National Report for older senior logistic workers

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Contents

Introduction

The Erasmus+ project "DiRECT – Digital Skills for Senior Logistic Staff" tackles a key challenge. It focuses on the digital shift in logistics. It considers its impact on older workers, specifically those over 50. Automation is growing. E-commerce booms. Digital tools are used more. Logistics firms face a task to prepare their workforces for the future, but firms do not want to lose valuable experience.

Older employees bring expertise and practical knowledge. These workers often face new demands, however. They include digital warehouse management, GPS route planning, and cloud communication tools. Research reveals this group is not inherently averse to technology. They need targeted support and suitable training.

The project aims to create digital training resources. Training formats and support are also created. These developments specifically address the needs of senior logistics professionals. Practical content is important. Digital accessibility is also important. It takes into account appropriate teaching for different ages. The project shares best practices across Europe.

With this project, DiRECT boosts digital skills in vocational education and training. It secures skilled workers in the logistics sector. It also strengthens social inclusion for older employees amidst digital change.

Bulgaria

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1. Field Research

This document represents the results from a survey of a 23 logistics professionals & VET trainers in the field of logistics from Austria. The data was collected in the period of end March – mid April. Half of the respondents are logistics company executives and half are trainers in the field of logistics (Figure 1). First, the logistics executives data will be presented, followed by trainers data.

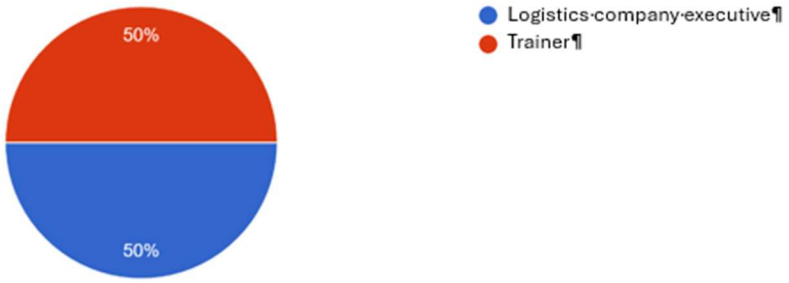

Figure 1 What is the subject of your work?

1.1 Logistics company executive

Figure 2 represents the number of the respondent by their age. As we can see from the figure all executives are aged bellow 50, with the majority of them even bellow 30. Such distribution of respondents could be considered as positive in general young people are more interested in new technologies.

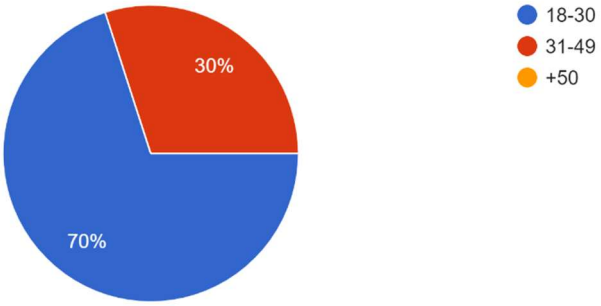

Figure 2. How old are you?

Only 20% of the respondent consider their company isn't facing a shortage of logistics professionals. Among the rest of the respondents, the companies in which they work have a shortage of logistics specialists – as per the 40% of the participants the shortage is still moderate, and the rest 40% says their companies still manage to control this shortage (Figure 3).

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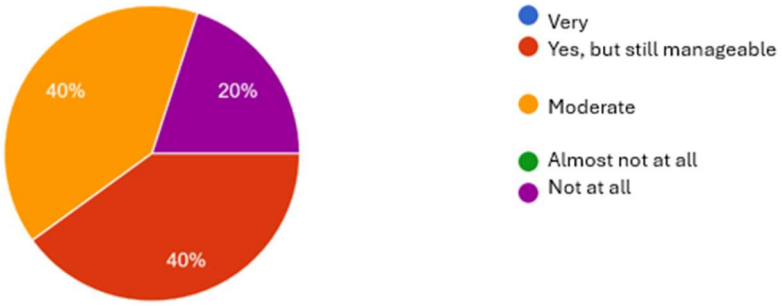

Figure 3. If yes, is your company facing a shortage of logistics professionals?

Although we see that the lack of staff is not yet a serious problem for companies in Bulgaria according to the results of the survey, the opinion of the respondents on the development of the situation in the next 10 years, presented on

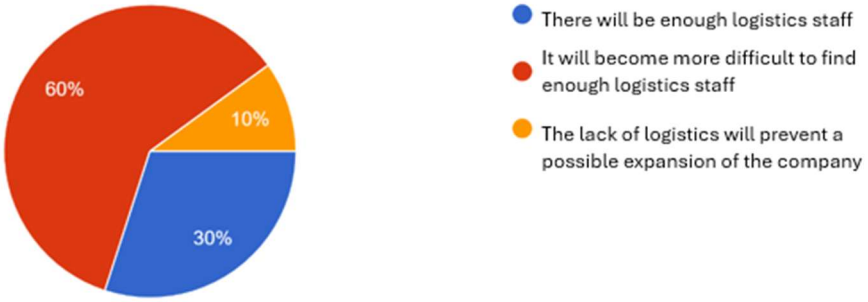

Figure *4* gives a different perspective. Only 30% says there will be enough logistics stuff. It will become more difficult to find enough logistics staff as per the majority of the respondents and for 10% this would prevent a possible expansion of their company.

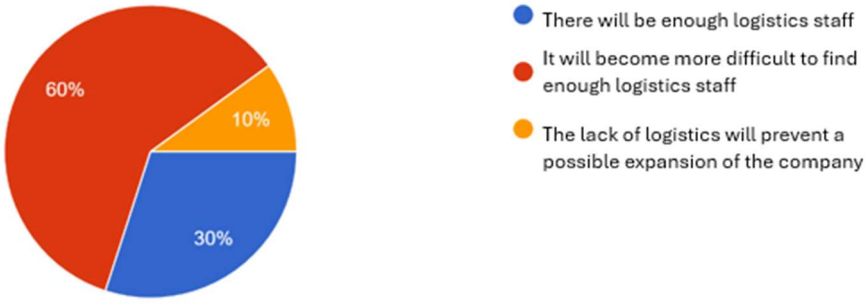

Figure 4. How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?

According to the logistics executive participants digital skill will be very important in the future (Figure 5), however the current assessment of the digital skills of logistics staff that is 50+ in their companies, shown on Figure 6, provides an

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interesting insight on that matter. Currently, only 10% of the 50+ aged logistics staff is considered to have very good digital skills with 90% assessed to have areas for improvement – 50% is considered to have good digital skills and 40% - moderate digital skills. These data suggest the need to plan further training 50+ aged employees to meet the future expectations of the sector.

Figure 5. How important will digital skills be in the future?

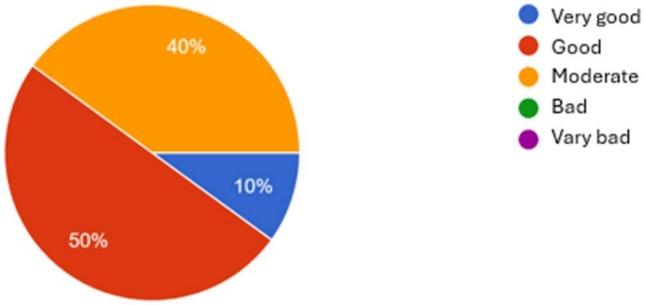

Figure 6. How do you assess the digital skills of your logistics staff (50+ years)?

Moreover, participants assess the expertise in their companies to new technologies in the logistics field mostly as moderate (80%) which further supports the need for training digital skills in logistics.

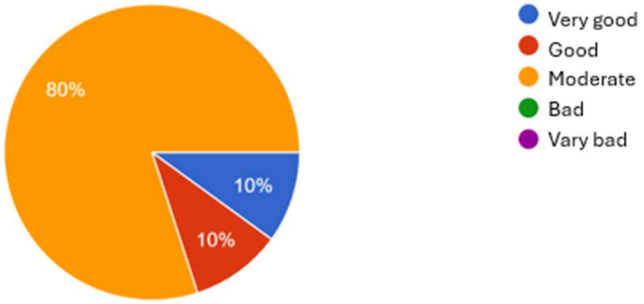

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Figure 7. How do you assess the expertise in your company in relation to new technologies in the logistics field?

