UNION OF ENGINEERS AND TEXTILE TECHNICIANS OF SERBIA

VII INTERNATIONAL SCIENTIFIC CONFERENCE

CONTEMPORARY TRENDS AND INNOVATIONS IN THE TEXTILE INDUSTRY

VII MEĐUNARODNA NAUČNA KONFERENCIJA

SAVREMENI TRENDOVI I INOVACIJE U TEKSTILNOJ INDUSTRIJI

PROCEEDINGS

EDITOR:
Prof. dr SNEŽANA UROŠEVIĆ

Belgrade, 19-20th September, 2024
Union of Engineers and Technicians of Serbia
Dom inženjera „Nikola Tesla“

PROCEEDINGS
IN THE TEXTILE INDUSTRY
SNEŽANA UROŠEVIĆ

UNION OF ENGINEERS AND TEXTILE TECHNICIANS OF SERBIA

AND

UNION OF ENGINEERS AND TECHNICIANS OF SERBIA
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PREFACE

The 7 th International conference "Contemporary Trends and Innovations in the Textile Industry" CT&ITI 2024, is co-organized by:

- Union of Engineers and Textile Technicians of Serbia,
- Union of Engineers and Technicians of Serbia,
- Faculty of Technology and Metallurgy in Belgrade, University of Belgrade, Serbia,
- Faculty of Technology, "Goce Delchev" University, Shtip, North Macedonia,
- Faculty of Mechaical Engineering, Polytechnic University of Tirana, Albania,
- Society for Robotics of Bosnia and Herzegovina and
- Balkan Society of Textile Engineering-BASTE of Greece.

The Ministry of Science, Technological Development and Innovation of the Republic of Serbia recognized the importance of this Conference, and thus, supported it.

The aim of this Conference is to consider current technical, technological, economic, ecological, R&D, legal and other issues related to the textile industry, then the application of contemporary achievements and the introduction of technical and technological innovations in the production process of fiber, textile, clothing and technical textile by applying scientific solutions in order to improve the business and increase the competitive advantages of the textile industry on the domestic and global market.

Leading scientists and experts from the Balkans and other countries, working at faculties, textile colleges and institutes, but also individuals who professionally deal with the issues at hand are taking part in this Conference.

The Conference program involves papers dedicated to the scientific and practical aspects of the following topics: Textile and Textile Technology, Textile Design, Management and Marketing in the Textile Industry and Ecology and Sustainable Development in the Textile Industry. The Conference program includes 66 papers, and a total of 158 participants from 17 countries: Albania, Australia, Bosnia and Herzegovina, Bulgaria, Croatia, Germany, Greece, India, North of Macedonia, Montenegro, Portugal, Romania, Serbia, Slovenia, Spain, Turkey and Ukraine.

Therefore, this Conference is an opportunity for establishing scientific, educational and economic cooperation of our country with other countries. Certain number of papers by domestic authors present the project results dealing with fundamental research and technological development, financed by the Ministry of Ministry of Science, Technological Development and Innovation of the Republic of Serbia.

I would like to thank all those who have made it possible to organize the conference Contemporary Trends and Innovations in the Textile Industry and make it a success. First, I would like to thank the Scientific and Organizing Committee for working hard, spending countless hours and finding the best solutions for numerous organizational aspects of our Conference. I also thank all the other institutions that supported the Conference in various ways, because without their support, the Conference could not have been organized. Last but not least, I would like to thank plenary lecturers, all authors and co-authors and guests for their participation in the Conference.

On behalf of the Organizing Committee

Prof. dr Snežana Urošević, president

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INNOVATIVE ENTREPRENEURSHIP AS A KEY FACTOR IN CREATING A SUSTAINABLE TEXTILE AND FASHION INDUSTRY

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ABSTRACT: *This paper studies the impact of applying innovative entrepreneurship in the process of realizing sustainable business practices in the textile and fashion industry. The paper begins with the main characteristics of sustainable development which tries to reconcile economic, ecological and social aims, and which is realized through a large number of activities manifested in the principles of green and circular economy, bioeconomy, waste management, clean technologies etc. Firstly, the necessity of applying new business models based on innovation and sustainability is studied closely, then the attention is directed to the possibility of their application in the textile and fashion industry. Special attention in this paper is devoted to the role of innovative entrepreneurship in sustainable business practices in this sector. The conclusion is that the textile and fashion industry have considerable opportunities for the application of innovative entrepreneurship and the realization of the sustainable development principles, as well as that innovative entrepreneurship today represents one of the main driving forces of its innovative sustainable business models.*

