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ECONOMIC AND ENVIRONMENTAL DETERMINANTS OF TEXTILE WASTE MANAGEMENT IN THE CONTEXT OF UKRAINE'S EUROPEAN INTEGRATION COURSE

Abstract. *The article provides a comprehensive analysis of textile waste management, focusing on global best practices and the adaptation mechanisms relevant to Ukraine in the context of its European integration. The study examines the European Union's policy on textile waste, with a focus on legislative initiatives and circular economy requirements that are being actively implemented within the EU. It highlights the need for Ukraine to align its practices with EU standards in sustainable production and consumption, essential for competitiveness in the European market. The paper also assesses the state of Ukraine's regulatory framework for textile waste management. Despite the existence of relevant legislative acts, there is a significant gap in the practical implementation of an effective recycling and waste disposal system. The article emphasizes the importance of creating a robust legal and regulatory environment that supports sustainable waste management practices. Additionally, the study analyzes textile trade dynamics between Ukraine and the EU from 2014 to 2023, stressing the importance of transitioning to sustainable production methods to enhance the competitiveness of Ukrainian manufacturers. The article examines the potential benefits of adopting eco-friendly practices to improve Ukraine's export potential and reduce environmental impact. The article further explores opportunities for business sector development in textile waste recycling, offering environmental and economic benefits. It outlines how the recycling industry could contribute to reducing environmental burdens and creating green jobs in Ukraine. Based on the findings, the article provides recommendations for the government, businesses, and society, urging coordinated efforts to develop a sustainable textile waste management strategy. The study concludes that the effective implementation of this strategy relies on the coordinated efforts of the government, private sector, and public stakeholders, as well as the successful adaptation of European standards to Ukrainian realities. This approach will contribute to environmental improvement, strengthen Ukraine's competitive position in the European market, and expand opportunities for textile exports.*

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Keywords: *circular economy, export, resource efficiency, sustainable development, textile waste, waste management, European integration.*

JEL Classification: D11, E60. M21

Absztrakt. *A cikkben bemutatjuk a textilhulladék-gazdálkodás komplex elemzését, különös tekintettel a világszintű tapasztalatokra és az Ukrajna európai integrációjának kontextusában releváns adaptációs mechanizmusokra. Vizsgálták az Európai Unió textilhulladékokra vonatkozó politikáját, különös figyelmet fordítva az EU-ban aktívan bevezetett jogalkotási kezdeményezésekre és a körforgásos gazdaság követelményeire. Hangsúlyozták az ukrán gyakorlatok harmonizálásának szükségességét az európai fenntartható termelési és fogyasztási normákkal, ami fontos feltétele az EU-piacon való versenyképességnek. A munkában az ukrán jogi szabályozás állapotkerül kimutatásra és értékelésre a textilhulladékok kezelése terén. A vonatkozó jogszabályok megléte ellenére jelentős eltérés tapasztalható a hulladékok hatékony újrahasznosítási és ártalmatlanítási rendszerének gyakorlati bevezetésében. A cikk hangsúlyozza egy hatékony jogi környezet létrehozásának fontosságát, amely támogatná a hulladékkezelés fenntartható gyakorlatát. Ezenkívül a kutatás elemzi a textilkereskedelem dinamikáját Ukrajna és az EU között a 2014–2023 közötti időszakban, kiemelve a fenntartható termelési módszerekre való áttérés szükségességét az ukrán gyártók versenyképességének növelése érdekében. Megvizsgálják az ökológiailag biztonságos gyakorlatok bevezetésének potenciális előnyeit az ukrán exportpotenciál növelése és a környezetre gyakorolt negatív hatások csökkentése érdekében.A kutatás különös figyelmet fordít a textilhulladék-feldolgozó üzleti szektor fejlődési kilátásaira, amelyek mind környezeti, mind gazdasági előnyökkel járhatnak. Felvázoljuk az ágazat által kínált lehetőségeket a környezetterhelés csökkentése és „zöld” munkahelyek teremtése terén Ukrajnában. Az elemzés alapján a cikk ajánlásokat fogalmaz meg a kormány, az üzleti szféra és a nyilvánosság számára, felszólítva őket a textilhulladék-gazdálkodás fenntartható stratégiájának kidolgozására irányuló összehangolt fellépésre. A következtetésekben hangsúlyozzák, hogy egy ilyen stratégia hatékony megvalósítása az állam, a magánszektor és a közvélemény összehangolt fellépésétől, valamint az európai szabványok ukrán viszonyokhoz való sikeres adaptációjától függ. Ez a megközelítés hozzájárul az ökológiai helyzet javításához, Ukrajna versenyképességének erősödéséhez az európai piacon és a textiltermékek exportlehetőségeinek bővítéséhez.*

Kulcsszavak: *körforgásos gazdaság, export, erőforrás-hatékonyság, fenntartható fejlődés, textilhulladék, hulladékgazdálkodás, európai integráció.*

Анотація. *У статті представлено комплексний аналіз управління текстильними відходами з акцентом на світовий досвід та механізми адаптації, релевантні для України в контексті її європейської інтеграції. Досліджено політику Європейського Союзу щодо текстильних відходів, зосереджено увагу на законодавчих ініціативах і вимогах циркулярної економіки, які активно впроваджуються в ЄС. Підкреслено необхідність гармонізації українських практик із європейськими стандартами сталого виробництва та споживання, що є важливою умовою конкурентоспроможності на ринку ЄС. У роботі також оцінено стан нормативно-правової бази України у сфері управління текстильними відходами. Незважаючи на наявність відповідних законодавчих актів, спостерігається суттєвий розрив у практичному впровадженні ефективної системи переробки та утилізації відходів. У статті наголошується на важливості створення дієвого правового середовища, яке б підтримувало сталу практику поводження з відходами. Крім того, проаналізовано динаміку торгівлі текстилем між Україною та ЄС у період 2014–2023 років, акцентуючи увагу на необхідності переходу до сталих виробничих підходів для підвищення конкурентоспроможності українських виробників. Розглянуто потенційні переваги впровадження екологічно безпечних практик для підвищення експортного потенціалу України та зменшення негативного впливу на довкілля. Окрема увага приділяється перспективам розвитку бізнес-сектору в галузі переробки текстильних відходів, що може надати як екологічні, так і економічні вигоди. Окреслено можливості, які створює ця галузь для зниження екологічного навантаження та створення «зелених» робочих місць в*

Україні. На основі проведеного аналізу у статті сформульовано рекомендації для уряду, бізнесу та громадськості, закликаючи до скоординованих дій щодо розробки сталої стратегії управління текстильними відходами. У висновках підкреслюється, що ефективна реалізація такої стратегії залежить від злагоджених дій держави, приватного сектору та громадськості, а також від успішної адаптації європейських стандартів до українських реалій. Такий підхід сприятиме покращенню екологічної ситуації, зміцненню конкурентних позицій України на європейському ринку та розширенню можливостей для експорту текстильної продукції.

