



# Overall National Report for Older Senior Logistic

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## Contents

Purpose and Approach of this Report.....	5
Austria .....	6
1. Field Research.....	6
1.1. Logistics company executive .....	6
1.2. Trainer .....	13
1.3. Summary.....	13
2. Desk Research.....	14
2.1. Impact of Covid in digital logistic sector transformation in Europe.....	14
2.2. Opinions and problems this change occurred in logistics workers over 50 years old in Europe .....	17
2.3. Summary and Intermediate Conclusions .....	19
2.4. Bibliography Resources .....	19
Poland.....	22
1. Field Research.....	22
1.1 Logistics company executive .....	23
1.2. Trainer .....	26
1.3. Summary.....	28
2. Desk Research Poland .....	28
2.1. Impact of Covid in digital logistic sector transformation in Europe.....	28
2.2. Opinions and problems this change occurred in logistics workers over 50 years old in Europe .....	31
2.3. Summary and Intermediate Conclusions .....	33
2.4. Bibliography Resources .....	33
Greece .....	36
1. Field Research.....	36
1.1 Logistics company executive .....	37
1.2. Trainer .....	40
1.3. Summary.....	44
2. Desk Research .....	45
2.1. Impact of Covid in digital logistic sector transformation in Europe.....	45
2.2. Opinions and problems this change occurred in logistics workers over 50 years old in Europe .....	47
2.3. Summary and Intermediate Conclusions .....	50
2.4. Bibliography Resources .....	50
3. Focus group ( <i>if applicable</i> ).....	52
Bulgaria .....	53
1. Field Research.....	53

1.1. Logistics company executive .....	54
1.2. Trainer.....	60
1.3. Summary .....	66
2. Desk Research .....	66
2.1. Impact of Covid in digital logistic sector transformation in Europe.....	66
2.2 Opinions and problems this change occurred in logistics workers over 50 years old in Europe	75
2.3. Summary and Intermediate Conclusions .....	77
2.4. Bibliography Resources .....	79
Spain.....	81
1. Field Research.....	81
1.1. Logistics company executive .....	81
1.2. Trainer.....	87
1.3. Summary .....	93
2. Desk Research .....	93
2.1. Impact of Covid in digital logistic sector transformation in Europe.....	93
2.2. Opinions and problems this change occurred in logistics workers over 50 years old in Europe	95
2.3. Summary and Intermediate Conclusions .....	97
2.4. Bibliography Resources .....	98
3. Focus group (if applicable) .....	99
Cyprus .....	100
1. Field Research.....	100
1.1 Logistics company executive .....	100
1.2. Trainer.....	103
1.3. Summary .....	107
2. Desk Research .....	108
2.1. Impact of Covid in digital logistic sector transformation in Europe.....	108
2.2. Opinions and problems this change occurred in logistics workers over 50 years old in Europe	109
.....	109
2.3. Summary and Intermediate Conclusions .....	110
2.4. Bibliography Resources .....	110
3. Focus group (if applicable) .....	112



## Purpose and Approach of this Report

The purpose of this National Report is to examine the impact of the Covid-19 pandemic on the transformation of the digital logistics sector in Europe, with a particular focus on the project partner countries (Austria, Poland, Bulgaria, Greece, Cyprus, Spain). Additionally, it aims to address the aspects and problems that have arisen for logistics workers over the age of 50. The report is divided into two main categories: field research and desk research.

The field research includes surveys with logistics company executives and trainers to understand how companies have responded to changes and the implementation of new training methodologies. The results of these surveys were generated through a structured questionnaire and are highlighted in the report with diagrams to illustrate key findings and trends. This section provides a detailed look into the practical adjustments made by logistics companies and the effectiveness of training programs in enhancing digital competencies among their workforce.

The desk research analyzes secondary data on general trends and changes in the digital logistics sector in Europe. It also examines the perceptions and challenges faced by employees over 50, focusing on their adaptation to new technologies and the digital shift in logistics operations. This analysis includes a review of existing literature, industry reports, and statistical data to provide a comprehensive overview of the sector's transformation.

The interim findings will summarize the insights from both categories, outlining the main challenges and opportunities identified. These findings will offer suggestions for improving employee adaptation and efficiency, particularly for older workers. The report aims to provide actionable recommendations to help logistics companies and policymakers support the digital transformation of the sector while addressing the specific needs of an aging workforce.

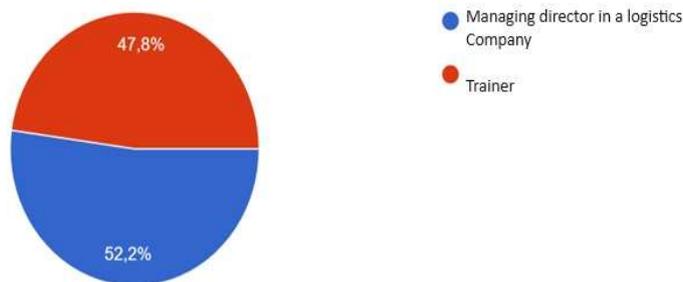
By combining field research and desk research, this report seeks to provide a holistic view of the digital transformation in the logistics sector, highlighting both the successes and the areas that require further attention and support. The goal is to facilitate a smoother transition to digital logistics practices and ensure that all employees, regardless of age, can effectively contribute to and benefit from this transformation.



# Austria

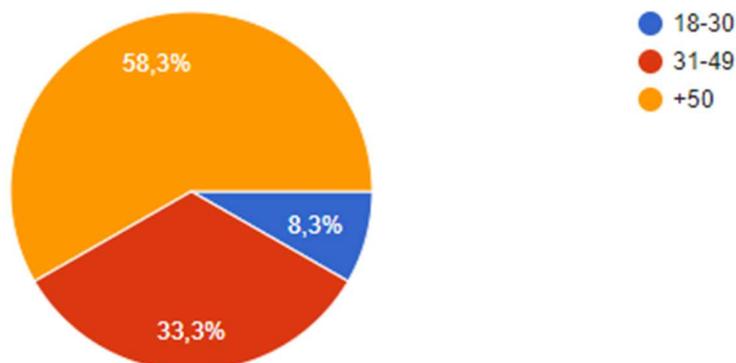
## 1. Field Research

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. 12 answers came from employees of logistics companies and 11 from logistics trainers. Figure 1). First, the logistics executives data will be presented, followed by trainers data.



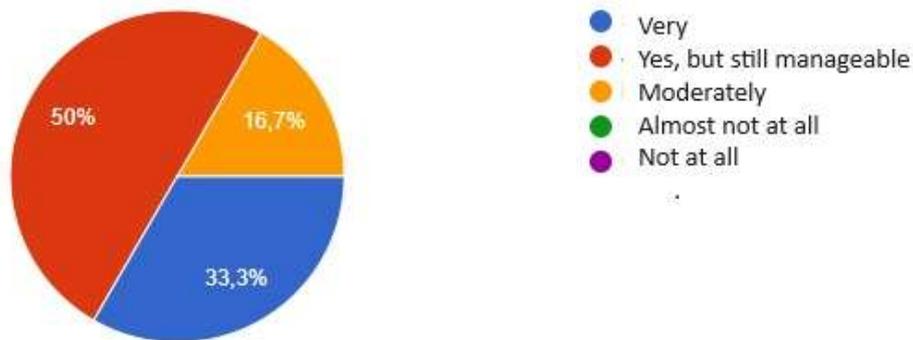
### 1.1. Logistics company executive

How old are you?

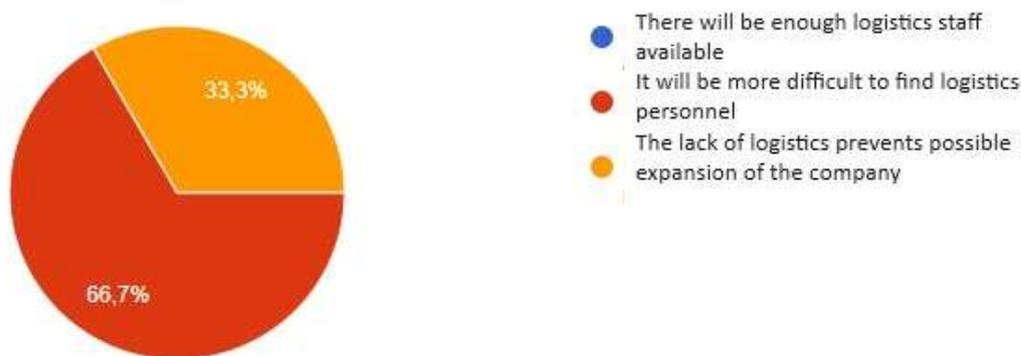


The fact that the majority of respondents are over 50 years old suggests that digitalisation in the logistics industry is encountering obstacles. There may be a lack of skilled workers who are familiar with the latest digital technologies, or there may be resistance to change from older employees.

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



More than 80% of respondents are confronted with a shortage of logistics specialists



None of the respondents believe that there will be enough logistics personnel: The reasons for this could be:

Growing demand due to economic growth: As the global economy grows, so does the demand for logistics services. If the supply of qualified personnel does not keep pace with this demand, bottlenecks could arise.

Demographic change: In many countries, there is a demographic change that is leading to an ageing population. This can lead to fewer workers being available, particularly in sectors such as logistics, which often require physically demanding work.

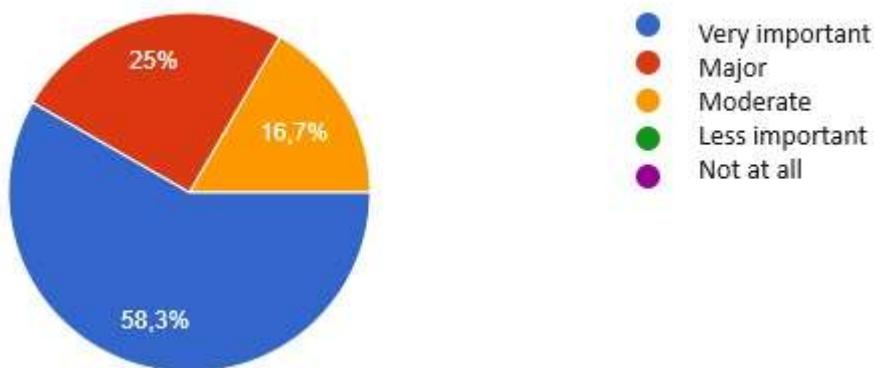
**Skills shortage:** There could be a shortage of qualified workers in the logistics industry, especially those with specific skills such as supply chain management, IT skills or knowledge of new technologies such as automation and artificial intelligence.

**Attractiveness of the occupational field:** The logistics industry may not be attractive enough for many potential employees, whether due to working conditions, pay, working hours or other factors. This can lead to less interest in a career in logistics and thus limit the supply of personnel.

**Education and training system:** If the education and training system is not sufficiently geared towards the requirements of the logistics industry, this could lead to a shortage of qualified personnel. This includes both formal education and vocational training opportunities.

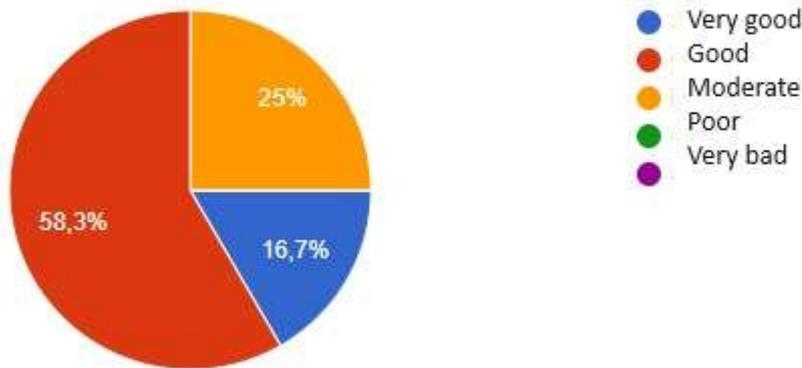
**Technological changes:** Advancing digitalisation and automation in the logistics industry could change workforce requirements, potentially rendering existing jobs obsolete or requiring new skills that may not be readily available.

How important will digital skills be in the future?



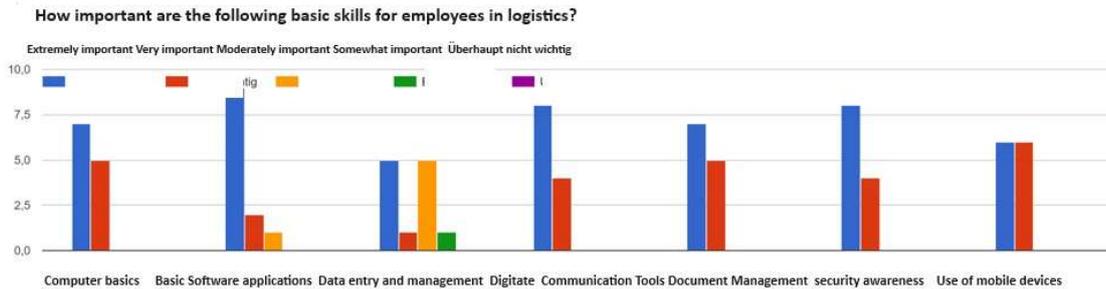
More than 58% of the logistics managers surveyed consider digital skills to be very important for logistics employees. None of the respondents rated digital skills as less important or not important at all. This is very interesting considering that the majority of respondents are older than 50 and may be sceptical about digitalisation.

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



More than 80% of respondents rated their digital skills as good and moderate. Only 16% as very good. A high need for further training can be recognised here.

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



The competences were rated on a scale from "Extremely important" to "Not at all important". Here is the description and interpretation of each category:

Computer Basics:

Extremely important: High rating (7.0)

Very important: Moderate rating (5)

Low ratings in the moderately, somewhat and not at all important categories.

Basic software applications:

Extremely important: Very high rating (9)

Very important: Moderate rating (2)

Hardly any ratings in the other categories.

Data entry and management:

Moderately important: Highest rating (5)

Very important: Moderate rating (5)

Somewhat important: Existing (1)

Extremely important and not at all important have lower ratings.

Digital communication tools:

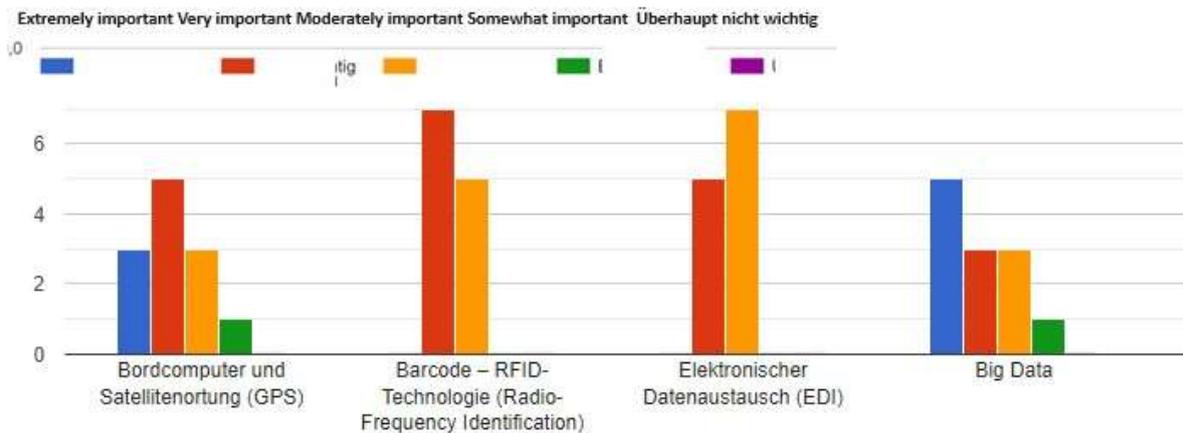
Extremely important: 6

Very important: 4

Basic software applications, security awareness and use of mobile devices and digital communication tools are predominantly rated as extremely important.

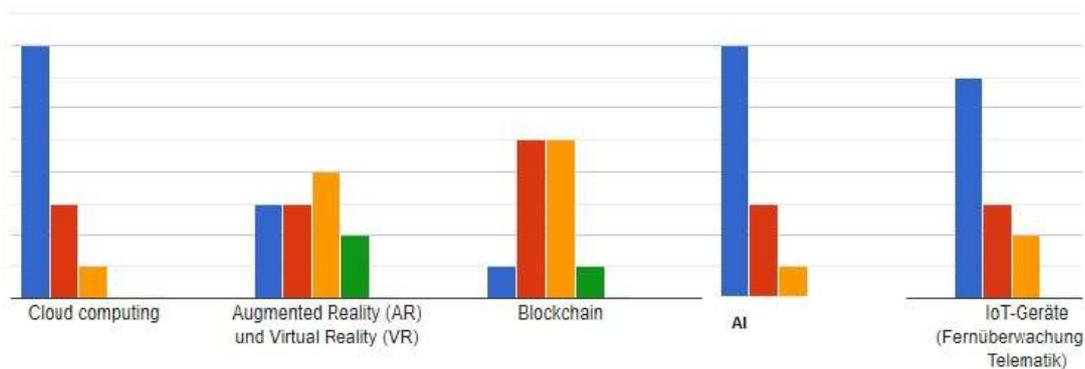
Computer basics and document management are also rated highly, with a strong focus on their extreme importance.

