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DIGITISATION IN FOREST INDUSTRY IN BULGARIA - STATE AND PERSPECTIVES¹

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Abstract: A main objective of the paper is to present the state, current trends and challenges in front of the enterprises in Bulgarian Forest sector, based on the introduction of digital tools and solutions in business and economy as a whole. A subject of analyses is the degree of digitisation of forest sector enterprises based on the implementation and use of online-based applications and electronic catalogs; specialized information and communication management systems and networks; office and warehouse management software. The indicators under analysis are divided into the following groups - "connectivity and digital skills"; "internal processes" and "relationship with customers, suppliers and third parties". In order to achieve comparability of the results, the selected indicators are the same as those officially used by Eurostat. For the purposes of the analysis, secondary and primary data are used as well as publications in the specialized literature, legislation framework and analyzes of statistical data from national and international databases. The paper presents primary results from in-depth interviews with management representatives from large forest industry enterprises, according to the requirements of the Bulgarian Accountancy Act (AA). Good digital practices in the furniture manufacturers are also presented, and some opportunities for development of the Forest industry entities are suggested.

Keywords: digitisation; Forest sector; Forest industry; in-depth interviews; large enterprises.

1. INTRODUCTION

In the context of the fourth industrial revolution, digitisation on economic, social, educational and political level is among the priorities of the European Union (EU) (Digital agenda for Europe, 2014; The EU and the digital single market, 2017). There are fundamental differences between the terms "digitisation", "digitalization" and "digital transformation". "Digitisation" can be in general defined as "material process of converting analogous streams of information into digital bits" (Brennen, J.S., Kreiss, D., 2016). By sharing the idea of Gray and Rumpel, we believe that digitalization „is the use of digital technologies to change a business model and provide new revenue and value-producing opportunities; it is the process of moving to a digital business" (Gray and Rumpel, 2015, p. 1319). Digital transformation in hand is "an organizational change that is caused by the rapid development and application of digital technologies in business" (Slavova, M., 2016, p.142). The causal link between global technological development and the introduction of diverse digital solutions and tools by enterprises is a factor that makes digitalization from a competitive advantage to a need and a basis for economic growth. A main goal of the paper is to outline the current state, trends and challenges ahead of the Bulgarian forestry enterprises, which comes from the implementation of digital tools and online business solutions. An object of more in deep study is the level of digitisation of Bulgarian forestry

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enterprises, based on the implementation and use of online-based applications and electronic catalogs; specialized information-communication and management systems and networks; office applications and warehouse management software. Subject of analyzes are publications in the specialized literature, statistical data analysis and analysis of collected primary information from in-depth interviews with managers of large-scale forestry enterprises. Some good practices of used digital tools by Bulgarian furniture manufacturers' enterprises are presented as well.