The following three questions rate the importance of three major group of digital skills. Figure 8 represents the importance of some basic skill for employees in logistics. These basic skills are: *Computer Basics, Basic Software Applications, Data Entry and Management, Digital Communication Tools, File Management, Security Awareness, Mobile Device Usage.* All the above mentioned are rated as extremely important or very important from the perspective of the logistics executives that participate in this survey.

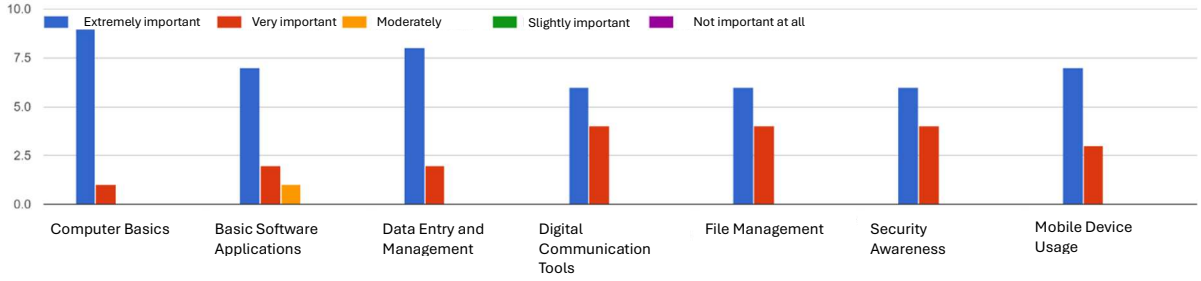

Figure 8. How important are the following basic skills for Employees in logistics

The next question is related to the technological skills for employees in logistics. Most of the respondents consider *Onboard computers and satellite tracking (GPS), Bar coding - RFID technology and Electronic Data Interchange (EDI)* are extremely important. Other technologies could also be considered as very important by a major part of the participants are the technologies related to *Big Data, Cloud computing* and *IoT devices*. For 50% of the participant *Augmented Reality (AR) and Virtual Reality (VR)* is important (extremely important -10% and very important -40%), however 20% of the participants don't think AR/VR is important. We can also notice for some participants that he Artificial intelligence and blockchain technology isn't that important, still the 90% of the respondents point these technologies as important at least to some extent.

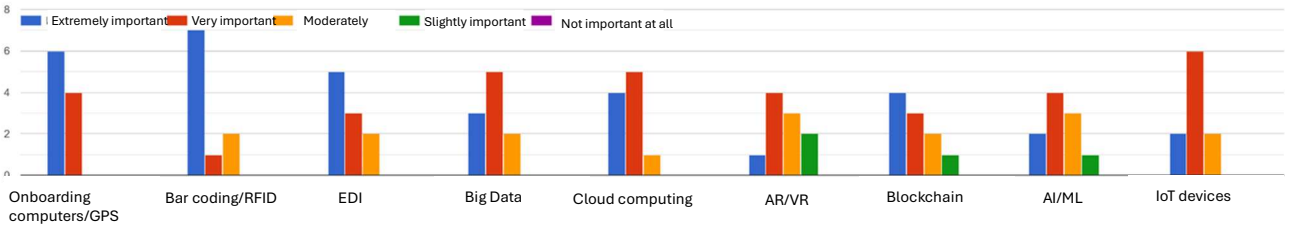

Figure 9. How important are the following technological skills for Employees in logistics

In terms of the system skills for employees in logistics, four systems appear as extremely important for most of the participants, these are - *Customers Relationship Management (CRM), Suppliers Relationship Management (SRM), Transport*

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Management System (TMS) and Warehouse Management System (WMS) - Warehouse Control Systems (WCS). Although *Yard management system (YMS)* and *Order Management System (OMS)* are rated overall with lower importance by some of the participants, these systems could also be considered as important in general. The detailed data is presented on Figure 10

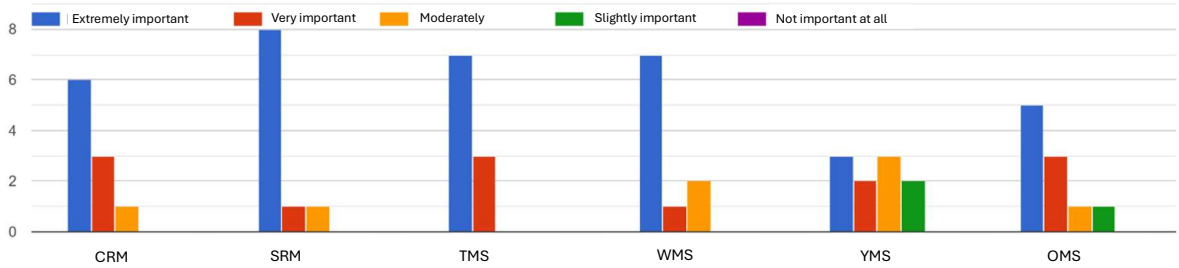

Figure 10. How important are the following systems skills for Employees in logistics

After rating the importance of different systems and technologies in logistics, respondents were asked to assess the overall education and training on new technologies in logistics in their country. Results are presented on Figure 11. Total 80% asses the education and training as Good or Very good.

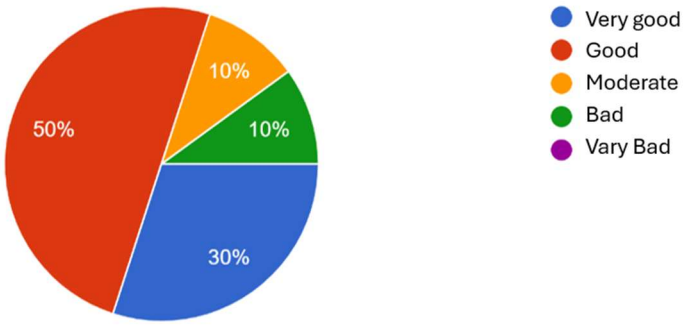

Figure 11. How would you assess education and training on "new technologies in logistics" in your country?

When asked whether their customers require the use of sustainable and new technology services and whether this could be a competitive advantage for their companies in the future, respondents answered positively, with only 10% having some hesitation in the use and benefits of sustainable and new technologies (Figure 12).

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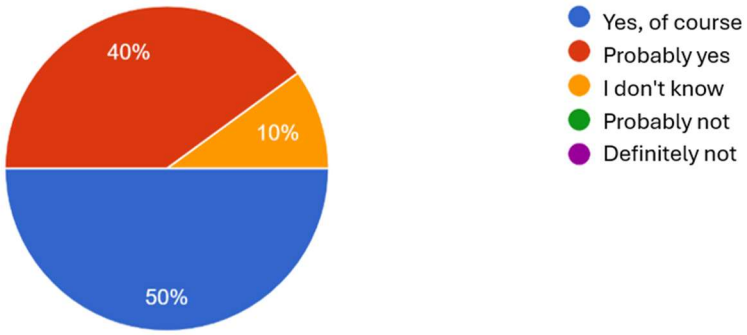

Figure 12. Do your customers require the use of sustainable and new technology services and if you had them would it be a competitive advantage for your company in the future?

To the last question, to what extent the respondents would be interested in training employees over 50 +age in their company regarding new technologies in the sector, all those who participated in the survey would show interest in such training to one degree or another (Figure 13)

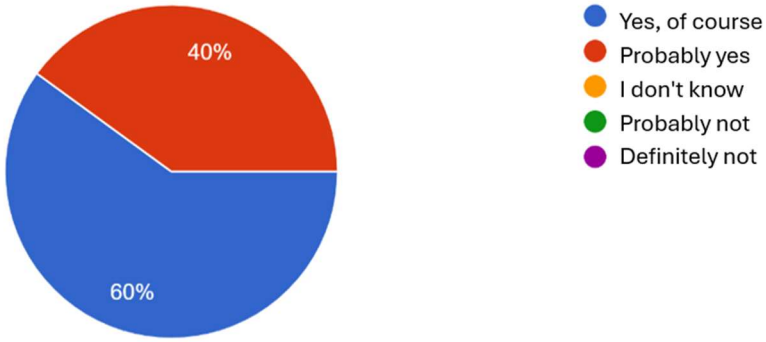

Figure 13. Would you be interested in training your employees over 50 in new technologies in the sector?

1.2 Trainer

When asked about how they see logistics recruitment shaping up over the next 10 years, majority of respondents worry that there will be a shortage of logistics specialist with 20% considering the expected shortage will hold back the company from expanding. Only 10% are optimistic, thinking that there will be enough logistics staff. The data is represented on Figure 14.

