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## THE ROLE OF SUSTAINABLE FINANCE IN ACHIEVING SUSTAINABLE DEVELOPMENT GOALS

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**ABSTRACT.** In the article, the analysis of scientific literature leads to the definition of sustainable finance and identification of its types. This distinction allows for a more detailed examination of sustainable finance in different contexts, especially when only one type of sustainable finance is considered. The empirical study that has been carried out in the Baltic Sea states confirms that sustainable finance has an impact on the implementation of sustainable development goals. The countries that use more sustainable finance have better results in terms of the SDGs. The created research model reflects the sequence of data collection and the process of determining the relationship between sustainable development and sustainable finance. The correlation between the two is confirmed by the conducted research. The more sustainable is the country's financial model, the better is the implementation of sustainable development goals.

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## Introduction

The increasing environmental pollution, social inequality and economic growth at the expense of environment pose a threat to the present and future generations. The classic view that the economic growth will solve everything has become unacceptable, because infinite growth in a limited system is impossible; thus, development should be qualitative. The concept of sustainable development that was formed in the 1960s has received a lot of attention and has become an inseparable part of governments and companies. It has been increasingly introduced as the correct path towards the future that will ensure everyone's well-being. Unfortunately, this complex concept encompasses many different areas, and its implementation is not as simple

as it would seem at first. The fact that there is no single definition of sustainable development is a testament to the variety of opinions and different approaches to the development.

Sustainable development has been analysed from different perspectives, but the general consensus is that the most important sustainable development dimensions are economy, environment and society. Over the time, sustainable development transitioned from a simple idea to an action plan, first, with 8 goals, and now, with 17 goals, that encompasses the whole world. The research on the topic has been gradually growing in number and scope. It is clear that sustainable development is very important today and will be even more important tomorrow; thus, it is necessary to understand the essence of this process and fulfil the expectations of humanity successfully. The implementation of sustainable development goals in the presence of climate change, social exclusion and increasing inequality is a priority to the governments worldwide. At the same time, it is impossible to fund the SDGs without the resources. Sustainable finance is one of the means for achieving this purpose; it is a kind of investment that encompasses economic, social and environmental aspects. Sustainable finance makes it possible to transition towards a competitive low-carbon economy. However, since sustainable financial systems and sustainable financial models are still being created, it is a fairly new concept, the implementation of which raises many questions that scientists try to answer.

The aim of the article is to determine the influence of sustainable finance on the implementation of sustainable development goals.

## **1. Literature review**

The financial resources are necessary when trying to implement the set goals, which have been discussed in the United Nations Sustainable Development Summit 2015. During the summit, it has been agreed that the public sector resources of countries, national and international business investments, resources of public and international cooperation organisations and borrowed funds will be used for the implementation of sustainable development goals (Addis Ababa Action Agenda, 2015). According to Gester (2011), the financial sector plays an important role in economics, and in order to cause changes, there is no possibility to implement them without including banking and finance. Sustainability raises challenges for the main financial activities (management, products and processes) and philanthropy, and company's social responsibility forms only a limited part of the change. Banks or intermediaries that provide financial services are becoming more aware that sustainable policy has a positive potential in the financial sector: sustainability can reduce costs, increase income, reduce risks, develop human capital and increase the availability of the capital. Wilson (2010) agrees that finance should be used sustainably, aiming to create economic activities that would not reduce future economic activities and industrial capacities, but notices that the concept of the financial sector and sustainability is in an important stage of development that does not have a clear path, directions or examples, and this raises difficulties.

Traditional finance, according to Fullwiler (2015), is insufficient and unsuitable for the implementation of sustainable development goals, because it does not consider three-dimensional sustainable development perspective, including environmental and social issues. According to the scholar, sustainable finance can help to create more general finance theory, providing a starting point for the analysis of projects, portfolio management, business assessment, shareholder interaction and public sector policy analysis that encompasses social and ecological nature of finance. When a more general finance theory assesses sustainability and punishes for pollution, the markets will have to take measures as well. Ziolo et al. (2019) agree that the traditional finance paradigm is inadequate and inconsistent in comparison to the

changes appearing in economics, especially the ones related to the increasing threat of social and environmental risks. The transformation of traditional carbon-high economics into carbon-low economy requires traditional financial system to become more ecological (Chen, 2013). Schoenmaker (2017) states that following the United Nations sustainable development goals, sustainable development becomes a common responsibility of governments, companies and citizens and makes it impossible to disregard sustainability in strategy and finance.

Levine (2005) has determined the following functions of finance:

- 1) Prepare information about possible investments and allocate capital in advance;
- 2) Monitor investments and implement corporate governance after funding;
- 3) Facilitate trading, diversification and risk management;
- 4) Mobilize and pool savings;
- 5) Ease the exchange of goods and services.

According to Schoenmaker (2017), the first three functions are especially important for sustainable finance. The scholar states that the main objective of the financial system is to allocate funding to achieve its most productive use, and the funding can help to make strategic decisions related to the implementation of sustainable development goals. The investments during the implementation of the project have an impact on the environment, society or economy, and even a profitable project can have a negative effect that will appear in the long-term. The attitudes of investors as well have an impact on the implementation of sustainability, because it is possible to choose sustainable companies for investing. Due to this reason, finances have to regard sustainability dimensions.

According to Aspinnall, Jones, McNeill, Werner and Zalk (2018), when creating an understanding of what is waiting in the future, people inevitably base it on the past, but it is already known that what is perceived today as a norm, will be unacceptable in the future. Thus, it is necessary to understand the risk of finance that may emerge in the long-term, especially due to the environment and suitability issues. Finance can help to evaluate future money flow risks, and due to the environmental problems caused uncertainties, risk management can help to reduce or even solve these uncertainties (Schoenmaker, 2017; Jarrah et al., 2022; Govender & Hassen-Bootha, 2022; Alawaqleh et al., 2022; Jubril et al., 2022). Scholtens (2006) distinguishes finances, especially socially responsible investments, as the engine of sustainability. He states that everything is related, because economic production influences environmental activities, and financial development is intertwined with economic development. Efficiently working financial markets ensure effective movement of capital in the economy by reducing financial risk and ensuring stable funding of the real economy (Arestis cited in Ziolo et al., 2019). However, the weakness of finance is that it is an in-between link facilitating economic operations. Finally, when receiving investment, the success or failure of the project from the financial perspective is reviewed, and in the case of socially responsible investment, the non-financial results have to be taken into consideration as well (Scholtens, 2006).

Even in recent decades, most of the institutions stress that the financial institutions have to integrate the aspects of environmental, social and corporate governance (ESG) into the decision-making processes, aiming to reduce ESG risks. However, there still remains a gap between sustainable development and many financial markets, and the main difference between them is that the perspective of sustainable development is multiple and holistic, and the financial sector aims at one-dimensional goal, i.e., to maximize the financial profit (Pisano & Martinuzzi Bruckner, 2012).

According to Pisano et al. (2012), there still is a huge gap between sustainable development and many actions of financial markets. Sustainability is related to the future; thus, the main challenge is a fairly long period (Schoenmaker, 2017; Cavagnetto et al., 2022; Kim et al., 2023). Vandekerckhove and Leys (2012) state that first of all, the questions that have to be

reviewed in order to reduce the gap should be determined. Moreover, better sustainable development indicators are necessary for analysing goals as well as various proposals for sustainable finance strategies and investments. Sustainable finance creates a concept and certain response to the challenges of financial market and sustainable development related to funding (Ziolo et al., 2019; Aliamutu et al., 2023). According to Schoemaker and Schramade (2019), the use of finances as a means to achieve social goals can change the direction of the economy from the present path to the sustainable world.

Schoemaker and Schramade (2019) state that funding should complement successful sustainable development due to the following reasons:

- Finance can play the main role when allocating investment for sustainable enterprises or projects and in such a way accelerate the shift towards the circular economy;
- Sustainable finance analyses how finance (investment and loans) interact with economic, social and environmental issues;
- When allocating funds, finance can help to make strategic decisions about sustainable goals;
- Investors can influence companies in which they invest and in such a way can direct them towards sustainable business practice;
- Finance assesses the pricing risk and can help to solve uncertainties peculiar to the environmental questions;
- Finance and sustainability look into the future.

According to Schoemaker and Schramade (2019), traditional financial system is based on the linear production and consumption processes and fixed government budgets for various sectors that aim to create financial value. Whereas the aim of sustainable finance is the creation of long-term value that is shown in Figure 1.

