SEE-GL

SKILLS AND EMPLOYMENT
ENHANCEMENT IN GREEN LOGISTICS

Research Framework: Socio-Economic Structure and Job Requirements

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1. Introduction

The "Skills and Employment Enhancement in Green Logistics" (SEE-GL) project is a regional initiative implemented in Slovenia, Croatia, Bosnia and Herzegovina, Kosovo, and Montenegro, aimed at modernizing vocational education and training (VET) in the transport and logistics sector. By embedding Environmental, Social, and Governance (ESG) principles into VET curricula, SEE-GL addresses critical regional challenges, including environmental sustainability, labor market adaptability, social inclusion, and good governance.

The project supports the transition toward a green and sustainable logistics industry by equipping professionals with future-oriented skills and fostering cooperation between public and private sector actors. It also promotes the use of digital education tools and alignment with the European Qualifications Framework (EQF) to facilitate mobility and employability. One of the key goals is the development of a new occupational profile - ESG Specialist in Transport Logistics - as well as the improvement of training capacities of VET institutions to respond to evolving labor market demands. Through targeted interventions, SEE-GL contributes to the broader objectives of the Erasmus+ Programme, including green transition, digitalization, social inclusion, and regional cooperation in the Western Balkans.

2. Research Methodology

The report provides an in-depth analysis of national socio-economic conditions, labor market trends, and training requirements in the logistics and transport sector. Special emphasis is placed on green logistics, emerging job profiles, and the evolving qualification standards aligned with the European Qualifications Framework (EQF). The focus is on identifying skill gaps and assessing the readiness of VET systems to support sustainable, inclusive, and future-oriented employment pathways.

Data for this report were collected through a combination of desk research and qualitative fieldwork. Desk research included the review of existing literature, statistical data, national policy documents, and relevant VET frameworks. Fieldwork was conducted through focus group discussions in each participating country—Slovenia, Croatia, Bosnia and Herzegovina, Kosovo, and Montenegro. Each focus group gathered 10–15 participants from a diverse range of stakeholders including logistics professionals, employers, educators, policymakers, and job seekers.

Discussions were guided by a common framework of thematic questions covering:

- Current and future job requirements in the logistics sector
- The rise of green jobs and sustainable employment models
- Career mobility and cross-border recognition of qualifications
- Access to vocational training and upskilling opportunities
- Employment conditions, wage levels, and job security
- Inclusion of ESG principles in vocational practices and training content

The insights gathered were analyzed to identify national trends, priority training areas, and gaps between labor market needs and current educational provision. Each country partner compiled its findings into a national report, which together form the basis of a joint Socio-Economic Research Report. This methodology ensures that the SEE-GL project's training and curriculum development efforts are grounded in real-world labor market evidence and stakeholder perspectives. The research findings will directly inform the design of new VET modules for ESG Specialists in Transport Logistics and contribute to policy recommendations that support sustainable economic development and employment across the region.

3. Focus Group Structure

As part of a broader effort to understand labor market dynamics and socio-economic conditions across target countries, a series of structured focus group discussions was conducted. The primary objective of this qualitative research was to gather in-depth insights into current job qualifications and requirements, the development of green jobs, access to training and education, wage levels, job security, and overall socio-economic challenges facing different stakeholder groups.

Each focus group comprised 10 to 15 participants selected to ensure a broad spectrum of perspectives, including:

- **Government representatives:** Ministry of Transport, Economic policymakers, Environmental regulatory bodies (e.g., sustainability agencies);
- **Industry professionals:** Owners and managers of logistics, transport, and micrologistics companies, Supply chain and freight forwarding experts, Representatives from green logistics startups and innovators;
- **Drivers and logistics workers:** Truck drivers (long-haul and urban logistics), Warehouse staff and distribution center employees, Port and shipping workers;
- **Academia:** Professors and researchers specializing in transport, logistics, and environmental studies, University and highschool students studying transport, logistics, and supply chain management;
- **Employment & training agencies:** Representatives from job placement and vocational training offices, HR professionals from logistics companies, Workforce development specialists;
- **Business associations & trade unions:** Chamber of Commerce representatives, Trade unions for transport and logistics workers, Industry advocacy groups focused on fair wages and working conditions
- **Sustainability & green economy advocates:** NGOs promoting green jobs and sustainable transport, Representatives from EU-funded green transition programs, Climate-focused think tanks and policy experts
- **Technology & innovation experts:** Specialists in digitalization, automation, and AI in logistics, Developers of green transportation solutions (electric/hydrogen trucks, smart logistics), Representatives from research institutions on future mobility solutions.

3.1. Data Collection & Analysis

Data will be collected through desk research and qualitative fieldwork (focus group discussions). Each session was carefully documented, and the resulting insights were synthesized into summary reports. These findings provide a qualitative foundation for understanding country-specific labor conditions and the evolving needs of the logistics and transport workforce, with particular attention to green transition imperatives within the logistics sector.

4. Country-Specific Research Summaries

This section presents a summary of the country-specific research conducted through focus groups and desk analysis.