Ключові слова: *циркулярна економіка, експорт, ефективність використання ресурсів, сталий розвиток, текстильні відходи, управління відходами, європейська інтеграція.*

Problem statement. Textile production is one of the largest industrial sectors globally, but it is also one of the most environmentally intensive. A significant amount of waste generated during the production of textile products has become not only an economic issue but also a global ecological problem. Textile production waste consists not only of material remnants but also toxic chemicals that enter ecosystems and microplastics, which, through degradation processes, can negatively affect the environment for decades.

In recent decades, the fashion industry has significantly increased its output, producing new collections with rapidly changing trends and excessive consumption. At the same time, this sector has become one of the largest sources of environmental pollution, significantly impacting water resources, soil, and air quality. Textile production not only consumes vast amounts of water but also generates an ever-growing quantity of waste that is not recycled. For example, it takes up to 2,700 liters of water to make one cotton T-shirt, an amount equivalent to the drinking water needs of one person for over two and a half years [1]. The problem is further compounded by the fact that billions of clothing items are discarded each year, most of which are not recycled, with only 12% of the materials used in clothing production being sent for secondary recycling [2]. Meanwhile, the fashion industry continues to operate based on a disposable model and "fast fashion," which leads to the mass production of low-quality items that quickly become obsolete, further contributing to the generation of massive waste. From an environmental perspective, this model is entirely unsustainable, and the need to transform the industry into a sustainable and environmentally safe one is becoming increasingly urgent.

On a global scale, significant efforts are being made to address these issues, particularly in the European Union, where recycling policies within the framework of the circular economy are actively being developed, aimed at reducing textile waste and conserving natural resources. However, for Ukraine, which is still in the process of adapting to new environmental standards and sustainable practices, there are substantial barriers, including insufficient infrastructure for textile waste recycling, the lack of a comprehensive regulatory approach in this area, and low awareness among producers and consumers about the industry's impact on the environment.

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The existence of such challenges underscores the importance of finding new approaches to address this issue, which would allow for the transition to more sustainable textile waste management practices. This would contribute to preserving environmental balance and ensuring the sustainable development of the textile industry in Ukraine.

Literature review. The impact of textile production and its waste on the environment has been the subject of research by several prominent Ukrainian scholars. A notable contribution was made by Kriuchkova V. [3], who examined a sustainable approach to textile waste management, with a particular focus on the environmental consequences of wastewater generated during textile washing and its impact on soil quality; Tykhomyrova T. [4] analyzed the ecological condition of soils near unauthorized textile waste dumps, providing valuable insights into pollution levels in affected areas; Chikiriakin K. [5] explored the role of grant-supported upcycling initiatives as tools for enhancing ecological awareness and reducing textile waste. Meanwhile, Ivanishena T. [6] conducted a life cycle assessment of materials to improve processes in the light industry and support the transition to circular economy principles, while Ishchuk T. [7] focused on developing textile waste recycling technologies and outlining the prerequisites for a textile waste management roadmap, emphasizing the potential of secondary raw materials in advancing sustainability within the sector. Among international scholars, notable contributions have been made by Yalchin-Enis I. [8], who explored the mechanical properties of composites made from recycled textile waste and E-glass fabric in bio-based epoxy matrices; Sezgin H. [9], who examined the environmental risks of textile waste and proposed relevant management strategies; and Pensupa N. [10], who provided a thorough review of contemporary trends and future directions in sustainable textile waste recycling.

Highlighting previously unresolved aspects of the general problem. Despite significant scientific contributions in the field of textile waste management, issues related to the implementation of circular economy principles and effective recycling of textile waste remain underexplored in Ukraine, particularly in the context of the country's European integration course. The adaptation of European environmental standards to the Ukrainian context is especially relevant, requiring further research and the development of comprehensive strategies.

Research aim and objectives. The aim of the article is to examine the eco-economic factors of textile waste management, analyze global practices in handling such waste, and identify adaptation mechanisms for Ukraine, taking into account European environmental standards and strategies in the context of the country's European integration course.

Results and discussions. Climate change and the deterioration of the environment pose a serious threat to Europe and the world, requiring decisive action. In December 2015, the European Commission (EC) approved its first Circular Economy Action Plan [11]. On December 11, 2019, European Commission President Ursula von der Leyen presented the European Green Deal, a strategy aimed at transforming the EU into the first climate-neutral continent by 2050. All 27 member states have committed to reducing greenhouse gas emissions by at least 55% by 2030

(compared to 1990 levels), which will contribute to sustainable economic growth, resource efficiency, and a just transition, creating new opportunities for innovation, investment, and improved living standards for citizens [12].

Within the framework of the European Green Deal, the textile industry is identified as one of the key resource-intensive sectors that requires urgent changes to reduce its environmental impact. The fashion industry ranks third among the largest environmental polluters in the world, behind fossil fuels and agriculture. It is responsible for 10% of global annual carbon emissions, and it is predicted that by 2050, its share of global emissions will reach 25% [13]. The textile industry is third in terms of water consumption and land use, and it is also one of the top five most resource-intensive sectors in terms of primary raw material usage and greenhouse gas emissions. Less than 1% of textile waste is recycled into new fibers for clothing production, while every second, the volume of textiles equivalent to a truckload is sent to landfills or incineration [14]. On average, each European consumes about 26 kilograms of textiles annually, of which approximately 11 kilograms ultimately become waste. Although some used clothing is exported outside the EU, the majority (87%) is incinerated or sent to landfills [1].