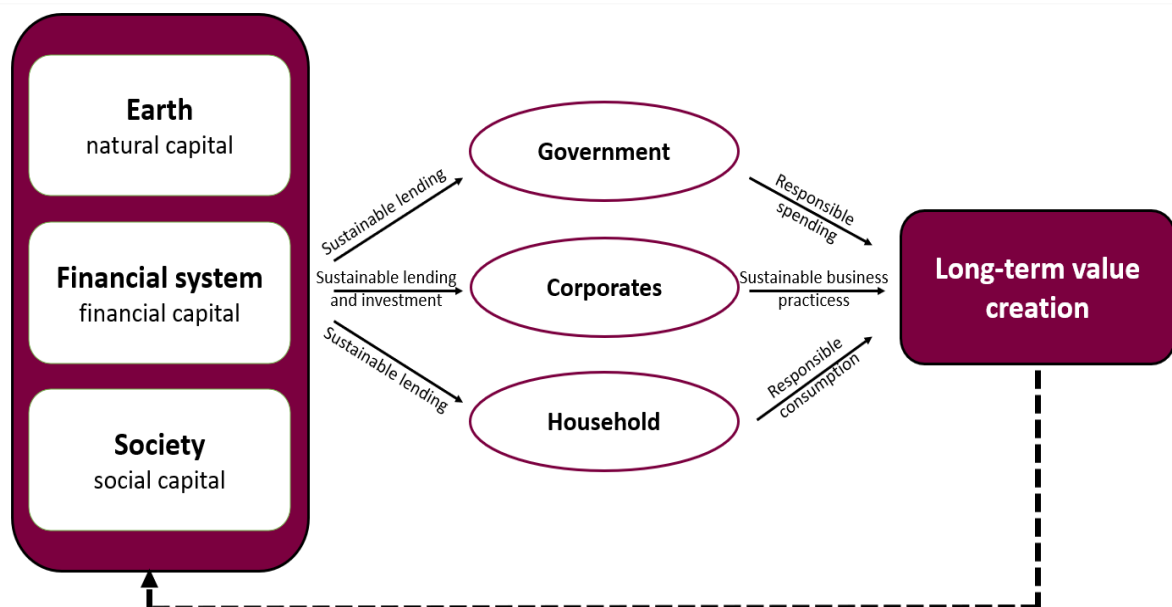


Figure 1. System of sustainable finance

Source: created by the authors based on Schoenmaner, D. and Schramade, W. (2019).

When producing and consuming, it is important to consider and integrate natural, social and financial capital all together. When analysing this figure on the basis of finance, the main participants (government, corporates and household) receive capital from investment and

lending, and it is used sustainably and responsibly. Finally, the obtained result is the creation of long-term value that corresponds to the implementation of sustainable development goals before 2030 and is an appropriate perspective for all the participants of the system. The dashed line reflects the feedback, because in this cycle, the creation of long-term value helped to preserve natural, social and financial capital (Schoenmaker & Schramade, 2019).

Fullwiler (2015) has a similar view that the financial area, which is developing towards sustainable finance, allows to incorporate social and environmental aspects that are correlating with sustainable development pillars into the general finance theory. Sustainable finance should be an alternative to the traditional finance and could be transferred in order to ensure the welfare and prosperity of the world economics (Rebai, Azaiez, Saidane cited in Ziolo et al., 2019). Ziolo et al. (2019) stress that sustainability encompasses all types of finances, and these types are displayed in Figure 2.

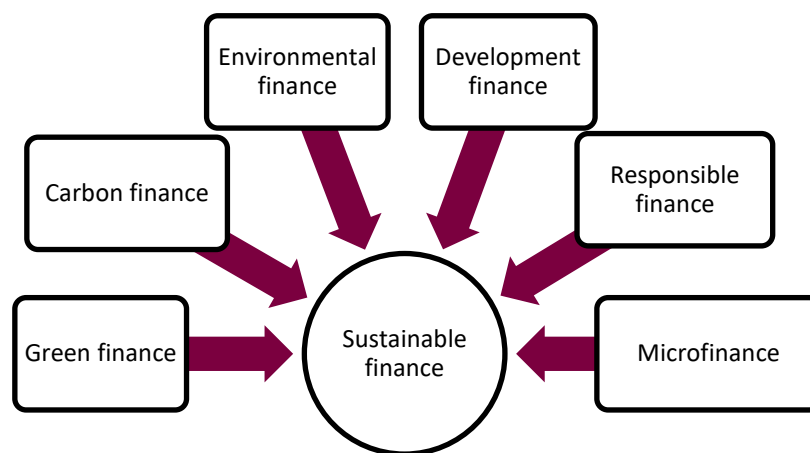


Figure 2. Types of sustainable finance

Source: created by the authors based on Ziolo, M., Filipiak, B. Z., Bak, I., Cheba, K., Tirca, D. M., and Novo-Corti, I. (2019).

Traditional finance usually has a negative impact on the environment, and green finance, on the contrary, connects the business world with the environmentally friendly behaviour (Wang, Zhi, 2016). Carbon finance reduces the effect of carbon dioxide emissions on health and climate (Simon, Bumpus & Mann, 2012) and in such a way supports the decarbonization processes. According to Nyangon (2016): “Environmental finance touches almost every aspect of market, business models, regulations, public finance, and infrastructure development”. It encompasses green finance and carbon finance. Whereas the development finance is related to the financial aspects of economic development and refers to the public funding. Loans or grants from governments, official government aid agencies and inter-governmental organizations that are mainly intended to promote economic development and welfare of developing countries are defined as development finance (Tierney et al., 2011). Microfinance reduces the consequences of social exclusion by providing financial services for low-income individuals (Ravi, 2012; Hazudin et al., 2022; Adda et al., 2021), and responsible finance influences environmental as well as social activities due to the investment (Scholtens, Cerin & Hassel, 2008). Finally, all mentioned types compose sustainable finance, which Schoenmaker (2017) describes as considering how finance (investment and loans) interrelate with economic, social and environmental issues. Thus, sustainable finance encompasses the components of sustainable development; therefore, the more sustainable finance tools will be incorporated into the financial system, the bigger will be the reaction to the negative external influences, and this will help to achieve sustainable development goals (Ziolo et al., 2019).

Schoenmaker (2017), when explaining sustainable finance, assess financial, social and environmental return all together. According to Soppe (2009), the core element of sustainable finance concept is a three-dimensional goal, and finance is a more limiting variable. In order to exist in a market economy, viability and continuity are necessary, but sustainability exceeds these goals. A company and its shareholders commit to achieve all activity results, including social and environmental goals. Except for the previously listed types of finance, they should be distinguished according to their use in public or private financial systems (Ziolo et al., 2019):

- In the public financial system, such means can be distinguished: environmental taxes, sustainable fiscal policy and public expenditures that support the funding of sustainable development.
- In the private (market) financial system, there are such means as green financial products having a positive influence on the environmental quality and microfinance, supporting social inclusion.

To sum up, having understood that traditional finance is becoming ineffective in the contemporary economics, in order to develop sustainably, according to scientists, sustainable finance is becoming more important and compulsory. There has already been distinguished many types of finance that can help to implement different areas of sustainable development. Most of them are intended for the environmental protection; however, due to the importance of all fields, there have been distinguished sustainable finance that encompasses the welfare of economy, environment and society.

“Finance can accelerate the transition to a low-carbon economy” (Schoenmaker, 2017, p. 49). However, the impact of economic activities on society, especially on the environment, usually appears in the long-run, and the time period, towards which the managers and investors orient in traditional finance, is usually short-term. Thus, even though the application of sustainable business and finance practice is an important step towards sustainable development, it may be not enough due to two reasons (Schoenmaker, 2017):

- 1) It is mistakenly thought that if something is right for everyone (micro-level), then it will be right for the whole (macro-level). Even though individual companies apply the principles of sustainable development, it is unclear whether the limits of planet will be exceeded.
- 2) The borders of countries cause challenges for including external factors. After strengthening one sector’s regulation, the business will transfer into other sectors or countries that have less stringent requirements or have none at all.

Regardless of that, according to Zorlu (2018), the financial system has a huge potential to help sustainable investments in such scale and speed that is compatible with the Paris Agreement and sustainable development goals. However, the political actions that would strengthen the driving forces of the real economy and create favourable conditions for sustainable investments are necessary. Understanding the necessity of changes; the author distinguishes the following means that can improve funding when considering sustainability:

- 1) Strengthening cooperation. Political support, which would aim to ensure closer cooperation between the main market participants and regulatory participants of the financial sector and provide opportunities for them to think wider about the national and commercial interests, is necessary. An example of regional cooperation is the European Union’s High Level Expert Group (EU HLEG, 2018) that creates a combined financial system, which determines stability, sustainability and climate goals together with the financial sector. The governments should apply targeted financial regulatory interventions, including disclosure of better-quality information about the ESG and climate related risks.

- 2) Adapting financial system to the sustainable development goals and correcting inadequate pricing. International Monetary Fund and the World Bank should start to integrate sustainability aspects into their supervision mechanisms of the world financial system. Whereas the governments should provide long-term political signals to the investors, financiers and businesses in order to deal with the short-term perspective, for example, by creating sustainable national infrastructure and plans for raising capital. Moreover, wide level responsibility is necessary in order to solve the incompatibility issues. The companies should include case analysis and testing under the most unfavourable conditions into their strategies (Schoenmaker, 2017).
- 3) Strengthening assigned duties and revealing information. Regulatory authorities should explain the legal systems intended to integrate sustainability-related risks and opportunities, and companies and financial institutions should reveal how they integrate sustainability, ESG issues and climate-related risks into their strategies and investment solutions. Insurance companies and pension funds should consult with their beneficiaries about sustainability priorities and reflect them in the fund investment strategy.
- 4) Correcting information asymmetry. The multilateral interconnected networks should be strengthened between the financial regulatory authorities, central banks, in order to achieve closer technical cooperation. The Network of Central Banks and Supervisors for Greening the Financial System (NGFS, 2019) that was founded in 2017 is a great example of strengthening abilities and capabilities of participating financial institutions. The measures (guidelines for financial institutions, expectations for the industry) for observing and assessing financial flows and their effects are necessary.

Sustainable finance usually encompasses the already mentioned means. The EU High Level Expert Group (EU HLEG, 2018) states that sustainable finance is related to two necessities. The first one is to increase the financial input into sustainable and integrated growth by funding the long-term innovation and infrastructure needs of the society and speeding the transition into low-carbon, resource-efficient economy. The second one is to strengthen the financial stability and asset pricing by improving the assessment and management of long-term material risk and intangible value creation factors, including the ones related the environmental, social and governance ESG factors.