**How important are the following technological skills for employees in logistics?**



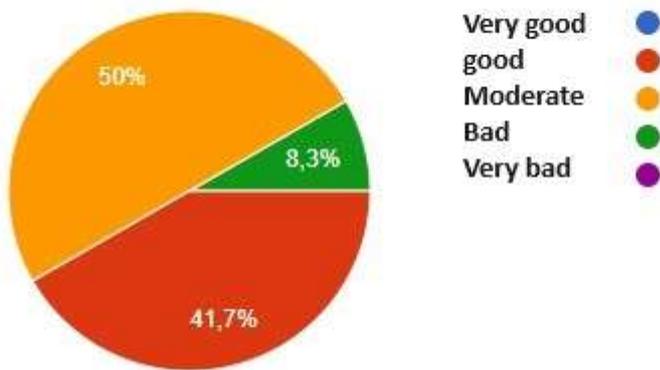
Overall, the chart shows that RFID technology is considered to be the most important technological capability in logistics, followed by EDI and GPS. Big data is also considered relevant, but not as strongly as the other technologies. The ratings reflect that different technological capabilities in logistics are prioritised differently, with RFID technology enjoying the highest priority.

How important are the following technological skills for employees in logistics?



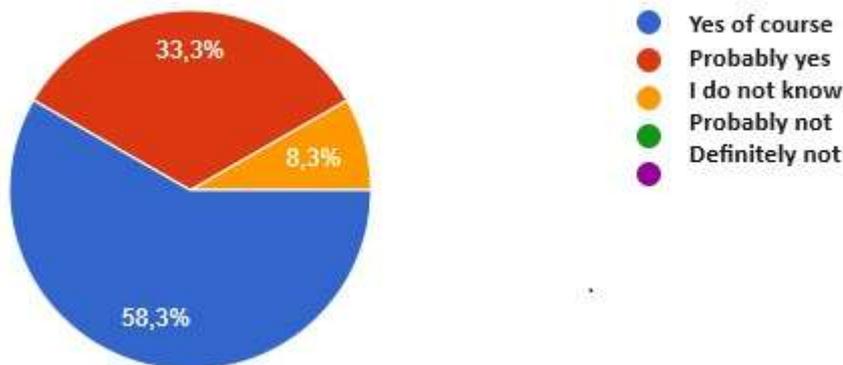
Cloud computing and artificial intelligence are rated the highest

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



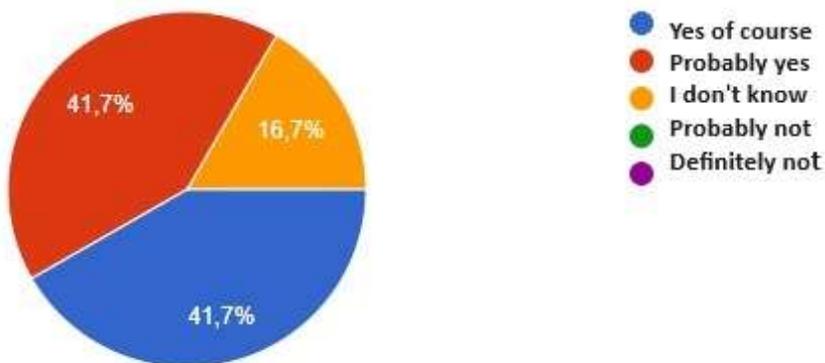
Training opportunities in Austria are only rated average

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?



Sustainable and technological services are clearly seen as a competitive advantage in Austria.

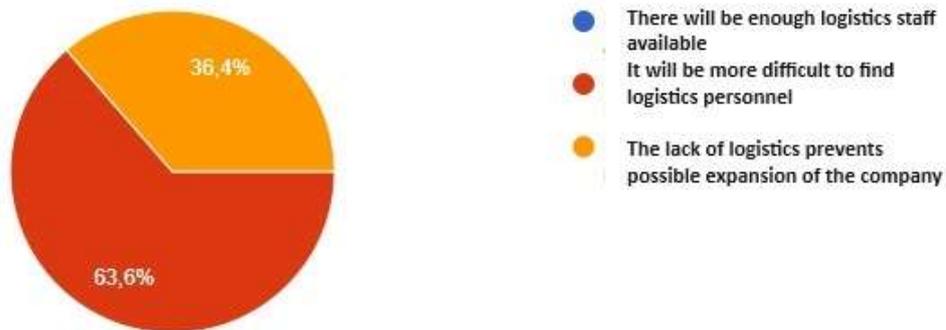
Would you be interested in training your employees over 50 in new technologies in the sector?



More than 80% of 50+ employees are willing to take part in training concepts for digital skills

## 1.2. Trainer

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



Recruiting logistics personnel will become increasingly difficult in the future

How important will digital skills be in the future?

- How would you assess education and training on "new technologies in logistics" in your country?
- Do you have trainees over the age of 50?
- Do you incorporate in your training programmes the new technologies applied in the logistics sector?
- Have you attended specific training on recent developments in the logistics sector?
- Do you adapt your teaching method according to the needs of logistics learners?
- Do you consider continuous training as essential for the development of logistics workers?
- Do you offer practical training or laboratory experience to trainees?
- Do you evaluate the performance of trainees during and after the training programs?

## 1.3. Summary

*Your text*



## 2. Desk Research

### 2.1. Impact of Covid in digital logistic sector transformation in Europe

#### Digital transformation of the economy in Austria

The COVID-19 pandemic acted as a catalyst for digitization in many areas, even in logistics. Lockdowns and contact restrictions increased the pressure to automate processes. It also put pressure on using digital solutions for home-office tasks, contactless delivery, and e-commerce processing. The pandemic accelerated digitization often. But, recent surveys show the transformation remains ongoing. It is, at times, slower than hoped.

The proportion of Austrian companies rating their level of digitization as advanced has recently fallen slightly. Many businesses still do not use artificial intelligence. Security concerns, high costs, and a lack of skilled workers are cited as the main obstacles. Digitization of business processes, cybersecurity, and a lack of skilled workers are considered central trends in the industry. Most companies see digital transformation as an opportunity, but only some are truly on an integrated path. They aim to implement digitization, sustainability, and resilience at the same time.

Automation and AI play a central role in digitization. Many processes are already automated in intralogistics, like warehousing and picking. But, transport logistics are more complex. AI applications see use, especially for planning, forecasting, and customer service. However, advanced AI projects see use more in digitally mature companies. Platform solutions, like digital freight exchanges and logistics networks, support efficiency in the supply chain. The pandemic promoted their use through the need for flexible, digital coordination in exceptional situations.

E-commerce is a major driver of digital transformation. Record values were achieved in online retail due to COVID-19. Logistics companies had to adapt, and must still adapt, their processes. They do so through automated distribution centers, route optimization, and real-time communication with customers. Austrian Post, for example, invests specifically in technology and IT expertise. It does so to meet the rising parcel volume. Overall, the pandemic has increased the pressure to act on digitization. The current phase is characterized by implementing and anchoring these changes for the long term.

#### Before COVID-19

##### 1. digitalisation in the early stages:

Before the pandemic, the digitalisation of the logistics sector in Austria was still at an early stage. Although many companies recognised the need for digitalisation, implementation was often slow and fragmented. There were efforts to optimise processes and implement new technologies, but penetration was not comprehensive.

##### 2. traditional logistics processes:

Many logistics companies continued to rely heavily on traditional methods and manual processes. Paper-based documentation, manual inventories and poorly integrated IT systems were still widespread.

##### 3. first steps towards innovative technologies:

Some progressive companies were already starting to utilise technologies such as Internet of Things (IoT), Big Data and Artificial Intelligence (AI) to improve efficiency and transparency in their supply chains. However, these initiatives were the exception rather than the rule.

##### 4. competitive advantages through digitalisation:

Companies that have already invested in digital technologies have achieved competitive advantages through more efficient processes, better data analysis and optimised supply chains. These companies were able to react more flexibly to market changes and often offered better customer service.

According to COVID-19

1. accelerated digitalisation:

The pandemic acted as a catalyst for digitalisation in the logistics sector. The need to quickly adapt supply chains and respond to unforeseen challenges led many companies to invest more in digital solutions. Cloud-based platforms, automation and AI-based tools were increasingly implemented.

2. e-commerce boom:

The sharp rise in e-commerce during the pandemic led to an increased need for efficient logistics solutions. Companies had to adapt their systems to the increased demand and invested in technologies that enabled faster and more reliable order fulfilment.

3. new business models and technologies:

Innovations such as drone deliveries, autonomous vehicles and smart warehouses became increasingly important. These technologies help to reduce costs and increase efficiency and were increasingly used in pilot projects and regular operations.

4. data-driven decision-making:

The use of data analytics and real-time data management has become the standard. Companies are increasingly turning to big data to make better predictions, avoid bottlenecks and make their supply chains more resilient.

5. change in the way we work

Remote working and flexible working models have been introduced in the logistics industry. Digitalisation supported these new ways of working through improved communication tools and virtual collaboration platforms.

6. sustainability and resilience:

Sustainability and resilience of supply chains have become more of a focus. Digital tools are helping to reduce CO2 emissions by planning more efficient routes and optimising energy consumption. In addition, more resilient and flexible supply chains are being developed that can respond better to future crises.

Overall, the COVID-19 pandemic has significantly accelerated the digitalisation process in the Austrian logistics sector and led to a broader and deeper integration of digital technologies. The companies that successfully implement this transformation are better positioned to master future challenges and secure competitive advantages.

The following study is also interesting in this context:

Study IND4LOG4 Industry 4.0 and its impact on the transport industry and logistics (Federal Ministry for Transport, Innovation and Technology)

Executive Summary The aim of the IND4LOG4 project, which was carried out by the OeKB in cooperation with the WU, is to analyse the effects of Industry 4.0 on the Austrian logistics and transport industry. The project analyses the company level, the industry level and the macroeconomic level. Approach The topic was addressed on the basis of expert interviews, a standardised survey of 250 logistics and transport companies operating in Austria, in-depth case studies at the level of industrial and transport and logistics companies, and a scenario-based assessment of the impact of Industry 4.0 on production and value creation in Central European sectors, transport performance and labour market effects in Austria. Recommendations for action were derived on the basis of the findings. Key findings On the part of industrial companies, a number of successfully implemented Industry 4.0 concepts can already be observed in the area of collecting, storing,

analysing and providing data with the aim of increasing efficiency in the production process. However, corresponding applications can also be identified in all upstream and downstream processes. However, the challenges of digitalisation for companies remain access to an efficient broadband infrastructure, comprehensive and standardised interfaces and data protection. Transport and logistics companies require intensive integration into their customers' processes; at the same time, however, they are also confronted with different interfaces and IT systems as well as a lack of trust on the part of their customers, with the latter being a particular obstacle to the realisation of Industry 4.0 potential in Austria. Promising new business models arise primarily from the changing needs of end and industrial customers, in particular from the increasing reduction in the size of shipments, same-day delivery concepts, new supplier structures in the area of raw and semi-finished products and flexible production planning, which enable just-in-time or just-in-sequence production in areas and for groups of goods that were previously not possible or necessary. The technology with the greatest potential to drastically change supply chains is 3D printing, although the profitability of these processes is currently still viewed critically. The analysis of industry interdependencies clearly shows that value chains and networks are likely to become more closely meshed as a result of the digitalisation of the economy. Due to Germany's central position in global value chains in particular, this also means advantages for Austrian and Central European industries in the medium term, regardless of where the impetus for digitalisation comes from. Digitalisation is likely to lead to growth effects in Austria in the medium term; in particular, value creation effects of +0.7% per year are expected in scenario 1 (Industry 4.0 is largely characterised by industrial manufacturing and automation technology), which is more favourable for Austria. In scenario 2 (Industry 4.0 is primarily characterised by the ICT sector), the estimated growth impulse here amounts to +0.3 % per year. Demand for freight transport is likely to increase in line with rising economic output in Central and Eastern Europe, although the efficiency of the transport system (in the sense of a reduction in empty runs and increased multimodality) is also likely to increase. While an accelerating increase in demand for freight transport is expected over the next four to five years, this will level off again from 2022 onwards.

Recommendations for action Industry 4.0 and its impact on transport logistics In the area of transport and infrastructure policy, the broadband capability of the telecommunications infrastructure and the real-time capability of the transport infrastructure are key challenges that need to be overcome, as is the connectivity of the infrastructure systems to corporate IT systems. RTI policy can support developments relating to digitalisation by creating test fields and test tracks for new transport technologies, promoting the development of intermodal and multimodal concepts to increase the resilience of supply chains, promoting technological retrofitting (especially in the SME sector) and promoting cooperation concepts, networking and interdisciplinarity based on existing tracks. Attention must also be focussed on the development and identification of potential applications for big data. In addition to RTI and infrastructure policy, there is also a need for action in other areas, such as education policy (schools, initial and further training) and proactive labour market policy. In connection with the dynamisation of company and industry structures, support for start-ups is considered important. Last but not least, the creation of standardised interfaces and data structures, which represent one of the key challenges for the transport industry, should not be forgotten at this point. Efforts are already being made at international level to ensure the broadest possible interoperability. From an Austrian perspective, it is necessary for the nationally responsible bodies to be heavily involved in this standardisation process in order to ensure an early and efficient conversion of existing and new systems.

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

Logistics workers over the age of 50 face various challenges in connection with the digital transformation process. These problems can occur on a technological, psychological and organisational level. Here are some of the main issues faced by these logistics workers:

### 1. technological challenges

#### a. Digital skills shortage:

Many older logistics workers have less experience with modern technologies compared to younger colleagues. This can lead to uncertainty and difficulties in learning and using new digital tools and systems.

#### Fast-moving technological changes:

The speed at which new technologies are developed and introduced can be overwhelming. Older logistics workers may struggle to keep up with these rapid changes and continually adapt to new systems.

### 2. psychological challenges

#### a. Fear of the new:

The introduction of new technologies can cause anxiety and uncertainty. Older logistics workers may be concerned that they will not be able to learn new skills or that their previous knowledge and experience will be devalued.

#### b. Self-confidence:

Self-confidence can be affected if older logistics workers feel that they cannot keep up with technological demands. This can lead to reduced commitment and less willingness to take on new challenges.

### 3. organisational challenges

#### a. Lack of training and development opportunities:

Not all companies offer sufficient training and development programmes that are specifically tailored to the needs of older logistics workers. This can result in these logistics workers not receiving the support they need to utilise new technologies effectively.

#### b. Age discrimination:

In some cases, older logistics workers may feel that they are disadvantaged because of their age. This may take the form of fewer training opportunities, fewer opportunities for career progression or less confidence in their abilities from management.

#### c. Unfavourable workplace culture:

A workplace culture that strongly favours younger employees and technological affinity can marginalise older logistics workers and make their integration process into the digital transformation more difficult.

### 4. physical and cognitive challenges

#### a. Health restrictions:

With age, health problems such as visual impairments, hearing problems or motor impairments can occur more frequently, which can make it more difficult to use new technologies.

b. Cognitive changes:

Older logistics workers may take longer to process new information and learn new skills, which can make the training process longer and more difficult.

Accelerated digitization creates unique problems for older logistics employees. Many people over 50 did not grow up with digital technology. Throughout their careers, they adapted to older processes. New tools and rapid changes sometimes cause insecurity, stress, and opposition. For instance, switching to real-time communication with digital warehouse management or collaborative platforms demands technical and mental adaptations.

At the same time, some opportunities have emerged. Flexible work models at home, as well as digital tools, can relieve physical strain. The key is targeted training. Awareness of training has grown in the general population. However, older employees attend these offerings less often. Reasons include a lack of access, less confidence in learning, and unsuitable learning formats.

Several good practices appear to solve these problems:

**Encourage technology acceptance:** Older employees often need more time and convincing to understand the benefits of digital tools. Respectful communication, customized training, and the inclusion of their experiences encourage openness and a willingness to learn.

**Design age-appropriate training:** Small groups, relevant content, time to practice, and different training levels are crucial. Blended learning, training videos, and peer learning like reverse mentoring have proven effective.

**Make ergonomic and health-related adjustments:** Automated tools, ergonomically designed workplaces, and preventive measures help maintain the performance of older workers. Consider exoskeletons and health checkups.

National and European programs also support shifting. For instance, in Austria, the AMS and WKO offer funding for digitization and logistics training. The EU also provides clear direction to broadly promote digital training with its Skills Agenda and initiatives like the Pact for Skills. Logistics associations contribute to development with industry-specific training and networks.

The digital shift can succeed, even for older employees, if investments are made in people and not just technology.

## 2.3. Summary and Intermediate Conclusions

COVID-19 gave digitalization a boost in logistics. Automation, AI, platform solutions, and growing e-commerce are changing how people work.

It becomes clear the human element remains key. The 50+ generation brings experience but needs help with digital skills. Investments in training for older workers, better ergonomics, and a supportive work environment matter. This is both socially responsible and economically smart. Companies see these advantages, and they benefit from skilled, loyal, and teachable employees.

DiRECT and similar projects help older logistics workers build digital skills. These also secure the industry's ability to innovate long-term. There is a chance to shape digitalization across generations. It can be inclusive and ready for the future.

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## Poland

### 1. Field Research

First, we would like to mention that the questionnaire was distributed in Poland and there is a question: “What is the subject of your work?” and 2 options are given.

The option: logistics company executive, and the option: trainer

When the respondent, depending on the target group, selects one of the two options, the corresponding question field is automatically opened.

As we can see in the pie chart above, 50% of the respondents are logistics company executive and 50% are trainer.



