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Effects of Digitalization on Labor Market Development in Transport Sector in Post-Covid Environment

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Abstract

The development of digitalization processes in a post-pandemic environment has the potential to seriously affect the labor market in the transport sector in South-Eastern European countries, which sector is not prepared for such a transformation. An increasing number of transport companies will face the dilemma of keeping their workforce or replacing it with digital devices and robots. The consequences of the COVID-19 pandemic, which led to many small and medium-sized enterprises bankruptcies in the sector, will make it even more difficult for transport companies to remain competitive both on the national and European transport market. Based on statistical and descriptive analysis, the article aims to forecast the emerging trends in the sector and to give recommendations for a smooth transition, considering the specifics of the transport sector in terms of social and technological sustainability. The study identifies the problems, related to the digitalization of the transport sector and reveals the possibilities for their overcoming in regard to road passenger carriages in intercity lines in developing countries with transition economies like Bulgaria.

Keywords: Digitalization, Labor Market Intransport, Passenger Carriages

JEL: R42, J24, O31

Introduction

One of the main economic sectors over which the COVID-19 pandemic had a great repercussion, is the transport sector. As a result of the economic, health, social and demographic crisis, domestic and international passenger carriages were significantly restricted. The passenger flow in urban, suburban, and intercity lines decreased, which fact forced a significant part of the small and medium-sized transport enterprises to reduce or discontinue their economic activity. This in turn affects both the number of persons employed and the volume of turnover from passenger carriages. The interest in digitalization of the supply and demand of freight and passengers 'carriages increased, as well as the introduction and development of digital skills and competencies amongst the transport workers. However, this poses a risk for the future development of the national transportation system. Firstly, because a stable and sustainable institutional

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environment is needed for the functioning of the business, which will predispose transport operators to increase their revenues and market shares. Secondly, companies should be encouraged to invest financial resources in developing their employees' skills and competencies in the digital environment, as well as to enhance workers' monthly wages to reduce staff turnover. And in the conditions of a high competition environment, where the transport sector functions, most of the companies make normal profit and the allocation of such financial resources is a problem for their survival.

Over 75% of the licensed transport operators, which are providing intercity, domestic, and international passenger carriages are small enterprises - they have a fleet of less than 10 vehicles (RTA a, 2023). The number of passengers carried in intercity lines decreased by 30% in the last two years compared to the years before the COVID - 19 pandemics (NSI, 2021). In most of the cases, revenues from passenger carriages are equal or even lower than the total costs of operators and it is impossible for them to reinvest in developing the digital skills and competencies of transport workers, in renewal of the fleet of vehicles in accordance with the Internet of Things and Internet of Vehicles concepts (IoT, IoV,).

Regarding the abovementioned, the purpose of the current research is to identify the trends in intercity passenger carriages development in the case of Bulgaria, so as to determine the opportunities new digital skills to be created amongst the transport workers or the existing ones to be developed. The main object of the study is road passenger carriages in intercity lines, as the author has chosen a representative sample of large transport companies in this field, covering regional cities with a population over 50 000 citizens. The research question of the study is whether the financial status quo of road passenger carriers in intercity lines could be used as a prerequisite for assessing the readiness of these companies to implement digital technologies in their main economic activity. The results of a conducted survey amongst the studied transport companies about their attitude and opinion, concerning the digitalization of labor market in the transport sector are also summarized. For the purposes of the study, the methods of statistical and descriptive analysis will be applied.

Review of the scientific literature in the field of human resources digitalization

The issue, concerning the digitalization of economic processes and its impact on employment, has been a subject of extensive research during the last 10 to 15 years. The detailed examination of this issue is significant, especially for the EU member states such as Bulgaria, because the existing socio-economic problems in this country - low wages and strong migration of the labor-intensive population, could be much more important for the employees' motivation, increased labor productivity and companies' efficiency (Keremidchiev, Naydenova, 2012). In this regard, Prodanov (2021) analyzes the changes that have taken place in the conditions of transition to the Fourth Industrial Revolution and their impacts on the development of the working force. He has also studied theoretically how the digitalization of economic processes will radically transform the classical understanding of human labor and the development of new ways of combining capital and human factors in the future.

Already in the past century Elkington (1997) talked about measuring the social and environmental attitude of business organizations and changes in their corporate behavior through the introduction of the "triple bottom line" concept. This concept has much in common with the development of the human resources in conditions of global digitalization processes, as it put the accent on gender equality in hiring personnel, ensuring appropriate working environment and higher professional qualification of the workers. According to the author, by applying the triple bottom line concept, business organizations make profits through sustainable development practices.