4.1. Country: Bosnia and Herzegovina

Focus group participants:

- Government representatives (Employment Bureau Kiseljak, Ministry of Transport and Communications of the Herzegovina-Neretva Canton)
- Logistics and transport Companies - Public Sector (Public Company Railways of the Federation of Bosnia and Herzegovina Ltd. Sarajevo, JP BH POŠTA d.o.o. Sarajevo),
- Educational and Training Institutions (Professors from Transport Engineering Study Program CEPS Kiseljak, The Ministry of Education, Science, Culture, and Sport of the Zenica-Doboj Canton, the Department for Traffic Education)
- NGO (The Chamber of Commerce of the Federation of Bosnia and Herzegovina)
- Private company representatives (Almy transport, Samer & Co. Shipping d.o.o. Sarajevo, Transkop d.o.o., Mozzart d.o.o. – Logistics Sector)
- Professional drivers (Milšped BiH).

The interviews were conducted both online and in person. The first meeting served as an orientation, including a discussion about the nature of the project and the interview process. It was agreed that the interview questions would be sent to all participants, who would then provide detailed responses via email to CEPS representatives. A total of 12 individuals from six different relevant sectors participated in this activity.

4.1.1. Socio-Economic Structure in Bosnia and Herzegovina

Bosniaand Herzegovina has a transitional economy with limited market reforms. The economy relies heavily on exports of metals, energy, textiles, and furniture, as well as on remittances and foreign aid. A highly decentralized government hampers economic

policy coordination and reform, while excessive bureaucracy and a fragmented market discourage foreign investment.(1)

The industrial sector is diverse, with metal processing serving as the backbone of the economy, focused on steel production in Zenica and Olovo and aluminum in Mostar (Aluminij Mostar). This export-oriented sector is among the largest employers in the country. The automotive components industry comprises over 60 companies, employing around 11,000 people and exporting approximately 90% of their output [undp.org]. The chemical and pharmaceutical industries include key players like Bosna lijek and several smaller local firms producing generics, covering 20-25% of the domestic market. In the energy sector, coal-fired power plants in Tuzla, Kakanj, and Ugljevik dominate electricity generation, accounting for about 60%, while renewable energy sources such as hydro (around 2,076 MW installed capacity), wind, and solar are in early stages of development. Mining remains significant with extraction of lignite, iron ore, bauxite, lead, and zinc, alongside emerging lithium exploration. Construction contributes roughly 8% to GDP and 6% to employment, driven by major public infrastructure projects like Corridor Vc. Agriculture accounts for approximately 4-5% of GDP and 17% of employment, producing grains, fruits, vegetables, livestock, dairy, meat, wood, and paper, with fruit growing and fish farming as key segments. The services sector forms about 55% of GDP and employs half of the workforce, with rapid growth in ICT and startups supported by digitalization and banking loans for SMEs. Tourism is also recovering strongly, attracting both international and diaspora visitors, supported by cultural festivals and winter tourism.(2) Bosnia and Herzegovina is at an early stage of preparation for a functioning market economy. In 2023, economic growth slowed to around 1.6%, largely due to adverse international conditions. The public sector is still inefficient and oversized, and the business environment suffers from a fragmented internal market and a weak rule of law. Although some structural shifts are visible-particularly a move toward the service sector (e.g., trade, IT, and tourism)-manufacturing, transport, and energy continue to play significant roles. However, Bosnia and Herzegovina lags behind in both the energy and digital transitions. Its trade integration with the EU is high, but overall trade remains below potential.

Key sectors mentioned in the report (3):

- Energy: Early stage of preparation, with no significant progress made in aligning with EU directives.
- Transport: Some level of preparation, but road safety and intelligent transport systems need major improvement.

[1] Moody'sAnalytics,BosniaandHerzegovina - Economic Indicators: https://www.economy.com/bosnia-and-herzegovina/indicators#ECONOMY

[2] Agencija za statistiku Bosne i Hercegovine, Bosna i Hercegovina u brojkama: https://bhas.gov.ba/Calendar/Category/30

[3] European Commission Staff Working Document: Bosnia and Herzegovina 2024 Report: https://enlargement.ec.europa.eu/document/download/451db011-6779-40ea-b34b-a0eeda451746_en?filename=Bosnia%20and%20Herzegovina%20Report%202024.pdf

- Agriculture and rural development: Limited progress, requiring harmonization and capacity building.
- ICT/Digital transformation: Very early stage, lacking alignment with EU acquis and without a functioning legal framework.

The logistics and transport sector in Bosnia and Herzegovina remains underdeveloped, hindered by outdated infrastructure, limited investment, and regulatory inefficiencies. Despite the country's strategic position as a transit hub in the Western Balkans, systemic issues continue to restrict its full potential. According to the World Bank's Logistics Performance Index, Bosnia and Herzegovina scored 2.6 out of 5 in 2022 for the quality of trade and transport infrastructure, highlighting the urgent need for improvements(4). Key bottlenecks include slow customs procedures, aging infrastructure, and insufficient intermodal capabilities.