## 1.1 Logistics company executive

- **How old are you?**

In this particular pie chart, the highest percentage - 40%, are between the ages of +50

- **If yes, is your company facing a shortage of logistics professionals?**

We observe that 60% face a shortage of logistics professionals in their company, while in 30 % this shortage is at a moderate level.

- **How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?**

50% of respondents believe that the situation regarding logistics recruitment in the next 10 years will become more difficult to find enough logistics staff, and 30% believe that shortages in logistics staff will not allow the company to expand.

- **How important will digital skills be in the future?**

88,9% believe that digital skills will be important or very important in the future.



- **How do you assess the digital skills of your logistics staff (50+ years)?**

The digital skills of logistics staff (50+ years old) are rated by the company's executives as " moderate" with 30% demonstrating this, while 50% consider the digital skills of logistics staff (50+ years old) to be at a " bad" level.

- **How do you assess the expertise in your company in relation to new technologies in the logistics field?**

60% rate their company's expertise in relation to new technologies in the field of logistics as bad or very bad. Only 10% rate their company's expertise in relation to new technologies in the field of logistics as "good".

- **How important are the following basic skills for Employees in logistics**

We observe that a large majority of the respondents consider the basic skills as important or extremely important.

- **How important are the following technological skills for Employees in logistics**

We observe that most respondents consider the technological skills to be important or extremely important.

- **How important are the following systems skills for Employees in logistics**

We observe that most respondents consider the systems skills to be important or extremely important.

- **How would you assess education and training on "new technologies in logistics" in your country?**

According to the above pie chart, the respondents assess the education and training on "new technologies in logistics" in our country, as good only with a rate of 20%, and "moderate" with a rate of 40% , while the rate of 30 % which shows that by some the education and training on "new technologies in logistics" in our country, is considered " bad".

- **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?**

Only 30 % of respondents indicated that their customers require the use of sustainable and new technological services and believe that if the company had them, it would probably be a competitive advantage for the company in the future.

- **Would you be interested in training your employees over 50 in new technologies in the sector?**

50% of respondents were interested in training their employees over 50 years old in new technologies in the sector, free of charge.



## 1.2. Trainer

- **How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?**

VET trainers in logistics believe that the situation in terms of logistics recruitment over the next 10 years will become more difficult to find sufficient logistics staff. In particular, this perception is supported by 70% of respondents.

- **How important will digital skills be in the future?**

90% of respondents consider that digital skills will be very important in the future, while the rest, only 10% consider the development of digital skills to be quite important.

- **How would you assess education and training on "new technologies in logistics" in your country?**

30% of respondents rate education and training on "new technologies in logistics" in Poland as "bad". There is also 40% who consider it "good".

- **Do you have trainees over the age of 50?**

60% of respondents answered that they have trainees over 50 years old, which indicates the need still to develop digital skills for this age group.

- **Do you incorporate in your training programmes the new technologies applied in the logistics sector?**

90% incorporate in their training programs the new technologies applied in the field of logistics, while the percentage that do not is smaller.

- **Have you attended specific training on recent developments in the logistics sector?**

90% of respondents have attended specific training on recent developments in the logistics sector.

- **Do you adapt your teaching method according to the needs of logistics learners?**

90% of all VET trainers in logistic adapt their teaching method according to the needs of the logistics learners.

- **Do you consider continuous training as essential for the development of logistics workers?**

90% of the respondents consider that continuous training is essential for the development of logistics workers.



- **Do you offer practical training or laboratory experience to trainees?**

Only 40% of VET trainers in logistics offer practical training or laboratory experience to trainees.

- **Do you evaluate the performance of trainees during and after the training programs?**

50% of respondents evaluate the performance of trainees during and after the training programs, while the rest 50% do not evaluate.

### 1.3. Summary

In conclusion, there seems to be a significant agreement between the respondents from the two target groups (logistics company executive, trainer) regarding the need for digital skills in the logistics sector, in the age group over 50 years old. The recognition of this need is important as digital technology is becoming increasingly important in the logistics industry.

Furthermore, the recognition of the shortage of digital skills in this age group indicates the need for further training in technology.

## 2. Desk Research Poland

### 2.1. Impact of Covid in digital logistic sector transformation in Europe

According to a survey conducted by EY Poland, digital transformation accelerated during the pandemic in more than half of the companies, and 27% of the companies surveyed even admit that they were motivated to act in this area solely by the pandemic. In 8 per cent of companies, digital transformation slowed down as a result of the pandemic, and in 1 per cent of companies the process stopped because of it. In around a third of the companies surveyed (32%), the pandemic had no impact on digital transformation at all.

or 27% of respondents, however, digital transformation is primarily an investment in technology, with a slightly smaller percentage (25%) declaring that it is a process of transformation within the company that goes beyond technological solutions. Overall, more than half of those surveyed (55%) say digital transformation is part of a strategy, but 36% introduce it in response to current issues. In 5% of companies, it is imposed by factors outside the company's control, and 4% introduce it when interesting solutions appear on the market.

- Nearly 80% of the companies surveyed give digital transformation a high or medium priority, but the results of our survey show as if through a lens that the approach to digital transformation in Polish



companies is polarised and can mean something completely different in each company. A large group of companies consider it merely an investment in technology, but there are also those who declare that it is for them a holistic and multifaceted stage of change in the company. Regardless of which group they are in, almost all of them realise that it generates potential for the company, although they do realise that a change in the existing way of thinking will be necessary to carry it out.

Companies still want to focus primarily on hardware purchases, with less focus on database implementation. Some companies - 17% - do not intend to implement any new digital transformation solution in the coming year or year and a half.

Thinking about the purchase of hardware and infrastructure as a core activity in the digital transformation process applies to past, present and future activities. And this is not an unreasonable attitude. Indeed, more often than not, the entire process requires the purchase of specific tools, equipment and solutions. However, one cannot stop there, as this will only mean upgrading resources and not the overall transformation of the company. Individual processes - even if they use advanced technologies and solutions - will be ineffective if the changes do not touch all aspects of the company's operations. This may turn out to be a trap, as digital transformation is a continuous process of improving a company and not just punctual and one-off actions.

If companies already decide to carry out a digital transformation, the most dynamic transformation is taking place in the accounting, sales and customer service departments - areas characterised by the lowest level of automation, on the other hand, generating business growth. What is surprising in this juxtaposition is the perception of administrative processes as the least important areas in terms of the order in which digital transformation solutions are implemented.

Only 13% of respondents did not identify any barriers to implementing digital transformation solutions. More than a third of respondents indicated that one of the main ones is that it is too expensive. More than a quarter of companies face employee fears of change, one in four companies face a lack of competence or resources. The lack of a proper strategy, an organisational culture geared towards implementing innovation, the lack of a leader ready to lead change (14%) and even management's fear of change remain a problem for many companies in this regard.

The 'Digital Transformation of Companies 2020' survey was conducted using CATI and CAWI, at the end of October 2020 by CubeResearch, with a sample of 989 respondents. Half of the respondents surveyed hold a position as a manager or head of a department, most commonly IT, Finance, HR and Sales. 24% hold a position as a board member or director and one fifth are owners or co-owners of the surveyed company. Only 6% of respondents work in a lower position.

Representatives of various industries took part in the survey. As intended, we looked at four of them with particular attention. These are manufacturing, finance, retail and logistics.

Most of the companies surveyed have more than 10 years' experience in the market. Only slightly less than a fifth have been in business for less than a decade, while 15% have been on the market for less than five years.

Also in terms of revenue, the companies surveyed are quite diverse. Most, 36%, generate between PLN 50 and 150 million in profit annually. The revenues of about a quarter of the companies are between PLN 150 and 300 million, and more than one fifth up to PLN 50 million. The smallest group of companies, but as many as 18%, generate annual revenues in excess of PLN 300 million.

Survey participants were also asked about the percentage of the budget they allocate annually to digital transformation. More than half of the respondents declared that their company allocates up to 3% of revenue for this purpose, and about a quarter that 4-5% from profit. Fewer, less than a tenth of respondents, contribute 6 - 10% of revenue, and above 10% of revenue 8% of respondents.

Digital transformation is about adapting evolving technologies to the specific needs of the sector and modernising work organisation and company culture. Technological advances, especially those

observed in the last decade, have demonstrated the superior effectiveness of digital solutions compared to traditional methods. Today, digitalisation is treated as part of the progress of civilisation, covering various industries and areas of activity. Among the most current trends, we highlight artificial intelligence, blockchain, virtual reality and the Internet of Things.

In the context of logistics, adaptation to digital innovations has allowed for more efficient, fast and sustainable process management. The logistics industry, characterised by complex structures and diverse data, has started to benefit from new technologies that have become easier to control and implement thanks to digitalisation.

Digital transformation in logistics, following the COVID-19 pandemic, has become a key factor in shaping modern company strategies. This process, which is widespread in many industries, has contributed to increased management efficiency, especially in areas as complex as logistics. By adapting new technologies, the logistics sector can fully exploit the potential of innovation, improving its productivity.

Due to the challenges of the COVID-19 pandemic, logistics has experienced significant improvements through digital transformation, especially in the area of document management. An example is the electronic consignment note, or E-AWB, which is the digital equivalent of the traditional paper document. It allows a shipment to be tracked from the moment it is picked up to the point of delivery. But it is not just a matter of tracking - the E-AWB also brings benefits in terms of trust and process transparency. The integration of this solution with transport systems has definitely improved efficiency in logistics.

Artificial intelligence (AI) and machine learning are opening the door to a revolution in many sectors, adapting them to the digital age. Logistics is no exception. Thanks to AI, it is possible not only to optimise supply chain management, but also to gain instant access to relevant data, analysis and recommendations. This translates into better, more informed decisions for logistics companies. Artificial intelligence and machine learning applications include, for example, precision production planning, in-depth supplier assessment, customer acquisition or transport and inventory management.

The Internet of Things, or IoT, represents one of the most important technological developments of our time and its impact on the logistics sector is enormous. A key benefit of IoT for logistics is the ability to accurately monitor and transport sensitive products. Specialised sensors based on this technology make it easier to control the transport of sensitive goods such as food or medicines. With IoT sensors, it is not only possible to track parameters such as temperature or humidity, but also to verify the authenticity of products through smart labels.

In the logistics sector, as in many other industries, cloud-based technologies play a key role. With the cloud, it is not only possible to store huge amounts of data cost-effectively, but also to process it instantly. In an industry where data is integrally linked to complex networks, cloud technology is becoming essential. Any information generated by artificial intelligence and the resulting analysis and conclusions can be efficiently collected and managed using cloud solutions.

Digital transformation in the logistics sector has taken on a new dimension with the inclusion of blockchain technology. Blockchain, as a revolutionary innovation, has significantly influenced the way transactions are verified and secured. It has made it possible to precisely track every change, transaction or other operation within a given network. The technology significantly increases the security of decision-making processes, making decisions in the logistics area more informed, to the benefit of all parties. Additionally, blockchain eliminates the need for a central management point, allowing all network participants to easily access key data.

Digital transformation has opened up exciting new opportunities for the logistics industry, such as sustainability and green logistics. In many sectors, technological advancements are shifting the focus

towards green measures, and logistics is no exception. Modern developments such as intelligent traffic management, the use of artificial intelligence and the development of autonomous vehicles have influenced the industry to become more sustainable. The interest in green innovations in the logistics sector is increasing the demand for such technologies. Promoting a green approach is becoming key to achieving a competitive advantage in the industry.

Consequences of the COVID-19 pandemic:

According to the research, which was conducted in 2022 among 335 randomly selected small, medium and large Polish manufacturing, trade and service enterprises. As a result of the research, it was found that the COVID-19 pandemic had a huge influence on logistics in all surveyed enterprises in 2020–2021. Changes in logistics conditions caused by the pandemic overlapped with the logistics determinants of contemporary enterprises before the pandemic. Strategic and operational management of logistics processes increasingly determined the economic and market results of the best surveyed enterprises during the COVID-19 pandemic. Enterprises achieving the best results during the pandemic implemented the supply chain management strategy that was in a constant state of creation and development, characterized by an immediate response to changing customer requirements, environmental conditions and competitors' activities, respecting, at the same time, the principles of sustainable development. During the pandemic, the most effective logistics managers took quick actions so as to reduce the likelihood of disruption, decrease the severity of the effects of events, and create and maintain competitive advantages of their enterprises.

The COVID-19 pandemic caused multiple hazards that disrupted the logistics systems of businesses around the world (Choi et al, 2023; Rinaldi & Bottani, 2023; Vilko & Hallikas, 2023). The simultaneous occurrence of supply and demand shocks has created enormous challenges in logistics regarding the management of procurement, production, distribution, inventory, returns, after-sales service, transportation and the entire supply chain (Butt, 2021; Pauli et al, 2023, pp. 336-362; Min, 2023, pp. 1765-1781; Skowronek, 2023, pp. 2-10). The pandemic has created unprecedented logistical challenges related to the need to protect health and ensure safety. Logistics managers had to start taking a strategic approach to creating logistics activities and solutions, which were implemented at a strategic and operational level within the company (Gąsowska, 2022a, pp. 81-107).

The COVID-19 pandemic has created enormous uncertainty and a sharp increase in risk in logistics systems. In such an environment, it was crucial to limiting the likelihood of disruption to logistics processes throughout the logistics system and taking rapid action to reduce the severity of the consequences of an incident (van Hoek, 2020, pp. 341-355; Kohl et al, 2022, pp. 1386-1407; Song et al, 2022, pp. 1408-1436). Digital technologies have played an important role in the risk analysis of logistics systems, enabling faster decision-making processes with appropriate use of information, facilitating rapid responses to disruptions in logistics systems (Choi, 2021).

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

The COVID-19 pandemic has brought huge disruptions and challenges to supply chains, affecting many industries worldwide. For instance, in various countries, healthcare systems have been under extreme levels of stress due to the capacity issues such as shortage in personnel, equipment, and space in hospitals and the poor governance of infections. Many airlines suffered huge losses and bankruptcies because of increased travel restrictions and uncertainties posed by changing regulations .

Recreational industries such as restaurants, hotels, and gyms were also hit by huge losses due to implemented lockdowns to curb the spread of infections.

The logistics sector is also experiencing risks and challenges brought by COVID-19 pandemic. Crossing border of goods became much more complex due to imposed lockdowns at national and international levels, hampering logistics operations and causing delays in delivery of goods. A decline and shortage of logistics service providers (LSPs) for transporting goods were also observed, especially at the beginning of the pandemic. Many manufacturing companies were forced to close plants due to government regulations, thereby reducing the supply of goods. Other companies shifted their focus on manufacturing in-demand products during COVID-19. In the global logistics transportation alone, the value of losses in revenue due to COVID-19 pandemic is estimated to be 1.1 trillion euros in 2020.

Changes resulting from the COVID-19 pandemic among workers 50+:

The number of logistics workers performing work at the employer's premises fell from 88.5% before the pandemic to 65.5% during the pandemic, before rising again to 83.1%. In contrast, the scale of hybrid and remote working provided increased during the pandemic period to 21.4% and 11.4% respectively (Table 5). The isolation of workers was a result of top-down restrictions on maintaining social distance to limit coronavirus transmission.

In response to the emerging shortage of logistics workers and the problems of retaining them - if only because of their conviction not to retire - employers began increasingly to offer their staff various types of benefits. In this way, they wanted to make work more attractive and increase their own competitiveness in the market. The economic downturn following COVID-19 forced a change in the approach to employee benefits, including for logistics employees. Savings, including reductions in labour costs, became necessary. The survey found that employers were giving up on paying additional benefits, mainly providing employees with sports and leisure cards and training, courses and other forms of professional qualification. Although they were not guaranteeing benefits to too many employees, they were still depleting their availability.

The negative changes that affected logistics employees' working situation mainly included stress, instability and job insecurity. This inconvenience was indicated by more than 3/5 of the population who spoke critically about the impact of the COVID-19 pandemic on professional matters. Other negative changes were a reduction in salary for work, an increase in responsibilities (excess work), and loss of work at the previous company.

When considering the situation and the rules of coexistence in the workplace, the respondents identified the negative phenomena they could face. For 47.8% of people, time pressure was the most important, which could translate into excess stress and psychological strain, which in turn was highlighted by 38.9% of respondents. About one third of the population was dissatisfied with overcrowding with tasks to be performed, and a slightly smaller group criticised the excessive demands (pressure) of superiors. Gender discrimination was the least perceived.

In terms of the strength of the impact of negative phenomena in the company, abstracting from the scale of their occurrence, excessive work control and time pressure were felt most strongly. This was followed by stress and heavy mental workloads and lack of flexibility at work. Other phenomena had

an average impact on interpersonal relations and the functioning of the workforce, and therefore did not constitute a particular annoyance for the respondents.

Vocational qualifications of employees 50+ It is a favourable phenomenon to take care of qualifications and to broaden employee qualities in this respect. When asked whether the respondents had ever been forced to retrain, 34.6% answered in the affirmative, while the remaining 65.4% denied it. Most had done so quite a long time ago, more than 10 years ago. During the last years, when the COVID-19 pandemic was ongoing, one in five respondents had retrained.

The main reasons for retraining were the desire to change jobs and the inability to find employment in their occupation - 28.3% and 28.1% respectively. Respondents also pointed to employer requirements, as well as the idea of learning and trying something different - 22.2% and 20.8%. Unattractive working conditions within their occupation came next. When analysing the reasons for retraining, it is worth noting that these were both due to external reasons beyond the employees' control and based on their individual aspirations, thoughts.