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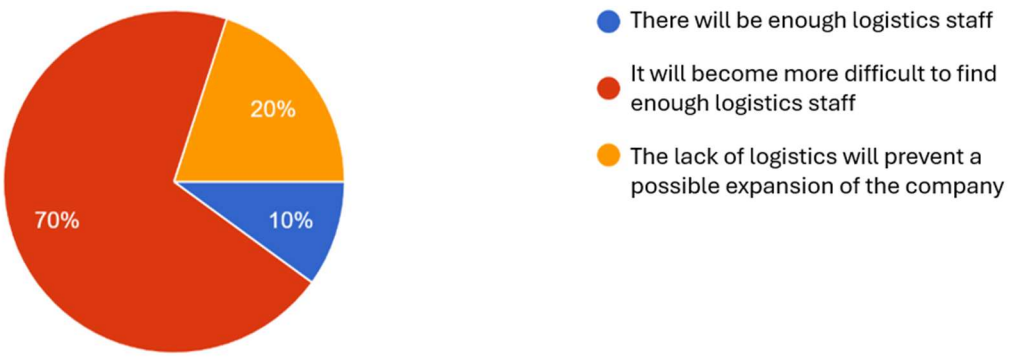

Figure 14. How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?

As we can see from the Figure 15 all respondents agree that digital skills will be very important in the future.

Figure 15. How important will digital skills be in the future?

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When asked to evaluate the state of education and training on "new technologies in logistics" in Bulgaria 70% have positive insight: 30% assessed it as 'very good,'40% regarded it as 'good, and the remaining 30% rated it as 'moderate'.

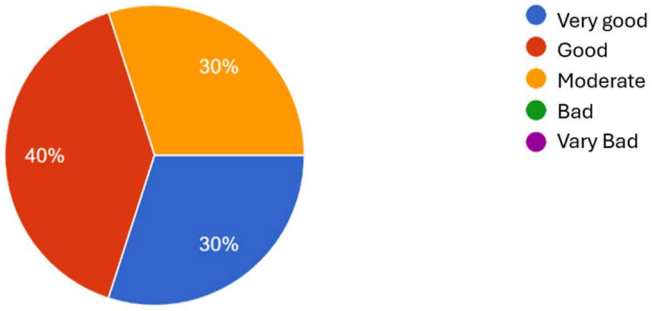

Figure 16. How would you assess education and training on "new technologies in logistics" in your country?

In terms of the age of the people being educated from the respondents the majority of the trainers do not trainer people above 50+ age. Only 2 of the 10 trainers provide trainings to older workers in logistics.

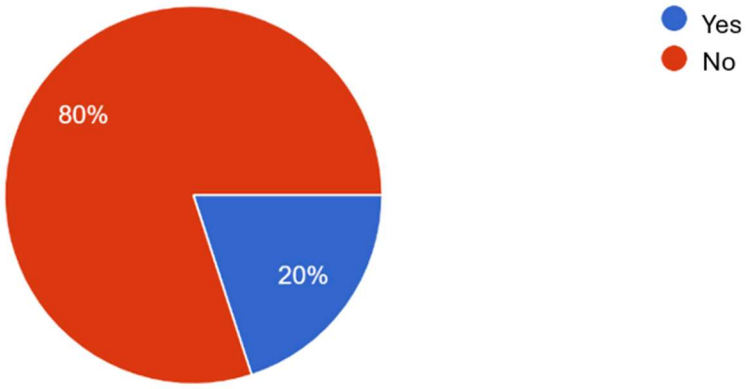

Figure 17. Do you have trainees over the age of 50?

All respondents incorporate in the training programmes new technologies applied in the logistics sector (

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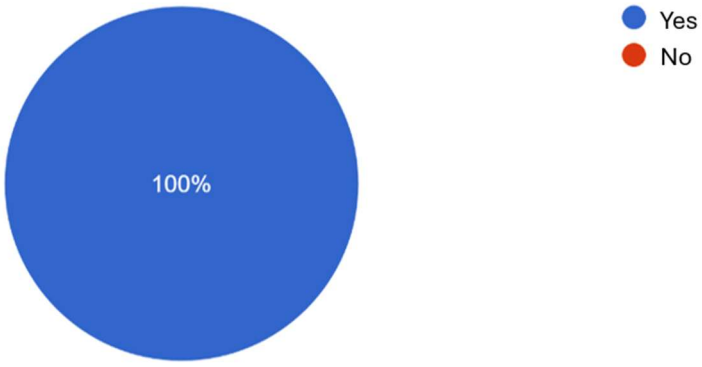

Figure 18).

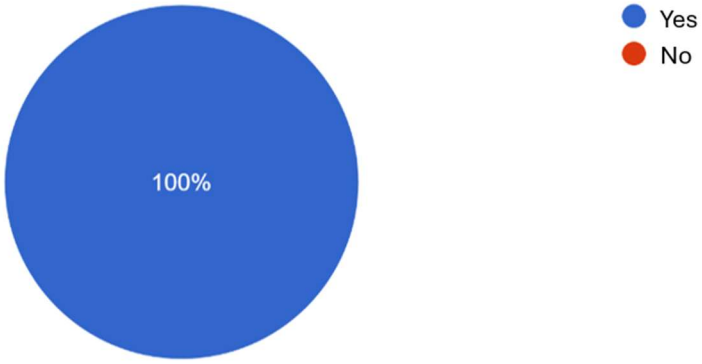

Figure 18. Do you incorporate in your training programmes the new technologies applied in the logistics sector?

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When asked whether participants had attended specific training on recent developments in the logistics sector, 60% responded affirmatively, indicating they had attended such training, while 40% reported they had not.

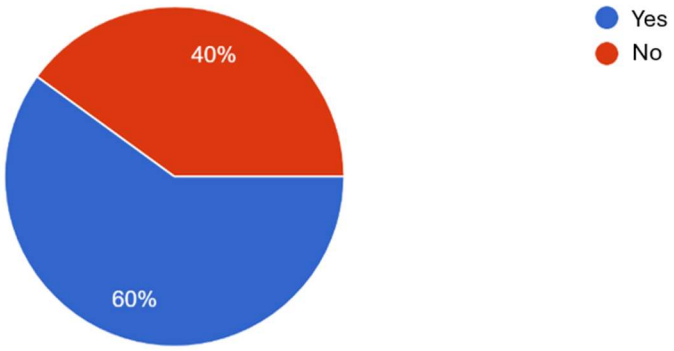

Figure 19. Have you attended specific training on recent developments in the logistics sector?

All trainers agree that continuous training is essential for the development of logistics workers (

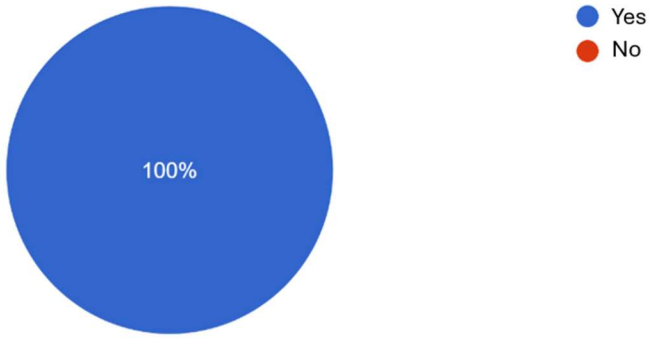

Figure 21) and they adapt their teaching methods according to the needs of logistics learners (

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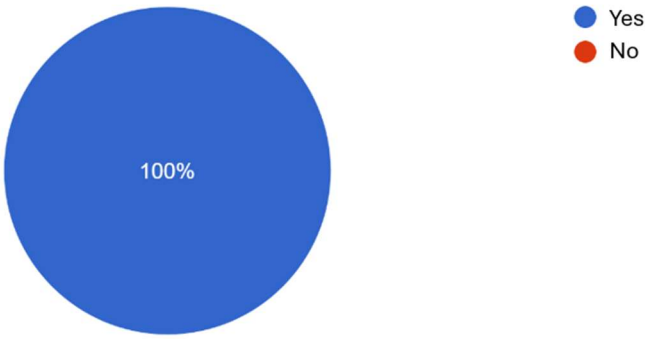

Figure 20). Both trends could be considered as very positive.