Road transport is the dominant mode of freight movement in Bosnia and Herzegovina. The country has a total of 8,150 kilometers of main and regional roads; however, only a small portion meets EU standards. In recent years, investment in road infrastructure has increased, largely through projects co-financed by international financial institutions such as the European Bank for Reconstruction and Development (EBRD) and the European Investment Bank (EIB). Notably, construction work on the Corridor Vc motorway- a key EU transport corridor-has been a major focus of these investments. The railway network in Bosnia and Herzegovina covers approximately 1,030 kilometers, much of which is in need of modernization. Freight volumes transported by rail remain modest, primarily due to slow transit times and infrastructure limitations. Additionally, the sector is challenged by institutional fragmentation between the Federation of Bosnia and Herzegovina and Republika Srpska, which complicates coordination and efficiency in cross-entity rail operations. Bosnia and Herzegovina is served by four international airports: Sarajevo, Banja Luka, Tuzla, and Mostar. Despite this, air cargo accounts for only a small share of total freight volume, owing to limited infrastructure and low demand. Nonetheless, efforts are ongoing to improve air connectivity, particularly for passenger traffic, in an attempt to better integrate the country into regional and global transport networks.

Focus group overview: Socio-Economic Structure in Bosnia and Herzegovina with a review of the logistics sector

Participants emphasized that national-level challenges - such as economic instability, political dysfunction, inflation, high fuel costs, low foreign investment, and emigration - are significantly impacting job availability and business growth. Structural issues like excessive taxation, inefficient bureaucracy, and outdated regulations continue to deter investment and labor market development.

[4] TheWorldBank,LogisticsPerformance Index (LPI) - International Scorecard Page, accessed on 5.4.2025.:https://lpi.worldbank.org/index.php/international/scorecard/line/C/BIH/2023

In the logistics sector, these problems are particularly evident. Companies face rising operating costs, especially in transport and wages, which limit job creation and workforce development. Despite growing demand for logistics services in international trade, firms struggle with poor infrastructure, lack of skilled labor, and limited technological advancement. While young people show interest in logistics careers abroad, limited local training and poor working conditions discourage domestic engagement. Low wages and insecure contracts fuel high turnover and talent loss. Globalization and international trade have brought both opportunities and risks. Participants noted increased job creation due to rising trade volumes and the entry of multinational logistics firms such as DHL and UPS, which support skill development and higher standards. However, Bosnia and Herzegovina has not fully leveraged these advantages due to weak infrastructure and governance. Challenges such as outsourcing, competition from low-cost countries, and vulnerability to global crises were also highlighted. The outflow of skilled workers, especially drivers, remains a major concern.

To address these issues, participants called for regional cooperation, infrastructure investment, and the creation of a national logistics cluster to consolidate resources, promote innovation, and support green logistics. Without strategic reform, the potential of global trade may remain untapped for Bosnia and Herzegovina's logistics workforce.

4.1.2. Job Requirements & Qualifications in Bosnia and Herzegovina

Bosnia and Herzegovina's labor market demonstrates resilience despite challenges posed by workforce emigration and resulting labor shortages. The evolving economy and demographic shifts are driving changes in sectoral demands, with notable growth in hospitality, construction, trade, healthcare, and transport/logistics. This dynamic environment increasingly values a balanced combination of practical skills and formal qualifications, tailored to specific industry needs.

Vocational and technical education plays a crucial role, especially in sectors such as construction, hospitality, administrative services, and logistics, highlighting a clear shift toward job-specific competencies. Healthcare and STEM fields continue to require formal certifications and higher education credentials, while customer-facing roles in trade and tourism emphasize strong communication abilities and often foreign language proficiency. Administrative positions typically call for foundational business knowledge and IT literacy.

Overall, Bosnia and Herzegovina's labor market is adapting to meet evolving economic and demographic realities by fostering a workforce equipped with both academic credentials and hands-on vocational training aligned with sector-specific demands The logistics sector in Federation Bosnia and Herzegovina is characterized by steady but moderate growth, with a 0.9% employment increase reported in 20245. This growth is driven by increased demand for transport, warehousing, and supply chain services, benefiting from the country's strategic geographic location and economic development. Key occupations such as truck drivers, warehouse workers, and logistics personnel remain highly sought after, with a notable projected 67% increase in demand for truck drivers by 2025.(6) Despite its growth, the sector faces challenges including labour shortages caused by workforce emigration and a lack of adequately trained local professionals. The sector's future competitiveness hinges on enhancing vocational education tailored to logistics, upskilling workers with digital competencies related to modern supply chain and fleet management, and fostering targeted workforce development programs.(7) Job postings data from early 2023 showed that transport, storage, and logistics accounted for nearly 10% of all employment advertisements, underlining the sector's growing significance in the national economy. Continued alignment of training and education with the sector's needs is essential to sustain this growth and address labour supply gaps.

