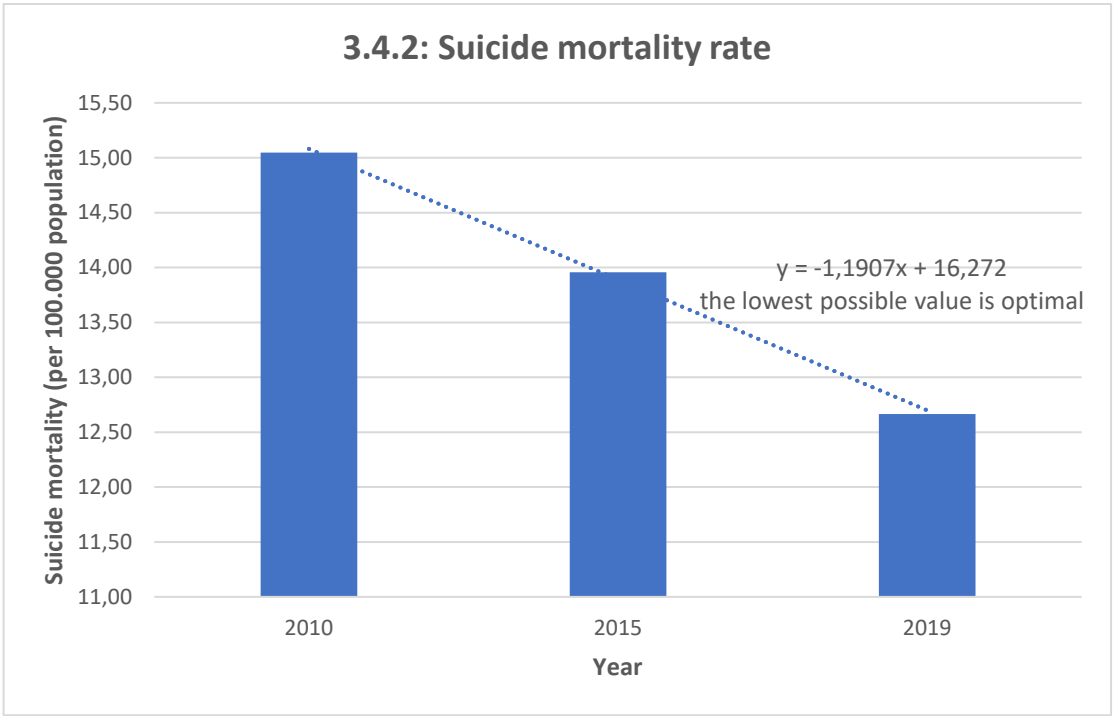

3.2.1: Under-5 mortality rate
Infant mortality rate (deaths per 1,000 live births)
4,50
4,00
3,50
3,00
2,50
2,00
1,50
1,00
0,50
0,00
y = -0,1016x + 4,2634
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

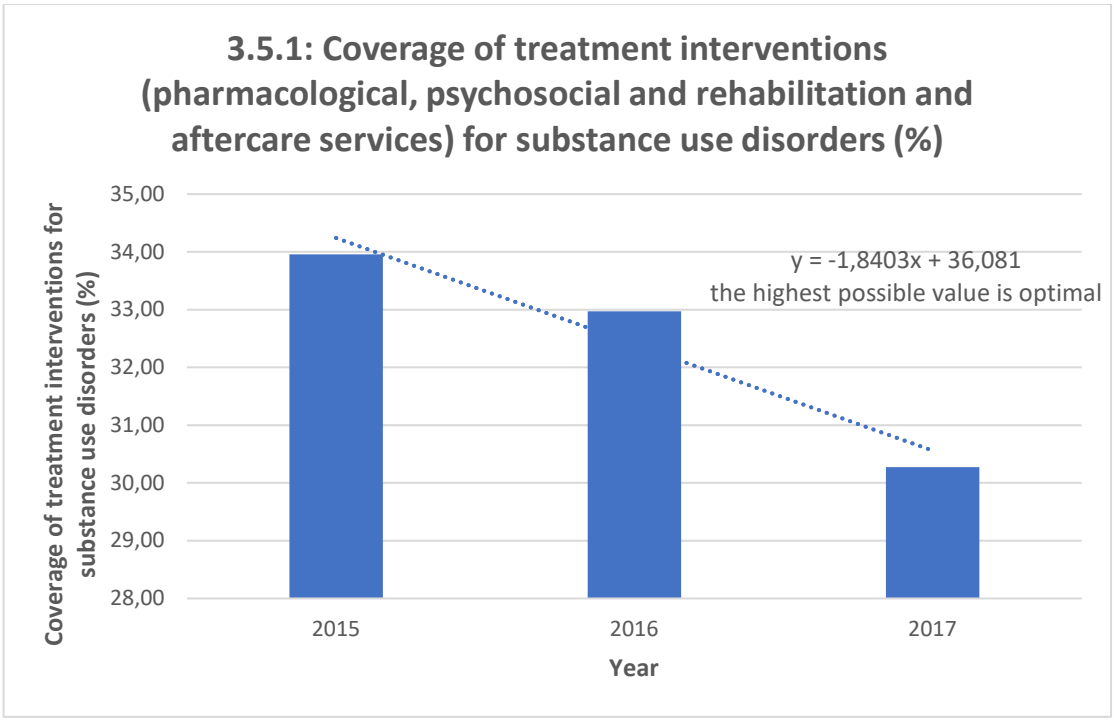

3.2.2: Neonatal mortality rate (per 1,000 live births)
Neonatal mortality rate (per 1,000 live births)
3,00
2,50
2,00
1,50
1,00
0,50
0,00
y = -0,0534x + 2,7908
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

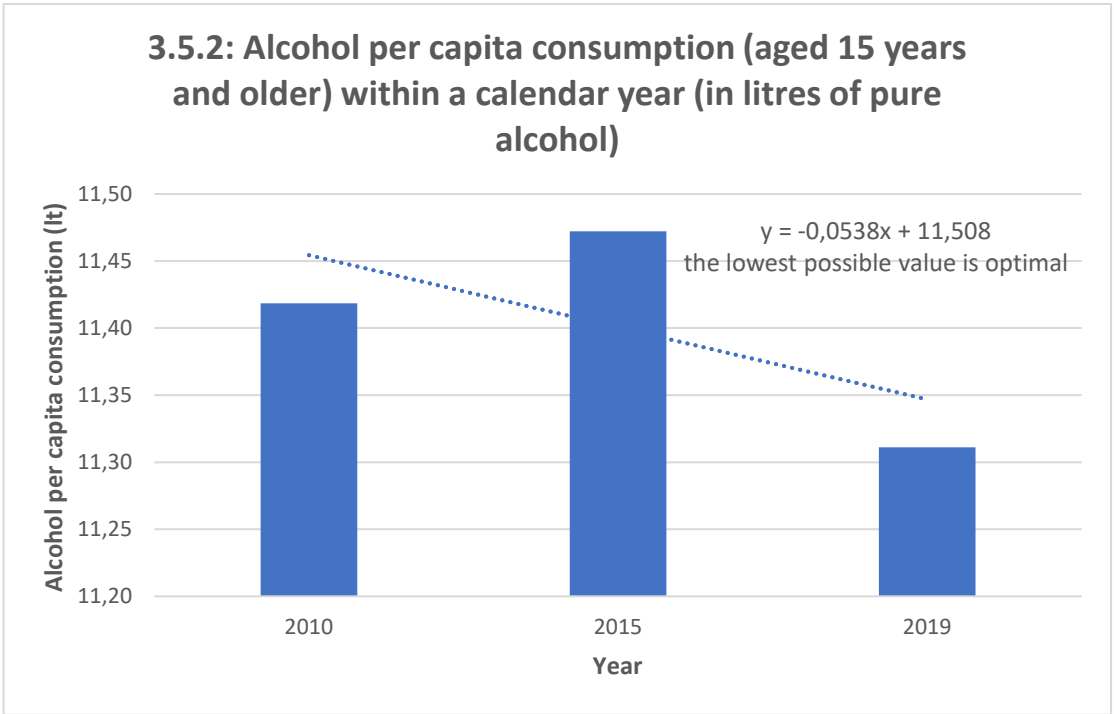

3.3.2: Tuberculosis incidence (per 100,000 population)
Tuberculosis incidence (per 100,000 population)
25,00
20,00
15,00
10,00
5,00
0,00
y = -0,749x + 19,949
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

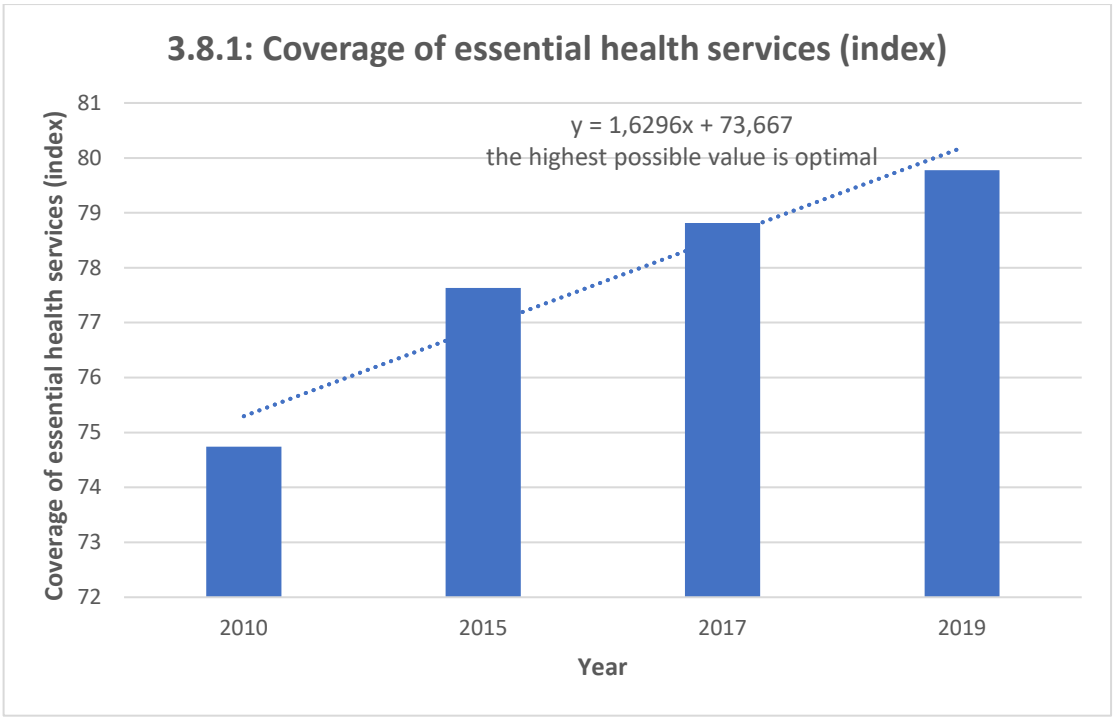

3.3.4: Standardised death rate due to hepatitis
Standardised death rate due to hepatitis
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
y = -0,0391x + 1,1948
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

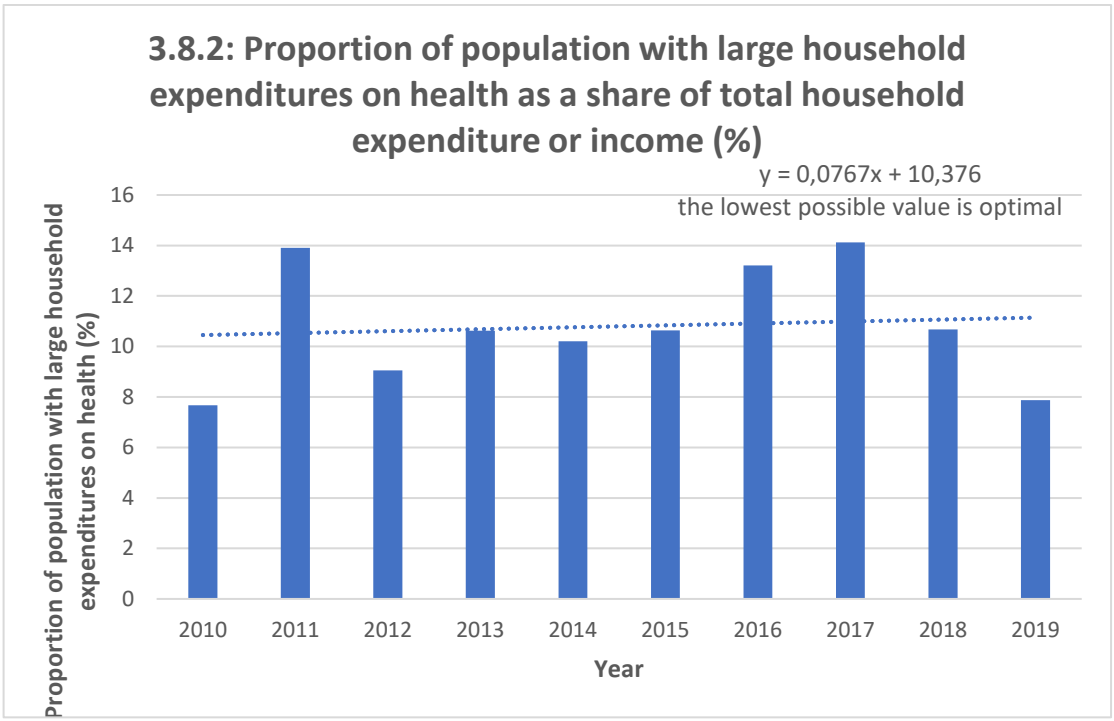

3.4.1: Mortality rate attributed to cardiovascular disease, cancer, diabetes or chronic respiratory disease
16,00
15,50
15,00
14,50
14,00
13,50
13,00
12,50
12,00
Mortality rate (%)
y = -1,2019x + 16,899
the lowest possible value is optimal
2010
2015
2019
Year

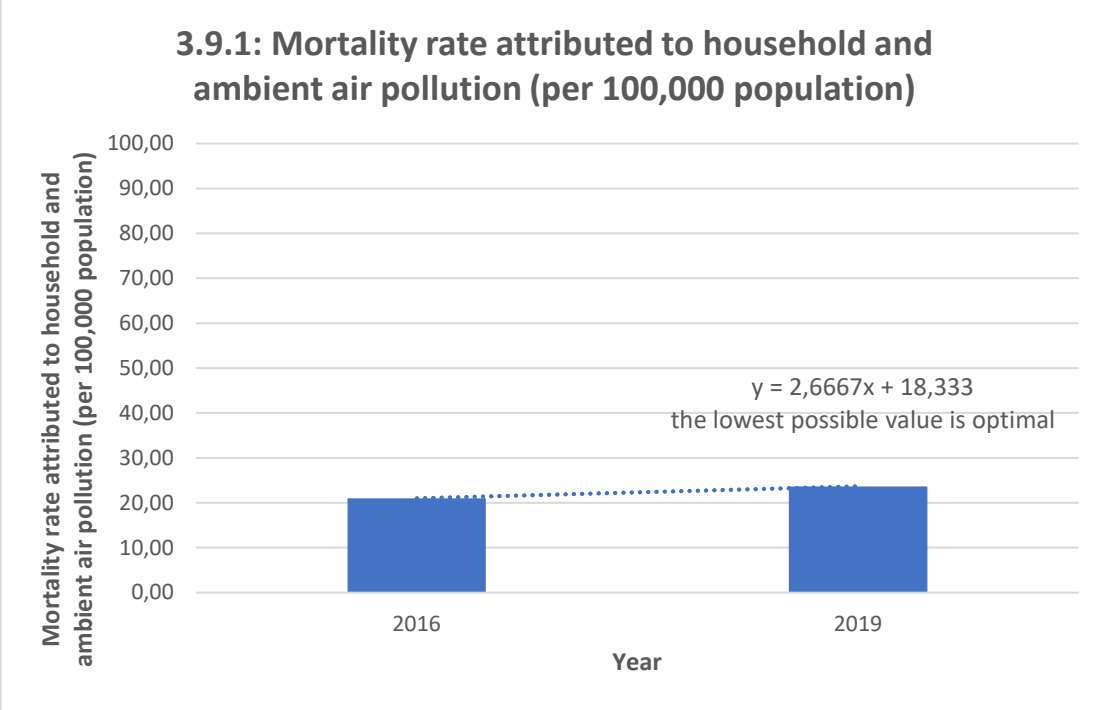

3.4.2: Suicide mortality rate
15,50
15,00
14,50
14,00
13,50
13,00
12,50
12,00
11,50
11,00
Suicide mortality (per 100.000 population)
y = -1,1907x + 16,272
the lowest possible value is optimal
2010
2015
2019
Year

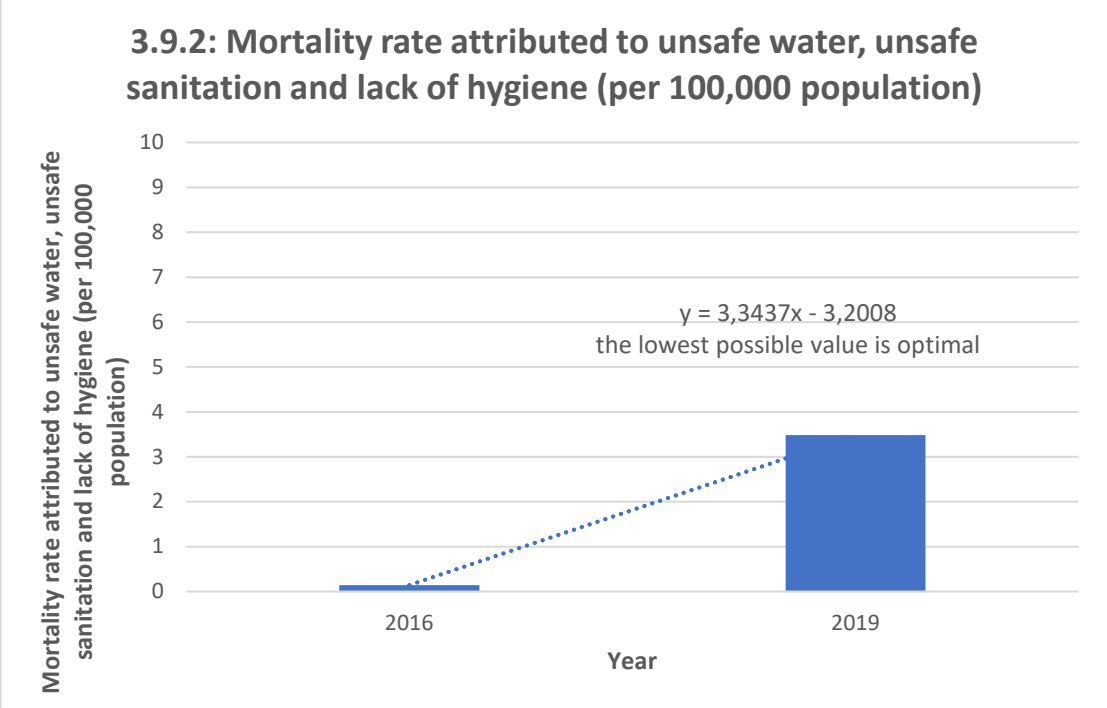

3.5.1: Coverage of treatment interventions (pharmacological, psychosocial and rehabilitation and aftercare services) for substance use disorders (%)
Coverage of treatment interventions for substance use disorders (%)
35,00
34,00
33,00
32,00
31,00
30,00
29,00
28,00
y = -1,8403x + 36,081
the highest possible value is optimal
2015
2016
2017
Year

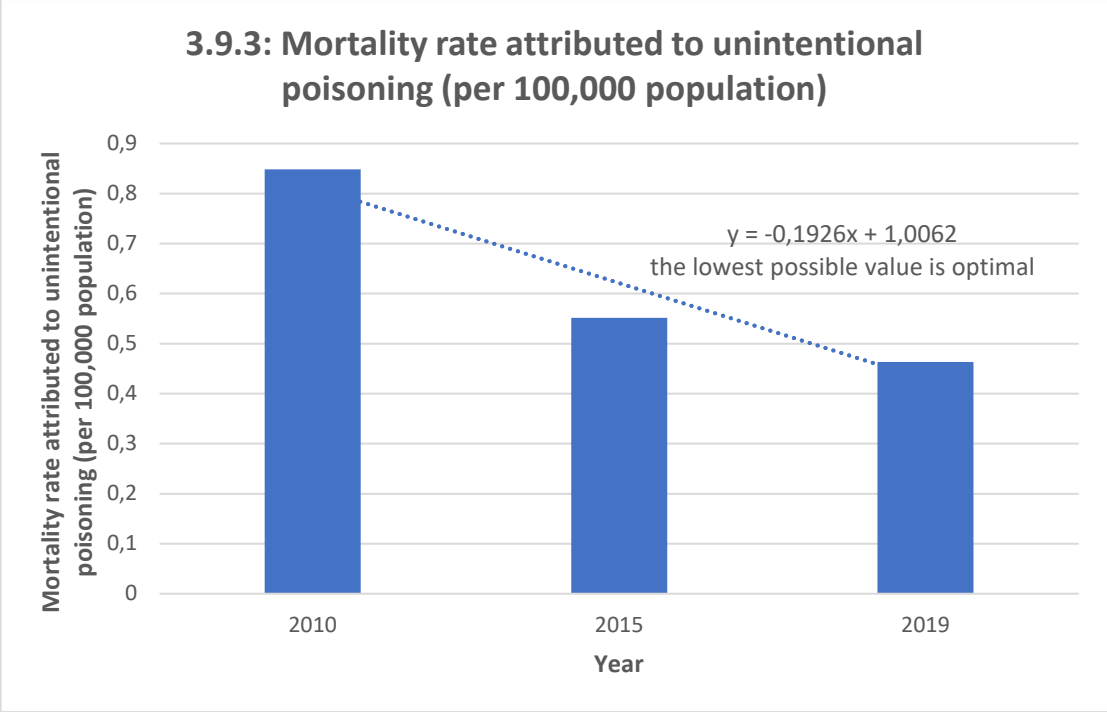

3.5.2: Alcohol per capita consumption (aged 15 years and older) within a calendar year (in litres of pure alcohol)
Alcohol per capita consumption (lt)
11,50
11,45
11,40
11,35
11,30
11,25
11,20
y = -0,0538x + 11,508
the lowest possible value is optimal
2010
2015
2019
Year

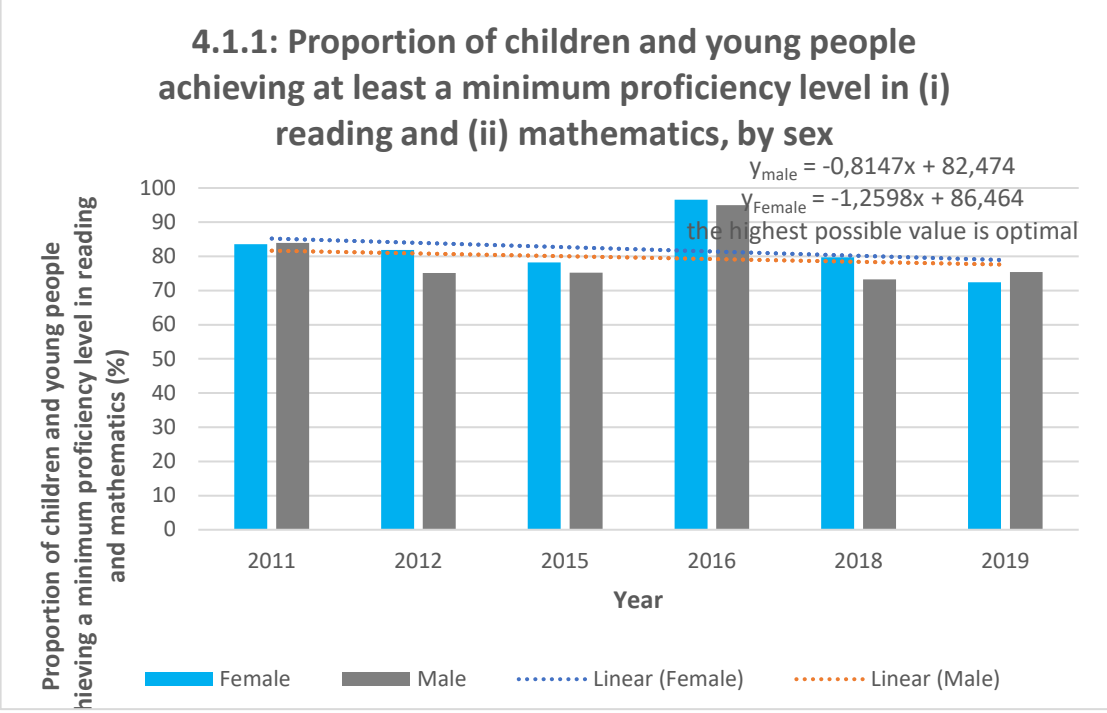

3.8.1: Coverage of essential health services (index)
y = 1,6296x + 73,667
the highest possible value is optimal
Coverage of essential health services (index)
81
80
79
78
77
76
75
74
73
72
2010
2015
2017
2019
Year