As regards participation in activities related to improving professional competences and adapting to current changes (e.g. resulting from digitisation), 65.6% of respondents answered in the affirmative. Thus, they expressed their willingness, as opposed to 15.4% of those who were not interested and negated participation in such activities

## 2.3. Summary and Intermediate Conclusions

### *Conclusion*

The pandemic has accelerated all the evolutionary changes taking place in the area of digitisation, and has allowed the rapid implementation of many solutions that had remained in the testing and trial phase for years.

In summary, Poland's logistics work force aged 50+ has faced multiple challenges in adapting to the digital transformation and manoeuvring through the volatile circumstances caused by the COVID-19 pandemic. By addressing the technological skills gap, providing tailored training and support, and leveraging local initiatives, Poland can strengthen its mature workforce to thrive in the evolving field of digital logistics. Nurturing the skills development and resilience of the older workforce is essential to ensure their continued relevance and contribution to Poland's logistics ecosystem.

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# Greece

## 1. Field Research

First, we would like to mention that the questionnaire was distributed in Greek and there is a question: “What is the subject of your work?” and 2 options are given.

The option: logistics company executive, and the option: trainer

When the respondent, depending on the target group, selects one of the two options, the corresponding question field is automatically opened.

As we can see in the pie chart below, 61.5% of the respondents are logistics company executive and 38.5% are trainer.



## 1.1 Logistics company executive

- **How old are you?**

In this particular pie chart, the highest percentage, 75 %, are between the ages of 30-49.

- **If yes, is your company facing a shortage of logistics professionals?**

We observe that 50% face a shortage of logistics professionals in their company, while in 37.5% this shortage is at a moderate level.

- **How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?**

75% of respondents believe that the situation regarding logistics recruitment in the next 10 years will become more difficult to find enough logistics staff.

- **How important will digital skills be in the future?**

68.8% believe that digital skills will be very important in the future, while the rest also believe that digital skills will be quite important in the future.



- **How do you assess the digital skills of your logistics staff (50+ years)?**

The digital skills of logistics staff (50+ years old) are rated by the company's executives as " moderate" with 56.3% demonstrating this, while 31.3% consider the digital skills of logistics staff (50+ years old) to be at a " bad" level.

- **How do you assess the expertise in your company in relation to new technologies in the logistics field?**

62.5% rate their company's expertise in relation to new technologies in the field of logistics as "moderate", while it is worth mentioning that 31.3%, an unexpected percentage, rate their company's expertise in relation to new technologies in the field of logistics as "good".

- **How important are the following basic skills for Employees in logistics**

The chart above showed that basic computer skills, basic software applications and Mobile Device Usage are considered very important basic skills employees in logistics.



- **How important are the following technological skills for Employees in logistics**

We observe that most respondents consider the following technological skills to be very important: Electronic Data Interchange (EDI), RFID technology (Radio Frequency Identification), IoT devices (remote monitoring and telematics)

- **How important are the following systems skills for Employees in logistics**

We notice with great variation that Warehouse Management System (WMS) - Warehouse Control Systems (WCS), is considered a very important system skill for logistics employees, as opposed to Yard management system (YMS), which is not considered important by respondents.

- **How would you assess education and training on "new technologies in logistics" in your country?**

According to the above pie chart, the respondents assess the education and training on "new technologies in logistics" in our country, as "moderate" with a rate of 43.8% while very close is the rate of 37.5% which shows that by some the education and training on "new technologies in logistics" in our country, is considered " bad".

- **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?**

50 % of respondents indicated that their customers require the use of sustainable and new technological services and believe that if the company had them, it would probably be a competitive advantage for the company in the future.

- **Would you be interested in training your employees over 50 in new technologies in the sector?**

The highest percentage of respondents (62.5%) were interested in training their employees over 50 years old in new technologies in the sector, free of charge. It is worth mentioning that 25% of the respondents were also quite interested in training their employees over 50 years old in the new technologies of the sector free of charge.

Well, overall, 87.5% are interested in offering free training to their employees in the logistics industry to acquire digital skills.

## 1.2. Trainer

- **How old are you?**

We observe that 60% of respondents are over 50 years old, while the rest 40% are between 31 and 49 years old. The respondents belong to the age target group of the project.

- **How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?**

VET trainers in logistics believe that the situation in terms of logistics recruitment over the next 10 years will become more difficult to find sufficient logistics staff. In particular, this perception is supported by 80% of respondents.

- **How important will digital skills be in the future?**

80% of respondents consider that digital skills will be very important in the future, while the rest 20% consider the development of digital skills to be quite important. It is worth mentioning that there is no respondent with a different perception.



- **How would you assess education and training on "new technologies in logistics" in your country?**

40% of respondents rate education and training on "new technologies in logistics" in Greece as "bad". There is also 10% who consider it "very bad".

- **Do you have trainees over the age of 50?**

80% of respondents answered that they have trainees over 50 years old, which indicates the need to develop digital skills for this age group.

- **Do you incorporate in your training programmes the new technologies applied in the logistics sector?**

70% incorporate in their training programs the new technologies applied in the field of logistics, while the percentage that do not is smaller.

- **Have you attended specific training on recent developments in the logistics sector?**

50% of respondents have attended specific training on recent developments in the logistics sector, while the rest 50% have not attended.



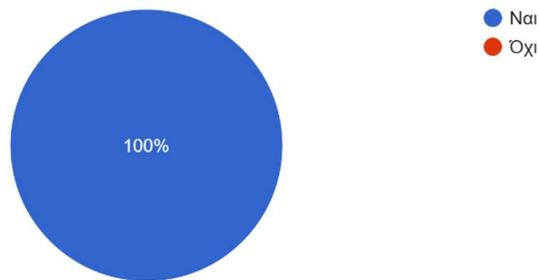
- **Do you adapt your teaching method according to the needs of logistics learners?**

All VET trainers in logistic adapt their teaching method according to the needs of the logistics learners.

- **Do you consider continuous training as essential for the development of logistics workers?**

Θεωρείτε ότι η συνεχής εκπαίδευση είναι απαραίτητη για την ανάπτυξη των εργαζομένων στο logistics;

10 απαντήσεις



All respondents consider that continuous training is essential for the development of logistics workers.



- **Do you offer practical training or laboratory experience to trainees?**

90% of VET trainers in logistics offer practical training or laboratory experience to trainees, while only 10% do not offer.

- **Do you evaluate the performance of trainees during and after the training programs?**

50% of respondents evaluate the performance of trainees during and after the training programs, while the rest 50% do not evaluate.

### 1.3. Summary

In conclusion, there seems to be a significant agreement between the respondents from the two target groups (logistics company executive, trainer) regarding the need for digital skills in the logistics sector, in the age group over 50 years old. The recognition of this need is important as digital technology is becoming increasingly important in the logistics industry.

Furthermore, the recognition of the shortage of digital skills in this age group indicates the need for further training in technology. Learning digital skills can help to improve performance and efficiency in the sector, as well as to address the challenges resulting from the digital transition and new technologies.

Respondents seem to be aware of the seriousness of the situation and suggest supporting and investing in training and professional development programs to upgrade digital skills in the logistics sector.

## 2. Desk Research

### 2.1. Impact of Covid in digital logistic sector transformation in Europe

In Greece, the digital upgrading of supply chains remains in short supply compared to other European countries. Only a fifth of businesses have invested in digitally upgrading their internal supply chain, despite the fact that 80% of logistics activities are carried out in-house. This is largely due to the view that the supply chain is often seen as a support process with low added value.

In trade and industry, the use of big data analytics technologies remains limited. Although one-third of businesses use specialized warehouse management (WMS) applications, 53% still rely on Excel spreadsheets to manage storage. In addition, 41% do not have a fleet management system, and only 20% have purchased specialized applications, while the rest use simple office applications.

However, supply chain operation and management (3PL and 4PL) companies are showing a greater willingness to invest in warehouse and fleet management technologies. Nevertheless, the technologies of the fourth industrial revolution remain limited in adoption in this field.

In Greece, warehouse management focuses mainly on Warehouse Management Systems (WMS), which are used by 61% of businesses. Also, the use of fleet management systems is widespread, with a percentage of 52%, while the number of RFID digital sensors for vehicle monitoring is gradually increasing and has reached 26%. In addition, 68% of businesses focus on digital procurement solutions.

The pandemic has had a significant impact on the supply chain industry, with 81% of companies reporting that their supply chain operations were severely affected. 68% predict a downturn of more than 20%, with 15% predicting losses of more than 40%. In addition, 66% believe that the pandemic will have a long-term impact on overall operating costs.

The pandemic has also demonstrated the need for higher technological and digital maturity in the industry. The use of modern digital tools has emerged as key to efficient collaboration across the value chain, offering flexibility, resilience and effective risk management. In addition, the pandemic has led businesses to drastically adjust their order plan, highlighting the need to renew and improve processes.

The adaptation of commercial and industrial enterprises to exceptional production and demand conditions is closely linked to the low maturity of their supply processes. The problems highlighted during the pandemic highlight the need for digitalization of the supply chain sector, as it is necessary to improve productivity, reduce operating costs and respond to the high time demands of delivered products.

Previously, the logistics sector in Greece had a more traditional approach. Processes were often manual and companies relied on traditional systems and methods to manage their supply chains. However, the advent of Covid-19 interrogated this approach.

The above concerns have led many businesses to adopt digital solutions and technologies. The automation of processes and the use of Internet of Things (IoT) technology, artificial intelligence (AI) and sensors became more widespread, enhancing the digital maturity of the sector.

The digitalisation of the supply chain is central to successfully adapting to these new conditions. Although there were already some digitalisation efforts before the pandemic, the need for such solutions became even more urgent during the crisis.

Digitalisation is necessary to manage the volatile environment and the problems arising from the pandemic, such as unforeseen changes in demand and restrictions on movement and production.

Each player has an important role in this transformation process. Let's see how each actor contributes to this transformation:

#### Researchers and analysts:

- They provide a deeper understanding of market trends and needs, as well as the supply chain impacts of COVID-19.
- They provide analyses and recommendations on technological innovations that can be applied to improve the supply chain.
- They help develop strategies to effectively use technology and data to improve supply chain management.

#### Technology executives:

- They implement technology solutions that help improve the supply chain, such as inventory management systems, data tracking and recording platforms, and predictive analytics tools.
- They help integrate technologies such as automated processes, artificial intelligence, and big data analytics into the supply chain.

#### Government officials:

- They create policies and regulations that promote the digital transformation of the supply chain, encouraging the adoption of innovative technologies and data security.
- They provide financial support and incentives for businesses investing in digital solutions to improve the supply chain.
- They promote the creation of education and vocational training programs to increase the skills needed for the digital transformation of the supply chain.

Statistical reports and surveys showing the transformation of the digital logistics sector in Greece after Covid-19 are limited, but observation of practical changes in businesses and reports from the main players demonstrate the trend towards digital transformation to address the new challenges brought about by the pandemic.

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

The logistics industry in Greece has been subject to transformative changes in recent years, catalyzed by digitalization and further accelerated by the global COVID-19 pandemic.

**Assessment of Changes due to COVID-19 Pandemic** - How employees over 50 in the digital logistic sector assess the changes brought about by the Covid-19 pandemic?

The perspectives of logistics workers over 50 in Greece regarding the alterations precipitated by the COVID-19 pandemic exhibit a spectrum of reactions. While some workers commend the heightened safety measures and the newfound flexibility of remote work options, others express apprehensions regarding job security, escalated workloads, and disruptions in supply chains. These apprehensions are particularly pronounced given the economic turbulence experienced by Greece, adding layers of complexity to the concerns of older workers within the logistics domain (Eurofound, 2020).

Employees over 50 in the digital logistics sector in Greece have undergone significant shifts in their working environment and perceptions due to the COVID-19 pandemic. Their assessment of these changes is multifaceted, influenced by various factors such as job role, technological proficiency, and personal circumstances.

Many employees over 50 in the digital logistics sector appreciate the implementation of remote work options and enhanced safety measures in response to the pandemic (Kyriakopoulos, G. L., Moysiadis, T., & Papakitsos, E. C., 2021). Remote work provides them with the flexibility to maintain productivity while minimizing the risk of exposure to the virus. Moreover, safety protocols such as social distancing and sanitization procedures are generally well-received as they contribute to a safer working environment.

Despite the benefits of remote work, older employees may face challenges in adapting to digital collaboration tools and virtual communication platforms. The sudden transition to remote work may exacerbate feelings of isolation and disconnect, particularly for those who are less familiar with technology. (Kyriakopoulos, G. L., Moysiadis, T., & Papakitsos, E. C., 2021) Collaborative tasks that were previously conducted in person may now require additional effort to coordinate effectively, leading to potential frustrations and inefficiencies.

**Main Problems Regarding Digital Transformation** - What are the main problems faced by employees over 50 years old regarding the digital transformation process?

Navigating the digital transformation process poses significant challenges for older logistics workers in Greece. Foremost among these challenges is the technological literacy gap, wherein older workers may grapple with the adoption of novel digital tools and systems. (Kyriakopoulos, G. L., Moysiadis, T., & Papakitsos, E. C., 2021) Concurrently, resistance to change emerges as a substantial barrier, as older workers may exhibit reticence towards embracing new technologies, fearing potential job displacement or becoming overwhelmed by the rapid pace of transformation. Furthermore, the restricted access to age-appropriate training programs and support mechanisms exacerbates these

challenges, impeding the acquisition of requisite digital skills among older workers (European Commission, 2019; Eurostat, 2021).

As explained, one of the main problems is the technological literacy gap, where older workers may struggle to adapt to new digital tools and systems (Eurostat, 2021). This gap can hinder their ability to perform tasks efficiently and may lead to feelings of frustration and inadequacy (Eurofound, 2018).

Resistance to change is another significant barrier faced by older employees in Greece. Research by the European Commission highlights that older workers may find it challenging to embrace new technologies and workflows, fearing job displacement or becoming overwhelmed by the rapid pace of transformation (European Commission, 2019).

Moreover, limited access to age-appropriate training programs and support mechanisms exacerbates these challenges, impeding the acquisition of requisite digital skills among older workers (European Parliament, 2019). This lack of access to training opportunities can further widen the technological literacy gap and hinder the professional development of older employees.

Age discrimination and stereotypes also contribute to the challenges faced by older workers in Greece during the digital transformation process. Eurofound's study reveals that older workers may encounter biases in hiring and training opportunities, as well as assumptions about their ability to adapt to technological changes (Eurofound, 2020).

**Impact on Training and Skills Development** - How has their training and skills development been affected by the pandemic and digital changes, in Greece?

The COVID-19 pandemic has catalyzed profound disruptions in the realm of training and skills development for logistics workers over 50 in Greece. With the imposition of restrictions on in-person activities and concomitant disruptions in workplaces, traditional training modalities have become less accessible. Although remote work arrangements offer avenues for virtual training, they may fail to adequately cater to the specific needs of older workers. Consequently, older logistics workers in Greece confront hurdles in keeping abreast of digital advancements, thereby exacerbating concerns regarding their long-term employability and career trajectories (European Commission, 2020; European Agency for Safety and Health at Work, 2020).

The training and skills development of employees over 50 in Greece have been significantly impacted by the COVID-19 pandemic and the concurrent digital changes. The pandemic-induced disruptions have necessitated adaptations in traditional training methods, leading to both challenges and opportunities for skill development.

The restrictions imposed to curb the spread of the virus have limited in-person training opportunities, forcing organizations to shift towards virtual training modalities (Katsikas, D., & Kokkinos, A., 2020). While remote training offers flexibility and accessibility, it may not adequately cater to the specific needs of older workers. Research by the European Commission indicates that older employees may face difficulties in adapting to digital training platforms and may require additional support to navigate virtual learning environments (European Commission, 2020).

Furthermore, the rapid digitalization of workplaces, spurred by the pandemic, has necessitated the acquisition of new digital skills. Employees over 50 in Greece may find themselves in need of upskilling



or reskilling to keep pace with evolving job requirements. However, limited access to age-appropriate training programs and support mechanisms may hinder their ability to acquire these skills effectively (Eurostat, 2021).

Despite these challenges, the pandemic has also presented opportunities for skills development among older workers. Remote work arrangements have provided employees with more time and flexibility to engage in self-directed learning and skill-building activities. Additionally, organizations and educational institutions have increasingly offered online training courses and webinars tailored to the needs of older workers, facilitating their professional development (European Agency for Safety and Health at Work, 2020).

The pandemic has underscored the importance of digital skills in navigating the changing landscape of work, making it imperative for employees over 50 in Greece to adapt and acquire new competencies. Employers, policymakers, and training providers must collaborate to ensure that older workers have access to relevant training opportunities and support mechanisms to enhance their skills and remain competitive in the digital era.

**Needs Created and Skills Acquired by Workers Over 50 Locally** - What needs were created and what skills were acquired by workers over 50, in Greece?

The evolving landscape of work in Greece, influenced by factors such as the COVID-19 pandemic and digital transformation, has created new needs and opportunities for workers over 50. These changes have necessitated the acquisition of new skills and the adaptation of existing ones to remain competitive in the workforce.

One of the primary needs created for workers over 50 in Greece is the acquisition of digital skills. The rapid digitalization of workplaces, accelerated by the pandemic, has highlighted the importance of proficiency in digital tools and technologies (Tzannatos, Z., & Monastiriotes, V., 2021). Employees over 50 may need to acquire skills such as digital literacy, proficiency in using communication and collaboration platforms, and data analysis capabilities to effectively navigate the digital landscape (Eurostat, 2021).