In this sense, one of the United Nations Sustainable Development Goals (2015) focuses on higher labor productivity, full employment and decent work for everyone till 2030, which corresponds with no job losses and technology innovations.

A group of Italian researchers (Evangelista, et.al, 2014) have analyzed the macroeconomic effects of information and communication technologies (ICT) application through the usage of three groups of indicators: level of information and communication security; level of Internet usage; impact of ICT on key socio-economic processes. By an econometric modeling, the authors evaluate the impact of these technologies on labor productivity for various economic sectors; employment rate; employment rate of long-term unemployed people; employment rate of disabled people etc. Another interesting publication in this sense is that of Fossen and Sorgner (2019), who make a difference between the various aspects of digitalizing professions and occupations. They distinguish between "destructive" and "transforming" digitalization. According to them a "destructive" digitalization is the automation of a particular occupation or a profession through the application of machine-controlled equipment. The "transforming" digitalization in their opinion is the use of modern digital technologies as a factor for labor productivity increase rather than labor force replacement.

In his book, Chaffey (2019) identifies what the result of digital transformation on the development of the separate business organizations is and he determines this transformation as a result of serious changes in the companies' organization processes, structure and financial performance. The author notes that the transition to digital technologies implementation is based on innovations, social media marketing and internet technologies.

Millan et.al. (2019) examine what the benefits for functioning of the business in European economy digitalization environment are. The authors put the focus of their publication on three key moments while analyzing the correlation between enterprises' effectiveness and information and communication technologies implementation. Firstly, they accentuate on the frequency of ICT usage in the daily arrangements of workers. Secondly, in their opinion the level of ICT application will depend on the type of employment (self-employed, part-time employed, full-time employed) and thirdly - it will be necessary to consider the so-called inertia effects, according to which there are fear and prejudice amongst workers about the ICT implementation, because of the routine nature of their daily work. A similar study, in the case of Switzerland, is done by the researchers Belsmeier and Woerter (2019), who summarize that the investments in digitalization of the main economic activities of companies, will have a positive

effect on the employment of high qualified workers and therefore will have a negative impact on the employment and retention of low-skilled personnel. In this regard, the authors recommend the overall labor policy of the Swiss government to be oriented to the efficient allocation of high-skilled workers to economic sectors with the greatest potential for growth. In addition, they believe that the introduction of continuous learning for workers (especially medium- and low-skilled) will contribute to a stable equilibrium of the labor market.

In relation to the subject and purpose of the study, an interesting publication is that of Leviakanges, (2016), who examines the impact of digitalization on the transportation sector of Finland. Through a PESTEL analysis, the author tries to identify the main political and strategic problems, as well as the measures to overcome them so that the Finnish transportation system could work sustainably and efficiently. He puts the accent on three main indicators, through which he evaluates the impact of digitalization on the various transport modes, especially employment, productivity, and effectiveness.

A group of researchers (Latorre, et.al, 2017) study the probability of the human capital to be replaced by digital capital in the case of Spain. As a result of the analysis, they highlight the macroeconomic and microeconomic effects of this activity. According to them, many positive effects such as GDP growth, better living conditions and welfare could increase because of the digital capital increase at the macro level. However, at the micro level, the negative effects prevail, especially in the economic sectors which are non-productive.

Zareva, and Kirova (2021) linked digitalization of processes (especially the intelligent specialization of production processes) with the creation of new knowledge amongst working age employees. The authors conclude that one of the ways for reaching an innovative potential increase for both the national and European economy, is the technological upgrade of the production processes and the affirmation of the business-education-science relationship.

As a result of the literature review, none of the identified articles repeats the purpose of the current study. In the present research are analyzed the risks and opportunities for job losses and the creation of brand new professions in a specific sub-sector of the national economy - road passenger carriages in intercity lines are analyzed. Like the purpose of some of the reviewed publications, the current study has identified the global trends in transport sector digitalization, but the focus is on the development of intercity passenger carriages. On the other side, it is completely different in structure and content in comparison to the abovementioned articles, as it analyzes the economic activity of separate road transport companies (turnover, labor productivity, persons employed) and surveys their opinion about the digitalization of the labor market.

