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THEORETICAL FOUNDATIONS AND GEORGIAN PRACTICE OF GREEN FINANCING FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

The research focuses on the challenges and prospects for developing green finance, which provides funds for achieving the UN Sustainable Development Goals. The objectives of the study are to assess the level of development and structure of green finance, as well as to identify the factors determining its development, taking into account recent trends in the global economy.

The article analyzes the state and development trends of the green finance market, identifies barriers to the development of green financial instruments, proposes solutions to emerging problems, and identifies the specific features of sustainable finance development In Georgia.

The study utilized the concept of sustainable development and a problem-oriented approach to green finance. The analytical work was conducted using methods of analysis and synthesis, comparison and grouping, economic analysis, and modeling.

The study results showed that interest in green finance instruments is driven by societal demands for sustainable development and environmental conservation, which require stricter accountability requirements for green financial instruments, more stringent regulatory oversight, and reliable disclosure of information supported by more accurate data.

Conclusions were drawn regarding the need to stimulate the use of green financing instruments and develop a legal framework for sustainable development that will ensure the harmonization of green financing policies and standards not only at the national but also at the global level.

KEYWORDS

Green Finance, Green Financing, Sustainable Development, Green Bonds, Green Loans, Green Investments

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I. Introduction

At the current stage of society's development, "green" financing is a current and, at the same time, quite relevant trend, which is associated with the need to introduce environmental measures in business processes, the emergence of new financial instruments and their active dissemination.

Green finance is an important tool of the global financial system for achieving the UN Sustainable Development Goals, which were adopted in 2015 in the interests of future generations to ensure the sustainable development of humanity based on the implementation of three main components: economic growth, social integration of society and environmental protection.

Green finance, which includes the integration of environmental, social and governance (ESG) issues into financial decisions, plays an important role in the sustainable development of the country. This type of financing aims to take into account environmental and social responsibility issues, which contributes to sustainable and inclusive economic growth.

The article discusses important issues related to green finance, such as: theoretical foundations of green financing, green financing instruments and main development directions, and features of the green financing market in Georgia.

II. Results and Discussion

II.1. Theoretical basis of the research. Since the mid-20th century, the idea of socially responsible investing—whereby business investment decisions are based on an assessment of a company's contribution to societal development, taking into account the environmental well-being of the population through a harmonious combination of economic and environmental requirements—has spread worldwide, establishing a close link between financial investments and public interests (Kabir L.S., 2017). This stems from the negative consequences of global processes occurring in the global economy.

The term "green finance" was first used by American economist Richard Sandor in 1992 in a course taught at Columbia University. He believed that green finance, which primarily finances projects that prevent climate change, could become the primary driver of reducing greenhouse gas emissions and transitioning to more sustainable and environmentally friendly economic growth (Sandor R., 2012).

A significant event in the field of green finance was the launch of the United Nations Environment Programme (UNEP) Finance Initiative at the UN Conference on Environment and Development, held in 1992. However, significant greening of financial markets did not occur during the 1990s (Bobylev S.N., 2021).

The concept of "green finance" emerged in the West at the beginning of the 21st century, following the recognition by scientists and politicians that businesses should not only generate profits but also be responsible to society for the environment.

In the modern world, increasing attention is being paid to the concept of low-carbon development, aimed at reducing greenhouse gas emissions and mitigating the effects of climate change while achieving the Sustainable Development Goals.

A number of international documents adopted by the UN, OECD, G7, G20, World Bank, EBRD, EU, IEA, IRENA (The International Renewable Energy Agency), and others propose action plans to ensure sustainable development, as well as solutions to global climate problems (Mudretsov A.F. & Prudnikova A.A., 2022).

Furthermore, numerous initiatives and recommendations are being put forward to promote the development of green finance and achieve the Sustainable Development Goals. For example, the Principles of Responsible Investment (PRI) were formulated, calling for the consideration of environmental, social, and governance (ESG) factors in investment decision-making to improve risk management and generate sustainable, long-term returns. International organizations are being established, including the Carbon Disclosure Project (CDP), which maintains the world's largest database on corporate environmental impacts; the International Sustainability Standards Board (ISSB), which ensures the accuracy, reliability, comparability, and transparency of reporting; and others.