Key words: *sustainability, innovation, entrepreneurship, business models, textile and fashion industry.*

INOVATIVNO PREDUZETNIŠTVO KAO KLJUČNI FAKTOR U KREIRANJU ODRŽIVE TEKSTILNE I MODNE INDUSTRIJE

APSTRAKT: *U ovom radu proučava se uticaj primene inovativnog preduzetništva u procesu realizacije održivog poslovanja subjekata tekstilne i modne industrije. U radu se polazi od glavnih karakteristika koncepta održivog razvoja koji teži da pomiri ekonomske, ekološke i socijalne ciljeva, a koji se realizuje kroz veliki broj aktivnosti, ispoljenih kroz principe zelene i cirkularne ekonomije, bioekonomije, upravljanje otpadom, čistije tehnologije, itd. Posebno se proučava neophodnost primene novih modela poslovanja koji*

su zasnovani na inovativnosti i održivosti, zatim se pažnja fokusira na mogućnosti njihove primene u sektoru tekstilne i modne industrije. Posebna pažnja u radu posvećuje se ulozi inovativnog preduzetništva u procesu održivog poslovanja ovog sektora. Zaključuje se da sektor tekstilne i modne industrije ima izuzetno široke mogućnosti za primenu inovativnog preduzetništva i za realizaciju principa održivog razvoja, kao i da inovativno preduzetništvo predstavlja danas glavni pokretački faktor njegovog inovativnog održivog poslovanja.

Ključne reči: *održivost, inovacije, preduzetništvo, poslovni modeli, tekstilna i modna industrija.*

1. INTRODUCTION

The necessity of applying new, sustainable and innovative business models has arisen as a consequence of numerous negative consequences of the liner model, which was in use for many years as the only business model. The most adverse consequences of the liner business model are massive environmental pollution, low quality of life, excessive depletion of natural resources, enormous waste production and so on. Seeing that such business model has led not only to worse economic results but also to the threat to humanity's and this planet's survival, the need has arisen for radical changes of the ruling business model as well as the entire value system and priorities.

The concept of sustainable development which tries to reconcile economic, ecological and social aims represents the only long-term solution to the existing problems. The given concept is realized through a large number of activities manifested in the principles of green economy, circular economy, bioeconomy, waste management, clean technologies etc. In the framework of sustainable development, green economy, circular economy and bioeconomy play a particularly important role in its realization, even though the other elements of sustainable development cannot be disregarded either.

Seeing that the application of sustainable development concept implies implementing numerous key changes in business processes, the given changes have to be for the most part accompanied by innovative solutions, but also the readiness to invest in new fields and new ways of doing business. This way innovation and entrepreneurship, and particularly innovative, sustainable entrepreneurship, can play a significant role in the process of building and developing sustainability.

Since the textile and fashion industry have a major role in the environmental pollution, waste generation, and the creation of numerous social issues, their further development will to a great extent depend on the ability to solve the mentioned problems. Therefore, it is thought that creating sustainable business models, as well as applying innovative entrepreneurship can contribute greatly to a sustainable development of this sector.

2. THE NECESSITY OF APPLYING NEW BUSINESS MODELS BASED ON SUSTAINABILITY AND INNOVATION

Some of the main causes of the necessity and urgency of applying new, sustainable and innovative business models are ever more intense depletion of natural resources which is exceeding the possibility of their renewal, urbanization and the decline in the quality of life, economic losses and structural waste, bigger price risks, the emergence and constant improvement of clean technologies, accepting alternative business models, ever more intense degradation of the environment due to the climate change, the loss of biodiversity and natural capital, the degradation of land and water pollution.

Green economy represents the foundation of sustainable development realization. Its main elements are: bioeconomy, circular economy, clean technologies, and hierarchy in waste management, industry ecology and solutions based on nature conservation [1, 2]. Green economy advocates for using the untapped potential of ecological processes (i.e. ecosystem services), for improving social welfare, but in a way which does not threaten their sustainability, together with substantially lower risk to the environment. This concept offers a solution for reducing carbon emission, upgrading energy and resource efficiency and preventing the loss of biodiversity and ecosystem favors [3].

