

Study on the Application of Digital Technology in Footwear Industry in Albania

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Abstract: We live in a fast changing world, where technological advances are occurring rapidly in almost all areas of life. Thus, these sectors, especially textile industry have to adapt and innovate in order to stay in the market and survive. Industry 4.0 aims to promote digital manufacturing by expanding the digitalization and convergence of products, production chain and business models. In this way, it aims to transform the current factories into intelligent, connected and autonomous enterprises. Technological developments have led to the globalization of production making the concept of digitization an important part of the textile industry. The use of digital tools with a high efficiency is a necessity for the textile industry for the developing economy. In order to increase the competitive advantage and contribution of the textile industry, which already has an important role in the national economy, the digital technologies must be used efficiently. The aim of this study is to provide an overview of the current situation in the footwear industry with regard to the use of digital technology. The introduction of these systems in the footwear production companies in Albania would be a necessity, which is related both to the growing number of these companies operating in the country, but also to the trends in which the digitization of production processes is going in the world.

Keywords: digital technology; footwear industry; industry 4.0; textile industry

1 INTRODUCTION

The textile industry in Albania, especially the leather and footwear industry is one of the most important sectors of the Albanian economy. In the last three decades, this industry was known as the "Façon" industry, while now this sector is trying to be oriented towards closed-cycle production (full production package) and Made in Albania products [1, 2].

There are registered 807 enterprises of the textile, clothing, leather and footwear sector, 581 textile and clothing companies and 226 footwear and leather enterprises, of which about 700 are active companies [3, 4]. 72% of enterprises in the sector are owned by Albanians, and 8% have a joint ownership of Albanian and foreign investors [5]. The textile industry is one of the largest export categories in the country, accounting for 40% of total exports [2, 3]. Referring to the data given from INSTAT [3], it is noticed that the level of exports of textile and leather footwear sector in kg/year, was stable from 2016-2022 with an average of 56, 643 kg/year [2]. The largest share of exports is Italy, followed by Greece, and the rest is divided between France, Bulgaria, Spain, etc. [3].

After the global Covid-19 pandemic, at the beginning of 2022, this industry faced a tremendous increase in the order size from abroad of up to 200%, which decreased last year, but at the same time Albania is in a desperate need for a labor force [1]. This industry needs to adapt and innovate in order to stay in the market and survive.

In the era of digital transformation, the use of these digital tools or systems as pillars of the Industry 4.0 aims to transform the current factories into intelligent, connected and autonomous enterprises [6-10]. Moreover, these technological developments towards Industry 4.0 are made to improve the industry in order to overcome some of the challenges faced by manufactures; from global competition to environmental pollution and to working conditions [11-14]. Additionally, we have seen an increased awareness of different companies around the world to focus on the integration of sustainable processes and materials in the textile industry [15]. The current trends in the global textile industry have shown the application of digital technologies in the whole process of production

development and digitalization of processes in this industry, as part of the 9 Sustainable Development Goals (SDG-s) [5]. It is important to mention that the progress achieved towards European membership of Albania is accompanied by implementation of sustainable development reforms in our economy. Alongside with EU accession goals, in September 2015 Albania, along with 192 other United Nations (UN) member states, committed itself to the implementation of 'Transforming our world: the 2030 Agenda for Sustainable Development' [4]. So the integration of these new systems in the textile industry in different steps of product development as modeling, simulation, visualization, and so on, offers digital tools, that improve the whole process regarding costs, time, waste reduction, etc [2]. Furthermore, the increased focus on sustainability is perceived as a boost in the adaptation of these new technologies, which are a sustainable enabler in textile industry manufacturing [16]. Therefore, the textile industry in Albania needs to introduce innovations and build smart infrastructure by implementing digitized technologies such as Internet of Things (IoT), Artificial Intelligence (AI), Augmented Reality (AR) and Virtual reality (VR), etc. [17-19]. These new technologies are capable of creating sustainable industrialization through their unique and intelligent features [15, 20].

The aim of this study is to provide an overview of the current situation in the footwear industry in Albania, regarding the use of digital technology. This can be a solution for the companies to face the lack of labor force, but at the same time this is a commitment of Albanians to achieve the SDGs as a national strategic policy framework [21].

