THE ROLE OF FINANCIAL INSTRUMENTS IN PROMOTING SUSTAINABLE FINANCE AND THE CIRCULAR ECONOMY

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Abstract. *In the current context of climate change and sustainability concerns, the role of financial instruments in promoting sustainable finance and the circular economy is becoming increasingly important. This paper explores various available financial instruments, such as green bonds, sustainable loans, and ethical investment funds, and analyzes their impact on promoting circular economy initiatives. It also examines the barriers and challenges faced in implementing these instruments, as well as the policies and regulations that can facilitate their integration. By identifying the most effective practices and strategies, the paper aims to provide a comprehensive perspective on how the financial sector can contribute to the transition towards a more sustainable and circular economic model.*
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Introduction. The future of finance is digital: both consumers and businesses are increasingly adopting digital financial services, while innovative market players are implementing new technologies, and existing business models are shifting towards a collaborative and circular economy.

Digital finance has played a key role in helping citizens and businesses navigate the unprecedented challenges brought by the COVID-19 pandemic. For instance, online identity verification has enabled consumers to open accounts and access a wide range of financial services remotely. A growing proportion of in-store payments is now digital and contactless, and e-commerce has seen significant growth.

FinTech solutions have contributed to expanding and accelerating access to loans, including through the issuance of "green bonds" and government-backed loans as part of the response to the pandemic. Ensuring a stable and reliable digital infrastructure has also become crucial, given the increasing number of users of online financial services and the fact that many employees in the financial sector are working remotely. If there were any doubts before, it is now clear that digital finance

offers numerous benefits, and both citizens and businesses in Europe are ready to embrace them.

Europe must fully capitalize on this digital shift as part of its recovery strategy, contributing to the repair of the social and economic damage caused by the pandemic. Digital technologies will be essential for relaunching and modernizing the European economy across all sectors. They will enable Europe to advance as a global digital player. At the same time, financial service users must be protected from the risks associated with the increasing use of digital finance[11].

Innovation is increasingly taking a digital form, facilitating the development of businesses. To a growing extent, innovation involves new products, processes, or business models made possible by digital technologies. While initially serving merely as support, information technology systems, combined with appropriate software, have become a central pillar of economic activities for many businesses. This is because digitalization offers substantial new opportunities, as digital networks and data services generally facilitate economies of scale, enabling the provision of better-quality services at lower costs.

Innovation cycles are accelerating, becoming more open and collaborative. Digital technologies and applications are increasingly being built in a modular manner, communicating with each other through application programming interfaces (APIs).

Although financial innovation is not a new phenomenon, investments in technology and the pace of innovation have increased significantly. FinTech solutions are being introduced that use digital identification, mobile applications, cloud computing, big data analysis, artificial intelligence, blockchain technology, and distributed ledger technology. These new technologies are transforming the financial sector and the way consumers and businesses access services, creating opportunities for FinTech-based solutions to offer better access to finance and improve financial inclusion for digitally connected citizens. These developments place the consumer at the center, support operational efficiency, and further enhance the competitiveness of the EU economy. FinTech also plays an important role in the Capital Markets Union. It can contribute to deepening and expanding the EU capital markets by integrating digitalization, with the aim of transforming business models through data-driven solutions, such as in asset management, investment intermediation, and product distribution.

FinTech also presents opportunities and challenges regarding regulatory compliance and oversight. It can facilitate, streamline, and automate compliance and reporting processes, as well as improve supervision. Service providers can offer FinTech-based compliance services to regulated entities. However, regulated entities remain responsible for fulfilling their obligations. For instance, entities subject to customer due diligence requirements under anti-money laundering regulations

[11] Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions - "Now is Europe's time: repairing the damage caused by the crisis and preparing the future for the new generation", COM(2020) 456 final, 27.5. 2020.

cannot delegate responsibility for meeting these requirements to external service providers.

FinTech also poses challenges, such as cybersecurity risks, data protection issues, consumer and investor protection concerns, as well as market integrity matters. The General Data Protection Regulation (GDPR) and the Anti-Money Laundering Directive provide fundamental safeguards for protecting personal data and ensuring the integrity of the EU's financial system against money laundering and terrorist financing. An EU financial market based on technology requires full compliance with these fundamental safeguards. Cyber risks undermine trust and pose a threat to the stability of the financial system. Periodic security breaches highlight that cyberattacks are an increasing source of concern. Such attacks should be decisively addressed to prevent and mitigate any negative consequences for the financial sector and its clients and consumers. It is of paramount importance that the financial sector becomes more cyber-resilient to ensure that it is well-protected, that financial services are efficiently and seamlessly delivered across the EU, and that consumer and market confidence is maintained.

European regulatory and supervisory frameworks should allow businesses operating in the EU single market to benefit from financial innovation and offer their customers the most suitable and accessible products. Such frameworks should also ensure a high level of consumer and investor protection while maintaining the resilience and integrity of the financial system.

Literature review. Digital finance has evolved significantly in recent decades, with its roots in the adoption of electronic payment systems and the development of internet banking in the late 1990s (Smith & Jones, 2015). Early literature focuses on the transformation from traditional banking methods to digital solutions, emphasizing the gradual adoption of online transactions and digital payment platforms (Lee, 2010). In the contemporary era, the integration of advanced technologies such as mobile banking and blockchain has reshaped the financial sector (Doe, 2021).

The Impact of Digital Innovation on Business Development

According to Brown (2018), digital innovation has facilitated the growth of businesses by offering more efficient and cost-effective solutions. The adoption of cloud computing, big data analytics, and artificial intelligence (AI) has allowed companies to streamline their processes and enhance decision-making capabilities. Studies show that the adoption of digital financial tools has significantly accelerated the speed of business transactions and reduced operational costs (Anderson & Black, 2019).