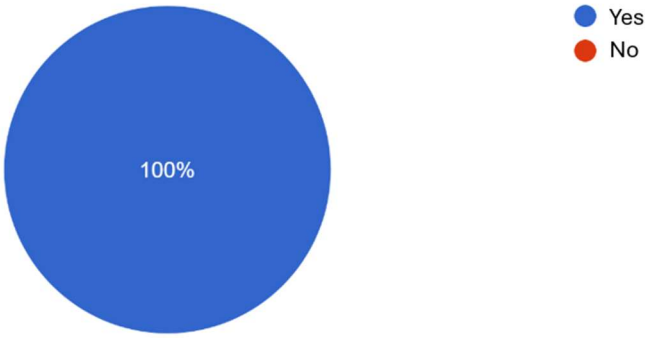

Figure 20. Do you adapt your teaching method according to the needs of logistics learners?

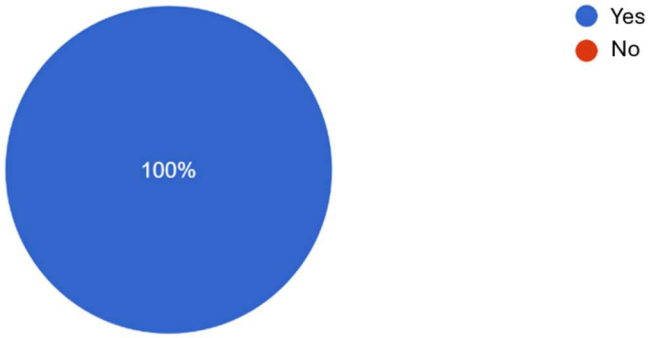

Figure 21. Do you consider continuous training as essential for the development of logistics workers?

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However, 30% of the trainers do not offer practical training or laboratory experience to their trainees (

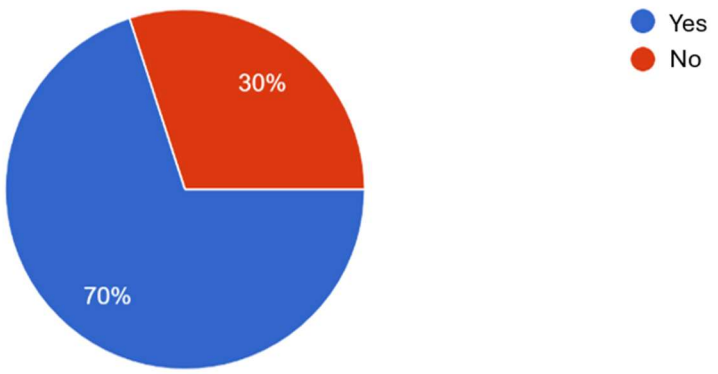

Figure 22).

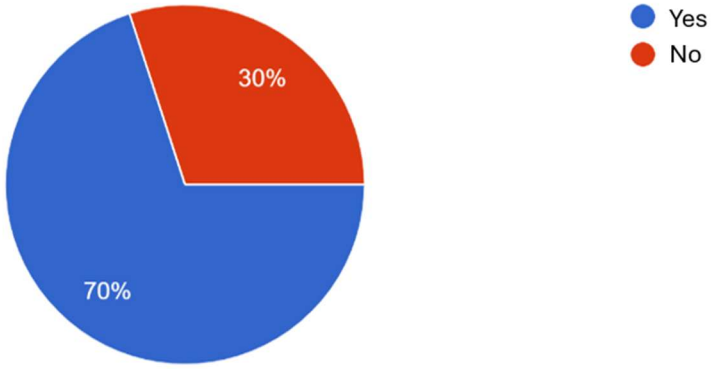

Figure 22. Do you offer practical training or laboratory experience to trainees?

Almost all trainers evaluate the performance of trainees during and after the training programs which means they are able to track the results and adjust their training methods.

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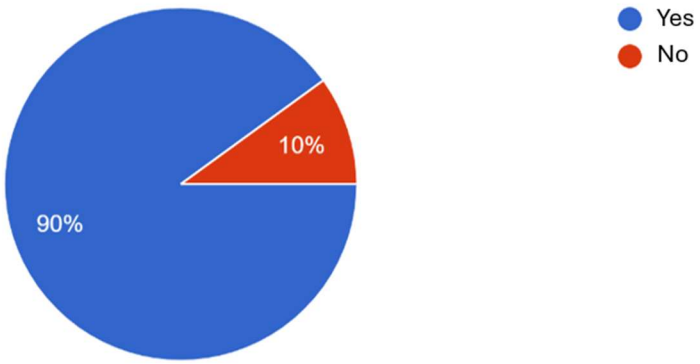

Figure 23. Do you evaluate the performance of trainees during and after the training programs?

1.3 Summary

Based on the survey findings conducted among 20 logistics professionals and VET trainers in Bulgaria, it is evident that there is a significant focus on the importance of digital skills and new technologies in the logistics sector. Among logistics company executives, while the current shortage of logistics professionals is not considered a severe issue, concerns arise regarding future recruitment challenges. Despite optimistic outlooks from only a minority regarding future staff availability, digital skill development is recognized as crucial for future success. Moreover, there is a consensus among executives on the importance of basic and technological skills, along with a recognition of the need for further training for older employees. Trainers, on the other hand, express concerns over potential shortages of logistics specialists in the future but also recognize the paramount importance of digital skills. Overall, both executives and trainers acknowledge the importance of continuous training and adapting teaching methods to meet the evolving needs of the logistics sector, although there is room for improvement in providing practical training experiences.

2. Desk Research

2.1 Impact of Covid in digital logistic sector transformation in Europe

2.1.1. Impact of Covid-19 on the economy and workforce[1]

Bulgaria is an open economy with a manufacturing sector that is integrated in the global supply chains. Before the pandemic, unemployment had the lowest historical values and productivity was increased due to structural reforms. The COVID-19

[1] Based on: OECD Economic Surveys: Bulgaria 2021: Economic Assessment, Available at: https://www.oecd-ilibrary.org/sites/281680fe-en/index.html?itemId=/content/component/281680fe-en

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pandemic appeared as a barrier to this progress and GDP fell sharply alongside the confinement measures (Fig. 24).

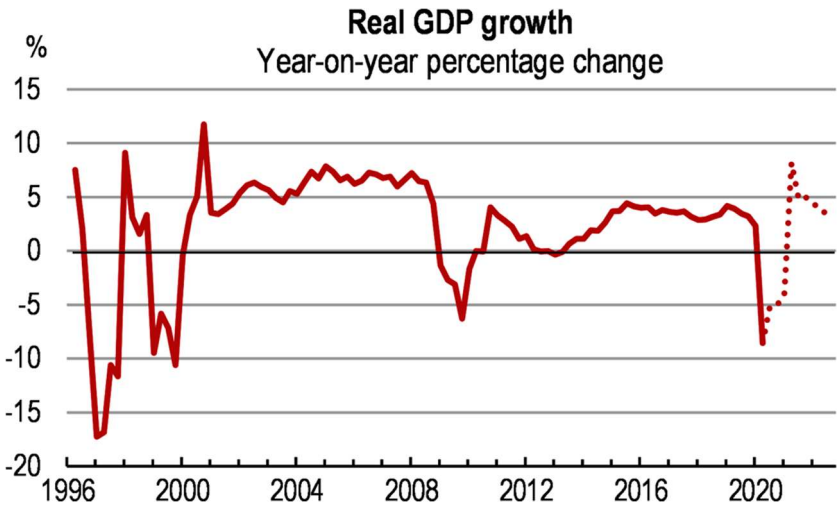

Figure 24. GDP growth abruptly interrupted

Source: OECD, Economic Outlook 108 database.

As a result of the fall of manufacturing volumes and price declines, employment also fell, where men and youth were affected mostly. Considering that the workforce is ageing, more active labour market policies are required to bring back employment to previous levels.

According to OECD a recovery is underway, because industrial production has started to recover. However, **uncertainty is high** due to the consumer income losses and their effect on the service and retail sector. Boosting investment in transportation infrastructure, energy efficiency, the digital economy, and innovation could lead to a more resilient economic recovery. This could enhance mobility and fortify connections to both domestic and international supply chains.

Table 1. The recovery is gradual

	2019	2020	2021	2022
Gross domestic product	3.7	-4.1	3.3	3.7
Exports	3.9	-10.7	6.0	5.7
Imports	5.2	-9.9	6.1	5.3
Unemployment rate	4.2	6.4	6.1	5.1
Consumer price index	3.1	1.6	1.4	1.8

Source: Adapted from OECD, Economic Outlook 108 database.