2. CURRENT STATE OF THE "DIGITAL ECONOMY" IN BULGARIA

In a pyramidal structure we can put digitisation at the bottom, digitalization in the middle, and digital transformation at the top of the pyramid. In this respect in order to talk about a digital economy, a high level of digitisation in the government and business sectors of a country must be achieved at first. According to data from the European Commission (2018), Bulgaria is at 26th out of 28 places based on the digital economy and society index (DESI). If we take a closer look Bulgaria is ranked 25th according to the indicator "connectivity", 27th on the indicator "human capital", 26th on the indicators "Internet use" and "Integration of digital technologies" and 23rd on the indicator "digital public services". The impossibility of Bulgaria to reach the average European level on the indicators under review may have a negative effect on the business as a whole. At microeconomic level, the implementation of enterprises' digitisation can be measured by the following indicators - "connectivity and digital skills"; "internal processes" and "relationship with customers, suppliers and third parties" (Monitoring the digital economy & society 2016 – 2021, 2015, p. 13). *The connectivity based on the use of computers and Internet access* is a basic form of digitisation (Jagjit, S., Lorentz, H., 2019, p. 79). According to Eurostat 87% of the enterprises in Bulgaria in 2017 have broadband access to Internet. This is 32 percentage points higher than in 2006. According to data from the Bulgarian national statistical institute (NSI) in 2017 and in 2018, the percentage of enterprises with access to Internet is 94.6% as the dominance is to large companies reporting hundred percent access. We can state that the digital competences of enterprises staff members are a prerequisite for effective and efficient use of the Internet as a tool for building a competitiveness. However, data from Eurostat indicate that the digital skills of Bulgarians are below the EU average. In 2017 people in Bulgaria at the age gap between 16 and 74 with basic or more complex digital skills are 29%, which is 3 percentage points higher than in 2016, but by 2 percentage points less than in 2015. As a reason we can outline the demographic changes in our country. In particular a negative natural growth is recorded in 2017 (-6.5 per 1 000 people) (Eurostat, Population and population change statistics, 2019). In addition, the highest percentage (30.6%) of staff that use Internet is reported by small enterprises compared to the staff of medium and large enterprises. The lack of digital competences is a factor that can have a negative impact on the business and respectively on the economy of our country. *Development of a website* is fundamental for visibility of enterprises, among customers and investors. Over the last five years (2014-2018) there is a gradual increase in the number of businesses that have websites. In 2018, it is 51.1% compared to 48.4% in 2014. Based on the size of enterprises in 2018, 88.2% of large enterprises, 74.1% of the average and 45.9% of small enterprises have a webpage that is advertising their activities. However, the use of social media (9%) and cloud computing services (5.5%) by Bulgarian enterprises is still among the lowest levels in the EU in 2018 (DESI, 2018, p.13). Also, despite the high percentage of businesses that have a website from 2010 to 2018, the percentage of organizations receiving electronically orders from their customers is below 11%. The highest percentage of online sales is reported by the large enterprises compared to medium and small ones. However, in 2018 compared to 2017, online sales has declined by 3.1 percentage points. The *"internal processes" indicator* is generally measured by the percentage of enterprises with automated resource management systems (eg ERP); use of mobile technologies with internal organizational purpose; percentage of enterprises using software applications to manage their customer information (eg CRM) as well as by the percentage of enterprises using RFID technologies. Between 2007 and 2017 the highest percentage (16%) of enterprises that use software applications to manage their customer

information is reported in 2014. It is noteworthy that, according to NSI in 2017, compared to the data available for the previous statistical period (2015), there is an increase of the indicator with 1.3 percentage points for small enterprises and 2.9 percentage points for medium enterprises. For large enterprises, however, there is a decrease by 0.7 percentage points. Until 2014 incl. there is a positive trend towards an increase in the number of Bulgarian enterprises using digital resource management systems. In 2017 compared to 2014, there is a decline in the indicator by 3.9 percentage points. If we analyse the NSI data more in deep we can point a gradual increase in the percentage of large enterprises that are using ERP for the period 2010 - 2015 (incl.). In 2017, however, the percentage is 1.6 percentage points less than the reported data in 2015. Enterprise relationships with customers, suppliers, and third parties are generally based on the use of electronic invoices, the development of an online store website, the use of social media, the ability to electronically share supply chain management information with customers and suppliers. It should be noted that large enterprises in our country report the highest percentage (30.7%) in 2017 compared to small and medium enterprises, whose business processes are automated related to those of their suppliers and/or customers. Looking at this indicator for the period 2010-2017, It can be noted that the highest numbers are recorded in 2012, when the percentage of large enterprises using similar systems or digital applications is 41.5%.

Based on the previous data we can state that the degree of digitisation of the Bulgarian economy as a whole is also a prerequisite for low levels of digitalization and digital transformation by enterprises. Although large enterprises are a major pillar of economic prosperity based on greater opportunities for innovation and attracting highly skilled human capital, they do not fully benefit from the opportunities provided by digital technologies. For example, even though 100% of large enterprises in Bulgaria reported use of Internet in 2018, fewer than 89% have their own online page, and less than 16% have a webpage for online sales. This is confirmed as well by data from studies of the business environment in Bulgaria, which indicates poor knowledge of the concept of digitisation and digitalization by enterprises. Because of this, digitisation is primary perceived as a way to optimize resources and processes in organizations (Study on the level of digitisation in Bulgaria, 2018; Innovation.bg, 2018; Chobanova, R., Kocarev, L., 2019).

