



MANAGEMENT SYSTEMS AND TOOLS FOR ASSESSING SUSTAINABILITY IN THE TEXTILE INDUSTRY

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ABSTRACT: The textile industry faces significant environmental and social challenges due to high consumption of natural resources, intensive use of chemicals, waste generation and the need to improve working conditions along the supply chain. In order to respond to these challenges, various sustainability management systems, international standards, certification systems and tools for evaluating the sustainable performance of organizations have been developed. The aim of this paper is to present the basic systems and tools that are applied to assess and improve sustainability in the textile industry, with special reference to ESG platforms, EcoVadis, amfori BSCI, OEKO-TEX®, GOTS, Higg Index® and LCA methodology. The paper analyses their role in monitoring the environmental, social and management aspects of business is along with their importance for increasing transparency, traceability and responsible management of the supply chain. Application of the mentioned systems and tools enables textile organizations to identify risks, measure sustainability performance and define measures for continuous business improvement. Their integration represents an important step towards the transition of the textile industry to a more sustainable and circular model of development.

Keywords: sustainability, ESG, EcoVadis, Higg Index, GOTS, OEKO-TEX.

SISTEMI UPRAVLJANJA I ALATI ZA VREDNOVANJE ODRŽIVOSTI U TEKSTILNOJ INDUSTRIJI

APSTRAKT: Tekstilna industrija suočava se sa značajnim ekološkim i društvenim izazovima usled velike potrošnje prirodnih resursa, intenzivne upotrebe hemikalija, generisanja otpada i potrebe za unapređenjem uslova rada duž lanca snabdevanja. U cilju odgovora na ove izazove razvijeni su različiti sistemi upravljanja održivošću, međunarodni standardi, sertifikacioni sistemi i alati za vrednovanje održivih performansi organizacija.



Cilj ovog rada je prikaz osnovnih sistema i alata koji se primenjuju za procenu i unapređenje održivosti u tekstilnoj industriji, sa posebnim osvrtom na ESG platforme, EcoVadis, amfori BSCI, OEKO-TEX®, GOTS, Higg Index® i LCA metodologiju. Analizirana je njihova uloga u praćenju ekoloških, društvenih i upravljačkih aspekata poslovanja, kao i njihov značaj za povećanje transparentnosti, sledljivosti i odgovornog upravljanja lancem snabdevanja. Primena navedenih sistema i alata omogućava tekstilnim organizacijama identifikaciju rizika, merenje performansi održivosti i definisanje mera za kontinuirano unapređenje poslovanja. Njihova integracija predstavlja važan korak ka prelasku tekstilne industrije na održiviji i cirkularni model razvoja.

Ključne reči: održivost, ESG, EcoVadis, Higg Index, GOTS, OEKO-TEX.

1. INTRODUCTION

The textile industry represents one of the most important industrial sectors at the global level; however at the same time it is counted among the industries with a considerable impact on the environment and society. High consumption of water and energy, intensive use of chemicals, greenhouse gas emissions and the generation of large amounts of textile waste represent the key challenges this sector is facing [1-2].

In addition to environmental aspects, issues of safety and health of employees, respect for human rights and responsible management of the supply chain are of increasing importance. Contemporary demands of the market, consumers and regulatory bodies brought about the need for a systemic approach to sustainability management in textile organizations [3].

The aim of this paper is to showcase the basic sustainability management systems in the textile industry, as well as the importance of applying international standards, certification systems, ESG (Environmental, Social and Governance) platforms and other tools for evaluating sustainability in improving sustainable business and competitiveness of textile organizations.

2. SUSTAINABILITY IN THE TEXTILE INDUSTRY

The textile industry is considered one of the largest consumers of natural resources and a significant source of environmental pollution. During the textile production process, large amounts of water and energy are consumed, various chemicals are used, and significant amounts of waste and emissions of harmful substances are generated [4].

The processes of dyeing, printing and final processing of textiles, which are associated with intensive consumption of water and chemical agents, represent a special challenge. In addition, the growth in the production and consumption of textile products has led to an increase in the amount of textile waste and a shortening of the product's life cycle, which further burdens the environment [5].



The concept of sustainability in the textile industry is based on establishing a balance between environmental, social and economic aspects of business. Environmental sustainability implies rational use of resources, reduction of energy and water consumption, application of more environmentally friendly chemicals and efficient waste management. Social sustainability includes the protection of health and safety of employees, respect for labor rights and responsible management of the supply chain, while economic sustainability refers to the long-term profitability and competitiveness of the organization [2-3].

3. SUSTAINABILITY MANAGEMENT SYSTEMS, ESG PLATFORMS AND TOOLS FOR SUSTAINABILITY EVALUATION IN THE TEXTILE INDUSTRY

Effective sustainability management in the textile industry requires a systematic approach that includes planning, implementation, monitoring and improvement of the organization's environmental, social and economic performance. To this end, numerous international standards, certification systems and sustainability assessment tools have been developed that enable organizations to identify risks, improve business processes and increase business transparency.