When analysing sustainable finance from the perspective of sustainable development, it is important to review how the finances can be implemented in the real market and what are their possible models. It is known that sustainability could be weak or strong, and sustainable finance could differ as well. Schoenmaker (2017) has proposed a sustainable finance framework based on the sustainable financial models. He distinguishes three groups of sustainable finance, and their comparisons with the traditional finances are displayed in Table 1.

Table 1. Framework for sustainable finance

Sustainable finance typology	Value created	Ranking of factors	Horizon
Traditional finance	Shareholder value	F	Short term
Sustainable finance 1.0 (TF 1.0)	Shareholder value (re-calculated compared with traditional finance)	$F > S$ and E	Short term
Sustainable finance 2.0 (TF 2.0)	Shareholder value	$I = F + S + E$	Medium term
Sustainable finance 3.0 (TF 3.0)	Common value	$S$ and $E > F$	Long term

F – financial value, S – social impact, E – environmental impact, I – integrated value.

Source: Schoenmaker, D. (2017)

From the traditional perspective, companies apply the framework when the focus is on the shareholders that are maximising the profit and looking for the optimal financial return and risk combination. The author stresses that even though the shareholder value should be as well assessed in medium and long-term periods, there are determined short-term encouragement means, i.e., quarterly financial reports, monthly/quarterly benchmarking of investment performance.

TF 1.0 Profit maximisation while avoiding ‘sin’ stocks. When aiming at sustainable finance, financial institutions should avoid investing in companies with negative impacts. From the social perspective, they include companies that sell tobacco, weapons or exploit child labour. In the environmental field, these are the classic examples of negative impacts: waste dumping and animal hunting, and some financial institutions include coal and other fossil fuels because of the carbon emissions. The limiting of investment can influence the determination of limit of set standards. However, the effect of limiting investments does not guarantee sustainability, because if the financial institutions refuse to support, other sources of funding are possible (retained earnings, debt financing), and the main aim still remains economic, i.e., to increase profit, market positions, competitiveness and shareholder value. Regardless of the increasing short-term shareholder value and profit maximisation, TF 1.0 still leads into a better direction, because the shareholders can start to change, and due to the funding possibilities, consider emission management, sustainable purchasing and retirement occupation systems if they want to get funding.

TF 2.0 Internalisation of externalities to avoid risk. The financial institutions at this level explicitly incorporate negative social and environmental externalities into their decision-making. From medium to long-term periods, these externalities might become priced in a form of tax or impact institution’s reputation negatively. The incorporation of externalities reduces the risk that the financial investments will become unviable, and this in turn increases the trust and company’s reputation. Attaching the financial value to the social and environmental impacts facilitates the optimisation process among different aspects (F, S, E); thus, the integrated value (I) could be determined by integrating financial, social and environmental values. Financial institutions and companies use a private discount factor (that is higher than the public discount factor) to discount future cash flows. As the effect on the environment and society is revealed only in the long-term and is more uncertain than the financial effect, private discount factor leads to smaller social and environmental value than the financial value.

Thus, when calculating the integrated value, first, the financial value (F) is calculated, and the social (S) and environmental (E) impacts are monetized. Then, the obtained values are summed, and the integrated value (I) is obtained. Due to the investments, the companies can reduce the negative social and environmental impact by improving their production process,



due to which, as it can be seen in Figure 3, the financial value reduces, but the negative social and environmental impacts reduce as well; thus, the integrated value in the final result is higher.

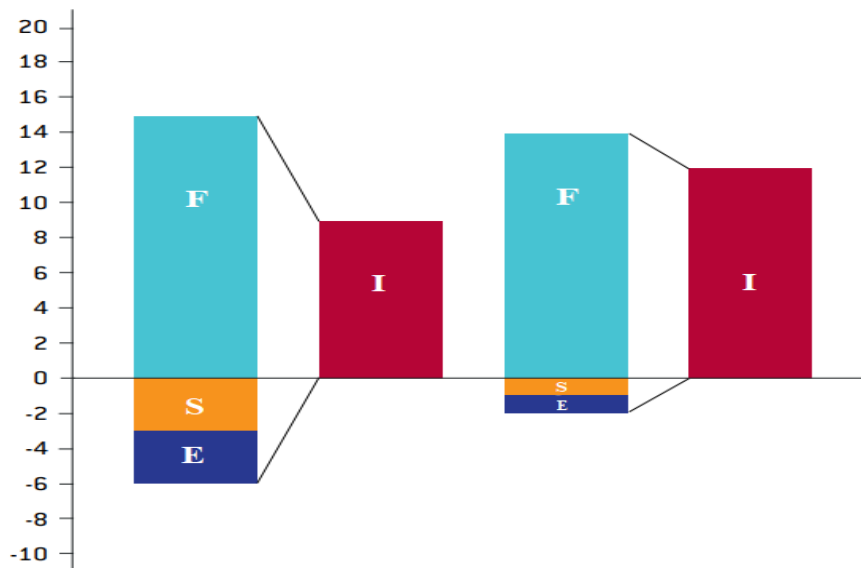


Figure 3. Financial value change into integrated value

Source: Schoenmaker, D. (2017).

In order to avoid the risk when the old management methods will no longer be effective, the companies could help to include the externalities before it is done by the government (pricing, regulation), the employees (strike, talent drain) or the public (reputation). However, it is known that it is not possible to monetize the ethical externalities, such as human rights, health and safety. In order to have a starting point, social-environmental value cannot be reduced compared to its initial value, because otherwise, it will allow calculating the impact of externalities. Finally, it has been distinguished that companies could include stakeholders in the application of true-value methodology in order to form a more inclusive risk understanding and social and environmental impact values. The stakeholders encompass direct stakeholders (shareholders, suppliers, employees and clients) as well as indirect stakeholders (society, environment).

TF 3.0 Contributing to sustainable development, while observing financial viability. The financial institutions, rather than avoiding unsustainable companies from a risk perspective, invest only in sustainable companies and projects due to the possible opportunities. In this approach, finance becomes a means to foster sustainable development by funding healthcare, green buildings, wind farms, electric car manufacturers and land-reuse projects. The starting point is the selection of investment projects based on their potential to generate positive social and environmental impacts. In this way, the financial system serves the sustainable development agenda from medium to long term. An important component of sustainable development is economics and financial viability, which remains important in investing. It is clear that sustainable investing usually provides a smaller return; however, the role of social preferences is becoming more important, which is shown by their interest in socially responsible investment funds. It is still unclear what will be the ultimate effect on the financial return, because if all investors transition towards sustainable development, there will be less chances of negative financial returns because of the extreme weather conditions. However, companies, that are aiming to remain in the market are operating by following certain limits and norms that the society perceives as socially acceptable behaviour, including following social and

environmental standards. When there is a lack of financial resources, the projects might be stopped, regardless of the positive return from the sustainability perspective. In comparison to the traditional finance, the core difference is that the role of TF 3.0 finance transitions from leading (i.e., profit maximisation) to serving (means to implement sustainable development).

According to Schoenmaker (2017), the first step towards sustainable finance (TF 1.0) would be for the financial institutions to avoid investing in companies with negative impacts (tobacco, criminal groups, whale hunters etc.). When social and environmental aspects are included in the stakeholder model, it is possible to transition to TF 2.0. Finally, it is possible to transition from risk to opportunities: leaders tend to invest more frequently in sustainable companies and projects, aiming to create value for a broader community (TF 3.0).

To sum up, it is possible to state that regarding the environmental degradation, the financial input in sustainable growth and reduction of climate change are stressed, and all sustainability dimensions are included. According to sustainability, sustainable finances can be subdivided into three groups; however, there are still some obstacles. Regardless, it is stressed that sustainable finances are oriented towards long-term period; thus, their positive impact on economy, environment and society should be seen in the future. Sustainable finance reflects sustainable development dimensions and is a means that can be used for the implementation of sustainable development goals.

## **2. Study framework and methods**

Usually, most sustainability development researches include traditional finance. This is because sustainable finance is only gaining popularity, and what has been noticed from the literature analysis, there is no single definition of it, which shows the novelty and relevance of the field. It is understandable that it is difficult to group finances of the countries into sustainable, more sustainable and the most sustainable; however, it is possible to test the framework created by Schoenmaker (2017), which has already been reviewed in the literature section, by conducting the research and testing whether the distribution of finances according to sustainability would be valuable for the implementation of sustainable development goals.

There have been used qualitative as well as quantitative research methods in the scientific researches. The researches analysing country's achievements in implementing sustainable development and employed financial instruments are based on the statistical data from the statistical databases, financial reports, policy documents, programs of non-governmental organizations and governments. Kuznets curve is used when determining the growth rates in time; the method of least-squares or the method of correlation coefficient inverse matrix are used when assessing the impact. The standardized sum method, correlation and regression analyses are used in researches, determining the relation between the analysed variables.

As this research aims to determine the influence of sustainable finance on the implementation of sustainable development goals, it is necessary to analyse the relation between the mentioned variables. Thus, in order to conduct this research, it was planned to employ the method of standardized sum, which would help to collect data, systematize and compare it with the research conducted by Ziolo et al. (2020). Then, the gather data will be subdivided into four groups, depending on the occupied place among the analysed countries, in order to find out which country implements sustainable development goals best and which model of sustainable finance is used in that country. The calculation of the correlation between sustainable development goals and sustainable finance will help to determine the existing connection, and the regression will reveal p value, which in turn discloses whether the obtained results are statistically significant. The research framework is shown in Figure 3.