The green factor is destined to play a key role in the development of the financial and real sectors of both global and national economies, according to research by D. Kahneman, P. Krugman, K. Perez, M. Spence, N. Stern, and others (Better Growth. Better climate: the new climate economy synthesis report. the global commission on the economy and climate, 2014).

Currently, there are various definitions of green finance. For example, the United Nations Environment Programme (UNEP) defines green finance as "financial products, investments, and services that promote sustainable development, environmental protection, and the fight against climate change." According to UNEP, green finance encompasses a wide range of financial instruments and investments that contribute to sustainable development and the fight against climate change[1].

At the same time, at the 11th G20 Summit in China in 2016, the following definition of green finance was adopted: "Green finance is an investment that leads to sustainable development, taking into account not only economic but also environmental and social aspects. This includes investments in clean energy, greenhouse gas emission reduction, water management projects, biodiversity protection, etc. Green finance also includes investments in technologies that can reduce negative environmental impacts and promote economic growth."[2] According to this definition, green finance not only helps protect the environment but also

[1] Green financing. The United Nations Environment Programme (UNEP). https://www. unenvironment.org/regions/asia-and-pacific/regional-initiatives/supportingresource-efficiency/green- financing#:~:text=Green%20.

[2] G20 Green finance Synthesis report. G20 Green finance study group, 05.09.2016. https://unepinquiry.org/wp-content/uploads/2016/09/Synthesis_Report_Full_EN.pdf

has a positive economic impact, contributing to job creation, increasing the competitiveness of companies, and reducing risks for investors.

In 2017, the European Commission defined green finance as "investments that promote environmental sustainability and generate economic growth." It includes investments in projects that reduce greenhouse gas emissions and combat climate change, as well as in projects to preserve biodiversity and ensure sustainable resource management."[1] According to the European Commission, green finance should become a tool for achieving the goals of the Paris Agreement on climate change, as well as for promoting sustainable development and the transition to a low-carbon economy. It can also contribute to the development of new technologies, increase the competitiveness of companies, and create jobs.

II.2. Main directions and tools for the development of green financing. Various instruments are used to finance green projects, including green bonds, green funds, green loans, green investment programs, green accounts, and green insurance products.

Each of these instruments has its own advantages and disadvantages and can be used to finance various types of green projects.

However, while green finance is a promising and important tool for achieving sustainable development, it has its limitations: high costs, which limit its accessibility for small and medium-sized enterprises; a lack of transparent standards for green investments, which creates challenges in assessing the effectiveness of green projects; and difficulties in taking into account all the environmental and social impacts of projects. Furthermore, green finance is used by unscrupulous companies for greenwashing[2].

Nevertheless, many large companies, including those previously unrelated to environmental issues, are beginning to implement green projects and invest in green technologies. This demonstrates that green finance not only serves as a tool for achieving sustainable development but can also become a driver of economic growth and development overall.

Over the past decade, the volume of global green financing for environmentally friendly projects worldwide has increased more than 100-fold. The share of green finance in total financing is steadily increasing: while in 2012 it was approximately 0.1%, in 2021 it was over 4%. According to research conducted by TheCityUK and BNP Paribas, global lending through green bonds, loans, and equity financing through initial public offerings (IPOs) targeting green projects was valued at US$540.6 billion in 2021, up from US$5.2 billion in 2012[3]. In 2021, green finance volumes continued to grow despite adverse economic conditions related to the COVID-19 pandemic. However, 2022 has proven to be a challenging year for green finance due to the current macroeconomic environment, with green finance volumes declining year-on-year for the first time in a decade.

The green bond market began with the issuance of bonds by the European Investment Bank in 2007. In 2014, the International Capital Market Association (ICMA) developed the Green Bond Principles (GBP), which set out key requirements for green bonds, including the use of proceeds to finance environmentally friendly projects, reporting on the use of funds, and ensuring transparency in the issuance process. Furthermore, the Climate Bonds Initiative (CBI), a non-profit organization dedicated to the taxonomy and certification of green bonds and other green financial instruments, was established.

