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Cite as: AIP Conference Proceedings 2430, 040011 (2022); <https://doi.org/10.1063/5.0077301>
Published Online: 24 January 2022

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Skills Development for Digital Transformation in Textile

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Abstract. The article focuses on topics of skills development for digital transformation in the textile, apparel and shoe industry. Based on the analysis of the main features in the textile, apparel and shoe industry of Belarus, opportunities for the growth of the industry and an increase in its market share by digitalization of production were identified. Based on the analysis of the main world trends in the textile, apparel and shoe industry, the skills and competencies required for digital transformation in the textile, apparel and shoe industry were identified. The tasks of their development are priorities for the industry enterprises and sectoral educational institutions. The success of the development of the textile, apparel and shoe industry depends on their joint efforts.

INTRODUCTION

Textile, apparel and shoe conform the largest retail market for non-food products in the world. Although the share of Belarus in this market is insignificant (with the exception of the market for flax products), the country has good human and production potential for the development of the textile, apparel and shoe industry. On the threshold of the fourth industrial revolution, which only highly developed countries have approached, the Internet and artificial intelligence (AI) get into all spheres of the economy, i.e., the transition to digitalization of the economies of all countries, which should radically change the whole world. In the current economic situation, textile, apparel and shoe industry needs non-standard solutions, breakthrough innovations. Digitalization of production opens up many opportunities in this field. However, many employees involved in labor processes today do not have the knowledge, skills and competencies necessary to build the digital economy [1, 2, 3]. Additional investments are required on the part of enterprises to attract and retain highly qualified personnel, create conditions for their development and maintain high productivity [4]. Therefore, the process of digital transformation needs new skills development, as well as the incentives measures for staff.

MATERIALS AND METHODS

The study of the main features in the textile, apparel and shoe industry of Belarus was conducted on the basis of data from National Statistical Committee of the Republic of Belarus (<https://www.belstat.gov.by/>). The analysis of the main world trends in the textile, apparel and shoe industry was conducted on the base of scientific articles of the well-known textile analyst. The skills and competencies required for digital transformation in the textile, apparel and shoe industry was defined from the open Internet sources. The study used the method of comparative analysis, time series analysis, market research methods.

RESULTS AND DISCUSSION

The textile, apparel and shoe industry is one of the key production sector in Belarus; however, over the past quarter of a century, the volume of industrial production has decreased by more than 3 times. This is due to the movement of production to countries with low production costs (Asian countries) and decrease in the competitiveness of the Belarusian textile, apparel and shoe industry in the world market [5]. The main characteristics of textile, apparel and shoe industry in Belarus are given in the table 1.

TABLE 1. Main characteristics of textile, apparel and shoe industry in Belarus.

Indicators	2015	2016	2017	2018	2019
Number of enterprises in the textile, apparel and shoe industry	1 936	1 889	1 927	1 933	1 952
Growth rate of textile, apparel and shoe production, percent	85,0	104,7	105,1	104,0	97,7
The share in the total industrial production, percent	3,5	4,0	3,9	3,6	3,4
Share of staff of the industrial sector, percent	9,7	9,5	9,7	9,7	9,5
The ratio of wages to the average in the industry, percent	67,1	68,8	68,0	65,8	65,1

The number of enterprises is rather stable and is about 2 thousand. The dynamics of sales volume is unstable, the share in the industrial production of Belarus is about 3,5-4%. At the same time, the share of the total employed in the industry is more than 9,5 percent, what indicates low labor productivity and explains the low level of wages compared to the average in industry.

The information on the number of the textile, apparel and shoe organizations by size and their shares in the output of the industry shown on the figure 1.

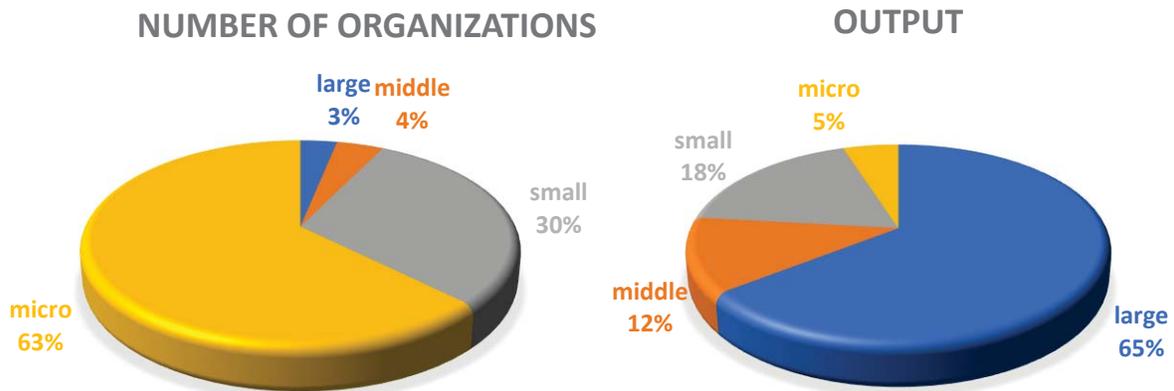


FIGURE 1. The textile, apparel and shoe industry organizations in Belarus by size.