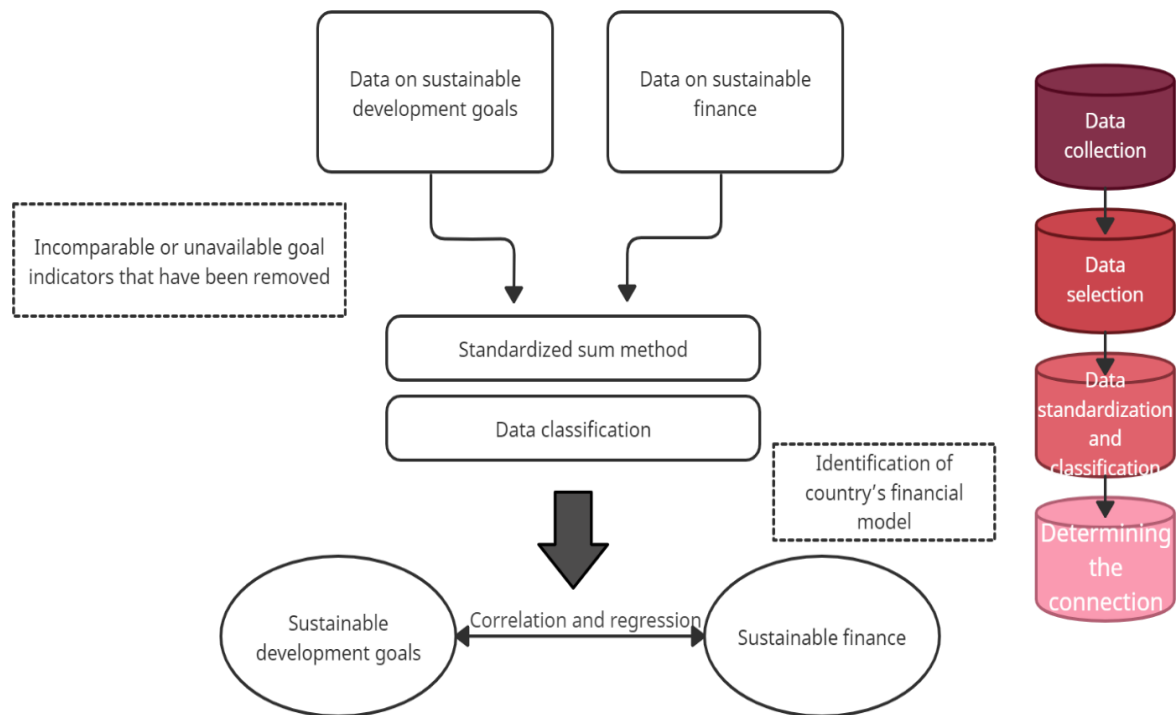


Figure 4. Research model to determine the role of sustainable finance in achieving sustainable development goals

Source: created by the authors

As it can be seen from Figure 4, first of all, data should be collected. As there are two sets of data, their sources differ. The data on sustainable development goals will be collected from the statistical database “Eurostat”, and the financial indicators of countries are collected from the “Organization for Economic Cooperation and Development”, “World Bank” and other institutions that collect and provide financial statistics. Some of the collected data could include the average of all EU countries; such indicators should be removed; thus, the selection of data is necessary. The collected data should be standardized that it could be compared and subdivided into groups, i.e., classified according to the results. After collecting and standardizing the necessary data, it will be possible to determine whether there exists a connection and if it does, whether the dependence is positive or negative. Finally, when the connection is determined, the raised hypothesis can be rejected or confirmed.

After reviewing theoretical as well as empirical material that has been collected, it has been observed that scientists usually state that the connection between sustainable finance and sustainable development goals exists; thus, this work aims to test scientists’ statements and research the existence of connection in practice and find out whether this statement as well applies to the Baltic Sea region, including Lithuania. Thus, the main hypothesis of this research is that the more sustainable is the country’s financial model, the better is the implementation of sustainable development goals. This hypothesis could be represented graphically.

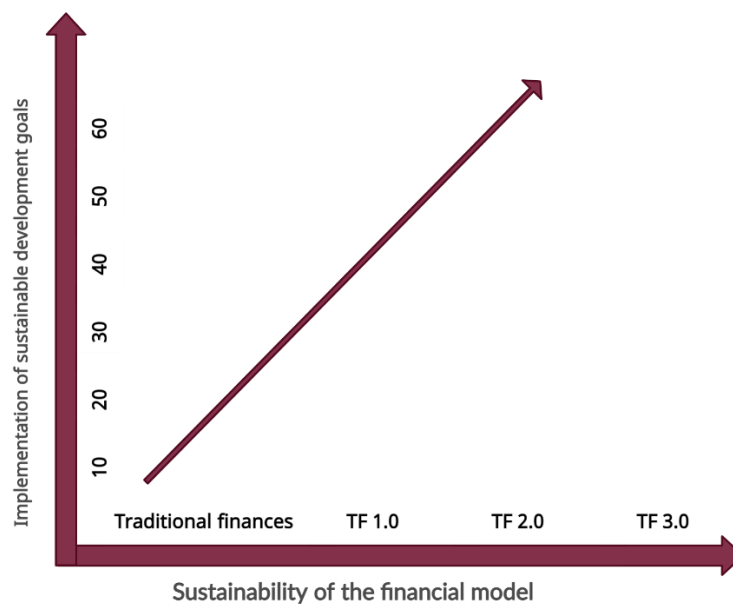


Figure 5. Dependence between financial model and implementation of sustainable development goals

Source: created by the authors.

As it could be seen from the diagram, according to the hypothesis, the more sustainable is the financial model, the better is the implementation of sustainable development goals. In the diagram, the letter A stands for the best the implementation of sustainable development goals, and D stands for the worst; thus, the achievements of countries will be reflected in this research in the context of the analysed subjects and not the whole world.

The research aims to reveal whether the use of sustainable finance can help to implement sustainable development goals better than the traditional finance.

The aim of the research is to determine the role of sustainable finance in the implementation of sustainable development goals in the Baltic Sea countries.

Sample of the research. The Baltic Sea countries, which include 9 countries: Denmark, Estonia, Latvia, Poland, Lithuania, Russia, Finland, Sweden and Germany, have been chosen for the research. These countries have been connected by political, economic, cultural and historical relations and have been taking care of the Baltic Sea according to the Convention on the Protection of the Marine Environment of the Baltic Sea Area (Spečiūnas, 2021). Due to the lack of data, it has been determined not to include Russia into the research; thus, only the Baltic Sea countries belonging to the European Union remained.

Method of the research. Quantitative method has been chosen for the research, during which the data was gathered from the statistical websites. For the implementation of sustainable development goals, the European Commission has been compiling data on each country's achievements in implementing every goal, providing statistics in the annual publications and each year's progress in the Eurostat database. Quantitative researches are used in order to reveal the true tendencies and statistical truth (Kardelis, 2016). This type of research is representative; the obtained data can be standardised, and this allows to compare the results with other researches (Cochen, Manion & Morrison, 2007). The collected data will be processed with Microsoft Office Excel program and displayed in a table. In order to determine the statistical connection between the financial model and the implementation of sustainable development goals, the correlation analysis will be used.

It should be not forgotten that the world pandemic has influenced the implementation of sustainable development goals. It has been stated in the Sustainable Development Report 2020, that due to the COVID-19, the economy is experiencing deep and growing crisis; the inequality within and among countries is increasing; the poverty and famine are increasing as well as the global tension. Antonio Guterres, the Secretary-General of the United Nations, has named this crisis as “the most challenging crisis we have faced since the Second World War and the worst economic fallout since the Great Depression in 1930”. It has been distinguished as well that the pandemic had the most negative short-term influence on the goals 1, 2, 3, 8 and 10 (Sachs et al., 2020). Even though pandemic was an obstacle to the sustainable development, the sustainable development goals together with the 2030 Agenda and Paris Climate Agreement provide a suitable direction towards developing and overcoming difficulties. Thus, COVID-19 should not provide a long-term slowdown effect on the achievement of sustainable development goals (Sachs, Kroll, Lafortune, Fuller & Woelm, 2021; Petrushenko et al., 2022).

Three Nordic countries: Finland, Sweden and Denmark, are leading in the implementation of sustainable development goals during the pandemic; however, they are still facing big challenges when trying to achieve goals. Even before the pandemic, low-income developing countries faced the lack of funding when implementing sustainable development goals. The International Monetary Fund has calculated that in order to achieve the goals before 2030, the developing countries should increase spending for the implementation of goals by 12% of GDP (Gaspar et al., 2019, p. 13). The pandemic has increased the shortage of funding, and the caused economic disasters resulted in two-year delay in implementing sustainable development goals. It has been calculated that the need for additional spending has reached 14% of GDP each year, which is 21% higher when it was assessed in 2019 (Benedek, Gemayel, Senhadji & Tieman, 2021). However, it is easier for the developed countries with high income to borrow, and their creditworthiness is higher than the developing low-income countries, which influences country’s recovery after the pandemic. The wealthy countries recover after the recession more quickly than the poor countries. Due to this reason, when calculating the results, the data of 2019 have been chosen, which would allow distancing from COVID-19 and assessing the role of sustainable finance before the pandemic that caused disturbances in implementing sustainable development goals.

There have been composed two sets of data when analysing the connections between sustainable development and finance, i.e., 1) indicators of sustainable development goals and 2) country’s financial indicators.

In order to obtain the first data, the indicators that the European Commission used when assessing the progress in implementing the newest sustainable development strategy, i.e., the 2030 Agenda, have been employed. The data on 2019 from the Eurostat statistical database have been analysed that showcase each country’s achievements in implementing every goal. The abbreviated indicators of goals and their effects, where S – stimulant, D – destimulant, are described in Table 2, and all indicators with more detailed descriptions are provided in the appendixes.