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Bulgaria will greatly benefit from joining the Eurozone but this brings a significant challenge related to the likelihood of wage increases. To maintain competitiveness and prevent macroeconomic imbalances, it's imperative for labour productivity to keep pace with the rising wage pressures. According to the OECD Economic Outlook for Bulgaria, there's a need to enhance skill levels. This involves improving the effectiveness and availability of education and training opportunities throughout the lifecycle. Enterprises prioritize the skilled workforce availability, as basic education fails to establish a solid skill foundation. As a result, the vocational education and training (VET) system should be more responsive to labour market demands.

The OECD recommended intensifying workplace training's role in the provision of vocational education and training and to allocate more resources for expanding and improving the quality of active labour market policies.

4.1.2. Overall digital sector transformation

The digital transformation impacts all sectors of the economy and the society. The existence of a state engagement in the formulation and implementation a digitalization policy in this area is vital. During Covid-19 pandemic, on 21 July 2020, the Council of Ministers adopted the strategic document, **"Digital Transformation of Bulgaria for the period 2020-2030".**[2] It represents a general policy, which sets six objectives to be achieved over the 10-year period:

- Deployment of a secure digital infrastructure;
- Provision of an access to adequate technical knowledge and digital skills;
- Strengthening the research and innovation capacity;
- Unlocking data potential;
- Digitalisation for a circular low-carbon economy;
- Improving the efficiency of government and the quality of public services.

The fulfilment of these objectives impacts various economic and social areas such as: digital infrastructure; cyber security; research and innovation; education and training; labour market adaptation; digital economy; agriculture; transport; energy; environment and climate; health; finance; culture; disinformation and media literacy; territorial development; digital governance; and security and citizen participation in the democratic process.

The rise of digital technologies and their integration into economy and society demands a reassessment of their great potential to boost the competitiveness of the Bulgarian economy. Another state document aimed at fulfilling this task is the **Digital Bulgaria 2025 Programme** coordinated by the Ministry of Transport, Information

[2] Council of Ministers, (2020). Digital Transformation of Bulgaria for the period 2020-2030.

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Technology and Communication.[3] It has the objective to modernise and increase the implementation of intelligent IT solutions in all areas of the economy and social life, as well as to enhance the digital competence and skills at all levels. Concerning the digital skills development, the document sets out 3 main objectives:

- *Modernisation of school and higher education in the field of ICT* through promoting the development of a modern ICT infrastructure at schools, assessment of students' digital competences upon graduation, updating the educational curriculum and teaching methods, and improving the training skills of teachers, educators and training providers.
- *Increasing the number of highly qualified specialists in the field of ICT* through increasing the number of people trained for ICT professions, and promoting lifelong learning for the development of qualified ICT specialists.
- *Improving the digital skills of the workforce.*

COVID-19 has negatively affected the global economy. Due to enforced lockdowns, numerous businesses and households shifted to online platforms, accelerating the digital revolution that had already been progressing for years. Bulgaria, under a state of emergency, also experienced a rapid pace of digitalization. However, despite some advancements, Ivanov (2022) concludes that Bulgaria still significantly trails behind the average digitalization levels seen in European countries. Below are the main results of Ivanov"s research:[4]

- The COVID-19 pandemic highlighted the critical role of established digital infrastructure. However, Bulgaria still falls significantly behind the European average in terms of connectivity. In several aspects, Bulgaria lags notably behind other EU nations, especially concerning the overall fixed broadband adoption.
- Another critical aspect of economic digitalization is human capital and digital skills enabling individuals to participate in online business activities. The COVID-19 crisis highlighted the importance of having the right digital skills to access necessary information, benefiting society as a whole. Despite slight improvements in recent years, Bulgaria still ranks lowest in the EU regarding digital skills. Only 29% of Bulgarians possess basic digital skills, compared to the EU average of 58%. Additionally, only 11% have advanced digital skills, compared to the EU average of 33%. Increasing the proportion of the working-age population with basic digital skills is crucial for adopting new technologies and achieving desired economic growth.
- Regarding internet usage in Bulgaria, there has been growth in Internet usage in recent years. However, Bulgaria still falls behind the average European levels. Bulgaria's lag is especially notable in video-on-demand usage, internet banking,

[3] Ministry of Transport and Communications, (2019). National Program "Digital Bulgaria 2025" and Road map for its implementation. Available at: https://www.mtc.government.bg/en/category/85/national-program-digital-bulgaria-2025-and-road-map-its-implementation-are-adopted-cm-decision-no73005-12-2019.

[4] Ivanov, C., (2022). "Assessment of the Level of Digital Technologies Penetration in Bulgaria after Covid-19 Outbreak". Economic Alternatives, University of National and World Economy, Sofia, Iss. 3, pp. 420-428.

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online shopping, and participation in online training courses compared to the European average.

- Another aspect of economic digitalization involves the integration of digital technologies by enterprises. Small and medium-sized enterprises in Bulgaria face significant challenges in transitioning their staff to remote work, largely due to a lack of essential digital skills among both owners and employees. The country's level is significantly below the EU average in terms of enterprises sharing information online and utilizing cloud computing services.
- The COVID-19 pandemic greatly influenced global e-commerce trends. However, in Bulgaria, online commerce is still in its early stages and small and medium-sized enterprises are just starting to engage in online sales and the potential for sales growth through social networks remains largely untapped. Despite a high proportion of Bulgarians using social media, only 10% of enterprises utilize these platforms for business promotion and development.
- The final significant aspect of economic digitalization pertains to digital public services. The COVID-19 crisis underlined the importance of ensuring inclusive access to public services. Consequently, there was an acceleration in the digitalization of public administration and information exchange between state institutions and citizens and Bulgaria performs well in delivering digital services to businesses.

Finally, the author concludes that despite some positive developments, the progress reported remains inadequate when compared to other EU member states. Overall, Bulgaria significantly falls behind the European average regarding digitalization of both the economy and society.

4.1.3. Transformation of the digital logistic sector before and after the impact of the Covid

Dragomirov and Boyanov (2021) researched the key problems of the digital transformation in Bulgarian logistics companies **before COVID-19 pandemic**. The following main research results could be outlined:[5]

- Concerning the ability for working with data the company financial departments perform highest followed by the logistics functions.
- Communication with supply chain partners is not quite digitalised because personal meetings, telephone and e-mails are still preferred. However, when communicating with suppliers, web platforms and automated systems are more commonly used.
- Digitalization is measured based on the implementation of various systems and technologies such as Transportation Management Systems (TMS), Warehouse Management Systems (WMS), Global Positioning System (GPS), Supplier Relationship Management (SRM), Customer Relationship Management (CRM), Enterprise Resource Planning (ERP), Manufacturing Execution Systems (MES), Radio-Frequency Identification (RFID), among others. The authors' assessment indicates that the overall level of digitalization is currently low and unsatisfactory, with scores averaging around the neutral midpoint of 3 on a scale from 1 to 5, where 1 represents "definitely not implemented" and 5 represents "definitely implemented." However, they also note that there is a

[5] Dragomirov, N. and Boyanov, L., (2021). "Digital Transformation Challenges of Logistics in Bulgaria", IOP Conference Series: Materials Science and Engineering, 1031 012050.

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clear intention and planning for significant steps towards digitalization in the future. This suggests that while the current state of digitalization may be lacking, there are strategic efforts underway to improve it, potentially indicating a positive outlook for future advancements in digital transformation within the organizations.