Trends in the digitalization process of road transport carriages at national, European, and global level

In recent years, it is discussed that the transport sector, and especially road transport, has the potential for a high degree of automatization of the passenger and freight carriages, as well as fleet exploitation. The number of continuously increasing personal cars at the expense of urban and intercity public transport services usage, as well as the increased traffic jams in big cities, led to

the necessity of improved safety, security, and comfort of carriages. In this regard, as early as 2011, the "Internet of things" (IoT) concept was put into practice as a basis for both the digitalization of passenger carriages and intelligent transportation systems deployment in the road transport.

A few years later (2016, 2017), IoT was upgraded and replaced with the "Internet of vehicles" concept (IoV). This technology is extremely useful for overcoming various obstacles, like traffic jams, many accidents and unsafe and insecure driving. "Internet of vehicles" includes five communication applications, which allow data transfer amongst: vehicles (V2V); vehicles and road infrastructure (V2R); vehicles and personal smart devices (V2P), vehicles and sensors of the environment (V2S), vehicles and infrastructure cellular nets (V2I) (Wu, Yang, Li, 2016). The main purpose of IoV is to deliver the best communication connectivity amongst the various participants in the road passenger carriages – customers, transport operators, cellular nets, vehicles – in real time, which connectivity is easily managed, controlled, reliable and operational.

The "Internet of vehicles" architecture consists of four levels: *control level*, which is also sensitive to the environment changes; *application level*, which consists of information and communication technologies; *transport level and net access*; *coordination level* (Sharma, Kaushik, 2019). However, the usage of such a type of system has many disadvantages, which could be reduced to the following: risk of weak and unreliable net connections; continuous delays in the process of data transfer; transfer of unreliable data about the traffic; high degree of scalability; security and confidentiality of data transfer. The key challenge in the usage of IoV is the complete digitalization of the car driving process, which fact makes the driver's function and presence meaningless. In this case, the driver could be engaged with other activities than driving, such as sending e-mails about the documentation of carriages, spending more time for leisure activities, etc. (Keuchel, 2020).

Therefore, because of the digitalization of road passenger carriages, the greatest risk of job losses and physical replacement of human resources by machinery is posed by low-skilled transport staff, such as drivers. This process could be strengthened by the necessity that all member-states should comply with the priorities of the European Green Deal and UN sustainable development goals, according to which untill 2040 only the share of road passenger and freight carriages will decrease by approximately 15% at the expense of the increase in the share of railway (by 3%) and inland waterway (10%) transport (WMU, 2019).

On the other hand, the complete digitalization of these processes will lead to the creation of brand new professions, such as operators of telecommunication equipment, personnel, maintaining the infrastructure facilities and power supply stations, etc.

As early as 2020, in a study launched by the World Economic Forum, it is stated that by 2025, 85 million of professions worldwide will be replaced by machinery; 40% of the staff employed will have to be retrained every six months and 43% of the world business organizations have a positive attitude to reductions of staff as a result of the digitalization of their main economic activities (WEF, 2020). All of the aforementioned facts will undoubtedly have a negative impact on the structure of the labor market in road

passenger carriages and especially on the supply and demand of human resources in intercity passenger services.

Firstly, because over 80% of the transport workers employed in companies, providing intercity road passenger carriages, are low-skilled people (for hiring coach drivers in Bulgaria, the minimum required qualification is secondary or secondary special education).

Secondly, the international digital economy and society index (i-desi) for Bulgaria is 39, while the average European index for the last four observed years is 48, which means that the country ranks in one of the last places amongst the other member states according to this indicator (DESI, 2022).

Thirdly, the investment of additional financial resources for human capital development by transport companies, operating in the field of road intercity passenger carriages is a difficult and, in some cases, impossible task, as more than 90% of these companies are small and medium-sized enterprises and they are most affected by the COVID–19 pandemics.

Fourthly, having in mind the global trends in the development of the automotive industry, approximately 60% of the main operations, done by humans, will be replaced by non-humanoid robots and drones and some of the most sought-after jobs will be artificial intelligence specialists; engineers in technology design and programming; operators of communication installations (WEF, 2020).

Fifthly, up to 80% of the organization of transportation processes and exploitation of vehicles in road passenger carriages will rely on the IoT and IoV concepts and it is expected that after 2025 approximately 16% of the transport workers employed will need to be retrained every 6 months.