Additionally, the shift towards remote work has emphasized the importance of adaptability and resilience. Workers over 50 in Greece may need to develop skills in remote collaboration, time management, and self-motivation to thrive in a virtual work environment (European Commission, 2020).

Furthermore, the pandemic has underscored the significance of health and safety skills. Employees over 50 may need to acquire knowledge and competencies in areas such as hygiene practices, workplace safety protocols, and mental health awareness to ensure their well-being in the workplace (European Agency for Safety and Health at Work, 2020).

In response to these emerging needs, workers over 50 in Greece have acquired a range of skills to adapt to the changing demands of the workforce. Many have embraced digital learning opportunities to enhance their digital literacy and acquire new technical skills (ILO, 2020). Research by Eurofound suggests that older workers have demonstrated resilience and adaptability in upskilling and retraining efforts, leveraging their experience and expertise to navigate through the challenges posed by the pandemic and digital transformation (Eurofound, 2020).

Moreover, older workers in Greece have developed skills in remote collaboration, problem-solving, and resilience as they navigate the complexities engendered by the pandemic and digital transformation (European Commission, 2021). These skills not only enable them to thrive in the current work environment but also position them to contribute positively to organizational resilience and innovation.

## 2.3. Summary and Intermediate Conclusions

### *Conclusion*

In conclusion, logistics workers over 50 in Greece encounter multifaceted challenges in acclimatizing to digital transformation and maneuvering through the vicissitudes instigated by the COVID-19 pandemic. By addressing the technological literacy gap, furnishing tailored training and support, and leveraging indigenous initiatives, Greece can empower its mature workforce to flourish within the evolving terrain of digital logistics. Ultimately, nurturing the skills development and resilience of older workers remains paramount for ensuring their sustained relevance and contributions to the logistics ecosystem in Greece.

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### 3. Focus group (*if applicable*)

STHEV in cooperation with RMR IKE organized a focus group on 16 April, 16:30 to 17:30 local time, on the topic: Transport and logistics - The challenges of the sector in the digital future. It was conducted through the Zoom online platform, and the total number of participants was 10 people from logistics companies.

During the focus group, the DiRECT project and its activities were briefly presented, as well as the results of the research conducted. This helped to provide new ideas and knowledge to all participants, encouraging them to explore the new trends and challenges the industry is facing in the digital world.

At the end of the focus group, an interesting discussion was held with the participants, during which the different aspects of the topic were further explored, thus enhancing the understanding and exchange of views on the challenges of the digital future in the transport and logistics sector.

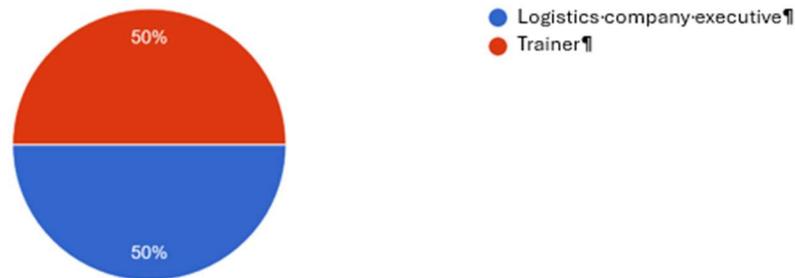
The general feedback was that there is a very important digital skills shortage in the logistic sector especially among employees over 50 and the participants felt that in the future this shortage will be bigger, for this reason they are very interested in training employees in digital skills in order to reduce the shortage and increase efficiency.



# Bulgaria

## 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.

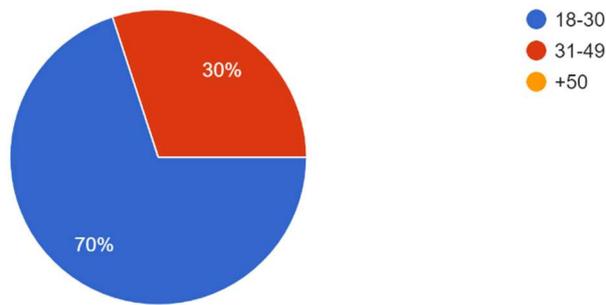


Figure 2. How old are you?

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).

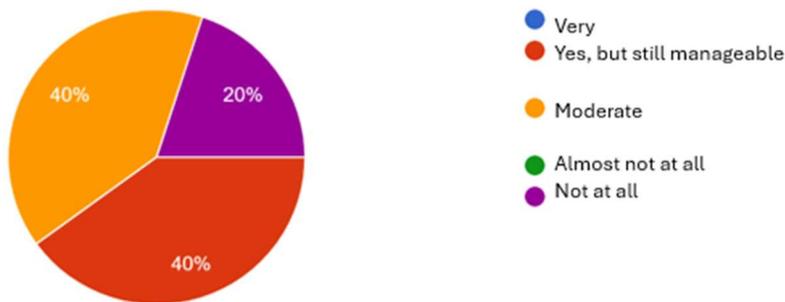


Figure 3. If yes, is your company facing a shortage of logistics professionals?



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

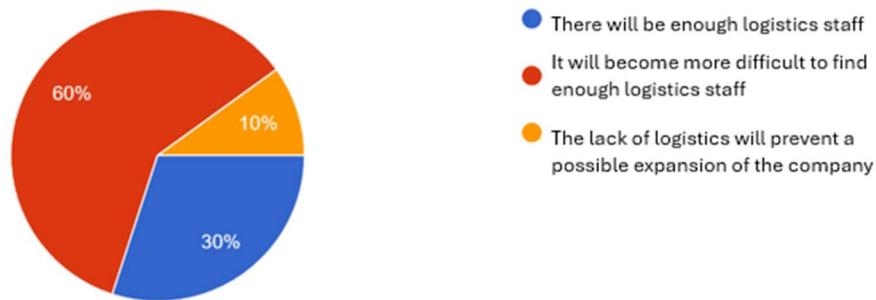


Figure 4 gives a different perspective. Only 30% says there will be enough logistics stuff. It will become more difficult to find enough logistics staff as per the majority of the respondents and for 10% this would prevent a possible expansion of their company.

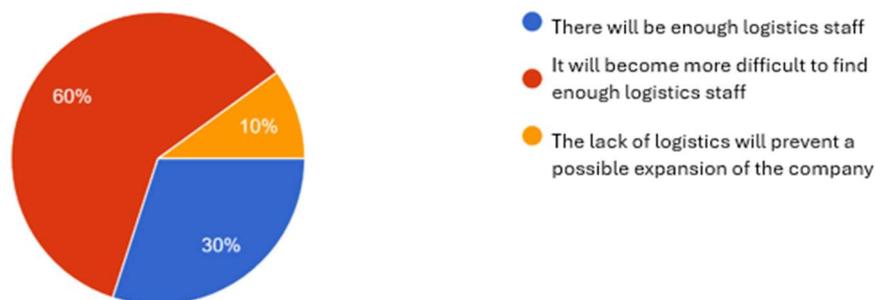


Figure 4. How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?

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 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?

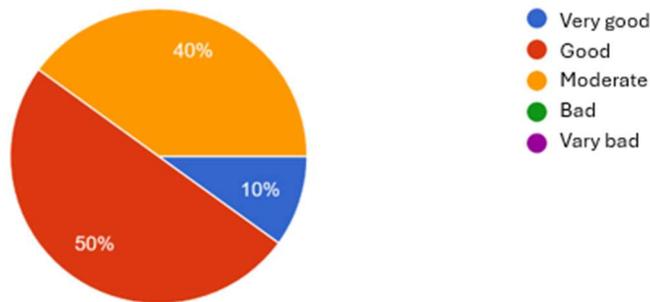


Figure 6. How do you assess the digital skills of your logistics staff (50+ years)?

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.

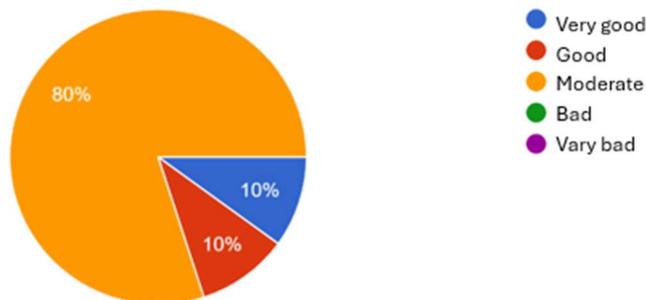


Figure 7. How do you assess the expertise in your company in relation to new technologies in the logistics field?

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.

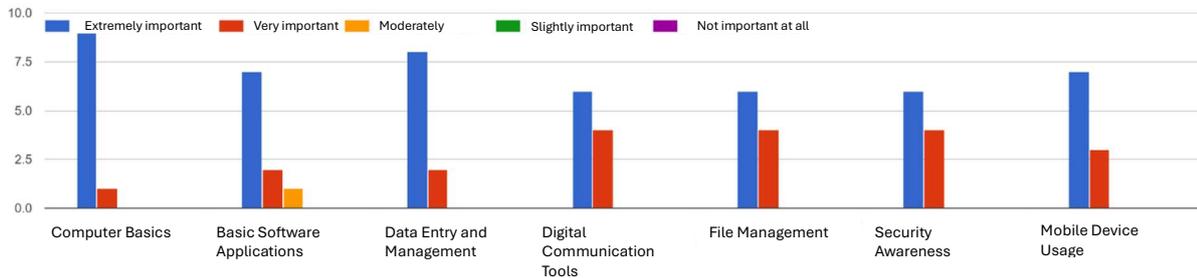


Figure 8. How important are the following basic skills for Employees in logistics

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.

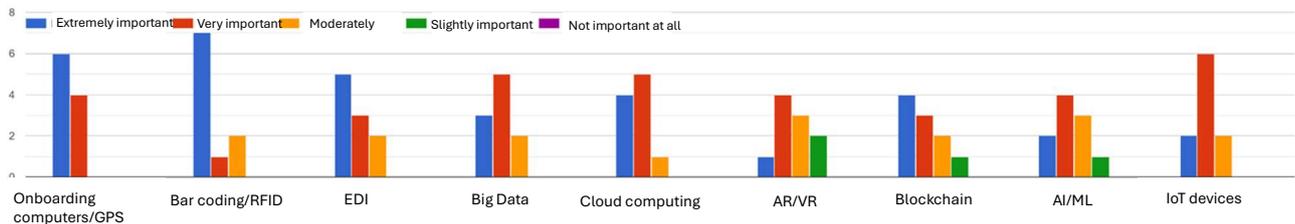


Figure 9. How important are the following technological skills for Employees in logistics

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 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

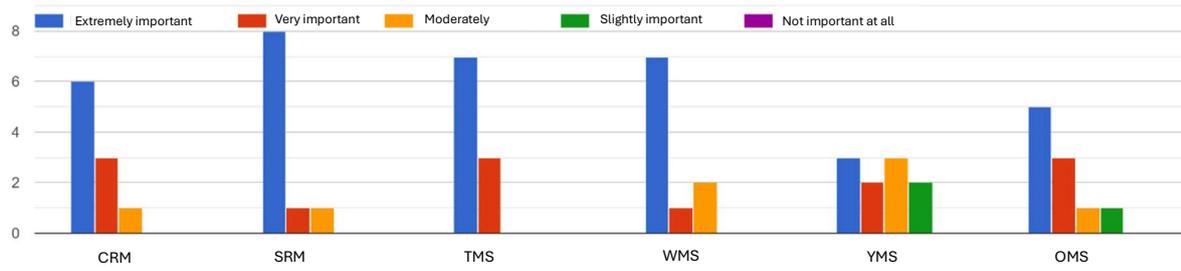
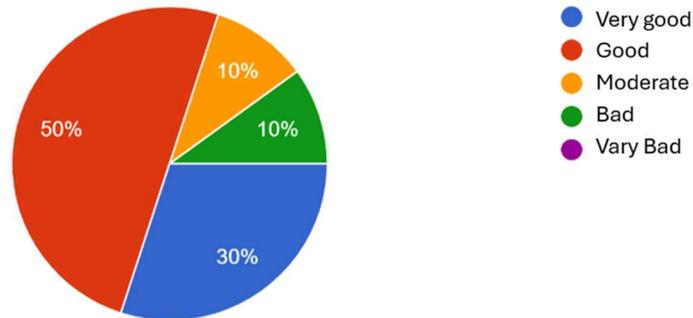


Figure 10. How important are the following systems skills for Employees in logistics

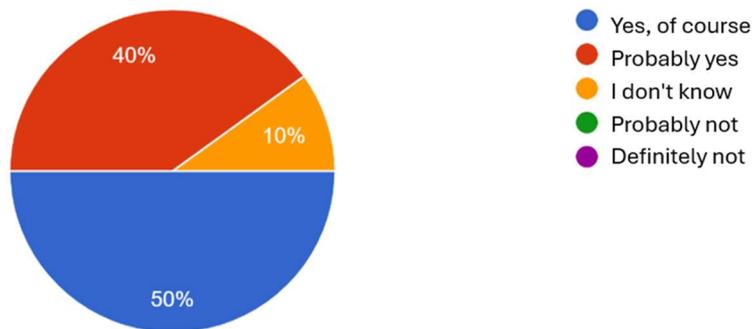


After rating the importance of different systems and technologies in logistics, respondents were asked to assess the overall education and training on new technologies in logistics in their country. Results are presented on Figure 11. Total 80% asses the education and training as Good or Very good.



*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).



*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)

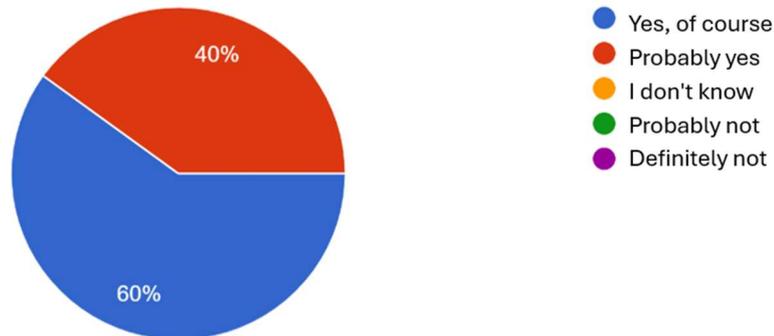


Figure 13. Would you be interested in training your employees over 50 in new technologies in the sector?

## 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.

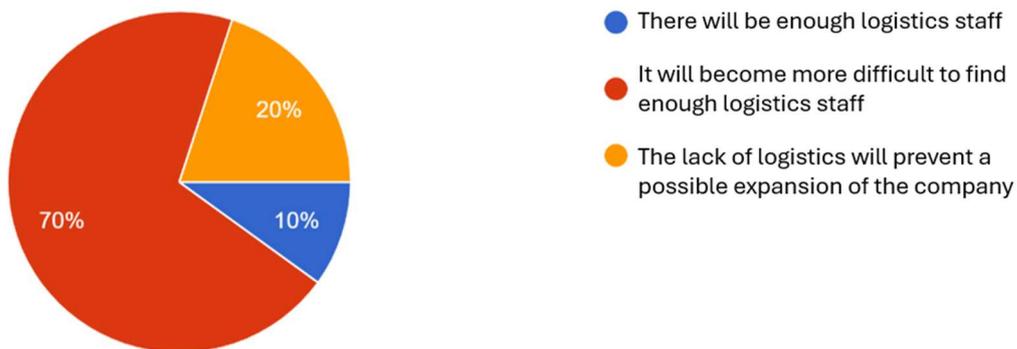


Figure 14. How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?



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?

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'.

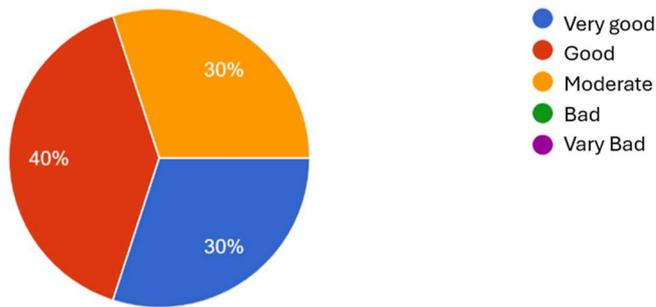


Figure 16. How would you assess education and training on "new technologies in logistics" in your country?

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

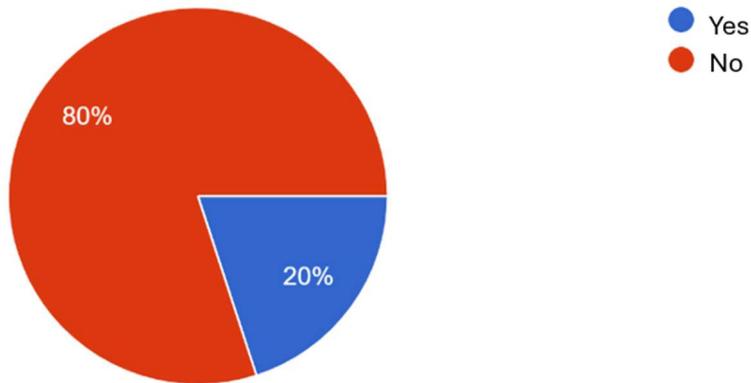
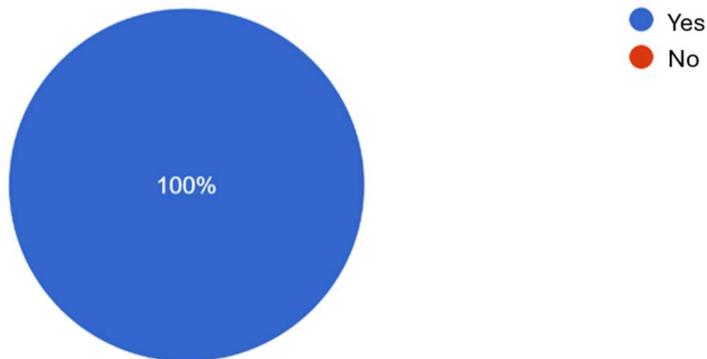


Figure 17. Do you have trainees over the age of 50?

