



GREEN BONDS AS AN INSTRUMENT OF SUSTAINABLE TRANSFORMATION IN THE TEXTILE INDUSTRY

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Nevena Drobnjaković^{1*}, Kosana Vićentijević^{1,a}

¹Western Serbia Academy of Applied Studies, Valjevo Department, Serbia

*E-mail: nevena.drobnjakovic@vipos.edu.rs, ORCID ID: 0009-0006-8662-3859

^aE-mail: kosana.vicentijevic@vipos.edu.rs, ORCID ID: 0000-0002-2230-6006

ABSTRACT: *The textile industry is one of the most significant sectors of the global economy, yet it is also one of the largest generators of negative environmental externalities, including greenhouse gas emissions, intensive resource consumption, and waste accumulation. In the context of accelerating climate change and the transition toward sustainable economic models, sustainable finance is gaining strategic importance, with green bonds emerging as one of the key instruments for mobilizing capital toward environmentally sustainable projects. This paper aims to provide a comprehensive analysis of the role of green bonds in financing the sustainable transformation of the textile industry by integrating the theoretical framework of sustainable finance, analyzing market trends, and evaluating empirical evidence. The methodological approach includes the analysis of secondary data, comparative analysis of financial instruments, and case studies of relevant market actors. The research findings indicate that green bonds contribute to improving capital allocation toward projects that support decarbonization, circular economy practices, and more efficient resource management within the textile sector. However, their effectiveness largely depends on an appropriate regulatory framework, the level of transparency, standardization of reporting, and the integration of ESG criteria into investment processes.*

Keywords: green bonds, textile industry, ESG, sustainable finance, circular economy.

ZELENE OBVEZNICE KAO INSTRUMENT ODRŽIVE TRANSFORMACIJE TEKSTILNE INDUSTRIJE

APSTRAKT: *Tekstilna industrija predstavlja jedan od najznačajnijih sektora globalne privrede, ali istovremeno i jednog od najvećih generatora negativnih eksternalija po životnu sredinu, uključujući emisije gasova sa efektom staklene bašte, intenzivnu potrošnju resursa i akumulaciju otpada. U kontekstu ubrzanih klimatskih promena i tranzicije ka održivim ekonomskim modelima, održivo finansiranje dobija strateški značaj, pri čemu green bonds predstavljaju jedan od ključnih instrumenata za mobilizaciju kapitala usmerenog ka ekološki održivim projektima. Cilj ovog rada je da pruži sveobuhvatnu analizu uloge zelenih obveznica u finansiranju održive transformacije tekstilne industrije,*



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kroz integraciju teorijskog okvira održivog finansiranja, analizu tržišnih trendova i evaluaciju empirijskih primera. Metodološki pristup obuhvata analizu sekundarnih podataka, komparativnu analizu finansijskih instrumenata i studije slučaja relevantnih tržišnih aktera. Rezultati istraživanja ukazuju da zelene obveznice doprinose unapređenju alokacije kapitala ka projektima koji podržavaju dekarbonizaciju, cirkularnu ekonomiju i efikasnije upravljanje resursima u tekstilnom sektoru. Ipak, njihova efektivnost u velikoj meri zavisi od adekvatnog regulatornog okvira, nivoa transparentnosti, standardizacije izveštavanja i integracije ESG criteria u investicione procese.

Ključne reči: zelene obveznice, tekstilna industrija, ESG, održivo finansiranje, cirkularna ekonomija.

1. INTRODUCTION

The contemporary textile and fashion industry stands at a critical crossroads. On one hand, it represents a significant economic sector that employs millions of people worldwide and drives global supply chains. On the other hand, it creates profound ecological and social challenges that can no longer be ignored. According to UNEP [16] data, this sector is responsible for 2–8% of global greenhouse gas emissions, consumes an astonishing 215 billion liters of fresh water annually (equivalent to the volume of approximately 86 million Olympic-sized swimming pools), and generates around 92 million tons of textile waste each year — the equivalent of a full truckload of clothing being dumped in a landfill or incinerated every second. Fast fashion further exacerbates the situation. Clothing production doubled between 2000 and 2015, while the average lifespan of a garment decreased by as much as 36%. The result is excessive resource consumption, massive pollution of water bodies with chemicals and microplastics, and growing social pressures in supply chains, particularly in developing countries.

In this context, traditional financing models show clear limitations. Bank loans are often too rigid for long-term green investments that require substantial changes across the entire value chain, while public funds are far from sufficient to cover the enormous costs of the necessary transition. This is where green bonds come into play — long-term debt instruments whose proceeds are used exclusively for projects with a clear positive environmental impact. They not only provide companies with access to capital under more favorable terms but also send a strong signal to the market and consumers about a serious commitment to sustainability.