The process of digitalization of the transportation services in road transport and especially – passenger carriages in intercity lines in Bulgaria, started in 2006, when all vehicles for passenger and freight carriages had to be equipped with digital tachographs (EP, 2006). The main purpose of these tachographs is to store information about the driving time and rest time of drivers. The digital tachographs have the following advantages:

- Data, stored in digital tachographs could be analyzed through software programmes and this allows the management of transport companies to make the correct decisions;
- The tachographs store data that is impossible to be manipulated and/or deleted.
- Data is read easier through digital tachographs rather than analog ones.

In relation to the usage of digital tachographs, various types of cards for different purposes are issued: a driver's card, a transport carrier's card and a card for installation procedures and upgrade (RTA b, 2023). In order that the safety, security and environmentally friendliness of road vehicles be improved, in 2008 was implemented the regulation on periodic training and initial qualification of drivers, holding various categories, used for public freight and passenger carriages (Regulation № 41, 2008). The training includes various courses, related to road safety driving, health and safety at work, reducing the carbon footprint on the environment by road transport, optimization of the vehicles' fuel consumption, introduction

of basic and specific digital skills. Since that time, 188 learning centers for periodic training and professional qualification of drivers are established and are functioning on the territory of Bulgaria (RTA c, 2023).

Economic performance and analysis of the status quo of passenger carriages in intercity lines

The present analysis is done based on a selection of several transport companies located in various regions in Bulgaria (Sofia, Plovdiv, Varna, Bourgas, Haskovo, Yambol), which constitutes a representative sample of the development of the subsector – passenger road carriages in intercity lines. The selected companies are classified as large enterprise and have a fleet of 60 to 180 vehicles and provide transportation services both in intercity lines and specialized travels. These transport companies rank top ten companies in the industry as they have the highest annual turnovers and the largest volumes of passenger kilometers produced (Registry agency of Bulgaria, 2023).

Regarding the selected road transport companies, indicators such as number of persons employed, economic activity revenues, labor productivity, share of domestic passenger carriages are analyzed. The results of a conducted survey amongst these companies are also presented, concerning the opinion of their CEOs about the advantages and disadvantages of digital technologies, the types of professions needed for the development of the sector in the future, etc.

According to the publicly available data in the registries of the Executive Agency Road Transport Administration, at the beginning of 2023, the number of licensed transport companies for the international road carriage of passengers on the territory of Republic of Bulgaria is 1167 (RTA a, 2023). This number includes also the companies which are licensed to provide specialized passenger carriages in accordance with art. 23 of the Law on carriages by Road (1999), as well as road carriage of passengers in intercity lines and those in international lines.

Most of the licensed transport enterprises – 97% - have a fleet of less than 50 vehicles, as 76% of them have a fleet of less than 10 vehicles, and 21% - have vehicles between 10 and 50, which relates them to the group of small and medium-sized enterprises (SMEs). Only 3% of the total number of companies licensed are large or very large transport companies, possessing a fleet of over 50 vehicles and a personnel of over 250 employees.

Although two of the priority goals of the draft of the "National strategy for encouraging the development of small and medium-size enterprises for the period 2021-2027" are to increase the competitiveness and specialization of SMEs in high-tech production, those goals are difficult to achieve especially for this subsector of the economy – road carriage of passengers in intercity lines (Ministry of Economy, 2021). This is absolutely confirmed by the results of the statistical analysis of the turnover, labor productivity and level of employment indicators for the studied transport companies.

Figure 1 presents the trends in the development of intercity passenger carriages in comparison to the total number of passengers carried on the territory of Republic of Bulgaria for the period 2015 – 2021.