In March 2022, the European Commission presented the EU Strategy for Sustainable and Circular Textiles, which aims to reduce textile waste, combat fast fashion, and create durable, recyclable products [15]. By 2030, textile products entering the EU market must be durable, recyclable, and made predominantly from recycled fibers without harmful substances. The strategy also includes measures for extended producer responsibility, eco-design, the implementation of a digital product passport, and tackling microplastic emissions. Furthermore, it encourages the development of business models focused on reuse and repair, and urges EU member states to create favorable tax conditions for these sectors [15].

Starting from January 1, 2025, the European Union introduced a new regulation on extended producer responsibility (EPR), which mandates member states to implement separate collection of discarded textile products. The main objective of this regulation is to minimize the disposal of reusable items and promote large-scale textile recycling within the EU. Some countries, including the Netherlands and France, have already implemented extensive textile waste collection systems through specialized containers or collection points in stores. Meanwhile, other countries are just beginning to develop their own infrastructure to meet the new requirements [16].

In the context of the textile product model, manufacturers are held responsible for the entire life cycle of the product, including its disposal after the end of its service-life. According to this initiative, the manufacturer is recognized as the enterprise that first places the textile product on the European Union market. Manufacturers must register with a Producer Responsibility Organization (PRO) and pay the corresponding contributions, while the PRO is responsible for establishing and managing a separate collection, reuse, and recycling system for textiles. The implementation of this model is expected to occur in 2026–2027 [11].

On July 18, 2024, the Ecodesign for Sustainable Products Regulation (ESPR) came into effect, replacing the 2009/125/EC Ecodesign Directive and establishing

general frameworks for the introduction of environmental requirements for specific product groups [17]. Specifically, the ESPR introduces ecological design standards for textile products, promoting the transition to a circular economy throughout the entire product life cycle. One of the stimulating mechanisms is the introduction of increased fees for placing textiles made from mixed materials on the market, which complicate the recycling process [18].

Additionally, the European Union has introduced the EU Ecolabel system, which can be awarded to manufacturers that comply with specified environmental standards. The presence of this label indicates a reduced content of harmful substances in the product and its minimal environmental impact, contributing to raising consumer environmental awareness and promoting more sustainable goods in the market [1].

The European Commission is also preparing to implement the Green Claims Directive, which will establish requirements for sustainable production and consumer rights protection. At the same time, the Directive aims to combat greenwashing by requiring companies to provide independent verification of the environmental claims made about their products. The implementation of these regulations is expected between 2025 and 2027 [11].

Given Ukraine's signing of the Association Agreement with the European Union, the creation of a free trade zone within its framework, and the granting of EU candidate status in June 2022, the strategic course towards European integration involves studying and adapting best practices from the EU, particularly in the field of textile waste management.

On August 13, 2020, Ukraine submitted a position paper to the European Commission regarding its participation in the European Green Deal (EGD), initiating a systemic dialogue with the EU and joint development of an integration roadmap [19]. Despite this, Ukraine continues to promote sustainable development principles, leveraging the support of international partners for the ecological restoration of affected regions. Ukraine’s integration into the EGD will not only contribute to the ecological modernization of the country but will also be a significant step towards building a competitive and climate-neutral economy.

Each year, approximately 10 million tons of household waste are generated in Ukraine, of which only 3-5% is directed towards recycling. The majority of waste accumulates in over 6,000 official landfills, while a significant amount ends up in unauthorized dumpsites, posing a serious environmental threat. On average, one Ukrainian generates between 300 and 500 kilograms of waste annually, highlighting the urgent need for the implementation of an effective waste management system [20]. The light industry products make up about 10% of the total household waste in Ukraine, with each Ukrainian discarding between 15 and 20 kilograms of textile waste annually [21].

On July 9, 2023, the Law of Ukraine "On Waste Management" came into force, initiating a reform in this area and aligning Ukrainian legislation with EU standards [22]. This law replaced the previous Law of Ukraine "On Waste", which did not meet current challenges and did not provide adequate support for modern disposal methods [23]. The new law, however, lays the foundation for further changes in the waste

management system in Ukraine, focusing on promoting recycling and reducing landfill volumes. It introduces a new permitting system, decentralization of management processes, multi-level planning, and infrastructure development. Key innovations include the adoption of European waste management principles, particularly the hierarchy that prioritizes waste prevention, reuse, and recycling, followed by disposal at environmentally safe landfills. The law also provides for extended producer responsibility and the gradual creation of necessary infrastructure for waste collection and processing [24].

According to current legislation, enterprises involved in the production or use of textile materials are considered waste generators. The disposal of such waste without proper documentation constitutes a violation of established regulatory requirements. Business entities are required to register in the state register "EcoSystem," transfer waste exclusively to licensed processors, and submit an annual Waste Declaration by February 20th if the volume of non-hazardous waste exceeds 50 tons per year or if there is at least 1 kg of hazardous waste. The accounting and reporting process must be carried out within clearly defined deadlines. Quarterly reports are to be submitted by the 20th of the month following the reporting period, while the annual report is due by January 20th of the year following the reporting year. Violations of these requirements may result in penalties and an increased risk of unscheduled inspections [25].

Ukraine is only beginning the process of implementing effective mechanisms for managing textile waste, gradually aligning its legislation with European standards. However, the level of textile recycling remains extremely low, due to the lack of specialized infrastructure for waste collection, sorting, and subsequent disposal. This problem is particularly acute in de-occupied territories, where environmental recovery is on par with the reconstruction of critical infrastructure. To effectively address this issue, a comprehensive combination of legislative changes, infrastructure development, and incentives for businesses to adopt environmentally responsible practices in the textile industry is necessary.

The report "Sectoral Strategies for the Textile Sector" (2022), developed under the EU4Business: Connecting Companies initiative, describes the current challenges faced by the textile industry in Eastern Partnership countries, including Ukraine, Georgia, Moldova, and Armenia [26]. Key challenges include a lack of skilled labor, limited business awareness of circular economy principles, and insufficient infrastructure for effective waste recycling. To overcome these obstacles, it is crucial to implement educational programs and upskilling initiatives, which will help companies adapt to environmental standards, obtain certifications, and strengthen their competitiveness in the global market. Special attention is also given to involving women, youth, and socially vulnerable groups in the development of sustainable textile production [26].