Among the most important standards are systems for quality management (ISO 9001), environmental protection (ISO 14001), occupational health and safety (ISO 45001) and energy management (ISO 50001). The integrated application of ISO 9001, ISO 14001, ISO 45001 and ISO 50001 standards enables organizations to use resources more efficiently, reduce negative impacts on the environment and improve the working conditions of employees [6-9].

In addition to management system standards, specialized tools and certification systems aimed at assessing sustainability and social responsibility play a significant role in the textile industry. Among these, the following stand out: EcoVadis platform for sustainability assessment, the amfori BSCI (Business Social Compliance Initiative) - a social compliance system in the supply chain, the OEKO-TEX® textile safety standards, the GOTS (Global Organic Textile Standard) for the certification of organic textile products and the Higg index® for evaluating the environmental and social performance of materials, products, production processes and locations [10-14].

The modern concept of sustainability management is increasingly based on ESG principles, which include monitoring the environmental, social and management aspects of business. The application of these principles enables organizations to respond to the demands of customers, investors and regulatory bodies, while increasing their competitiveness and resistance to market changes [3]. Sustainability management systems need to be distinguished from sustainability assessment tools. Management systems represent the organizational framework for planning, implementation, monitoring and continuous improvement of the organization's environmental, social and economic performance. In contrast, sustainability evaluation tools are used to assess the level of development of sustainable practices and the performance of an organization or its suppliers.



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EcoVadis is a globally recognized platform for evaluating a company's ESG performance, i.e. environmental, social and management aspects of business, which enable a standardized evaluation of the level of development of the sustainability management system. The assessment is based on the analysis of policies, implemented activities and achieved results of the organization, which includes four key areas: environmental protection, labor and human rights, ethical business and sustainable procurement [10]. The methodology of the EcoVadis system is based on the principle of performance scoring, where companies are evaluated against international standards and best practices in the industry. Based on the obtained results, a ranking is made and a sustainability score is assigned, which enables the comparison of companies within the same or related sectors. In the textile industry, EcoVadis is most often used as a tool for assessing suppliers in the supply chain, which enables the identification of environmental and social risks, as well as the improvement of business transparency. It is particularly important in the control of working conditions, management of chemicals, reduction of the ecological footprint and compliance with customer requirements.

Application of the EcoVadis methodology contributes to increasing responsibility in the supply chain, strengthening ESG performance and improving the competitiveness of textile organizations on the global market.

Amfori BSCI (Business Social Compliance Initiative) is an international framework for assessing and improving social responsibility in global supply chains, with a special focus on the textile industry, developed by the amfori organization [11]. This system is not used for product certification; instead, it is a framework for evaluating and continuously improving the social performance of suppliers. BSCI is based on a code of conduct that includes basic principles such as the prohibition of child and forced labor, the provision of safe and healthy working conditions, respect for working hours and fair remuneration, as well as the prohibition of discrimination. The implementation of the system is carried out through evaluations and audits of suppliers, as well as defining corrective measures in cases of confirmed non-conformities. In this way, amfori BSCI contributes to increasing transparency and responsibility in the supply chain, as well as improving the social dimension of sustainability in the textile industry.

OEKO-TEX® is an international certification and testing system that is an important tool for evaluating sustainability and safety in the textile industry. It includes various standards that assess the safety of textile products, production conditions and the impact of production processes on the environment. The most famous standard, STANDARD 100 by OEKO-TEX® confirms that textile products have been tested for the presence of harmful substances and are safe for use. In addition, standards such as STeP by OEKO-TEX® (Sustainable Textile & Leather Production) and MADE IN GREEN by OEKO-TEX® evaluate the sustainability of production processes, chemical management, environmental protection, occupational health and safety, social responsibility and product traceability. Due to its comprehensive approach, OEKO-TEX® represents an important tool for assessing and improving sustainability, quality and transparency in the textile supply chain [12].



GOTS (Global Organic Textile Standard) is the leading international standard for the certification of organic textile products and one of the most important tools for evaluating sustainability in the textile industry. It covers the entire production chain from growing organic fibers, processing and dyeing, to production, packaging and labeling of finished products. In addition to certifying that textiles contain organic fibers, GOTS sets strict requirements regarding environmental protection, responsible use of chemicals, waste and water resources management, as well as respect for social criteria, including safe working conditions, prohibition of child and forced labor, and respect for labor rights. Due to its comprehensive approach, GOTS represents a reliable tool for assessing and improving the sustainability of textile products and production processes [13].

The Higg Index® is a set of standardized sustainability assessment tools for the textile, fashion and footwear industries developed by the Sustainable Apparel Coalition (SAC), an organization now known as Cascale. Its primary purpose is to measure and evaluate the environmental and social impacts of materials, products, production processes and production locations along the entire supply chain. The Higg Index includes multiple modules to assess different aspects of sustainability, including environmental impacts, energy and water consumption, greenhouse gas emissions, chemical management and working conditions. The application of the Higg Index allows textile companies to identify key areas for sustainability improvement, compare performance with industry practices, and make data-based decisions to reduce negative environmental and social impacts [15-19].