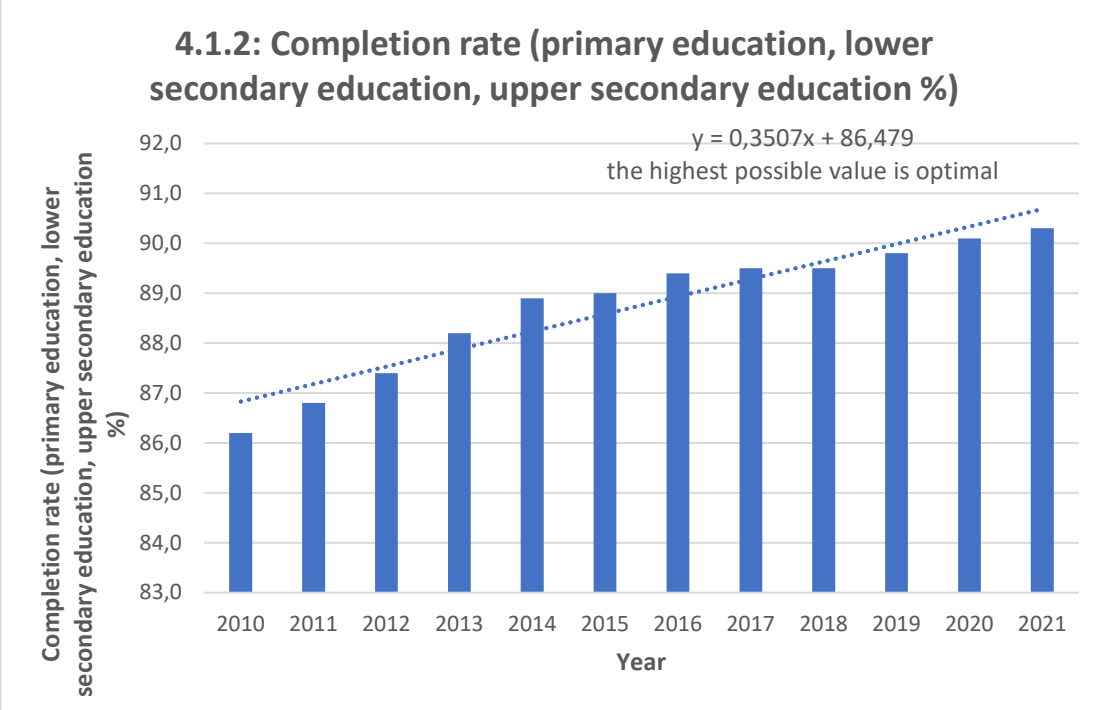

3.8.2: Proportion of population with large household expenditures on health as a share of total household expenditure or income (%)
y = 0,0767x + 10,376
the lowest possible value is optimal
Proportion of population with large household expenditures on health (%)
16
14
12
10
8
6
4
2
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

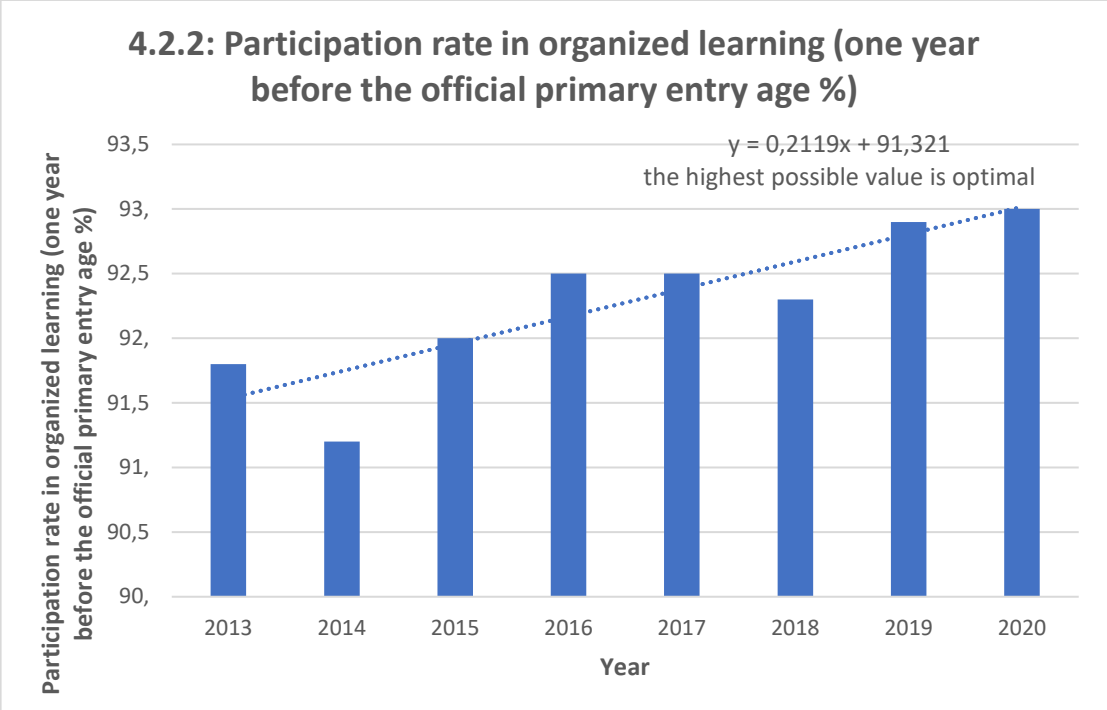

3.9.1: Mortality rate attributed to household and ambient air pollution (per 100,000 population)
Mortality rate attributed to household and ambient air pollution (per 100,000 population)
100,00
90,00
80,00
70,00
60,00
50,00
40,00
30,00
20,00
10,00
0,00
y = 2,6667x + 18,333
the lowest possible value is optimal
2016
2019
Year

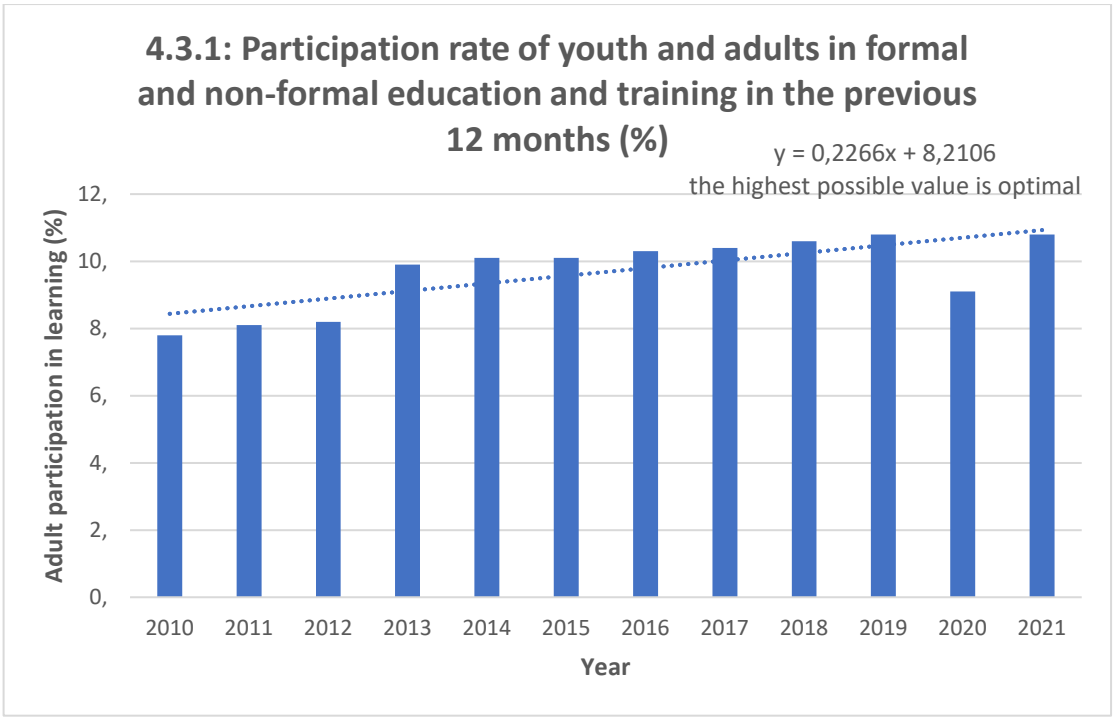

3.9.2: Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (per 100,000 population)
Mortality rate attributed to unsafe water, unsafe sanitation and lack of hygiene (per 100,000 population)
10
9
8
7
6
5
4
3
2
1
0
y = 3,3437x - 3,2008
the lowest possible value is optimal
2016
2019
Year

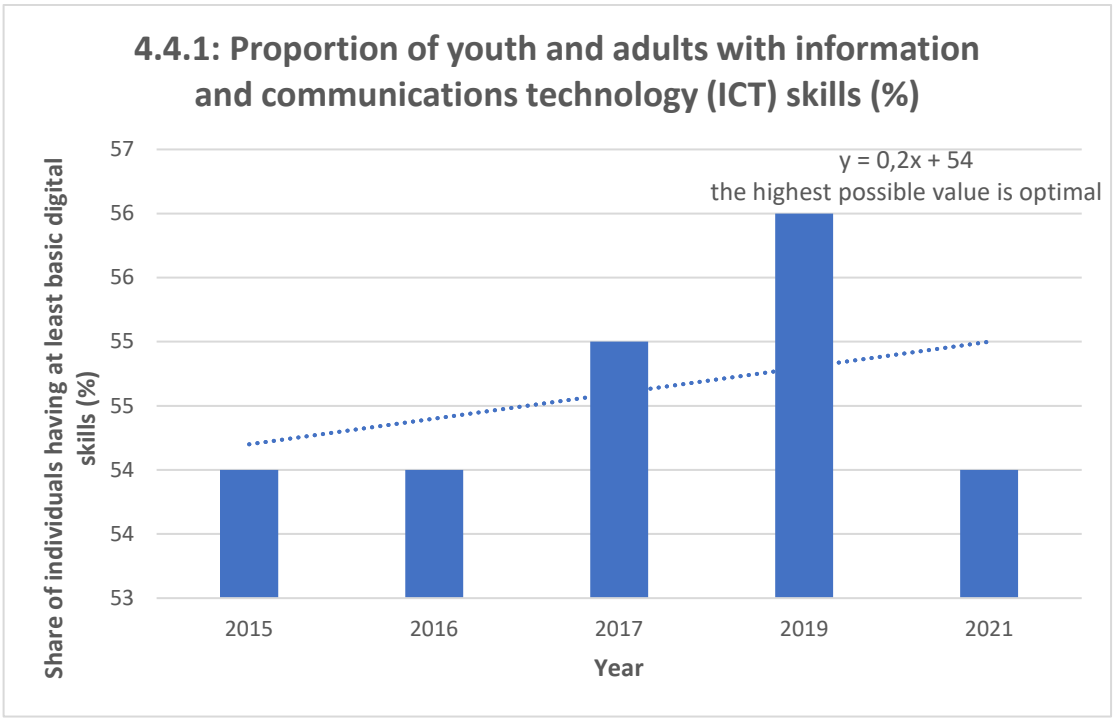

3.9.3: Mortality rate attributed to unintentional poisoning (per 100,000 population)
Mortality rate attributed to unintentional poisoning (per 100,000 population)
0,9
0,8
0,7
0,6
0,5
0,4
0,3
0,2
0,1
0
y = -0,1926x + 1,0062
the lowest possible value is optimal
2010
2015
2019
Year

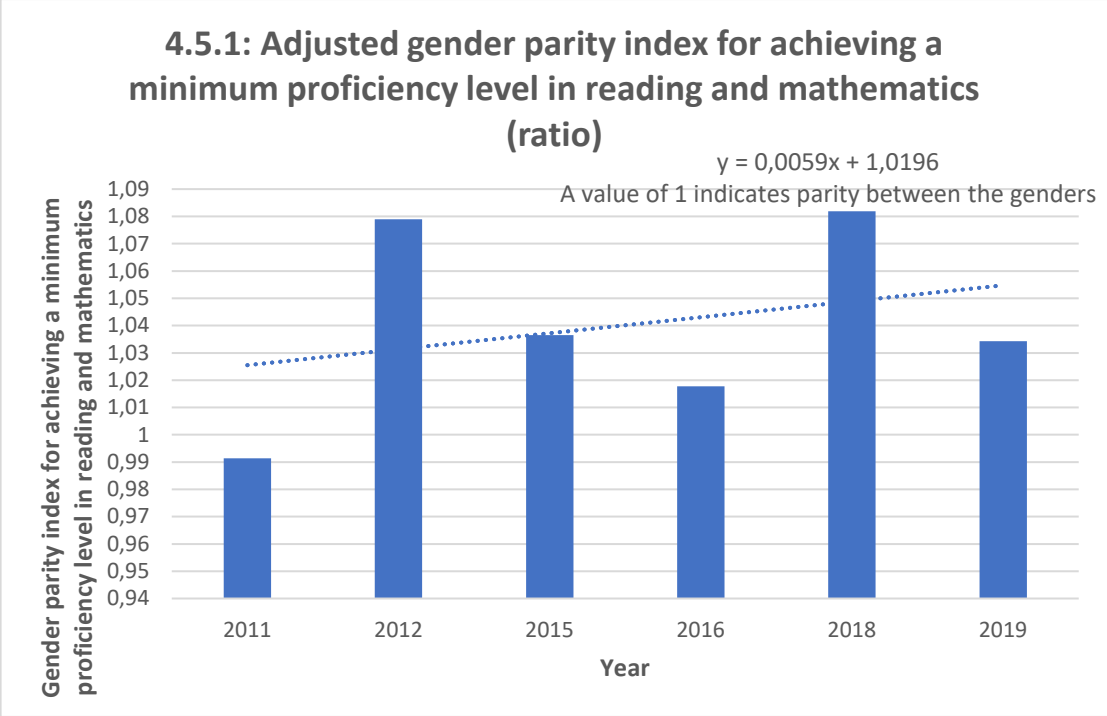

4.1.1: Proportion of children and young people achieving at least a minimum proficiency level in (i) reading and (ii) mathematics, by sex
Proportion of children and young people achieving a minimum proficiency level in reading and mathematics (%)
y_{male} = -0,8147x + 82,474
y_{Female} = -1,2598x + 86,464
the highest possible value is optimal
100
90
80
70
60
50
40
30
20
10
0
2011
2012
2015
2016
2018
2019
Year
Female
Male
Linear (Female)
Linear (Male)


4.1.2: Completion rate (primary education, lower secondary education, upper secondary education %)
y = 0,3507x + 86,479
the highest possible value is optimal
Completion rate (primary education, lower secondary education, upper secondary education %)
92,0
91,0
90,0
89,0
88,0
87,0
86,0
85,0
84,0
83,0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

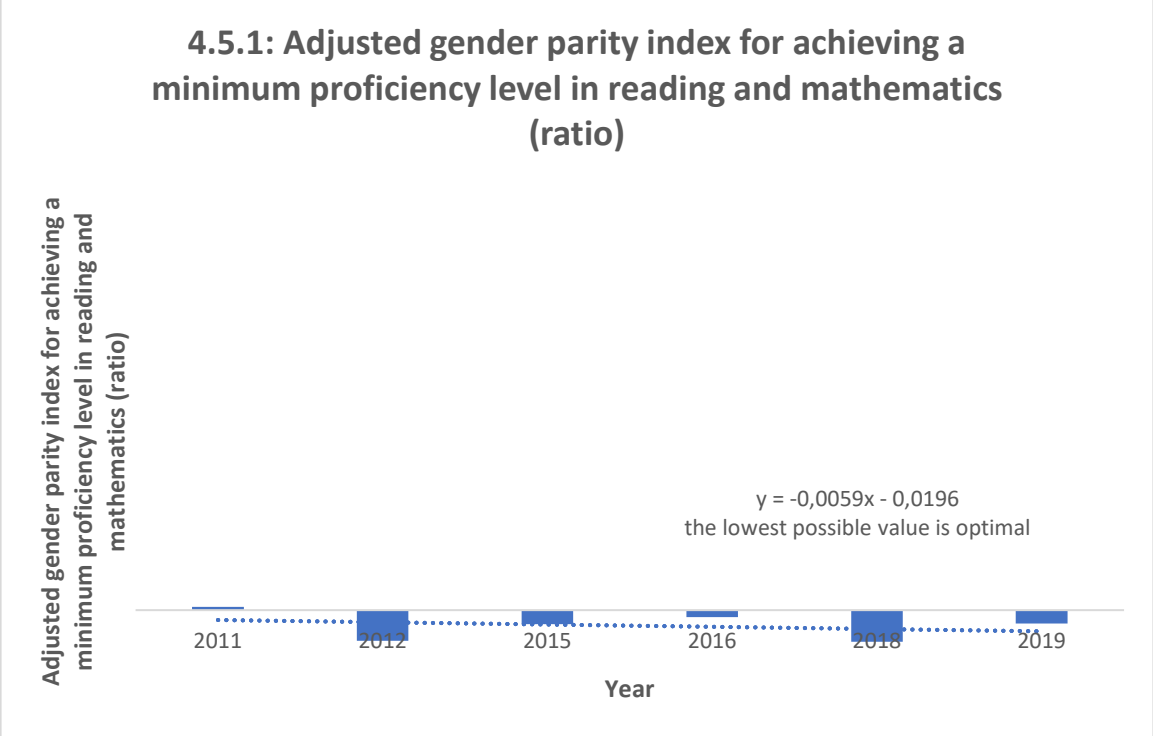

4.2.2: Participation rate in organized learning (one year before the official primary entry age %)
y = 0,2119x + 91,321
the highest possible value is optimal
Participation rate in organized learning (one year before the official primary entry age %)
93,5
93,
92,5
92,
91,5
91,
90,5
90,
2013
2014
2015
2016
2017
2018
2019
2020
Year

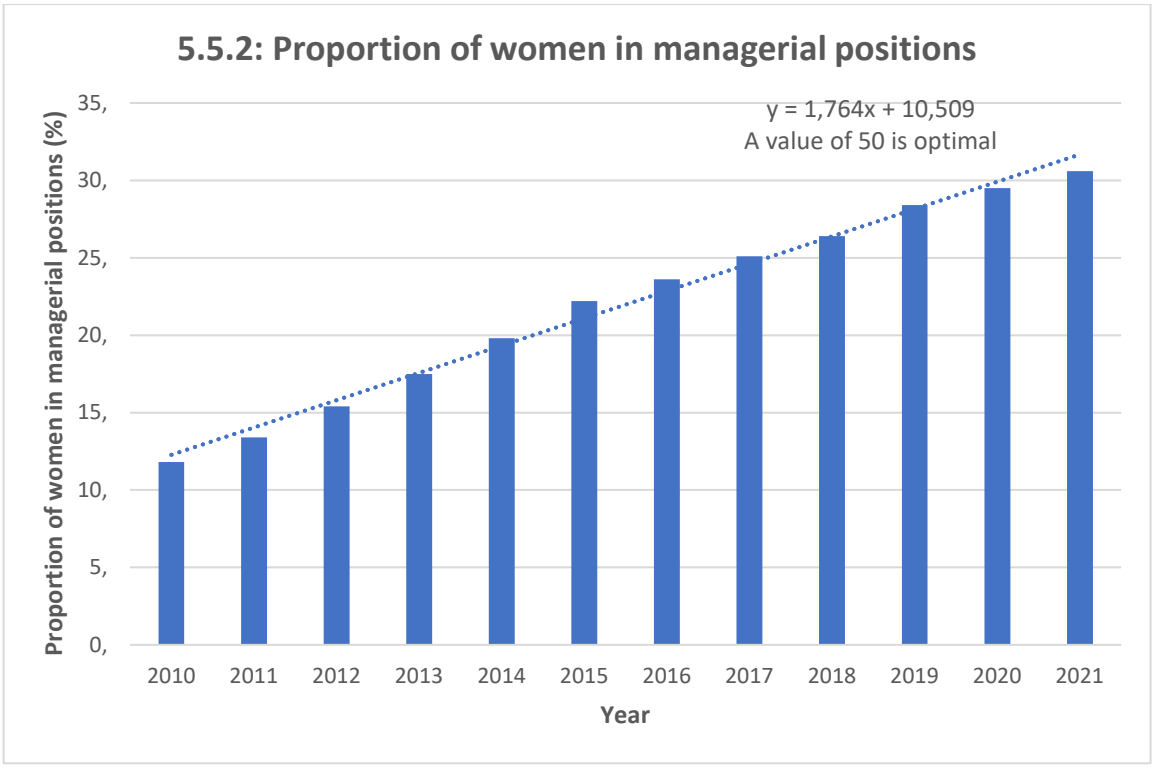

4.3.1: Participation rate of youth and adults in formal and non-formal education and training in the previous 12 months (%)
y = 0,2266x + 8,2106
the highest possible value is optimal
Adult participation in learning (%)
12,
10,
8,
6,
4,
2,
0,
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year


4.4.1: Proportion of youth and adults with information and communications technology (ICT) skills (%)
y = 0,2x + 54
the highest possible value is optimal
Share of individuals having at least basic digital skills (%)
57
56
56
55
55
54
54
53
2015
2016
2017
2019
2021
Year

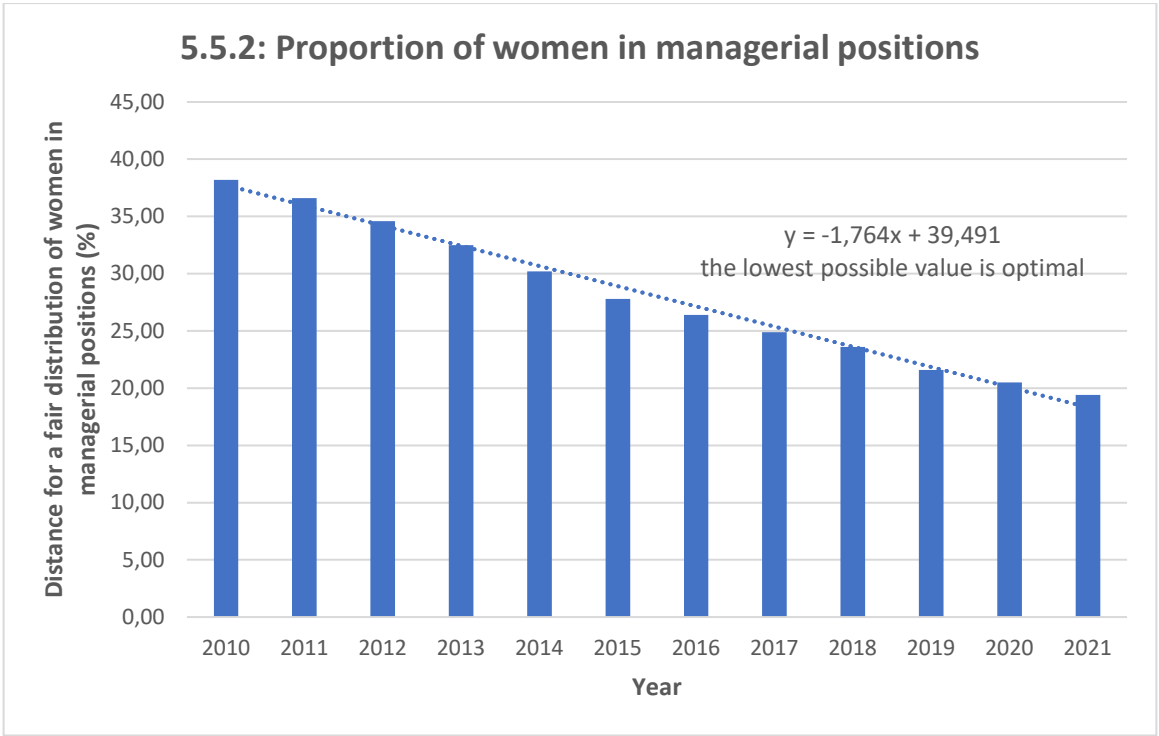


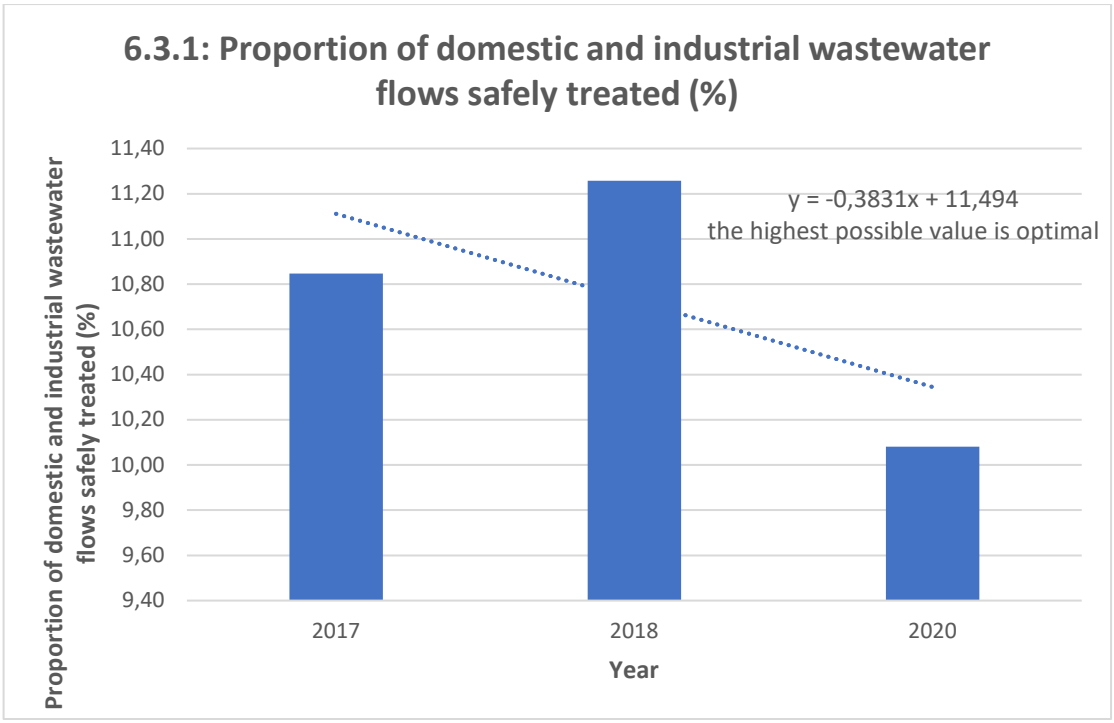
As a GPI below 0.97 indicates a disparity in favor of males, while a GPI above 1.03 indicates a disparity in favor of females, we consider it necessary to transform the graph so as the distance from the optimal value of "1" is indicated.

