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TECHNOLOGICAL DEVELOPMENT OF WOOD INDUSTRY ENTERPRISES OF THE REPUBLIC OF MACEDONIA

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ABSTRACT

Technological progress is the most dynamic development factor of a qualitative nature. It is the basis of the global characteristics of the international economy, and it is inseparable from growth, investment and foreign trade. This is not the case with the economy, and therefore wood industry in the Republic of Macedonia which is characterized by low growth rates, a small amount of investment and export and import of raw materials and equipment, thus seriously falling behind in an area of technological progress that relies on classic outdated technologies. As a result, technological, and therefore the innovation capacity of the business sector is on unsatisfactory level.

Key words: technology, technology development, wood industry, investment

1. INTRODUCTION

Development of technology is an inseparable part from the overall economic development of each country. The technological progress achieved in industrialized countries created preconditions for development of science, engineering and new technologies. Underdeveloped countries usually get familiar with transfer of technology through the huge global corporations, but the former should make efforts to establish and implement an active policy of technological development which includes a series of measures to support innovations and application of new knowledge. Therefore, technical education, knowledge and application experience from developed countries are important prerequisites for inclusion of Macedonian companies in the global economic movements.

In order to manage the enterprises, as a necessity for survival in the competitive struggle of world markets for products and services, acceptance of new technological solutions and their application is an imperative. Managers need to make conditions for acceptance of the innovations offered by technological development, and efficient operations and management depend on the managers' speed in decision making, on their acceptance of new know-how and experiences in using the latest techniques and technologies.

The rapid obsolescence of equipment, techniques and technological solutions requires constant research and development in terms of constant developments and improvements in the interest of survival in the struggle for a more competitive economy.

Constant improvement of technology and knowledge has become essential imperative of development of the Republic of Macedonia. Analyses show that macroeconomic stability of the country in terms of its openness to the world depends on the effectiveness of the policy of technological development today. By how a respective state will support the advancement of technology and how business entities will practice technological choices within their development strategies, it will depend on the extent of achieving the goals of economic and social development.

Rapid technological development requires new standards in management and decision-making in the economy at all levels. Macro level is very complex because it should create a favorable environment for development of a competition capable economy, and micro level enterprises should

make decisions that ensure competitiveness through high quality and high efficiency using the limiting factors conditioned by the macroeconomic environment.

In terms of globalization of the world economy, the SMEs sector's internationalization is necessary, which requires duly preparation. Only competition capable enterprises that include the application of modern knowledge and new technologies can become part of the world market of goods and services through business cooperation, partnership and direct negotiations.

The Republic of Macedonia is falling behind in conquering and application of modern technologies, and at the same time shows a significant technological dependence from abroad. Businesses in the wood industry as part of Macedonian economy are facing the same situations and challenges.

2. PROPERTIES OF THE WOOD INDUSTRY ENTERPRISES

SMEs in the economy of Macedonia are of growing importance and a key dynamic factor of overall socio-economic development. Companies classified as small and medium enterprises (SMEs) are the most included in the wood processing sector.

Small and medium enterprises (SMEs) are officially defined by the European Union as entities that have less than 250 employees and which are independent in their operations in terms of larger entities. Their annual turnover can not exceed 50 million or their annual account does not exceed 43 million Euros. This definition is crucial for determining which companies may be beneficiaries of EU programs to support SMEs or specific policies, such as competition rules for SMEs etc. SMEs can be divided into three categories according to their size: micro enterprises with less than 10 employees, small enterprises - between 10 and 49 employees and medium-sized enterprises with number of employees between 50 and 249. (The law for small enterprises in Europe, 2010)

Micro enterprises are real giants of the European economy. About 67% of the jobs in the private sector belong to European SMEs (The law for small enterprises in Europe, 2010).

The basic criterion for determining the term SME (small business) is the number of employees. The most appropriate definition of SMEs can be seen if we make a comparative parallel as in the following Table 1.

From the table below we can see that classification of enterprises in the Company Law in relation to the number of employees was made in accordance with the definition used by the EU. However, as far as the total turnover and value in the balance sheet is concerned, it is not the case. Only a few companies in Macedonia can adequately fit into the European classification. To solve this problem, the national authorities accepted the values from the EU, but with reduced value of 1/4 or 1/5 of the value of EU turnover and balance sheet.

Micro enterprises in Macedonia in 2013 participated with 85% of the total number of active enterprises (71290). Small businesses participate with 6.7% of registered business entities. The least represented are medium-size enterprises with only 1.8%. The remaining 6.5% of total number of active enterprises in the economic structure of the Republic of Macedonia, with most participating artisans registered as individuals (6.2%) and the lowest percentage of large commercial entities with 0.3% (State Statistical Office of the Republic of Macedonia, Announcement - Business Entities, 2014, own calculation).