Modular Innovation and Open Financial Systems. Recent research highlights the importance of modularity in digital innovation, particularly in financial services (Miller & Thompson, 2020). The development of Application Programming Interfaces (APIs) has fostered a more open and collaborative environment for financial services, allowing different platforms and systems to interact seamlessly

(White et al., 2022). This modular approach to innovation promotes flexibility and enhances the scalability of financial solutions (Doe, 2021).

The Role of FinTech in Sustainable Finance and the Circular Economy

The Emergence of Green Bonds and Sustainable Finance

The issuance of green bonds has become a cornerstone of sustainable finance, with FinTech playing a pivotal role in this sector (Smith & Green, 2020). As described by Johnson and Lee (2019), FinTech platforms have facilitated the distribution of green bonds by providing transparent and efficient mechanisms for issuers and investors. Research suggests that these financial instruments are crucial for promoting investments.

Research methodology. This chapter outlines the research methodology employed to investigate the role of financial instruments in promoting sustainable finance and the circular economy. The methodology is based on empirical research, combining both qualitative and quantitative methods. This approach allows for a comprehensive understanding of the phenomena being studied by collecting data from various sources and applying different analytical techniques.

The research is designed as a mixed-methods study, incorporating both quantitative and qualitative approaches to gather comprehensive data on the subject. The empirical nature of the research allows for real-world insights and the generation of data that can lead to a deeper understanding of the application of FinTech solutions in sustainable finance.

The quantitative analysis component focuses on analyzing numerical data related to the adoption of digital financial instruments, particularly FinTech solutions, in promoting sustainable finance and circular economy practices. This includes statistical analysis of financial data, trends in the issuance of green bonds, and the impact of digital finance on sustainability metrics.

The qualitative analysis component includes in-depth interviews and case studies. Interviews are conducted with key stakeholders in the financial sector, including experts in sustainable finance, circular economy, and digital finance. The case studies focus on organizations and financial institutions that have successfully implemented FinTech solutions to support sustainability goals.

The empirical research relies on two main sources of data: primary and secondary.

The primary data was collected through surveys and interviews with industry experts, as well as financial professionals involved in the development and implementation of green financial instruments.

Secondary data were collected from a range of published reports, academic articles, and financial databases. This data provided context and supported the quantitative analysis by offering insights into the broader trends in sustainable finance and the circular economy.

Financial Data: Data from financial institutions and market reports on green bond issuance, the performance of sustainability-linked financial instruments, and the integration of digital technologies in finance.

Literature Review: Articles from academic journals on sustainable finance, circular economy, and the role of FinTech in these areas were reviewed to support the empirical findings.

The research utilized a purposive sampling technique to select participants for interviews and case studies. This approach was chosen to ensure that only individuals with relevant experience and knowledge of sustainable finance and FinTech were included.

Data Analysis Methods. The data analysis for this research employed both quantitative and qualitative methods to ensure a robust examination of the research questions. Metrics such as the frequency of green bond issuance, the rate of adoption of blockchain technology, and the level of digital financial services usage were examined. To explore relationships between the adoption of FinTech solutions and sustainability outcomes, inferential statistics such as regression analysis were used. This helped to quantify the impact of digital finance on promoting the circular economy and reducing environmental impact.

The qualitative data collected from interviews were analyzed using thematic analysis. The interview transcripts were coded to identify key themes related to the role of FinTech in supporting sustainable finance. Themes such as the challenges of implementing digital finance solutions and the benefits of blockchain in tracking sustainability metrics were explored.

The case studies were analyzed in-depth to provide contextual understanding of how different financial institutions are leveraging digital finance to drive sustainability. This involved comparing the experiences of institutions to identify the best practices and lessons learned.

The research adhered to strict ethical guidelines to ensure the confidentiality and privacy of the participants. All respondents to the survey and interviews were informed about the purpose of the research, and their consent was obtained before data collection. Additionally, all data was anonymized to protect the identities of the participants and institutions involved in the study.

This chapter has outlined the research methodology used in this study, highlighting the mixed-methods approach that combines both quantitative and qualitative analysis. By employing empirical research techniques, this study aims to provide a comprehensive understanding of how financial instruments, particularly those enabled by FinTech, can support the transition to sustainable finance and the circular economy.

Main results. In response to the significant risks posed by global warming, on December 12, 2015, 195 countries participating in the United Nations Framework Convention on Climate Change reached an agreement by adopting the Paris Agreement. The primary goal was to limit global temperature rise to well below 2°C above pre-industrial levels, with efforts to further limit the increase to 1.5°C to mitigate severe impacts.

The European Commission has since set an ambitious target of achieving net-zero greenhouse gas emissions by 2050, which will require major transformations across economies and present significant challenges for various industries.

Sustainable finance plays a crucial role in meeting the political objectives outlined in the European Green Deal, launched by the European Commission in 2019, as well as in fulfilling the EU's international commitments on climate action and sustainability. Sustainable finance helps channel private investments towards a climate-neutral, resource-efficient, and equitable economy that is resilient to climate change. It also ensures that investments contribute to a sustainable recovery in the aftermath of the COVID-19 pandemic, with funds allocated to EU member states contingent on meeting specific environmental and sustainability criteria.

To further support the objectives of the European Green Deal, the European Climate Law came into force on July 29, 2021. This law ensures that all EU policies align with the goal of achieving climate neutrality by 2050, making this target legally binding. Both EU institutions and member states are required to take necessary measures at both the EU and national levels to meet this objective, while emphasizing the importance of fairness and solidarity among member states.