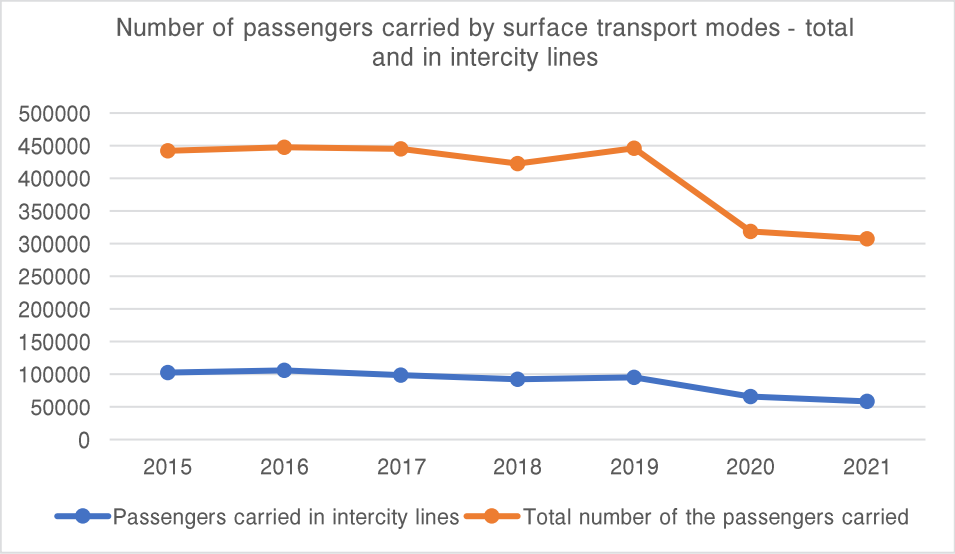

Figure 1[1]. Number of passengers carried by surface transport modes
Source: National Statistical Institute of Bulgaria, 2022

Road passenger carriages in intercity lines account for only 2,2 % of the total number of passengers carried in the country and they are approximately 22% of the number of passengers carried by surface transport modes. As one could see on figure 1 with every subsequent year of the period under review, their number decreases by an average of 7370 passengers and in 2021 the number of passengers carried in intercity lines has decreased by 43% compared to 2015. It is obvious that the COVID-19 pandemic is detrimental for the development of this economic subsector. For the time after 2020 many restrictive measures were introduced in all sectors of the economy so that the health crisis in Bulgaria could be managed. These measures included restrictions, concerning the travel of organized groups of people, as well as the specialized transport of students due to changes in the organization of their education process – the distance learning mode. Undoubtedly, this trend of development of the road passenger carriages in intercity lines will continue in the coming years because of the deepening health, economic, demographic, and social crises in the country, which will negatively affect the market shares and annual turnovers of the companies, operating in this subsector as well as the equilibrium of the labor market. This trend is also confirmed by the decreasing number of the intercity bus lines in Bulgaria where according to the National Statistical Institute database in 2021 compared to 2019, 435 bus lines were closed as unprofitable for intercity passenger carriages on the territory of the entire country (NSI, 2022).

In several consecutive graphs indicators such as the number of persons employed

[1] Surface passenger transport carriages include road transport and railway transport carriages and they exclude urban electrical transport carriages in accordance with the methodology of the National Statistical Institute of Republic of Bulgaria, https://www.nsi.bg/sites/default/files/files/publications/StatBook2022.pdf

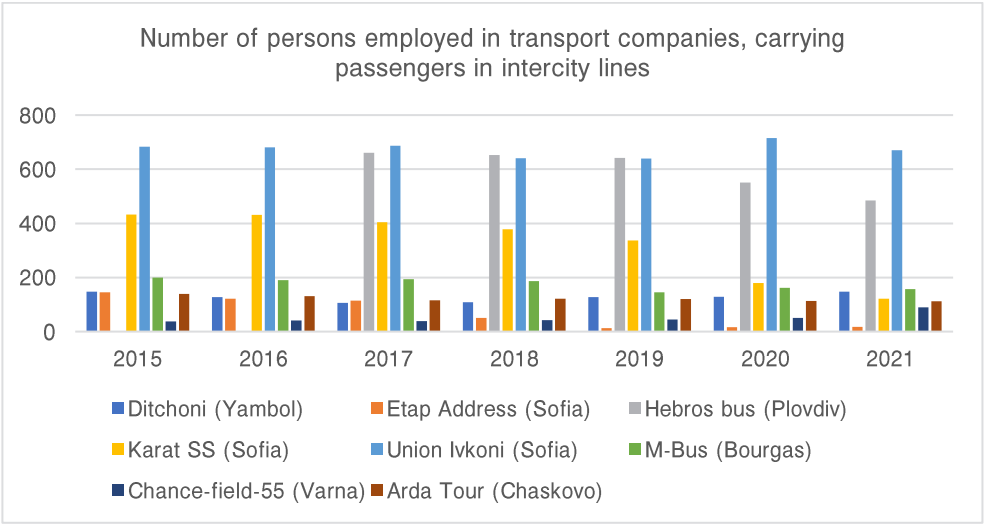

Figure 2. Number of persons employed by road passenger carriers in intercity lines
Source: Registry Agency of Bulgaria, 2023

in companies, operating in the field of road passenger carriages in intercity lines, labor productivity and annual turnover of the transport companies will be presented. The examination of these indicators has much in common with the process of digitalization of road passenger transport. Figure 2 presents the number of persons employed by road passenger companies.