2 RESEARCH METODOLOGY

In order to better understand the situation regarding the digitalization of the footwear industry in Albania, for this study the selective sampling survey method was used [3]. It is known that this survey is organized in the cases when the general survey is impossible or requires too much work. This type of survey has several advantages such as: it is much more economical, it has a more operative character and the conclusion is obtained in a very short time. It also

ensures that the survey program is much richer than in the case of general survey. During this survey, registration errors are smaller and fewer in number, therefore it is also used as a control method to correct the data of the general survey. The purpose of this survey is to get a clear picture and perception of the current situation of the footwear manufacturing industry in the country, to identify the problems that this sector has in terms of production and digitalization. In different round tables the representatives of the companies discuss the problems they faced, but to our knowledge no published paper could be found on the current situation of the footwear manufacturing industry.

In this way this survey will contribute to the development of the methodology for a study of footwear manufacturing companies located in Albania, in order to identify the problems and the importance of using digital technology.

The design of the survey was done by gathering information on the actual situation of the companies, and how they see the future for their business. In this way the survey consisted of seven categories of questions, like:

1. How prepared are the companies to adopt a digital production business model?
2. What do they think are the benefits of digital technologies?
3. How do companies see the future of their businesses in terms of digitization and digitized production?
4. What do they think are the difficulties that the sector is currently facing in implementing these digital technologies?
5. What kind of digital technologies are companies currently using in the country?
6. Which digital technologies do they want to use?
7. If the difficulties were resolved, into which of the technologies would they be willing to invest, in order to improve them?

The selection criteria of companies participating in the survey will be:

- size of the company, which in our case will go for those companies which are big in size and include more processes in their production (offer full production package).
- companies that produce various articles, such as: sports shoes, work shoes, sandals, children shoes, etc.

With the purpose to select the sample size, the survey was conducted in collaboration with ProExport Albania (PEA, Association of the Textile and Footwear Companies). This association, PEA, has 85 footwear companies as members, so $10\% \times 85 = 9$ companies (in terms of references (TOR)). The number of the companies that participated in the survey was 16 in order to have a better representation of the companies, located in different cities in Albania.

For creating the sample structure of the companies, an already updated database was used from the information received from INSTAT and the "Pro Export Albania" Association. Data collection was decided to be done according to the "web survey" measurement method.

3 RESULTS AND DISCUSSION

After the survey was completed by the companies, the statistical processing of survey results and data analysis

was done. In this way a database was created on the current state of the footwear industry in Albania, on the actual situation of the companies, and how they see the future for their business, according to the answers of the survey.

It was found out from this study that the majority of these companies export all their production, 75%, while 19% of them export more than 75% of the total production, and only 6% export between 25% and 49% of the production.

To the first question regarding how the companies were prepared to adopt the digital production business model, it can be seen (Fig. 1) that 75% of the companies are in the process of digital transformation, while 25% of the companies have not started the digital transformation process. This result shows that none of them has completed this process, but most of them are in the process, which shows that they are aware of the importance of these digital technologies.

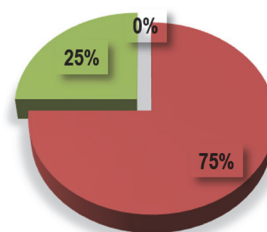


Figure 1 The current digital manufacturing business model in Albania

In order to find out how well informed companies are about the new digital technologies, they were asked about the benefits of these technologies, their perception of the future of the companies, and the difficulties that the footwear sector faces in implementing these technologies.

In terms of the awareness of the benefits of using the digital technologies, Fig. 2 shows that the majority of companies agree that the implementation of digital technologies brings benefits. This can be linked with the fact that 75% of these companies are in the process of digitalization.

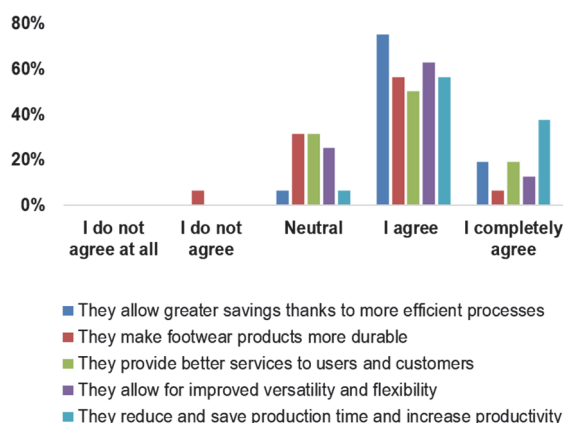


Figure 2 The benefit from the application of digital technologies

Regarding the question how the companies see the future of their businesses in terms of digitization and digitized production, from Fig. 3 it can be seen that most of the companies are not very optimistic about the future use of digital technologies.