Manufacturing industry participates with a total of 7918 active businesses, of which in the year 2013 6004 were micro enterprises, small enterprises were 1134, and only 347 were medium enterprises. In this sector, too, the percentage share of micro enterprises is the highest with 76%, as opposed to small enterprises that characterized percentage of 14%. Medium-sized enterprises participated with 4.4% (State Statistical Office of the Republic of Macedonia, Announcement - Business Entities, 2014, own calculation).

Businesses in wood industry in the Republic of Macedonia are characterized with similar representation of active business entities in 2013. Of the total 635 active businesses, micro enterprises have a major share of about 55%, small businesses participated with 30%, while medium enterprises with only 15%. For medium in terms of number of employees most represented (about 13%) are enterprises with up to 100 employees (Fig. 1).

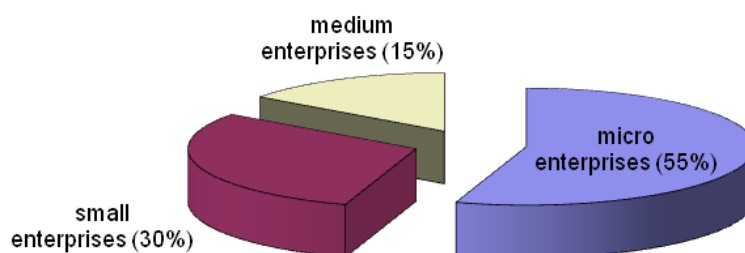
For small and medium enterprises it is particularly important to establish a consistent national policy to support the permanent development because of their huge and important role in the process

of economic restructuring and economic development in general. Especially small and new enterprises have difficult access to capital, to information and new technologies, including new knowledge, which is an argument more for the industrial policies of the developed countries to prioritize and consider highly important the overall support of small and medium enterprises (Zarezankova and Potevska, 2003).

Table 1. Classification of enterprises

	Definition of EU enterprises	Company Law (2004)	Accounting Law (1992), modification (2002)
In the first year of operation, it is necessary to meet the two of the following criteria			
Micro	to 10 employees	to 10 employees	
	annual turnover \leq 2 million EUR	annual income $<$ 50,000 EUR	
	value of assets \leq 2 million EUR	then 80% of gross income is realized from a client	
Small	to 50 employees	to 50 employees	to 50 employees
	annual turnover \leq 10 million EUR	the total turnover $<$ 2 million EUR	the annual income $<$ 8,000 average monthly salaries per employee
	value on the balance sheet \leq 10 million EUR	value of assets $<$ 2 million EUR	value of assets $<$ 6,000 average monthly gross salaries per employee
Medium	to 250 employees	to 250 employees	to 250 employees
	annual turnover \leq 50 million EUR	annual turnover $<$ 10 million EUR	the annual income $<$ 40,000 average monthly salaries per employee
	value on the balance sheet \leq 43 million EUR	value of assets $<$ 11 million EUR	value of assets $<$ 30,000 average monthly gross salaries per employee

Source: Agency for promotion of entrepreneurship, SMEs report, 2004



Source: Cluster of wood industry of the Republic of Macedonia, own research

Figure 1. Structure of enterprises of wood industry in 2013

Globalization of the world economy requires new forms of modern business, application of new knowledge, new technologies and business cooperation, with a view to providing competitive production and persistence of the global world market of goods and services.

The Republic of Macedonia is on a relatively low level in relation to development and application of new technologies because of several reasons: funds that have education and research institutions, the absence of technology policy, and consequently the measures to support and help innovation, transfer of technology, research and development of relevant institutions.

3. TRANSFER OF TECHNOLOGY AND KNOWLEDGE

For entrepreneurs and managers of small businesses the commonly imposed task is to keep up with the latest technology and techniques, which is quite difficult due to financial difficulties and the absence of knowledge and experience in their use. Therefore in the developed countries special attention is paid to education and developing staff, which is performed through special research institutes, centers for research and development, agencies designed for faster adoption of the latest knowledge and technologies and their application.

Franchising system, leasing system and license agreements represent forms of transfer of technology important to the development of small and medium enterprises and for their survival. At the same time these represent a tool for financing. Beside through them, technology transfer is performed with direct foreign investment, purchase of equipment from abroad etc (Zarezankova and Potevska, M., 2003).

Commercial transfer of technology covers more types such as: import-export, foreign direct investments, joint ventures, licenses, franchises, cooperation agreements, key on hand contracts, etc.

