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Analysis and assessment of technology transfer opportunities in the apparel manufacturing sector

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ABSTRACT

On the basis of the performed analysis, it is found that at present existing apparel and textile institutes do not carry out research and development activities related to the technological development of the apparel manufacturing sector. A predominant part of enterprises do not have a scientific basis, do not carry out independent research and development activity and do not have qualified personnel available for developing and implementing new technologies. This determines that the technology transfer in apparel manufacturing sector to be an external resource of the company for achieving economic growth in long term.

Keywords: technology transfer, apparel manufacturing, opportunities, competitiveness.

INTRODUCTION

Apparel manufacturing is one of the oldest, completely separate and autonomous, and traditionally important in its significance and place industry sector. Nowadays, as in the past, it occupies an important place in the economic life of the country, ensuring the satisfaction of population needs of apparel. As for the Bulgarian conditions, the sector could be characterized by good resource provision, availability of material-technical base, established production traditions.

However, at the same time, it cannot be ignored the fact that after the loss of traditional foreign markets, the apparel manufacturing enterprises have more and more difficulties in distribution of their products, as on domestic market so abroad. One of the essential reasons for this is that the strong competition from other apparel producers that have similar competitive advantages. On the basis of the specified situation in the sector of the apparel manufacturing, the reasons for carrying out the analysis and assessment are outlined in relation to the setting of the opportunities on technology transfer that could provide guidance in improving the producer competitiveness in this industry sector.

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RESULTS AND DISCUSSION

Ever since the beginning of the 20th century, the tailoring industry is subjected to the influence of a number of internal and external factors that require its organized large-scale restructuring, whose implementation needs clear and precisely followed national strategy and policy. Apparel manufacturing sector has always been the main source of revenues for the country. Until 1989 the relative share of total industrial production sector amounts to over 2 % of the total industrial production of the country. Within this period, Bulgaria is one of the major manufacturers of apparel and a major supplier on the market of the former socialist countries. In this period, the exports of textiles, apparel and leather for the non-socialist countries amounted to about 40 - 50 million US dollars per year [3].

In the years after 1989 apparel sector production falls into the group of the most highly affected by the economic changes in industrial sectors of the country. In the first years of the transition period nearly 40 000 employees were dismissed from the enterprises. The average wage was below the social minimum, production stay reached 35 % of the working time. A large part of the enterprises were not working for months and the employees in them were in the group of socially disadvantaged people. However, the majority of the Bulgarian enterprises for apparel manufacturing, managed to survive and adapt to the new external environment thanks to the fast reorientation of the market and production structure as well as the good qualification of employees.

It should be specified that for 2015 the relative share of proportion in the total industrial production for the industry amounts to about 6 % of the total industrial production of the country, and more than 80 % of the produced in the country apparel (work outfit, coats, sports, both for men and for women) are designated to external markets through subcontract manufacturing. Successful distribution of the Bulgarian producers of apparel on the world market is determined by the following main factors: geographic disposition of our country, good technological potential and the flexibility of enterprises, low wages, the achieved image of good quality and long years of experience in apparel manufacturing. These factors are particularly important when ordering a smaller series of branded apparel. Apparel export is in the following zones: European Union - 80 % (with predominant share for Germany, Italy, France and Hungary, and the United States and Canada - 10 %, the countries of the CEE - 4 % of export and other countries 6 % [4].

There is an increase in demand of apparel on the domestic market. Retail sales in 2014 increased by 28 % in comparison to 2010, and 15 % towards 2012. However, the internal market is a determinant for the Bulgarian apparel manufacturing [5].

As for the scientific and technical service of apparel manufacturing enterprises , it should be pointed that until 1989, this function was performed by State Economic Association (SEA) Rila, which is managed all enterprises for apparel manufacturing in the country /Vitosha in Sofia, Bulgaria in Plovdiv, Misia in Pleven, Pioneer in Biala, Slatina in Byala Slatina and Vida in Vidin, etc. In enterprises structuring each of these specialized units are being constructed for the specialised divisions for development activity, which with the help of competent specialists implement economic and technical policy for the further development of the apparel manufacturing sector. Along with this structure, there is a State Institute of apparel and ready-to-wear clothes (VEDA) [1, 2].