**Table 2. Sustainable development goals and indicators to calculate them**

	Name of the goal	Abbreviation	Used indicators
Goal 1	End poverty in all its forms everywhere	SDG1	SDG_01_10, D; SDG_01_20, D; SDG_01_30, D; SDG_01_40, D; SDG_01_41, D; SDG_01_60, D.
Goal 2	End hunger, achieve food security and improved nutrition and promote sustainable agriculture	SDG2	SDG_02_10, D; SDG_02_20, S; SDG_02_30, S; SDG_02_40, S; SDG_02_51, D; SDG_02_60, D.
Goal 3	Ensure healthy lives and promote well-being for all at all ages	SDG3	SDG_03_11, S; SDG_03_20, S; SDG_03_30, D; SDG_03_40, D; SDG_03_42, D; SDG_03_60, D.
Goal 4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	SDG4	SDG_04_10, D; SDG_04_20, S; SDG_04_31, S; SDG_04_40, D; SDG_04_60, S; SDG_04_70, S.
Goal 5	Achieve gender equality and empower all women and girls	SDG5	SDG_05_10, D; SDG_05_20, D; SDG_05_30, D; SDG_05_40, D; SDG_05_50, S; SDG_05_60, S.
Goal 6	Ensure access to water and sanitation for all	SDG6	SDG_06_10, D; SDG_06_20, S; SDG_06_30, D; SDG_06_40, D; SDG_06_50, D; SDG_06_60, D.
Goal 7	Ensure access to affordable, reliable, sustainable and modern energy	SDG7	SDG_07_10, D; SDG_07_20, D; SDG_07_30, S; SDG_07_40, S; SDG_07_50, D; SDG_07_60, D.
Goal 8	Promote inclusive and sustainable economic growth, employment and decent work for all	SDG8	SDG_08_10, S; SDG_08_11, S; SDG_08_20, D; SDG_08_30, S; SDG_08_40, D; SDG_08_60, D.
Goal 9	Build resilient infrastructure, promote sustainable industrialisation and foster innovation	SDG9	SDG_09_10, S; SDG_09_30, S; SDG_09_40, S; SDG_09_50, S; SDG_09_60, S; SDG_09_70, D.
Goal 10	Reduce inequality within and among countries	SDG10	SDG_10_10, S; SDG_10_20, S; SDG_10_30, D; SDG_10_41, D; SDG_10_50, S; SDG_10_60, D.
Goal 11	Make cities inclusive, safe, resilient and sustainable	SDG11	SDG_11_10, D; SDG_11_20, D; SDG_11_31, S; SDG_11_40, D; SDG_11_50, D; SDG_11_60, S.
Goal 12	Ensure sustainable consumption and production patterns	SDG12	SDG_12_10, D; SDG_12_20, S; SDG_12_30, D; SDG_12_41, S; SDG_12_50, D; SDG_12_61, S.
Goal 13	Take urgent action to combat climate change and its impacts	SDG13	SDG_13_10, D; SDG_13_20, D; SDG_13_30; SDG_13_40; SDG_13_50, S; SDG_13_60, S.
Goal 14	Conserve and sustainably use the oceans, seas and marine resources	SDG14	SDG_14_10, S; SDG_14_21; SDG_14_30; SDG_14_40, S; SDG_14_50; SDG_14_60, D.
Goal 15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss	SDG15	SDG_15_10, S; SDG_15_20, S; SDG_15_41, D; SDG_15_50, D; SDG_15_60, S; SDG_15_61, S.
Goal 16	Promote just, peaceful and inclusive societies aiming for sustainable development, ensure access to justice for all and create effective, accountable and inclusive institutions at all levels	SDG16	SDG_16_10, D; SDG_16_20, D; SDG_16_30, S; SDG_16_40, S; SDG_16_50, S; SDG_16_60, S.
Goal 17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	SDG17	SDG_17_10, S; SDG_17_20, S; SDG_17_30, S; SDG_17_40, D; SDG_17_50, S; SDG_17_60, S.

Source: created by the authors based on Eurostat Database (2021).

Data limitations: even though most of the data are collected each year, the publication of some data tends to delay or is published as the EU average. Some data are collected every

two or three years; thus, it has been decided to choose the results from the year before. SDG\_05\_10 reflect 2012-year data; SDG\_15\_50, 2016-year data; SDG\_06\_60, 2017-year data; SDG\_03\_41, SDG\_03\_42, SDG\_04\_40, SDG\_06\_20, SDG\_06\_30, SDG\_06\_40, SDG\_06\_50, SDG\_09\_61, SDG\_11\_31, SDG\_11\_50, SDG\_12\_50, SDG\_12\_61, SDG\_15\_10, SDG\_15\_41 and SDG\_16\_10 indicators provide 2018-year data, and SDG\_03\_30 reflect 2020-year data. The indicators: SDG\_12\_10, SDG\_13\_30, SDG\_13\_40, SDG\_14\_21, SDG\_14\_30, SDG\_14\_50, which reflect data of all European Union or even the whole world, had to be removed from the research and not included in the calculations of the analysed countries.

When analysing sustainable financial models, the following financial indicators of the Baltic Sea countries have been used.

Table 3. Financial indicators of the Baltic Sea countries

Abbreviation	Title and description	Measurement unit	S/D	Pillar
F1	Government support to agricultural research and development. Shows the support from the government's budget for the scientists' research and technological development activities; in other words, reveals whether the government prioritise public RTD funding.	Euro per inhabitant	S	Environmental
F2	Gini coefficient of equivalised disposable income.	Coefficient of 0 (maximal equality) to 100 (maximal inequality)	D	Social
F3	General government expenditure on education, compared to GDP.	%	S	Social
F4	General government expenditure on health, compared to GDP.	%	S	Social
F5	General government expenditure on social protection, compared to GDP.	%	S	Social
F6	General government total expenditure on law courts, compared to GDP.	Euro per inhabitant	S	Social
F7	General government gross debt, percentage of GDP. It reveals the relation between the not repaid government debt at the end of the year and GDP at the current market prices.	%	S	Economic
F8	Shares of labour taxes in total tax revenues. Revenue from corporate income taxes as a share of GDP.	%	S	Environmental
F9	Share of environmental taxes in total tax revenues.	%	S	Environmental
F10	Percentage of total revenues from environmental taxes and social contributions.	%	S	Environmental
F11	Consolidated banking leverage, domestic and foreign entities. An indicator that encompasses only banking sector, defined as all assets divided by the total capital.	% of GDP	D	Economic
F12	Bank credit to the private sector.	% of GDP	S	Economic
F13	Official development assistance as share of gross national income.	% of gross national income	S	Economic
F14	EU imports from developing countries.	million EUR	S	Economic
F15	Income from natural resources.	% of GDP	S	Environmental

S – Stimulant (the higher, the better), D – Destimulant (the lower, the better).

Source: created by the authors.

The financial indicators have been selected in such a way that they would reflect three sustainability pillars: environmental sustainability and its funding show indicators F1, F8, F9, F10 and F15; F2, F3, F4, F5 and F6 are related to the social pillar, and the indicators F7, F11, F12, F13 and F14 reveal the implementation of economic pillar. The mentioned indicators have been selected based on the research conducted by Ziolo et al. (2021).

In order to analyse the connection between the implementation of sustainable development goals and sustainable finance, the research has been conducted in two steps. In the first step, aiming to determine every country's development, the standardized sum method is used. It helps to compare the development of analysed countries from the sustainability perspective. The higher is the value, the better is the implementation of sustainability; thus, when collecting data, some of them were marked as stimulant, while others as destimulant. All collected data on sustainable development goals are perceived as equally important and have the same significance. According to Eurostat, six indicators are used to measure the achievement of every goal (Eurostat, 2021). When using the standardized sum method, every country's individual goal indicator has been calculated following this formula (Ziolo et al., 2020):

$$g_i = \frac{1}{m} \left[ \sum_{j \in S} \frac{y_{ij} - \bar{y}_j}{s_j} + \sum_{j \in D} \frac{\bar{y}_j - y_{ij}}{s_j} \right]$$

where S are stimulant indicators, D – destimulant indicators,  $\bar{y}_j$  – average,  $s_j$  – Standard deviation, m – number of indicators.

Further on, when distinguishing countries development, the previously obtained indicators are used, and the following formula is applied:

$$g_i'' = \frac{1}{g_{max} - g_{min}} * g_i' + z$$

where z is calculated when  $g_i' = 0$  and  $g_i'' = g_{min}$ .

Applying the previously described formula, there is obtained a measuring scale that is transferred into a new one from 0 to 1, where zero equals to the lowest value, and one refers to the best result achieved by a country. Based on the gathered results, there are distinguished four typological groups of the analysed countries: A group:  $g_i'' \geq \bar{g}_i'' + s_{g_i''}$ , B group:  $\bar{g}_i'' + s_{g_i''} > g_i'' > \bar{g}_i''$ , C group:  $\bar{g}_i'' > g_i'' > \bar{g}_i'' - s_{g_i''}$ , D group:  $g_i'' < \bar{g}_i'' - s_{g_i''}$ . In such a way, the results on the implementation of sustainable development goals of the Baltic Sea countries are distributed into four groups, where A refers to the highest value and D to the lowest. Then, the obtained values are presented in a table, and the countries are ranked from the best to the worst, where 1 is the best, and 8 is the worst. The countries are distributed in the same way, according to the financial indicators.