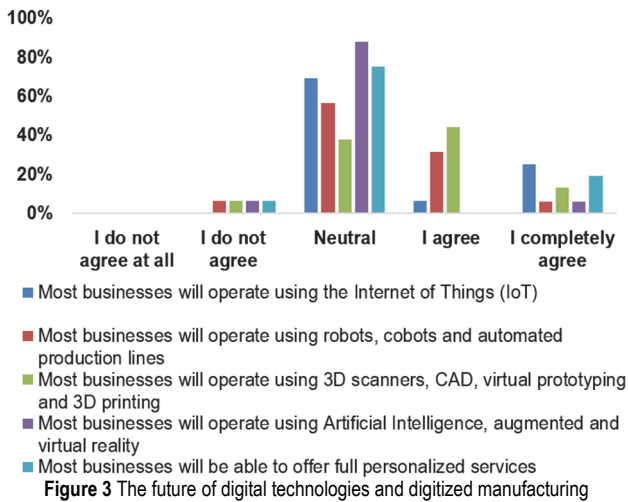


Figure 3 The future of digital technologies and digitized manufacturing

When asked what they think are the difficulties that the sector is currently facing in implementing these digital technologies, from Fig. 4, it can be seen that:

- 50% agree and 25% completely agree that the difficulty for the implementation is the lack of qualified personnel.
- 50% agree and 19% completely agree that the difficulty for the implementation is the lack of training.
- 38% agree and 56% completely agree that the difficulty for the implementation is financing and lack of investments.
- 25% say they agree, while 56% completely agree that the difficulties for the implementation are the high production costs.
- 31% say they agree, while 56% completely agree that the difficulty for the implementation is the decrease in demand/orders from European countries.
- 44% say they agree, while only 6% completely agree that the difficulty for the implementation is the adaptation of digital tools to each business model of the company (B2B, B2C).
- 31% say they agree, while only 6% completely agree that the difficulty of the implementation is the lack of sectorial organization.

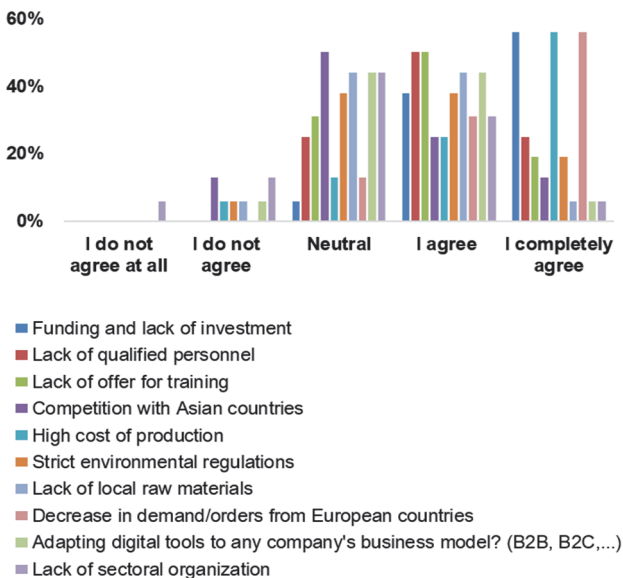


Figure 4 The difficulties currently faced by the footwear companies in the implementation of digital technologies

The last three questions were about acquiring more knowledge with regard to the actual situation and the technologies they are using, to what they want to apply in the future, if they will solve all the difficulties that their companies are facing, in which of them they will be willing to invest in order to improve these digital technologies.

In each figure, from Fig. 5 to Fig. 10 are given their answers regarding all three situations for all the digital technologies mentioned in the survey, such as 3D scanning, 3D printing, CAD (Computer Aided Design) and Virtual Prototype, Robotics and Automation, IoT (Internet of Things), AI (Artificial Intelligence), and E-Commerce (Electronic Commerce), they are currently using.

Concerning those questions, the companies answered as follows: Regarding the application of the 3D scanning and 3D printing from Fig. 5, it is clear that these two technologies are currently not used at all by the footwear industry, while a rather low interest is shown in the near future.