Focus group overview: Job Requirements & Qualifications in in Bosnia and Herzegovina with a review of the logistics sector

In traditional logistics, foundational competencies include supply chain management, inventory and warehouse operations, transport planning, use of ERP/TMS/WMS systems, and knowledge of customs and regulatory standards. Soft skills such as communication, problem-solving, teamwork, and foreign language proficiency also play a crucial role, especially for administrative and coordination roles. Technical education in transportation, logistics, or engineering is commonly required, along with certificates like ADR for hazardous goods and ISO standards for quality and environmental management. The green logistics sector builds on these traditional competencies with an added emphasis on sustainability and eco-efficiency. This includes skills in route optimization for fuel reduction, energy-efficient driving (eco-driving), implementation of circular economy principles, and knowledge of technologies that minimize emissions and waste. Expertise in renewable energy use, green finance, and regulatory compliance with EU environmental directives is becoming increasingly valuable. As logistics evolves toward digitalization and sustainability, the sector demands a workforce that is both technically skilled and environmentally conscious, highlighting the need for continuous learning and specialized training programs.

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5 Federalni zavod za zapošljavanje Sarajevo.Izvještaj o istraživanju tržišta rada u Federaciji BiH 2024/2025: https://www.fzzz.ba/ckFinderFiles/files/Izvje%C5%A1taj%20o%20istra%C5%BEivanju%20tr%C5%BEi%C5%A1ta%20rada%20u%20FBiH%202024-2025.pdf?csrt=2450963473142906308

6 MojPosao.ba. Analiza tržišta rada 2024: Potražnja za radnicima pala, nastavak negativnog trenda se očekuje i u 2025!: https://www.mojposao.ba/post/analiza-trzista-rada-2024-potraznja-za-radnicima-pala-nastavak-negativnog-trenda-se-ocekuje-i-u-2025-mojposaoba/5238?page=1

7 Agencija za rad i zapošljavanje Bosne i Hercegovine. Istraživanje tržišta rada u Bosni i Hercegovini: https://arz.gov.ba/Dokumenti/Fajlovi/Istrazivanje%20trzista%20rada%202023%202024%20ARZ.pdf

4.1.3. Green Jobs and Economy in Bosnia and Herzegovina

Bosnia and Herzegovina is beginning its transition toward a green economy, with significant opportunities for new employment- especially as international investments and projects take shape. A World Bank-backed €90.7 M initiative supports the shift from coal to renewables in coal regions like Banovići and Zenica, aiming to increase renewables' share to 43.6% by 2030.(8) The SME Go Green program (EBRD/EU) is mobilizing €120–400 M across the Western Balkans to help SMEs adopt green technologies in sectors such as agriculture, wood, and metal. Local grants have been used for solar energy setups, resource efficiency, and green business models, creating green job opportunities in rural and industrial areas.(9) Programs like EU4Employment are investing €5.5 M to train ~1,800 mostly young or vulnerable jobseekers for green and digital transitions, aiming to fill at least 600 roles in green sectors.(10) Studies conducted by UNDP and the Environmental Protection Fund of FBiH represent a significant contribution to raising awareness about the potential of green jobs in Bosnia and Herzegovina(11), showing that energy efficiency measures not only support environmental protection but could also create up to 4,000 new jobs annually.(12) The logistics sector in Bosnia and Herzegovina shows slow growth in opening opportunities for green jobs.

Focus group overview: Green Jobs and Economy in Bosnia and Herzegovina with a review of the logistics sector

The transition toward green logistics in Bosnia and Herzegovina faces significant challenges, including underdeveloped infrastructure, lack of government incentives, and low awareness of sustainable practices among stakeholders. Although there is growing interest in supporting green business initiatives abroad, locally, obstacles such as limited availability of electric vehicle charging stations, insufficient investment in modern warehouses, and financial constraints hinder progress. Public-private partnerships and subsidies are seen as vital tools to support workforce development and ease the financial burden on employers. However, the current market demand for green jobs is minimal, and green policies have yet to meaningfully influence employment or labor requirements within the logistics sector.

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[8] Reuters. ***World Bank to support Bosnia's energy transition with $90.7 million loan:*** https://www.reuters.com/business/energy/world-bank-support-bosnias-energy-transition-with-907-million-loan-2025-05-05/

[9] European Bank for Reconstruction and Development (EBRD). ***EBRD and EU support green and sustainable transition in Bosnia and Herzegovina***:https://www.ebrd.com/home/news-and-events/news/2024/ebrd-and-eu-support-green-and-sustainable-transition-in-bosnia-and-herzegovina.html

[10] Delegation of the European Union to Bosnia and Herzegovina & European Union Special Representative in Bosnia and Herzegovina. ***European Union Launches €5.5 Million Project to Create New Jobs in Bosnia and Herzegovina***: https://www.eeas.europa.eu/delegations/bosnia-and-herzegovina/european-union-launches-€55-million-project-create-new-jobs-bosnia-and-herzegovina_en

[11] UNDP Bosnia and Herzegovina. ***Zeleni poslovi - Analiza uticaja mjera energetske efikasnosti na zapošljavanje u BiH***: https://www.undp.org/bs/bosnia-herzegovina/publications/zeleni-poslovi-analiza-uticaja-mjera-energetske-efikasnosti-na-zaposljavanje-u-bih