According to the data presented in figure 2, the largest number of persons employed in road transport companies, carrying passengers in intercity lines, is observed in the regions of Sofia and Plovdiv. This distribution is logical, because the aforementioned cities are the biggest ones within the country, have a large population and provide the best opportunities for life, work, mobility and entertainment for citizens. For some of the observed units in the representative sample, there is a reduction in the number of employees after 2019. Some of them have reported a reduction of 9 times in the number of persons employed in 2021 compared to 2015 (e.g. Etap Address JSc), and for others it is 3.6 times (Karat SS ltd). The identified trend in the turnover of transport staff in the regions of Varna and Bourgas (M-Bus ltd and Chance-field- 55 ltd) is the one of hiring more transport workers in the summer months, especially when the foreign tourist flow to the Bulgarian Black Sea coast is higher and their decline when the tourist season ends. Consequently, the transport companies are not financially stable to cover the total costs for their personnel and they are forced to dismiss them. On the other hand, the financial support of the government to the small and medium sized enterprises as a result of the Covid-19 pandemic is not sufficient for both reinvestments in their economic activity and for development of the professional skills of transport workers and may lead to a loss of market shares.

The observed fluctuations in the transport workers' employment in intercity passenger carriages do not have a significant impact on the employment in sector "Transport, storage

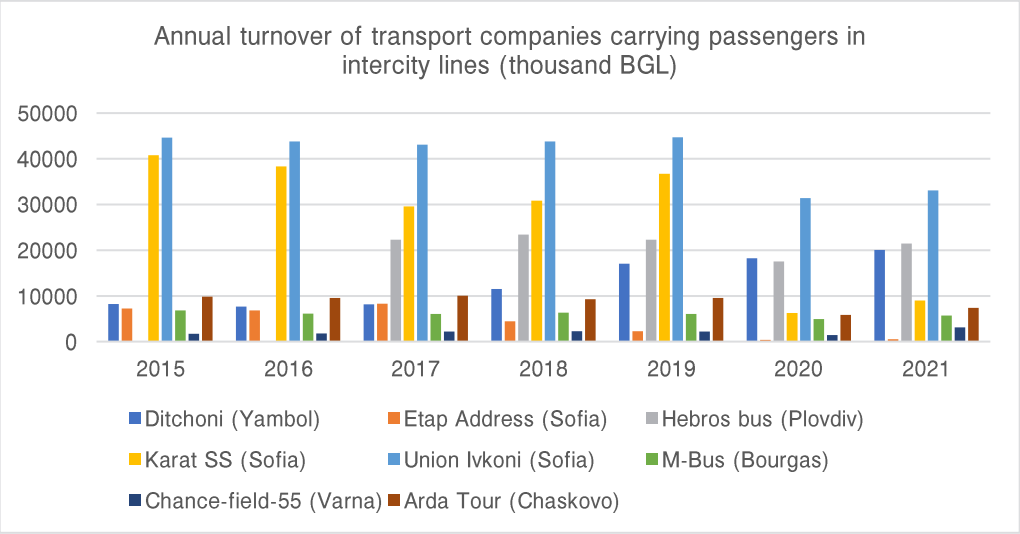

Figure 3. Annual turnover of road passenger carriers in intercity lines
Source: Registry Agency of Bulgaria, 2023