Ukraine's textile industry in the 1970s-1980s was one of the largest in the former USSR, accounting for about 50% of textile production. Over time, the industry underwent significant changes, particularly due to economic difficulties and outdated production facilities [27]. Today, the country is actively restoring its textile industry, despite the challenges caused by the war—destruction of infrastructure, labor

shortages, reduced consumer demand, and a decline in orders from international partners. Nonetheless, the industry continues to demonstrate resilience and is gradually regaining its position.

The textile and garment industry is an important part of Ukraine's economy, employing about 2,500 enterprises and providing jobs for over 100,000 workers. Approximately 40% of the production is exported, with European countries being the main markets. In 2023, trade in textile products and clothing between Ukraine and the EU reached a volume of 1.7 billion euros, with Ukraine ranking 23rd among textile exporters to the EU and 13th among importers [28]. Despite the difficult conditions of the war, many enterprises in this sector continue to operate, particularly in the production of fabrics for the needs of the Ukrainian Armed Forces. The European Commission actively supports the liberalization of customs tariffs through negotiations under the Association Agreement with the EU, which helps stabilize the economic situation and ensures predictability in trade relations between Ukraine and the European Union [28].

The dynamics of trade in textile goods between Ukraine and the EU from 2014 to 2023 indicate a gradual increase in exports from 335.9 million euros in 2014 to 405.3 million euros in 2023. At the same time, imports of textile products from the EU also steadily grew, rising from 888.7 million euros in 2014 to 1,307.8 million euros in 2023 (Figure 1).

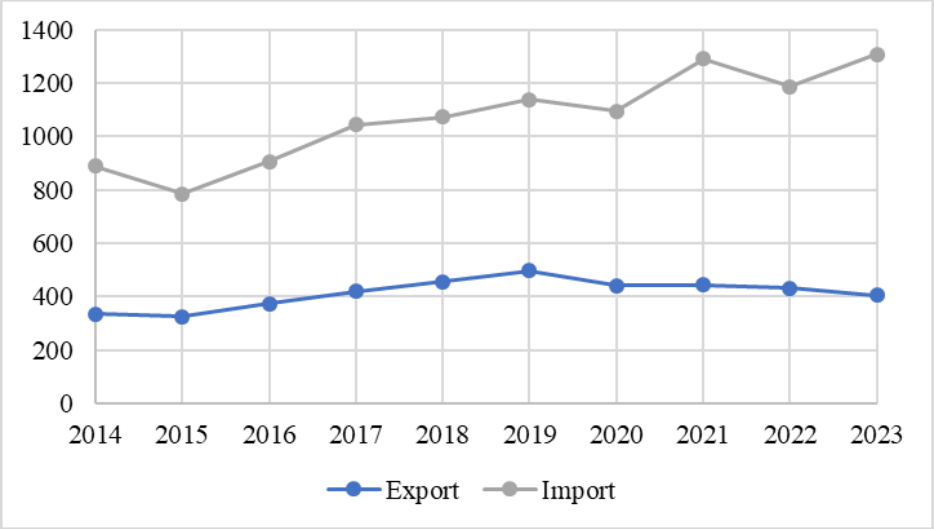

Figure 1. Dynamics of Ukraine's trade in textile products with the EU in 2014–2023 (million euros)*

** Formed by the authors based on the source [28]*

The Ukrainian textile sector continues to export products to the EU, but stringent regulatory requirements and trends toward environmental sustainability present additional challenges. Amid a reduction in exports and growing reliance on state orders, the industry has an opportunity to transform in line with the principles of a circular economy, which will contribute to its long-term competitiveness. One of the key barriers is the insufficient infrastructure for the collection, processing, and reuse of textile waste, which is becoming critical in cooperation with European partners. EU

regulations require mandatory waste recycling; however, Ukrainian legislation does not incentivize the implementation of corresponding environmental practices, and state support in this area is almost nonexistent. From 2025, Ukrainian manufacturers that do not comply with EU waste management regulations may lose access to the European market [26]. Thus, despite the significant challenges posed by the war, the Ukrainian textile industry faces the need for a large-scale "green" transformation, which will not only ensure compliance with European standards but also create the preconditions for further sustainable development.

The second-hand clothing market is an example of a circular economy, which extends the life cycle of items through their reuse. However, the problem lies in the fact that Ukraine is not just integrating into this system but is effectively becoming the final link in the chain of clothing disposal for Europe. While EU countries address the problem of surplus textile waste by exporting it to less wealthy states, Ukraine lacks effective mechanisms for further processing or safe disposal. Every year, hundreds of thousands of tons of used clothing enter the Ukrainian market, a significant portion of which is unsuitable for reuse [29]. As a result, Ukraine is increasingly becoming a "textile landfill," as most of this waste ends up in landfills, where decomposition can take decades or even centuries. The lack of infrastructure for recycling and environmentally responsible textile waste management exacerbates the problem, creating long-term environmental risks. Furthermore, given the low cost of second-hand goods that are widely imported into Ukraine, domestic manufacturers are forced to compete not only with European companies but also with cheap imported clothing.

Ukrainian clothing manufacturers aiming to enter the EU market face a number of risks, particularly due to the tightening of environmental requirements and the standardization of production. Ukraine remains a consumer of textile components and does not control the waste generation process, as many sewing companies operate under tolling schemes. At the same time, the issue of textile waste is not yet a priority compared to larger challenges, such as demining and industrial emissions [29]. However, in the future, this may lead to complications in exports due to non-compliance with EU regulations, increased waste disposal costs, and the implementation of extended producer responsibility, which will impact business profitability and sustainability.

The problem of textile waste recycling in Ukraine remains significant, primarily due to the insufficient culture of old clothing disposal and the limited infrastructure for collecting textile materials. Waste collection points are underdeveloped, making the process of reuse more difficult. Typically, worn-out clothing is either recycled into rags or disposed of with household waste, leading to it being sent to landfills.

A significant step in addressing this issue and implementing circular solutions in the light industry was the launch of Ukraine's first textile waste recycling production line, Re:inventex, in Irpin in 2025 [30]. The plant uses modern technologies that allow for the opening up of textile materials' leftovers generated during the production of clothing, bed linens, and other products, for their subsequent recycling into yarn and fabric. Currently, the line operates in test mode, processing waste from its own production, as well as raw materials from several partner companies. The plant's

capacity is 2,500 tons of textile waste per year [30]. This project marks an important step in the transformation of Ukraine's light industry, demonstrating the practical implementation of circular economy principles. The realization of such initiatives is a determining factor in forming sustainable production processes, optimizing resource use, and strengthening the competitive positions of Ukrainian enterprises in the international market.