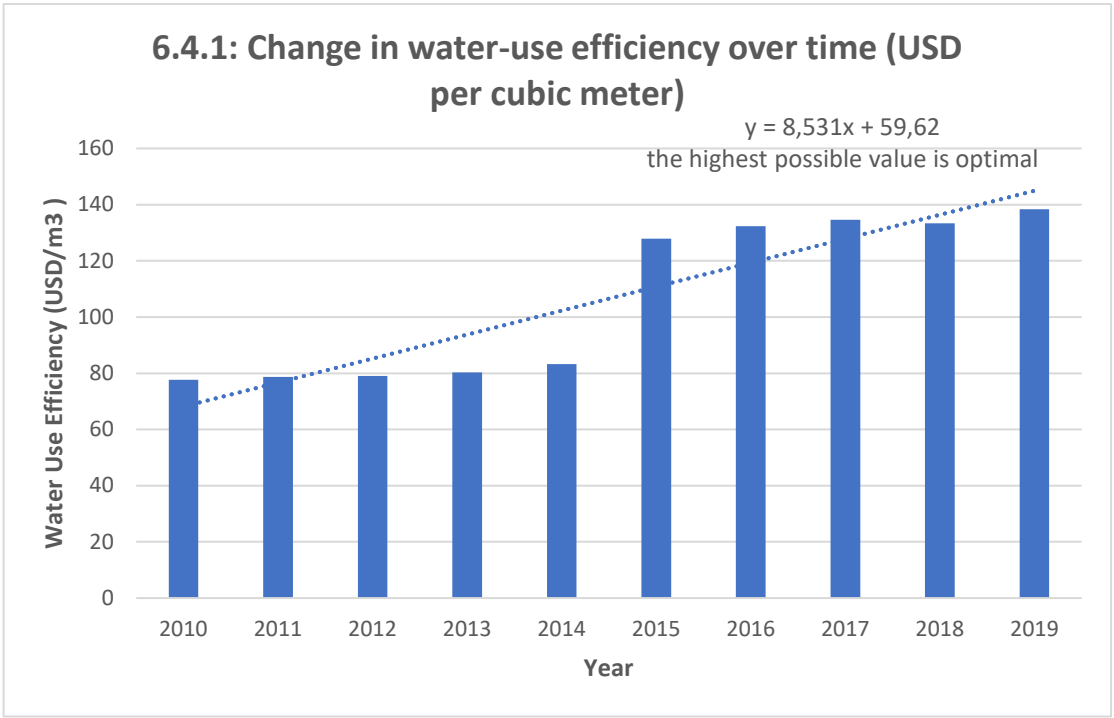


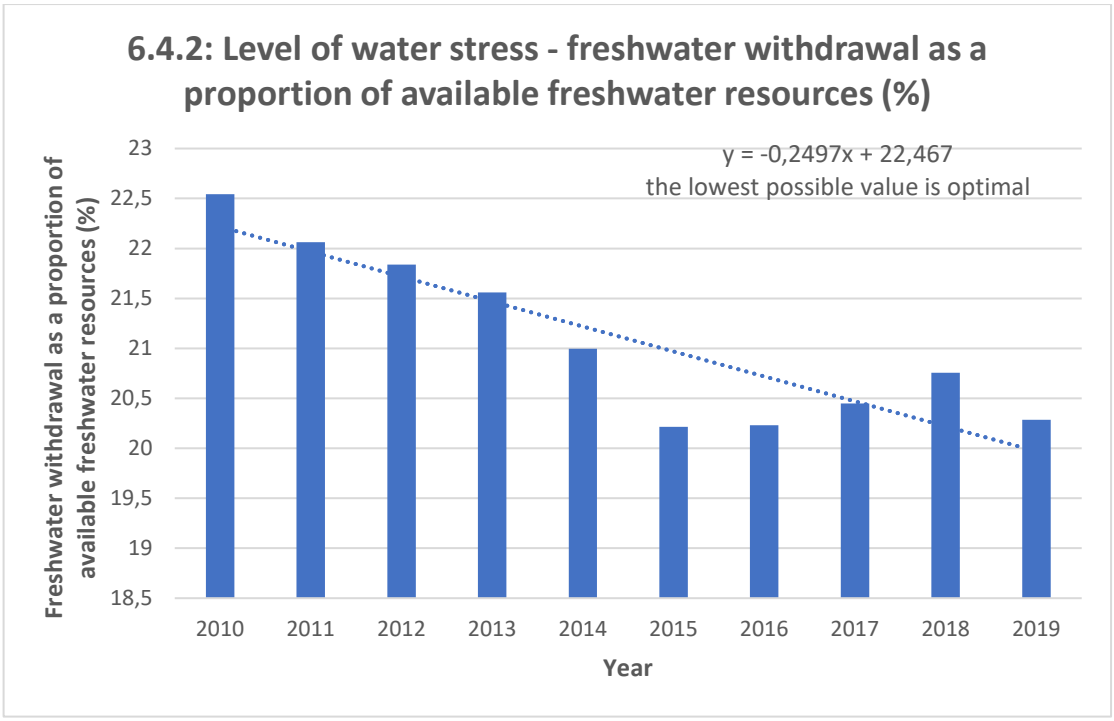


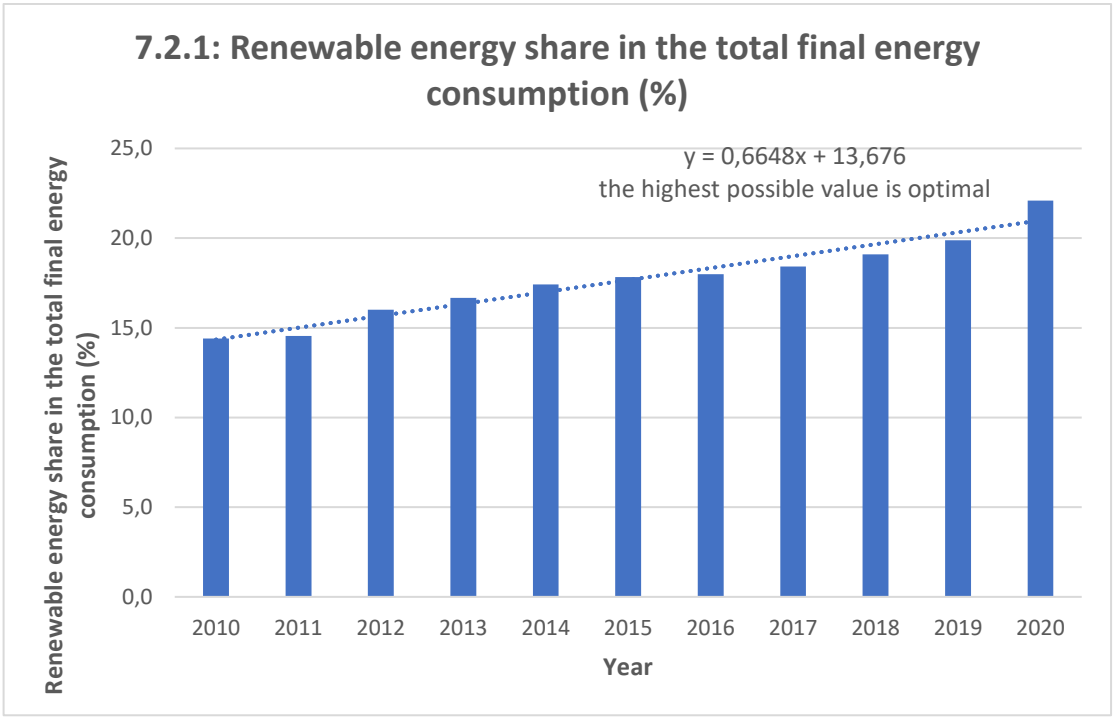
A transformation follows, so as the optimal trend is indicated

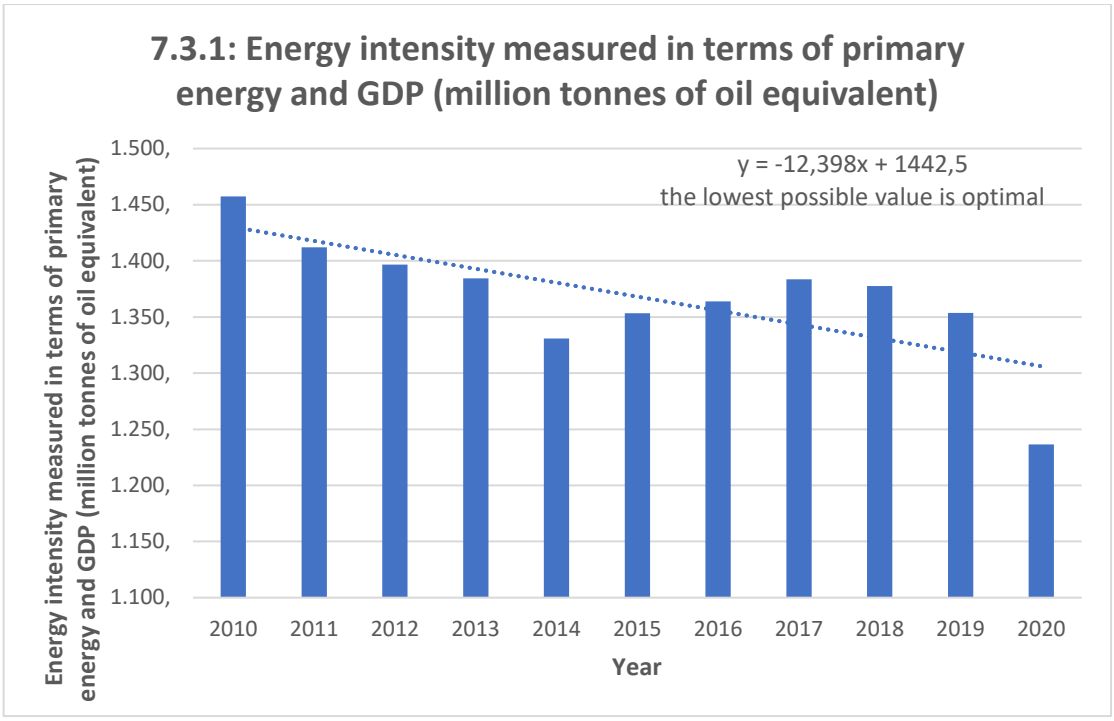


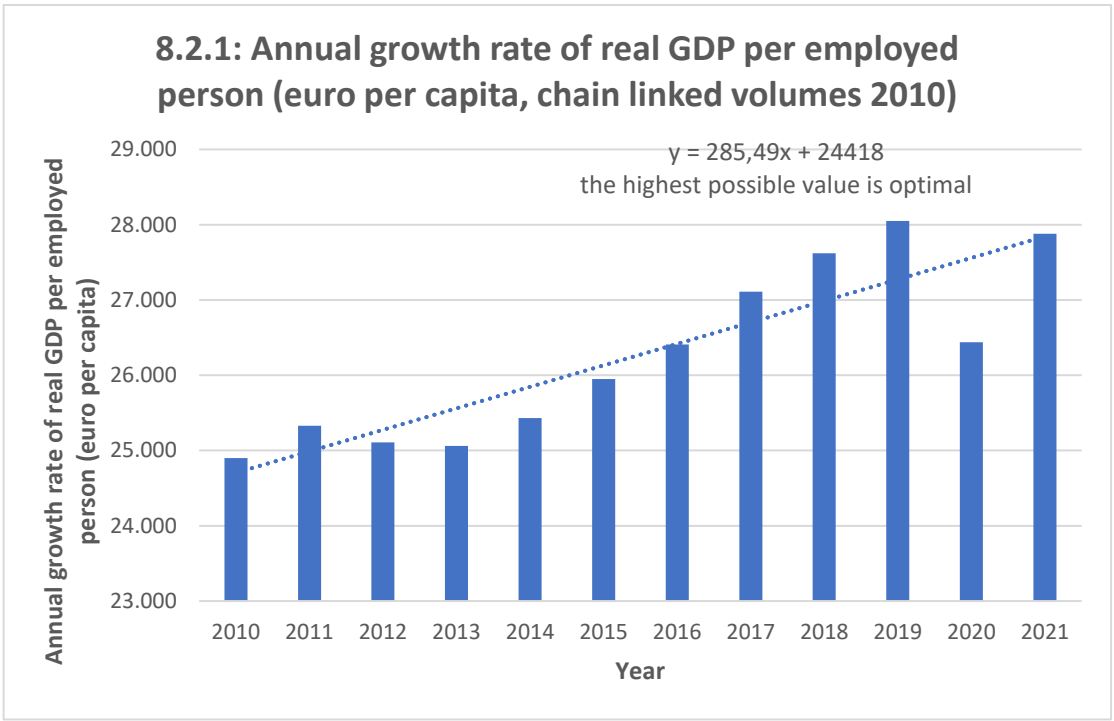

6.3.1: Proportion of domestic and industrial wastewater flows safely treated (%)
Proportion of domestic and industrial wastewater flows safely treated (%)
11,40
11,20
11,00
10,80
10,60
10,40
10,20
10,00
9,80
9,60
9,40
y = -0,3831x + 11,494
the highest possible value is optimal
2017
2018
2020
Year

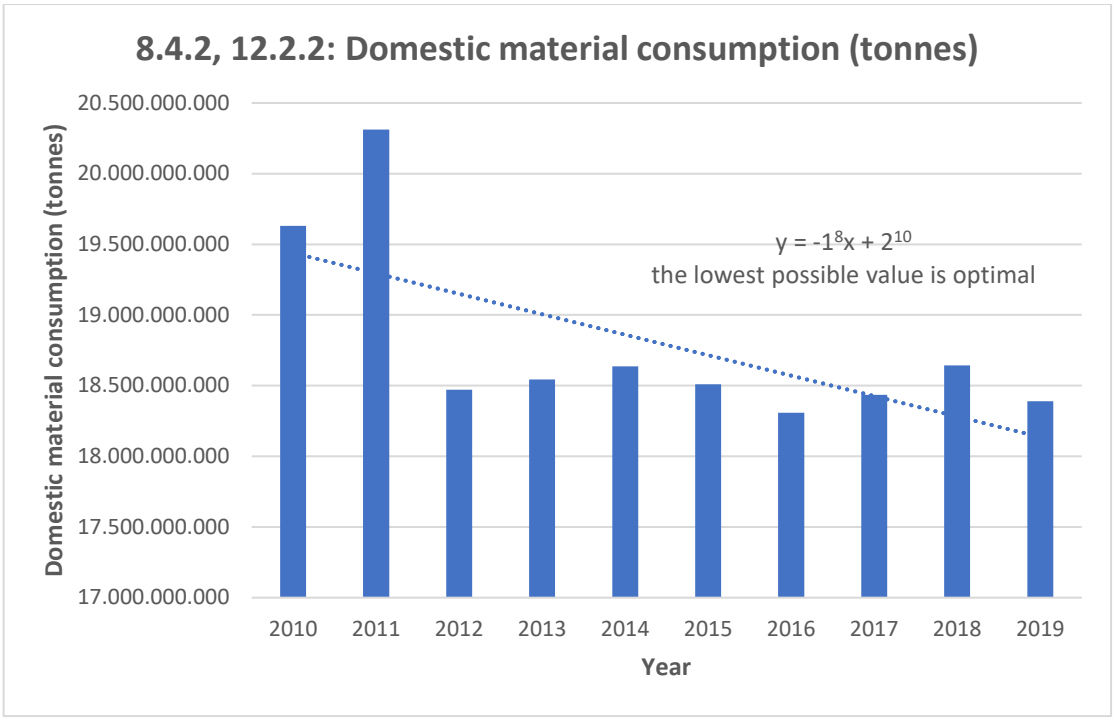

6.4.1: Change in water-use efficiency over time (USD per cubic meter)
Water Use Efficiency (USD/m3)
160
140
120
100
80
60
40
20
0
y = 8,531x + 59,62
the highest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

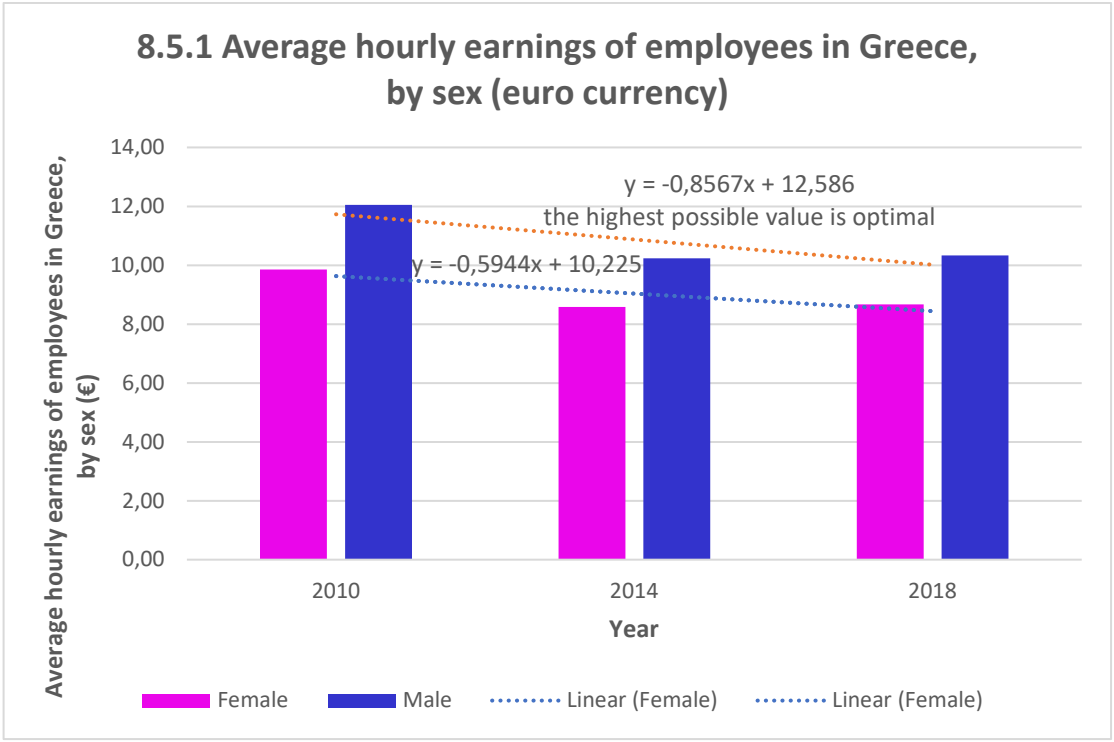

6.4.2: Level of water stress - freshwater withdrawal as a proportion of available freshwater resources (%)
Freshwater withdrawal as a proportion of available freshwater resources (%)
23
22,5
22
21,5
21
20,5
20
19,5
19
18,5
y = -0,2497x + 22,467
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

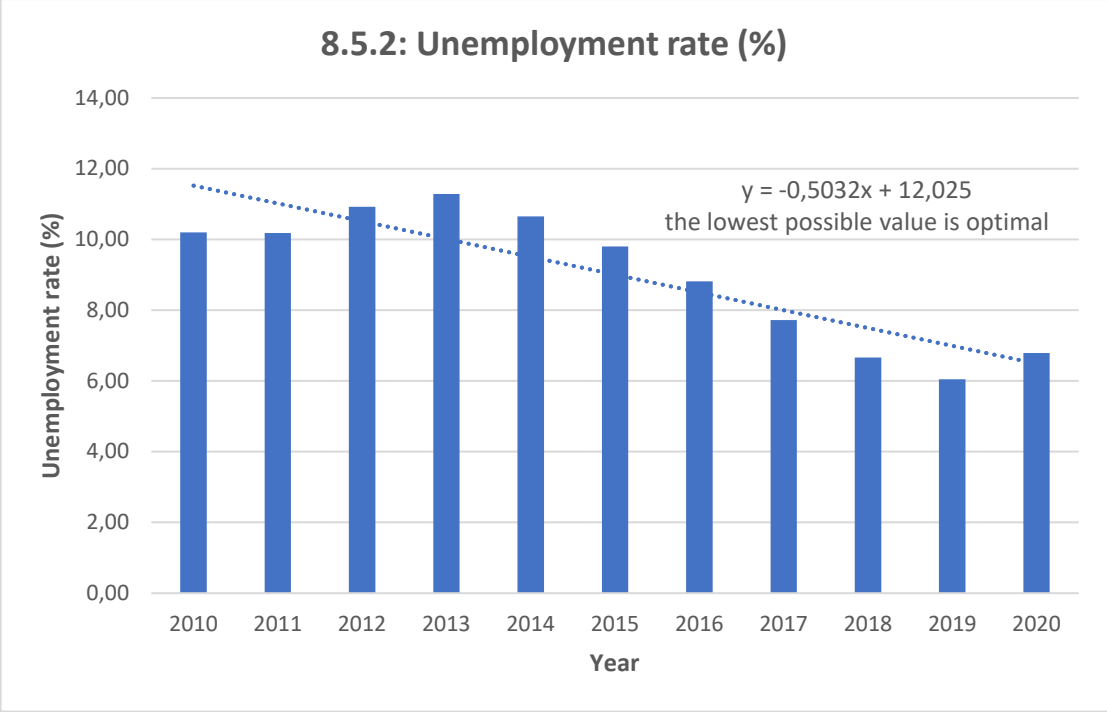

7.2.1: Renewable energy share in the total final energy consumption (%)
Renewable energy share in the total final energy consumption (%)
25,0
20,0
15,0
10,0
5,0
0,0
y = 0,6648x + 13,676
the highest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

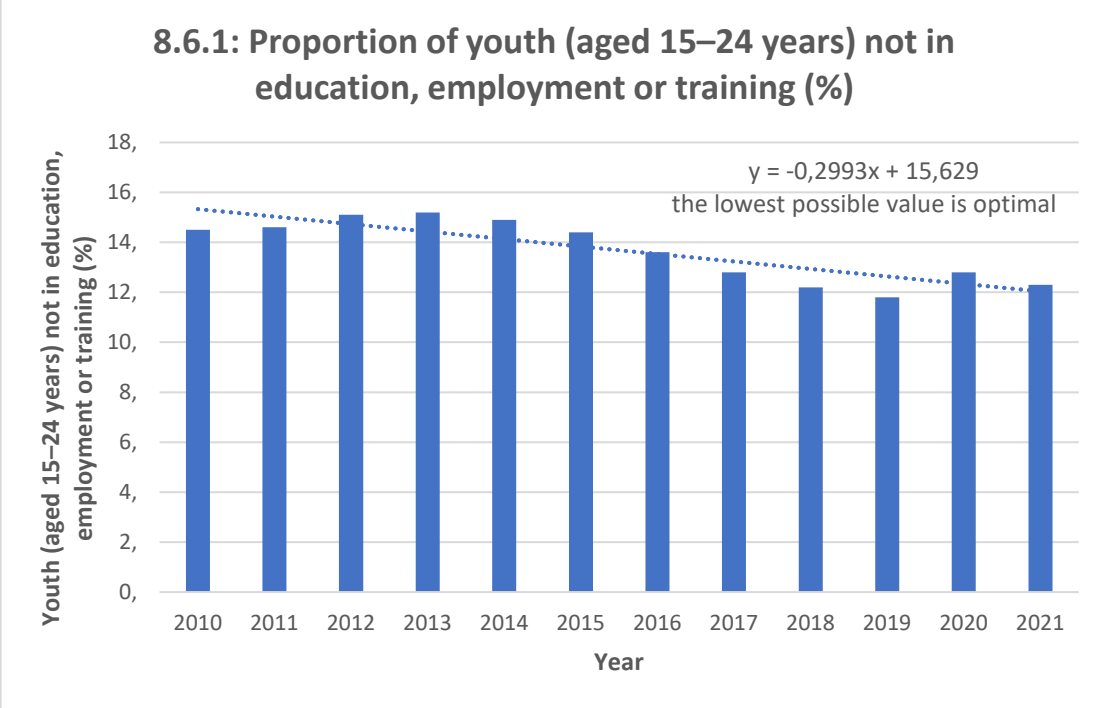

7.3.1: Energy intensity measured in terms of primary energy and GDP (million tonnes of oil equivalent)
y = -12,398x + 1442,5
the lowest possible value is optimal
Energy intensity measured in terms of primary energy and GDP (million tonnes of oil equivalent)
1.500,
1.450,
1.400,
1.350,
1.300,
1.250,
1.200,
1.150,
1.100,
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