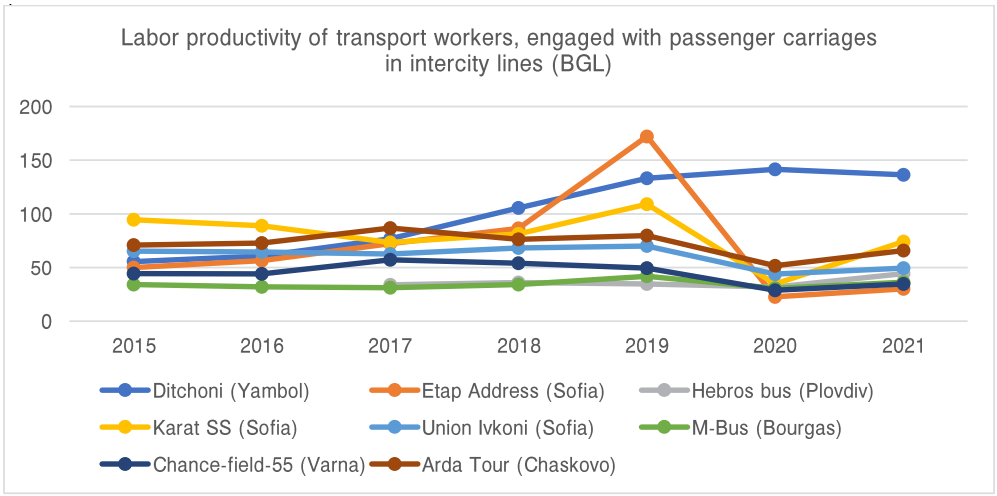

Figure 4. Labout productivity of employees by road passenger carriers in intercity lines
Source: own calculations of the author

and posts", as it is only 2% of it. However, it negatively influences the demographic situation of the relevant region and the migration processes on its territory.

Figure 3 shows the trends in annual turnovers of road transport companies, carrying passengers in intercity lines.

The highest share of annual turnover is realized by the transport carriers, which are registered as companies on the territory of the regions of Sofia, Plovdiv and Yambol. For the period of Covid-19 pandemics (2019-2021) one can see reductions in the values

of the indicator which are typical of all of the transport operators, excluding Ditchoni Ltd and Chance-field-55 Ltd, where a growth of 18% and 23% respectively is observed. For the same period, a decrease of 77% and 75% is observed in the annual turnovers of Etap Address JSc and Karat SS Ltd. This in turn means that transport carriers are unable to allocate sufficient financial resources for maintaining their market positions and are unable to gain competitive advantages in terms of digital technologies' implementation and personnel's digital skills development.

Labor productivity is what matters significantly when we are talking about effectiveness of passenger carriages. Labor productivity covers the efficiency of tangible fixed assets exploitation and labor of transport workers. It is determined by several factors, such as education and qualification of staff, deployment of information and communication technologies, status quo of the working environment, etc. (Koralova, 2015).

Figure 4 presents information about the labor productivity of transport workers, engaged with passenger carriages in intercity lines. Having in mind the specific nature of transport activity, the author has used the natural method to calculate labor productivity of transport workers (Gibbons and Overmann, 2009).

As one can see on the figure above, the highest labor productivity of transport workers employed is reported in the region of Yambol (101 300 BGL of the average annual incomes of the company are provided by one worker). The lowest labor productivity is observed in the region of Plovdiv – 25800 BGL on average per transport worker, although "Hebros bus" ltd provides a high employment rate of transport workers. Even companies, such as „M-Bus"ltd and „Chance-field-55" ltd (approximately 35 000 BGL per transport worker), which hire seasonal transport workers, have a higher labor productivity rate. The observed trends in the development of the reviewed indicators show a decrease in its values during the COVID-19 pandemics and in most cases, they equal the values of the indicator, observed in 2017.

Having in mind the analysed indicators, labor productivity of transport workers, engaged with road passenger carriages in intercity lines does not change significantly in conditions of a high employment rate and high annual turnovers of the transport carriers, as well as specific working conditions (e.g. seasonal employment). In some companies, like Ditchoni ltd, labor productivity is the highest even though both the number of persons employed and the annual turnover of the company are low. In this regard the labor productivity will definitely depend on external economic factors, such as the deployment and development of information and communication technologies.

The figures below present the summarized results of a conducted survey amongst the studied transport companies, concerning the effect of digitalization on the labor market in the transport sector; the obstacles that hinder future digitalization of the road passenger carriages in intercity lines and the type of digital technologies to be implemented in the future economic activity of the companies.

As one can see from the figures above, 80% of the respondents think that in the next five years the digital development of the passenger carriages in intercity lines will depend on the deployment of artificial

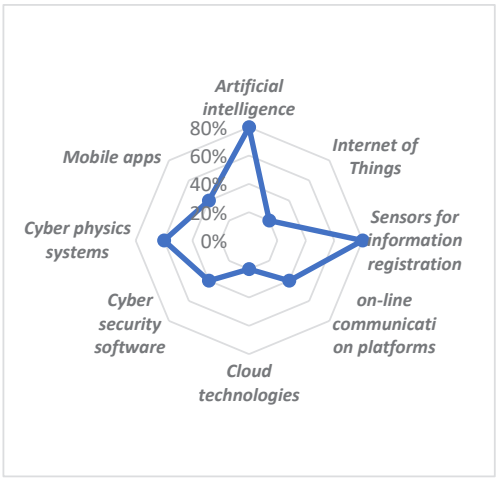

Figure 5. What type of digital technologies should be deployed in the economic activity of transport companies in the next 5 years?