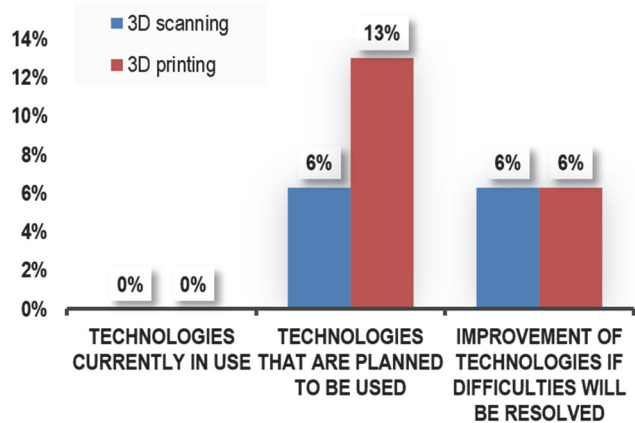


Figure 5 3D scanning and 3D printing technologies

When it comes to the use of CAD and Virtual Prototyping Technologies, as it can be seen in Fig. 6, 19% of the companies actually design their products and only 13% customize their products. However, there is an increase in interest shown for the near future, where in addition to design and customization there is also an interest in virtual prototyping.

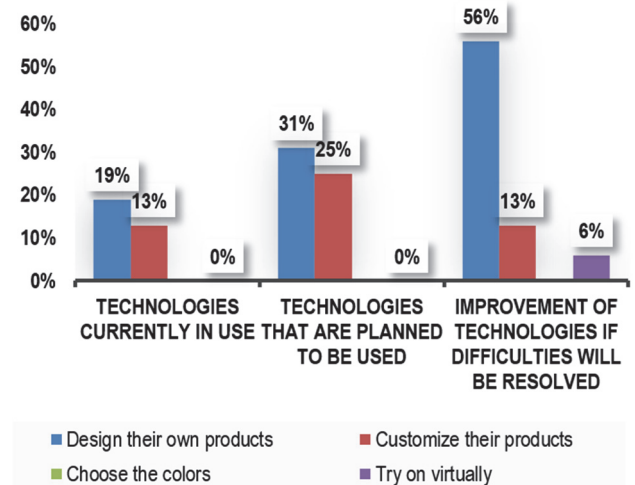


Figure 6 CAD and virtual prototyping technologies

While, for the application of robotics and automation, as it can be seen in Fig. 7, the companies are using them in different processes: 50% are using them in assembling, 38% in cutting, 25% in sewing and 6% in supply chain management processes. Interest is shown for the other companies that would like to use them in the near future, especially the quality control and inspection, showed by 13%.

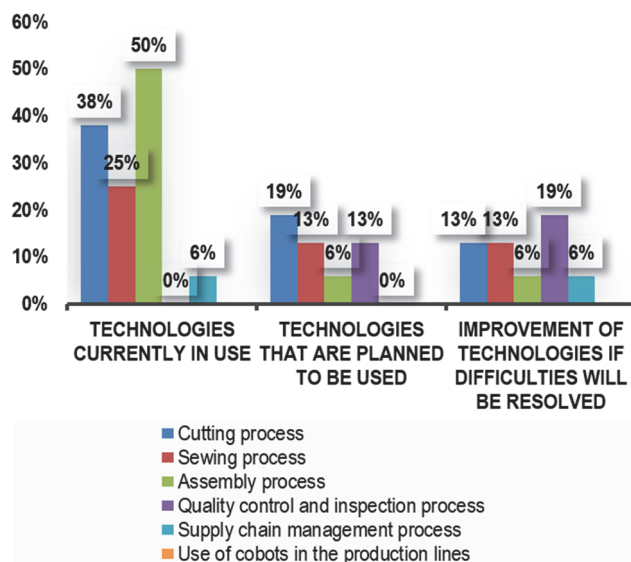


Figure 7 Robotics and automation technologies

When it comes to improving existing technologies, there is a low interest in investing in new technologies which from one side are very necessary to improve the industry in order to overcome some of the challenges faced by manufacturers; from global competition to environmental pollution and to working conditions, but from the other side an enormous budget is required. And maybe this last one is not possible for their budget due to the problems coming from the last five years in the Albanian industry, such as faced with the earthquake in November 2019, Covid-19 pandemic at the beginning of 2020, and currently the inflationary trends resulting from the War in Ukraine, and the impact of the Euro depreciation in the Albanian currency the last year are the reason [5].