The industry is represented by organizations of different sizes. In terms of production volumes, large enterprises dominate. Textile, knitwear, leather and footwear industries are represented in Belarus mainly by large enterprises,

small and medium-sized enterprises are widespread in the garment industry. This provides good opportunities for sectoral integration along the value chain.

Over the past 5 years, the textile industry has undergone a wide modernization, which made it possible to provide enterprises with modern equipment and increase labour productivity in textile. In 2020, textiles took the first place in terms of production among enterprises in the textile, apparel and shoe industry (figure 2).

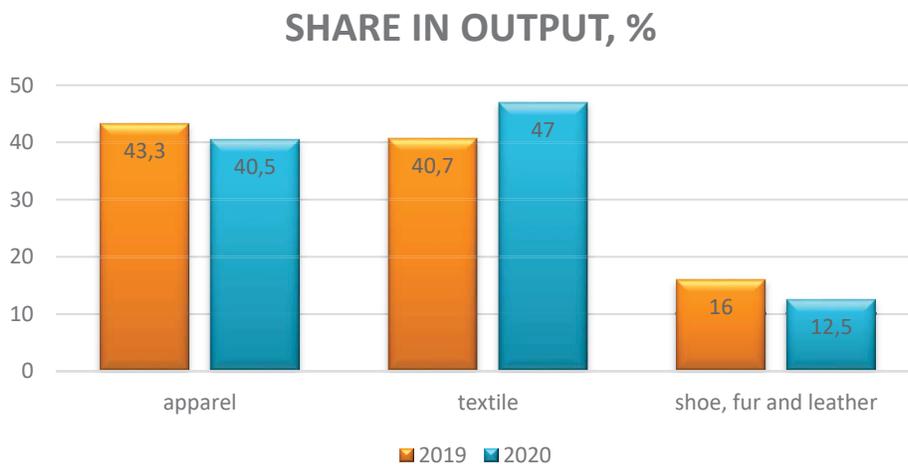


FIGURE 2. Output structure in textile, apparel and shoe industry of Belarus.

Thus, textile enterprises should be oriented towards finding new sales markets in other countries and industries to maintain sectoral growth.

The share of the textile, apparel and shoe industry in the world market is less than 1%, with the exception of the production of linen-containing fabrics. Nevertheless, the textile, apparel and shoe industry in Belarus has a good potential for development, due to the availability of production facilities (figure 3), qualified personnel, and sectoral research centers (RUE ‘Centre for scientific research of light industry’ in Minsk and EI ‘Vitebsk state technological university’ in Vitebsk).

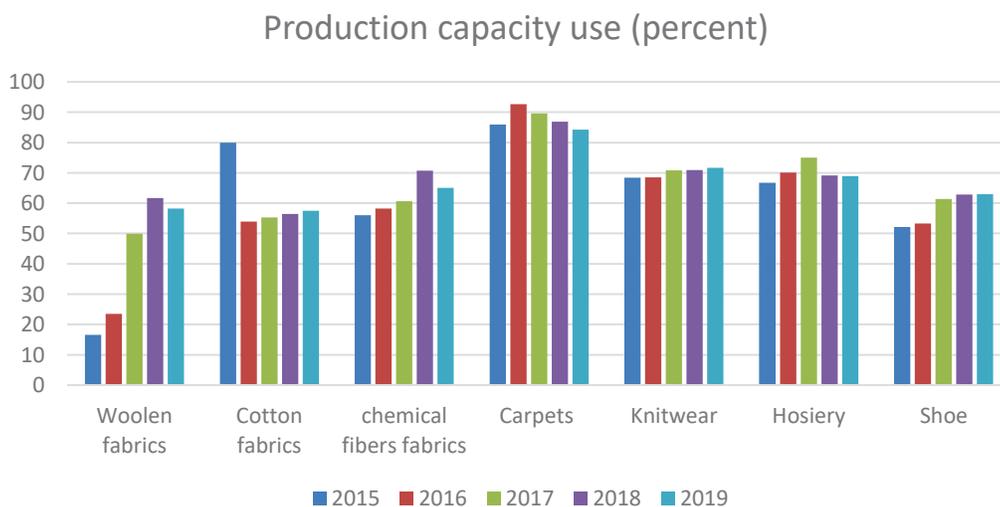


FIGURE 3. Production capacity use in textile, apparel and shoe industry of Belarus.

In the current economic situation, light industry requires non-standard solutions, breakthrough innovations for its development and expanding. Today, the world market requires to develop and modernize manufactured products

permanently, create innovative products, not only replacing imported materials in the domestic market, but also outstripping them in functional and other properties, introduce innovative technologies and implement ideas for creating new products, including by means of "diffusion of innovations", i.e., coming from other industries and areas of science. The innovative type of development of textile, apparel and shoe industry presupposes a continuous and purposeful process of searching, preparing and implementing innovations in order to increase the efficiency of its functioning, to a greater degree of meeting the needs of the industry's customers.