Circular economy is the economy which is regenerative in its design and which aims to ensure the greatest utility and value of products, components and materials at all times [4]. So as to achieve the mentioned goal, it is necessary to apply the integrative approach, starting with the choice of business models and product design, to the design of supply chains and the choice of materials. Circular economy strives to reduce solid waste, landfills and emissions through activities such as reuse, reproduction and/or recycling. Like the concept of sustainable development, the concept of circular economy is also a global developmental concept which takes care of the current state of the economy, industrial production and consumption which can endanger future generations, and it can as well represent the source of untapped competitive advantage [5]. Both concepts are also based on the transformation of economic system, collaboration between different economic entities, innovation of business models and application of multi and interdisciplinary approaches.

It is important to emphasize that the implementation of the circularity principle in business models and supply chains represents a prerequisite for sustainable production which is necessary for improving economic and ecological performances of developed and developing countries [6]. The European Commission presents circular economic systems as useful for different dimensions of sustainability (productivity of resources, job openings and GDP growth), but it does not specify whether they present the necessary or sufficient condition and in which way they are connected with other concepts which promote and encourage sustainability. Circularity and systems based on services are necessary, but not sufficient conditions for a sustainable economic system. For long-term sustainability, in addition to establishing the closed circle system, it is necessary to ensure other conditions as well, such as the change in the way of life, behavior patterns and spending habits.

Other than the listed similarities, the literature points out certain main differences between the concept of sustainable development and the concept of circular economy. The mentioned differences are: *time of origin* (the concept of sustainable development is older), *aims* (unlike the sustainability goals which are different and changeable, circular economy

aims to close the circle), *motives* (circular economy is motivated by the idea of better resource utilization and waste and emissions reduction using circular rather than linear systems), *priorities* (the concept of circular economy prioritizes economic prosperity first, and then environmental benefits, while the concept of sustainable development is conceived of as a holistic approach which sees economic, social and ecological dimensions as equal and balanced), *users* (sustainability aims to be of use to the environment, economy and society as a whole, while the main users of circular economy are economic actors who apply a circular system) and *responsibility* (in the debate on sustainability responsibilities are shared, but not clearly defined, while in the literature it is thought that the responsibility for the transition to circular system rests primarily with private businesses and policy makers).

On the other hand, circular bioeconomy is a political (intergovernmental), industrial and social initiative, which requires, among other things, the following [7]:

- introducing flexible and encouraging culture of organizational changes in value chains;
- strengthening public-private partnerships;
- readiness to develop bio-based industries so as to ensure self-sufficiency in basic goods;
- systemic way of thinking at all levels and building appropriate institutions at a local and regional level;
- efficient mixture of policies, appropriate legal framework and innovative approach;
- appropriate changes in terms of quality standards with the aim of accepting recycled bio-products.
- mutual effort and collaboration between researchers, technological centers, industry, primary sector, new entrepreneurs, consumers, civil society and public policy makers.

In the process of constructing the three main building blocks of circular economy, business entities have a role in realizing the following: *circular product design and production, development of new business models* and *existence of reverse logistics and treatment methods* which ensure that materials return to the market. In addition to this, a successful transition to new, more adequate business models requires the construction of the fourth block which refers to *enabling and creating favorable systemic conditions* in whose development the key role belongs to educational and financial institutions as well as platforms for collaboration (between sectors or enterprises and policy makers) and new economic framework.

3. THE POSSIBILITIES OF APPLYING INNOVATIONS AND SUSTAINABLE BUSINESS MODELS IN THE TEXTILE AND FASHION INDUSTRY

The textile and fashion industry are the trades with a wide spectrum of possibilities for applying innovations and sustainable business models. Todeschini et al. (2017) pinpointed five socioeconomic and cultural macro-trends which lead to initiating the application of sustainable and innovative business models in the textile and fashion industry. These are:

applying the circular economy concept in industrial processes which enable innovations in product design, services and business models, the adoption of corporate social responsibility measures, sharing economy and collaborative consumption which promote economic growth based on innovations and entrepreneurship and reducing the negative impact on the environment, technological innovation (using alternative raw materials rather than scarce natural resources, recycled materials, natural dyeing techniques, improving clothing durability, reducing waste etc.) and consumer education and increased consumer awareness of the advantages of sustainable and green products.