The Climate Law also includes provisions for monitoring progress and adapting actions as needed, based on existing systems such as the governance process for national energy plans and periodic reports from the European Environment Agency, as well as the latest scientific evidence on climate change and its effects.

Sustainable finance has become a key focus for the European Union, serving as a critical tool in achieving the political objectives of the European Green Deal. It is seen as a type of financing that supports the sustainable development of the economy while simultaneously reducing environmental pressures and considering social and governance factors.

The purpose of sustainable finance is to improve the financial sector's contribution to sustainable development, particularly in the context of combating climate change. This involves integrating environmental, social, and governance (ESG) factors into financial decision-making, with the goal of directing long-term investments towards sustainable economic activities and projects.

Several legislative initiatives at the European level have been introduced and transposed into national legislation, or applied directly in Romania, to foster the development of environmentally sustainable economies, in line with collective efforts to combat climate change.

The European Commission's action plan on sustainable finance and its renewed strategy for sustainable finance includes ten initiatives organized into three main categories:

- ✓ Reorienting capital flows towards a more sustainable economy.
- ✓ Incorporating sustainability elements into risk management.
- ✓ Encouraging transparency and a long-term vision.

The implementation of this action plan has led to the adoption of a set of legislative acts that create the necessary framework for sustainable finance, including:

Definition of sustainable economic activities: Regulation (EU) 2020/852 establishing a framework to facilitate sustainable investments (Taxonomy Regulation).

Introduction of transparency requirements:

Establishing reporting requirements for providers and distributors of financial products and services to clients regarding the impact of sustainability risks on investment profitability and the effect of investments on the economy's sustainability – Regulation (EU) 2019/2088 on sustainability-related disclosures in the financial services sector (SFRD).

Imposing obligations on companies to report reliable and comparable sustainability information needed by investors and other stakeholders – a proposal for a directive on corporate sustainability reporting (CSRD), which entirely replaces the Non-Financial Reporting Directive (NFRD).

Creation of new benchmarks for low-carbon impact activities: A benchmark for climate transition activities and a specialized benchmark – Regulation (EU) 2019/2089 amending Regulation (EU) 2016/1011 on benchmarks.

In addition to financing mechanisms supporting sustainable projects through banking and financial markets, the insurance sectors, as well as those in the investment fund and private pension fund industries, play a significant role in the transition to a green economy as institutional investors interested in placing financial resources for the medium and long term.

Financial market participants, financial advisors, and issuers are obliged to provide specific information regarding their approaches to integrating sustainability-related risks and considering the negative impacts on sustainability.

In June 2021, the European Commission adopted a new strategy for financing the transition to a sustainable economy, aiming for several actions to achieve this goal, including:

- Expanding the EU Taxonomy framework, a general framework for the green labeling of financial instruments;
- Identifying gaps in protection offered by insurers regarding natural disasters;
- Including ESG risks in credit ratings;
- Amendments to the Solvency II directive to integrate sustainability risks into insurers' risk management processes.

In the context of the new strategy, the European Commission also proposed establishing a legal framework for European green bonds through a new regulation (European Green Bond Standards – EUGBS).

Achieving the United Nations (UN) Sustainable Development Goals (SDGs) requires sustained long-term investment. These investments are crucial for decarbonizing existing physical capital, ensuring resilience to a changing climate, conserving and enhancing natural capital, and training and reskilling the workforce for a climate-neutral economy.

The coronavirus pandemic has further complicated this challenge, imposing unprecedented pressure on individuals, healthcare systems, national economies, and government finances.

The European Union (EU) has decisively responded to facilitate recovery through the ambitious €750 billion "NextGeneration EU" package. Additionally, at the international level, the EU launched the "Team Europe" initiative, part of the global crisis response program, amounting to nearly €36 billion. However, recovery from COVID-19 is expected to dominate global public finances in the short and medium term, especially considering the calls from various stakeholders for a green recovery.

The European Investment Bank (EIB) Group, including the Bank and the European Investment Fund, plays a vital role in supporting the EU in achieving the long-term objectives of the European Green Deal and the UN SDGs.

The EIB Group is one of the world's largest financiers of sustainable development, with a particular focus on climate action and environmental sustainability. Through a wide range of financial products and advisory services, the EIB collaborates with partners to support long-term ecological investment needs. The EIB Climate Bank Roadmap for 2021-2025 focuses on innovation, providing everything from seed capital for early-stage development to senior debt for mature technologies.

The EIB Board's decisions centre on two main areas:

- First, the EIB aims to increase its support for climate action and environmental sustainability, targeting over 50% of its total lending activity by 2025. This commitment is intended to mobilize €1 trillion for investments in the coming decade, accelerating the transition to a climate-neutral and resilient economy.
- The second essential dimension is to ensure that "all financing activities align with the objectives and principles of the Paris Agreement." The EIB cannot support the agreement with 50% of green financing while simultaneously undermining its goals with the remaining 50%, adhering to the principles of sustainable finance.

The EIB is committed to ensuring that all its activities do not significantly harm the objectives of reducing carbon emissions and adapting to climate change. In line with the common alignment framework of the Multilateral Development Banks (MDBs) from Paris, the Roadmap breaks down this commitment into four main workstreams. The first focuses on accelerating the global ecological transition by increasing green investments and supporting long-term innovation and new business models. Additionally, it emphasizes ensuring that the transition is equitable for all, supporting communities vulnerable to climate risks.