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



sector (Figure 18).

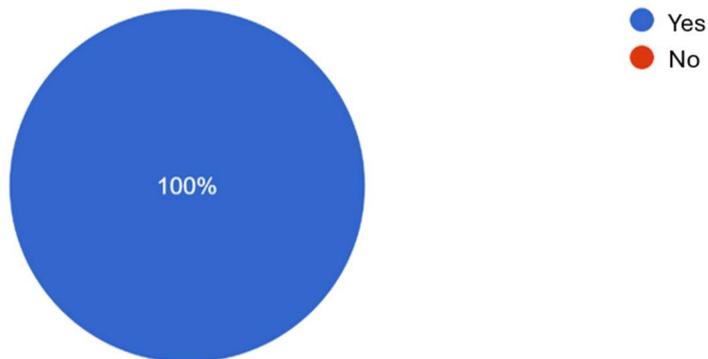


Figure 18. Do you incorporate in your training programmes the new technologies applied in the logistics sector?

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.

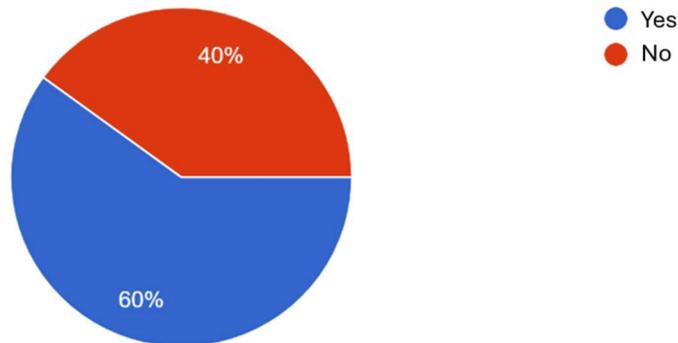


Figure 19. Have you attended specific training on recent developments in the logistics sector?

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

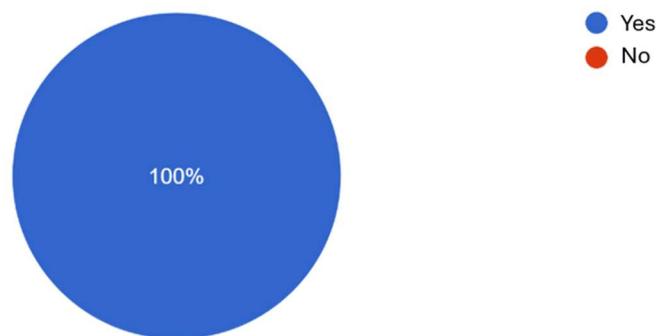


Figure 21) and they adapt their teaching methods according to the needs of logistics learners (

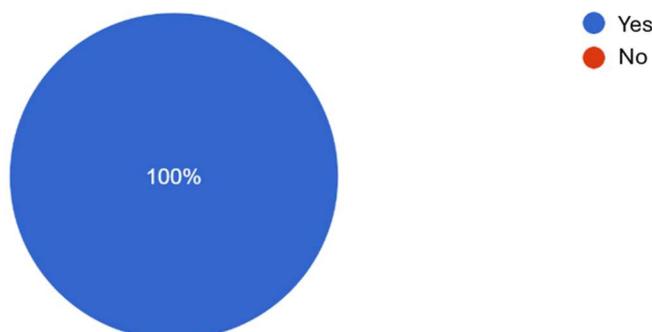


Figure 20). Both trends could be considered as very positive.

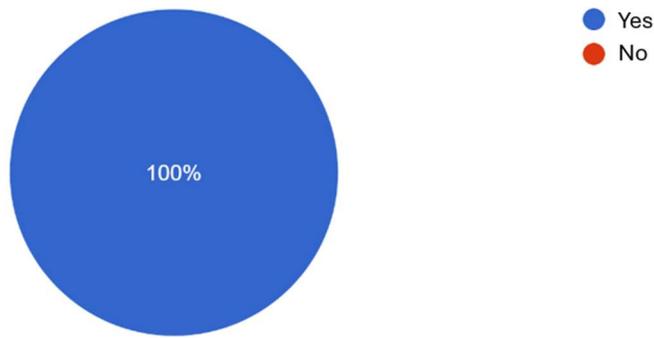


Figure 20. Do you adapt your teaching method according to the needs of logistics learners?

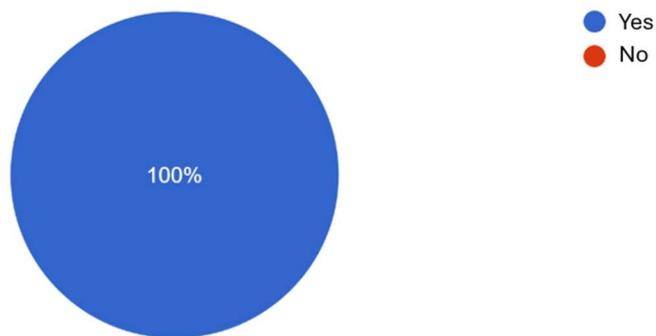
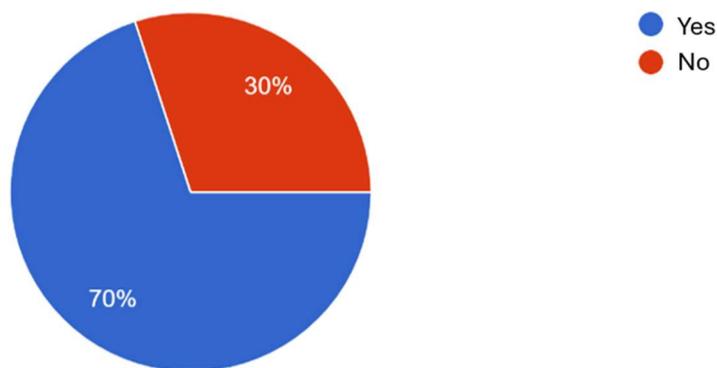


Figure 21. Do you consider continuous training as essential for the development of logistics workers?

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



(  
Figure 22).

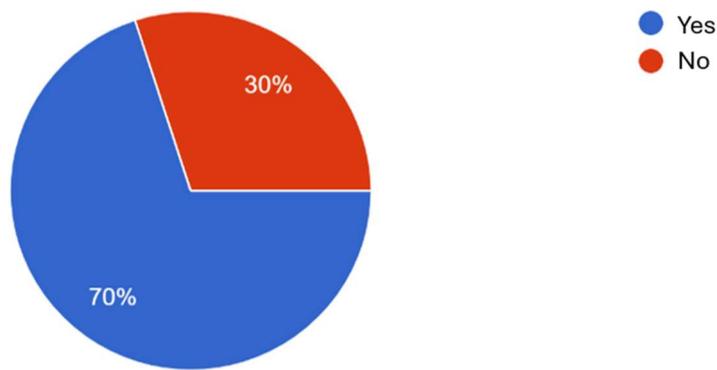


Figure 22. Do you offer practical training or laboratory experience to trainees?

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.

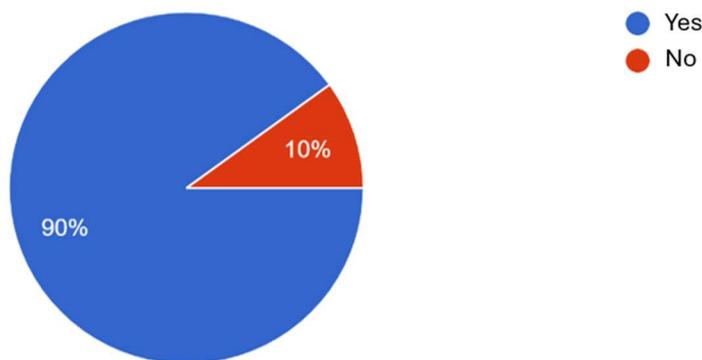


Figure 23. Do you evaluate the performance of trainees during and after the training programs?

### 1.3. Summary

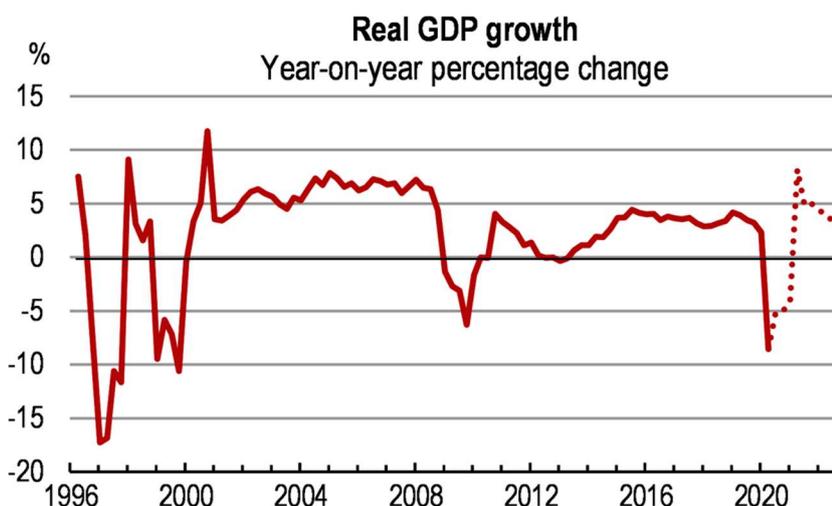
Based on the survey findings conducted among 20 logistics professionals and VET trainers in Bulgaria, it is evident that there is a significant focus on the importance of digital skills and new technologies in the logistics sector. Among logistics company executives, while the current shortage of logistics 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<sup>1</sup>

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



**Figure 24. GDP growth abruptly interrupted**

<sup>1</sup> 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>

**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.**

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.

### 2.1.2. 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**”.<sup>2</sup> 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 Technology and Communication.<sup>3</sup> 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

<sup>2</sup> Council of Ministers, (2020). Digital Transformation of Bulgaria for the period 2020-2030.

<sup>3</sup> 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>.

still significantly trails behind the average digitalization levels seen in European countries. Below are the main results of Ivanov's research:<sup>4</sup>

- 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, 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.

### *2.1.3. 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:<sup>5</sup>

<sup>4</sup> 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.

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



- 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 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 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.<sup>6</sup> 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

<sup>6</sup> 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.

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.<sup>7</sup>

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 logistics industry.<sup>8</sup> 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.<sup>9</sup>

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.<sup>10</sup> 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:<sup>11</sup>

- 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

<sup>7</sup> 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.

<sup>8</sup> 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.

<sup>9</sup> 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.

<sup>10</sup> Ahmedova, S., (2022). “Covid-19 Impact upon the Digitalization of the Transport Sector in Bulgaria”. *Transportation Research Procedia*, Iss. 63, pp. 809–816.

<sup>11</sup> Ahmedova, S., (2022). “Covid-19 Impact upon the Digitalization of the Transport Sector in Bulgaria”. *Transportation Research Procedia*, Iss. 63, pp. 809–816.

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).

- 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.

#### *2.1.4. 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.<sup>12</sup> 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 nearly 200 new specialists within a few years

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



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.<sup>13</sup>

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.<sup>14</sup>

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

<sup>13</sup> 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>.

<sup>14</sup> 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/>



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:<sup>15</sup>

- In the 2022 edition of the Digital Economy and Society Index (DESI), Bulgaria ranks 26<sup>th</sup> 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) and the Confederation of Independent Trade Unions in Bulgaria (CNSB). The research results related to digital skills are the following:<sup>16</sup>

- 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

<sup>15</sup> 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>.

<sup>16</sup> 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>.

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:<sup>17</sup>

- 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 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.<sup>18</sup> These workers

<sup>17</sup> 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. Народно стопански архив, (3), с. 49-70.

<sup>18</sup> 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



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 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.<sup>19</sup>

### 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

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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](https://doi.org/10.1007/978-3-030-22012-9_12).

<sup>19</sup> 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>

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 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 and specific skills 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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# Spain

## 1. Field Research

### 1.1. Logistics company executive

This report introduces the data collected from a wide range of companies, associations, and educational centres in the logistics sector during the two-week period of April 2024 (1-15). The survey has been divided into 2 parts so we can get answers from two different groups of professionals:

- A. Executives in a logistics company
- B. Trainers in logistics

As asked on the guidelines for WP2 we have collected 10 answers from each group of people. We show the results of our survey on the following report.



## **Logistics company executives**

### **How old are you?**

We asked managers about their own age, we can see that the majority are professionals between 31-49 years of age, 80% of them. None of the people answering is below 30 years old, and only 2 of them are over 50. This mean we are getting our data from people with a wide professional experience but not too old as to be not aware about digitalization.

### **Is Your company facing a shortage of logistics professionals?**

The following question was on how the concern of companies about the lack of workers in the future was. There is a worry about the shortage of professionals in this sector, as 40% say they are worried about the lack of professionals, 30% confirm there is a shortage but is under control and another 30% say that the current situation is normal. No one considered the lack of professionals as “something not to worry about”. In conclusion, this is a topic to be concern about.



## **How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?**

When asking directly about this situation in 10 years time, we can find out how worrying is the scenario as all answers confirm that the lack of workers will be a problem in the future: 70% consider that , in the future, they will have to face problems hiring professionals in the logistics field, and, what's more 30% consider the situation as a problem for the company growth and expansion. how In this section we can see that 70% think that it will be difficult to find logistics personnel.

## **How important will digital skills be in the future?**

As we may all agree, digital skills will be relevant in the future. More than that, 8 out of 10 respondents think that digital skills will be very important in the future, and an additional 20% think that they will be quite important. This means a 100% of answers ensuring that digital skills will be an important issue for the future of the company.



### **How do you assess the digital skills of your logistics staff (50+ years)?**

The scenario showed by these answers show that all managers consider their staff over 50 years old not well or very well trained with digital skills. The truth is that half of them consider their knowledge “normal” and the other half bad (40% bad, 10% very bad). This result means that at least, 50% consider that the digital skills of their workers should improve at least to reach a standard or normal scenario.

### **How do you assess the expertise in your company in relation to new technologies in the logistics field?**

In this question there is a variety of answers since 30% say that they have a normal level of knowledge in new technologies. Another 30% say that they have a good level and 10% considered their companies with a very good level of use of new technologies. On the other hand, 30% say that their relationship with new technologies in logistics is bad.

It is important to know that we are not measuring the real level of expertise of the company in relation to new technologies, but what is the situation they think they have with new technologies. No one considers themselves as “very bad” and only one person describe the situation as “very Good”.

### **How important are the following basic skills for employees in logistics**

We wanted to analyse how important they see the following skills for the future. (we show in parenthesis the ranking)

- Computer basics: All managers asked classified it as very important, somewhat important or extremely important, although it was not a top of mind but still very concern about skills on computer basics. (5)
- Basic Software: Same answers as “computer basics”. Managers consider that a basic knowledge of basic software and computers is relevant. (5)
- Data entry and management: considered either extremely important or very important to all respondents (except 2 that classified it as “important”). (4)
- Digital Communication Tools: very important to most of the managers and extremely important to a couple of them. (2)
- File management: even though this topic was ranked last, most answers choose options as very or moderate importance. (7)

- Security awareness: Very important issue, managers say, classifying it as the third topic in order of relevancy. (3)
- Mobile Device Use: Most important based on answers so dealing with mobile devices is a top of mind worry for managers. (1)

### **How important are the following technological skills for employees in logistics?**

- On-board computers and satellite tracking: all answers mark it as extremely important and very important. This is the top of mind topic for this question. (1)
- Bar coding RFID (radio frequency) technology: the opinion of very important dominates, followed by extremely important and moderately important. (4)
- Electronic Data Interchange (EDI): the opinion of extremely important dominates, followed by very important and moderately important. This is considered 2nd in order of importance. (2)
- Big-data: the somewhat important opinion stands out, followed slightly below the normal and very important levels. (6)
- Cloud computing: highlights the moderate level of importance, followed by somewhat important and very important. Finally, we find that they are not very important for managers referring to workers, with a small percentage. (7)
- Augmented Reality (AR) and Virtual Reality (VR): moderate importance and low importance predominate when managers think about this topic and their employees. (8)
- Blockchain (9): not considered very important as to the level of employees in the logistic sector.
- Artificial Intelligence/Machine Learning: the degree of very important stands out highly and quite below moderate importance. (5)
- IoT devices (remote monitoring and telematics): the opinion of very important predominates followed by extreme importance. (3)

### **How important are the following systems skills for employees in logistics**

- CRM (Customer Relationship Management): opinions are divided into very important and extremely important, and this issue is ranked 2 among all options. (2)
- SRM (Supplier Relationship Management Programs): opinions vary between some importance and moderate importance making this option 5th in the rank. (5)

- Transportation Management (Transportation Management Programs): is seen as important and ranked 3 as most respondents mark it as extremely or very important and 1 person ranked it as some importance. (3)
- Warehouse Management System (WMS): the opinion of very important is predominant followed by extremely important and finally 2 people chose it as moderate. (4)
- Yard Management System: has not been seen as important compared to all other options as this skill ranked last among all options. (6)
- Order Management System: leading the importance given by respondents, order Management system is seen as a skill extremely important for employees by half of managers while the other half see it as very important. (1)



### **How would you assess education and training in "new technologies in logistics" in your country?**

Managers consider that the contents of the education system in Spain, related to “new technologies in logistic” are bad (70%) or normal (30%). This data is something that we should be worried about as the contents the companies need for their workers has not been taught to students in logistics. This means we should review this content.