[12] Fond za zaštitu okoliša Federacije BiH. ***Predstavljena studija „Zeleni poslovi" – mogućnost otvaranja 4000 novih radnih mjesta u BiH godišnje***: https://fzofbih.org.ba/predstavljena-studija-zeleni-poslovi-mogucnost-otvaranja-4000-novih-radnih-mjesta-u-bih-godisnje/

A major barrier to advancing green logistics is the gap in education and skills, as many workers lack the expertise needed to operate with new technologies, such as electric vehicles and digital route optimization tools. Companies often have to train existing employees or seek new, specialized staff, which is complicated by an absence of green logistics programs in formal education systems. While some logistics firms have adapted to European Union standards-particularly regarding vehicle emissions and operational regulations-these adaptations mostly address compliance rather than proactive sustainability transitions. Increased awareness campaigns, educational reforms, and stronger collaboration between government bodies and industry could improve readiness for green logistics, but until now, legislative and infrastructural support remains limited. Despite the slow pace of adoption, experts see green logistics as a crucial element for future economic sustainability, projecting substantial job creation in environmentally sustainable sectors globally. The shift demands significant retraining and mindset changes among workers and employers alike. To foster this transformation, a multifaceted approach involving subsidies, tax incentives, enhanced education and training, legislative reforms, and promotion of innovation is essential. Without coordinated efforts and substantial investments, the logistics sector risks lagging behind in sustainable development, missing opportunities for both environmental benefits and economic growth. However, as environmental awareness grows and global standards tighten, pressure will mount for Bosnia and Herzegovina to accelerate the green transition in logistics.

4.1.4. Career Paths in Bosnia and Herzegovina

In Bosnia and Herzegovina, career paths across key industries typically begin with entry-level positions that, through experience and additional qualifications, lead to more specialized and managerial roles. In Information Technology, professionals often start as junior developers or IT support and advance toward senior developers, project managers, or cybersecurity experts, driven by strong demand from digitalization and EU market integration. Manufacturing and industry careers usually begin in technical or machine operation roles, with progression to supervisory or managerial positions, supported by technical education and on-the-job training amid growing export industries. The finance and banking sector sees career growth from teller or junior analyst roles to credit analysts and branch managers, boosted by increasing financial literacy and EU-aligned regulations. Healthcare professionals start as junior doctors or nurses, advancing through specialization and sometimes into administration, reflecting public sector reforms and private healthcare growth. Tourism and hospitality careers often begin in reception or service roles, with opportunities to move into management or specialized fields like event planning due to regional tourism expansion. Finally, the transport and logistics sector typically offers operational entry roles such as warehouse workers or dispatchers, with career advancement to logistics coordinators or supply chain managers supported by technical knowledge and certifications, responding to rising e-commerce demand and improved regional connectivity.

Based on existing data and typical trends observed in Bosnia and Herzegovina, the logistics sector offers career paths starting from operational roles such as warehouse workers and dispatchers, progressing toward supervisory and management positions like logistics coordinators and supply chain managers. This progression is often facilitated by additional training, certifications, or formal education in logistics and related fields. The sector is experiencing steady demand due to growing trade volumes, e-commerce expansion, and increasing regional connectivity. However, challenges persist, including a shortage of skilled workers with both practical experience and digital competencies such as ERP and transport management systems. Awareness and implementation of green logistics practices remain limited but are gradually gaining attention, reflecting wider sustainability goals.

Focus group overview: Career Paths in Bosnia and Herzegovina with a review of the logistics sector

Career development opportunities in Bosnia and Herzegovina's logistics sector exist but are shaped by various factors including company size, market conditions, and socio-economic context. Progression often depends on formal education, specialized certifications, and practical experience, with mentoring and networking being vital to unlocking growth potential. While some companies actively support employee training and international knowledge exchange, many rely on stable, proven staff with limited visible upward mobility. The local job market offers fewer conventional career paths compared to more developed economies, prompting professionals to navigate career growth through less structured or informal means. Despite these challenges, ongoing education, skill enhancement, and digital literacy remain critical for professional advancement, especially as new roles emerge linked to sustainable logistics and environmental management.

Digitalization and automation are profoundly reshaping the logistics sector by optimizing resource use, enhancing operational efficiency, and enabling greener, more sustainable practices. Technologies such as artificial intelligence, robotics, advanced software, and data analytics reduce manual labor demand but create new opportunities in system management, IT maintenance, and environmental impact monitoring. This shift requires workers to develop technical skills and adapt to rapidly evolving digital tools. While automation can displace some traditional jobs, it also drives the creation of green jobs and roles focused on overseeing and improving automated processes. The future of logistics careers in Bosnia and Herzegovina depends on strategic investment in training, mentoring, and career path clarity, ensuring that digital transformation supports inclusive growth and sustainable development within the sector.