Based on the conducted research and practice it can be said that innovations in textile industry enterprises have a vital role in the process of encouraging their business. A study by Wongwilai et al. (2022) which explored the importance of innovative ideas and their contribution to the business sustainability of textile industry enterprises takes into consideration three factors in the studied processes [8]. These are: innovative processes, innovative production and innovative supply chains. The results of the given study point out that innovative ideas have a key role in business sustainability. They increase the innovative production and supply chains which then leads to positive effects on business sustainability.

In the textile and fashion industry there is a wide range of possibilities for increasing the value of the existing clothing by extending its life span and enabling new ways of using it, for creating zero waste and for slow fashion. Table 1 shows the mentioned trends which foster innovations in fashion sustainability-related business models, as well as their impact on the nine main areas of the business model.

Table 1: Trends and drivers of sustainability-related business model innovation for fashion businesses

Macro-trend	Driver of sustainable innovation	Where does it drive innovation in sustainable business models in fashion?
Circular economy	Recycling	Cost structure, key activities, key partners
	Vegan	Key partners, key resources, channels, value proposition
	Upcycling	Key resources, key activities, value proposition
Corporate social responsibility	Sweatshop free	Customer relationship, key resources, key activities
	Fair trade	Customer relationship, key partners
	Locally sourced	Customer relationship, value proposition, key partners
Sharing economy and collaborative consumption	Fashion library	Customer relationship, value proposition, revenue streams
	Second hand	Value proposition, channels, customer relationship, key activities, revenue streams
	Collaboration	Key partners, key activities, key resources, delivery channels, customer relationship
Technological innovation	Sustainable raw materials	Key resources, customer relationship, cost structure

	Zero waste	Key resources, key activities, cost structure
	Wearables	Key resources, key activities, key partners, value proposition, cost structure
Consumer awareness	Capsule wardrobe	Customer relationship, value proposition, revenue streams
	Lowsumerism	Customer relationship, value proposition, revenue streams
	Slow fashion	Value proposition, customer relationship

Source: Todeschini et al., 2017, p. 763.

The literature also emphasizes the importance of the diffusion of open innovation models for enterprises in the textile and fashion industry with a view to ensuring ecological sustainability of their processes and products. It is also highlighted that the possibility of increasing innovative performance of enterprises by adopting the open innovation model depends on two elements; those are [9]: a) the capacity to collaborate with enterprises which do business in different sectors; b) internal investment in research and development so as to ensure the necessary absorption capacity for collaboration. It is very important to emphasize that contemporary innovations in the textile and fashion industry, especially product innovations, are very complex and that they necessitate acquiring technological knowledge in different scientific fields, such as materials science, nanotechnologies, medicine, chemistry and alike.

Water, fuel and chemicals are used as basic resources in large quantities in business operations in the textile industry enterprises. Chemicals released in the environment from processing and dyeing of textile make up a third of all chemicals released into the environment [10]. Because of this, so as to mitigate the damage already done to the environment, and to reduce and prevent the future negative impacts, it is necessary to introduce and apply the principles of sustainable business in the textile industry enterprises. Sustainable business implies the change in the value system, priorities and the entire business philosophy, which, on the other hand, points to the necessity of a constant introduction of sustainable innovations.

The application of *sustainable innovations* in the textile industry means that the products which are produced are *safer*, *more efficient*, *healthier* and *ecologically more acceptable* and that they use *less material*, *create less waste* and *spend less energy*. Eco design can significantly reduce energy consumption, as well as energy loss. The tools used in eco design, which are popular in the textile industry, include the eco sign, carbon footprint, life cycle analysis, sustainability design and water footprint [11]. Eco signs in the textile industry promote ecological practices such as sustainable production and reduction of harmful chemical in textile.

Other than the abovementioned, the assessment of the life cycle is also very important in the textile industry, because each phase of an industrial process has a potential to significantly influence the ecology and society, from using toxic chemicals or large amounts of energy, to the lifespan end phase, where some products emit harmful chemicals after being disposed of on landfills. In the materials domain, sustainable innovations should contribute to the reduction, replacement or usage of more sustainable materials. This form

of sustainable innovations is critical because the majority of materials used in the textile industry are unsustainable, since fibers used are obtained from fossil fuels.