Non-commercial technology transfer is very important for the development of the enterprises and simultaneously for increment of their competitive ability. It is connected with the educational component of support also. It comprises conferences, technical sciences, scientific and technical literature, training at foreign universities, hiring top foreign engineers, training in foreign enterprises, and of course, personal contacts and industry espionage.

Licenses, franchise agreements, joint ventures represent a significant transfer of technology and knowledge and provide strategic partnership, they represent a specific form of financing for SMEs. In the Republic of Macedonia, and accordingly with the companies of wood industry, these forms of partnership are not very developed, or are in their infancy (Zarezankova and Potevska, M., 2003).

4. THE SITUATION WITH TECHNOLOGY IN WOOD INDUSTRY ENTERPRISES OF THE REPUBLIC OF MACEDONIA

Until Macedonia's independence, wood industry, in terms of technological equipment, did not drastically fall behind the technology used in the West European area. Most of the plants (wood industry enterprises) were built in the early seventies of the last century. Production equipment purchased was with the same technology and quality that was used by wood industry in the European countries. The lower productivity and poor quality of products in terms of European manufacturers were not result of poor technical equipment, but rather of other subjective weaknesses.

So far the results achieved in wood industry have yielded comparative advantages (large share of domestic raw materials, relatively low investments in individual buildings, environmentally friendly activity, etc...). But these advantages are not sufficient for survival and development. Incentives are needed for enhancement of the competitive and export capabilities oriented on final production. It is undoubtedly required to revitalize and modernize technology and to closely connect it with the accompanying industries for the sake of development and survival of this industry.

In order to see the situation with investments in technological equipment of the wood industry enterprises, investments in domestic and imported machinery and equipment were analyzed. Data was obtained from the Statistical Office of the Republic of Macedonia for the period 2007 - 2012 year. It analyzed investments in technology of wood manufacturing, wood products and furniture production. The data is presented in Table 2 and Table 3.

Table 2. Investments in machinery and equipment in manufacturing of wood and wood products (in million Denars)

Years	Total	Domestic machinery and equipment	Imported machinery and equipment
2007	8	0	8
2008	20	0	20
2009	7	1	6
2010	19	3	16
2011	22	0	22
2012	13	0	13
Average	14,8	0,7	14,1
AAR	10,2	/	10,2

Source: State Statistical Office of the Republic of Macedonia, Publications, Investments in fixed assets, own calculation

The previous table shows that for manufacture of wood and wood products have been invested on average 14,8 million denars, out of which 14,1 million denars belong to imported machinery and equipment, while only 700000 denars are for machinery and equipment from domestic production, all that for the period 2007 - 2012.

According to the data from Table 2, we can see that the realized investments in machinery and equipment for manufacture of wood and wood products have positive trend, with an annual average rate (AAR) of 10,2% for the period analyzed. Beside fluctuations, the investments in imported machinery and equipment noted positive trend, with the same annual average rate of 10,2%.

Table 3 shows data on investment in technology for production of furniture.

Table 3. Investments in machinery and equipment in furniture production (in million denars)

Years	Total	Domestic machinery and equipment	Imported machinery and equipment
2007	61	0	61
2008	96	0	96
2009	40	1	39
2010	32	0	32
2011	23	0	23
2012	35	4	31
Average	47,8	0,8	47,0
AAR	- 10,5	/	-12,7

Source: State Statistical Office of the Republic of Macedonia, Publications, Investments in fixed assets, own calculation

From the data in Table 3 we can see that from total investments in machinery and equipment for furniture production (47.8 million denars), the annual average for the analyzed period is mostly invested in technology by importing - 47 million denars. Investments in domestic machinery and equipment are very low, being only 800 000 denars average for the period under study.

Investments in machinery and equipment for furniture production have fluctuations during the years of the period studied (Table 3). As the result of these fluctuations, the investments have negative tendency to decrease, with annual average rate of -10,5%. The same trend has investment in machinery and equipment from imports with AAR from -12,7%.

Total investments in technology of the companies in the Republic of Macedonia amounted 28.161 billion denars annual average for the period 2007 - 2012, out of which 85% was investments in machinery and equipment from imports, while only 15% went to domestic machinery and equipment.

From the foregoing we can conclude that out of total investments for technological development in the Republic of Macedonia (28.161 million denars), only about 0.2% (62.6 million denars) were invested in enterprises of wood industry with annual average for the period 2007 - 2012. The most have invested in imports technology.

Most machinery and equipment per enterprise covers primarily processing and production of construction carpentry with domination of universal machines. There was lack of new technologies and there was huge participation of labor in the production process. With the increasing level of complexity of the machines, the number of technological operations reduced and the role of the human factor, thus increasing production capacity, production speed, precision in manufacturing, quality control etc Application of new technologies is more present in the final production.