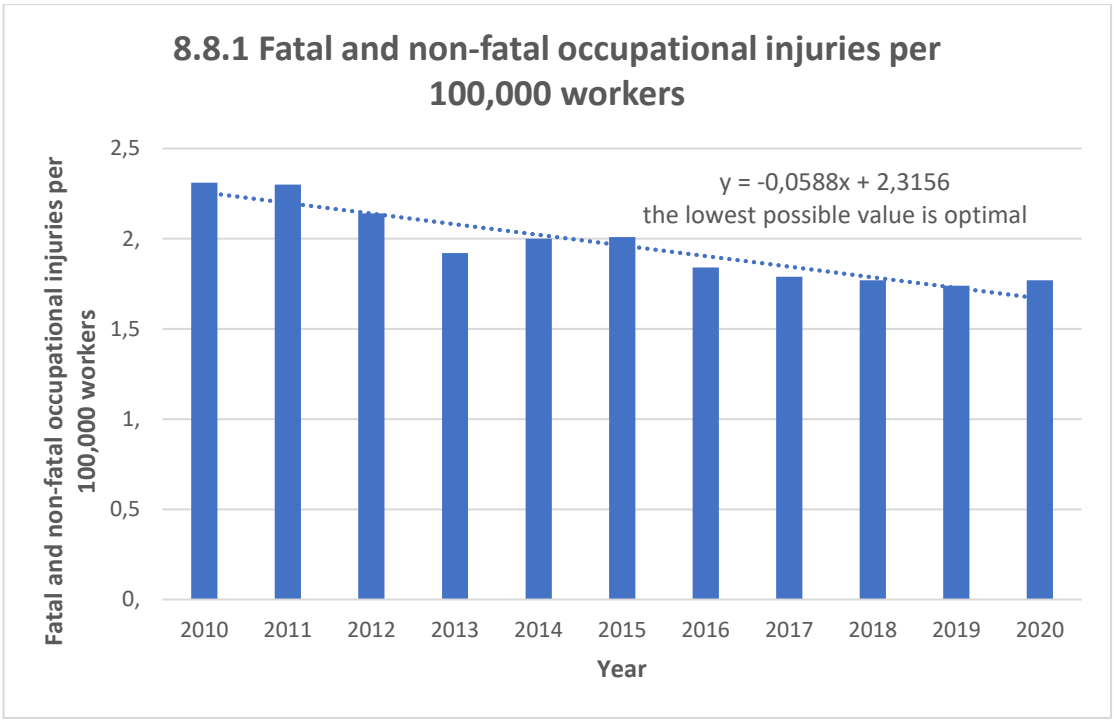

8.2.1: Annual growth rate of real GDP per employed person (euro per capita, chain linked volumes 2010)
y = 285,49x + 24418
the highest possible value is optimal
Annual growth rate of real GDP per employed person (euro per capita)
29.000
28.000
27.000
26.000
25.000
24.000
23.000
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

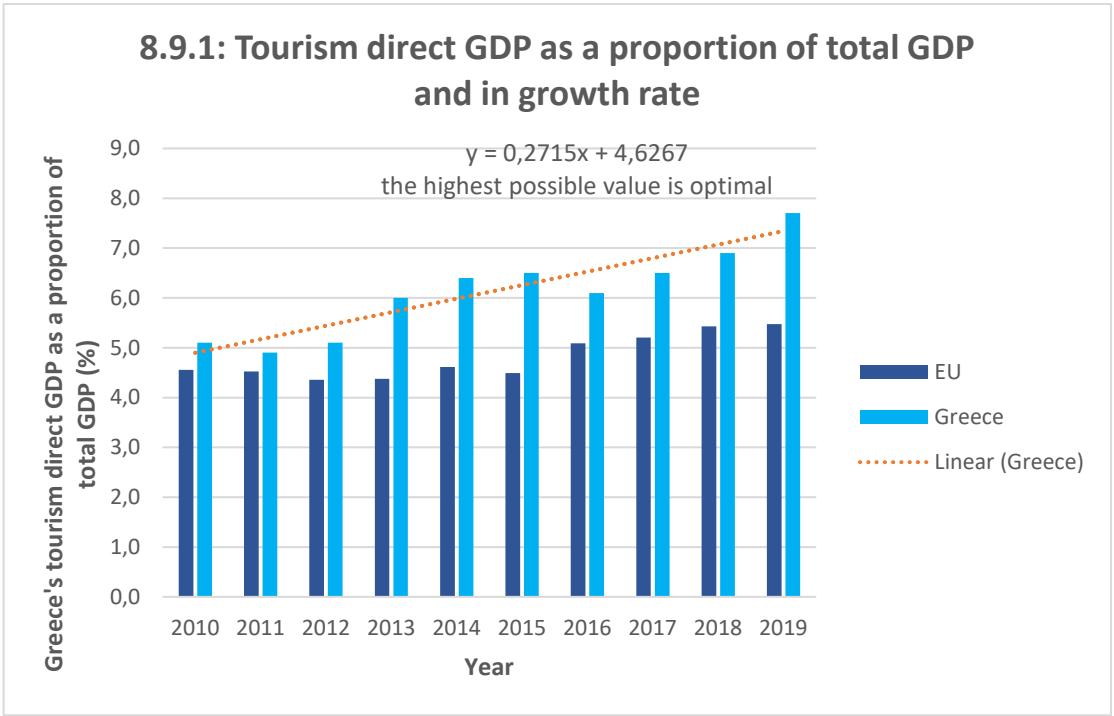

8.4.2, 12.2.2: Domestic material consumption (tonnes)
Domestic material consumption (tonnes)
20.500.000.000
20.000.000.000
19.500.000.000
19.000.000.000
18.500.000.000
18.000.000.000
17.500.000.000
17.000.000.000
y = -1^8x + 2^10
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

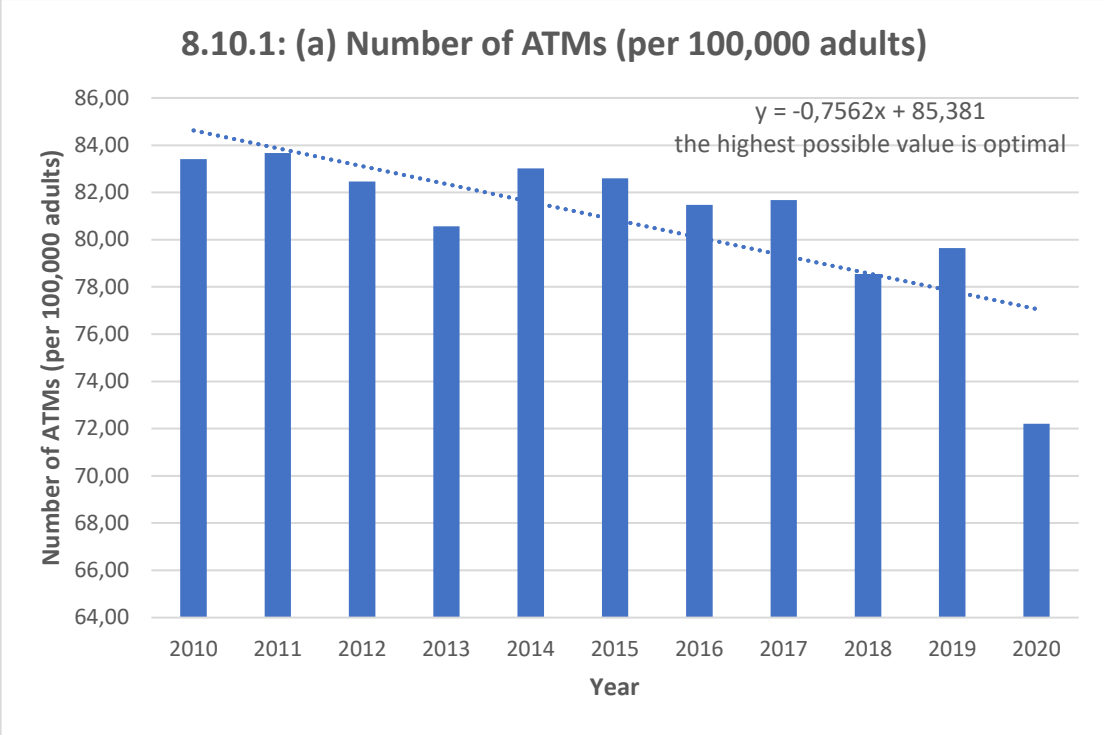

8.5.1 Average hourly earnings of employees in Greece, by sex (euro currency)
Average hourly earnings of employees in Greece, by sex (€)
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
y = -0,8567x + 12,586
the highest possible value is optimal
y = -0,5944x + 10,225
2010
2014
2018
Year
Female
Male
Linear (Female)
Linear (Female)

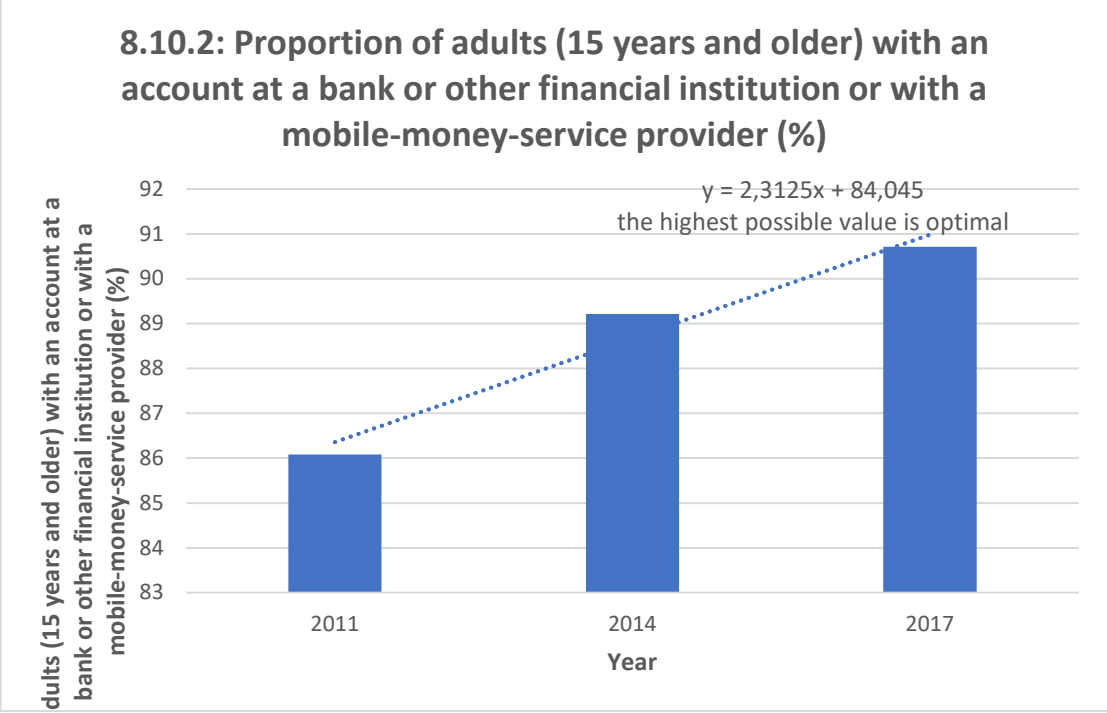

8.5.2: Unemployment rate (%)
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
Unemployment rate (%)
y = -0,5032x + 12,025
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

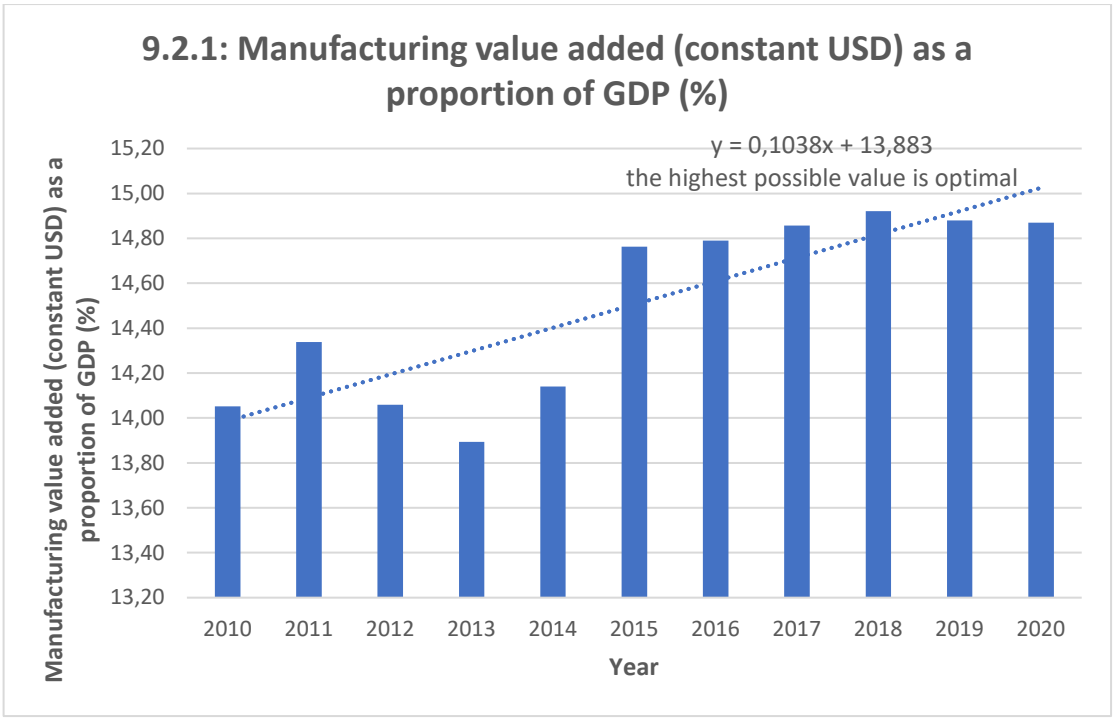

8.6.1: Proportion of youth (aged 15–24 years) not in education, employment or training (%)
18,
16,
14,
12,
10,
8,
6,
4,
2,
0,
Youth (aged 15–24 years) not in education, employment or training (%)
y = -0,2993x + 15,629
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

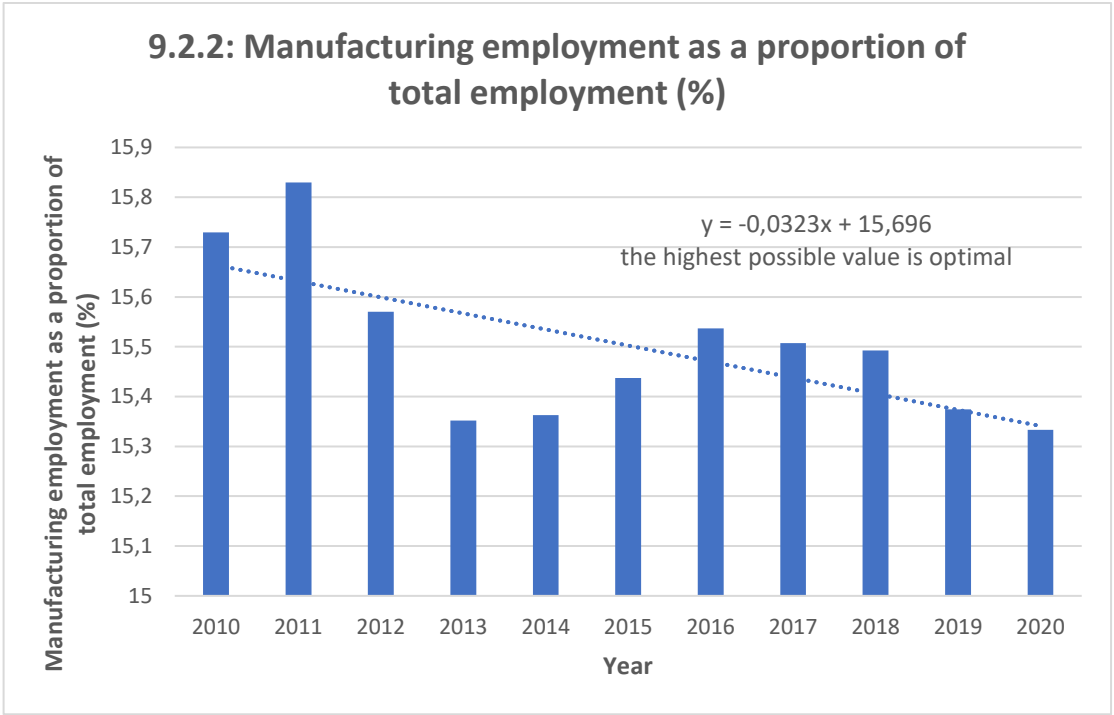

8.8.1 Fatal and non-fatal occupational injuries per 100,000 workers
y = -0,0588x + 2,3156
the lowest possible value is optimal
Fatal and non-fatal occupational injuries per 100,000 workers
2,5
2,
1,5
1,
0,5
0,
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

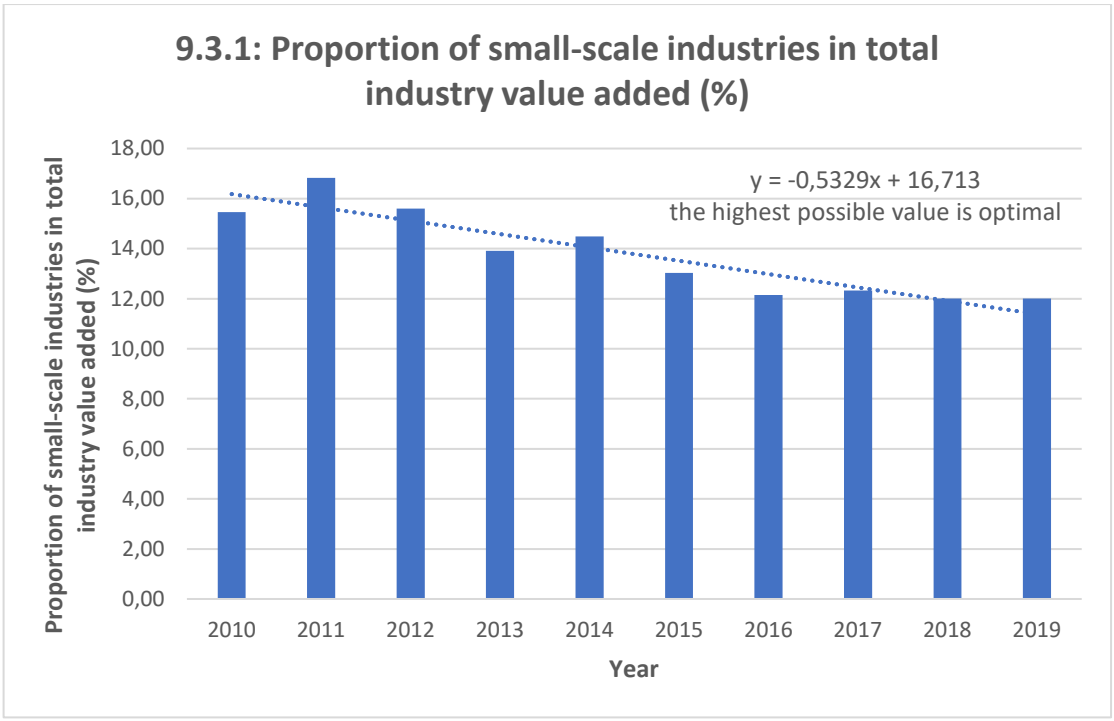

8.9.1: Tourism direct GDP as a proportion of total GDP and in growth rate
y = 0,2715x + 4,6267
the highest possible value is optimal
Greece's tourism direct GDP as a proportion of total GDP (%)
9,0
8,0
7,0
6,0
5,0
4,0
3,0
2,0
1,0
0,0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
EU
Greece
Linear (Greece)

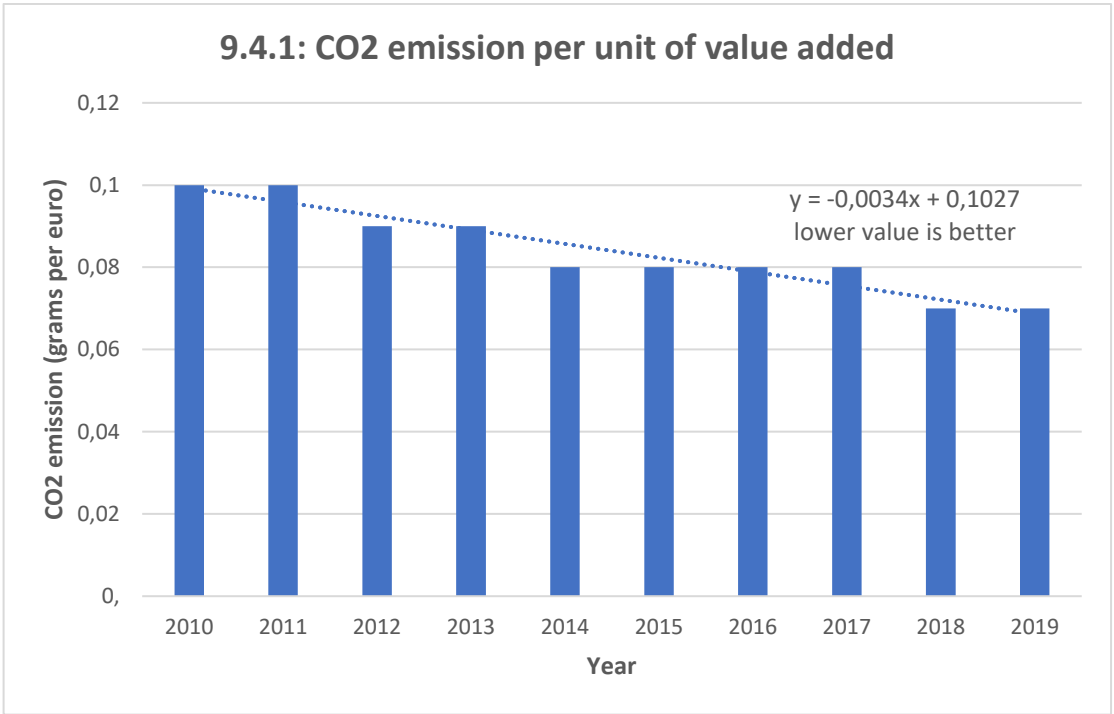

8.10.1: (a) Number of ATMs (per 100,000 adults)
y = -0,7562x + 85,381
the highest possible value is optimal
Number of ATMs (per 100,000 adults)
86,00
84,00
82,00
80,00
78,00
76,00
74,00
72,00
70,00
68,00
66,00
64,00
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

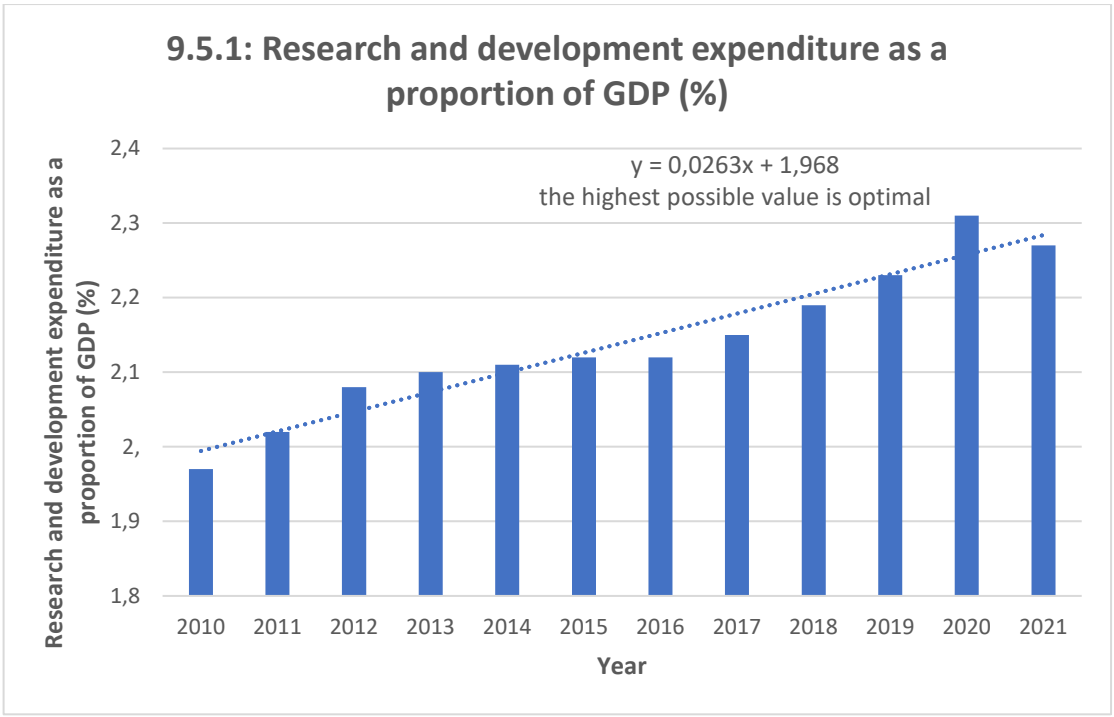

8.10.2: Proportion of adults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider (%)
y = 2,3125x + 84,045
the highest possible value is optimal
dults (15 years and older) with an account at a bank or other financial institution or with a mobile-money-service provider (%)
92
91
90
89
88
87
86
85
84
83
2011
2014
2017
Year