One kind of sustainable innovation in practice are sustainable process innovations, which include cleaner production, ecological efficiency, waste management, supply chain management, as well as enzyme-based technology and textile processing. *Cleaner production* represents an integrative preventative ecological business strategy which aims to increase the overall efficiency and reduce human and environmental risks by producing high-quality products [12]. *Eco efficiency* is the capacity of an organization to provide goods and services at competitive prices with minimal harmful influence on the environment and using resources during their life cycle, with the idea of “creating greater value with less impact on the environment“[13]. *Waste management* is a form of sustainability innovation which is focused on reducing, reusing and recycling waste.

One of huge global problems in the textile industry is waste. With a view to managing waste efficiently, strategic steps proposed by peer-reviewed literature include focus on raw materials, waste management and shaping comsumer behavior.

Supply chain management is directed towards the attitude a company has towards upstream processes (raw materials) and downstream processes (distribution), which are very complex in the textile industry and which include complex local and international networks. A few innovative points related to supply chain management are the following: traceability of supply chains and upstream and downstream connection in the process of forming value chains.

One of the key driving forces of sustainability innovations is organizational innovative practice. There are a few practices which refer to organizational innovations, and they include environmental management systems and corporate policies, collaboration, business models, culture and knowledge management and risk management. Environmental management systems and corporate environmental policy could make it easier for companies to reconcile their ecological and social responsibility in a way understandable and acceptable for every interested party in a company. Collaboration is critical in this process because main challenges in the textile industry entail collaboration between different social actors (industries, universites, research institutions and public policy makers) so as to reach more sustainable solutions in this sector.

The new business model which contributes to sustainability innovations is particularly related to circular business models, which enables companies to create value for increasing the efficiency of resources with a longer product lifespan and closing material loops. Numerous authors claim that, in order to enable the realization of circular economy, it is necessary to formulate an innovative business model, not just to apply product and process innovations. Only in this way will it be possible to realize product and material reuse. The key players in the process of developing innovative business models in the textile industry with a greater potential are young entrepreneurs and consumers.

As one of the most significant fields of research tackled in almost all peer-reviewed articles are obstacles to applying sustainable innovations in the textile industry. The mentioned obstacles can be of internal or external character [14]. A typical example of an internal barrier is the lack of awareness of the need for sustainable innovations, which can be a

consequence of the lack of knowledge of the existing impact of innovations on ecological and social aspects, as well as the lack of information concerning the market needs for innovative and sustainable products. The barriers often mentioned also refer to investment and production costs, primarily related to technology replacement, research and development costs or material replacement, which affect the increase in the selling price which customers can find unacceptable and which can make the product less attractive on the market. An external obstacle in the development of innovative sustainable practices in the textile industry can be, for example, the lack of support from the government in terms of financial incentives and non-financial aid. Another obstacle can refer to the challenges subjects face when searching for potential partners for collaboration, and which are related to culture compatibility and different abilities needed. Unstable macroeconomic conditions are also considered a barrier to the development of sustainability innovations.

4. THE IMPACT OF INNOVATIVE ENTREPRENEURSHIP ON SUSTAINABLE BUSINESS PRACTICES IN THE TEXTILE AND FASHION INDUSTRY

The possibility of innovating business models and reducing the negative impact of business activities on the environment is particularly great in the textile and fashion industry. By introducing the concept of sustainable development, green and circular economy, entrepreneurship has more and more “green” characteristics. This particularly refers to environmental entrepreneurship, eco-entrepreneurship, green (or ecological) entrepreneurship and sustainable entrepreneurship. Many studies pointed out the unbreakable bonds that exists between green entrepreneurship and innovations [14]. Designing and placing new products and services and creating new jobs while simultaneously solving ecological problems (such as the loss of biodiversity and global warming) is the main idea of green entrepreneurship. The idea of green entrepreneurship is manifested first and foremost in actions and motivation which stem from the desire to solve specific ecological problems or to transform the sector so that alternative and more sustainable products and practices become more common.