In the second step, every country's financial model is identified according to the indicators based on the models proposed by Schoenmaker (2017) that already have been mentioned in the theoretical part. The correlation analysis has been used in order to analyse the relations between the analysed areas, which helps to determine the connections between the sustainable development goals and sustainable finance indicators, and the p value of regression analysis is calculated, which reveals whether the obtained data is statistically significant. Finally, the obtained results are discussed and compared to similar research that has been conducted in 2020.



### 3. Research data analysis and discussion of results

The gathered and calculated data reveal sustainable finance and the implementation of sustainable development goals of all analysed countries. The results of the research are provided in Table 4, where first of all, the calculated  $g_i''$  value is shown (1), then, the country's occupied position among the analysed eight countries (2) and the distribution according to the typological groups, where A is the best performed group and D is the worst (3).

Table 4. Results of sustainable development goals and finance sector calculations

Country	F			SDG1			SDG2			SDG3			SDG4		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Denmark	1.000	1	A	0.655	5	B	1.000	1	A	0.715	2	B	0.824	2	B
Germany	0.669	3	B	0.659	4	B	0.287	6	C	0.703	3	B	0.024	7	D
Estonia	0.494	5	C	0.368	6	C	0.387	4	C	0.205	7	C	0.494	4	B
Latvia	0.363	7	C	0.000	8	D	0.633	3	B	0.000	8	D	0.000	8	D
Lithuania	0.000	8	D	0.140	7	D	0.379	5	C	0.216	6	C	0.440	5	C
Poland	0.399	6	C	0.700	2	B	0.000	8	D	0.472	5	C	0.248	6	C
Finland	0.748	2	B	1.000	1	A	0.135	7	C	0.644	4	B	0.672	3	B
Sweden	0.640	4	B	0.660	3	B	0.916	2	A	1.000	1	A	1.000	1	A
	SDG5			SDG6			SDG7			SDG8			SDG9		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Denmark	0.690	3	B	0.660	4	B	1.000	1	A	0.588	3	B	0.913	2	B
Germany	0.560	4	B	0.489	6	C	0.300	6	C	0.696	2	B	0.794	3	B
Estonia	0.000	8	D	0.536	5	B	0.668	3	B	0.519	5	B	0.325	5	C
Latvia	0.440	6	C	0.666	3	B	0.650	4	B	0.000	8	D	0.000	8	D
Lithuania	0.467	5	C	0.057	7	D	0.005	7	D	0.026	7	D	0.121	7	C
Poland	0.208	7	C	0.000	8	D	0.488	5	C	0.047	6	D	0.196	6	C
Finland	0.816	2	B	0.813	2	B	0.000	8	D	0.563	4	B	0.794	4	B
Sweden	1.000	1	A	1.000	1	A	0.830	2	B	1.000	1	A	1.000	1	A
	SDG10			SDG11			SDG12			SDG13			SDG14		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
Denmark	0.930	2	A	0.648	4	B	1.000	1	A	0.990	2	B	0.590	3	B
Germany	0.623	3	B	0.617	5	B	0.780	3	B	0.792	4	B	1.000	1	A
Estonia	0.412	6	C	0.778	3	B	0.288	5	C	0.857	3	B	0.180	5	C
Latvia	0.000	8	D	0.256	7	C	0.244	6	C	0.617	7	C	0.419	4	B
Lithuania	0.154	7	D	0.419	6	C	0.000	8	D	0.641	6	C	0.593	2	B
Poland	0.506	5	C	0.000	8	D	0.224	7	C	0.000	8	D	0.059	7	C
Finland	1.000	1	A	1.000	1	A	0.968	2	A	0.694	5	C	0.000	8	D
Sweden	0.585	4	B	0.909	2	B	0.561	4	B	1.000	1	B	0.119	6	C
	SDG15			SDG16			SDG17								
	1	2	3	1	2	3	1	2	3						
Denmark	0.039	7	D	0.919	2	B	1.000	1	A						
Germany	0.274	5	C	0.756	4	B	0.764	3	B						
Estonia	1.000	1	A	0.380	6	C	0.734	4	B						
Latvia	0.613	3	B	0.000	8	D	0.665	5	B						
Lithuania	0.611	4	B	0.389	5	C	0.036	7	D						
Poland	0.000	8	D	0.349	7	C	0.189	6	C						
Finland	0.994	2	A	1.000	1	A	0.000	8	D						
Sweden	0.235	6	C	0.818	3	B	0.786	2	B						

1 –  $g_i''$  value, which shows the country's achievements, 2 – country's ranking, 3 – country's belonging to one of the four groups.

Source: created by the authors.

After reviewing Table 4, the attention should be given to the analysed Scandinavian countries that are leading in the ranking and distribution of groups. Denmark occupied the first

place in achieving the following sustainable development goals: 2, 7, 12, 17. It has been in the second place 6 times and is leading according to the sustainable finance indicators. Finland is best at achieving 3 goals from 17, i.e., 1, 11 and 16, and occupied the second place in achieving 4 goals. Whereas, Sweden has been in the first place among the analysed countries 7 times and is best at implementing sustainable development goals 3, 4, 5, 6, 8, 9 and 13. It should be noted that Sweden is the only one of the analysed countries that has not been assigned to the group D, which means that in all cases of sustainable development goals and sustainable finance indicators, the results were higher than the difference between the average and standard deviation. Only two times, the results were lower than the average (goals 14 and 15).

The ranking of countries according to the occupied positions may not reveal the true tendencies; thus, the distribution of countries into four groups according to the obtained results can reveal a more precise data interpretation. The results of both methods are provided in Table 5.

Table 5. Comparison of sustainable development goals implementation

	Typological group					Ranking position							
	A	B	C	D		1	2	3	4	5	6	7	8
<b>Denmark</b>	5	11	-	1		4	6	3	2	1	-	1	-
<b>Germany</b>	1	11	4	1		1	1	5	4	2	3	1	-
<b>Estonia</b>	1	7	8	1		1	-	3	3	5	3	1	1
<b>Latvia</b>	-	6	4	7		-	-	3	2	1	2	2	7
<b>Lithuania</b>	-	2	8	7		-	1	-	1	4	3	7	1
<b>Poland</b>	-	1	10	6		-	1	-	-	3	4	4	5
<b>Finland</b>	6	6	2	3		4	4	1	3	1	-	1	3
<b>Sweden</b>	7	8	2	-		7	4	2	2	-	2	-	-

Source: created by the authors.

As it can be seen from Table 5, according to the ranking of countries from 1 to 8, Sweden performed the best, and Latvia and Poland, the worst. However, after reviewing countries belonging to the typological groups (A, B, C or D), the lowest results were obtained by Latvia, Lithuania and Poland. This means that even though Poland quite frequently occupied the final position in the context of all countries, when comparing the results, it is not considered the worst in implementing sustainable development goals. Whereas Lithuania that has been left in the final eighth position only once is actually not far from the final position according to the gathered data. Due to this, Lithuania has been left in the second-last position 7 times.

Thus, according to the typological groups, the following countries have been included in the highest group A: for the goal 1, Finland; for the goal 2, Denmark and Sweden; for the goal 3, Sweden; for the goal 4, Sweden; for the goal 5, Sweden; for the goal 6, Sweden; for the goal 7, Denmark; for the goal 8, Sweden; for the goal 9, Sweden; for the goal 10, Finland and Denmark; for the goal 11, Finland; for the goal 12, Denmark and Finland; for the goal 13, none, because the average was sufficiently high; for the goal 14, Germany; for the goal 15, Estonia and Finland; for the goal 16, Finland; for the goal 17, Denmark. According to the distribution of countries in the first typological group A, the attention should be drawn to Sweden, which has occupied the first place even 7 times. However, the results of Denmark and Germany exceed the average 11 times and have been assigned to the group B, which shows good results as well. Finland is in a good position in implementing sustainable development goals, because it has been assigned 6 times to the group A (goals: 1, 10, 11, 12, 15, 16) and the same number of times to the group B (goals: 3, 4, 5, 6, 8, 9). The results of Poland are quite low, because most of the goals are implemented below the average of the analysed countries. The only one that

has not been mentioned is Estonia that showed average performance, but in comparison to other Baltic countries, i.e., Lithuania and Latvia, it had the best results.

According to the collected financial data, the countries could be grouped according to the used financial model by applying the classification proposed by Schoenmaker (2017). The distribution of countries is reflected in Table 6.

Table 6. Financial models of the analysed countries

Traditional finance F*	Sustainable finance 1.0 F > S and E	Sustainable finance 2.0 I = F + S + E	Sustainable finance 3.0 S and E > F
Lithuania	Estonia, Latvia, Poland	Germany, Finland, Sweden	Denmark

F, S, A – dimensions of sustainability: financial value, social impact, environmental impact; I – integrated value.

Source: created by the authors.

According to the obtained results, Denmark, which excellently implements the goals of sustainable development, applies sustainable financial model 3.0. This country has a well-developed environmental tax system and the lowest income inequality level that is measured by GINI coefficient. It could be stated that Denmark has the highest level of sustainability understanding. Sustainable financial model 3.0 is based on public and private funding, which are coherent and integrated with one another, and the funding proportions are balanced. The financial market is well-developed, and the financial institutions offer a variety of different sustainable finance measures. In 2020, the Danish financial sector allocated almost 62 M Euros to the green transition. More than 9 out of 10 financial institutions offered sustainable products, and “Finance Denmark” has developed a framework for financed emissions, accounting for the financial sector, paving the way for the members to deliver on the recommendation of setting targets for the reduction of carbon emissions from investments and lending. Moreover, The Danish Investment Association made the first sector-wide commitment to reducing the carbon footprint of Danish retail equity investment funds by 75% up to 2030 in comparison to the All Countries World Index in 2020 (Finance Denmark, 2021).