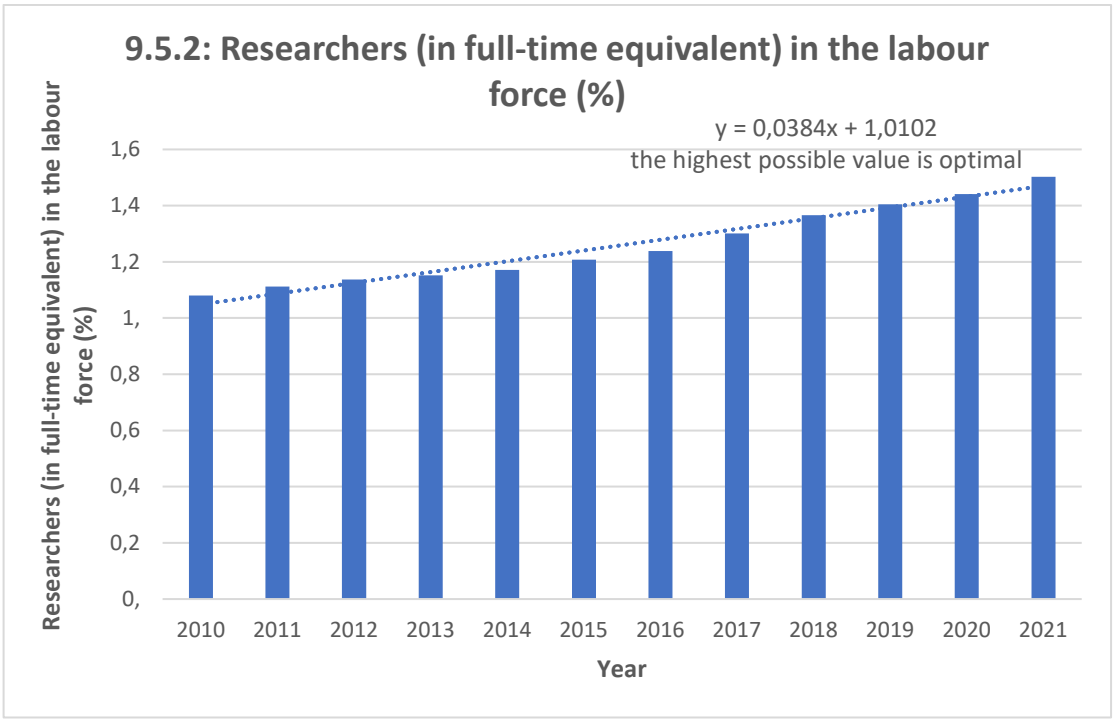

9.2.1: Manufacturing value added (constant USD) as a proportion of GDP (%)
y = 0,1038x + 13,883
the highest possible value is optimal
Manufacturing value added (constant USD) as a proportion of GDP (%)
15,20
15,00
14,80
14,60
14,40
14,20
14,00
13,80
13,60
13,40
13,20
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

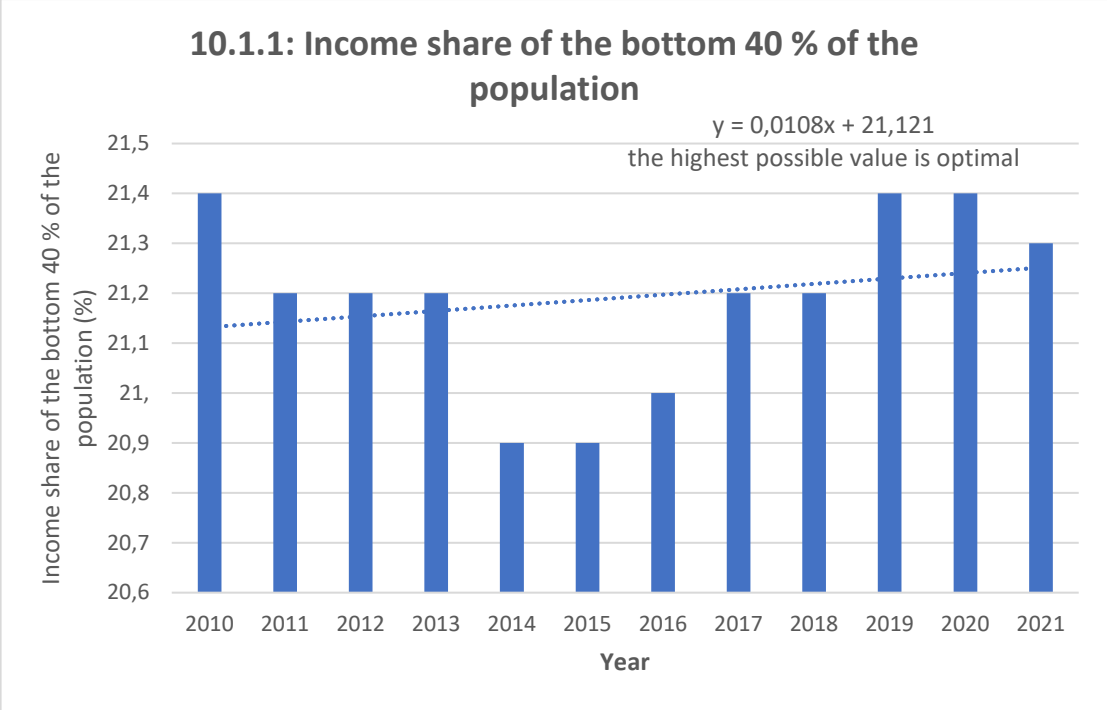

9.2.2: Manufacturing employment as a proportion of total employment (%)
y = -0,0323x + 15,696
the highest possible value is optimal
Manufacturing employment as a proportion of total employment (%)
15,9
15,8
15,7
15,6
15,5
15,4
15,3
15,2
15,1
15
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

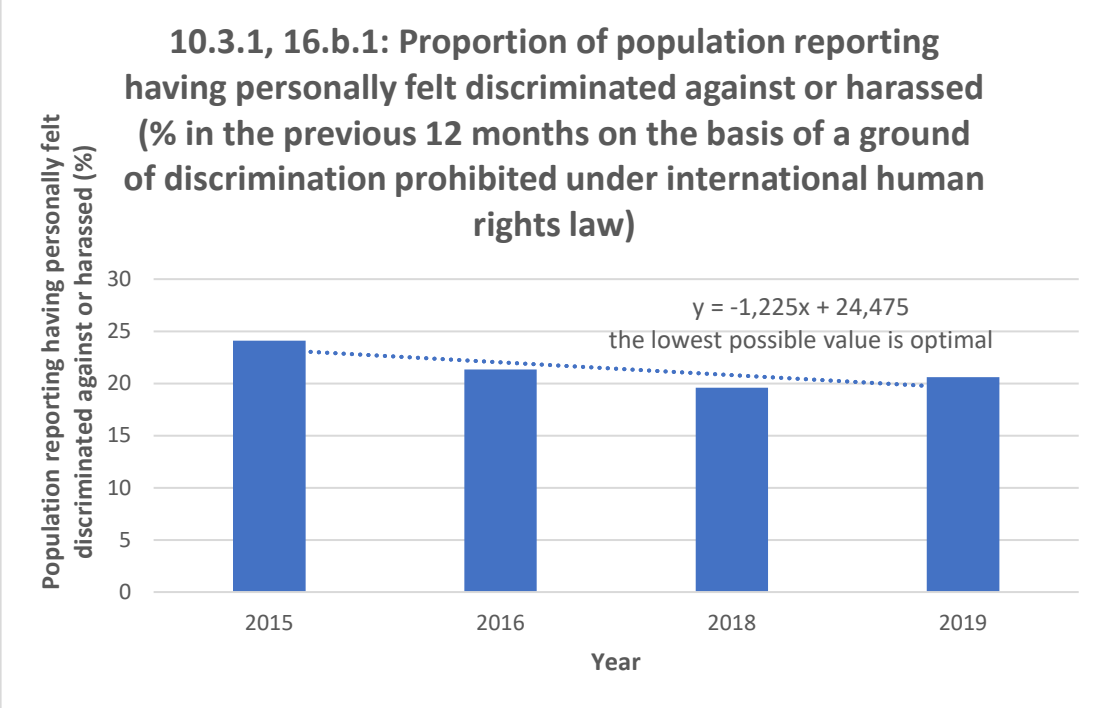

9.3.1: Proportion of small-scale industries in total industry value added (%)
Proportion of small-scale industries in total industry value added (%)
18,00
16,00
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
y = -0,5329x + 16,713
the highest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

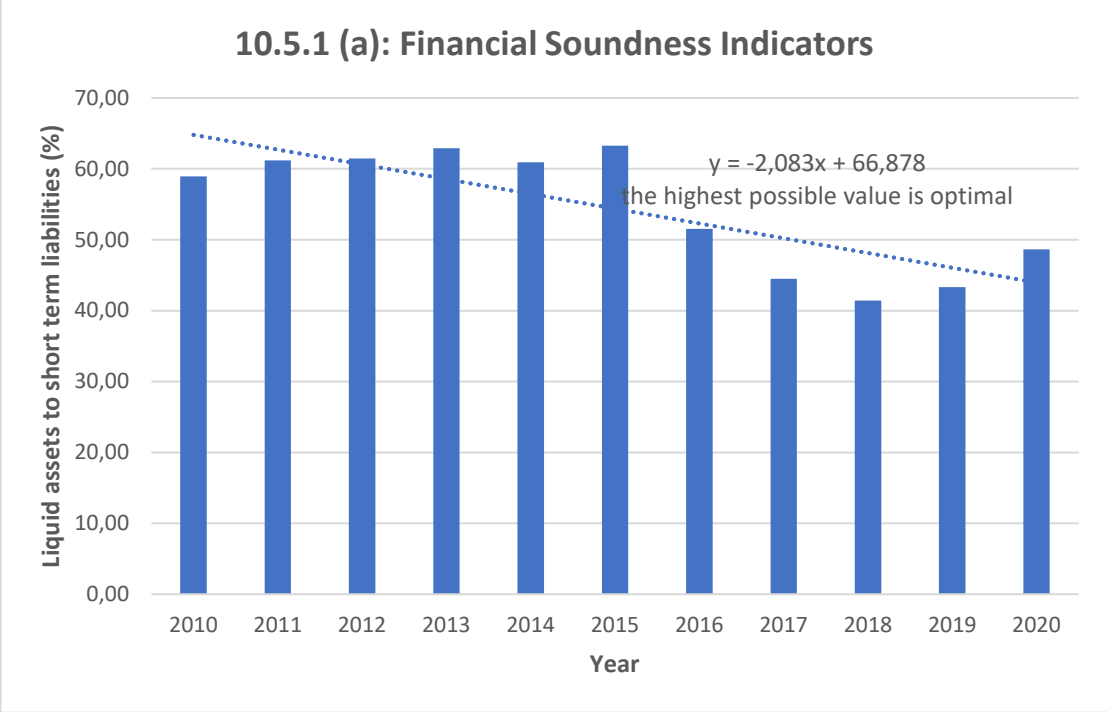

9.4.1: CO2 emission per unit of value added
CO2 emission (grams per euro)
0,12
0,1
0,08
0,06
0,04
0,02
0,
y = -0,0034x + 0,1027
lower value is better
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

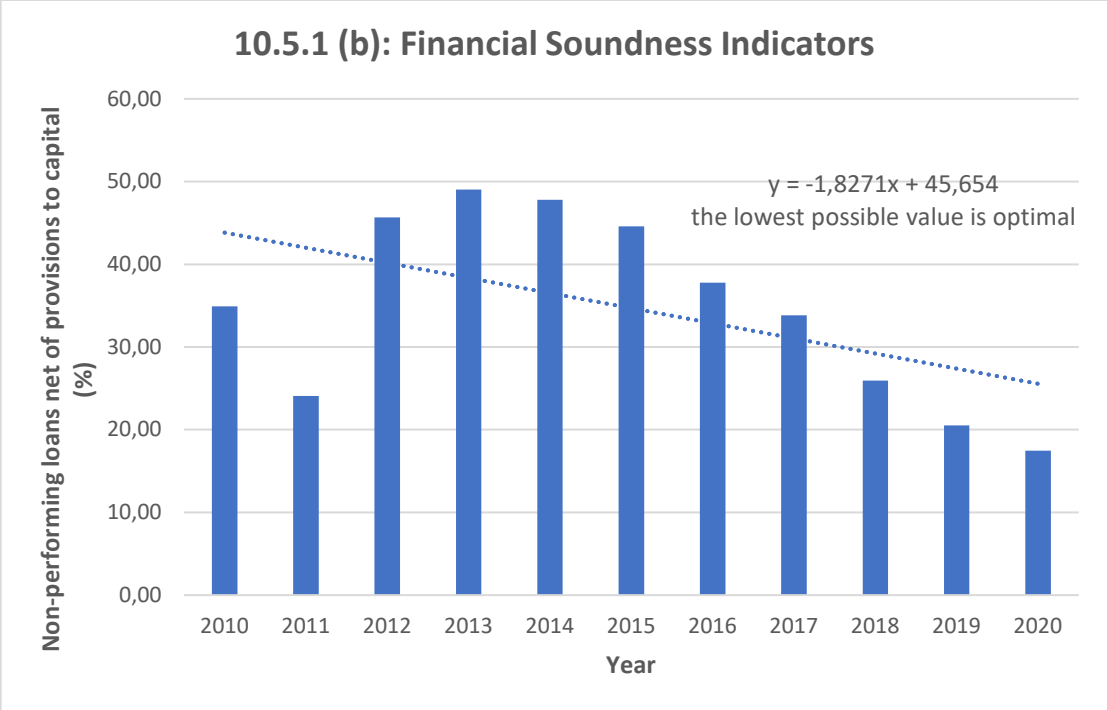

9.5.1: Research and development expenditure as a proportion of GDP (%)
y = 0,0263x + 1,968
the highest possible value is optimal
Research and development expenditure as a proportion of GDP (%)
2,4
2,3
2,2
2,1
2,
1,9
1,8
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

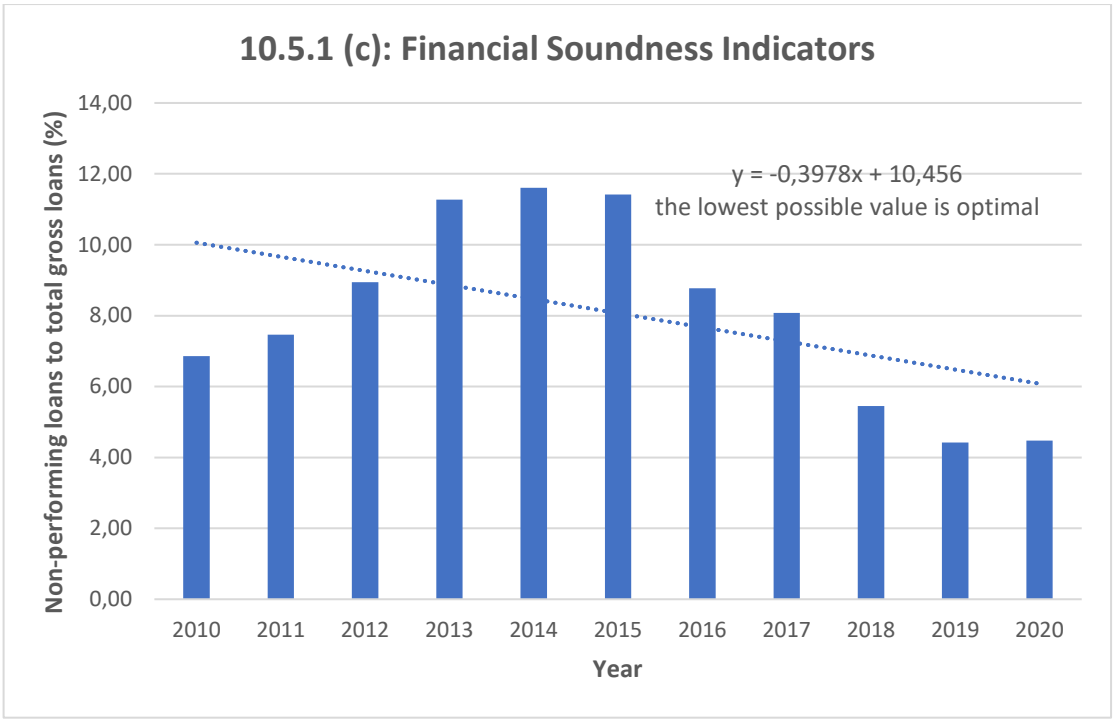

9.5.2: Researchers (in full-time equivalent) in the labour force (%)
y = 0,0384x + 1,0102
the highest possible value is optimal
Researchers (in full-time equivalent) in the labour force (%)
1,6
1,4
1,2
1,
0,8
0,6
0,4
0,2
0,
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

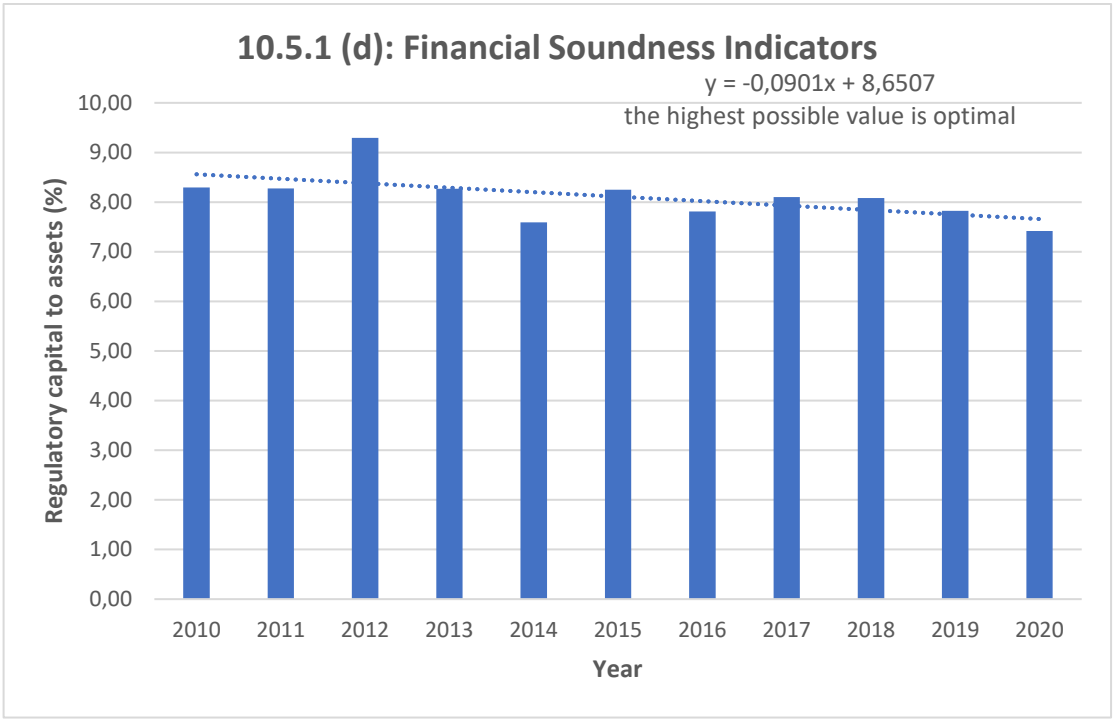

10.1.1: Income share of the bottom 40 % of the population
y = 0,0108x + 21,121
the highest possible value is optimal
Income share of the bottom 40 % of the population (%)
21,5
21,4
21,3
21,2
21,1
21,
20,9
20,8
20,7
20,6
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

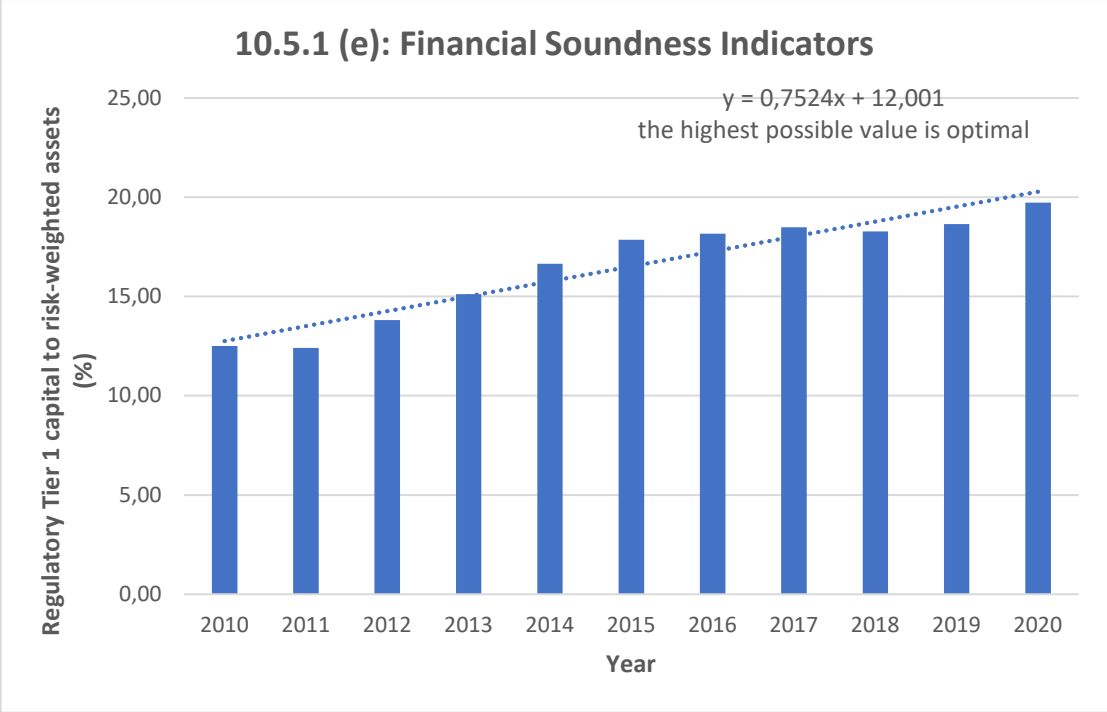

10.3.1, 16.b.1: Proportion of population reporting having personally felt discriminated against or harassed (% in the previous 12 months on the basis of a ground of discrimination prohibited under international human rights law)
y = -1,225x + 24,475
the lowest possible value is optimal
Population reporting having personally felt discriminated against or harassed (%)
30
25
20
15
10
5
0
2015
2016
2018
2019
Year

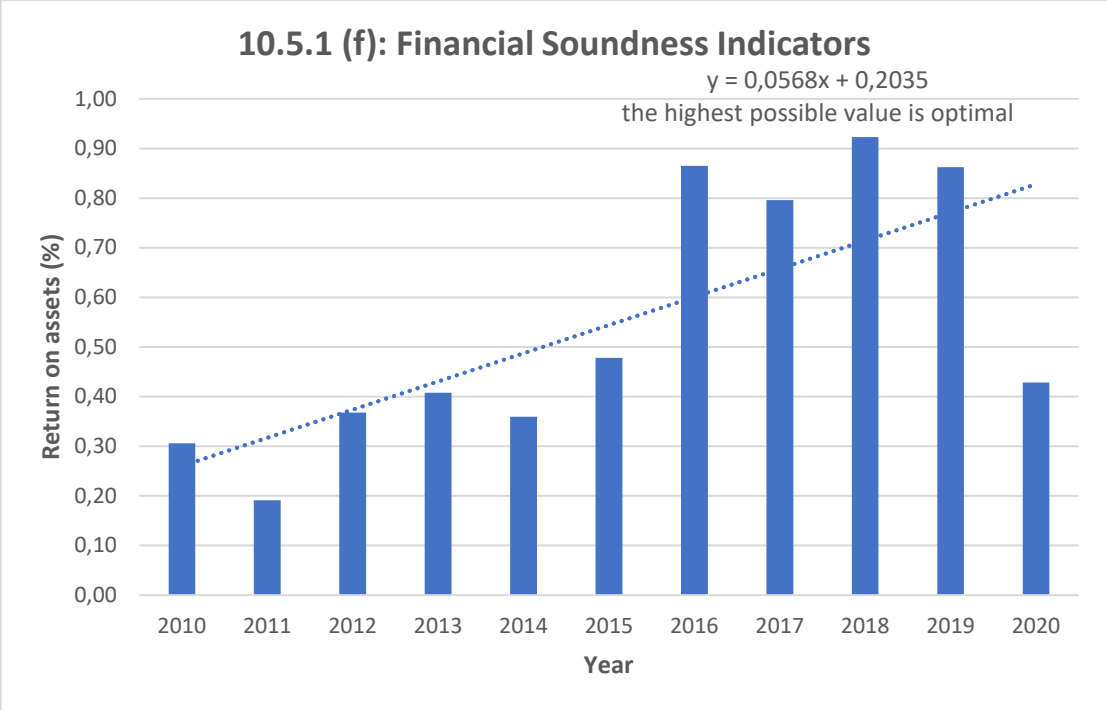

10.5.1 (a): Financial Soundness Indicators
Liquid assets to short term liabilities (%)
70,00
60,00
50,00
40,00
30,00
20,00
10,00
0,00
y = -2,083x + 66,878
the highest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

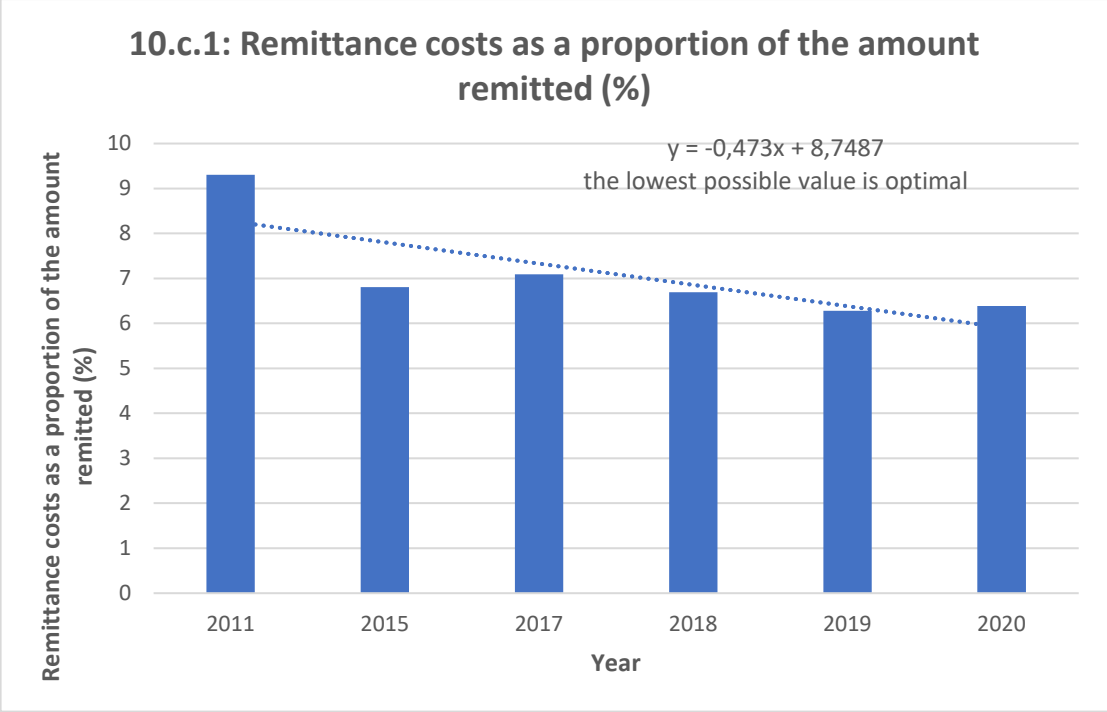

10.5.1 (b): Financial Soundness Indicators
Non-performing loans net of provisions to capital (%)
60,00
50,00
40,00
30,00
20,00
10,00
0,00
y = -1,8271x + 45,654
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