The transition to a sustainable production model is possible thanks to the joint efforts of the government, businesses, and individual citizens. In particular, in the fashion industry, up to 80% of the environmental impact is formed during the product development stage, but not all manufacturers are aware of their crucial role in implementing changes [31]. Around the world, there are already numerous examples of effective resource use that show how businesses can drive the development of sustainable practices. For instance, Mango Materials is an innovative company developing biopolyester – a material with biodegradation properties in various environments. This material has significant potential to reduce environmental impact. At the same time, Ralph Lauren introduced an updated version of the classic Polo shirt, made from fibers entirely sourced from recycled plastic bottles, using advanced dyeing technology that doesn't require water. Mycotex, on the other hand, is creating materials based on fungal roots that can naturally decompose after use [2]. Patagonia launched the Worn Wear online platform, allowing users to buy, exchange, and sell second-hand items from the brand. Additionally, the company opened its first physical Worn Wear store, where a range of second-hand products purchased from customers and subsequently recycled is offered. H&M accepts old or new textiles, regardless of brand, and sends them to the nearest recycling factories. Customers who bring in textiles receive a 15% discount card for future purchases. Ecoalf manufactures its products from recycled materials such as fishing nets, coffee grounds, and plastic bottles. Madewell's unique recycling program not only allows customers to recycle old jeans but also uses them in construction, thus contributing to sustainable development [31].

To successfully implement sustainable practices in textile waste management in Ukraine, joint efforts from the government, businesses, and the individual consumers are needed (Table 1).

Table 1.

Recommendations for textile waste management for the government, business, and society*

Government	*Business sector*	*Individual consumers and community initiatives*
• Development of mandatory standards for textile companies regarding waste collection and recycling • Creation of government grants and subsidies for	• Support for clothing exchange programs, where consumers can donate their old clothing for reuse • Creation of infrastructure for collecting old clothing at store locations or through mobile	• Actively participate in clothing collection programs through stores or specialized platforms • Donate old clothing for recycling through dedicated containers or collection

Government	***Business sector***	***Individual consumers and community initiatives***
companies involved in textile waste recycling • Simplification of the permitting process for new textile waste recycling enterprises • Setting recycling quotas for textile waste at enterprises • Introduction of taxes or penalties for companies not adhering to textile waste recycling standards • Development of responsible consumption and disposal policies for clothing among businesses and citizens • National educational campaigns on textile waste recycling and environmental impact reduction • Investment in scientific research to develop new methods of textile waste recycling • Support for initiatives to create laboratories and centers for testing new materials and technologies in the textile waste sector	apps • Investment in research and development of new textile recycling technologies to improve waste utilization efficiency • Production of clothing made from recycled textile materials • Creation of platforms for selling or exchanging old clothing, allowing consumers to give items a second life • Collaboration with charitable organizations for the redistribution or renovation of used clothing • Creation of closed-loop models for textile products, where clothing can be returned for recycling after use • Launch of special clothing collections made from used materials to demonstrate business commitment to sustainable development • Implementation of technologies to reduce waste during the manufacturing stage, such as optimizing cutting or sorting processes	points • Choose high-quality clothing, favoring natural materials and fabrics made from recycled materials, as well as brands that transparently communicate their environmental impact • Repair and update clothing, extending its lifespan, instead of discarding it • Follow the principles of "Reduce, Reuse, Recycle," by reducing consumption, reusing clothing, and ensuring textile waste is recycled • Optimize your wardrobe by minimizing unnecessary purchases and avoiding impulsive spending • Rent or exchange clothing for temporary needs, rather than purchasing new items for every event • Support brands that practice sustainability, use recycled materials, and implement circular business models • Promote environmental awareness among the population through educational campaigns and the popularization of sustainable textile consumption practices

** Formed by the authors*

Thus, the state must create the necessary regulatory conditions, support the infrastructure for waste recycling, and ensure education on the importance of sustainable development. Businesses, in turn, must implement innovative solutions that reduce the negative environmental impact, as well as actively support recycling and material reuse programs. Society should actively engage in waste disposal and recycling processes and changing their consumption habits. Only through coordinated

efforts from all participants can an effective transition to sustainable development in Ukraine be ensured, particularly in the context of managing textile waste and integrating Ukrainian practices with European sustainable development standards.

Conclusions and prospects for further research. Textile waste is one of the most significant environmental issues nowadays. The modern textile industry causes immense environmental pollution due to the rapid consumption and disposal of products that become unnecessary, as well as the large volumes of chemicals used in production. Fashion, particularly the concept of fast fashion, amplifies this process by encouraging excessive production and consumption. This approach significantly impacts the environment, increasing waste volumes and putting pressure on ecosystems. The European Union is actively implementing measures to reduce the environmental impact of textile waste. Specifically, legislative initiatives are being introduced to promote the recycling and disposal of textile waste, the development of the circular economy, and the transition to sustainable production. For example, directives requiring the collection of clothing waste for recycling, or incentives for businesses transitioning to more environmentally friendly technologies. European companies are actively investing in the latest textile recycling technologies, creating materials from secondary resources, and developing closed-loop production cycles.

In Ukraine, this issue requires significant attention in the context of the European integration course and commitments to environmental protection. Currently, Ukraine does not have sufficiently developed mechanisms for recycling textile waste, and the culture of sustainable consumption still needs development. However, the existence of numerous initiatives, including the launch of the first textile waste recycling line in Ukraine, provides hope for positive changes. The government should intensify the development of legislative acts that will promote the implementation of environmental standards in the textile industry, supporting the recycling of textile waste, reducing the amount of produced waste, and encouraging the development of "green" technologies. This could include the creation of specialized recycling enterprises, support for scientific research in this field, and the development of public awareness about the need for changes in consumption and clothing disposal approaches.

The adaptation of European standards and practices to Ukrainian realities is not only an ecological necessity but also a strategic condition for integrating Ukrainian producers into the EU market. To achieve this, approaches at all levels need to be transformed – from eco-design and innovative business models to scientific research and educational initiatives that will promote the formation of an ecological culture within society. Thus, the implementation of advanced European experience gives Ukraine the opportunity to become a competitive player in the global textile waste management system.