4.1.5. Access to Training & Education in Bosnia and Herzegovina

In 2024, 17.6% of surveyed employers (451 in total) expressed a need for additional employee training, particularly in the context of introducing new technologies. The greatest demand was for job-specific training conducted directly at the workplace (68.1%), followed by computer and IT-related training (31.3%). However, 65.7% of employers reported that they are unable to host students for practical training, although for certain occupations - such as salespersons- they expressed willingness to train as many as 452 students. Most employers also lack the capacity to organize training and professional development for unemployed individuals, highlighting the need for active employment measures to support employer participation in such initiatives. Occupations for which employers are willing to provide practical training include shoemakers, cooks, waiters, tailors, locksmiths, bakers, nursing technicians, carpenters, butchers, economists, food technologists, textile technicians, upholsterers, and CNC operators (13).

In Bosnia and Herzegovina, access to training and educational programs for the general workforce varies significantly across sectors and regions. While vocational and technical education has seen moderate improvements, many industries -including logistics- still face challenges related to the relevance, availability, and adaptability of training opportunities. A significant portion of logistics sector employees indicated limited access to structured, continuous professional development. Respondents emphasized that most training is conducted informally, on the job, rather than through certified programs or formal education. Furthermore, there is a notable lack of specialized courses focused on modern logistics practices such as green logistics, digital tools (e.g., ERP or WMS systems), and international supply chain standards.

Employers reported difficulty in finding workers with practical logistics skills, citing a gap between educational curricula and real-world requirements. Although public technical schools and some universities offer logistics-related content, these programs are often insufficiently aligned with the dynamic needs of the market. Additionally, regional disparities were observed—urban centers like Sarajevo and Banja Luka have greater access to education providers, while rural and peripheral areas remain underserved. A noteworthy example of informal education is the FIATA School of Forwarding, run by the Foreign Trade Chamber of BiH in Sarajevo. It offers a 14-module certified program covering freight forwarding, transport modes, customs procedures, ICT in forwarding, and intermodal logistics. Over 500 professionals have obtained FIATA diplomas since its inception 14 years ago.(14)

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[13] Agencija za rad i zapošljavanje Bosne i Hercegovine. Istraživanje tržišta rada u Bosni i Hercegovini: https://arz.gov.ba/Dokumenti/Fajlovi/Istrazivanje%20trzista%20rada%202023%202024%20ARZ.pdf

[14] Vanjskotgrovinska komora Bosne i Hercegovine. FIATA škola špedicije: https://komorabih.ba/fiata-skola-spedicije/

Focus group overview: Access to Training & Education in Bosnia and Herzegovina with a review of the logistics sector

Based on all the focus group responses, the biggest challenges in accessing training and further education in Bosnia and Herzegovina - especially in specialized fields like green logistics - are the lack of available and quality programs tailored to the current needs of the labor market. Traditional educational systems often do not cover topics related to sustainability, new technologies, and environmental standards sufficiently, while flexible learning formats such as online courses are still limited. Additionally, high course costs and the lack of financial support, along with limited awareness of available training opportunities, further hinder workers' access to relevant education. Many employees struggle to balance work responsibilities with the time required for further training, and employers often do not invest enough in employee development due to financial constraints or unclear obligations regarding sustainability. The situation in green logistics is even more complex due to the need for specific knowledge in areas such as low-emission transport, emissions management, and supply chain digitalization. A large number of workers are unfamiliar with basic green logistics concepts, and relevant training programs are scarce and often not tailored to industry needs. Rapid changes in legislation and technology demand continuous and high-quality education, which is currently insufficiently supported by both educational institutions and employers. To address these challenges and develop a skilled workforce ready to meet the demands of the green labor market, better coordination between institutions, increased investment in education, and raising awareness of the importance of sustainable practices in business are essential.

4.1.6. Wage Levels in Bosnia and Herzegovina

Wage levels in Bosnia and Herzegovina have shown a steady upward trend in recent years, with the average net salary reaching approximately 1,336 KM in late 2024.(15) Sectors such as information and communication technologies (ICT), finance, and energy continue to offer the highest wages - often exceeding 2,000 KM net- with the ICT sector averaging 2,024 KM and finance and insurance at 1,967 KM. In contrast, industries like accommodation and food services (899 KM), construction (1,020 KM), and retail (1,092 KM) remain among the lowest paid.(16) The recently adopted minimum wage in the Federation of BiH, set at 1,000 KM for 202517, represents a substantial increase from previous years but still falls short of covering the average household's monthly cost of living, which exceeds 3,000 KM. Real wage growth has outpaced productivity in some areas, raising concerns about long-term economic sustainability despite short-term benefits for workers. Despite these positive wage developments, disparities remain stark across sectors, regions, and company sizes. Urban centers such as Sarajevo and Mostar offer significantly higher salaries compared to rural areas, while small and medium enterprises, which employ the majority of the workforce, typically offer lower wages than large firms.

Salaries in the logistics sector range from approximately 1000 KM to 2,156 BAM per month, with higher earnings for managerial and specialized roles. Warehouse workers in Sarajevo earn a median monthly salary of around 1000 KM. Logistics coordinators in Sarajevo have an average monthly salary of approximately 1,888 BAM, with a range from 1000 KM to 3,001 KM.18 Supply chain specialists in Bosnia and Herzegovina can earn between 1,619 KM and 2,942 KM per month.19 Lorry drivers in the logistics sector have salaries ranging from 1,041 KM to 2,407 KM per month. Forwarders in transport and logistics roles earn between 1000 KM and 1,846 KM monthly. Logistics clerks typically earn between 775 KM and 1,917 KM per month.