According to the organization, green bonds are the primary instrument for green finance, accounting for over 90% of all green finance globally. The amount of funds allocated for global green bond issuance increased from US$2.3 billion in 2012 to US$524.8 billion in 2021 and US$443.72 billion[4] in 2022.

In 2020, amid the COVID-19 pandemic, there was an increase in the number of public sector green bond issuers, particularly among state-backed companies, while private investment either remained flat or declined. In 2021, there was a significant increase in green bond volume as private sector issuers returned to the market, driven by an increase in financial (+143%) and non-financial (+111%) assets. These two types of issuers together accounted for approximately 45% of total green bond volume by the end of the year. Sovereigns,

[1] Defining ‘green’ in the context of green finance. Final report. European Commission, October 2017. https://ec.europa.eu/environment/enveco/sustainable_finance/pdf/studies/Defining%20Green%20in%20green%20finance%20%20final%20report%20published%20on%20eu%20website.pdf.

[2] Greenwashing (from the English word washing, by analogy with whitewash) is the deliberate misleading of consumers regarding the goals of an organization or manufacturer regarding the environmental friendliness of a product or service, i.e., speculation on the topic of environmental and social responsibility.

[3] https://www.thecityuk.com/news/accelerating-growthfor-global-green-finance.

[4] S&P Global Market (2023). https://www.spglobal.com/marketintelligence/en/about

where the issuer-borrower is a state, also showed growth, accounting for approximately 10%. However, according to data presented by the Climate Bonds Initiative in 2022, sovereign issuance declined by 38.1% year-on-year, while non-financial corporate supply declined by 35.8%.

Looking at the global green bond market from 2014 to 2021, it's worth noting that developed countries accounted for the majority of issuance (71.4%), emerging markets (21%), and international institutions (7.6%). In 2021, the share of international institutions in green bond issuance declined to 4%, while developed countries' share increased to 75%. At the same time, the contribution of emerging markets increased due to the growth in the number of development banks (378%), financial (324%), and non-financial corporate (278%) issuers[1].

In 2021, Europe ranked first in green bond issuance (with US$288.5 billion), Asia-Pacific ranked second (with US$147.7 billion in green bond issuance), North America ranked third (with US$102 billion in green bond issuance), and Latin America ranked fourth (with US$8.9 billion in green bond issuance).

The US continues to be the leader in the green bond market with US$334 billion in green issuance since 2014, followed by China in second place with US$250 billion, Germany in third place with US$189.8 billion and France in fourth place with US$189.7 billion. The Netherlands also ranks among the top five most active issuers (with $97.2 billion in green bonds issued).

In 2022, amid heightened volatility, green bond supply in Europe declined by 32.5% to $219.03 billion, while North American green bond issuance fell by 43.2% to $60.22 billion. Green bond issuance in Asia-Pacific was more stable, falling by only 2.5% in 2022. China issued $76.25 billion in green bonds in 2022, followed by Germany with $60.77 billion in green bonds and North America with $49.00 billion in green bonds[2].

In 2021, 35 emerging market countries issued green bonds, including seven new entrants (Costa Rica, Guatemala, Nigeria, Pakistan, Paraguay, the Philippines, and Ukraine). This demonstrates that more and more countries are embracing green finance and recognizing its importance for achieving sustainable development. In 2021, other types of bonds related to social and sustainable development investments also began to be issued in this group of countries.

In terms of the sectoral composition of green investments, the three main sectors (energy, construction, and transportation) account for approximately 84% of the green bond market.

The sectoral composition of green investments can vary by region and country, but generally, energy, construction, and transportation are the main sectors receiving green bond proceeds. Overall, by the end of 2021, green investment in energy amounted to $205 billion, in construction – $166.2 billion, in transport – $95.2 billion. This was followed by investment in water resources – $35.5 billion, land use – $29.4 billion, and waste recycling – $23.4 billion.