Список використаних джерел

1. The impact of textile production and waste on the environment (infographics). *Topics | European Parliament*. URL: https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics

2. “Робимо перші кроки у сфері переробки текстильних відходів”, Людмила Буханцова. *Astar*. URL: https://kse.ua/ua/about-the-school/news/147-5-mlrd-zagalna-suma-pryamih-zbitkiv-zavdana-infrastrukturi-ukrayini-cherez-viynu-na-kviten-2023-roku/
3. Крючкова В. В., Тихомирова Т. С., Чікірякін К. В. Сталий підхід до управління текстильними відходами: досвід Чехії та перспективи його використання в Україні.*Екологічні науки*. 2024. № 5 (56). С. 203-210. URL: https://repository.kpi.kharkov.ua/handle/KhPI-Press/85784
4. Крючкова, В.; Тихомирова, Т. Екологічний стан ґрунтів у зоні несанкціонованих звалищ текстильних відходів: досвід Дергачівської територіальної громади Харківської області. 2025, 54–60, URL: https://doi.org/10.32848/agrar.innov.2024.27.8
5. Тихомирова Т. С. Крючкова В. В., Чікірякін К. В. Грантові проєкти для підтримки апсайклінг-підприємництва та розвитку екологічної культури в Україні як інструмент зменшення текстильних відходів. *Науковий вісник Вінницької академії безперервної освіти. Серія : Екологія. Публічне управління та адміністрування* : зб. наук. пр. Вінниця : Видавничий дім "Гельветика", 2025. Вип. 1. С. 53-61. URL: https://repository.kpi.kharkov.ua/handle/KhPI-Press/88437
6. Іванішена, Т., Мандзюк, І., Трухіна, О., Пекарська, В. (2023). Оцінка життєвого циклу матеріалів як інструмент удосконалення процесів легкої промисловості та впровадження принципів кругової економіки виробництв. *Herald of Khmelnytskyi National University. Technical Sciences, 325(5(1), 89-97*. URL: https://doi.org/10.31891/2307-5732-2023-325-5-89-97
7. Іщук, Т., Іванішена, Т., (2025). Напрямки використання вторинної сировини у легкій промисловості. *Herald of Khmelnytskyi National University. Technical Sciences*, *349*(2), 166-170. URL: https://doi.org/10.31891/2307-5732-2025-349-24
8. Yalcin-Enis, I. Evaluation of recycled textile wastes with E-glass fabric in bio-based epoxy matrix composites: investigation of the mechanical properties. *J Mater Cycles Waste Manag* 25, 171–180 (2023). URL: https://doi.org/10.1007/s10163-022-01522-6
9. Yalcin-Enis, I., Kucukali-Ozturk, M., Sezgin, H. (2019). Risks and Management of Textile Waste. In: Gothandam, K., Ranjan, S., Dasgupta, N., Lichtfouse, E. (eds) Nanoscience and Biotechnology for Environmental Applications. Environmental Chemistry for a Sustainable World, vol 22. Springer, Cham. URL: https://doi.org/10.1007/978-3-319-97922-9_2
10. Pensupa, N., Leu, SY., Hu, Y. *et al.* Recent Trends in Sustainable Textile Waste Recycling Methods: Current Situation and Future Prospects. *Top Curr Chem (Z)* 375, 76 (2017). URL: https://doi.org/10.1007/s41061-017-0165-0
11. EU Textile Waste Directive: Key Updates for SMEs in 2025. *The Loop Factory*. URL: https://www.loopfactory.se/news/eu-textile-waste-directive-in-2025
12. Delivering the European Green Deal. *European Commission*. URL: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en
13. Roos van Keulen. 5 Takeaways From the New EU Circular Fashion Strategy. *Earth.Org*. URL: https://earth.org/5-takeaways-from-the-new-eu-circular-fashion-strategy/
14. New EU Strategy for sustainable and circular textiles. *Interreg Europe*. URL: https://www.interregeurope.eu/policy-learning-platform/news/new-eu-strategy-for-sustainable-and-circular-textiles
15. EU Strategy for sustainable and circular textiles. *European Parliament*. URL: https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-eu-textiles-strategy
16. Guinebault M. New EU regulations for the fashion industry are coming into force in 2025. *Fashion Network*. URL: https://ww.fashionnetwork.com/news/New-eu-regulations-for-the-fashion-industry-are-coming-into-force-in-2025,1690622.html
17. Ecodesign for Sustainable Products Regulation. *European Commission.* URL: https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/ecodesign-sustainable-products-regulation_en

18. Michaliková M. Waste Not: The Textile Crisis. *Interreg Europe.* URL: https://www.interregeurope.eu/policy-learning-platform/news/waste-not-textile-crisis
19. Європейський Зелений Курс. *Екодія.* URL: https://ecoaction.org.ua/ievropejskyj-zelenyj-kurs.html
20. День вторинної переробки. *Let's do it, Ukraine*. URL: https://letsdoitukraine.org/2024/11/ldu-recyclingday2024/
21. Реформа стартувала – вступив у дію Закон «Про управління відходами». *Міністерство захисту довкілля та природних ресурсів України.* URL: https://mepr.gov.ua/reforma-startuvala-vstupyv-u-diyu-zakon-pro-upravlinnya-vidhodamy/
22. Щербак В. В Ірпені відкрили першу в Україні лінію з переробки текстилю. *BigKyiv.* URL: https://bigkyiv.com.ua/v-irpeni-vidkryly-pershu-v-ukrayini-liniyu-z-pererobky-tekstylyu/
23. Сергєєв, О. А. (2025). Європейський досвід запобігання утворенню побутових відходів та можливості його адаптації в Україні. *Трансформаційна економіка*, (4 (09), 71-77. URL: https://doi.org/10.32782/2786-8141/2024-9-11
24. Закон України "Про управління відходами" набув чинності. *Еколтава*. URL: https://www.ekoltava.org/2023/07/09/zakon-ukrayiny-pro-upravlinnya-vidhodamy-nabuv-chynnosti
25. Як бізнесу адаптуватися до нових правил управління текстильними відходами у 2025 році? *Re:inventex*. URL: https://www.facebook.com/share/p/18QVSgpCit/
26. Фарбар К. Сталість як шлях до майбутнього української галузі текстилю та одягу. *Укрлегпром.* URL: https://ukrlegprom.org/ua/news/stalist-yak-shlyah-do-majbutnogo-ukrayinskoyi-galuzi-tekstylyu-ta-odya/
27. Mollá, K., & Vantyghem, D. (2022, September). Sectorial strategies for the textiles sector. *EU4Business: Connecting Companies (EU4BCC)*. URL: https://connectingcompanies.eu/wp-content/PDF-Flip/Textile_Sector%20strategy.pdf
28. SPRING Report. Analysis of the EU Textile & Clothing External Trade in 2023. (2024). *EURATEX*. URL: https://www.textilindustrie.at/p2/FVN/EURATEX_SpringReport2024.pdf
29. Виклики для українських виробників з огляду на EU Textile Strategy-2030. *Укрлегпром*. URL: https://ukrlegprom.org/ua/news/vyklyky-dlya-ukrayinskyh-vyrobnykiv-z-oglyadu-na-eu-textile-strategy-2030/
30. Яковенко І. В Ірпені відкрили першу в Україні лінію з перероблення текстильних відходів. *Village.* URL: https://www.village.com.ua/village/business/news/359501-v-irpeni-nbsp-vidkrili-nbsp-pershu-v-ukrayini-liniyu-z-pererobki-tekstilnih-vidhodiv
31. The environmental crisis caused by textile waste. *Roadrunner.* URL: https://www.roadrunnerwm.com/blog/textile-waste-environmental-crisis