3. DIGITISATION IN THE FORESTRY BASED INDUSTRY IN BULGARIA

3.1. Profile of the Forest industry in Bulgaria and state of the problem

The Forest industry is a part of the Forest sector, where SMEs are over 97% of all enterprises. The main economic activities in the Forest industry are related to the production of wood products (wood tiles, parquet, joinery, etc.) and production of furniture (upholstered furniture, furniture, mattresses, etc.). ICT are important both for the organization of management and production based on the reduce of labor costs, time of operations and optimization of technological processes. However, the main investments in the industry are primarily focused on purchasing machinery and automating production, rather than on the integration of business processes in enterprises. In this respect, ICT in the sector mainly involves implemetation of websites, e-mails, electronic catalogs and shops, Internet advertising and more. The used digital tools includes: integrated Enterprise Resource Planning systems (ERP); Customized Customer Relationship Management (CRM) Customer Relationship Management (CRM) systems; Supply Chain Management systems (SCM); Computer-Aided Design (CAD), and more. Along with the integration of enterprise management tools described above, companies need software tools at the point of sale. Manufacturers use automated tools to configure products and pricing, and visualize products with dynamic graphics. Virtual reality uses 3D graphics and devices to provide an interactive view, and it offers visual solutions and their correspondence with other items or accessories. (Popova, 2013). The ICT studies in the Forest industry in Bulgaria are mainly focused on SMEs, so a research regarding the used digital systems and tools in large enterprises will show some current trends and could highlight good practices in the field. Previous survey results are indicative that enterprises operating in the Forest sector in Bulgaria have better performance than the average levels of the country mentioned above (Chobanova et al., 2018, p. 164-

189). In this respect 92.1% of enterprises participating at the survey use computers and Internet. 61.8% of those which use Internet have fixed or broadband connection. Nearly 91.4% of the enterprises state that a major factor for using Internet in the organization is the need for online interaction with the government institutions. 23.1% of the surveyed enterprises have a website and 17.1% offer possibility for online orders to their customers. 25.7% - have business processes, which are automatically linked to those of their suppliers and customers. From administrative and organizational point of a view, 37.1% of organizations under analysis prepare and issue electronic invoices to their clients while 34.3% use social media (including social networks, blogs, multimedia sharing websites, etc.). 8.6% have implemented cloud services in their activities. As a conclusion, compared to the results of Bulgaria's overall performance, forest sector enterprises report better data, excluding those related to broadband Internet access. Interesting is the fact that only 23% of enterprises have webpage, despite that their online presence can be seen as a factor for increasing sales and confirming their position on the market. This result can be explained by the lower use of ICT in logging and wood processing organizations. At the same time, owners and managers of enterprises in the country point out the need for active implementation of digital tools and trainings related to their use. This is stated as a priority for increasing the organizational efficiency and innovation of enterprises (BCWFI, 2018).

3.2. Survey methodology and results

The subject of the study is the degree of digitisation of Bulgarian forest sector enterprises based on the use of online-based applications and electronic catalogs; specialized information and communication systems and management systems; office applications and warehouse management software. The observation methodology is characterized by: use of officially reported indicators in the EU and the country (Eurostat, NSI); ability to conduct deep interviews and collect detailed, reliable and diverse data; selection of the largest enterprises in various economic activities of the industry (production of upholstered furniture, production of furniture, manufacture of wood panels, production of parquet and laminates, production of mattresses, production of toys, etc.). The used method is in-depth interviews with duration of 20 minutes. The subject of the survey is large enterprises, according to the requirements of the AA. The choice of the target group is in line with the authors' goal to study the level of implemented digital solutions and information and communication technologies among enterprises with diverse economic activities in the forest industry. Observing units are the sixth largest enterprises (over 250 employees), in the respective core economic activities of the forestry industry. The interviews are conducted in 2018. The monitoring questionnaire includes issues aiming to determine the degree of digitisation of enterprises based on the following indicators: *Use of computers and Internet by enterprises* (use of e-mail, website, electronic catalog, e-shop, Internet advertising); *Internal processes* (use of integrated ERP systems, specialized systems such as CRM, SCM, computer networks, office packages); *Enterprise relationships with customers, suppliers, and third parties* (use of inventory management systems, digital supply chain management and supplier relationships, electronic forms of orders or other information systems between suppliers and businesses, unique and automated product identification throughout the supply chain). The use of digital tools and solutions by large enterprises under investigation in this paper is outlined in Table 1.