The EIB Group will continue to support a wide range of activities in accordance with its public policy objectives. Therefore, the third workstream aims to ensure that none of these activities significantly impede the transition. In other words, all its financing activities should align with the objectives of the Paris Agreement.

The European Green Deal is becoming the new growth strategy for the EU, representing a significant opportunity for the EIB Group to strengthen its dialogue with member states to facilitate the long-term achievement of green investments. This level of ambition also extends beyond the EU's borders.

The Agreement addresses eleven areas, including a just transition for all, both within the EU and globally; thus, these areas are relevant to the EIB's operations worldwide.

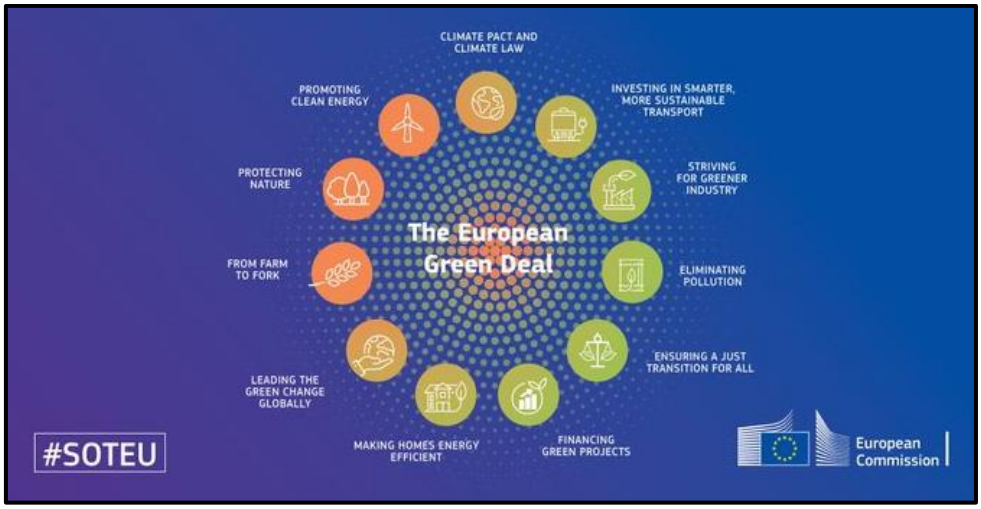

Figure 1. **Basic themes of the European Green Deal**
Source: europa.eu

Structuring around these areas of interest helps to ensure full alignment of the EIB Group with the EU. including the objectives and by extension the use of the EU budget. It provides a coherent basis for strengthening dialogue with Member States on investment programs – ranging from medium-term Recovery and Resilience Plans[12], National Energy and Climate Plans 2030[13], National adaptation strategies and plans, territorial just transition plans[14], or long-term national strategic plans[15].

Green bond as a sustainable investment tool. The rapid transition to a low-carbon economy is necessary to achieve the climate goal agreed in the Paris Agreement. The Intergovernmental Panel on Climate Change's latest report, the Sixth Assessment Report, concluded that global emissions would need to be almost halved by 2030 to limit the 1.5°C temperature increase that is projected to require an additional average annual investment in clean energy and infrastructure of about $3 trillion by the end of the decade. The International Monetary Fund is also calling for the harnessing of private finance for climate change in emerging markets and

[12] https://ec.europa.eu/info/files/guidance-member-states-recovery-and-resilience-plans_en
[13] https://energy.ec.europa.eu/topics/energy-strategy/national-energy-and-climate-plans-necps_en
[14] https://ec.europa.eu/info/strategy/priorities-2019-2024/european-green-deal/finance-and-green-deal/just-transitionmechanism_en#:%7E:text=Territorial%20just%20transition%20plans%20define,to%20be%20met%20by%202030
[15] https://ec.europa.eu/info/energy-climate-change-environment/implementation-eu-countries/energy-and-climate-governance-and-reporting/national-long-term-strategies_en

developing economies (see Figure below). The financial market has a vital role to play in directing capital to the required capital investment.

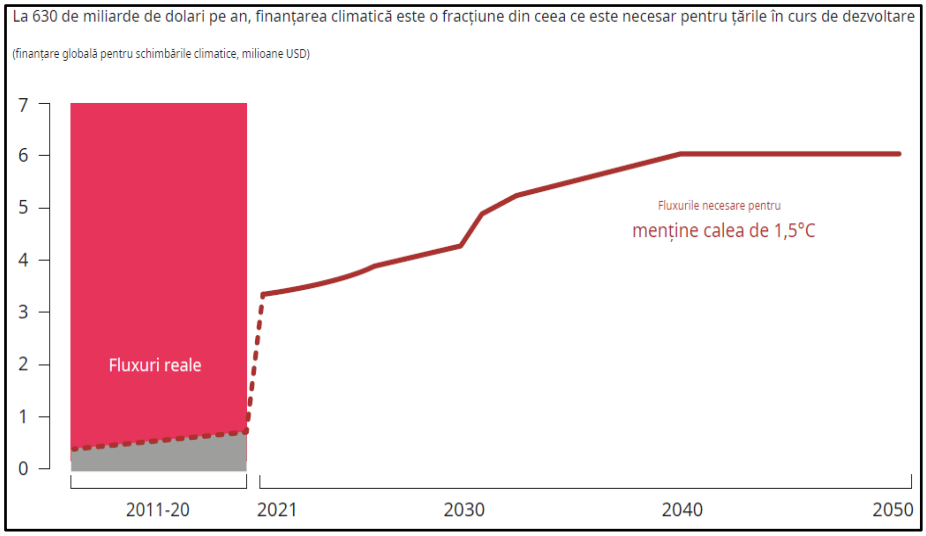

Figure 2. **Climate change financing gap in developing countries**

Source: "The public sector must play a major role in catalyzing private finance for climate change" (K. Georgieva and T. Adrian), International Monetary Fund, August 2022, www.imf.org