References

1. The impact of textile production and waste on the environment (infographics). *Topics | European Parliament*. URL: https://www.europarl.europa.eu/topics/en/article/20201208STO93327/the-impact-of-textile-production-and-waste-on-the-environment-infographics (in English)
2. "Robymo pershi kroky u sferi pererobky tekstyl′nykh vidkhodiv", Lyudmyla Bukhantsova. ["We are taking the first steps in the field of textile waste processing", Lyudmila Bukhantsova]. *Astar*. URL: https://kse.ua/ua/about-the-school/news/147-5-mlrd-zagalna-suma-pryamih-zbitkiv-zavdana-infrastrukturi-ukrayini-cherez-viynu-na-kviten-2023-roku/ (in Ukrainian)
3. Kryuchkova V. V., Tykhomyrova T. S., Chikiryakin K. V. Stalyy pidkhid do upravlinnya tekstyl′nymy vidkhodamy: dosvid Chekhiyi ta perspektyvy yoho vykorystannya v Ukrayini. *Ekolohichni nauky*. [Sustainable approach to textile waste management: Czech experience and prospects for its use in Ukraine. *Environmental Sciences*.]. 2024. № 5 (56). С. 203-210. URL: https://repository.kpi.kharkov.ua/handle/KhPI-Press/85784 (in Ukrainian)
4. Kryuchkova, V.; Tykhomyrova, T. Ekolohichnyy stan gruntiv u zoni nesanktsionovanykh zvalyshch tekstyl′nykh vidkhodiv: dosvid Derhachivs′koyi terytorial′noyi hromady Kharkivs′koyi oblasti.

[Ecological condition of soils in the zone of unauthorized textile waste landfills: experience of Dergachiv territorial community of Kharkiv region]. 2025, 54–60, URL: https://doi.org/10.32848/agrar.innov.2024.27.8 (in Ukrainian)

5. Tykhomyrova T. S. Kryuchkova V. V., Chikiryakin K. V. Hrantovi proyekty dlya pidtrymky apsayklinh-pidpryyemnytstva ta rozvytku ekolohichnoyi kul′tury v Ukrayini yak instrument zmenshennya tekstyl′nykh vidkhodiv. Naukovyy visnyk Vinnyts′koyi akademiyi bezperervnoyi osvity. Seriya : Ekolohiya. Publichne upravlinnya ta administruvannya : zb. nauk. pr. Vinnytsya : Vydavnychyy dim "Hel′vetyka", Vyp. 1. [Grant projects to support upcycling entrepreneurship and the development of ecological culture in Ukraine as a tool for reducing textile waste. Scientific Bulletin of the Vinnytsia Academy of Continuing Education. Series: Ecology. Public management and administration: collection of scientific works – Vinnytsia: Publishing house "Helvetica", Issue 1]. 2025. C. 53-61. URL: https://repository.kpi.kharkov.ua/handle/KhPI-Press/88437 (in Ukrainian)
6. Ivanishena, T., Mandzyuk, I., Trukhina, O., Pekars′ka, V. (2023). Otsinka zhyttyevoho tsyklu materialiv yak instrument udoskonalennya protsesiv lehkoyi promyslovosti ta vprovadzhennya pryntsypiv kruhovoyi ekonomiky vyrobnytstv [Life cycle assessment of materials as a tool for improving light industry processes and implementing the principles of circular economy in production]. *Herald of Khmelnytskyi National University. Technical Sciences, 325(5(1), 89-97*. URL: https://doi.org/10.31891/2307-5732-2023-325-5-89-97 (in Ukrainian)
7. Ishchuk, T., Ivanishena, T., (2025). Napryamky vykorystannya vtorynnoyi syrovyny u lehkiy promyslovosti [Directions of using secondary raw materials in light industry]. *Herald of Khmelnytskyi National University. Technical Sciences*, *349*(2), 166-170. URL: https://doi.org/10.31891/2307-5732-2025-349-24 (in Ukrainian)
8. Yalcin-Enis, I. Evaluation of recycled textile wastes with E-glass fabric in bio-based epoxy matrix composites: investigation of the mechanical properties. *J Mater Cycles Waste Manag* **25**, 171–180 (2023). URL: https://doi.org/10.1007/s10163-022-01522-6 (in Ukrainian)
9. Yalcin-Enis, I., Kucukali-Ozturk, M., Sezgin, H. (2019). Risks and Management of Textile Waste. In: Gothandam, K., Ranjan, S., Dasgupta, N., Lichtfouse, E. (eds) Nanoscience and Biotechnology for Environmental Applications. Environmental Chemistry for a Sustainable World, vol 22. Springer, Cham. URL: https://doi.org/10.1007/978-3-319-97922-9_2 (in English)
10. Pensupa, N., Leu, SY., Hu, Y. *et al.* Recent Trends in Sustainable Textile Waste Recycling Methods: Current Situation and Future Prospects. *Top Curr Chem (Z)* 375, 76 (2017). URL: https://doi.org/10.1007/s41061-017-0165-0 (in English)
11. EU Textile Waste Directive: Key Updates for SMEs in 2025. *The Loop Factory*. URL: https://www.loopfactory.se/news/eu-textile-waste-directive-in-2025 (in English)
12. Delivering the European Green Deal. *European Commission*. URL: https://commission.europa.eu/strategy-and-policy/priorities-2019-2024/european-green-deal/delivering-european-green-deal_en (in English)
13. Roos van Keulen. 5 Takeaways From the New EU Circular Fashion Strategy. *Earth.Org*. URL: https://earth.org/5-takeaways-from-the-new-eu-circular-fashion-strategy/ (in English)
14. New EU Strategy for sustainable and circular textiles. *Interreg Europe*. URL: https://www.interregeurope.eu/policy-learning-platform/news/new-eu-strategy-for-sustainable-and-circular-textiles (in English)
15. EU Strategy for sustainable and circular textiles. *European Parliament*. URL: https://www.europarl.europa.eu/legislative-train/theme-a-european-green-deal/file-eu-textiles-strategy (in English)
16. Guinebault M. New EU regulations for the fashion industry are coming into force in 2025. *Fashion Network*. URL: https://ww.fashionnetwork.com/news/New-eu-regulations-for-the-fashion-industry-are-coming-into-force-in-2025,1690622.html (in English)
17. Ecodesign for Sustainable Products Regulation. *European Commission.* URL:https://commission.europa.eu/energy-climate-change-environment/standards-tools-and-labels/products-labelling-rules-and-requirements/ecodesign-sustainable-products-regulation_en (in English)