4. IMPLEMENTATION OF A SUSTAINABILITY MANAGEMENT SYSTEM IN THE TEXTILE ORGANIZATION

The implementation of a sustainability management system in the textile organization begins with the identification of major environmental, social and economic aspects of the business. Water and energy consumption during the textile dyeing and finishing process, the use of chemicals, the generation of wastewater and textile waste, as well as the working conditions of employees and the management of the supply chain [4-5] are identified as the most significant.

In order to improve environmental performance, the organization can apply measures to reduce water and energy consumption, optimize production processes and increase the scope of waste recycling. Special attention is paid to the choice of chemicals with less of a negative impact on the environment and to the control of their use during production [5].

The social component of sustainability includes improving the safety and health of employees, continuous training of staff and ensuring working conditions in accordance with international standards and principles of social responsibility. At the same time, the organization establishes criteria for the selection and evaluation of suppliers, considering their sustainability practices and compliance with market requirements [12-13].

Monitoring and evaluation of sustainability performances is carried out using appropriate indicators, such as specific consumption of water and energy per unit of product, amount



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of waste generated, degree of recycling, number of injuries at work and level of compliance of suppliers with the requirements of sustainable business [11].

In addition to monitoring internal performance indicators, modern textile organizations apply international standards, certification systems and sustainability evaluation tools, such as ISO standards, GOTS, OEKO-TEX, Higg Index and BSCI. Their application enables an objective assessment of environmental, social and management aspects of business, increases the transparency of the supply chain and provides a basis for continuous improvement of sustainability. The analysis of the life cycle of the product (LCA - Life Cycle Assessment) is of particular importance, enabling the identification of key impacts during all stages of the creation of a textile product and the selection of more sustainable materials and technologies [20].

Regulation (EU) 2024/1781 on the ecological design of sustainable products (ESPR - Ecodesign for Sustainable Products Regulation) represents the regulatory framework of the European Union which introduces requirements for the sustainable design of products and the assessment of their impacts during the entire life cycle. In the context of the textile industry, the ESPR represents an important regulatory instrument for the improvement and evaluation of sustainability, as it encourages the measurement and improvement of the environmental performance of products through criteria such as efficient use of resources, reduction of emissions, limiting the use of harmful substances, increasing the durability of products, the possibility of repair, reuse and recycling [21].

The regulation promotes the application of sustainability methods and indicators, especially the product life cycle assessment (LCA) approach, and requires greater transparency along the supply chain. Of particular importance is the introduction of the digital product passport (DPP - Digital Product Passport), which enables the collection and exchange of data on the composition of the product, the origin of materials, environmental characteristics and the possibilities of sustainable management of the product after its use. Within the textile industry, ESPR complements existing sustainability assessment tools such as the Higg Index, GOTS, OEKO-TEX, BSCI and LCA, providing a regulatory basis for more objective measurement, comparison and improvement of the sustainability of textile products. The aim of the regulation is to move from the model of linear production and consumption of textiles to a circular model, while increasing producer responsibility, transparency and sustainability of the entire value chain. In practice, ESPR complements existing sustainability rating systems as it directs manufacturers to look at sustainability not only through product certification, but across the entire life cycle, product design and resource management. The ESPR also introduces requirements that encourage waste reduction, including limiting the destruction of unsold products and improving reuse and recycling systems. The implementation of these requirements is a challenge for the textile industry due to the need to establish effective systems for data collection, product traceability, reuse and recycling of textile products.



5. CONCLUSION

The textile industry faces numerous challenges in the field of environmental protection, rational use of resources and social responsibility, which makes sustainability one of the key factors of its future development. The increasingly pronounced demands of the market, consumers and regulatory bodies require textile organizations to establish a systemic approach to sustainability management and continuous improvement of business processes [1], [3].

The implementation of a sustainability management system enables organizations to manage energy and water consumption more efficiently, reduce negative environmental impacts, improve employee working conditions and manage the supply chain more responsibly. The integration of international standards, certification systems and ESG tools contributes to increased business transparency, better risk management and strengthening the competitive position of organizations on the global market.

ESG sustainability assessment platforms are a modern digital tool that enables the collection, analysis and monitoring of data on the environmental, social and management performance of textile organizations. Their application enables more objective evaluation of sustainability through defined indicators, comparison of results between organizations and identification of areas for improvement. The special importance of ESG platforms is reflected in increasing the transparency of the supply chain, monitoring supplier compliance and supporting decision-making based on reliable data.

In combination with international standards and sustainability assessment tools, such as LCA, Higg Index, GOTS, OEKO-TEX, BSCI and the requirements of the European regulation ESPR, ESG platforms represent an important basis for systematic sustainability management in the textile industry. They enable the transition from individual initiatives to an integrated management model that encompasses the entire product life cycle and the entire value chain.

It can be concluded that sustainability is no longer just a strategic commitment of individual organizations, but a necessary condition for business success in the long run and for the development of the textile industry. Modern systems and tools for sustainability evaluation, including ESG platforms, LCA methodology, certification systems and regulatory frameworks, represent an important element of the transformation of the textile industry towards a more transparent, responsible and circular business model.

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