Green bonds have become the main sustainable financing tool in the market. Since the first green bond was issued in 2007 by the European Investment Bank, the green bond market has grown into a cumulative issuance market of US$1.6 trillion. Issuance of green bonds in 2021 increased by 75% from the previous year, exceeding 500 billion dollars. According to Dutch bank ING, global ESG bond supply will likely reach $905 billion in 2024. Having topped $1 trillion in 2021, the global supply of ESG bonds has struggled to maintain the same pace. The outlook for sovereign and municipal green bond issuance remains strong in the US, where corporate deals have tailed off. Meanwhile, reports towards the end of 2023 indicate ESG fund flows face growing headwinds, impacting their popularity.

Green bonds are fixed-income securities that resemble conventional bonds; however, the funding raised through the issuance of these bonds is primarily directed toward environmental sustainability. The introduction of the Green Bond Principles (GBP) in 2014 played a significant role in promoting the green bond market by providing guidelines on best practices for issuing green bonds. The GBP established four core components to determine whether a bond qualifies as green:

1. *Use of Proceeds:* The proceeds must be exclusively allocated to eligible green projects, which should be clearly described in the legal documentation of the bond.
2. *Project Evaluation and Selection Process:* The issuer must clearly communicate the environmental sustainability objectives of the eligible green projects to investors. This includes detailing how the issuer determines the

projects' alignment with eligible green categories and providing additional information on how they identify and manage perceived social and environmental risks associated with the relevant projects.

3. *Management of Proceeds:* The net proceeds from the green bond, or an equivalent amount, should be credited to a sub-account, transferred to a sub-portfolio, or otherwise tracked by the issuer in a manner that is appropriate and certified by the issuer through a formal internal process linked to their lending and investment operations for eligible green projects.
4. *Reporting:* Issuers are required to provide and maintain updated information on the use of proceeds, which should be renewed annually until complete and timely allocation, especially in the case of significant developments.

The European Commission is also establishing a EU Green Bond Standard as part of the European Green Deal— the EU's growth strategy aimed at transitioning the EU economy to a sustainable economic model, including the goal of becoming the world's first climate-neutral continent by 2050.

By leveraging the capabilities of distributed ledger technology, the entire bond issuance and subscription process, along with related lifecycle events, were modelled from creation to maturity, involving stakeholders such as investors, placement institutions, issuers, and green data providers. While maintaining critical functionalities, the following enhancements have been introduced:

- *Embedded Market and Processing Rules:* Each step of the process is validated in an observable and auditable manner, ensuring compliance with established market rules.
- *Encoding of Legal Agreements:* The legal terms of real-world agreements are encoded and preserved within Daml smart contracts, which explicitly define the roles, rights, and obligations of all stakeholders involved in the workflow.
- *Strict Privacy and Data Segregation:* Privacy is rigorously enforced through Daml's need-to-know data model, which is implemented via the smart contract coding framework and integrates with a cryptographically secured blockchain platform.
- *Simultaneous Settlement Across the Holding Chain:* Settlement occurs simultaneously throughout the entire holding chain, enhancing asset mobility while effectively eliminating counterparty risk from the process.

All these combined elements between digital, green and circular can be found in the Genesis 2.2 Project. launched in 2022 (Fig.3, Fig.4 and Fig.5).

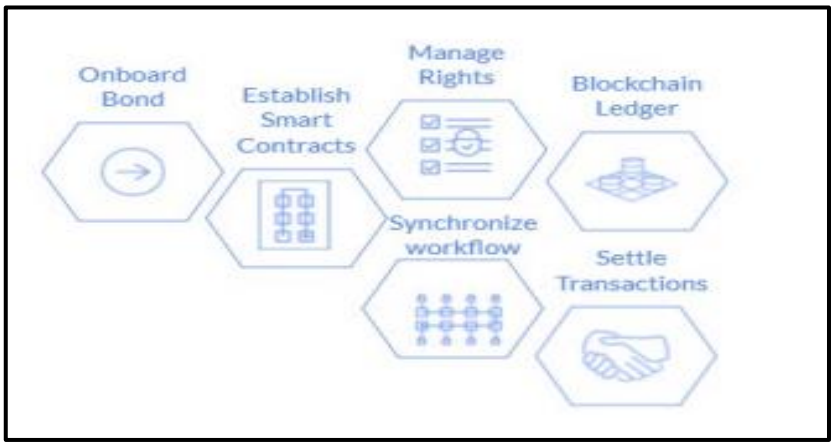

Figure 3. **Bond Onboarding with Smart Contracts**
Source: Genesis Project 2.0., 2022