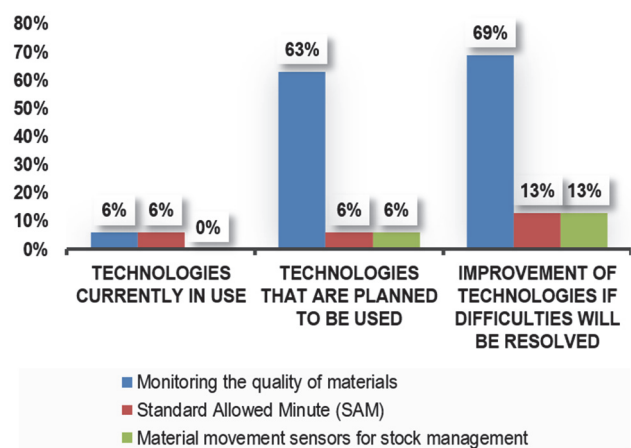


Figure 8 Digital technologies of internet of things (IoT)

As it can be seen from Fig. 8 only 6% of the companies apply the digital technologies of IoT by: monitoring the

quality of materials and Standard Allowed Minute, but the interest increases when it comes to the interest for the near future, where the interest for monitoring the quality of materials increased by 63% and 69% for improvements of these technologies. There is also interest in the near future in the use of material movement sensors for stock management with 6% in the near future and 13% for improvements of these technologies.

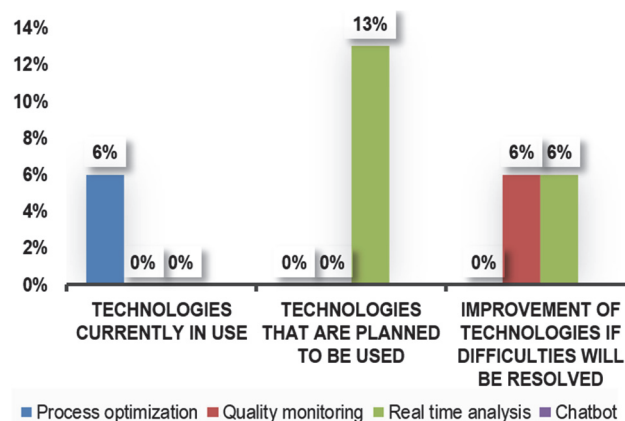


Figure 9 Digital technologies of artificial intelligence (AI)

From Fig. 9 it can be seen that only 6% of the companies are using the AI in the optimization processes, whereas an interest is shown for the near future in the use of real time analyses, and for improvement of these technologies the interest is for quality monitoring and real time analysis with 6%.

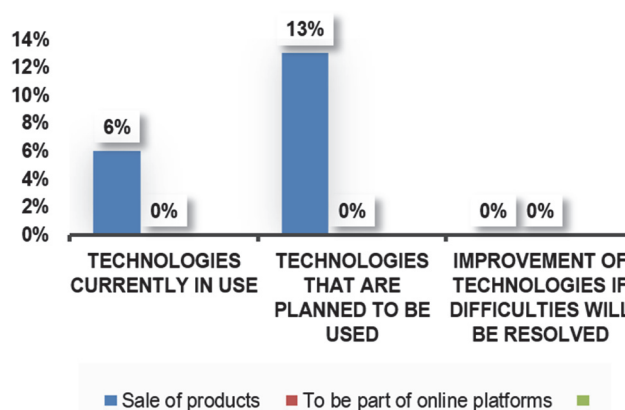


Figure 10 Digital technologies of E-commerce

In Fig. 10 it can be seen the approach that the footwear industry has with the digital technologies of E-Commerce, which is quite low. Only 25% of them apply the online purchase of the raw material, and 6% apply the online sales of the products. Nevertheless, there is a low level of interest of 13% in using them in the near future, and the same percentage is foreseen to make improvements in this technology.

4 CONCLUSIONS

To conclude we can say that this study has provided an overview of the current situation in the footwear industry with regard to the use of the digital technology. From the survey it was found out that the Albanian footwear industry

is mainly export oriented, where 75% of footwear companies are exporting all of their production.

Although the majority of companies agree that the implementation of digital technologies brings benefits, from the analysis of the survey it turns out that only a small part of this industry uses the digital technologies.

Furthermore, most of the companies are not very optimistic about the future use of digital technologies. This can be linked to their interest to invest in these technologies, which appears to be quite low due to the problems that this industry is actually facing, especially in this period when the manufacturing sector besides all economic issues during these five years is in lacks of the of labor force. As most of the companies mentioned there is a lack of: qualified personnel offer for training, investments, high production costs and which is also very important the decrease in demand/orders from European countries.

These digital technologies, as one can see in the daily lives, are constantly changing both our lives and the business world. Dynamic capabilities are an important asset that a company must have to better understand and integrate into the new digital age.

The footwear industry needs to be aware that the digital transformation will fundamentally change the way the companies use technologies in order to improve their performance and have the opportunity to survive in this rapidly changing world.

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