Figure 6. In your opinion, what is the effect of digital technologies deployment in your transport company?

Source: summaries of the author, based on a conducted survey with the studied transport companies

intelligence, sensors for information registration and the application of cyber physic systems (60%). Some 40% of the transport companies' CEOs argue that mobile apps, cloud computing and cyber security softwares will be important in the long run, but not so much, as they are now widely used in the processes of organization and management of the intercity passenger carriages.

Regarding the expected effect of digital technologies deployment by the transport operators, all of the respondents think that these technologies will contribute to the optimization of the economic activity of the companies. According to 83% of them, the digital technologies deployment will correspond to personnel with higher qualification and a better working environment. A mere 17% of the respondents think that digital technologies' deployment will lead to loss of jobs, while 67% have confirmed that these technologies will contribute to higher labor productivity.

As a main obstacle that hinders digital technologies deployment in the transport companies, 45% of the CEOs point out the lack of transport workers with appropriate qualification and according to 44% of them, the main problem is the lack of sufficient financial resources for investments in digital technologies and the digital skills of the personnel.

Conclusion

In the last two years the global COVID-19 pandemics negatively influenced the work of road passenger transport and especially the passenger carriages in intercity lines and specialized travels of citizens. As a result of the analysis of financial and economic indicators of transport companies, it is clear that the number of transport workers employed is the highest in large regions and

in the capital of the country, where huge passenger traffic is concentrated. There is a seasonality in hiring and firing transport workers, depending on the domestic and foreign tourist flows in the country, mainly in the regional cities, located on the Black Sea coast. A significant reduction in the annual turnovers of road passenger companies is observed, as some of the carriers reported a decrease by between 40% and 80%.

This means that transport operators are not capable of investing some of their profit in innovations and human resources development. Consequently it will hinder the digitalization processes of both the entire economic activity of the companies and the upgrade of the existing digital skills or acquiring new ones by the transport workers. This statement is also confirmed by the results of a survey amongst the road passenger carriers, according to which, over 80% of the respondents want a better working environment (implementation of digital technologies) and transport workers with higher professional qualification (general and specific digital skills).

A positive effect of the COVID-19 pandemics proved to be the acceleration of digitalization processes of the supply and demand of transportation services.

According to the International Digital Economy and Society Index, Bulgaria ranks last compared to the EU average values, which statement suggests that the digital technologies in the country are applied more in theory and less in practice.

A key challenge in the digitalization of the main processes in passenger carriages in intercity lines is the risk of job loss. For example, in intercity road passenger carriages in Bulgaria, 80% of the employed transport workers (drivers) are low-skilled and they are at a risk of losing their jobs. On the other hand, the results of the survey show that approximately 70% of the companies see positive effects of digital technologies on the labor productivity of transport workers and optimization of the economic activity.

Having in mind the rapid pace of development of the automotive industry worldwide, the periodical training of transport workers for development of their skills and qualification will have to be held every 6 months, but not every 5 years, as stated in the Bulgarian Regulation on initial qualification and periodic training.

Obviously, studying the financial and economic performance of road passenger carriers as a prerequisite for assessing their readiness for digital transformation in developing countries, such as Bulgaria, gives some guidelines how capable they are in ensuring financial capital for innovations, digital skills of the personnel and future development. Consequently, the digital development of the human resources in the field of road passenger transport will depend not only on the organization and structure of the business processes, but also on the introduced government policy, concerning social security, labour force insurance and decent work.

In accordance with the aforementioned, the perspectives for deployment and expansion of digital technologies in the field of intercity road passenger carriages in the future need to be oriented towards: *Firstly,* radical changes in the national legislation, concerning the process of acquiring initial qualification and periodical training by

drivers in accordance with the "Internet of things" and "Internet of vehicles" concepts. *Secondly*: provision of state support or funding through European operational programs and funds for the organization and conducting of training courses to improve the existing basic and/or specific digital skills or to acquire new ones by the transport workers. *Thirdly*: establishment of specialized departments in the structure of the transport companies, whose main activities should be devoted to the assessment of the transport workers' digital skills. *Fourthly*: The Ministry of transport and communications will have to prepare annual reports about the main trends and level of digitalization of the transportation services in all transport modes in Bulgaria in order the national digital economy and society index to be increased.

Note

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