This paper examines the potential of green bonds as an instrument for accelerating the sustainable transformation of the textile industry. Particular emphasis is placed on the European regulatory framework (the European Green Deal and the Strategy for Sustainable and Circular Textiles) and the implications for the Western Balkan countries, including Serbia. The structure of the paper includes the theoretical framework of sustainable finance, an analysis of regulatory conditions, empirical examples of successful issuances, identification of key challenges, and practical recommendations for application in the regional context.



2. THEORETICAL FRAMEWORK AND MECHANISM OF GREEN BONDS

Green bonds are defined and governed by the Green Bond Principles of the International Capital Market Association (ICMA). These principles represent a voluntary framework that has become the de facto gold standard in the field of green finance. They rest on four key pillars: clear use of proceeds, a rigorous process for project evaluation and selection, transparent management of funds throughout the life of the bond, and regular, detailed reporting on achieved results. Unlike ordinary (conventional) bonds, green bonds require transparent monitoring of the actual environmental impact of the projects they finance — the so-called impact reporting. This means that the issuer cannot simply raise funds and spend them at its own discretion; it must clearly demonstrate to investors what has been concretely achieved in terms of emission reductions, water savings, recycling, or other measurable environmental benefits. In recent years, a significant evolution of this instrument has emerged — the so-called sustainability-linked bonds (SLB). Unlike classical green bonds, the coupon rate (interest) on these bonds is directly linked to the achievement of pre-agreed ESG targets. If the targets are not met, the interest rate increases, creating a strong financial incentive for real change. Examples of such targets include reducing Scope 3 emissions in the supply chain, increasing the share of recycled materials in production, or reducing water consumption per unit of product. These instruments are particularly useful for the textile industry, as they enable financing of a wide range of measures across the entire, highly complex value chain — from cotton cultivation and fiber production, through processing and sewing, to product design and end-of-life recycling systems. In this way, they overcome the limitations of classical green bonds, which are often focused only on specific, easily measurable projects.

In the domestic literature, Vićentijević (2018) [17] highlights the accounting aspects of the circular economy in the textile industry, emphasizing the need to adapt financial reporting to new sustainability models. Similarly, Vićentijević et al. (2022) [19] analyze the integration of CSR and SDGs in creating added value in the textile industry, providing an important foundation for understanding the role of financial instruments in this transition. In the domestic literature, Vićentijević (2018) highlights the accounting aspects of the circular economy in the textile industry, emphasizing the need to adapt financial reporting to new sustainability models. Similarly, Vićentijević et al. (2022) analyze the integration of CSR and SDGs in creating added value in the textile industry, providing an important foundation for understanding the role of financial instruments in this transition.

3. REGULATORY CONTEXT IN THE EUROPEAN UNION

The European Green Deal, presented in 2019, represents the European Union's ambitious strategic framework for achieving climate neutrality by 2050. Within this broader package, the Strategy for Sustainable and Circular Textiles from March 2022 occupies a central place regarding the textile sector. This strategy aims to fundamentally change the way textiles are produced, used, and disposed of, shifting the focus from the linear “take-make-dispose” model to a genuine circular economy. Among the key measures envisaged by the



Strategy are: the introduction of ecodesign (mandatory requirements for durability, recyclability, and repairability of products), extended producer responsibility (EPR), the Digital Product Passport (DPP) as a tool for greater transparency throughout the product lifecycle, and a ban on the destruction of unsold or returned textiles. These regulations are not only environmental in nature — they directly affect the financial side of business. Companies that fail to adapt to the new rules face higher capital costs, restricted access to the EU market, and increasing risks of regulatory penalties. In such an environment, green bonds and similar sustainable finance instruments can serve as an important bridge between strict regulatory requirements and real business needs. They enable companies to raise the necessary capital for concrete investments — from switching to renewable energy sources in factories, to establishing recycling and reuse systems, to improving the monitoring and optimization of complex supply chains. The Digital Product Passport plays a particularly important role in this process. Vićentijević and Simeunović (2024) [18] emphasize that the DPP can significantly contribute to improving the sustainability of the textile industry and the circular economy, primarily through increased transparency and easier monitoring of environmental performance. Similar observations can be found in other authors: Papile and Del Curto (2025) [14] highlight the importance of the DPP for integrating information on raw materials in the textile ecosystem, while Legardeur and Ospital (2024) [13], in a study for the European Parliament, analyze the practical possibilities of implementing the digital passport in the textile sector and its potential to accelerate circular practices. In this way, green bonds not only help finance the necessary changes but also enable companies to respond systematically to growing regulatory and market demands.