Green (or ecological) entrepreneurship advocates for designing and implementing business models which offer solutions for reducing or preventing negative effects of fast fashion on ecological and social sustainability by implementing different types of eco-innovations. Its aim is transformation, i.e. “greening” of the sector so as to make it more sustainable, as well as the creation of not only economic, but social and ecological value as well [16]. The key characteristics of green entrepreneurs are the following [15]:

- Using new business opportunities and a lack of aversion to risk;
- Strong intrinsic motivation and desire to offer their contribution in terms of ensuring a more sustainable future;
- Focus on ensuring both direct financial benefits and positive impact on the environment by fostering innovations related to the environment and sustainable development;
- Awareness of creating a more sustainable future.

However, we should not forget that the implementation of sustainable development causes the increase in business expenses. Due to this, entrepreneurs who run their businesses in

accordance with the principles of sustainable development are often on the brink of extinction, and one of the main reasons for this is insufficient involvement of the public sector in the support of entrepreneurs in the sector. This is why it is necessary for local and regional authorities to build and apply individualized approaches to entrepreneurs. This is because green entrepreneurs represent a very heterogenous group with different motives and strategic aims, but also diverse financial and ecological goals.

The importance of sustainable entrepreneurship, as a potential solution to different problems, has drastically increased worldwide. Owing to new sustainable business models, products and services, entrepreneurs can contribute to the solution of environmental problems. The latest studies have tried to integrate entrepreneurship with sustainability and to encompass a wide concept of sustainable entrepreneurship, which includes financial, ecological and moral criteria [17]. Entrepreneurs, small and middle-sized enterprises have a particularly important role to play in this process. Fast, great and often unpredictable changes in the surroundings face entrepreneurs, small and medium-sized enterprises with numerous challenges of finding possibilities for solving problems and improving business success. Entrepreneurs, small and medium-sized enterprises can play a major role in a country's development, which is why they are generally thought of as a key pillar of economic development in developing countries. Therefore, entrepreneurial abilities and knowledge are of essential importance for the development of sustainable entrepreneurship.

In contemporary business conditions innovative aspect of entrepreneurship is of crucial importance in almost all sectors, including the fashion industry. Doing business in the fashion industry, just like fashion employers themselves, requires a high level of innovation and entrepreneurship so as to achieve high performance and high efficiency. Studies show that there is a large number of individuals in the fashion industry who are at the same time inventors, owners and fashion company managers. Such companies were created as a result of commercialization of fashion ideas and design methods, production, as well as the application of such business or marketing methods which have led to revolutionary or incremental changes in the fashion industry. Global fashion business today entails, other than a high level of creativity and innovation, sophisticated management techniques. The given management methods have to adjust to a fast development of business strategies in fashion management.

Entrepreneurs are market actors who: manage businesses in an entrepreneurial way, establish new organizations, bring innovations into the market (either new products or services, or new processes), identify market possibilities etc. [18]. Entrepreneurship is a process of using the possibilities that exist in the surroundings or which are made by innovations in an attempt to create value. They often include creating and managing new business ventures by individuals or teams [19]. Mutual aspects of entrepreneurs' and innovators' creativity appear in different areas such as: design, science, technology, art and organizational development. This enables creative entrepreneurs to work in many different types of organizations.

Joseph Schumpeter thought that "without innovations, there are no entrepreneurs" and that an entrepreneur is actually an innovator who creates something new for an organization

and customers. Also, forced innovations are of fundamental importance, seeing that innovations are necessary for restarting, recreating and reflecting at all levels of an organization. Besides, corporate entrepreneurship is regarded as a necessary element in the process of creating continuous innovation and achieving competitive advantage on dynamic markets, as well as in building organizational skills which enable a company to create capacity for continuous innovation. In this context, entrepreneurs are motivated people who are able to seize an opportunity and transform it into their own market opportunity. Studies show that there is a high level of correlation between high-performance enterprises and innovative entrepreneurs, which is in accordance with the literature that voices the opinion that innovations improve company performance, and thus their competitive advantage as well.

There is a very strong bond between creativity and innovation in new markets, products, processes and technologies. It is particularly important to emphasize that the innovation in fashion is a continuous and almost endless process, which significantly improves the competitiveness of textile enterprises and fashion business. The market is constantly looking for new products in the area of product innovation. Because of this, universities continuously come up with new inventions and try to commercialize their new technologies. The commercialization of mentioned innovations depends on business models applied, marketing and finance, as well as industrial partners and management methods. The driving force of innovation are creative and venturesome individuals. In addition to a high level of creativity and innovation, doing business in the textile and fashion industry requires sophisticated management techniques. Two dimensions of “creativity and innovations” are associated with this industry [19]. The first one refers to product innovations associated with fashion/textile designers’ creativity which is important in creating stronger international brands and leading world competitive products. The second dimension refers to innovations in “business operations,” marketing techniques, supply chain management etc.