Analysts believe global green bond issuance will recover in 2023 amid supportive government policies, a more certain interest rate environment, and a catch-up of delayed issuances compared to last year.

Green loans are an important green financing instrument. They are loans issued by banks or other lending institutions to finance projects and initiatives that reduce greenhouse gas emissions and improve the environmental sustainability of businesses and society as a whole.

Green lending began in 2005, when several major US banks, such as Wells Fargo and Bank of America, dedicated resources to ensuring the implementation of sustainable business practices[3]. In 2007, the International Finance Corporation (IFC) launched an initiative to create a green loan standard, which allows for the determination of a project's green status and informs investors about projects that meet this standard. The green loan market reached a significant milestone in 2018, when the Loan Market Association (LMA), in collaboration with leading financial institutions, developed the Green Loan Principles (GLP), which are closely aligned with the Green Bond Principles (GBP). Furthermore, various programs exist to stimulate the use of green loans, such as those implemented by the International Monetary Fund, the World Bank, and others, which provide financial support to projects that meet green loan criteria. The advantage of green loans is that they can be provided under more favorable terms than conventional loans, making them attractive to borrowers. However, the use of green loans remains limited and concentrated primarily in the syndicated loan market.

By 2021, green loans worth US$78.6 billion had been issued (compared to US$432 million in 2017), representing a nearly 200-fold increase in these green financial instruments in four years[4]. By country, the largest

[1] https://www.climatebonds.net/market/data/, 2023
[2] https://www.climatebonds.net/market/data/, 2023.
[3] http://www.gov.cn/xinwen/2022–03/08/content_5677832.htm.
[4] https://www.climatebonds.net/market/data/, 2023

amounts of green loans approved are in the United States, the United Kingdom, Australia, France, Japan, and China (David Gilchrist, Jing Yu & Rui Zhong, 2021). China currently ranks first globally in green lending, accounting for 90% of all green financing. According to the People's Bank of China (PBoC), by the end of 2021, China's green loan balance in yuan and foreign currency reached RMB 15.9 trillion, a 33% increase from 2020[1].

The share of green IPOs in the green finance landscape is still insignificant, but there is growing interest in this type of investment. Green IPOs typically attract investors interested in long-term sustainability and environmental responsibility. Over the past decade, global green IPO activity has been uneven in both volume and value. In 2021, 30 green IPOs were issued, a record number. However, increased volatility due to political upheaval and macroeconomic factors, worsening forecasts, and poor post-IPO performance have led to a significant decline in the global IPO market in 2022.

ESG (Environmental, Social, and Governance) criteria remain a key topic for investors and companies filing for IPOs, regardless of sector. As global climate change and energy restrictions intensify, companies that integrate ESG principles into their core business processes will attract more investors and receive higher valuations. However, it should be noted that assessing ESG factors is quite complex and ambiguous. Some companies may perform well in one area but lag in another. Furthermore, there is a risk that companies will try to manipulate their ESG indicators to satisfy investor demands. Nevertheless, ESG investing can serve as an effective tool for achieving sustainable development and addressing global challenges.

It is worth noting the important role of the public sector and public financial institutions in the development of green finance, which possess significant financial capacity and are less susceptible to risks and negative market trends. As global experience shows, no country has been able to effectively implement a green finance system without the support of a financial regulator. Central banks can stimulate green investments by imposing regulatory requirements on financial institutions to incorporate green instruments into their monetary policy and international reserve management policies (Krylova L.V., Prudnikova A.A., & Sergeeva N.V., 2022).

II.3. Characteristics of the Green Finance Market in Georgia. Green finance is gaining popularity worldwide, and Georgia is no exception. However, the promotion of green finance is characterized by specific challenges, which are determined by the economic, political and cultural characteristics of our country. Among the main challenges in promoting green finance in Georgia are the unregulated legal framework and imperfect market mechanisms for green investments (Merab, V., Irakli, K., & Nino, V. 2020).