4. EMPIRICAL EXAMPLES AND CASE STUDIES

One of the most significant examples of the application of this instrument in the textile industry is undoubtedly the H&M Group. In February 2021, the company issued sustainability-linked bonds worth €500 million with a maturity of 8.5 years. The bonds were directly linked to three key sustainability targets: increasing the share of recycled materials to 30% by 2025, reducing emissions from own operations by 20%, and reducing absolute emissions across the value chain. Investor interest was exceptionally high — the bonds were oversubscribed nearly eight times, clearly demonstrating market confidence in the seriousness of their green strategy.

Similar experiences have been recorded by other well-known companies in the sector. Luxury giant Chanel issued two tranches of sustainability-linked bonds in 2020 totaling €600 million, with targets to reduce emissions in own operations by 50% by 2030 and by 10% in the supply chain. Burberry has also successfully placed green bonds, while Adidas has attracted significant investor attention with its issuances focused on emission reductions and the transition to sustainable materials. In recent years, an increasing number of companies from Asia and Europe, including some smaller players supported by funds such as the Good Fashion Fund, have been using these instruments to finance concrete projects such as factory modernization and the introduction of circular processes.



These examples clearly show that green and sustainability-linked bonds bring multiple benefits. They serve not only as a source of capital for necessary investments but also significantly strengthen the company's reputation in the market, facilitate cooperation with suppliers, and enable participation in programs such as the Green Fashion Initiative or the Fashion Pact. At the same time, the success of these issuances has most often been recorded among large, publicly listed companies that have the resources for certification and transparent reporting.

However, for small and medium-sized enterprises that dominate the textile sector in the Western Balkans, the situation is considerably more complex. High issuance costs, complex verification requirements, and a lack of expertise represent serious obstacles. [1,2,3,4,8,9].

5. CHALLENGES AND LIMITATIONS

Despite its great potential, the application of green bonds in the textile industry faces numerous serious challenges that limit their wider use. The most frequently mentioned problem is greenwashing. When verification and control are not sufficiently strict, companies can easily present their activities as much greener than they actually are. In this way, raised funds are sometimes used for projects with very limited or even questionable real environmental impact. According to some studies, as many as one-third of corporate green bond issuers show poorer environmental performance after issuance (Hong Kong Monetary Authority, 2022)[10]. Another significant problem is the high fragmentation of the sector. The textile industry is characterized by the dominance of small and medium-sized enterprises, especially in Asia and the Western Balkan countries. These enterprises often lack sufficient capacity to scale green projects, while complex supply chains further complicate implementation and monitoring. A particularly demanding challenge is the lack of standardized metrics for measuring Scope 3 emissions, which account for the largest part of the total carbon footprint of textile companies. Without reliable and widely accepted measurement methods, it is difficult to set realistic targets and later prove their achievement to investors. High costs of issuance and continuous reporting should also be added. The process of certification, engagement of external auditors, and preparation of detailed impact reports can be extremely expensive and administratively demanding, making it unprofitable for smaller market players.

In the context of Serbia and the Western Balkan region, these challenges are even more pronounced. An underdeveloped capital market, limited availability of guarantee funds, and insufficient state incentives for green projects further hinder access to these instruments.

6. CONCLUSION

Green bonds are proving to be a highly promising financial instrument that can significantly accelerate the sustainable transformation of the textile industry. They enable the raising of necessary capital while simultaneously sending a clear message to investors,

partners, and consumers that the company is seriously addressing issues of circularity and reducing environmental impact. They achieve the best results when combined with public-private partnerships and expert technical support. However, in order to fully realize their potential, concrete and systemic changes are required. Based on the analysis, the following key recommendations stand out: Develop targeted national incentives and guarantee funds specifically aimed at small and medium-sized enterprises, as they form the backbone of the textile sector in Serbia and the region, while facing the greatest barriers to accessing such instruments. Subsidies, guarantees, or tax reliefs would be of great importance. Strengthen the capacities of enterprises for ESG reporting and certification through trainings, mentoring programs, and expert support. Without quality data and transparent reporting, it is difficult to gain investor confidence. More actively encourage regional cooperation and knowledge exchange with European Union countries, using available funds to transfer best practices and experiences. Integrate green financial instruments into national strategies for the development of the circular economy, so that green bonds are not an isolated measure but part of a broader and coherent policy framework. In addition, it would be worthwhile to develop hybrid financing models that combine bonds with grants or technical assistance, tailored to the real capabilities of smaller producers. Future research should focus on monitoring the actual effects of these bonds on the ecological and business performance of companies in our region.

Although green bonds do not represent a universal solution in themselves, they can serve as a significant catalyst for the profound sustainable transformation of the textile industry, provided that there is clear political will, strong institutional support, and active engagement of business entities. The transition from conceptual frameworks and good intentions to concrete measures and systemic changes is a key prerequisite for success. The future of the textile sector largely depends on the ability of policymakers and the business community to align economic interests with the requirements of environmental protection and the principles of the circular economy.

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