Focus group overview: Wage Levels in Bosnia and Herzegovina with a review of the logistics sector

Wage levels in the logistics sector of Bosnia and Herzegovina generally fall in the middle range compared to other industries, reflecting the sector's operational nature and the diversity of roles it encompasses. While specialized and managerial positions, such as supply chain analysts or logistics managers, command relatively competitive salaries, frontline operational jobs like warehouse workers and transport drivers tend to receive lower wages. Factors influencing salary growth include professional experience, specialization - especially in emerging fields such as green logistics and automation - company size, and regional economic conditions. Larger multinational firms and companies investing in sustainable logistics typically offer better pay and benefits. Education, certifications, and continuous skills development also positively impact earning potential. Despite its stable demand fueled by the growth of e-commerce and globalization, the logistics sector still faces challenges related to automation, market fluctuations, and economic crises, which influence wage dynamics and employment conditions.

15 Trading Economics. Bosnia And Herzegovina Average Monthly Wages https://tradingeconomics.com/bosnia-and-herzegovina/wages

16 Federal Office of Statistics, 2024: http://www.fzs.ba

17 Vlada Federacije Bosne i Hercegovine. Utvrđena najniža plaća za 2025. godinu u iznosu od 1.000 KM https://fbihvlada.gov.ba/bs/utvrdena-najniza-placa-za-2025-godinu-u-iznosu-od-1000-km

4.1.7. Job Security in Bosnia and Herzegovina

Job security in Bosnia and Herzegovina remains a significant concern for many workers due to economic challenges, structural labor market issues, and high unemployment rates. The labor market is characterized by a relatively high share of temporary and informal employment, which limits job stability for a large portion of the workforce. Economic sectors such as public administration, education, and healthcare tend to offer more stable employment contracts, whereas private sector jobs—especially in construction, agriculture, and retail—often involve seasonal, part-time, or short-term contracts. Legal protections for workers exist, including regulations on severance pay and notice periods; however, enforcement can be inconsistent, especially in smaller firms and informal settings.

Focus group overview: Job Security in Bosnia and Herzegovina with a review of the logistics sector

Job security in logistics is moderate but varies significantly depending on contract type and company practices. Many workers face instability due to the prevalence of temporary contracts, outsourcing, and informal employment, which undermine their rights and benefits. While the sector benefits from constant demand for transportation and distribution services, risks arise from technological changes, economic downturns, and evolving regulations. Workers who adapt to technological advancements and acquire specialized skills tend to have better prospects, whereas those in manual roles face higher vulnerability. Additionally, economic shocks like the COVID-19 pandemic and geopolitical tensions have disrupted supply chains, highlighting the sector's exposure to external risks. Overall, improving wage conditions, securing stable employment contracts, and mitigating risks related to automation and economic volatility are key to enhancing worker stability and satisfaction in the Bosnian logistics sector.

4.2. Country: Croatia

Focus group participants:

- Government representatives (Ministry of internal affairs (police), City of Nova Gradiška)
- Logistics industry company,
- Training institution (POU AMC NG, Auto moto centar Nova Gradiška d.o.o.)
- Business associations (Croatian Chamber of Crafts-Craftsmen's Association Nova Gradiška)
- NGO (LAG Zapadna Slavonija, Association Prevencija)
- Private company representatives (AVD Company d.o.o., Mariokop, Plan logistika)
- Professional drivers (2 person).

The interview with representatives of the scientific community was conducted via online interview in the previous days, and included a professor at the Faculty of Transport and Communications in Zagreb, as well as an expert who collaborates with several faculties, with the title of Doctor of Economics - Business Management in Logistics, an assistant professor at Apeiron University and the title of graduate road traffic engineer. In addition, an online interview was conducted with two employers (Transport inženjering doo and Axereal doo), as well as a representative of the Croatian Employment Service. Total of people interviewed during this activity is 16.

Photos and signed participation list from focus group with dates are in Annex 2.

4.2.1. Socio-Economic Structure in Croatia

The current state of the economy of the Republic of Croatia in 2025 is characterized by moderate but stable growth, with challenges related to inflation, productivity and structural reforms. According to estimates by the International Monetary Fund (IMF), the Croatian economy will grow by 3.1% in 2025, which is above the eurozone average. The Croatian National Bank (HNB) forecasts growth of 3.2%. Inflation is expected to slow to an average of 3.7% in 2025, with a further decrease to 2.6% in 2026. Employment continues to grow, with an expected increase of 2.5% in 2025. The unemployment rate could fall below 5%.

The average nominal gross salary increased by 8.5%, while the real salary growth was 5.5%. The main industries in the Republic of Croatia are still the processing and metalworking industry, the information and communication sector and tourism.