- The survey data suggests that Bulgarian organizations exhibit a weak application of software systems to support transport processes. Primarily, these systems are utilized for generating reports and maintaining a database of transport tasks. However, there's only a slight positive discrepancy noted in the adoption of mobile devices, cloud technologies, and GPS systems. Unfortunately, the areas that promise automation, reduced communication, routing efficiency, and similar benefits receive very low marks in terms of implementation and effectiveness. This indicates a significant gap between the potential benefits of advanced technologies and their actual utilization in the context of managing transport processes within Bulgarian organizations.
- The data suggests that the full capacity of storage systems is not being utilized effectively too. While there are high average scores for processes such as invoicing and receiving orders, indicating that many warehousing systems are integrated with accounting systems, critical processes like picking, demand forecasting, and synchronization with transport management systems are not adequately covered. This lack of coverage in essential processes likely impacts overall performance negatively. Without efficient systems in place to manage tasks such as picking and demand forecasting, warehouses may struggle to operate at optimal levels of productivity and responsiveness to customer demands. Integrating these systems more comprehensively could lead to improvements in overall performance and efficiency within the organization.
- The data indicates the degree of utilization of CRM (Customer Relationship Management) software across various aspects of business relationships with customers. Among the popular uses of CRM in Bulgaria are receiving orders, maintaining a customer database, communicating with customers, and managing order statuses. However, there is notably less usage in areas such as sending congratulatory and reminder messages. Overall, there is considerable room for improvement in CRM utilization, which could lead to better services for customers and provide companies with richer data for analytics and optimization of client relationships. One significant observation is that CRM systems are not fully integrated with other digital platforms such as Facebook, eBay, OLX, or communication applications like Viber and WhatsApp. This lack of integration limits the holistic view of customer interactions and may lead to fragmented data and missed opportunities for engagement. Additionally, automatic text messages are not well integrated into the broader CRM framework, suggesting a need for better alignment between communication channels and CRM systems to ensure seamless customer interactions. Improving integration between CRM systems and various digital and communication platforms could enhance the efficiency and effectiveness of customer engagement strategies, ultimately leading to improved customer satisfaction and business outcomes.
- Digitalization in Supplier Relationship Management (SRM) is more prevalent in certain activities, such as document management, maintaining supplier databases, and communication with warehouses, suppliers, and couriers. Conversely, activities like negotiations and online auctions show lower levels

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of utilization. Integration with auction platforms, automatic order placement, and notifications for problem occurrences also receive low scores, indicating areas with significant room for improvement in terms of digitalization. Additionally, cloud computing ranks low among the utilized digital technologies in SRM. Addressing these gaps in digitalization could enhance the efficiency and effectiveness of supplier relationship management processes.

- Enterprise Resource Planning (ERP) systems are not yet widely adopted and implemented across organizations, indicating a missed opportunity to improve and integrate various business activities. This delay in mass adoption could be attributed to factors such as cost, particularly for small or medium enterprises (SMEs), where expensive software may not always be affordable.

The authors' conclusion underscores a significant potential for digital transformation in Bulgaria, highlighting the pressing need for educational initiatives focused on modern IT paradigms such as the Internet of Things (IoT), digital devices, technologies, and approaches for digital transformation. This requirement extends beyond the logistics and supply chain sectors to encompass most other business fields. A key barrier to the adoption of these technologies is the lack of understanding regarding their benefits. Some enterprises may envision a digital transformation where their current business model becomes more digitalized while essentially remaining the same. Others may seek to pursue entirely new digital business models to enhance their existing portfolio's value. A digital business transformation can encompass both of these approaches.

The **COVID-19 pandemic played a significant role** in driving the digitalisation in logistics by speeding up the adoption of advanced technological and procedural solutions. Brzeziński, L. and Wyrwicka highlighted that the digitization of logistics management within an organization relies on numerous existing technological solutions.[6] The COVID-19 pandemic has spurred the digitization of organizational processes and the evolution of business models in enterprises. Moving forward, there will be a greater emphasis on the extensive utilization of artificial intelligence, robotics, and automation, potentially leading to the partial or complete replacement of human labor. According to the authors, digitalizing logistics management brings several advantages to the organization. Firstly, it underscores the organization's commitment to advancing in this area, enhancing its legitimacy. Secondly, it serves as a competitive advantage due to improved customer service which fosters a positive perception of the company's operations among stakeholders and the reduction of logistics costs. Drawing on findings from studies conducted by various authors regarding the advancement of digitization in logistics management, the authors indicated that the progression or heightened level of digitization within logistics processes was a reaction and an effort to mitigate the potential adverse impacts of the COVID-19 pandemic.[7]

The COVID-19 pandemic has led to the expansion of online shopping, which has in turn presented new barriers for logistics companies in Bulgaria. Valeva and Alexieva-Nikolova researched the development of e-commerce and its impact on the

[6] Brzeziński, L. and Wyrwicka, M.K., (2022). „The Progress of Digitalization of Logistics Management in the Enterprise Caused by the COVID-19 Pandemic". European Research Studies Journal, Vol. XXV, Iss. 2B.

[7] Brzeziński, L. and Wyrwicka, M.K., (2022). „The Progress of Digitalization of Logistics Management in the Enterprise Caused by the COVID-19 Pandemic". European Research Studies Journal, Vol. XXV, Iss. 2B.

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logistics industry.[8] In the years before the pandemic, there was already a noticeable increase in customer preference for e-commerce. However, the onset of COVID-19 dramatically accelerated this shift from traditional brick-and-mortar stores to online shopping platforms. The authors state that the surge in e-commerce activity has correspondingly fuelled an increased demand for logistics services. Notably, this trend has also increased the interest of investors in the logistics sector. A study conducted on the Logistic Performance Index (LPI) by the World Bank serves as a measure of the key factors influencing the overall efficiency of logistics within a country. Interestingly, the data for 2022 reveal that Bulgaria's logistics sector conditions surpass the average for Europe and Central Asia region in all aspects. This indicates that Bulgaria's logistics services market is undergoing robust development and aligns with global trends in logistics services market expansion. [9]

The transportation sector has been an early adopter of digital technologies which offer significant potential for optimizing the logistics systems. According to Ahmedova the increased utilization of digitalization in transportation promises for achieving lower-carbon emission mobility.[10] It also opens up various possibilities for implementing relatively inexpensive and straightforward performance measures, such as electronic processes and communication of shipping cargo (known as "e-Freight"). Furthermore, expediting the deployment of intelligent transportation systems, which integrate different vehicle types, and expanding policies toward autonomous vehicle management could serve as crucial resources for enhancing efficiency within transportation systems across road, rail, sea, and air transport services. Based on a survey conducted among transport enterprises, Ahmedova made the following assessments and conclusions:[11]

- Nearly half of the transport enterprises have managed to formulate a more comprehensive and fully developed digitalization strategy. However, a mere 3% of the surveyed enterprises possess a long-term comprehensive digitalization strategy spanning a duration of 10 years. The majority of companies strategically plan their digitalization initiatives for the short and medium term, typically within 1-5 or 6-10 year timeframes.
- The global pandemic has presented significant challenges to the transport sector as many enterprises found themselves compelled to adapt to make additional investments in the digitalization of their processes. The emerging priorities include the implementation of remote communication technologies, the development and delivery of new digital services, increased automation of information technology and business processes, and so forth. When queried about the specific types of technology they intend to adopt or have already implemented, approximately half of the companies chose: Big data and advanced analytics, mobile applications, digital connectivity, and/or Internet of Things (IoT).

[8] Valeva K. and Alexieva-Nikolova, V., (2023). “Impact of E-commerce on the Logistics Sector”. International Scientific Journal "Industry 4.0", Year VIII, Iss. 7, pp. 365-369.
[9] Valeva K. and Alexieva-Nikolova, V., (2023). “Impact of E-commerce on the Logistics Sector”. International Scientific Journal "Industry 4.0", Year VIII, Iss. 7, pp. 365-369.
[10] Ahmedova, S., (2022). “Covid-19 Impact upon the Digitalization of the Transport Sector in Bulgaria”. Transportation Research Procedia, Iss. 63, pp. 809–816.
[11] Ahmedova, S., (2022). “Covid-19 Impact upon the Digitalization of the Transport Sector in Bulgaria”. Transportation Research Procedia, Iss. 63, pp. 809–816.

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- A significant proportion of transport enterprises in Bulgaria view digitalization as a means to optimize resource utilization, enhance automation in manufacturing processes, improve customer-supplier interaction, and facilitate highly integrated processes. However, businesses in Bulgaria hold modest expectations regarding profit growth and reduced ecological footprint resulting from digitalization.
- Transport enterprises in the country are not anticipating any significant disruptions or job losses due to digitalization. Moreover, these companies have a clear vision of the necessary workforce for the industry in the coming years. In addition to technology and engineering specialists, there is a recognized need for experts with strategic competencies, such as those capable of developing and implementing new business strategies, including digital business models and digital marketing.
- Employee qualifications and the level of investment represent the primary barriers that Bulgarian businesses must overcome to accelerate the process of digital transformation.