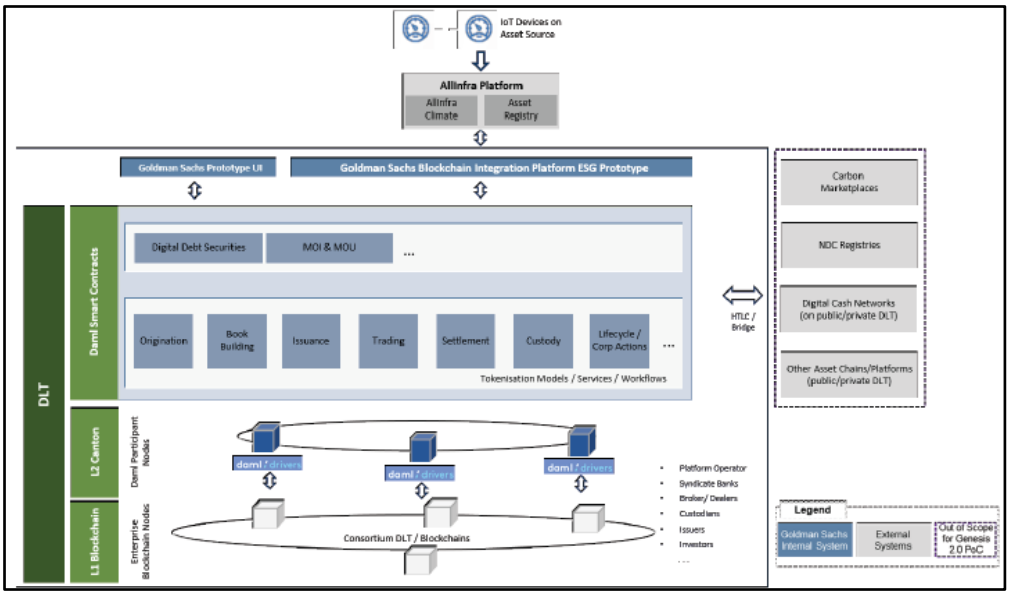

Figure 4. **DAP ESG prototype technical architecture**
Source: Genesis Project 2.0., 2022

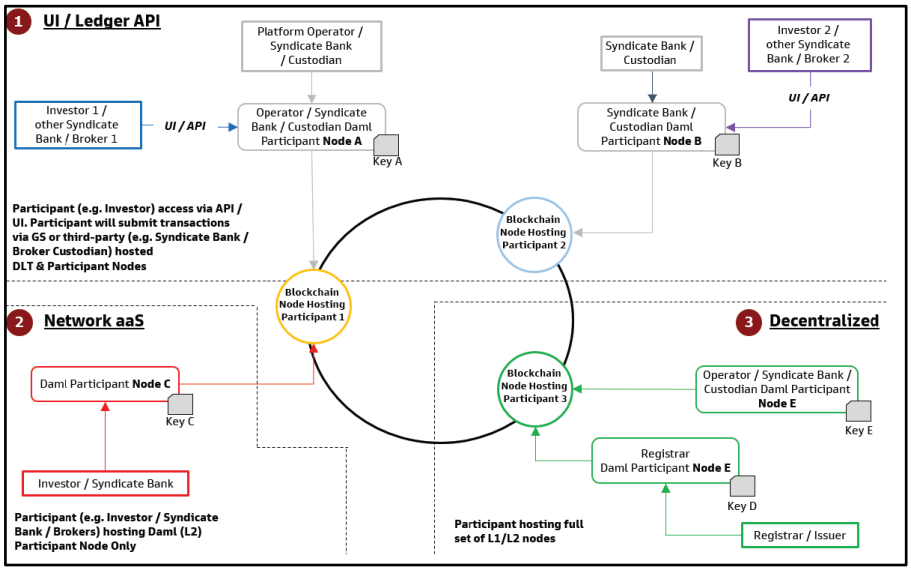

Figure 5. **Implementation architecture of the "green bond" participant**
Source: Genesis Project 2.0., 2022
Project Genesis 2.0 Solutions

Efficiency Gains Through Digitalization

The prototype enhances efficiency by fully digitizing the bond issuance process. By utilizing this prototype, issuers can completely digitize the subscription, allocation, and settlement processes for green bonds and MOI (Measurable Outcome Indicator) assets. This allows for direct delivery to investors' digital wallets. As a result, issuers can engage directly with investors, eliminating redundant steps, shortening the settlement cycle, and ultimately reducing costs, risks, and capital requirements in the market.

Transparency in Environmental Impact

The prototype ensures transparency regarding the ecological impact of funded projects by tracking MOIs, effectively mitigating the risk of greenwashing. It facilitates on-demand monitoring of real-time, unverified MOI data for the environmentally friendly activities financed through green bonds. This capability enhances the clarity surrounding the environmental impact of projects and the progress of commitments related to ecological attributes (i.e., MOI bonds). Consequently, it enables all stakeholders to make informed decisions based on their investment objectives. Furthermore, it helps limit instances of ecological misconduct by allowing investors to monitor the MOI achievements of the issuer and facilitating the direct allocation of any associated ecological certificates to investors.

The sustainable finance market has experienced significant growth, with a strong investor appetite for products that address social issues. Social, gender, and sustainability bonds and loans offer pathways to direct capital towards reducing persistent inequalities between women and men; however, they are not being utilized to their full potential. This note provides guidance to the market on how sustainable debt instruments could be employed to promote gender equality in both the public

and private sectors. We hope to encourage stakeholders in the capital markets to go beyond traditional activities in addressing gender inequalities and to unlock the financing opportunities presented by sustainable instruments.

At the European level, the "Green Index 3.0" has been developed through the Inclusive and Climate-Smart Green Finance Action Group. The Green Index serves as the primary indicator for assessing the current performance of a financial actor, including green financing, and for defining an action plan to improve it.

Green Index 3.0 is aligned with existing primary standards, initiatives and regulations, ensuring simpler reporting and compliance for stakeholders using Green Index 3.0. Sample initiatives, standards and regulations from among the 70+ reviewed.

Figure 6. **Standards, initiatives and regulations**
Source: own processing, EMN, Green Index 3.0., 2022

As of 2021, "Green" is one of the 7 dimensions of USSEPM and is integrated into the SPI. USSEPM Dimension 7 is a lighter version of Green Index 3.0.