The Georgian government plays an important role in the development of green finance. In this regard, the Order of the President of the National Bank of Georgia dated 23.02.2024 "On Approval of the Procedure for Granting, Maintaining and Canceling the Status of Green, Social, Sustainable and Sustainability-Related Bonds" is particularly important.

In 2024, the Georgian market for sustainable development instruments grew quite rapidly. The leader in the Georgian market was the green bond market, which accounted for 80% of the market value, with investments in clean transport and renewable energy being prioritized. However, in 2025, market growth slowed significantly against the backdrop of rising key interest rates and currency volatility.

The 2024 Government Program of Georgia - "For Building a European State" - states that in order to promote the principles of a green and circular economy, the implementation of a separate system for collecting specific waste across the country will continue and the list of specific waste that will be subject to separate collection will be expanded.

To ensure financial stability and support sustainable development, the National Bank of Georgia (NBG) is actively integrating environmental, social and sustainability issues into its policies. The Bank has developed a Sustainable Finance Roadmap, which sets out specific time-bound actions. The roadmap aims to create a sound regulatory framework and prepare the market for the transition to sustainable finance (Vanishvili, M., Kokashvili, N., & Sosanidze, M., 2025).

Together with local and international experts, the NBG also developed a Sustainable Finance (SF) Taxonomy, which was published in August 2022. In January 2023, the NBG also adopted a taxonomy regulation that defines green, social and sustainable loans and imposes monthly reporting obligations on commercial banks. As of September 2025, the green loan portfolio in Georgia related to the SF taxonomy amounted to approximately 412 million GEL, which represents less than 1% of the total credit portfolio. The majority of these loans (63%) are directed to the renewable energy sector, 57% are allocated to hydroelectric projects, and 17% to the green transport sector.

[1] http://www.gov.cn/xinwen/2022–03/08/content_5677832.htm.

Our research has shown that the following projects are more often financed through green bonds in Georgia:

(1) *Energy efficiency and renewable energy projects:* Implementation of energy-efficient technologies, such as LED lighting and energy-efficient HVAC systems, which have reduced energy consumption, carbon emissions, and costs;

(2) *Pollution prevention and control projects:* Implementation of pollution prevention and control technologies, such as air and water filtration systems. As a result, both air and water quality have improved and environmental pollution has been reduced;

(3) *Natural resource and land management projects:* Restoration of forests, land conservation, and protection of biodiversity. Georgia's ecosystem has been improved, biodiversity has been preserved, and an action plan to combat climate change has been developed;

(4) *Clean Transport Projects:* Development of eco-friendly transport systems, such as electric buses and bike lanes. Energy savings, reduced air pollution, and reduced transport costs;

(5) *Water and Waste Management Projects:* Development of water conservation and waste management programs, such as rainwater harvesting and waste recycling. Water resources are saved, waste is reduced, and environmental pollution is reduced;

(6) *Green Building Projects:* Construction and renovation of energy-efficient and eco-friendly buildings. Energy consumption, carbon emissions, and costs are reduced (Vanishvili, M., & Kharitonashvili, T., 2020).

According to experts, given the national goals set for achieving carbon neutrality for the Georgian economy, it is impossible to finance only green projects and sectors, which would make them even greener. To achieve climate change goals, it would be appropriate to involve companies in dirty and carbon-intensive sectors in the process using transitional bonds, which would make them more sustainable.

III. Conclusions

The required financial resources for investing in the green economy are difficult to quantify due to its global, multi-sector nature and the lack of reliable data. According to the International Renewable Energy Agency (IRENA), global investment in low-carbon energy transition technologies reached a new record of $1.3 trillion in 2022. However, annual investment must more than quadruple to exceed $5 trillion to stay within the 1.5°C limit for global warming. By 2030, total investment in the green economy must reach $44 trillion[1].

The lack of transparency and predictability in national green investment policies impacts investor confidence. To make green finance more accessible and effective, unified green investment standards must be developed, stricter requirements for companies and projects must be established, and greater transparency and accountability must be ensured.

[1] https://www.irena.org/Publications/2023/Feb/Global-landscape-of-renewable-energy-finance-2023

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