NC and CNC machines are present in companies with a higher degree of complexity of production (furniture production, manufacture of wood products, less in production of construction carpentry).

It is necessary to separate the subcategories of producing plate furniture (made by veneer, plywood, MDF, etc.), upholstered furniture and massive furniture in furniture production. The highest investments were realized in production of plate furniture and upholstered furniture. Production of massive furniture has the lowest investments in renewal of the machine fleet.

The largest exporters of machinery and equipment in the wood processing sector in the Republic of Macedonia are Italy, Germany, Croatia and Slovenia, and also can be found imported technology from Austria, China, Belgium, etc. Manufacturing of machinery and equipment for wood industry is not present in the country.

5. DISCUSSION AND CONCLUSIONS

The characteristics of modern technologies are not possible to explain away from the context of economic development. In that context, the Republic of Macedonia shows a great lag in winning and application of modern technology, and at the same time has made a significant technological dependence from abroad. Technological dependence of the Macedonian economy is manifested by: conditionality, in most cases because of importing/purchasing outdated equipment and spare parts under adverse credit conditions; conditionality for purchase of imported raw materials; insufficient technological guaranteed performance for purchased licenses and foreign technologies; inability to fully use the installed capacities of the acquired technology; limited opportunities to export finished products from foreign technology; inability to consistently use the domestic staff's potential, especially in the development of their own "know - how", "software" and the like.

Due to the lagging of modern processes of modification of the production structure and technology in the world, our economy which is equipped mainly with outdated technology, is not sufficiently competitive and not complementary with Western economies with respect to the type of production, and to the physical characteristics of the products, quality, design and modernity.

Enterprises from the field of wood industry, as part of the Macedonian economy, are characterized with the previously mentioned specifics.

In terms of employment structure with respect to the wood industry, out of the 635 business entities analyzed, most are micro and small enterprises making thus about 85% of the total, while medium enterprises participate with only 15%. This situation is typical for the whole employment structure of Macedonian economy.

Transfer of technology is very important for development of enterprises and a major challenge for entrepreneurs. Franchising, licensing and joint ventures are also important forms of transfer of technology and knowledge, and at the same time a specific form of financing for enterprises. These forms of partnership are in infancy in the Republic of Macedonia, and it covers wood industry enterprises.

Wood industry enterprises mostly invested in imported machinery and equipment, and a very small percentage in machinery and equipment of domestic production in the period 2007 - 2012 year. Out of the total investments for technological developments in the Republic of Macedonia, only about 0.2% was invested in wood industry business. The biggest investments were realized in furniture production, i.e. the production of plate and upholstered furniture.

Technological developments allow for increment in production as a major condition for increasing accumulation or business surplus, and hence increase the possibilities of funding from their own sources. For these reasons it should be number one priority in any business enterprise.

REFERENCES

- [1] Zarezankova – Potevska, M. (2003): Tehnoloski razvoj na malite i srednite pretprijatija so unapreduvanje na sorabotkata so stranskite partneri, Refereti i diskusii od naucen sober, Stranski kapital vo funkcija na tehnoloski razvoj na Republika Makedonija, Zdruzenie na odrzliv razvoj, Skopje.
- [2] Popovska, Z. (2003): Nasoki na tehnoloskata politika na Republika Makeodnija, Refereti i diskusii od naucen sober, Stranski kapital vo funkcija na tehnoloski razvoj na Republika Makedonija, Zdruzenie na odrzliv razvoj, Skopje.
- [3] Horman, i dr. (2009): Razvoj industrijske politike u FBiH, Mašinski fakultet u Sarajevu, Sarajevo.
- [4] The Republic of Macedonia, National Cluster Atlas, An Inventory of Clusters, Cluster-Related Networks and Initiatives, Skopje, 2013.
- [5] Agencija za podrška na pretpriemnistvoto na RM, (2004): Izvestaj za MSP, Skopje.
- [6] Drzaven zavod za statistiki na Republika Makedonija, (2014): Soopstvenie od oblasta: Delovni subjekti – broj na aktivni delovni subjekti, Skopje.
- [7] Drzaven zavod za statistika na Republika Makedonija,(2008); (2009); (2011); (2013); (2014) Publikacii: Investicii vo osnovnite sredstva, Skopje.
- [8] Nacionalna strategija za ekonomskiot razvoj na Republika Makedonija, razvoj i modernizacija, (1997): Makedonska akademija na naukite i umetnostite, Skopje.
- [9] www.apprm.gov.mk (Dokumenti – Zakon za mali pretprijatija za Evropa, 01.09.2010)
- [10] <http://www.aik-invest.hr/wp-content/uploads/2013/12/2-strateske-smjernice.pdf>.

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