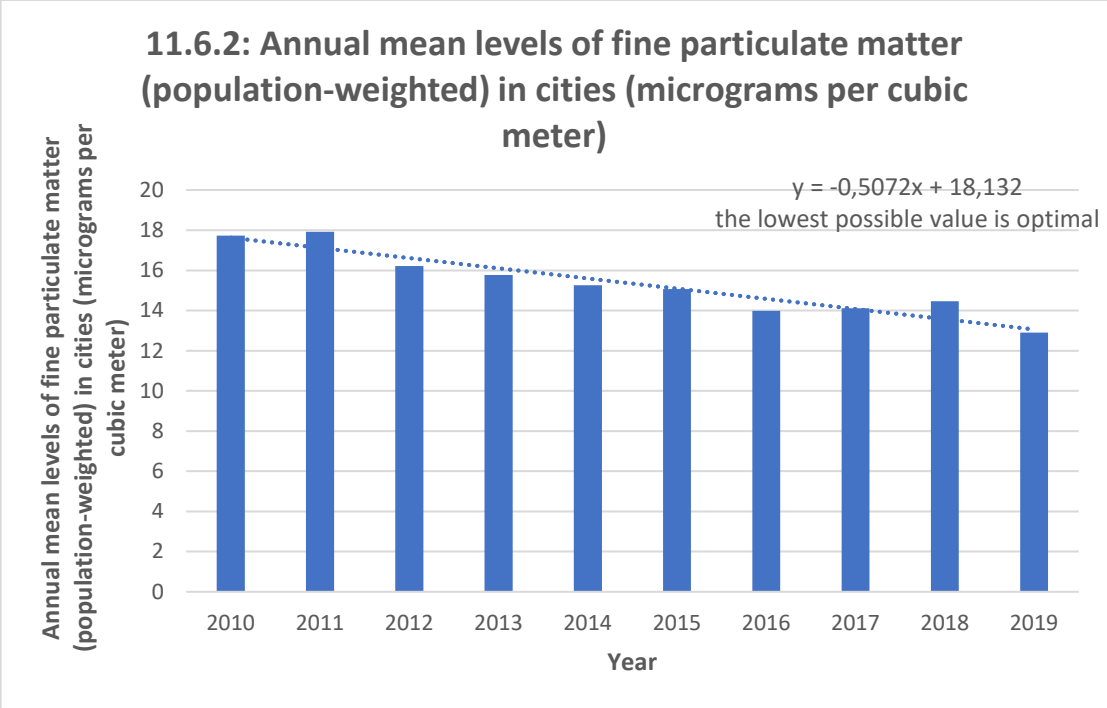

10.5.1 (c): Financial Soundness Indicators
y = -0,3978x + 10,456
the lowest possible value is optimal
Non-performing loans to total gross loans (%)
14,00
12,00
10,00
8,00
6,00
4,00
2,00
0,00
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

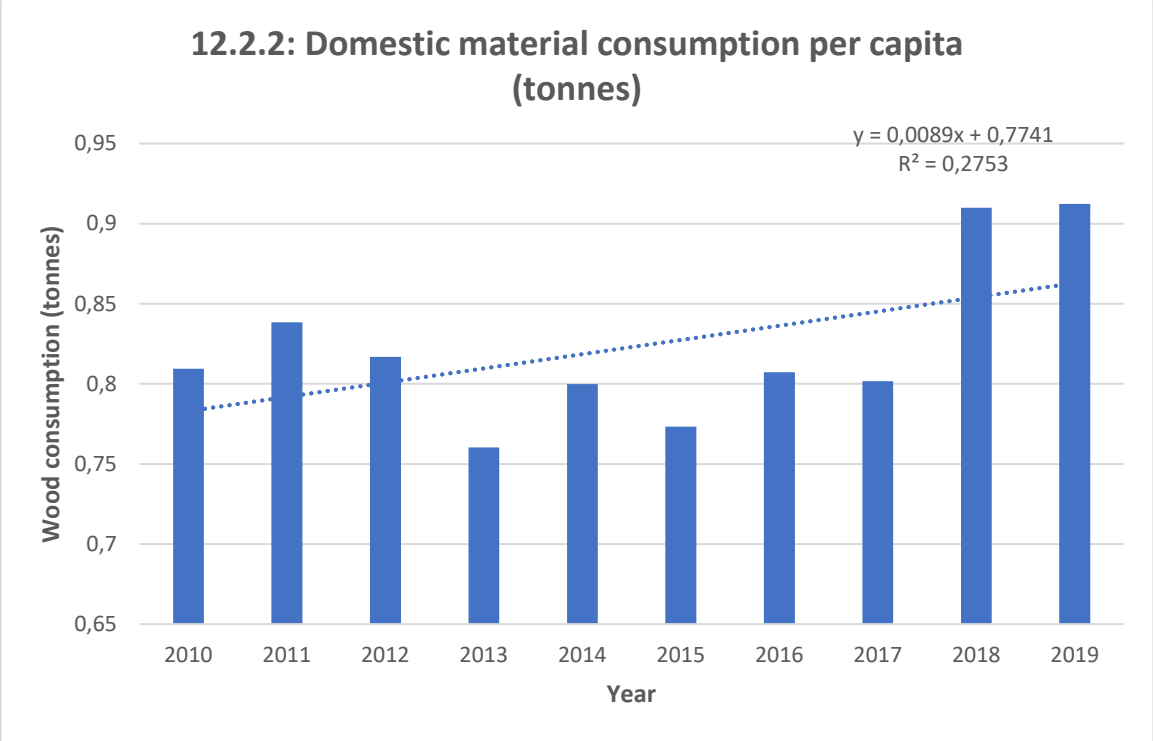

10.5.1 (d): Financial Soundness Indicators
y = -0,0901x + 8,6507
the highest possible value is optimal
Regulatory capital to assets (%)
10,00
9,00
8,00
7,00
6,00
5,00
4,00
3,00
2,00
1,00
0,00
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

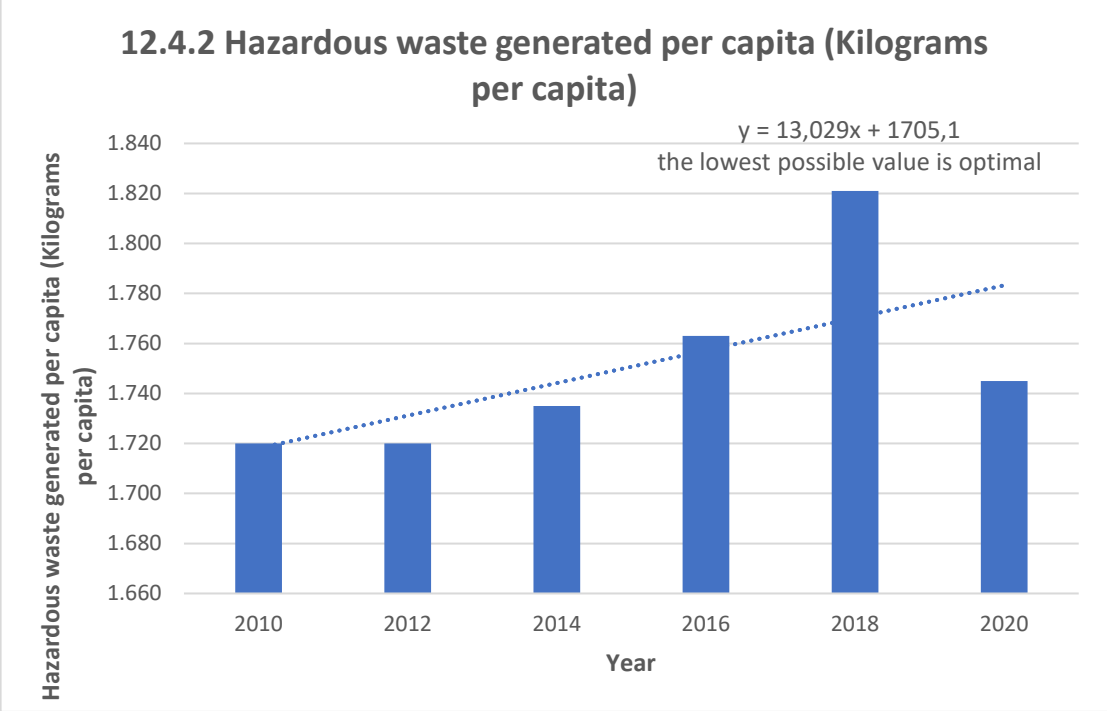

10.5.1 (e): Financial Soundness Indicators
y = 0,7524x + 12,001
the highest possible value is optimal
Regulatory Tier 1 capital to risk-weighted assets (%)
25,00
20,00
15,00
10,00
5,00
0,00
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

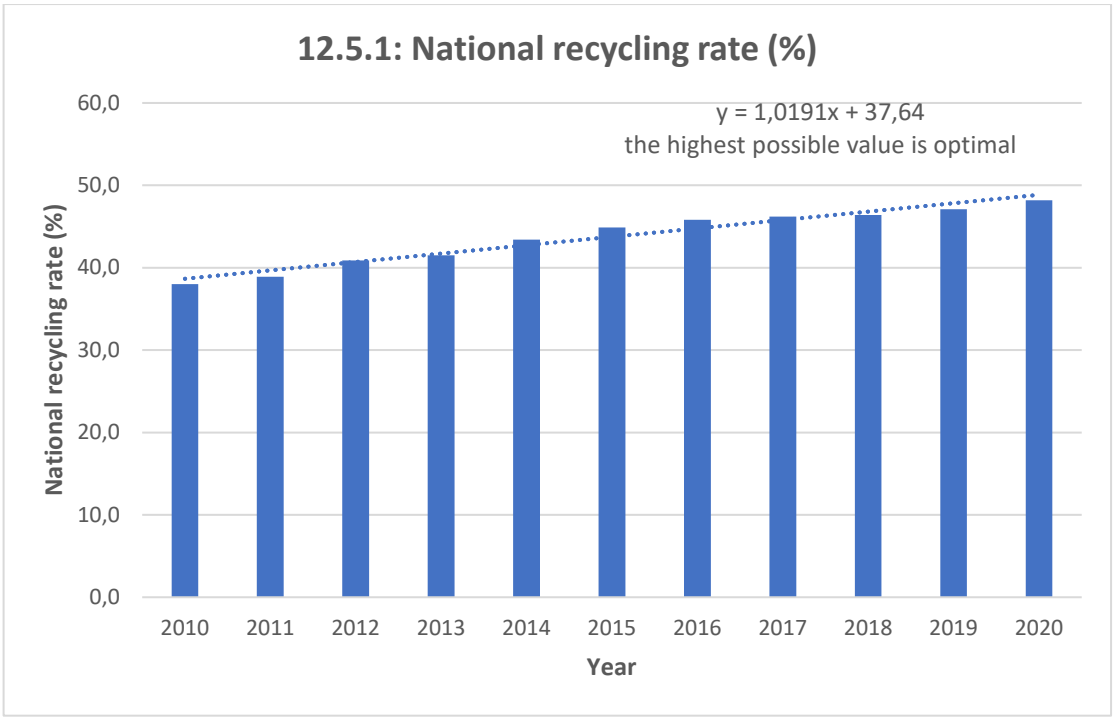

10.5.1 (f): Financial Soundness Indicators
y = 0,0568x + 0,2035
the highest possible value is optimal
Return on assets (%)
1,00
0,90
0,80
0,70
0,60
0,50
0,40
0,30
0,20
0,10
0,00
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year


10.c.1: Remittance costs as a proportion of the amount remitted (%)
y = -0,473x + 8,7487
the lowest possible value is optimal
Remittance costs as a proportion of the amount remitted (%)
10
9
8
7
6
5
4
3
2
1
0
2011
2015
2017
2018
2019
2020
Year

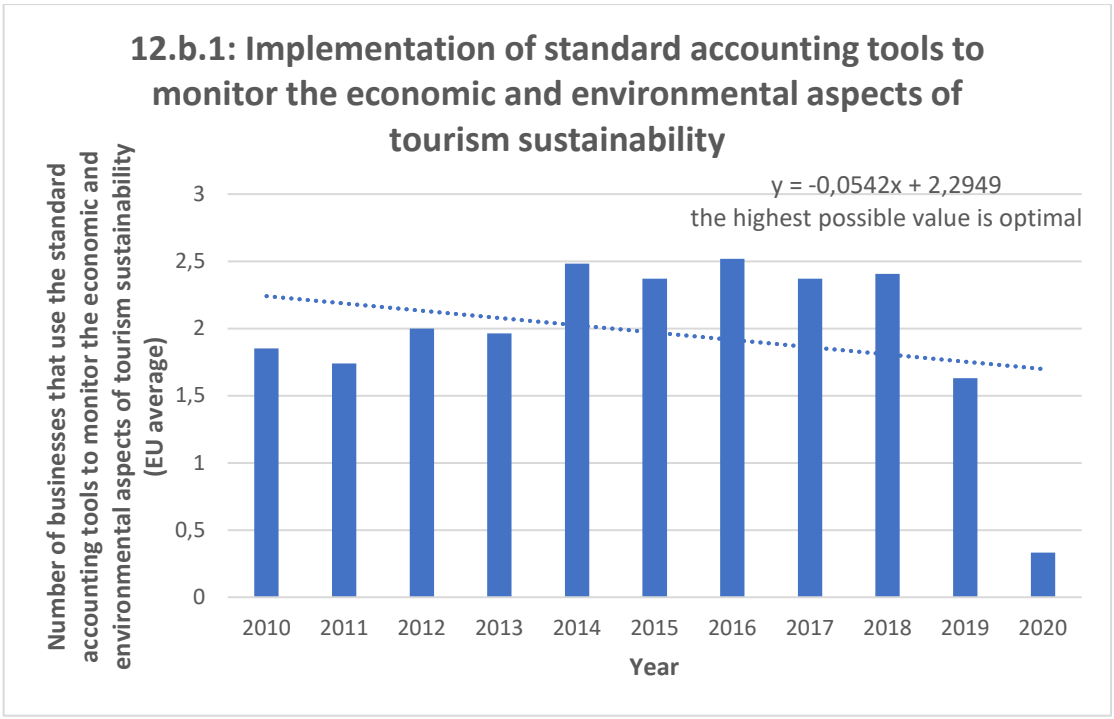

11.6.2: Annual mean levels of fine particulate matter (population-weighted) in cities (micrograms per cubic meter)
y = -0,5072x + 18,132
the lowest possible value is optimal
Annual mean levels of fine particulate matter (population-weighted) in cities (micrograms per cubic meter)
20
18
16
14
12
10
8
6
4
2
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

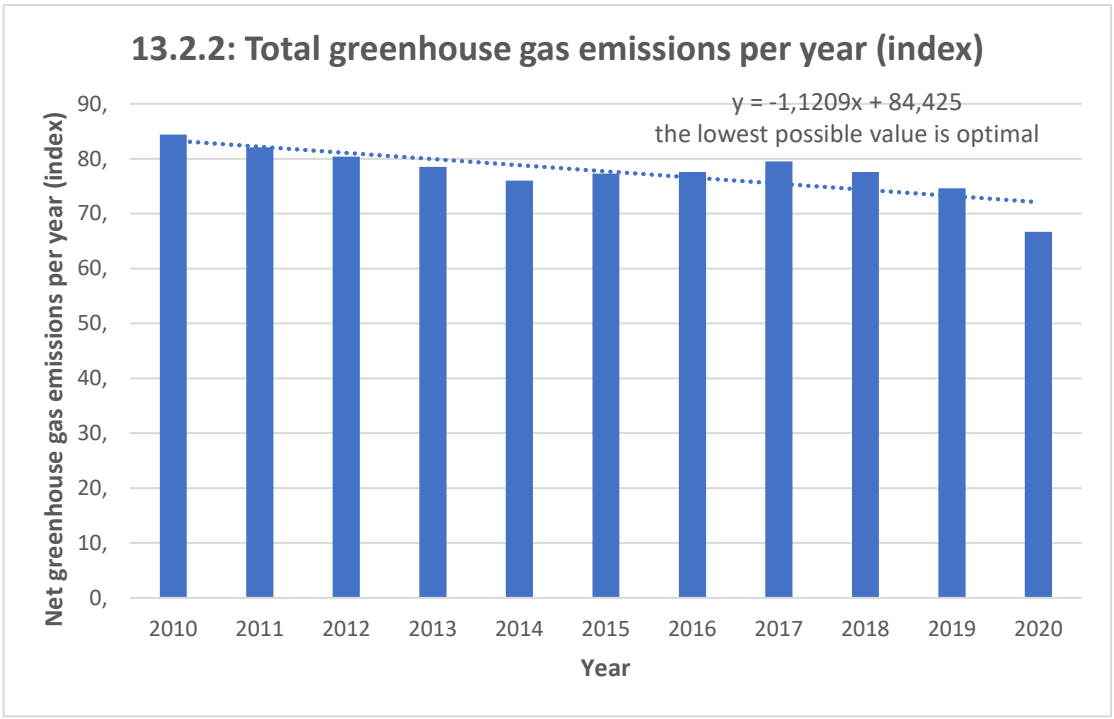

12.2.2: Domestic material consumption per capita (tonnes)
y = 0,0089x + 0,7741
R² = 0,2753
Wood consumption (tonnes)
0,95
0,9
0,85
0,8
0,75
0,7
0,65
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year

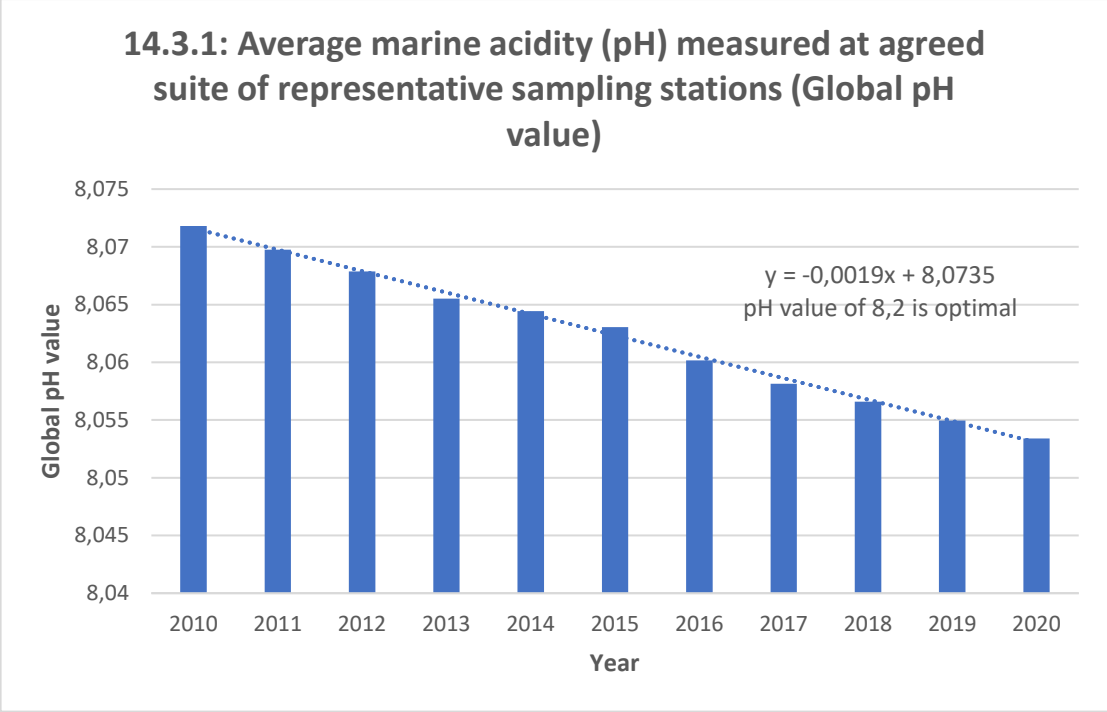

12.4.2 Hazardous waste generated per capita (Kilograms per capita)
y = 13,029x + 1705,1
the lowest possible value is optimal
Hazardous waste generated per capita (Kilograms per capita)
1.840
1.820
1.800
1.780
1.760
1.740
1.720
1.700
1.680
1.660
2010
2012
2014
2016
2018
2020
Year


12.5.1: National recycling rate (%)
y = 1,0191x + 37,64
the highest possible value is optimal
National recycling rate (%)
60,0
50,0
40,0
30,0
20,0
10,0
0,0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

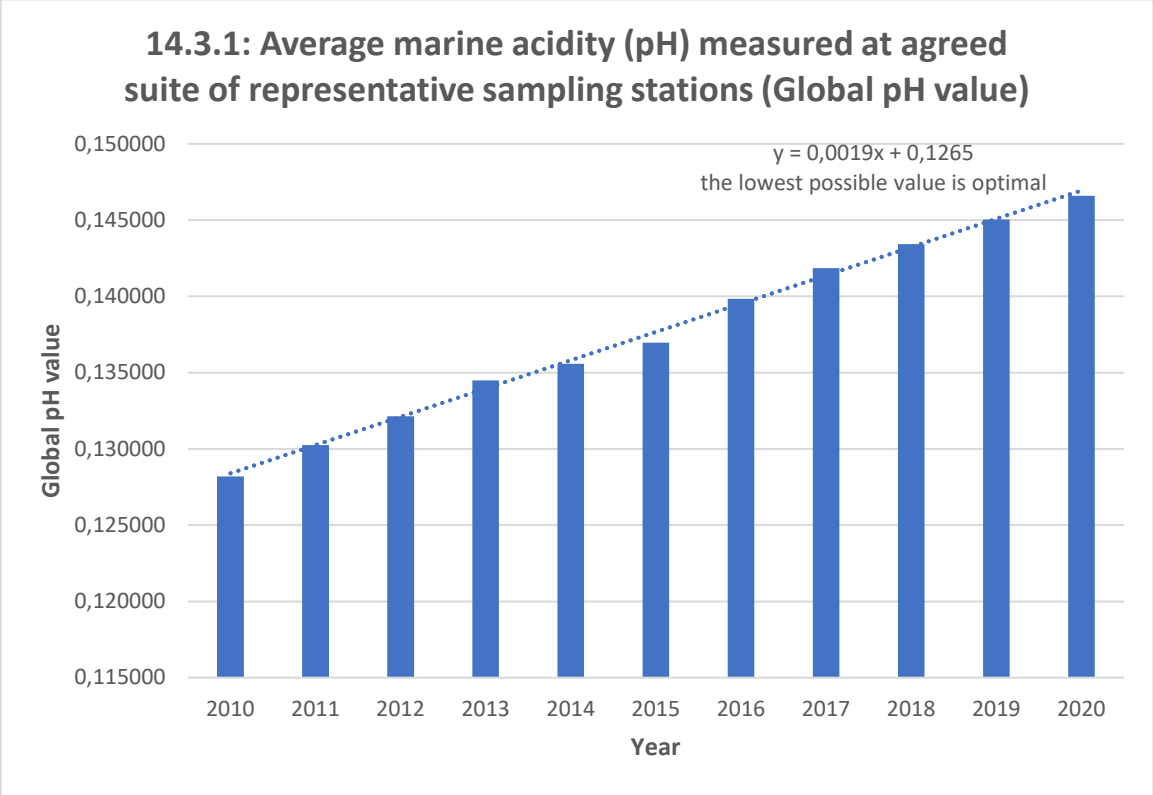

12.6.1: Number of companies publishing sustainability reports
y = 7,5524x + 15,795
the highest possible value is optimal
Number of companies publishing sustainability reports (EU average)
60
50
40
30
20
10
0
2016
2017
2018
2019
2020
Year