Table 1. Use of digital tools in the largest forest industry enterprises in Bulgaria

Indicator	Name of enterprise					
	Mebel Still	Videnov	Kronoshpan	Kastamonu	Irelly	Ted Bed
Use of computers and Internet						
<i>E-mail</i>	✓	✓	✓	✓	✓	✓
<i>Website</i>	✓	✓	✓	✓		✓

<i>Electronic catalog</i>	✓	✓	✓	✓		✓
<i>E-shop</i>		✓				✓
<i>Virtual tour with pricing option</i>		✓				✓
<i>Internet advertising</i>		✓				✓
Internal processes						
<i>Integrated systems ERP type</i>	✓		✓			✓
<i>Specialized systems CRM, SCM type</i>			✓			✓
<i>Computer systems, office packets and networks</i>	✓	✓	✓			
Enterprise relationships with customers, suppliers and third parties						
<i>Stock management systems</i>		✓		✓		
<i>Digital supply chain management and supplier relationships</i>		✓				✓
<i>Electronic forms of orders or other information systems between suppliers and enterprises</i>		✓	✓		✓	
<i>Unique and automated product identification throughout the supply chain</i>		✓	✓	✓		✓

It is noticeable that businesses use email and have web pages, electronic catalogs, and office packs. This also determines the level of digitisation as a prerequisite for the active use of ICT tools, technologies and solutions of different types. Internet advertising and e-shop sales are used by businesses whose production is mainly focused on the domestic market. Enterprises that work primary with foreign markets rely on contractual relations and as franchisees have a guaranteed market and sales. It is logical that businesses also actively use logistics and relationship-related capabilities such as electronic forms of ordering and automated product identification throughout the supply chain. This is related to the search for opportunities for shortening delivery times and production operations, as well as optimizing the work with the many suppliers that companies operate.

3.3. Good practices of furniture manufacturers, operating at the territory of Bulgaria

As good practices regarding the level of digitisation by Bulgarian companies we can point out - Videnov Group Ltd., Kronospan Bulgaria Ltd. and Ted - Bed Ltd. Examples of digital systems and tools used in production and management in those enterprises are: CALL customer service center via online orders and sales; specialized electronic catalog with full technological specification, dimensions and materials of wood-based panels, models and schematics of the components; mobile application (KronoDesign), which allows different combinations of scenery, colors and textures, as well as a choice of interior style; corporate blog and B2B business information, incl. franchise opportunities. When we talk about good practices of digital solutions used by foreign forest industry enterprises operating in Bulgaria, IKEA is a good example. Its application called "Ikea Place", functioning in Bulgaria as well, use augmented reality, which help customers to imagine their home with new furnitures, sold in the shop. The 3D digital tool can be used on smartphones. The in-store logistics managers of the retailer use an inventory replenishment management process developed by IKEA called 'minimum/maximum settings' to respond to store-level inventory reorder points and reorder products. The software functions on the base of the number of products that will be sold from the reserve stack of bin in a single day or two-day period. The aim is to minimize the number of stock goods while meeting

customers' demands and lowering the cost of lost sales. The data from the software helps managers to forecast sales for the next couple of days and order in the suitable amount of products. Another good digital example implemented in Bulgaria is called Click & Collect. It helps people to buy products online and then to pick them up directly from the stationary shop. This digital tool is offered in our country by IKEA, Mömax, Butlers or DEPOT. Another good practices that is worth mentioning is the 3D animations used by the German furniture retailer MACO Möbel. The tool gives customers a life-size, spatial impression of the planned facility and enables them to interactively intervene in the planning process. In addition to modern websites, social media activities, image films and testimonials, the Forest industry and trade is increasingly discovering influencers for its online marketing activities. An effective strategy, as a significant number of people now base their purchasing decisions on bloggers and influencers.