4.1.4. Main players and their role in the transformation of digital logistic sector after COVID-19

The main players with big role in the transformation of digital logistic sector after Covid are not only the government institutions which determine the strategic guidelines and the policy of digitalization of the economy and society as it was discussed above, but also the subsidiaries of foreign leading companies that drive the manufacturing export and the progress in digitalization in other sectors of the economy.

One such example is a company - a global supplier of micro-electronic semiconductor solutions which has a production subsidiary in Bulgaria. The COVID 19 pandemic in 2020 caused major upheaval in the sector's supply chains, triggering a global hunger for chips. The restrictions related to the coronavirus have played their part, increasing the demand for computers, peripherals, smartphones and other products that allow work and entertainment from home. This was immediately reflected in shortages, delayed deliveries and increased prices of cars and all electrical engineering around the world. At the same time, this growing need for chips has not been met with appreciable growth in production on a global scale. The reasons for this are complex, but the main one is that manufacturing chips is extremely complex.[12] Even large technology companies with significant financial resources and know-how were not able to immediately catch up with market demand. This affected the company in Bulgaria also and its on-time deliveries, and capacity constraints forced production to be 'shared' between its customers. This is a real challenge for a manufacturing company that has practiced "Just-in-time" production and strives for timely delivery. Little by little, with the passing of the COVID-19 pandemic and the continuous efforts and investments of the company to expand production, the company is on its way out of this situation. Only in the production base in Sofia, Bulgaria, the company increased its capacity by hiring

[12] Economic.bg, (2022). „Hunger for Chips“ (Глад за чипове), Available at: https://www.economic.bg/bg/a/view/glad-za-chipove

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nearly 200 new specialists within a few years and in 2022 it delivered 1.9 billion chips to customers worldwide, with 1.1 billion coming from Bulgaria alone.

Another example is Lufthansa Technik Logistik Services (LTLS), which is poised to become a leader in aircraft spare parts logistics innovation. Given the critical importance of transportation and storage for providing reliable MRO (Maintenance, Repair, and Overhaul) services, digitalization of these core areas is of high priority. Automated storage, autonomous transportation systems, and digital assistance systems help optimize processes. These changes are already noticeable, especially in handling urgent requests. Some of the innovations the company has introduced in Sofia, Bulgaria, which is a place for one of their main hubs are the Optical Character Recognition (OCR) document analysis system in the warehouse supplemented by intelligent content analysis, specially developed localization platform to maximize space utilization, the use of Proglove, a digital data glove that eliminates the need for employees to carry a mobile scanner, as well as POSEIDON which uses GPS to track shipments in real-time.[13]

A third example is Cargo-partner, established 40 years ago and operating in Bulgaria for 20 years, which provides transport services and storage in a logistics base with 22,000 pallet spaces. While electronic tracking has long been utilized for standard services such as transport, storage, and commissioning, the company aims to integrate additional warehouse services, like repacking and evaluation of returned goods, into specialized software. Many logistics firms, including Cargo-partner, are increasingly using software connected to their counterparts, enabling instant online submission and processing of requests and information with minimal errors. By connecting their IT solutions with clients' systems and automating processes through EDI and API connections, Cargo-partner facilitates warehouse and transport order transmission, inventory management, customs clearance, and reporting. Moreover, their state-of-the-art transport request tracking and warehouse management software enables customers to track shipments, manage inventory, and receive reports. In addition to improving efficiency, the development of electronic cargo management systems and warehouse operations has the potential to reduce environmental impact. Cargo-partner aims to decrease carbon emissions by optimizing transport resources and promoting green transport solutions through electronic platforms. Starting from December 2022, every customer offer issued by Cargo-partner includes the estimated value of CO2 emissions, enhancing transparency and encouraging customers to choose environmentally friendly solutions.[14]

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[13] Official Website of Lufthansa Technik Logistik Services, https://www.lufthansa-technik.com/en/lufthansa-technik-logistik-services; Official Website of Lufthansa Technik Sofia, https://www.lufthansa-technik.com/en/lufthansa-technik-sofia; Lufthansa Industry Solutions, "Artificial intelligence enhances customer service in the BDAE Group Improved efficiency thanks to AI: Insurance provider benefits from automated document processing", Available at: https://www.lufthansa-industry-solutions.com/de-en/solutions-products/artificial-intelligence/artificial-intelligence-enhances-customer-service-in-the-bdae-group.

[14] Digitalk, (2023). "84.6 billion dollars will reach the costs of digitalization of logistics by 2027", Available at: https://digitalk.bg/new_technologies/2023/05/04/4479498_856_mlrd_dolara_shte_dostignat_razhodite_za/

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As it can be seen from the examples above, the primary goal of the main business players in Bulgaria is digitalization of logistics and supply chain processes. Industry experts play a crucial role in implementing new logistics processes and technologies, leveraging their experience and knowledge to improve online processes and digital platforms. The ongoing digitization process in logistics is expected to enhance the quality of services while reducing the costs across the entire supply chain. Through contemporary information systems and technologies and intelligent data analytics, leading companies improve human resources, capacity planning, and reduce goods processing time. Specially developed algorithms recognize patterns and provide resource utilization suggestions, leading to more accurate forecasts and higher planning security.

2.2 Opinions and problems this change occurred in logistics workers over 50 years old in Europe

2.2.1. State of the digital skills in Bulgaria

The official website of the European Union Digital Skills and Job Platform provides an analysis of the digital skills in Bulgaria. The main conclusions are the following:[15]

- In the 2022 edition of the Digital Economy and Society Index (DESI), Bulgaria ranks 26th out of 27 EU countries in the Human Capital dimension, scoring 32.6 compared to the EU average of 45.7. Bulgaria performs well in terms of female ICT specialists, accounting for 28% of all ICT specialists, surpassing the EU average of 19%. Additionally, the country has a high proportion of ICT graduates. However, the proportion of ICT specialists in the workforce is lower at 3.5% compared to the EU average of 4.5%. Only 8% of individuals possess above-basic digital skills, significantly lower than the EU average of 26%, and merely 31% have basic digital skills, compared to the EU average of 54%.
- According to data from the Bulgarian National Statistical Institute (2022), 96.1% of businesses have internet access, but only 40.2% of employees utilize it. Merely 9.1% of businesses offer ICT training to their employees. Moreover, 79% of individuals aged between 16 and 74 regularly use the internet. Specific digital skills of citizens as of 2021 include 39.1% being familiar with copying or moving files, 27.9% using word processing software, and 25% knowing how to download or install apps.

Another important analysis is performed within the framework of the "Ready for Digital Transformation" project, carried out by the Bulgarian Chamber of Commerce (BCC), in partnership with the Ministry of Labor and Social Policy (MLSP)

[15] Official Website of the European Union, Digital Skills and Job Platform, (2023). "Bulgaria: a snapshot of digital skills". Available at: https://digital-skills-jobs.europa.eu/en/latest/briefs/bulgaria-snapshot-digital-skills.

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and the Confederation of Independent Trade Unions in Bulgaria (CNSB). The research results related to digital skills are the following:[16]

- Most enterprises, particularly small and medium-sized ones (SMEs), are inadequately prepared and are falling behind in their adoption of digital transformation. Shortages of *general skills* are mainly observed in: "Information and data literacy" (evaluating and managing data, information and digital content); "Communication and collaboration" (interaction and collaboration through digital technologies); "Security" (device protection, personal data protection and privacy); "Problem Solving" (identifying needs and technology solutions, identifying gaps in digital competence). A shortage of *specific skills* is observed in: working with e-tables and databases; with specialized software and systems; with cloud technologies; use of anti-virus programs; installing software and drivers, working with diagnostic systems; remote access communication and troubleshooting applications and systems; setting digitization strategies; market potential research through digital means; realization of sales by electronic means, etc.
- The three leading barriers to the introduction of new digital technologies in enterprises are: insufficient funds to invest in digitization (79%), the lack of a long-term strategy (69%) and insufficient qualifications and skills of employees (68%).The top three psychological barriers among employees when introducing new digital technologies are anxiety about lack of knowledge, skills and experience (69%), lack of information about the benefits and effects of digitalization (61%) and anxiety about the ability to meet new demands (61%).