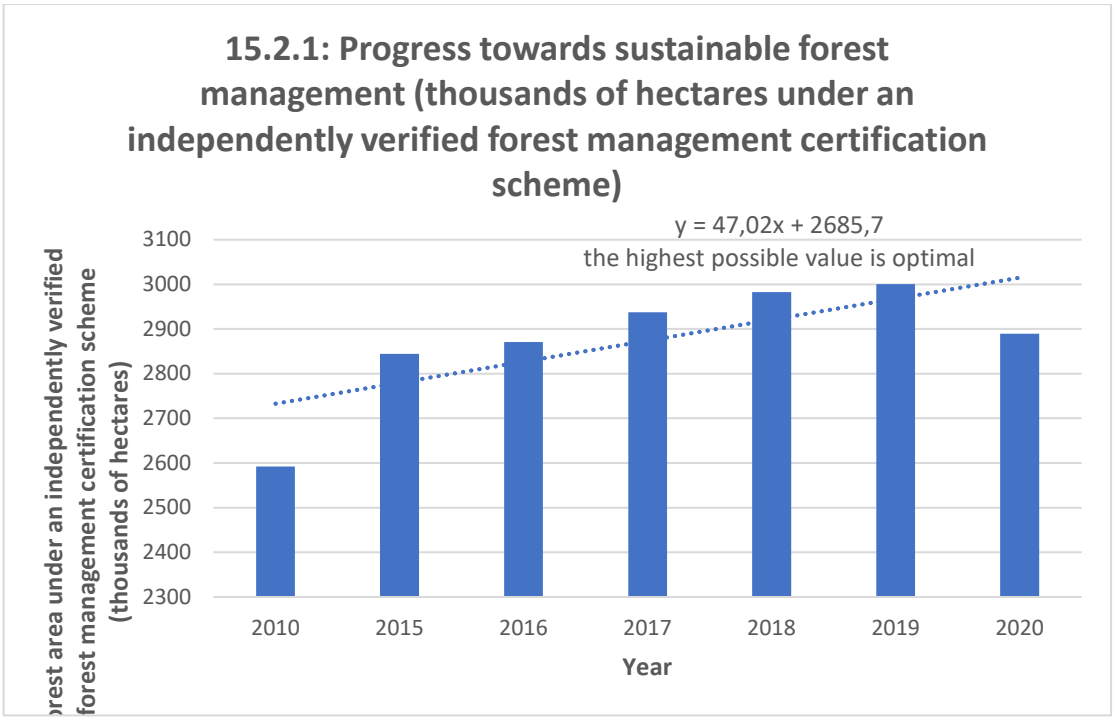

12.b.1: Implementation of standard accounting tools to monitor the economic and environmental aspects of tourism sustainability
Number of businesses that use the standard accounting tools to monitor the economic and environmental aspects of tourism sustainability (EU average)
y = -0,0542x + 2,2949
the highest possible value is optimal
3
2,5
2
1,5
1
0,5
0
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

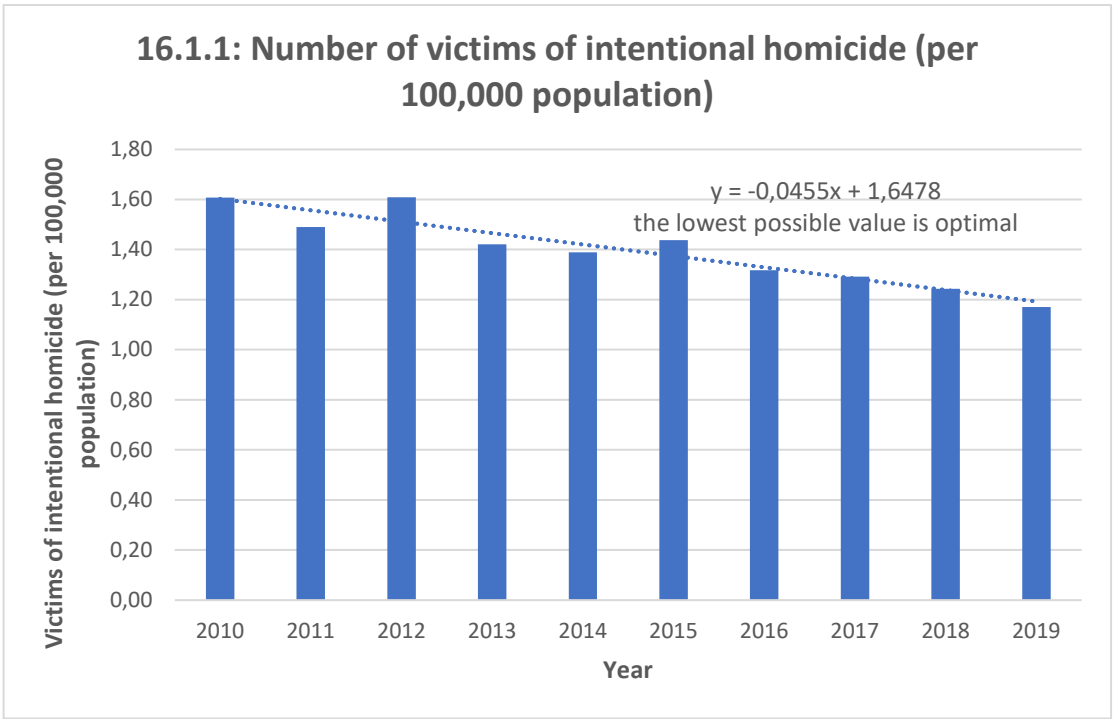

13.2.2: Total greenhouse gas emissions per year (index)
Net greenhouse gas emissions per year (index)
y = -1,1209x + 84,425
the lowest possible value is optimal
90,
80,
70,
60,
50,
40,
30,
20,
10,
0,
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
Year

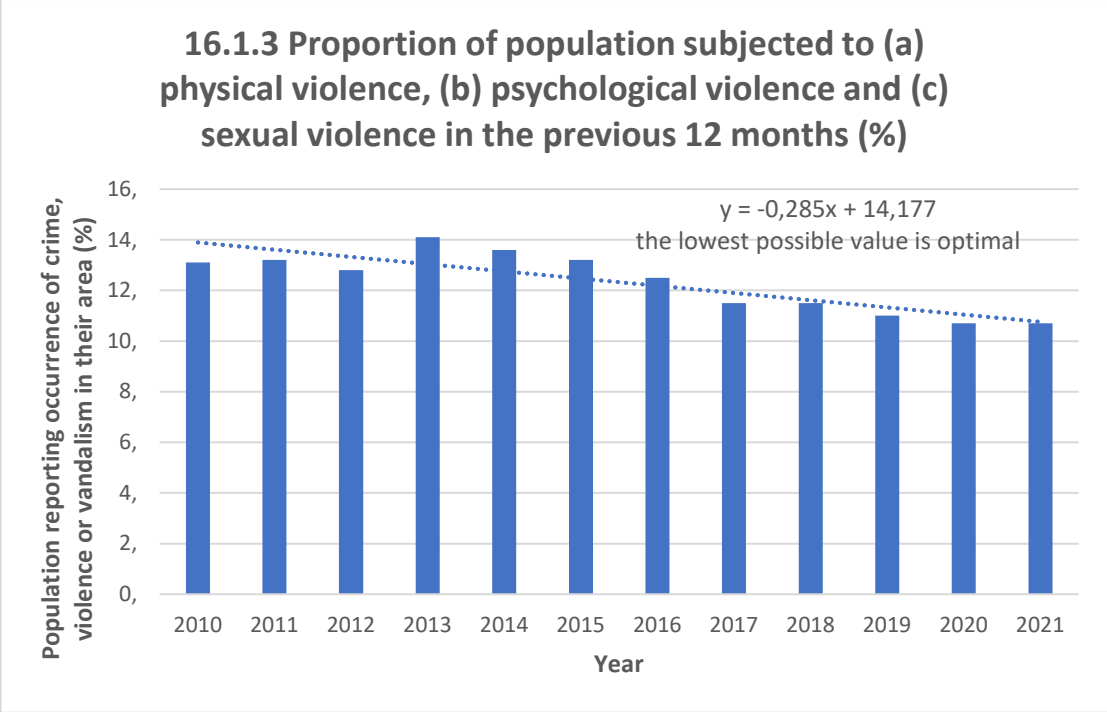


A transformation follows, so as the gap between each year's value and the optimal value of "8.2" is indicated




15.2.1: Progress towards sustainable forest management (thousands of hectares under an independently verified forest management certification scheme)
y = 47,02x + 2685,7
the highest possible value is optimal
3100
3000
2900
2800
2700
2600
2500
2400
2300
2010
2015
2016
2017
2018
2019
2020
Year
(thousands of hectares)
forest management certification scheme


16.1.1: Number of victims of intentional homicide (per 100,000 population)
y = -0,0455x + 1,6478
the lowest possible value is optimal
1,80
1,60
1,40
1,20
1,00
0,80
0,60
0,40
0,20
0,00
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
Year
Victims of intentional homicide (per 100,000 population)


16.1.3 Proportion of population subjected to (a) physical violence, (b) psychological violence and (c) sexual violence in the previous 12 months (%)
Population reporting occurrence of crime, violence or vandalism in their area (%)
16,
14,
12,
10,
8,
6,
4,
2,
0,
y = -0,285x + 14,177
the lowest possible value is optimal
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
Year

Appendix III – Our survey's questionnaire

Dear participants,

This research is conducted for the needs of a doctoral thesis at the University of Piraeus, regarding the implementation of the principles of sustainable development by businesses and organizations. Their sustainable development relates not only to their economic results and achievements but also to their set standards for protecting the environment and the values of our culture. Therefore, in order to ensure the organization's safe, smooth and reliable functioning (combined with the best possible conditions for the society), environmental, social and economic dimensions of sustainability should be equally considered.

Participants in this questionnaire are mainly executives of public or private organizations. The respondents, whose choice was made by random sampling, are called to give answers about their understanding of the principles of sustainable development. They are also called to submit an opinion on the extent that the principles of sustainable development are implemented in their organization. Finally, they are called to evaluate a series of indicators, according to the importance with which each indicator is treated in their organization.

By analyzing the respondent's replies, we wish to create a business sustainability framework to highlight the sustainable development priorities set by public entities or private businesses. At this point, we assure you that the content of the survey as well as your responses on it are confidential data, and as a copyright of the University of Piraeus it will not be used for any other purposes or by a third party. Any data collected will be exclusively used for the conduct of this thesis and the results will be analyzed as a whole, in order to maintain your anonymity.

Please finally note, that there are no right or wrong answers and that it 'll take you about 10 minutes to complete this questionnaire. For answering, please check the appropriate box, giving only one answer to each question.

The rapporteurs,

D. Bouras, PhD Candidate
Professor S. Sofianopoulou

PART A

In the table below, you are called to answer questions (Q1-Q15) that relate either to the concept of sustainable development or to the actions undertaken by your business, related to sustainable development principles.

Your answers will be placed on a Likert scale, varying from "Not at all" to "Very". Finally, in case you don't understand a question, please leave it blank.

		Not at all	**A little**	**Neutral**	**Enough**	**Very**
1	Do you understand the concept or the principles that define sustainable development? *(if the answer is "Not at all", skip the next question and move to question 3)*					
2	Does your knowledge of the principles that define sustainable development derive from the organization that you work for?					
3	Do you know the vision, the values and the principles of the organization you work for as well as the objectives it is called to fulfil? *(if the answer is "Not at all", skip the next question and move to question 5)*					
4	To what extent do you consider that the objectives and the purpose that your organization is called to fulfil, are achieved?					
5	Are meetings held, among the members of the organization you work for, during the decision-making process (as a dimension of corporate social responsibility practice)?					
6	Is there safety and hygiene regulation for the staff employed in the organization you work for?					

		Not at all	A little	Neutral	Enough	Very
7	Is there a non-discrimination policy in the organization you work for (racial, social, against women, etc.), both in the recruiting process and in core employment?					
8	Does the organization you work for provide the necessary conditions to ensure that its worker's mental balance and physical integrity are ensured?					
9	Does the organization you work for support education as well as facilitates participation in scientific activities or studies (like providing grants, urging employees to attend seminars, retraining etc.)?					
10	Does your organization facilitate knowledge transfer or support the education of the employees of its cooperating entities (e.g. suppliers, customers, distributors, etc. employees) in order to improve the total quality of common services or products?					
11	Is there an open dialogue approach, information flow and feedback between the organization you work for and its social partners (such as citizens, local authorities, investors, trade unions, NGOs etc.)?					
12	Does the organization you work for cooperate with other organizations in order to resolve critical issues, address common problems and pursue common policies?					
13	Does the organization you work for encourage its workforce to participate in social activities?					
14	Does the organization you work for enhance the necessity of environmental awareness to its employees, by promoting environmental awareness actions? *(if the answer is "Not at all", please proceed to Part B')*					
15	Are resources or money saved through such actions (such as recycling programs, energy restriction policies, etc.)?					

PART B

The use of indicators for the recording of sustainability-related priorities in any organization is a widely accepted methodology. In the tables that follow, indicators are quoted in a logical order, according to the dimension of sustainability they belong to (environmental, economic, social, or mixed).

In this part, you are asked to evaluate the importance that the organization you work for, gives to each indicator. Your answers will be placed on a Likert scale, varying from "Not at all important" to "Very important". Finally, in case you don't understand a question, please leave it blank.

I. This section includes sustainability indicators relating to the environment (working, natural or urban)

Nr	Indicators	Not at all important	A little important	Neutral	Important	Very important
16	Greenhouse gas emissions					
17	Solid waste management / policy					
18	Liquid waste management /policy					
19	Material recycling within the organization you work for (such as paper collection bins, used batteries cans etc.)					
20	Air quality within the workplace (referring to odours, dust, etc.)					
21	Sound level intensity within the workplace (referring to noise)					
22	Use of ecological materials, environmentally and human friendly as well					
23	Natural heritage protection (referring to natural, not manmade areas)					

II. This section includes sustainability indicators relating to the economy (employee compensation, growth initiatives, funding e.t.c.)

Nr	Indicators	Not at all important	A little important	Neutral	Important	Very important
24	Employee's net earnings					
25	Employee's additional earnings (for using a private car / paying parking expenses / mobile telephone, etc.)					
26	Employee's participation in the profits of their organization (bonus, shares, bonds etc.)					
27	Innovation's rewarding					
28	Labor's productivity (the results obtained in relation to the number of employees)					
29	Net profit of the organization					
30	Organization's grant programs (National, E.U or International Grant Programs)					
31	Sponsorships					
32	Investing in research and development					

III. This section includes sustainability indicators relating to society (inside or outside the organization, social partners and stakeholders)

Nr	Indicators	Not at all important	A little important	Neutral	Important	Very important
33	Tertiary education graduate's employment					
34	Disabled people employment, as well as infrastructure development for their access to work					
35	Participation of women in leadership positions					
36	Employee participation in the decision-making process					
37	Service quality					
38	Facilities within the workplace (nursery, restaurant, etc.) and the existence of basic services near the workplace (schools, shops, public services, etc.)					
39	Safety at work (provision of occupational accidents, medical examinations of the workforce)					
40	Safety and quality of the public transport network (accidents restriction, adequate policing etc.)					
41	Social awareness actions					
42	Cultural heritage preservation (monuments, architectural buildings, signs, etc.)					
43	Social partner's (stakeholder's) participation in the decision–making process					

IV. This section includes sustainability indicators relating to more than one dimension

Nr	Indicators	Not at all important	A little important	Neutral	Important	Very important
44	Workforce training					
45	Programs to support workforce physical and mental health (in order to reduce work stress and increase efficiency)					
46	Additional insurance or retirement programs					
47	Number of leave days					
48	Corruption and abuse (referring to the power and material abuse)					
49	Bureaucracy					
50	Distance travelled to the workplace					
51	Traffic congestion					
52	Quality control					
53	Renewable energy source usage					

DEMOGRAPHICS

GENDER	□ Male	□ Female
AGE	□ under 20 years old □ 21 - 30 □ 31 - 40	□ 41 - 50 □ over 50 years old
MARITAL STATUS	□ Single	□ Married
PLACE OF RESIDENCE	□ Central Athens □ Northern Athens suburbs □ Southern Athens suburbs □ Eastern Athens suburbs □ Western Athens suburbs	□ Rest of Athens □ Northern Greece □ Southern Greece & Crete □ Central & Western Greece □ Insular areas
EDUCATION	□ Secondary degree □ Technological Institute □ University	□ MSc degree □ PhD degree
SPECIALTY	□ Administrative staff □ Teaching staff □ Medical staff □ Other (Specify):	□ Engineer □ Technical staff
TYPE OF BUSINESS ENTITY	□ Municipality □ Public entity □ Educational Institution □ Health Units □ Military service	□ Private company (up to 10 employees) □ Private company (11 - 100 employees) □ Private company (over 100 employees) □ Other (Specify): …….
FIELD OF ACTIVITY	□ Education □ Civil service / Services generally □ Other (Specify): ……...	□ Materials trade □ Small industry (processing raw materials) □ Industry (processing raw materials)
POSITION IN THE ORGANIZATION	□ Employee □ Chief officer □ Executive officer	□ Chief executive □ Other (Specify): ……...

COMMENTS - REMARKS: _____

_____

Thank you for your time and your willingness to complete this questionnaire, acknowledging you that you can be notified of the survey's results upon your request (in the email or fax you will indicate in the comments).

Appendix IV - The results of the questionnaire

Question-1		
Do you understand the concept or the principles that define sustainable development?		
Not at all	49	12,37%
A little	84	21,21%
Neutral	74	18,69%
Enough	**152**	**38,38%**
Very	37	9,34%
Total	**396**	
Mean	3,10	
Standard Dev.	1,22	
Variance	1,48	
Question-2		
Does your knowledge of the principles that define sustainable development derive from the organization that you work for?		
Not at all	**103**	**29,43%**
A little	75	21,43%
Neutral	53	15,14%
Enough	86	24,57%
Very	33	9,43%
Total	**350**	
Mean	2,72	
Standard Dev.	1,38	
Variance	1,90	
Question-3		
Do you know the vision, the values and the principles of the organization you work for as well as the objectives it is called to fulfill?		
Not at all	18	4,56%
A little	22	5,57%
Neutral	24	6,08%
Enough	**181**	**45,82%**
Very	150	37,97%
Total	**395**	

Mean	4,09	
Standard Dev.	1,03	
Variance	1,06	
Question-4		
To what extent do you consider that the objectives and the purpose that your organization is called to fulfill, are achieved?		
Not at all	3	0,79%
A little	53	14,02%
Neutral	76	20,11%
Enough	**206**	**54,50%**
Very	40	10,58%
Total	**378**	
Mean	3,56	
Standard Dev.	0,90	
Variance	0,80	
Question-5		
Are meetings held, among the members of the organization you work for, during the decision-making process (as a dimension of corporate social responsibility practice)?		
Not at all	47	11,93%
A little	66	16,75%
Neutral	61	15,48%
Enough	**161**	**40,86%**
Very	59	14,97%
Total	**394**	
Mean	3,29	
Standard Dev.	1,23	
Variance	1,52	
Question-6		
Is there safety and hygiene regulation for the staff employed in the organization you work for?		
Not at all	14	3,53%
A little	37	9,32%
Neutral	39	9,82%
Enough	**160**	**40,30%**

Very	147	37,03%
Total	**397**	
Mean	3,96	
Standard Dev.	1,10	
Variance	1,21	
Question-7		
Is there a non-discrimination policy in the organization you work for (racial, social, against women, etc.), both in the recruiting process and in core employment?		
Not at all	30	7,59%
A little	20	5,06%
Neutral	32	8,10%
Enough	139	35,19%
Very	**174**	**44,05%**
Total	**395**	
Mean	4,03	
Standard Dev.	1,20	
Variance	1,44	
Question-8		
Does the organization you work for provide the necessary conditions to ensure that its worker's mental balance and physical integrity are ensured?		
Not at all	21	5,25%
A little	39	9,75%
Neutral	61	15,25%
Enough	**180**	**45,00%**
Very	99	24,75%
Total	**400**	
Mean	3,75	
Standard Dev.	1,10	
Variance	1,20	
Question-9		
Does the organization you work for support education as well as facilitates participation in scientific activities or studies (like providing grants, urging employees to attend seminars, retraining etc.)?		
Not at all	39	9,85%

A little	87	21,97%
Neutral	70	17,68%
Enough	**142**	**35,86%**
Very	58	14,65%
Total	**396**	
Mean	3,15	
Standard Dev.	1,25	
Variance	1,56	
Question-10		
Does your organization facilitate knowledge transfer or support the education of the employees of its cooperating entities (e.g. suppliers, customers, distributors, etc. employees) in order to improve the total quality of common services or products?		
Not at all	60	15,35%
A little	62	15,86%
Neutral	84	21,48%
Enough	**136**	**34,78%**
Very	49	12,53%
Total	**391**	
Mean	3,11	
Standard Dev.	1,26	
Variance	1,60	
Question-11		
Is there an open dialogue approach, information flow and feedback between the organization you work for and its social partners (such as citizens, local authorities, investors, trade unions, NGOs etc.)?		
Not at all	84	21,48%
A little	**110**	**28,13%**
Neutral	89	22,76%
Enough	86	21,99%
Very	22	5,63%
Total	**391**	
Mean	2,54	
Standard Dev.	1,20	
Variance	1,45	
Question-12		

Does the organization you work for cooperate with other organizations in order to resolve critical issues, address common problems and pursue common policies?		
Not at all	58	14,72%
A little	110	27,92%
Neutral	80	20,30%
Enough	**117**	**29,70%**
Very	29	7,36%
Total	**394**	
Mean	2,82	
Standard Dev.	1,21	
Variance	1,47	
Question-13		
Does the organization you work for encourage its workforce to participate in social activities?		
Not at all	88	22,17%
A little	81	20,40%
Neutral	**107**	**26,95%**
Enough	100	25,19%
Very	21	5,29%
Total	**397**	
Mean	2,69	
Standard Dev.	1,20	
Variance	1,45	
Question-14		
Does the organization you work for enhance the necessity of environmental awareness to its employees, by promoting environmental awareness actions?		
Not at all	62	15,82%
A little	89	22,70%
Neutral	68	17,35%
Enough	**118**	**30,10%**
Very	55	14,03%
Total	**392**	
Mean	3,06	
Standard Dev.	1,32	
Variance	1,74	

Question-15		
Are resources or money saved through such actions (such as recycling programs, energy restriction policies, etc.)?		
Not at all	55	15,71%
A little	90	25,71%
Neutral	81	23,14%
Enough	**97**	**27,71%**
Very	27	7,71%
Total	**350**	
Mean	2,89	
Standard Dev.	1,20	
Variance	1,43	
Question-16		
Greenhouse gas emissions		
Not at all important	94	23,38%
A little important	63	15,67%
Neutral	78	19,40%
Important	**97**	**24,13%**
Very important	70	17,41%
Total	**402**	
Mean	2,97	
Standard Dev.	1,43	
Variance	2,03	
Question-17		
Solid waste management / policy		
Not at all important	47	11,78%
A little important	47	11,78%
Neutral	61	15,29%
Important	**124**	**31,08%**
Very important	120	30,08%
Total	**399**	
Mean	3,56	
Standard Dev.	1,34	

Variance	1,79	
Question-18		
Liquid waste management /policy		
Not at all important	62	15,38%
A little important	49	12,16%
Neutral	66	16,38%
Important	110	27,30%
Very important	**116**	**28,78%**
Total	**403**	
Mean	3,42	
Standard Dev.	1,41	
Variance	1,99	
Question-19		
Material recycling within the organization you work for (such as paper collection bins, used batteries cans etc.)		
Not at all important	16	4,01%
A little important	50	12,53%
Neutral	42	10,53%
Important	138	34,59%
Very important	**153**	**38,35%**
Total	**399**	
Mean	3,91	
Standard Dev.	1,15	
Variance	1,33	
Question-20		
Air quality within the workplace (referring to odours, dust, etc.)		
Not at all important	27	6,78%
A little important	48	12,06%
Neutral	62	15,58%
Important	**138**	**34,67%**
Very important	123	30,90%
Total	**398**	

Mean	3,73	
Standard Dev.	1,21	
Variance	1,46	
Question-21		
Sound level intensity within the workplace (referring to noise)		
Not at all important	23	5,79%
A little important	50	12,59%
Neutral	81	20,40%
Important	**139**	**35,01%**
Very important	104	26,20%
Total	**397**	
Mean	3,64	
Standard Dev.	1,16	
Variance	1,35	
Question-22		
Use of ecological materials, environmentally and human friendly as well		
Not at all important	55	13,99%
A little important	74	18,83%
Neutral	85	21,63%
Important	**121**	**30,79%**
Very important	58	14,76%
Total	**393**	
Mean	3,14	
Standard Dev.	1,28	
Variance	1,63	
Question-23		
Natural heritage protection (referring to natural, not manmade areas)		
Not at all important	42	10,91%
A little important	55	14,29%
Neutral	92	23,90%
Important	**122**	**31,69%**
Very important	74	19,22%

Total	**385**	
Mean	3,34	
Standard Dev.	1,25	
Variance	1,56	
Question-24		
Employee's net earnings		
Not at all important	31	7,75%
A little important	42	10,50%
Neutral	73	18,25%
Important	**173**	**43,25%**
Very important	81	20,25%
Total	**400**	
Mean	3,58	
Standard Dev.	1,15	
Variance	1,33	
Question-25		
Employee's additional earnings (for using a private car / paying parking expenses / mobile telephone, etc.)		
Not at all important	89	22,31%
A little important	52	13,03%
Neutral	60	15,04%
Important	**142**	**35,59%**
Very important	56	14,04%
Total	**399**	
Mean	3,06	
Standard Dev.	1,40	
Variance	1,95	
Question-26		
Employee's participation in the profits of their organization (bonus, shares, bonds etc.)		
Not at all important	**172**	**43,11%**
A little important	63	15,79%
Neutral	71	17,79%

Important	63	15,79%
Very important	30	7,52%
Total	**399**	
Mean	2,30	
Standard Dev.	1,36	
Variance	1,85	
Question-27		
Innovation's rewarding		
Not at all important	83	20,70%
A little important	70	17,46%
Neutral	65	16,21%
Important	**112**	**27,93%**
Very important	71	17,71%
Total	**401**	
Mean	3,05	
Standard Dev.	1,41	
Variance	1,98	
Question-28		
Labor's productivity (the results obtained in relation to the number of employees)		
Not at all important	37	9,38%
A little important	53	13,58%
Neutral	52	13,09%
Important	**150**	**37,78%**
Very important	105	26,17%
Total	**397**	
Mean	3,58	
Standard Dev.	1,27	
Variance	1,61	
Question-29		
Net profit of the organization		
Not at all important	45	11,57%