The countries that apply sustainable financial model 2.0. as well have a well-developed environmental tax system, but in this group of countries, some emit significant amounts of greenhouse gasses (in this case, Finland and Germany); thus, according to 2019 data, these countries do not effectively implement sustainable development goals 7, 13 and 17 that are related to climate change. Even though Sweden perfectly implements sustainable development goals, it is assigned to the sustainable financial model 2.0, because environmental financial indicators, such as government support to agricultural research and development, are lower than the average of analysed countries, whereas the social indicators are all significantly above the average. In 2020, for the first time, Swedish National Debt Office released the green government bond (Maltais & Sjostrom, 2021); thus, when analysing this country, according to the newest data, it could be assigned to the sustainable financial model 3.0. Public and private funding in 2.0 model is coherent, integrated and balanced, and the roles of private and public finance markets when funding sustainable development are interrelated.

Sustainable financial model 1.0 or traditional financial model is applied in countries after a systemic transformation or countries that suffered the most from the consequences of the 2008 financial crisis. The economies of these countries, applying sustainable financial model 1.0, are based on fossil fuels (coal) and only help to adjust the activities by changing the fossil fuel with renewable energy resources. The environmental tax system in this group of countries is developing, and these countries focus their efforts on poverty by using social

programs. Estonia and Latvia should be distinguished because their share of environmental tax revenue in government revenue from taxes and the percentage of total revenue from the environmental tax and social contributions was the highest of all analysed countries in 2019 and reached about 9 percent. Whereas Lithuania, out of all researched countries, is assigned to the traditional finance, because all its financial indicators do not reach the average of analysed countries. The traditional model and sustainable financial model 1.0 are mostly based on the public sector funding, and the finance market is not adapted to correspond to sustainable development funding expectations.

After assigning countries to the financial models, it has been noticed that the countries that use sustainable financial models 3.0 and 2.0 tend to implement sustainable development goals better than those using 1.0 or traditional finance. When testing the raised hypothesis, the correlation analysis has been calculated, the results of which are displayed in Table 7.

Table 7. Correlation coefficients and p values of sustainable development goals and sustainable finance

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	F
1	1.00	-0.21	0.79	0.44	0.43	0.28	-0.08	0.59	0.75	0.92	0.46	0.75	0.01	-0.29	-0.18	0.84	-0.11	0.69
2	-0.21	1.00	0.28	0.52	0.47	0.58	0.74	0.42	0.40	0.04	0.30	0.25	0.73	0.19	-0.29	0.19	0.73	0.38
3	0.79	0.28	1.00	0.62	0.73	0.46	0.21	0.83	0.93	0.76	0.52	0.69	0.35	-0.03	-0.47	0.86	0.24	0.67
4	0.44	0.52	0.62	1.00	0.55	0.50	0.31	0.61	0.65	0.56	0.65	0.39	0.52	-0.43	-0.04	0.66	0.12	0.44
5	0.43	0.47	0.73	0.55	1.00	0.65	0.02	0.58	0.73	0.47	0.54	0.60	0.48	0.02	-0.21	0.68	0.08	0.45
6	0.28	0.58	0.46	0.50	0.65	1.00	0.39	0.73	0.65	0.39	0.76	0.62	0.73	-0.18	0.20	0.47	0.49	0.64
7	-0.08	0.74	0.21	0.31	0.02	0.39	1.00	0.32	0.25	0.06	0.00	0.16	0.34	-0.05	-0.46	-0.02	0.84	0.48
8	0.59	0.42	0.83	0.61	0.58	0.73	0.32	1.00	0.92	0.63	0.82	0.67	0.71	0.00	-0.07	0.77	0.51	0.70
9	0.75	0.40	0.93	0.65	0.73	0.65	0.25	0.92	1.00	0.83	0.74	0.86	0.62	0.06	-0.25	0.93	0.39	0.82
10	0.92	0.04	0.76	0.56	0.47	0.39	0.06	0.63	0.83	1.00	0.58	0.89	0.26	-0.15	-0.14	0.92	0.07	0.84
11	0.46	0.30	0.52	0.65	0.54	0.76	0.00	0.82	0.74	0.58	1.00	0.61	0.79	-0.13	0.44	0.73	0.19	0.53
12	0.75	0.25	0.69	0.39	0.60	0.62	0.16	0.67	0.86	0.89	0.61	1.00	0.48	0.11	-0.12	0.85	0.32	0.93
13	0.01	0.73	0.35	0.52	0.48	0.73	0.34	0.71	0.62	0.26	0.79	0.48	1.00	0.29	0.20	0.48	0.61	0.47
14	-0.29	0.19	-0.03	-0.43	0.02	-0.18	-0.05	0.00	0.06	-0.15	-0.13	0.11	0.29	1.00	-0.28	0.01	0.38	0.01
15	-0.18	-0.29	-0.47	-0.04	-0.21	0.20	-0.46	-0.07	-0.25	-0.14	0.44	-0.12	0.20	-0.28	1.00	-0.13	-0.34	-0.24
16	0.84	0.19	0.86	0.66	0.68	0.47	-0.02	0.77	0.93	0.92	0.73	0.85	0.48	0.01	-0.13	1.00	0.09	0.74
17	-0.11	0.73	0.24	0.12	0.08	0.49	0.84	0.51	0.39	0.07	0.19	0.32	0.61	0.38	-0.34	0.09	1.00	0.54
F	0.69	0.38	0.67	0.44	0.45	0.64	0.48	<b>0.70</b>	<b>0.82</b>	<b>0.84</b>	0.53	<b>0.93</b>	0.47	0.01	-0.24	<b>0.74</b>	0.54	1.00
p	0.06	0.35	0.07	0.28	0.26	0.09	0.23	0.05	<b>0.01</b>	<b>0.01</b>	0.18	<b>0.00</b>	0.24	0.99	0.57	<b>0.04</b>	0.16	

1–17 – sustainable development goals, F – sustainable finance, p – calculated regression value p.

Source: created by the authors.

As it could be seen, the correlation confirms that the relation between sustainable development goals and finance exists. The highest correlation coefficient is 0.93; it was obtained from the sustainable finance and sustainable development goal 12. However, a strong relation (from 0.7 to 0.9) has been noticed with other goals, i.e., 8, 9, 10 and 16, and the average (from 0.5 to 0.7) between sustainable development goals 1, 3, 6, 11 and 17 and sustainable finance. A weak relation (from 0.3 to 0.5) is with goals 2, 4, 5, 7 and 13, and there is no relation, or it is very weak between sustainable development goals (14 and 15) and sustainable finance. Only goal 15 has a negative relation; this means that when implementing this goal, sustainable finance has an opposite effect, but the relation is very weak; thus, it could not be stated firmly.

The regression has shown that the relation is statistically significant between goals 9, 10, 12 and 16, where the correlation was the highest. This shows that sustainable finance actually has an influence on the implementation of sustainable development goals; however, it is possible that the influence on different goal differs. To sum up, the obtained data could be graphically displayed.

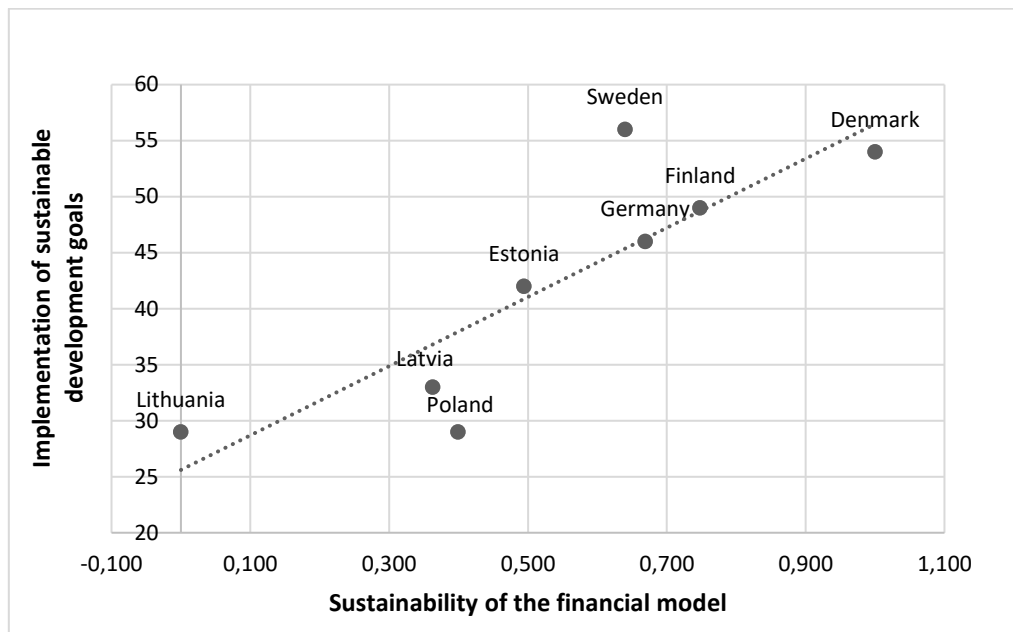


Figure 6. Dependence between financial model and sustainable development goals implementation in the analysed countries

Source: created by the authors.

As it could be seen from the Figure 6, the more sustainable is the financial model, according to the trend line, the better is the implementation of sustainable development goals. Due to this reason, the raised hypothesis could not be rejected.

To conclude, the correlation has confirmed that sustainable finance has influence on the implementation of sustainable development goals. The analysis proved that the relation exists and countries with more sustainable finance implement sustainable development goals better than the ones with less sustainable finance.