After 1989, with the restructuring of the industry, management of the enterprises apparel manufacturing were dismissed development division, a plant Vitosha that is the largest and most modern plant in Europe, stopped its existence. The State Institute of apparel and ready to wear clothes, which had good equipment and facilities, terminated its activities in the first year of the transition period due to lack of state funds and

own developments on the orders by the enterprises in the sector. Up to the establishment of the specialised cluster and Institute of Apparel and Ready to Wear Clothes Danube in 2006 and the National Institute of Apparel and Ready to Wear Clothes (NIARWC) in February 2007, which is the successor of the experience, long-standing practices and traditions of the closed State Institute of Apparel and Ready to Wear Clothes, Bulgaria was the only country among the former socialist countries and the only country in the EU that has no National Institute of Apparel and Ready to Wear Clothes.

The main priorities of these institutes are providing consultancy in the field of textile and tailoring industry, training activity, covering all stages of production, planning of the production cycle, management and marketing of the enterprises, development of innovative products and building a modern test laboratory in accordance with European standards.

Observing the activities of the institutes from their establishment to the present, the main activity is related to organising of workshops, exhibitions, training and qualifications and performing laboratory tests, current activities and main forms of institute financing. The goals of innovation implementation, scientific and technical development related to the technological progress of enterprises in the apparel manufacturing sector are not included in the activities of the institutes.

Scientific and technological services and preparation of frames is performed in universities (U) technology colleges (TC) and vocational schools (VS) referred to in Table 1 [8].

Observation of the scientific, technical and innovation activity of above referred universities (U) and technology colleges (TC) show that scientific and applied researches in the field of apparel are associated with the development of methodologies or improvement of such that are related with apparel design [6]. Considering the main form of production in the sector for the apparel manufacturing – subcontract production, which does not include design, construction and modelling for creating new models and the lack of information on the application of the methodologies developed in other countries shows that scientific and technological developments from the TU and TC do not find application in practice.

In the TU and TC there is no means of carrying out training in line with the opportunities and requirements of the production due to lack of proper facilities [7]. Moreover, in recent years due to a lack of students at the departments at the referred universities and TC ceased their independent existence. They will be soon closed and a small part of them will merge with other departments. These negative trends over the years led to a reduction of the teaching staff and the inability to conduct training and carry out the scientific and technical activity. The situation is similar to the vocational schools, where due to lack of students and suitable facilities (in Stara Zagora, Sliven, Shumen, etc.) do not provide specified qualification.

Due to the lack of legal base, that regulate funding of the scientific researches, different enterprises share funds only on short term activities. Future period scientific researches are not financed. This leads to decrease of the level of the scientific and implementation achievements in the sector of apparel manufacturing and the information servicing of the producers.

Therefore it is necessary the technology transfer to be implemented as one of the universal levers for effective management, which allows economic growth and competitiveness to be achieved with the lowest cost of resource shortage. It should be noted that technology transfer in apparel manufacturing will be a long term external resource for economic growth or the technology import and production export.

At present, the predominant part of apparel manufacturing enterprises does not have a scientific basis. They do not carry out independent research and development activity, but have the potential for development and implementation

Table 1. Scientific and technical services and personnel training for apparel manufacturing sector.

Schools	Name	Qualification
Universities	Sofia Technical University	Textile machinery and textile technology
	Gabrovo Technical University	Textile machinery and textile technology
	Northwest University *Neofit Rilski* in Blagoevgrad	Design and technology in tailoring production
Technological Colleges	TC in Blagoevgarad at Northwest University	Textile machinery and textile technology
	TC in Blagoevgrad at the Thracian University	Textile machinery and textile technology
	TC in Sliven at TU Sofia, TC in Lovech at TU Gabrovo	Textile machinery and textile technology
Vocational Schools	of clothing and textiles *Hristo Boyadziev* in Pleven	Design, Modeling and technology of clothing from textile, fashion design.
	of clothing *Anna May* in Plovdiv	Fashion design, design, modeling and clothing technology
	of textile and fashion design in Sofia	Fashion design, design, modeling and clothing technology.
	of apparel *Princess Maria Luisa* in Sofia	Clothing technology, sewing machine operators.
	of clothing *Nedka Ivan Lazarova* in Rousse	Fashion design, modeling, and fabrication of textile clothing.
	of textile and apparel *Stefan Karadza* in Elhovo	no qualification
	of textile and fashion design in Varna	Fashion design, computer design of textile area
	of apparel and catering *Raina Knyaginya* Stara Zagora	
	the textile apparel *Dobri Zheliazkov* –Sliven	no qualification
	of apparel, food and chemical technologies *Prof. Dr. Asen Zlatarov* in Shumen	no qualification
		no qualification

of innovative solutions. These enterprises are not leaders in technological terms, but rather followers who are using technologies and innovations developed elsewhere.