A little important	21	5,40%
Neutral	38	9,77%
Important	**155**	**39,85%**
Very important	130	33,42%
Total	**389**	
Mean	3,78	
Standard Dev.	1,28	
Variance	1,64	
Question-30		
Organization's grant programs (National, E.U or International Grant Programs)		
Not at all important	83	21,34%
A little important	54	13,88%
Neutral	71	18,25%
Important	**120**	**30,85%**
Very important	61	15,68%
Total	**389**	
Mean	3,05	
Standard Dev.	1,39	
Variance	1,93	
Question-31		
Sponsorships		
Not at all important	**103**	**27,03%**
A little important	72	18,90%
Neutral	75	19,69%
Important	100	26,25%
Very important	31	8,14%
Total	**381**	
Mean	2,71	
Standard Dev.	1,33	
Variance	1,76	
Question-32		

Investing in research and development		
Not at all important	73	18,58%
A little important	66	16,79%
Neutral	51	12,98%
Important	**117**	**29,77%**
Very important	86	21,88%
Total	**393**	
Mean	3,19	
Standard Dev.	1,43	
Variance	2,03	
Question-33		
Tertiary education graduate's employment		
Not at all important	23	5,72%
A little important	41	10,20%
Neutral	81	20,15%
Important	**169**	**42,04%**
Very important	88	21,89%
Total	**402**	
Mean	3,63	
Standard Dev.	1,11	
Variance	1,23	
Question-34		
Disabled people employment, as well as infrastructure development for their access to work		
Not at all important	71	18,02%
A little important	70	17,77%
Neutral	**118**	**29,95%**
Important	99	25,13%
Very important	36	9,14%
Total	**394**	
Mean	2,89	
Standard Dev.	1,22	
Variance	1,50	

Question-35		
Participation of women in leadership positions		
Not at all important	21	5,28%
A little important	46	11,56%
Neutral	129	32,41%
Important	**143**	**35,93%**
Very important	59	14,82%
Total	**398**	
Mean	3,43	
Standard Dev.	1,05	
Variance	1,10	
Question-36		
Employee participation in the decision-making process		
Not at all important	51	12,72%
A little important	65	16,21%
Neutral	90	22,44%
Important	**141**	**35,16%**
Very important	54	13,47%
Total	**401**	
Mean	3,21	
Standard Dev.	1,23	
Variance	1,52	
Question-37		
Service quality		
Not at all important	4	1,00%
A little important	17	4,24%
Neutral	47	11,72%
Important	144	35,91%
Very important	**189**	**47,13%**
Total	**401**	
Mean	4,24	
Standard Dev.	0,89	
Variance	0,80	

Question-38		
Facilities within the workplace (nursery, restaurant, etc.) and the existence of basic services near the workplace (schools, shops, public services, etc.)		
Not at all important	**136**	**34,26%**
A little important	78	19,65%
Neutral	69	17,38%
Important	75	18,89%
Very important	39	9,82%
Total	**397**	
Mean	2,51	
Standard Dev.	1,38	
Variance	1,91	
Question-39		
Safety at work (provision of occupational accidents, medical examinations of the workforce)		
Not at all important	28	7,05%
A little important	32	8,06%
Neutral	55	13,85%
Important	139	35,01%
Very important	**143**	**36,02%**
Total	**397**	
Mean	3,84	
Standard Dev.	1,20	
Variance	1,45	
Question-40		
Safety and quality of the public transport network (accidents restriction, adequate policing etc.)		
Not at all important	56	14,62%
A little important	60	15,67%
Neutral	73	19,06%
Important	**118**	**30,81%**
Very important	76	19,84%
Total	**383**	
Mean	3,25	
Standard Dev.	1,34	

Variance	1,79	
Question-41		
Social awareness actions		
Not at all important	55	14,21%
A little important	82	21,19%
Neutral	88	22,74%
Important	**113**	**29,20%**
Very important	49	12,66%
Total	**387**	
Mean	3,04	
Standard Dev.	1,26	
Variance	1,59	
Question-42		
Cultural heritage preservation (monuments, architectural buildings, signs, etc.)		
Not at all important	77	20,26%
A little important	69	18,16%
Neutral	74	19,47%
Important	**99**	**26,05%**
Very important	61	16,05%
Total	**380**	
Mean	3,00	
Standard Dev.	1,38	
Variance	1,91	
Question-43		
Social partner's (stakeholder's) participation in the decision – making process		
Not at all important	**98**	**25,99%**
A little important	66	17,51%
Neutral	95	25,20%
Important	97	25,73%
Very important	21	5,57%
Total	**377**	

Mean	2,68	
Standard Dev.	1,26	
Variance	1,59	
Question-44		
Workforce training		
Not at all important	15	3,76%
A little important	45	11,28%
Neutral	59	14,79%
Important	**174**	**43,61%**
Very important	106	26,57%
Total	**399**	
Mean	3,77	
Standard Dev.	1,08	
Variance	1,17	
Question-45		
Programs to support workforce physical and mental health (in order to reduce work stress and increase efficiency)		
Not at all important	**114**	**28,57%**
A little important	69	17,29%
Neutral	98	24,56%
Important	76	19,05%
Very important	42	10,53%
Total	**399**	
Mean	2,65	
Standard Dev.	1,35	
Variance	1,82	
Question-46		
Additional insurance or retirement programs		
Not at all important	**122**	**30,65%**
A little important	78	19,60%
Neutral	81	20,35%
Important	66	16,58%
Very important	51	12,81%

Total	**398**	
Mean	2,61	
Standard Dev.	1,40	
Variance	1,96	
Question-47		
Number of leave days		
Not at all important	26	6,52%
A little important	47	11,78%
Neutral	112	28,07%
Important	**141**	**35,34%**
Very important	73	18,30%
Total	**399**	
Mean	3,47	
Standard Dev.	1,12	
Variance	1,25	
Question-48		
Corruption and abuse (referring to the power and material abuse)		
Not at all important	20	5,12%
A little important	36	9,21%
Neutral	71	18,16%
Important	**136**	**34,78%**
Very important	128	32,74%
Total	**391**	
Mean	3,80	
Standard Dev.	1,15	
Variance	1,32	
Question-49		
Bureaucracy		
Not at all important	21	5,36%
A little important	34	8,67%
Neutral	74	18,88%

Important	**163**	**41,58%**
Very important	100	25,51%
Total	**392**	
Mean	3,72	
Standard Dev.	1,11	
Variance	1,24	
Question-50		
Distance travelled to the workplace		
Not at all important	66	16,75%
A little important	56	14,21%
Neutral	102	25,89%
Important	**111**	**28,17%**
Very important	59	14,97%
Total	**394**	
Mean	3,10	
Standard Dev.	1,30	
Variance	1,69	
Question-51		
Traffic congestion		
Not at all important	73	18,96%
A little important	65	16,88%
Neutral	**97**	**25,19%**
Important	88	22,86%
Very important	62	16,10%
Total	**385**	
Mean	2,99	
Standard Dev.	1,34	
Variance	1,81	
Question-52		
Quality control		
Not at all important	16	4,10%

A little important	37	9,49%
Neutral	59	15,13%
Important	**144**	**36,92%**
Very important	134	34,36%
Total	**390**	
Mean	3,88	
Standard Dev.	1,11	
Variance	1,24	
Question-53		
Renewable energy source usage		
Not at all important	85	21,74%
A little important	57	14,58%
Neutral	**102**	**26,09%**
Important	91	23,27%
Very important	56	14,32%
Total	**391**	
Mean	2,95	
Standard Dev.	1,34	
Variance	1,81	

Appendix V- The demographics of the survey

Having received 405 responses, we will state a reference to the statistical data of those who participated. We perform this demographic analysis so as to learn more about the population's characteristics and for future deductions to be made between the sample of our research and the general population (especially the number of employed in businesses and organizations). In conclusion, according to the 405 replies, the demographics of the questionnaire are analyzed in the next paragraph of this Appendix.

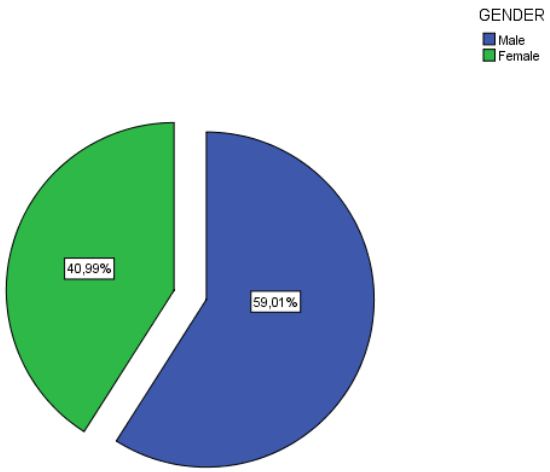
1. Gender

Beginning with the total number of the men who responded it amounts to 239 replies, while the women who responded were 166. As a result a 59% of those who responded were male respondents, while the 41% were female.

Table 1: Demographics / Gender

	Frequency	Percent	Cumulative Percent
Male	239	59,0	59,0
Female	166	41,0	100,0
Total	405	100,0	

Chart 1: Demographics / Gender



2. Age

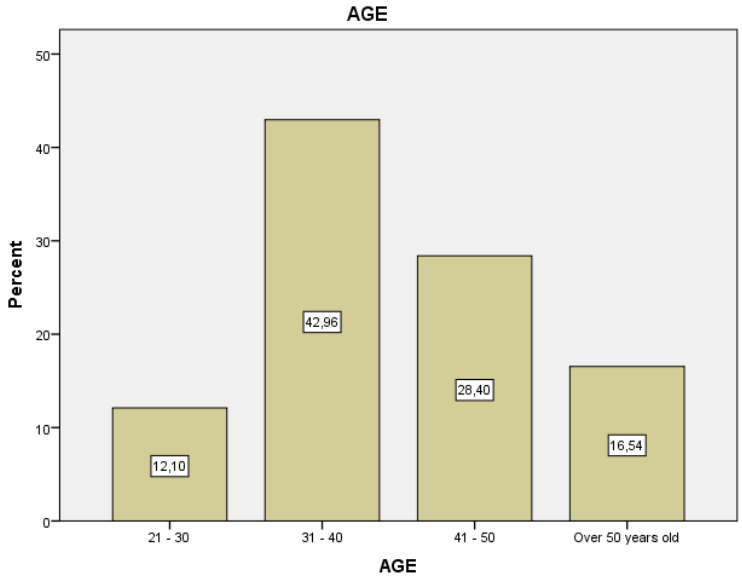
Regarding the age of the respondents, we can see that the majority is by far the age group of 31-40, where 174 respondents from the total number of 405 replied. The next group to follow is the age group of 41-50, which in turn is followed by the age group of 50 years old and over. The minority of our sample is the age group of 21 to 30 years old.

These figures are totally justifiable by the fact that our respondent's target group was oriented to senior officers and executives. As it is shown in the table below, 43% of the respondents belong to the age group of 31-40 while 28,4% belong to the age group of 41-50. These two age groups constitute the majority of the respondents with a cumulative percentage of nearly 72%.

Table 2: Demographics / Age

	Frequency	Percent	Cumulative Percent
21 - 30	49	12,1	12,1
31 - 40	174	43,0	55,1
41 - 50	115	28,4	83,5
Over 50 years old	67	16,5	100,0
Total	405	100,0	

Chart 2: Demographics / Age



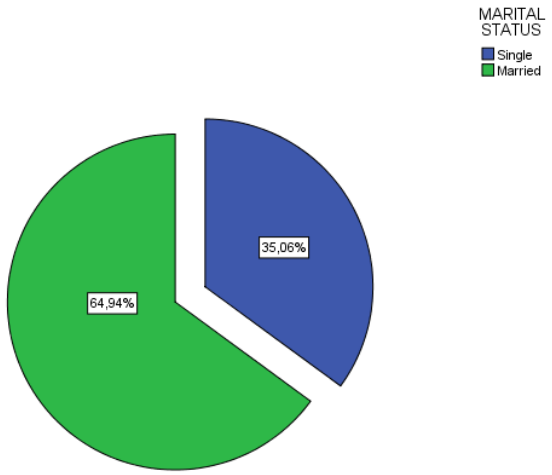
3. Marital status

Regarding the marital status of the respondents, we can see that 65% of them is married, while the single ones are nearly 35%. Having already seen that the majority of the respondents are above the 30th year of their life, it is absolutely justified that most of them are married.

Table 3: Demographics / Marital status

	Frequency	Percent	Cumulative Percent
Single	142	35,1	35,1
Married	263	64,9	100,0
Total	405	100,0	

Chart 3: Demographics / Marital status



4. Place of residence

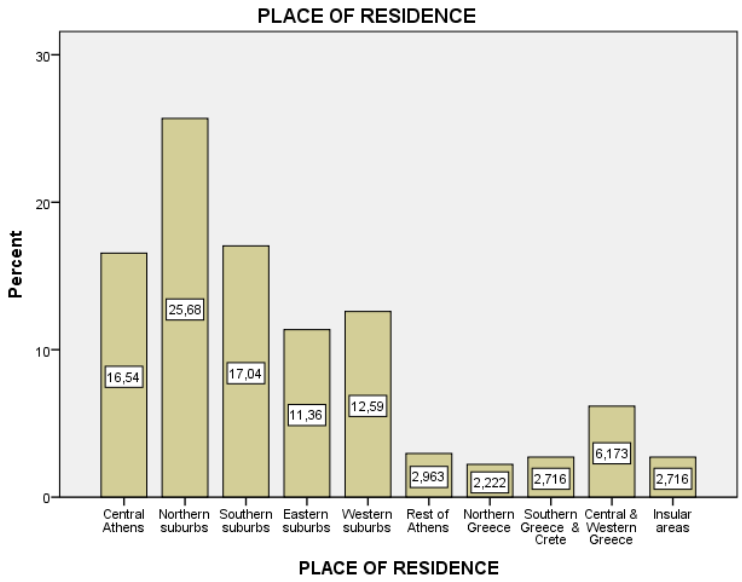
As can be clearly seen from the table below, the vast majority of the respondents lived in Athens although the questionnaire was send to all areas of Greece. Giving an explanation we could say that this is due to the fact that the majority (nearly 40%) of the population of Greece lives in the capital, Athens. However the fact that the cumulative percent of this group respondents is nearly 86% may raise issues of data fidelity. Taking this into account, a chi-square test for independence, between the "Place of residence" variable and the other categorical variables of the questionnaire

may be conducted, in order to exclude the possibility of significant correlation between the "Place of residence" and the rest of the questions.

Table 4: Demographics /Place of residence

	Frequency	Percent	Cumulative Percent
Central Athens	67	16,5	16,5
Northern suburbs of Athens	104	25,7	42,2
Southern suburbs of Athens	69	17,0	59,3
Eastern suburbs of Athens	46	11,4	70,6
Western suburbs of Athens	51	12,6	83,2
Rest of Athens	12	3,0	86,2
Northern Greece	9	2,2	88,4
Southern Greece & Crete	11	2,7	91,1
Central & Western Greece	25	6,2	97,3
Insular areas	11	2,7	100,0
Total	405	100,0	

Chart 4: Demographics / Place of residence



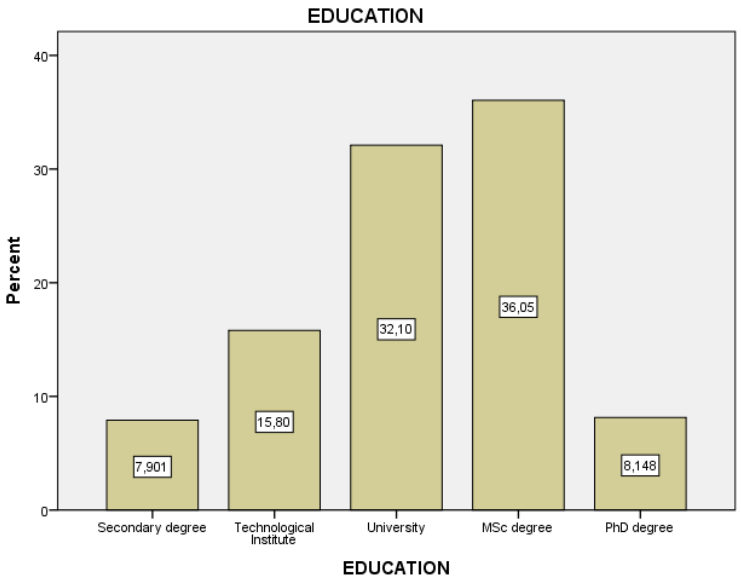
5. Educational level

Regarding the respondents' level of education, we can see that around 36 % of them have been awarded an MSc degree, while the second group is those who have a University degree. The minority in the sample is those who have a secondary level degree, who eventually are fewer than 8%. These figures are totally justifiable and verify the acceptance that the higher-level executives have usually been granted a university or an upper level degree. In our case the table that follows is indicative, as we can see that the cumulative percent of those who have awarded a university degree at least, is almost the 76% of the total.

Table 5: Demographics / Education

	Frequency	Percent	Cumulative Percent
Secondary degree	32	7,9	7,9
Technological Institute	64	15,8	23,7
University	130	32,1	55,8
MSc degree	146	36,0	91,9
PhD degree	33	8,1	100,0
Total	405	100,0	

Chart 5: Demographics / Education level



6. Specialty

Regarding the respondents' specialty, we can see that the larger part of them belong to the administrative stuff. This group consists of office workers in general, and

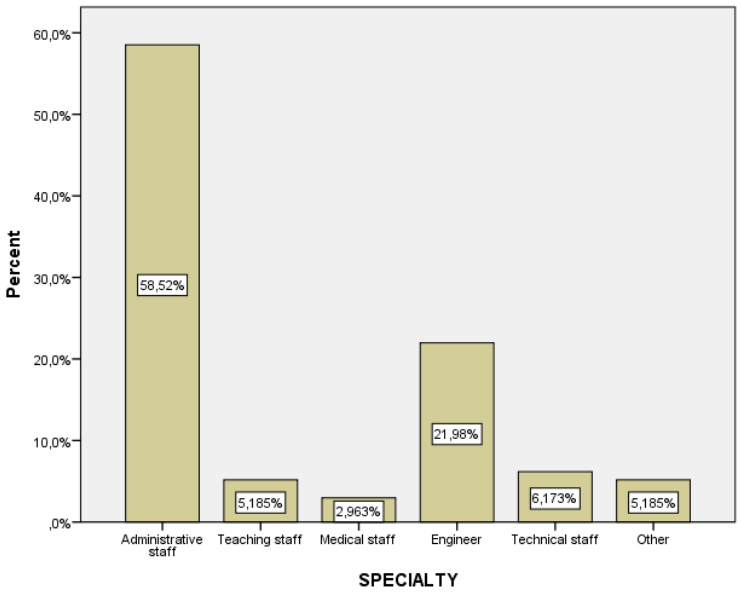
may be composed of executive officers, administrators, managers or employees. Due to the fact that the questionnaire was expected to be answered by the top management of each business, we accept as completely justified the high percentage of this group.

At this point we should clarify that the large number of the "Other" value, is mainly due to the absence of the "military staff" in the list of the corresponding choices. Consequently, we have to admit that this was an omission that should be resolved during the design of the questionnaire.

Table 6: Demographics / Specialty

	Frequency	Percent	Cumulative
Administrative staff	237	58,5	58,5
Teaching staff	21	5,2	63,7
Medical staff	12	3,0	66,7
Engineer	89	22,0	88,6
Technical staff	25	6,2	94,8
Other	21	5,2	100,0
Total	405	100,0	

Chart 6: Demographics / Specialty



7. Type of business entity

Regarding the respondents' type of business entity, we can see that the majority of the respondents work for a private company, regardless of its size. Specifically, the

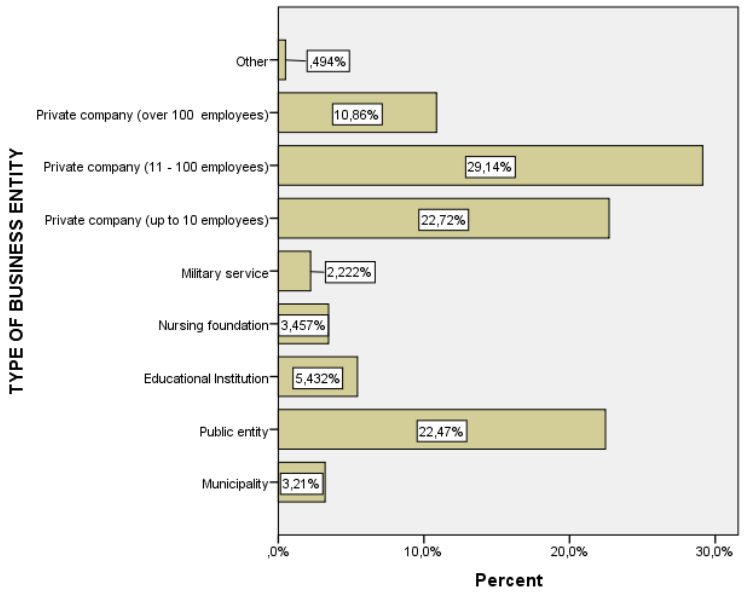
percentage of those who work in a private company is almost the 60% of the total respondents. Consequently, we understand that the rest 40% are public servants, a fact that is also confirmed by 31,1% cumulative of the top 3 categories that belong directly to the state.

At this point it is worth mentioning that, in order to give depth to the data analysis, we divided the public service to subgroups like municipalities, educational institutions and military services.

Table 7: Demographics / Type of Business Entity

	Frequency	Percent	Cumulative
Municipality	13	3,2	3,2
Public entity	91	22,5	25,7
Educational Institution	22	5,4	31,1
Nursing foundation	14	3,5	34,6
Military service	9	2,2	36,8
Private company (up to 10	92	22,7	59,5
Private company (11 - 100	118	29,1	88,6
Private company (over 100	44	10,9	99,5
Other	2	0,5	100,0
Total	405	100,0	

Chart 7: Demographics / Type of Business Entity



8. Field of activity

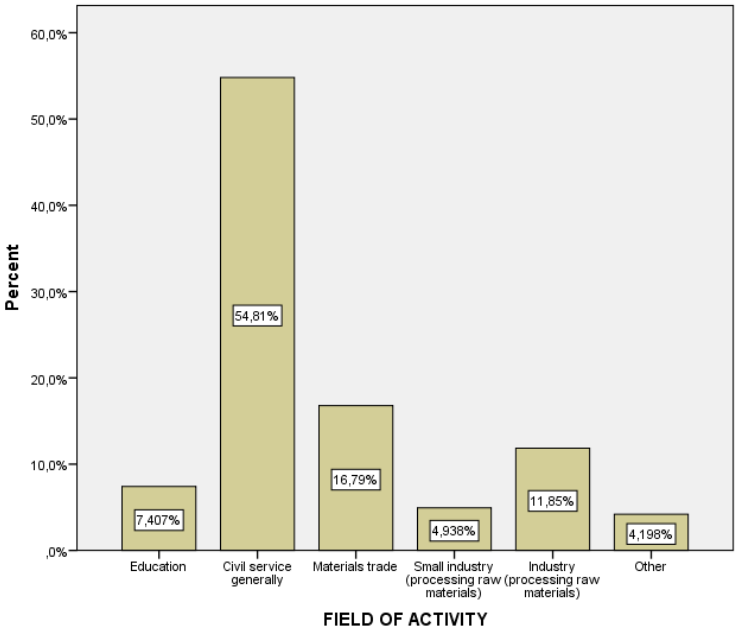
Analyzing the field of the respondent's activity, it is clear enough that the majority of them is working in the services sector, either private or public. This is justifiable, especially if we consider the character of the economy of Greece which is mainly based on the services sector.

What follows as the next group is the materials trade, while the third group is industry. At this point, we should highlight the little participation percentage of those who work for a small industry. This fact cannot be easily justified, especially if we take under consideration that the small industries in Greece are by far the majority. As for an explanation, a realistic approach would be that the interest of the small industry toward sustainable development remains low, but, in order to draw safe conclusions, further investigation is needed.

Table 8: Demographics / Field of activity

	Frequency	Percent	Cumulative
Education	30	7,4	7,4
Civil service / Services generally	222	54,8	62,2
Materials trade	68	16,8	79,0
Small industry	20	4,9	84,0
Industry	48	11,9	95,8
Other	17	4,2	100,0
Total	405	100,0	

Chart 8: Demographics / Field of activity



9. Position in the organization

Concerning the respondent's position in the organization, we may notice that the majority group is that of the employees. However, this interpretation is misleading, as over half of the participants are holding positions in the upper level in their businesses. To be more specific, we can see that the aggregate percentage of the respondents who work as top or middle level managers is 53,6%. As a consequence we may accept that this sample verifies the purpose of our survey, which mainly charges the executives of the private or public entities with the responsibility to express their opinion, expose the conditions of their working environment, concerning the implementation of sustainable development's principles and draw up a corresponding policy.

Table 9: Demographics / Position in the organization

	Frequency	Percent	Cumulative
Employee	188	46,4	46,4
Chief officer	70	17,3	63,7
Executive officer	63	15,6	79,3
Chief executive	67	16,5	95,8
Other	17	4,2	100,0
Total	405	100,0	

Chart 9: Demographics / Position in the organization