4. CONCLUSIONS

The survey results of the level of digitisation of Forest sector enterprises in Bulgaria shows better performance than that on the national average, based on officially used assessment indicators in the EU. A main limitation of this conclusion is the fact that these results are based mainly due to the performance of medium and large enterprises. A more detailed study of the best practices of the largest enterprises in the Forest industry shows that they are aware of and apply the opportunities provided by the ICT tools, common and dedicated. The above-mentioned good Bulgarian practices are attended by the 6 largest enterprises with a different subject of economic activity from the industry, of which 2 are with foreign participation. The SMEs in the sector in Bulgaria should work hard to develop and implement them, using the good Bulgarian and foreign practices in this field and their efforts should be focused on: using the online furnishing and pricing options of enterprise sites; the optimization of supply chain and supplier relationships; the exploiting the potential of digital marketing and advertising.

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REFERENCES

1. Brennen, J.S.; Kreiss, D. (2016): Digitalization. Int. Encycl. Commun. Theory Philos.
2. Chobanova R.; L. Kocarev; R. Popova; D. Georgieva; Z. Trayanov; D. Traychevska; R. Angelova (2018): Forestry sector in Bulgaria and Macedonia (Forestry sector in Bulgaria), Bulgarian Academy of Sciences.
3. Chobanova, R.; Kocarev, L. (2019): Digitalisation as a challenge for enterprises in 21st century, Economic Studies, 28 (1), pp. 153-173.
4. DESI, 2018, Report for Bulgaria
5. Digital agenda for Europe (2014): Luxembourg: Publications Office of the European Union
6. Gray, J.; Rumpe, B. (2015): Models for digitalization. Journal of software & system modelling, 14 (1): pp. 1319-1320.
7. <http://www.nsi.bg>, last accessed on 14.02.2019
8. [https://digital-agenda-data.eu/charts/desi-components#chart={"indicator":"DESI","breakdown-group":"DESI","unit-measure":"pc_DESI","time-period":"2018"}](https://digital-agenda-data.eu/charts/desi-components#chart={), last accessed on 14.02.2019
9. <https://ec.europa.eu/eurostat/tgm/download.do?tab=table&plugin=1&language=en&pcode=tin00090>, last accessed on 14.02.2019
10. Innovation.bg (2018): Smart policies for innovation growth, ARC Fund, pp. 71-76.

11. Jagjit, S.; Lorentz, H. (2019): Developing design principles for the digitalisation of purchasing and supply management, *Journal of Purchasing and Supply Management* 25 (2019): pp. 78–98.
12. *Monitoring the digital economy & society 2016 – 2021* (2015): European Commission, DG Communications Networks, Content & Technology
13. Population and population change statistics, Eurostat, available at: http://ec.europa.eu/eurostat/statistics-explained/index.php/Population_and_population_change_statistics, last opened on 04.02.2019
14. Slavova, M. (2016): Digital transformation of business, *Economic and social alternatives*, number 4, pp.142-149.
15. Study on the level of digitisation in Bulgaria (2018): Siemens Bulgaria and the German-Bulgarian Chamber of Industry and Commerce, online accessible on: https://bulgarien.ahk.de/fileadmin/AHK_Bulgarien/News/Digitalization_Survey_Bulgaria-BG.pdf
16. The EU and the digital single market (2017): European commission, extracted from: <https://publications.europa.eu/en/publication-detail/-/publication/8084b7f3-6777-11e7-b2f2-01aa75ed71a1>, last access on 12.02.2019

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