Seeing that solving environmental problems is related to high level of uncertainty, this offers great possibilities for realizing entrepreneurial activities. Entrepreneurial actions can compensate for ecological market failures by revealing, assessing and taking the chances contained in these failures, so as to initiate the process of using the environment and natural resources and to get to the development of ecologically more sustainable economy [20].

Circular entrepreneurship represents a special type of entrepreneurship and can be defined as a process of researching and exploiting the possibilities in the circular economy domain [21]. Circular entrepreneurship represents a special type of sustainable entrepreneurship which aims to protect the population and the environment. It is also connected with other types of entrepreneurship, especially organic entrepreneurship (focus on health and wellbeing), green entrepreneurship (focus on climate and ecosystems) and blue entrepreneurship (focus on clean water and sea life) [22]. New enterprises, whose business operations are based on circularity, should significantly contribute to solving ecological problems by creating new ecologically sustainable processes, products and services.

At the same time, circular entrepreneurship can represent a challenge for growing circular enterprises, as well as for all companies that are switching to sustainable business models and the application of circularity principles [23]. Entrepreneurial companies that apply

innovative business models can fill in the gap and provide critical links for corporations in reverse supply chains, while, on the other hand, they create new business opportunities for numerous social benefits [24]. Studies on these topics show that entrepreneurs are able to implement innovative business models, to develop innovative products and services, as well as to explore possibilities that arise from circular economy. This way they can solve numerous problems that occur in the social and ecological field. Realizing innovative sustainable business models represents the main driving force of implementing circular economy in the fashion industry.

5. CONCLUSION

Implementing the principles of sustainable development in business models and supply chains represents one of the main production requirements in contemporary economic conditions. The concept of sustainable development which aims to reconcile economic, ecological and social goals represents one of long-term solutions to the problems caused by applying the liner business model. The given concept can be realized through a large number of activities, manifested in the principles of green economy, circular economy, bio-economy, waste management, cleaner technologies etc. The application of the sustainable development principles implies radical changes in business operations, the way of thinking and the value system. The given changes require the application of new solutions in all areas of human activity, and new solutions are the result of innovative activities and adequate business ventures. This paper points out that the textile and fashion industry are trades with a wide variety of possibilities for applying innovations and sustainable business models. Based on the analysis of research conducted it can be concluded that innovations in textile industry enterprises have a vital role in the process of encouraging their business operations. The conclusion is that three elements have a particularly important role in the process of applying innovative ideas and their contribution to sustainability. These elements are: innovative process, innovative production and innovative supply chains.

The paper emphasizes that contemporary innovations in the textile and fashion industry, particularly product innovations, are very complex and entail acquiring technological knowledge in different areas. Specifically, the application of *sustainable innovations* in the textile industry means that *safer*, *more efficient*, *healthier* and *ecologically more acceptable* products which use *less material*, create *less waste* and spend *less energy* should be produced.

The paper also points to the obstacles that occur in the process of applying sustainability innovations in the textile industry. The lack of awareness of the need for sustainable innovations, as well as high investment and production costs are stated as internal obstacles. The lack of governmental support in terms of financial incentives and non-financial support, the challenges subjects are faced with when looking for potential partner for collaboration, as well as unstable macroeconomic conditions are stated as external obstacles. Hidden unethical practices in textile supply chains, then modern slavery practices which include employment agencies etc. represent hidden obstacles in this process.

This paper pays special attention to the characteristics of green entrepreneurship which advocates for designing and implementing business models which offer solutions for reducing or preventing negative impact of fast fashion on ecological and social sustainability by introducing different types of eco-innovations, with a view to transforming, i.e. “greening“ the sector so as to increase its sustainability and create not only economic, but also social and ecological value.
The conclusion is that entrepreneurial companies which apply innovative business models can fill in the gap and provide critical links for corporations in reverse supply chains, while, on the other hand, they create new business opportunities for numerous social benefits, as well as that innovative entrepreneurship is the main driving force of innovative sustainable business operations in the textile and fashion industry.

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