#### 4. Assessment of research results

In conclusion, the results of the conducted research confirm the relation between sustainable financial model and implementation of sustainable development goals. The more sustainable is the country's finance, the better is the implementation of sustainable development goals. Thus, the raised hypothesis cannot be rejected.

There has been created various sustainability rankings that can be compared to the obtained results of the research.

- According to the Global Sustainable Competitiveness Index (Solability, 2021), in 2019, the top 5 spots are occupied by Scandinavia; Sweden remained in the leading position even in 2021. The index measures the country's performance based on the integrated competitiveness model, and it is calculated by employing 116 quantitative indicators, including natural capital, resource intensity, intellectual capital, social cohesion and governance. The top twenty nations of 2019 index include all European countries, except for New Zealand and Canada. Finland is ranked at number 2, Denmark 4, Estonia 7, Latvia 9, Germany 15, Poland 21 and Lithuania 28.
- Robeco's (2021) country sustainability ranking for the performance analysis of countries on a wide range of ESG metrics confirm that Scandinavian countries are leading. In 2019, Sweden, Finland and Denmark are leading among 150 reviewed

countries when analysing such indicators as aging, corruption, environmental risk and other countries' strengths and weaknesses.

- Denmark (85.2), Sweden (85) and Finland (82.8) are leading in Sustainable Development Report 2019 (Sustainable Development Report, 2019). Germany (81.1) is ranked at number 6, Estonia (80.2) 10, Latvia (77.1) 24, Poland (75.9) 29 and Lithuania (75.1) 32. According to the newest 2021 data, Finland (85.9) is ranked at the first place, Sweden (85.61) in the second and Denmark (84.86) in the third. Germany is ranked at number 4 (84.48), Estonia (81.58) 10, Latvia (79.15) 22, Poland (80.22) 15 and Lithuania (76.70) 31.

Thus, the sustainability ranking analysis confirms that the research results are coherent and correspond to the ranking, because the same countries are in the leading positions.

In 2020, Ziolo et al. have conducted similar research on 2016 data; however, it should be noted that all countries belonging to the European Union were analysed, but from 17 goals, sustainable development goals 6 and 14 were not included. Due to this reason, countries ranking and assigning to typological groups can differ due to the sample, but the tendencies still could be noted. The research results show that the implementation of sustainable development goals depends on the application of sustainable financial model. The more sustainable is the financial model, the better is the implementation of sustainable development goals, and the most important impact of sustainable financial model is on the environmental pillar of sustainable development (climate actions). The less sustainable is the financial model, the more attention is given to the social goals.

When analysing further, the first typological group (the leading positions, according to the sustainable finance and sustainable development goals) is composed of Scandinavian countries. The Netherlands occupies the leading positions as well. The lowest positions according to sustainable finance are occupied by Hungary, Lithuania and Spain. Spain, in comparison to Hungary and Lithuania, implemented sustainable development goals 13 and 15 better, but due to funding, low revenues from the environmental taxes and social contributions, was assigned to the lowest sustainable finance typological group.

Thus, according to the research data on 2016, Sweden was assigned to the first typological group when implementing 7 goals (1, 4, 5, 9, 13, 15 and 17), and the research that has been conducted in this work show that Sweden is still leading in implementing goals 4, 5, 9 and 13, according to 2019 data, same as 3 years ago, and other four goals (2, 3, 6 and 8). Denmark has been assigned to the group A in implementing 6 out of 15 researched goals and occupied the first position in sustainable finance, as in 2019. This country has been assigned to the group B eight times and only once to the group C, which confirms that Denmark, which has been applying sustainable financial model 3.0 since 2016, is successfully implementing sustainable development goals. In the comparative research, Scandinavian countries and the Netherlands represent sustainable financial model 3.0, which is the highest level of sustainable finance that focusses mostly on sustainability. In this research, Denmark belongs to group 3.0 and Sweden and Finland to group 2.0, but in respect of all EU, when researching more countries, the average would be lower; thus, these countries could as well be assigned to sustainable financial model 3.0. Whereas Lithuania in both researches is assigned to the traditional finance, and the implementation of sustainable development goals is insufficient.

Pearson's linear correlation and Kendall's correlation have been implemented as well in the sample of sustainable finance and analysed sustainable development goals. The correlation only confirmed that the classification between sustainable development goals and sustainable finance differs. The highest coefficient of the correlation has been obtained between sustainable finance and goals 17 and 9 (Pearson's correlation 0.75 and 0.71 and Kendall's correlation 0.6 and 0.61, respectively). However, the existence of at least average strength

relation (0.5 and more) was observed between sustainable finance and goals 1, 3, 4, 5, 8 and 16. Only the connections between three goals: 2, 12 and 13, and sustainable finance have not been found. Thus, the results of both researches confirm the relation between sustainable financial model and the implementation of sustainable development goals. The more sustainable is the financial model, the better is the implementation of sustainable development goals. In countries that apply sustainable financial model 3.0, both public and private financial systems participate in funding sustainable development. These systems intertwine and complement one another. Sustainable financial model 2.0 as well allows implementing sustainable development goals better than the average of all countries; however, the funding of environmental goals requires a greater adaptation to the needs and structure of the economy. The countries that belong to this group are characterized by emission of significant amounts of greenhouse gasses; thus, public policy and finance market adaptation processes are needed, which include environmental taxes and funding technologies that support the development of renewable energy resources. Whereas in countries that employ traditional finance and sustainable financial model 1.0, private as well as public finance markets only start to adapt to the needs of sustainable development funding.

Thus, the data of both researches confirm the hypothesis about the connection between sustainable financial model and sustainable development goals and show that the more sustainable is the financial model, the better are the results of sustainable development goals implementation in the country.

The research was conducted on eight EU Baltic Sea countries analysing 17 sustainable development goals. The variables of sustainable development goals from the OECD Eurostat database have been used for the data analysis. In total, 111 variables have been included into the analysis, from which 96 reflect sustainable development goals and 15 sustainable finance. Having analysed the implementation of sustainable development goals in the Baltic Sea countries, it has been noticed that they are implemented best by the Scandinavian countries: Sweden, Denmark and Finland, and worst by the Baltic countries and Poland. It has been determined that the Scandinavian countries and Germany use sustainable financial models 3.0 or 2.0, Estonia, Latvia and Poland, sustainable financial model 1.0, and Lithuania, from all analysed countries, belong to the traditional finance. After the correlation was calculated, there has been noticed a connection between sustainable finance and sustainable development goals. The highest correlation coefficient 0.93 was between sustainable finance and sustainable development goal 12; thus, a conclusion could be made that sustainable finance has a strong impact on the sustainable consumption and production.

## **Conclusions and proposals**

After providing a theoretical basis for the sustainable development concept and sustainable development goals implementation, it has been agreed that an infinite growth in a limited ecosystem is impossible; therefore, other than previous types of development are necessary. In the implementation of sustainable development, the guidelines and references that would help to achieve the set goals are still being created. A transition has been made from eight Millennium development goals to seventeen sustainable development goals that the whole world tries to achieve. Sustainable development is composed of three dimensions: economic, environmental and social, and their harmonisation in implementing sustainable development goals is the main challenge.

Having determined the importance of sustainable finance in implementing sustainable development goals, it has been noticed that the financial sector occupies an important position in the implementation of sustainable development goals. Funding can be acquired from public

as well as private sectors, but the traditional finance does not implement the set goals in an intended level. The traditional finance should be changed into sustainable, which would take into consideration the creation of long-term value for the financial system, environment and society. Sustainable finances avoid investing in companies that have a negative effect, include social and environmental aspects and their role transfers from profit maximisation to serving, the means to implement sustainable development.

After assessing the role of sustainable finance in the sustainable development process, a model was composed that reflects that the more sustainable is the financial model, the better is the implementation of sustainable development goals. Sustainable finance in the model could be distributed into three groups: sustainable finance 1.0, 2.0 and 3.0, and the sustainable development goals could be assessed according to the results achieved by every country.

After analysing the impact of sustainable finance in implementing sustainable development goals in the Baltic countries, it has been determined that the role of sustainable finance in the implementation of sustainable development goals in the analysed countries is significant, because there exists a strong relation between sustainable finance and four sustainable development goals. Sweden, Denmark and Finland are best at implementing sustainable development goals, and the worst at implementing are Lithuania, Latvia and Poland out of all analysed countries. Denmark belongs to sustainable financial model 3.0, and Sweden, Finland and Germany, to sustainable financial model 2.0. According to 2019 data, Estonia, Latvia and Poland employ sustainable financial model 1.0, and Lithuania uses traditional finance. It has been noticed that the more sustainable is the financial model, the better is the implementation of sustainable development goals.

Proposals.

In order to implement sustainable development goals effectively, an efficient and integrated financial model based on private and public financial systems that are interrelated is necessary. Due to this, the governments should ensure parallel public and private financial systems development and cooperation when aiming for sustainability.

Government financial system, which provides the basis for traditional finance and sustainable financial model 1.0, has the capacity to support the implementation of social sustainable development goals, but these models cannot secure the implementation of environmental sustainable development goals. Thus, the governments should provide financial support to environmental goals by employing legal framework.

Financial policy and sustainable development should be the government's priority. Common monitoring indicators and reporting systems that would allow following the achievements of sustainable development goals are necessary. Moreover, there is a lack of measurement systems for negative impacts; thus, their creation would help to calculate the negative impact of investment on the environment or society.

It has been noticed that the influence of sustainable finance on different sustainable development goals is different; thus, the future researches could encompass the implementation of separate goals by using sustainable finance in order to find out whether sustainable finance has the same effect on particular goals in all countries.



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