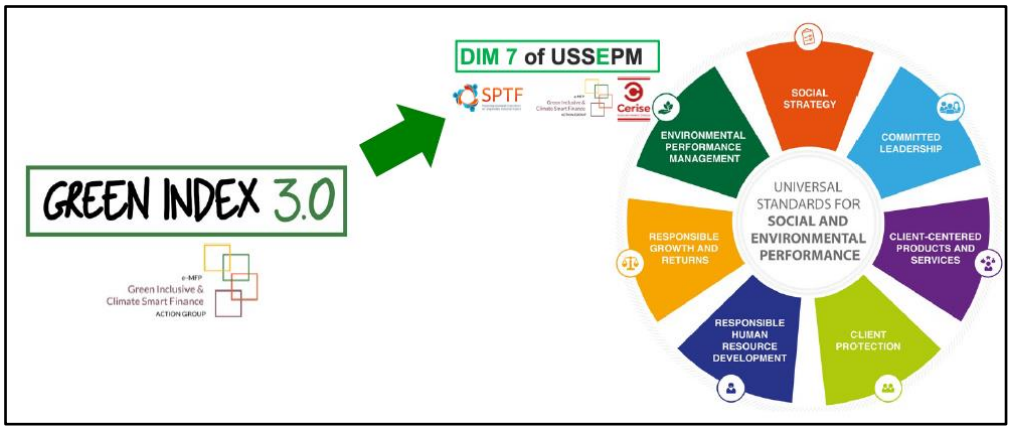

Figure 7. **Integrating environmental performance into USSEPM**
Source: own processing, EMN, Green Index 3.0., 2022

Innovation is crucial for enhancing Europe's competitiveness and ensuring the health and well-being of its citizens. It shapes markets, transforms economies, and drives significant improvements in public services. Additionally, innovation is essential for achieving the ambitious goals of both the green and digital transitions.

Green bonds play a vital role in fostering financial innovation that is green, digital, and inclusive.

A notable example of the impact of green bonds as a financing instrument was realized through the Recovery and Resilience Mechanism. In this initiative, EU countries were required to outline a cohesive package of projects, reforms, and investments across six policy areas in their recovery plans. The European Commission's largest program, NextGenerationEU, is a recovery tool amounting to approximately €800 billion in current prices, equivalent to 5% of EU GDP. This marks the first time that financial instruments are being supported through capital markets. To finance this program, the Commission is backing the issuance of securities on international capital markets as part of its diversified financing strategy. Approximately 30% of the funds for this initiative are being raised through the issuance of NextGenerationEU Green Bonds.

The European Commission is already issuing bonds to fund loans to the EU and third countries under four programs, including up to €100 billion for the SURE program to support jobs and keep people in work. To raise up to around €800 billion in current prices by 2026 for NextGenerationEU under the best financial conditions – 5% of EU GDP – the Commission will use a diversified financing strategy.

 loan for financing the recovery.

 the NextGenerationEU diversified financing strategy.

The European Commission is empowered by the EU Treaty to borrow from the international capital markets, on behalf of the European Union. It is a well-established name in the debt securities markets with a solid track record of successful bond issues over the last 40 years. These bond transactions are denominated exclusively in euros.

Loan repayment. he repayment of the loan will start from 2028 and will take place over a long-time horizon – until 2058. The loans will be repaid by the borrowing Member States. The grants will be reimbursed from the EU budget.

To help repay the loan, the Commission will propose new own resources to the EU budget (or sources of income), in addition to the existing ones. They could also be used for early repayment before 2028.

Table 1. **Presentation of bond syndication for NextGenerationEU financing**

(millions of euros)

EU000A3KSXE1	22-06-21	10 y	04-07-31	20 000	0.09%	0.00%	142 000
EU000A285VM2	06-07-21	30 y	06-07-51	6 000	0.73%	0.70%	83 000
EU000A3KTGV8	06-07-21	5 y	06-06-26	9 000	-0.34%	0.00%	88 000
EU000A283859	20-07-21	20 y	04-07-41	10 000	0.47%	0.45%	96 000
EU000A3KWCF4	21-09-21	7 y	04-10-28	9 000	-0.28%	0.00%	103 000
EU000A3K4C42	**19-10-21**	**15 y**	**04-02-37**	**12 000**	**0.45%**	**0.40%**	**135 000**

Source: own data processing European Commission, 2021

Table 2. **Presentation of NextGenerationEU funding bond auctions**

(millions of euros)

ISIN	type	Data	trance	maturity	The allocated volume *	Old outstanding amount *	The new outstanding amount *	Weighted average price	Lowest price accepted	% awarded at the lowest accepted price	Weighted average yield	Coverage rate
EU000A3KTGV8	Tap	29-09-21	15 y	06-07-26	2 495	9 000	11 495	102.35	102.20	22.11 %	-0.487 %	2.33
EU000A3KWCF4	Tap	27-10-21	7 y	04-10-28	2 497	9 000	11 497	100.81	100.67	59.70 %	-0.117 %	1.58

Source: own data processing European Commission, 2021

The interactions between Sustainalytics and corporate clients issuing green bonds, as well as government institutions and local administrations, have led to numerous benefits. These benefits, which the green bond issuing clients emphasized as highly significant, align with the findings from respondents of the Climate Bonds Initiative[16].