2.2.2. Effects of the COVID-19 pandemic on the training and skill development of human resources digitization in the logistics sector

A study investigates the effects of the COVID-19 pandemic on the process of digitization of human resources in the transportation sector. When examining the financial and economic status and the evolution of transportation infrastructure facilities, several trends have become apparent: [17]

- There is a trend of decreasing staff numbers in transportation facilities, with a decline ranging between 17% and 21%.
- Labor productivity in operational facilities decreased by an average of 33%.
- Global trends in enhancing processes for goods storage and auxiliary activities in transportation increasingly emphasize the establishment of "smart airports" and "intelligent ports." These advancements will necessitate employees with interdisciplinary qualifications for effective management and operation. The

[16] Investor.bg, (2023). "60% of enterprises in Bulgaria have a low level of digitization". Available at: https://www.investor.bg/a/517-pazar-na-truda/371456-60-ot-predpriyatiyata-v-balgariya-imat-nisko-nivo-na-digitalizatsiya.

[17] Koralova-Nozharova, P. and Nozharov, S., (2022). "Digitization of Transportation Infrastructure and its Impact on Human Resource Management". National Economic Archive, Iss. 3, pp. 49-70. (Коралова-Ножарова, П. и Ножаров, Щ. (2022). Дигитализацията на транспортната инфраструктура и нейното отражение върху управлението на човешките ресурси. Народностопански архив, (3), с. 49-70.

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most in-demand professions and roles in this domain over the next one to three years include digital marketing specialists, Big data experts, goods automation specialists, cloud and cyber-physical systems specialists, professionals skilled in developing digital business models, and experts in computer simulations.

- Consequently, the evolution of processes aimed at digitizing personnel management in transportation infrastructure should prioritize several key aspects: Firstly, establishing standardized training protocols to acquire or expand general and/or specific digital skills, tailored to the unique needs of various subsectors (such as maritime and aviation). Secondly, digitalizing procedures for concessioning infrastructure facilities to enhance operational efficiency and optimize capacity utilization. Lastly, updating training programs for transportation specialists involved in goods storage and auxiliary activities in transportation, considering the distinctive characteristics of the sector.

2.2.3. Problems related to employees over 50 years old regarding the digital transformation process

According to a study of barriers and concerns of elderly workers towards the digital transformation of work, elderly workers are increasingly significant for companies due to changing demographic structures characterized by declining birth rates and longer life expectancy, resulting in a higher median age of workers and a greater proportion of elderly workers in the labor force.[18] These workers play a key role in the transformation process for several reasons: Firstly, having begun their careers in pre-digital environments, they possess extensive experience and an elaborated understanding of technological change, which is valuable even in the context of digital transformation. Secondly, they have different technology acceptance needs, posing challenges for technology developers. Lastly, with industrial countries undergoing demographic shifts, elderly workers are poised to become the largest working group in the near future. The authors underline the importance of understanding their perspectives and needs which is crucial for the digital transformation of work, as it can greatly benefit from their insights. Lifelong learning, particularly in computer-related domains, will be essential as digital transformation continues. However, older workers may not have developed these skills yet, posing a challenge. Additionally, as job tasks evolve, older workers may find that their experience is no longer as beneficial, and they may face difficulties due to slightly reduced learning abilities and unfounded stereotypes. To guide the digital transformation of work effectively, it is essential to identify and address the concerns and barriers faced by elderly workers when dealing with digital technology in the workplace.

Data from the European Statistical Office indicates that at least 1.6 million Bulgarians need to undergo training courses to acquire and update skills for working with new technologies. The pandemic has significantly accelerated these processes. As

[18] Hildebrandt, J., Kluge, J. and Ziefle, M., (2019). Work in Progress: Barriers and Concerns of Elderly Workers Towards the Digital Transformation of Work. In: Zhou, J., Salvendy, G. (eds) Human Aspects of IT for the Aged Population. Design for the Elderly and Technology Acceptance. HCII 2019. Lecture Notes in Computer Science, vol 11592. Springer, Cham. https://doi.org/10.1007/978-3-030-22012-9_12.

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a result of this need a total of BGN 380 million will be allocated under the Recovery and Resilience Plan for the development of digital skills, including the establishment of a platform for basic training. The Ministry of Social Affairs will implement a project aimed at enhancing computer literacy among the elderly. [19]

2.3 Summary and Intermediate Conclusions

After Covid-19 a recovery is underway in Bulgaria. To maintain competitiveness and prevent macroeconomic imbalances, it's imperative for labour productivity to keep pace with the rising wage pressures. There's a need to enhance skill levels. This involves improving the effectiveness and availability of education and training opportunities throughout the lifecycle.

Two important strategic documents have been developed by the government, aiming to boost the digital Transformation of Bulgaria for the period 2020-2030. Both documents stress on the need to develop adequate technical knowledge and improve the digital skills and competences of the workforce at all levels. With the outbreak of COVID-19 Bulgaria experienced a rapid pace of digitalization, but despite some advancements, the country still significantly lags behind the average digitalization levels seen in European countries in terms of human capital and digital skills enabling individuals to participate in online business activities.

Concerning the digitalization of the logistics sector, the key problems before COVID-19 pandemic relate to the ability for working with data, the digital communication with supply chain partners, implementation of various logistics systems and technologies, application of software systems to support transport and warehousing processes, as well as ERP systems. However, there were strategic efforts to improve, indicating a positive outlook for future advancements in digital transformation within the organizations, which highlight the need for educational initiatives focused on modern IT paradigms. The COVID-19 pandemic has been instrumental in accelerating the digitization of logistics, speeding up the adoption of advanced technological solutions in Bulgaria. Furthermore, the surge in online shopping due to the pandemic has introduced new challenges for logistics firms. Bulgaria's logistics services market is experiencing substantial growth, aligning with global trends in the expansion of logistics services markets. Looking ahead, there will be a heightened focus on leveraging artificial intelligence, robotics, and automation.

The transportation sector has been quick to embrace digital technologies, recognizing their substantial potential for optimizing logistics systems. Almost half of transport enterprises have crafted comprehensive digitalization strategies and opted for technologies like Big data and advanced analytics, mobile applications, digital connectivity, and/or Internet of Things (IoT). Additionally, a notable portion of transport enterprises in Bulgaria sees digitalization as a tool to optimize resource utilization, increase automation in manufacturing processes, enhance customer-supplier interaction, and streamline integrated processes. The main obstacles that Bulgarian

[19] BNR, (2021). "Bulgaria to increase digital skills of older people with funds under the Recovery Plan". Available at: https://parliament140.bnr.bg/en/post/101500337/bulgaria-to-increase-digital-skills-of-older-people-with-funds-of-recovery-plan

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businesses need to overcome in order to speed up the digital transformation process are employee qualifications and the level of investment.

The transformation of the digital logistics sector post-COVID involves not only government institutions setting strategic guidelines but also subsidiaries of foreign leading companies driving manufacturing export and progress in digitalization across various sectors. These companies are pivotal in implementing new logistics processes and technologies, and their ongoing digitization efforts are anticipated to improve service quality and decrease costs throughout the supply chain.

Research works on the digital skills in Bulgaria reveal that quite a small share of the population possess above-basic digital skills, significantly lower than the EU average, and nearly only one third have basic digital skills, are familiar with dealing with files, use word processing software, and know how to download or install apps. Shortages of general an specific skill are observed and one of the three leading barriers to the introduction of new digital technologies in enterprises is actually the insufficient qualifications and skills of employees.

The effects of the COVID-19 pandemic on the process of digitization of human resources in the transportation sector are decreased staff numbers and reduced labor productivity. Global trends in enhancing digitalization processes necessitate employees specialized in digital marketing, Big data, goods automation, cloud and cyber-physical systems, and computer simulation. This will require establishing standardized training protocols to acquire or expand general and/or specific digital skills and updating training programs for transportation specialists involved in goods storage and auxiliary activities in transportation.

Elderly workers are increasingly important for companies due to demographic changes, such as declining birth rates and longer life expectancy. They bring valuable experience from pre-digital environments and have a nuanced understanding of technological change. However, they have different technology acceptance needs, posing challenges for developers. Understanding these needs is crucial for successful digital transformation, but they may face challenges in lifelong learning in computer-related areas due to reduced learning abilities and stereotypes. Effectively addressing their concerns and barriers is vital for guiding the digital transformation of work.

Bulgaria's logistics services market is witnessing significant expansion, reflecting broader global trends in the growth of logistics services markets. Boosting the percentage of the working-age population equipped with fundamental digital competencies is essential for embracing new technologies and realizing targeted economic expansion. This emphasises on the importance of educational efforts aimed at developing digital skills and competences on contemporary IT paradigms.

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