### **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?**

There is a high percentage of managers that do not consider that new technologies or sustainability is something that makes them be more competitive. Probably this question has to be Split into to ask about new technologies and sustainability separately. Still, 60% of them believe that both concepts will be important for their companies in the future. 30% do not know and 10% think it will not be important.

### **Would you be interested in training your employees over 50 in new technologies in the sector?**

All respondents are interested being 80% of them “yes of course” and 20% “probably yes” so this means there is a high demand for training in employees over 50 in the sector of logistics.

## **1.2. Trainer**

In this section we will report the results after collecting the answers from 10 trainers at the logistics sector.

### **How do you think the situation will evolve in terms of logistics recruitment over the next 10 years?**

Trainers are more optimistic with recruitment in the following 10 years than managers as half of them believe there will be enough workers. Still, 50% of teachers think that it will be more difficult to find professionals in logistics and, what more, 10% of them believe that this will be a problem for companies growth in the future.

### **How important will digital skills be in the future?**

All the teachers asked agree that digital skills will be very important in the future.

### **How would you assess education and training on "new technologies in logistics" in your country?**

When asked about contents in education, teachers believe this is something that is not bad (60%) but it should improve (30% think they are bad, 10% think they are very Good).



### **Do you have trainees over 50 years old?**

Most students are below 50 but still there is a high percentage of teachers that have had in class at least a student over 50. We can't ensure the age of students, but we can determine that, even though they are experienced workers, some skills have to be taught at training schools even for those with work experience.

### **Do you incorporate in your training programmes the new technologies applied in the logistics sector?**

Majority of respondents said No (60%,) while the rest of them said Yes. As a result, this may lead to think about the importance of using new technologies at the teaching centre, labs or as a tool when talking about remote learning.



**Have you attended specific training on recent developments in the logistics sector?**

Most teachers (70%) have not attended any training to incorporate new technologies or new working methods to their content. There is a short percentage that answer Yes but still this is just 30%.

**Do you adapt your teaching method according to the needs of logistics learners?**

Teachers tend to adapt their content to the needs of logistic learners (70%) but still there is a 30% that do not do it.



**Do you consider that continuous training as essential for the development of logistics workers?**

In this question, 100% of the votes were in favour. This mean that further education will be essential for the future.



### **Do you offer practical training or laboratory experience to trainees?**

In this question 70% said yes to offering practical training in the classroom or work placements to apprentices. On the other hand, 30% say no. It is a good value to offer practical training but we should reach a higher percentage.



## **Do you evaluate the performance of trainees during and after the training programmes?**

In this question, 100% of respondents said yes to the evaluation of trainees during and after the training programmes.

### 1.3. Summary

Logistics executives (all participants) consider there will be a lack of professionals in the future and also needs for training their employees. All answers indicated that digital skills are a must for the future and their companies although they considered half of their workers over 50 are bad at assessing digital skills.

When asked about specific skills or technologies:

- Mobile device used, digital communication tools, security awareness and data entry and management are basic skills.
- When asked about specific technologies executives considered on board computers and Satellite tracking, Electronic Data Interchange, IoT Devices and BarCode/RFID Technologies as the most important.
- When asked about System Skills: Order management Systems, CRM, Transportation Management and Warehouse Management where ranked on top of mind.

Most executives consider there are high needs for education and training in new technologies as new technology services and sustainability are an important issue for their companies.

Among trainers there is the belief that recruiting professionals will be a problem in the future an digital skills will be crucial, but 60% of trainers still do not incorporate new technologies into their training programs, highlighting the need to improve teaching about tech tools. 70% already include raining or lab experience, but there are still trainers that do not. All teachers that participated in the study consider continuous training essential for development but only 30% of them could attend training on logistics for themselves.

## 2. Desk Research

### 2.1. Impact of Covid in digital logistic sector transformation in Europe

The strategy of the Spanish Government is a commitment to digitalization. Their proposals are based on a series of programmes in coordination with the European Union and the regional governments to develop a digitalisation strategy on multiple ways.

The “Plan Nacional de Competencias Digitales” (National Digital Skills Plan) include different lines of action, specifically 7, which summarise the entire digitisation strategy implemented. Of these 7 lines of work, there is an important concern for digital skills during working life, development of digital skills in SMEs, promotion of ICT specialists and digitisation in the education sector, which shows the important weight that digitisation has for the productive sector in general.

Specifically, for the logistics sector, there are a series of proposals and plans that are included in the Observatory of Transport and Logistics in Spain, an entity created specifically to understand the needs of this sector, which is considered strategic. Among others, this observatory highlights the following factors affecting the logistics sector after COVID.

In 2019, the "Observatorio del Transporte y la Logística en España" published the document "La Transformación Digital del Transporte" (Digital transformation of transport) which establishes the general lines of work in this regard, lays the foundations on what the current situation is and represents the beginning of a series of actions which, however, a year later would be affected by the COVID.

This document establishes the challenges on which to work based on the current scenarios, and the following ideas can be extracted from its reading.

- Although it is not the object of study in this project, energy in general and fuel in particular is a determining factor for the logistics sector, as in the current scenario of price instability, it ends up directly affecting logistics. Therefore, there is a commitment to energy self-sufficiency in Europe to make us less dependent on external energy sources.
- The leading role of distance learning, accelerated development, and implementation of different programs for distance education.
- Increase of online services and products (purchases, exchanges between individuals, consultants, banking, etc.), which will reduce the number of people travelling, but will increase logistics.
- Remote work: a shift away from city centres will be observed as a pattern: transport will need to cover a more dispersed population.
- New last mile solutions: pick-up points, automatic openings of homes or cars, ...
- Need for comprehensive, real-time data collection to identify trends and act accordingly.

Based on the references consulted, the new technologies sector will play a fundamental role in the future of logistics and many other sectors in general, which will lead, if appropriate measures are not taken, to a lack of qualified professionals, as the needs of the logistics sector in terms of digitalisation will be similar in other sectors.

Software programmers, digital application developers, automation and robotics technicians, industrial designers and similar professions will be in high demand in the future.

Specific trainers’ profiles, especially those related to the afore mentioned professions, will also be essential. Another profile of trainers that plays an important role in this digital transformation will be

that of teachers who enable the re-training of active workers, so that their work experience can be combined with the learning of new digital skills.

The role of executives and companies is essential, as the future of the sector and more specifically of the companies they work for will depend on their conclusions, strategies, and leadership. Innovation and the development of new applications will be considered fundamental to gain competitive advantages.

Finally, the different administrations must promote specific training programmes for these sectors and keep continuous training throughout working life of workers in logistics.

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

COVID pandemic, in general, has resulted in an acceleration towards digitalisation: processes that were underway to make a technological and digital transition have been abruptly accelerated by the needs of a pandemic context. The result: there is a strong implementation of digital solutions to various problems that were already present, and companies were working on, but this transition has been done too fast. Therefore, the main conclusion is that the number of digitisation processes, the number of devices and programmes that employees have to work on has increased, and this has led to a need for rapid and sometimes incomplete training, given the rush to implement them.

Based on studies and statistics used for this report we can conclude that majority of Spaniards over the age of 50 use new technologies (smartphones, internet, ...). The National Institute of Statistics has published data stating that more than 90% of citizens between 55 and 64 years of age use the internet frequently. This figure rises to 97% in the population between 45 and 55.

Therefore, the general population is used to interacting with new technologies, but more in a personal context than in a professional one. Data obtained in the questionnaires together with some articles make us think on the use of new technologies in the workplace, which is lower. There is a need for training in some specific skills within the sector.

Different statistics show that, although the majority of Spaniards have digital skills, these are "low, reduced or limited". The figures are worrying if we refer only to the unemployed (40% say they have low or no digital skills). Among employees, the figure is 25%. Among paid workers, 28% say they have basic skills and 46% have advanced skills. There is a general need for digitalization among unemployed population.

In conclusion, although workers may be familiar with certain digital skills (internet, email, ...), there are other skills that need to be fostered to ensure a workforce that is able to reach the needs of digitization.

COVID meant a compulsory adaptation to new digital skills, these needs have been particularly important for workers. Certain work processes have changed radically since the pandemic. An example of this be contactless delivery: the collection of signatures has sometimes been replaced by

a simple photo of the delivered parcel, and the need to go to the customer's door has been replaced by delivery points or specific delivery instructions).

These new processes, which need a greater dependence on new technologies, have been implemented in a rapid and dizzying way, without giving trainers time to prepare their contents, nor employees time to receive adequate instructions and training.

It is necessary to highlight on what the most relevant competences are, to focus on them, to develop content that is acceptable to workers over 50 and to implement it. While most workers may have basic digital skills, training needs to focus on sector-specific digital skills.

Cybersecurity is an very important challenge as phishing, malware, viruses, Trojans, ransomware, hacking, ... are challenges that many workers, especially those who are not digital natives, may have to face and do not have the necessary skills to distinguish them.

There are specific training needs for digital skills related to the needs of the logistics sector for the incorporation of future professionals. In this sense, it is necessary to increase digital training in the classrooms of vocational training schools.

It is an objective of this study, there is a need for retraining in professional skills for workers in the logistics sector, which increases with the age of the workers. These training needs are becoming important given the possibility that there is a lack of logistics professionals, one of the solutions being to extend the active years of those employees already working in the sector.

Conclusions chapter will specify in which fields of knowledge are most interesting to address based on the study carried among the logistic sectors.



## 2.3. Summary and Intermediate Conclusions

Incorporation of a greater number of professionals with programming and technological knowledge into the logistics sector. AI and the automation of processes are in advance thanks to the sector's commitment to reducing working times and costs and being more sustainable. This may lead us to think that not so many workers will be needed, but we must not forget other factors.

E-commerce is reached its peak during the COVID pandemic, when travel constraints forced us to increase logistical needs. Among the needs caused by the pandemic we also find the rapid (and forced) digitalization of companies (increase of teleworking, promotion of online meetings, automation of processes, contactless pick-up/deliveries, ...) and citizens (increase of online transactions, reduction of the use of cash, delocalisation of suppliers, ...).

Therefore, while a number of processes can be automated and developed by artificial intelligence, others require a greater number of professionals who, in turn, need to have knowledge of new technologies and digitalisation, as their work will be closely related. This need for workers will force companies to require profiles that are also needed in other sectors. Continuous training is expected to be essential to ensure that workers have the knowledge, skills and competences needed in their jobs.

On the other hand, new needs are created in companies, which need to incorporate workers with knowledge of programming, digitalisation, robotics, ... most of these being newly created positions (it will be difficult to fill them with existing staff, and more complicated for these positions to be filled by people over 50 years of age).

With regard to the specific contents that need to be reinforced in order to achieve a better digital competence in the logistics sector, these would be:

- Cybersecurity: phishing, hacking, malware, ransomware, spyware, ...
- Management and data entry in management programs (customers, suppliers, transport, ...).
- Use of localization technologies (GPS, tracking, ...).
- Use of data exchange technologies (QR, barcode, RFID...),
- IoT devices that allow the exchange of data and whose activity can be programmed, monitored, ..

In a prominent place in the conclusions, we must also consider Artificial Intelligence, which although it is considered a basic competence for any worker (knowledge of the tools, their possibilities and how to consider them as sources of help or knowledge), more emphasis is placed on more technical profiles.

Being equally worrying, although not as relevant for digital skills in the over 50s, we could consider other aspects.

- Cloud computing, BigData, Blockchain, VR, AR, which are important technologies and need to be developed, but are not considered core competences when thinking about the target group, the over 50s. However, managers and executives in the logistics sector do consider these technologies to be key to the development, not of the future, but of the present of the sector, and are committed to investing in these technologies.

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### 3. Focus group (if applicable)

N/A



# Cyprus

## 1. Field Research

### 1.1 Logistics company executive

- How old are you?

The majority of logistics company executives participating in the survey belong to the core working-age group, with most respondents aged between 30 and 49 years. A smaller proportion is over 50, indicating a relatively balanced but still experienced management structure within the sector.

- If yes, is your company facing a shortage of logistics professionals?

Half of the respondents report that their company is currently facing a shortage of logistics professionals, while more than one third describe the shortage as moderate. Only a small minority indicate that no shortage exists, confirming recruitment as a structural challenge in Cyprus.

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

A strong majority of executives expect recruitment in the logistics sector to become increasingly difficult over the next ten years. This reflects concerns related to demographic change, skills shortages, and growing sectoral demands.

- How important will digital skills be in the future?

Digital skills are considered crucial for the future of logistics. Almost all respondents rate digital competencies as either very important or quite important, underlining their strategic relevance for competitiveness and operational efficiency.

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

The digital skills of logistics employees over the age of 50 are predominantly assessed as moderate, while a significant share is rated as low. This indicates a clear need for targeted upskilling and continuous digital training for older employees.

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

Most respondents evaluate their company's expertise in new logistics technologies as moderate. Around one third assess it as good, suggesting that while basic technological capabilities exist, further development is necessary to fully exploit advanced solutions.

- How important are the following basic skills for Employees in logistics

Basic skills such as computer literacy, use of standard software applications, and mobile device usage are rated as very important for logistics employees. These skills are seen as fundamental prerequisites for daily operational tasks.

- How important are the following technological skills for Employees in logistic

Technological skills related to Electronic Data Interchange (EDI), RFID technology, and IoT-based monitoring systems are considered very important by most respondents. These technologies are viewed as essential for modern logistics operations and transparency.



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

Education and training on new logistics technologies in Cyprus are mainly rated as moderate, with a considerable proportion of respondents describing them as insufficient. This highlights gaps between industry needs and existing training offers.

- 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?

Half of the respondents state that their customers require sustainable and technology-based logistics services. These services are widely perceived as a potential competitive advantage for companies in the future.

- Would you be interested in training your employees over 50 in new technologies in the sector?

A very high level of interest is expressed in providing training on new technologies for employees over 50 years of age. Most executives would support such training free of charge, demonstrating strong willingness to invest in lifelong learning.

### 1. Demographic Profile:

- Respondents include logistics company executives and trainers, with varying ages, highlighting a diverse workforce.

### 2. Professional Shortages and Future Trends:

- There is a noticeable shortage of logistics professionals.
- Recruitment in the logistics sector is expected to become more challenging over the next decade.

### 3. Importance of Digital Skills:

- Digital skills are seen as crucial for future logistics operations.

- The current digital skills of staff, particularly those over 50, need improvement.

#### 4. **Technological Expertise:**

- Companies report varying levels of expertise in new logistics technologies, indicating a need for further training.

#### 5. **Skills Assessment:**

- Basic, technological, and systems skills are all deemed important for logistics employees, with emphasis on continuous improvement.

#### 6. **Training and Education:**

- There is a call for enhanced education and training on new logistics technologies.
- Interest in training employees over 50 in new technologies is high among executives.

#### 7. **Customer Requirements and Competitive Advantage:**

- Customers increasingly demand sustainable and technologically advanced services, which could provide a competitive edge.

### **Comments:**

- **Positive Trends:**

- Acknowledgment of the importance of digital skills and new technologies is a forward-thinking approach that aligns with global logistics trends.

- **Areas for Improvement:**

- Addressing the skills gap in digital competencies, especially among older employees, is critical.
- Enhancing technological expertise across the workforce can improve efficiency and competitiveness.

- **Strategic Recommendations:**

- Invest in targeted training programs to upgrade digital and technological skills of all employees, particularly those over 50.
- Develop strategies to attract and retain young professionals in the logistics sector.
- Focus on sustainable practices and advanced technology to meet customer demands and gain a competitive advantage.

## 1.2. Trainer

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

The majority of trainers expect recruitment in the logistics sector to become more difficult over the next decade, aligning with the views expressed by company executives.

- How important will digital skills be in the future?

All trainers consider digital skills to be important or very important for the future of logistics, confirming consensus across stakeholder groups.

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

Education and training on new logistics technologies in Cyprus are predominantly rated as inadequate. A substantial share of trainers describe the situation as bad or very bad, indicating systemic weaknesses.

- Do you have trainees over the age of 50?

Most trainers report that they work with trainees over the age of 50, highlighting the relevance of age-appropriate digital training approaches.

- Do you incorporate in your training programmes the new technologies applied in the logistics sector?

A clear majority of trainers incorporate new logistics technologies into their training programmes, although a notable minority still do not, often due to limited resources.



- Have you attended specific training on recent developments in the logistics sector?

Only about half of the trainers have attended recent training on developments in the logistics sector, pointing to restricted access to continuous professional development.

- Do you adapt your teaching method according to the needs of logistics learners?

All trainers state that they adapt their teaching methods to the needs of logistics learners, indicating a strong learner-centred approach.