Technology transfer centres are one of the means for improving the enterprises innovativeness in the tailoring industry. For the sake of strengthening the intermediary infrastructure, it is important to be established institutes/centres for transfer of innovative achievements and products. The function of the institutes is to organise the distribution and to provide (individual or collective) innovative services to apparel manufacturing enterprises with an adequate capacity. They could create the potential for establishment of clusters. The cluster, which by its nature represents a technological and product related businesses, is actually a small innovation system that develops innovative activities on specific technology, sets a specific production cycle and/

or a specific region.

Apart from the scientific capacity of the companies, an important function for the development of the innovation process in the sector have the branch organisations, providing business services and creating partnerships between public institutions and private companies. The public enterprises and agencies serve as regional development and innovation centres.

At present, most of the existing enterprises do not have qualified personnel for developing and implementing new technologies in order to increase the volume, quality of production, develop new product, new design, collections or other innovative activities. Therefore, they do not use their innovation capacity. For this purpose they need to hire professionals that in most cases are expensive or risky. Support programmes for enterprises in the industrialized countries are widely spread. They mostly offer subsidies to existing enterprises in the recruitment of highly qualified young professionals. Given the mobility of human resources these programmes are the most direct method for increasing the innovative capacity of the sector. This is one of the preferred policies to enhance innovation of the enterprises in the apparel manufacturing sector, that do not have the financial and human resources to carry out research and development activities.

In order to increase the innovative capacity of enterprises in the apparel industry, it is necessary to promote the cooperation between innovative companies, public and private research and development organizations. There are a few examples of how you can set up such partnerships in Europe. The technology centres are an example of a successful approach; they are usually public and private research centres that accept orders for research projects with the applied nature of the industrial sector.

Apart from the technology centres, a main source of innovation is the big companies, which have financial resources to afford funds of development activities. On the other hand, cooperation in the field of innovation is based mostly on the informal networks. They could be both stimulated and organised. Stimulation of intercompany cooperation is of a great importance.

On the basis of the performed analysis of the situation and opportunities apparel manufacturing industry, it could be performed a situation SWAT analysis which define the link strengths - opportunities, weakness - threats.

Strengths:

- Long years of experience and traditions in the field of the apparel manufacturing
- Approved high quality production
- Experience and knowledge on production
- Positive image among users and assignors
- Loyalty and fair treatment of every partner
- Long-term contracts for materials deliveries

Weaknesses:

- Strong dependence on particular key customers
- Lack of organization of domestic trade
- Qualified staff decrease tendency which shall result in shortage of professionals in the near future

Opportunities:

- Market share increase
- Opportunities for differentiation of the product range
- Opportunities for expansion to new foreign markets
- Promotion of information transfer regarding new inventions and possibilities
- New business models in the field of services
- Promotion of capital, know-how, technologies and design transfer
- Attraction and promotion of sector investments

Risks:

- Constant increase in national and international competition

Price competition

• Dependence on raw materials and their delivery

• Downturn of qualified manpower due to low remuneration

• Limited local market

• Unsatisfying education and training

• Need of investment in security and providing better working conditions

• Dependence of the companies on key customers in order to perform their business activities.

CONCLUSIONS

Technology transfer could be observed as one of the methods on increasing the competitiveness of enterprises for apparel manufacturing through the implementation of new technological equipment. For the sake of its implementation, basically two approaches could be used. The first method is related with the acquisition of licences and know-how of known technologies, products, and trademarks of foreign companies. The second one is related to the deployment of own scientific and technical capacity. It has perspective but it requires overcoming of many financial and organizational management difficulties.

Based on the analysis and taking into account the present situation and the state of scientific and technical service of the enterprises in apparel manufacturing sector, it could be concluded that it is more appropriate the first approach to be used. In this manner, it well verified in the practice technologies shell be used that comply with the European and world quality control standards. At the same time, this approach provides good opportunities for the establishment of joint ventures aiming at obtaining additional loans for technological re-equipment.

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