18. Michaliková M. Waste Not: The Textile Crisis. *Interreg Europe.* URL: https://www.interregeurope.eu/policy-learning-platform/news/waste-not-textile-crisis (in English)
19. Yevropeys′kyy Zelenyy Kurs. Ekodiya. [European Green Deal. Ecodia]. URL: https://ecoaction.org.ua/ievropejskyj-zelenyj-kurs.html (in Ukrainian)
20. Den′ vtorynnoyi pererobky. [Recycling Day]. *Let's do it, Ukraine*. URL: https://letsdoitukraine.org/2024/11/ldu-recyclingday2024/ (in Ukrainian)
21. Reforma startuvala – vstupyv u diyu Zakon «Pro upravlinnya vidkhodamy». Ministerstvo zakhystu dovkillya ta pryrodnykh resursiv Ukrayiny. [The reform has started - the Law "On Waste Management" has come into force. Ministry of Environmental Protection and Natural Resources of Ukraine]. URL: https://mepr.gov.ua/reforma-startuvala-vstupyv-u-diyu-zakon-pro-upravlinnya-vidhodamy/ (in Ukrainian)
22. Shcherbak V. V Irpeni vidkryly pershu v Ukrayini liniyu z pererobky tekstylyu. [The first textile processing line in Ukraine was opened in Irpen]. *BigKyiv.* URL: https://bigkyiv.com.ua/v-irpeni-vidkryly-pershu-v-ukrayini-liniyu-z-pererobky-tekstylyu/ (in Ukrainian)
23. Serhieiev O. A. (2025). Yevropeys′kyy dosvid zapobihannya utvorennyu pobutovykh vidkhodiv ta mozhlyvosti yoho adaptatsiyi v Ukrayini. Transformatsiyna ekonomika. [European experience in preventing the formation of household waste and the possibility of its adaptation in Ukraine. Transformational economy]. (4 (09), 71-77. URL: https://doi.org/10.32782/2786-8141/2024-9-11 (in Ukrainian)
24. Zakon Ukrayiny "Pro upravlinnya vidkhodamy" nabuv chynnosti. [The Law of Ukraine "On Waste Management" has come into force]. Ekoltava. URL: https://www.ekoltava.org/2023/07/09/zakon-ukrayiny-pro-upravlinnya-vidhodamy-nabuv-chynnosti (in Ukrainian)
25. Yak biznesu adaptuvatysya do novykh pravyl upravlinnya tekstyl′nymy vidkhodamy u 2025 rotsi? [How can businesses adapt to new textile waste management regulations in 2025?] *Re:inventex*. URL: https://www.facebook.com/share/p/18QVSgpCit/ (in Ukrainian)
26. Farbar K. Stalist′ yak shlyakh do maybutn′oho ukrayins′koyi haluzi tekstylyu ta odyahu. [Sustainability as a path to the future of the Ukrainian textile and clothing industry]. Ukrlehprom. URL: https://ukrlegprom.org/ua/news/stalist-yak-shlyah-do-majbutnogo-ukrayinskoyi-galuzi-tekstylyu-ta-odya/ (in Ukrainian)
27. Mollá, K., & Vantyghem, D. (2022, September). Sectorial strategies for the textiles sector. *EU4Business: Connecting Companies (EU4BCC)*. URL: https://connectingcompanies.eu/wp-content/PDF-Flip/Textile_Sector%20strategy.pdf (in English)
28. SPRING Report. Analysis of the EU Textile & Clothing External Trade in 2023. (2024). *EURATEX*. URL: https://www.textilindustrie.at/p2/FVN/EURATEX_SpringReport2024.pdf (in English)
29. Vyklyky dlya ukrayins′kykh vyrobnykiv z ohlyadu na EU Textile Strategy-2030. [Challenges for Ukrainian manufacturers in view of the EU Textile Strategy-2030]. Ukrlehprom. URL: https://ukrlegprom.org/ua/news/vyklyky-dlya-ukrayinskyh-vyrobnykiv-z-oglyadu-na-eu-textile-strategy-2030/ (in Ukrainian)
30. Yakovenko I. V Irpeni vidkryly pershu v Ukrayini liniyu z pereroblennya tekstyl′nykh vidkhodiv. [The first textile waste processing line in Ukraine was opened in Irpen]. *Village.* URL: https://www.village.com.ua/village/business/news/359501-v-irpeni-nbsp-vidkrili-nbsp-pershu-v-ukrayini-liniyu-z-pererobki-tekstilnih-vidhodiv (in Ukrainian)
31. The environmental crisis caused by textile waste. *Roadrunner.* URL: https://www.roadrunnerwm.com/blog/textile-waste-environmental-crisis (in English)

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