- Do you consider continuous training as essential for the development of logistics workers?

Continuous training is unanimously regarded as essential for the development of logistics workers, regardless of age.



- Do you offer practical training or laboratory experience to trainees?

Most trainers offer practical or hands-on training, which is seen as a key success factor for effective skills development.

- Do you evaluate the performance of trainees during and after the training programs?

Only around half of the trainers systematically evaluate trainee performance during and after training programmes, suggesting room for improvement in quality assurance.

#### 1. Demographic Breakdown:

- The majority of the VET trainers surveyed are experienced professionals with several years in the field.
- A significant portion of respondents are middle-aged, indicating a stable and mature workforce.

#### 2. Educational Background:

- Most trainers possess higher education degrees, with a substantial number holding postgraduate qualifications.
- There is a strong emphasis on continuous professional development among the trainers.

#### 3. Training Needs and Preferences:

- Trainers expressed a need for ongoing training in digital competencies and modern teaching methodologies.
- There is a clear preference for blended learning approaches, combining online and face-to-face training sessions.

#### 4. Challenges Faced:



- A major challenge highlighted is keeping up with technological advancements and integrating them into the curriculum.
- Another significant issue is the lack of resources and support for professional development.

**5. Satisfaction Levels:**

- Overall job satisfaction is moderate, with many trainers feeling the need for more recognition and support from their institutions.
- Workload and administrative burdens are common concerns affecting job satisfaction.

**6. Impact of Training on Career Development:**

- Training and professional development activities are perceived to have a positive impact on career progression and effectiveness in the classroom.

**Comments:**

• **Positive Trends:**

- The high level of educational attainment and commitment to professional development among VET trainers is commendable. This reflects a dedicated workforce that is keen on maintaining high standards of education.

• **Areas for Improvement:**

- Addressing the technological gap is crucial. Institutions should invest in up-to-date training resources and provide ongoing support to trainers in adopting new technologies.
- Reducing administrative burdens and recognizing trainers' efforts more formally could significantly enhance job satisfaction and motivation.

• **Strategic Recommendations:**

- Implement structured professional development programs focusing on digital literacy and innovative teaching practices.
- Foster a supportive work environment by providing necessary resources and reducing unnecessary administrative tasks.
- Introduce recognition programs to acknowledge and reward the contributions of VET trainers, which can boost morale and job satisfaction.

### 1.3. Summary

The survey indicated that in Cyprus there is a diverse workforce with a shortage of logistics professionals, and recruitment challenges expected over the next decade. Digital skills are crucial for future operations, with a need for improvement among staff over 50. Technological expertise varies,

necessitating further training. Basic, technological, and systems skills are all important, with a focus on continuous improvement. Enhanced education and training on new logistics technologies are needed, and there's high interest in training older employees. Customers demand sustainable and advanced services, which could provide a competitive edge. Recommendations include investing in targeted training, attracting young professionals, and focusing on sustainability and advanced technology for competitive advantage.

The survey reveals that most VET trainers in Cyprus are experienced professionals with higher education degrees and a commitment to continuous professional development. Trainers prefer blended learning methods and seek training in digital competencies. Key challenges include keeping up with technology and a lack of professional development resources. Job satisfaction is moderate, affected by workload and a need for more recognition. Training positively impacts career progression. Recommendations include enhancing digital literacy programs, reducing administrative burdens, and implementing recognition initiatives to improve job satisfaction and support professional growth.

## 2. Desk Research

### 2.1. Impact of Covid in digital logistic sector transformation in Europe

#### Overall Digital Sector Transformation in Cyprus:

- **Pre-COVID Trends:** Prior to the pandemic, Cyprus's logistics sector was gradually integrating digital technologies, primarily focused on improving basic operational efficiencies through GPS tracking and electronic data interchange (EDI) systems. The pace of digital adoption was slower compared to broader European standards, largely due to the size of the market and limited investments.
- **Accelerated Change Post-COVID:** The COVID-19 pandemic acted as a catalyst for rapid digital transformation in Cyprus's logistics sector. With the disruption of traditional supply chains and the increased demand for e-commerce, Cypriot logistics companies were compelled to adopt more advanced digital solutions swiftly to cope with new market realities.

#### Transformation of the Digital Logistics Sector Before and After the Impact of COVID-19:

- **Before COVID-19:** The Cypriot logistics sector leaned heavily on conventional methods with minimal reliance on advanced digital technologies. The integration of technology was not deeply entrenched, and many processes remained manual, making the sector less efficient than its European counterparts.
- **After COVID-19:** Post-pandemic, there has been a significant shift towards digital logistics solutions in Cyprus. Technologies such as cloud-based systems for real-time inventory management, advanced analytics for demand forecasting, and automated warehousing solutions have become increasingly prevalent. These changes have not only helped companies manage the volatility in supply and demand but also enhanced overall operational agility.

#### Main Players and Their Role in the Transformation of the Digital Logistics Sector After COVID:

- **Researchers and Analysts:** Local universities and research institutions have undertaken numerous studies to analyze the impact of digital technologies in logistics, providing data-driven insights that help businesses understand evolving trends and prepare accordingly.

- **Technology Executives:** Tech leaders within Cyprus have been pivotal in designing and deploying digital solutions that meet the specific needs of local logistics companies. They have focused on developing scalable solutions that small to medium enterprises can adopt, considering the economic scale of Cyprus.
- **Government Officials:** Cypriot government officials have recognized the need for digital advancement in logistics as critical to economic recovery and resilience. Initiatives such as grants for digital transformation and training programs for digital skills have been launched to support this sector.

#### Statistical Reports/ Surveys:

- **2021 Cyprus Logistics Digital Transformation Survey:** This survey revealed that 68% of logistics companies in Cyprus accelerated their digital transformation plans due to the pandemic. The survey also indicated a substantial increase in investment in mobile technologies and cloud computing.
- **Annual Report on Cyprus's Digital Economy (2022):** This government-issued report details the progress and challenges in digitalizing the logistics sector, showing a 40% adoption rate of IoT devices for fleet management among Cypriot companies.
- **Cyprus Chamber of Commerce and Industry Report:** Focuses on how small to medium-sized enterprises within the logistics sector are coping with digital transformation, highlighting key areas for further development such as cybersecurity and data analytics training.

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

#### Assessment of Changes Brought About by the COVID-19 Pandemic:

- **Initial Reactions:** Employees over 50 in Cyprus's digital logistics sector have generally viewed the rapid digital transformation as a necessary response to the pandemic's challenges. However, there has also been a significant amount of apprehension regarding their ability to adapt to these new technologies and workflows.
- **Long-term Views:** Over time, many have come to appreciate the increased efficiency and potential for remote work that digital tools offer. However, there remains a concern about the fast pace of change and the pressure to continuously adapt to new technologies.

#### Main Problems Faced by Employees Over 50 Regarding the Digital Transformation Process:

- **Technological Adaptation:** The biggest challenge faced by older workers is the shift from manual, paper-based processes to digital platforms. Many express difficulties in adapting to interfaces that are not always designed with older users in mind.
- **Job Security:** There is a pervasive fear among older employees that their skills may become obsolete, making them less competitive in the job market. This fear is compounded by a perceived preference for younger, more tech-savvy employees within the sector.
- **Cultural Shifts in the Workplace:** The move towards digital logistics often entails a cultural shift towards more data-driven management practices. Older employees sometimes feel marginalized by these shifts, which can overlook the value of experience and hands-on knowledge.

#### Impact on Training and Skills Development:

- **Access to Training:** While there have been efforts to provide digital skills training, older workers in Cyprus often report that these programs are too basic or not tailored to their



specific needs in logistics. There is a noticeable gap in training that addresses intermediate or advanced digital skills.

- **Effectiveness of Training Programs:** Feedback on the effectiveness of training programs has been mixed. Some older workers find the pace of these programs too fast and the content sometimes irrelevant to their actual job functions. There is a call for more personalized, job-specific training that considers the existing skill levels of older workers.

#### **Needs Created and Skills Acquired by Workers Over 50:**

- **New Skills Needs:** The digital transformation has created a need for skills in areas such as digital communication, data analysis, and the use of enterprise resource planning (ERP) systems. There is also a growing demand for skills in cybersecurity as logistics systems become more interconnected.
- **Skills Acquisition:** Among those who have successfully adapted, many older workers have acquired foundational digital skills that enhance their job performance. Some have also taken the initiative to learn through online platforms outside of formal workplace training, demonstrating a proactive approach to personal and professional development.

## 2.3. Summary and Intermediate Conclusions

As the COVID-19 pandemic unfolded, Cyprus's logistics sector saw a marked increase in digital technology adoption. Before the pandemic, the integration of digital tools was gradual, focusing mainly on enhancing certain efficiencies. The sudden onset of the pandemic, however, necessitated a quicker pace of digital adoption to cope with new operational challenges such as maintaining social distancing and managing irregular demand.

Technologies that were previously considered advanced, like artificial intelligence, the Internet of Things, and cloud computing, became more essential. These tools helped companies manage increased e-commerce traffic and improve the resilience of supply chains. The role of technology leaders and government officials was significant in this transition, as they helped facilitate the adoption of these technologies through innovations and supportive policies.

However, this rapid shift brought challenges, especially for older workers in the sector. Many of these workers had to move away from familiar manual processes to new digital platforms, a transition that was not easy for everyone. The training programs meant to help them often did not meet their needs, being either too basic or not directly relevant to their specific job functions.

Moreover, concerns about job security became more pronounced among older employees. There was a feeling that the new, digitally-focused work environment favored younger employees who were more accustomed to using digital tools. This situation highlighted the need for policies and practices that support older workers' integration into the evolving digital landscape while recognizing their valuable experience.

Looking forward, the challenge for Cyprus's logistics sector is to maintain its technological momentum while ensuring that all parts of its workforce, including older employees, are equipped to thrive. The goal is to create a work environment where digital tools are used effectively and all employees feel valued and skilled enough to contribute to their fullest potential.

## 2.4. Bibliography Resources

1. "Digital logistics and the technology race" by McKinsey: [The survey findings suggest that reimagining work processes in conjunction with technology is crucial for achieving expected ROI<sup>1</sup>. Digital logistics and the technology race | McKinsey](#)



2. [“Future of Work in Logistics” Trend Report by DHL: This report explores how COVID-19 has accelerated the digital transformation of logistics to meet growing demand, alleviate labor shortages, and enhance supply chain resilience<sup>2</sup>. Read the report](#)
3. [“What Will Logistics Look Like After The Pandemic?” by Forbes: It highlights companies that have successfully transformed themselves to weather the storm<sup>3</sup>. Read more](#)
4. [“Logistics: Challenges and Opportunities in the Post-COVID-19 World” by Atos: It discusses how logistics companies have adapted to the challenges posed by COVID-19 and the importance of ongoing innovation<sup>4</sup>. Read more](#)

5. 2021 Cyprus Logistics Digital Transformation Survey:

Read the survey: [ICT CYPRUS REPORT 2021.pdf \(ccs.org.cy\)](#)

6. Annual Report on Cyprus’s Digital Economy (2022):

The report delves into various aspects of digital transformation, offering valuable data and analysis.

Explore the report: [Cyprus in the Digital Economy and Society Index | Shaping Europe’s digital future \(europa.eu\)](#)

Cyprus Chamber of Commerce and Industry (CCCI) Report:

This resource provides practical insights for businesses aiming to enhance their digital capabilities.

[CCCI | Cyprus Chamber of Commerce and Industry](#)



### 3. Focus group *(if applicable)*

*please describe your focus group, for example, job title, number of participants, when it happened, how it happened, feedback.*

You text

*In a focus group discussion with eight logistics executives and trainers in Cyprus, that took place online the following key points were highlighted:*

1. **Demographic Diversity:** *Participants varied in age, reflecting a mix of experience levels within the industry.*
2. **Professional Shortages:** *There is a notable shortage of logistics professionals, and recruitment challenges are expected to grow in the next decade.*
3. **Digital Skills:** *Digital competencies are deemed essential for future operations, with a significant need to improve these skills among older staff.*
4. **Technological Expertise:** *Current expertise in new logistics technologies is moderate, indicating a need for further training and development.*
5. **Skills Importance:** *Basic, technological, and systems skills are all crucial, with an emphasis on continuous improvement.*
6. **Training Needs:** *Enhanced education and training on new logistics technologies are necessary, especially for employees over 50.*
7. **Customer Demands:** *There is a growing demand for sustainable and advanced technological services from customers, which could provide a competitive advantage.*

#### **General Conclusions:**

1. **Emphasis on Digital Skills:** *The logistics sector in Cyprus recognizes the critical importance of digital skills for maintaining competitiveness. There is a clear need to invest in digital literacy and upskilling, particularly for older employees, to bridge the current gaps.*
2. **Addressing Professional Shortages:** *The sector faces significant recruitment challenges. Strategies to attract and retain young professionals are essential to ensure a sustainable workforce for the future.*
3. **Technological Advancements:** *Companies need to enhance their technological expertise to stay ahead. Continuous training programs focused on new logistics technologies will be crucial.*
4. **Importance of Comprehensive Skill Sets:** *A well-rounded skill set that includes basic, technological, and systems skills is vital for logistics employees. Continuous improvement and adaptation to new skills are necessary to meet evolving industry demands.*
5. **Meeting Customer Expectations:** *With increasing customer demands for sustainable and advanced technological services, companies that adapt to these trends will likely gain a*

*competitive edge. Focusing on sustainability and advanced technology is not just beneficial but essential for future success.*

6. **Strategic Focus Areas:** *Investing in targeted training, especially for employees over 50, developing recruitment strategies for younger talent, and prioritizing sustainability and advanced technology will help the logistics sector in Cyprus thrive in a rapidly changing environment.*

## **Demographic Profiles**

### **1. Participant 1 (45 years old, 20 years in logistics):**

- *"Our company is definitely experiencing a shortage of skilled logistics professionals."*
- *"Digital skills are essential. We can't stay competitive without them."*
- *"I agree, especially in integrating advanced systems into our daily operations."*
- *"We should invest in targeted training programs, especially for our older employees."*

### **2. Participant 2 (38 years old, 10 years as a trainer):**

- *"I'm 38 and have been working as a trainer in this field for the past 10 years."*
- *"Basic skills are foundational, but technological and systems skills are increasingly important."*
- *"Focusing on sustainability and advanced technology will help us meet customer demands and stay competitive."*

### **3. Participant 3 (52 years old, extensive logistics experience):**

- *"At 52, I bring extensive experience from various logistics roles."*
- *"Continuous improvement in these areas is crucial for our industry's growth."*

### **4. Participant 4 (47 years old, logistics manager):**

- *"Our company is definitely experiencing a shortage of skilled logistics professionals."*
- *"Enhanced training programs are necessary to keep up with technological advancements."*

### **5. Participant 5 (40 years old, recruitment specialist):**

- *"I foresee recruitment becoming increasingly challenging in the next decade."*
- *"There's a high interest in training our employees over 50 in new technologies."*

### **6. Participant 6 (35 years old, digital logistics coordinator):**

- *"Digital skills are essential. We can't stay competitive without them."*

- *"Our customers are demanding more sustainable and technologically advanced services."*

**7. Participant 7 (50 years old, logistics trainer):**

- *"Our older staff struggle with digital tools, and this needs urgent attention."*
- *"Having these capabilities would definitely give us a competitive edge in the market."*

**8. Participant 8 (43 years old, technology integration specialist):**

- *"We have a moderate level of expertise in new logistics technologies, but there's room for improvement."*
- *"Attracting young professionals to the logistics sector is essential."*

**Professional Shortages and Future Trends**

• **Shortage of Logistics Professionals:**

- *Participant 1: "Our company is definitely experiencing a shortage of skilled logistics professionals."*
- *Participant 4: "Our company is definitely experiencing a shortage of skilled logistics professionals."*

• **Future Recruitment Challenges:**

- *Participant 5: "I foresee recruitment becoming increasingly challenging in the next decade."*

**Importance of Digital Skills**

• **Future Importance of Digital Skills:**

- *Participant 6: "Digital skills are essential. We can't stay competitive without them."*
- *Participant 7: "Our older staff struggle with digital tools, and this needs urgent attention."*

**Technological Expertise**

• **Current Technological Expertise:**

- *Participant 8: "We have a moderate level of expertise in new logistics technologies, but there's room for improvement."*
- *Participant 1: "I agree, especially in integrating advanced systems into our daily operations."*

**Skills Assessment**

• **Importance of Basic, Technological, and Systems Skills:**



- *Participant 2: "Basic skills are foundational, but technological and systems skills are increasingly important."*
- *Participant 3: "Continuous improvement in these areas is crucial for our industry's growth."*

### **Training and Education**

- **Training on New Logistics Technologies:**

- *Participant 4: "Enhanced training programs are necessary to keep up with technological advancements."*
- *Participant 5: "There's a high interest in training our employees over 50 in new technologies."*

### **Customer Requirements and Competitive Advantage**

- **Sustainable and Advanced Services:**

- *Participant 6: "Our customers are demanding more sustainable and technologically advanced services."*
- *Participant 7: "Having these capabilities would definitely give us a competitive edge in the market."*

### **Recommendations**

- **Strategic Recommendations:**

- *Participant 1: "We should invest in targeted training programs, especially for our older employees."*
- *Participant 8: "Attracting young professionals to the logistics sector is essential."*
- *Participant 2: "Focusing on sustainability and advanced technology will help us meet customer demands and stay competitive."*