A significant difference between the textile, apparel and shoe industry and other industries is the dominant influence of fashion, the dictates of consumer demand and the constant change of the model range and often the assortment. Relevant for modern production is to reduce the time for new products to enter the market while meeting the specific needs of consumers. Customization (personalization) is a growing trend that should combine the advantages of mechanized and automated production with the flexibility and mobility of the atelier.

In the past decade, textiles have been actively used in other industries as raw materials (automotive, construction, medicine, etc.).

In these conditions, the most urgent tasks for textile, apparel and shoe industry enterprises are to ensure the intensification of production and reduce the cost of custom manufactured products, which can be solved by switching to a digital factory model.

The key prerequisites for digital transformation and the penetration of digital technologies into all spheres of the economy are the progressive growth of the capabilities and power of computing technology while reducing its cost; increased availability of high-speed data transmission. When introducing a complex of advanced digital technologies, a synergistic effect arises and provides a significant increase in the company's competitiveness. However, the application of these technologies in enterprises requires investment, as well as employees training. The digitization of enterprise processes often leads to a rethinking of the company's business, to the reconfiguration of value chains, and to a change in the marketing mix.

Most of traditional industries may not be ready for Industry 4.0 directly. They need effective solutions to support digital transformation. Textile industry is facing global competition for mass customization to address dynamic customer demands [6, 7].

Digital transformation at the micro level is the process of transferring an enterprise into a digital "flexible" state from the current one. To complete it successfully, it needs both digital technologies and skills of using them in a daily work [8, 9]. The main textile, apparel and shoe industry trends and the respective skills presented in the table 2.

TABLE 2. Main textile, apparel and shoe industry trends and the respective skills.

Textile, apparel and shoe trends	Skills required
Fast fashion	Digital Marketing, Programming, Web and App Development, Social Media
Customization	Digital Design and Data Visualization, AI and machine learning, Communication, Virtual collaboration
Automation	Automation of production and Robotics, Cloud computing, Programming,
Clustering	Communication, Cybersecurity and data science, Virtual collaboration
Globalization	Digital Business Analysis, Data Science and Data Analytics, Decision Making for Leadership
Penetration into other industries	Digital Project Management, Cybersecurity and data science, Virtual collaboration
Circular economy implementation [10]	Recycling, Waste reuse and share, Energy saving, Smart textile technologies, Nanotechnologies in textile

The introduction of digital technologies helps to reduce the costs of production and sales, that ensures efficiency and achievement of target values of profit growth.

However, digital transformation requires different competencies from employees. In this case, an increase in labour costs is possible, since the investment in staff training and digital skills development is needed [11].

Today, large enterprises in the textile, apparel and shoe industry are accumulating potential for digital transformation, an important component of which is staffing. To master digital technologies, industry enterprises need to integrate with educational centres of competence for digital transformation and light industry, using the experience of European countries. Leading textile universities are setting up training centres to train industry personnel in digital

skills and competencies (for example, the Digital Capability Centre (DCC) in Aachen, Germany in cooperation with ITA Academy in Aachen) [12].

When determining the object of digital transformation (the formation of the enterprise digital model is carried out in stages, one should start with the most labour-intensive processes), it is proposed to take into account the results of the analysis of labour costs by processes or by departments. This approach will provide the greatest effect and freeing up personnel for their subsequent training in new digital skills.

It is proposed to make a decision on the digital transformation of the selected object on the basis of a feasibility study, taking into account social consequences. At the same time, the availability of technological and technical capabilities, the economic effect, as well as the prevention of negative social consequences in the form of an increase in unemployment, conflicts and loss of personnel are ensured. In case of a positive decision, a digital transformation of the object is carried out with the release of personnel. This will lead to an improvement in the personnel cost structure in line with the organization's strategy.

The work time freed up as a result of digital transformation can be directed to the formation of new digital skills and competencies in staff, which can then be used in other processes. This approach will minimize the loss of personnel during transformation and at the same time allow to use the economic effect of transformation for a gradual transition to a digital model of the enterprise.

CONCLUSION

The textile, apparel and shoe industry in Belarus has a good potential for development and requires non-standard solutions, breakthrough innovations for its development and expanding. The most urgent tasks for Belarus textile, apparel and shoe industry enterprises are to ensure the intensification of production and reduce the cost of custom manufactured products, which can be solved by switching to a digital factory model. Today, large enterprises in the textile, apparel and shoe industry are accumulating potential for digital transformation, an important component of which is staffing. To master digital technologies, industry enterprises need to integrate with educational centres of competence for digital transformation and light industry. The success of the development of the textile, apparel and shoe industry depends on their joint efforts.

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