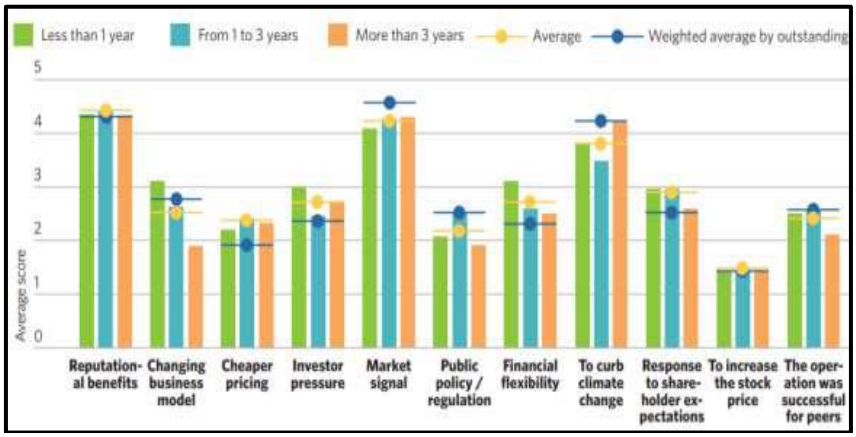

Figure 8. **Benefits reported by green bond issuers**

Sursa: Climate Bonds Initiative, 2020

Currently, green bonds stimulate the diversification of the investment client base for issuing clients through two major advantages. On one hand, these bonds are generally oversubscribed, and on the other hand, they provide a much higher level of

[16] Climate Bonds Initiative, *Green Bond Treasurer Survey 2020,* disponibil la: https://www.climatebonds.net/files/reports/climate-bonds-gb-treasurer-survey-2020-14042020final.pdf

price/volume stability. Additionally, this type of issuance helps raise awareness of social and environmental issues and opportunities. Most new green bond issuers emphasize that these financial instruments assist them in promoting sustainability goals and transitioning their business models toward more sustainable practices.
According to Regulation (EU) 2019/2088 of the European Parliament and Council, it is crucial to define the key actors involved in financing transactions. Bond markets provide an additional source of green financing that complements bank loans and serve as an important signaling mechanism for companies and investors. Green bonds utilize capital markets as a financial instrument to raise funds, particularly for investment projects such as renewable energy, energy efficiency, and clean water. The literature introduces the concept of "sustainable, social, and green bonds," which are also essential investment tools for achieving sustainable development goals. These bonds require issuers to report on and disclose the use of proceeds to connect investors with assets expected to have a positive impact on sustainability.

Discussion and conclusions. The increasing urgency to address climate change and environmental degradation has positioned sustainable finance as a critical component of global economic policy. Financial instruments, particularly green bonds, have emerged as pivotal tools in promoting sustainable practices and supporting the transition towards a circular economy. As highlighted in recent regulations, such as Regulation (EU) 2019/2088 of the European Parliament and Council, defining the roles of key stakeholders in financing transactions is essential for the effective implementation of these instruments.

Green bonds facilitate the diversification of the investment client base for issuers, offering dual advantages: they are often oversubscribed and provide greater price and volume stability. This has led to a growing interest from both corporate clients and governmental entities, which recognize the importance of these financial tools in achieving their sustainability goals. By tapping into capital markets, green bonds create a significant source of financing that complements traditional bank loans, thereby enhancing the overall funding landscape for sustainable projects.

Furthermore, the promotion of social and environmental awareness through these financial instruments underscores their broader impact. New green bond issuers frequently emphasize how these tools not only help finance specific projects, such as renewable energy and energy efficiency initiatives, but also play a crucial role in transitioning their business models toward more sustainable practices. This aligns with the emerging concepts of sustainable, social, and green bonds, which are increasingly recognized as vital investment vehicles for achieving the United Nations' Sustainable Development Goals (SDGs).

The obligation for issuers to report on the use of proceeds from green bonds is essential for ensuring transparency and accountability. By connecting investors with assets expected to yield positive sustainability impacts, these financial instruments foster greater confidence in the market, thereby attracting more investment into sustainable ventures. This shift toward a more accountable and transparent financial

landscape is not only beneficial for individual issuers and investors but is also vital for advancing the circular economy.

Limitations of the Research

Despite the promising findings regarding the role of financial instruments in promoting sustainable finance, this research has several limitations. First, the analysis primarily focuses on green bonds, which, while significant, represent only one segment of the broader sustainable finance landscape. Other instruments, such as sustainability-linked bonds or social bonds, warrant further exploration. Additionally, the study's reliance on secondary data from regulatory documents and market reports may limit the depth of insight into the motivations and experiences of stakeholders involved in these transactions.

Moreover, the rapidly evolving nature of sustainable finance means that the research may not fully capture the most recent trends or regulatory changes that could impact the effectiveness of financial instruments. The geographical scope is also limited, as the focus has primarily been on the European context, which may not fully represent global dynamics in sustainable finance.

Future Research

Future research should aim to address these limitations by expanding the scope to include a wider variety of financial instruments used in sustainable finance, such as impact investing and social bonds. Comparative studies across different regions and markets could provide valuable insights into the effectiveness and adoption of these instruments in diverse contexts.

Additionally, qualitative research, including interviews and surveys with stakeholders such as issuers, investors, and regulatory bodies, could enrich the understanding of the motivations, challenges, and best practices associated with sustainable finance initiatives. Finally, examining the long-term impacts of financial instruments on sustainability outcomes, particularly in relation to the circular economy, would provide crucial insights into their effectiveness in achieving desired social and environmental goals.

In conclusion, the role of financial instruments in promoting sustainable finance and facilitating the transition to a circular economy is significant. As the landscape of sustainable investment continues to evolve, it is imperative that stakeholders, including governments, financial institutions, and businesses—collaborate to enhance the effectiveness of these instruments. By doing so, they can ensure that sustainable finance becomes an integral part of the broader economic framework, ultimately leading to a more sustainable and resilient future.

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