1. Manufacturing: In February 2025, industrial production increased by 3.8% compared to the same month of the previous year. However, the number of employees in the industry decreased by 2.5%.
2. The metal processing industry recorded stable growth, with an increase in exports of 10%. It employs more than 61,000 workers, and the average gross salary reached 1,590 euros.
3. The ICT sector remains one of the most propulsive in Croatia, with almost 7,000 companies accounting for 4.3% of the total number of companies and employing 3.6% of the workforce. The average net salary in the sector is 1,683 euros, which is 46.7% higher than the national average.
4. Tourism is a key economic sector, with a share of 11.8% in GDP. In 2023, Croatia was visited by 15.8 million international tourists.

The logistics and transport sector in Croatia is set to experience significant growth in 2025, driven by infrastructure investments, digitalization and increased demand for transport services. Around 1.3 million square meters of warehouse space is under construction in Croatia, indicating strong growth in the logistics sector. For example, the Studenac retail chain is investing over EUR 10 million in a new logistics and distribution center in Velika Gorica, which will create more than 400 jobs. The concept of "Logistics 4.0" is increasingly being applied, including smart systems, big data analysis, artificial intelligence and digital platforms. These technologies enable route optimization, demand forecasting and cost reduction. Also, in the first quarter of 2025, 32.3 million tons of goods were transported, which represents an increase of 6.4% compared to the same period of the previous year. Of particular note is the increase in maritime and coastal transport by 24.5% and in pipeline transport by 40.9%. A total of 18.9 million passengers were transported in the passenger transport segment, an increase of 4.4% compared to the first quarter of 2024. Significant growth was recorded in air transport (13.7%) and rail transport (5.3%).

Interviews with members of the focus group revealed several facts related to the topic of Socio-Economic Structure. Thei believe that the socio-economic climate in most EU countries is stable, but faced with challenges such as inflation, energy crises and demographic changes. These factors affect logistics through the growth of operating costs and the lack of qualified labor. Croatia, as part of the EU, currently has a stimulating socio-economic climate for the growth of the logistics sector, but employment suffers due to a lack of qualified people, demographic challenges and pressures of change (digital and environmental).

Companies that invest in education, technological modernization and sustainability respond better to these challenges and offer more stable, promising workplaces. They are familiar with GDP growth of the Republic of Croatia, with the support of EU funds, investment in infrastructure and tourism, and the unemployment rate below 7%. Also believe that membership in the eurozone and Schengen simplifies cross-border trade and transport, which increases the demand for logistics services. Consequently, they are aware that the low unemployment rate and membership in the eurozone cause a labor shortage that is visible in many sectors, including logistics. Also, compared to the EU average, Croatia still lags behind in efficiency, which limits competitiveness, and the lack of specialized and technologically savvy personnel is particularly noticeable, especially in new branches of logistics (green, digital).

In parallel with economic growth, increased demand for logistics services (e-commerce, growth in exports and international transport), modernization of rail and road infrastructure (e.g. intermodal terminals), but also digitalization and green policies create new jobs for experts, planners and green specialists in logistics. The lack of local labor leads to the increasing employment of foreign workers (from Asia, the Balkans), but also to pressure on wages and working conditions that not all employers are able to keep up with, especially since, in parallel with demographic challenges, the Republic of Croatia has to follow decarbonization goals, which is changing the structure of jobs in logistics, as well as the requirements for electric vehicle drivers, energy-efficient warehouses and sustainable transport planners. They also stated the role of international trade and globalization that has a crucial impact on the logistics sector. Employment opportunities in multimodal transport, customs brokerage, international distribution and the management of complex supply chains increases need for knowledge of foreign languages, customs regulations and digital tools further emphasizes the importance of a highly qualified workforce. As the global flow of goods increases, so does the need for logistics services - especially in countries like Croatia that have a favorable geostrategic position and access to the EU market. The growth of exports and imports requires more labor in transportation, warehousing, customs brokerage and logistics planning, and Croatia is a transit country for goods between Western Europe and the Balkans, which creates a need for drivers, dispatchers, operators and IT specialists. In particular, specialists for international forwarding, import-export coordinators and compliance experts, as well as multilingual and digitally literate staff, will be increasingly in demand. Globalization also affects the emergence of competition (especially since the Republic of Croatia is part of the EU). The arrival of large logistics companies (DPD, DHL, Maersk, Raben, etc.) brings with it the employment of local workers and the introduction of global standards, which directly affect small and medium-sized companies that are left without a quality workforce. Companies must reduce costs and speed up deliveries, and with the development of e-commerce, the demand for courier and express services is increasing, especially in urban centers. Global disruptions such as pandemics, wars, trade tensions can sharply reduce the volume of international trade, which reduces both the number of orders and the need for workers (war in Ukraine, BREXIT, etc.).

4.2.2. Job Requirements & Qualifications in Croatia

Key qualifications in the traditional logistics sector include knowledge of Supply Chain Management (SCM), warehouse operations management, inventory management, route and distribution network optimization, knowledge of logistics software and systems such as SAP and ERP systems, and understanding of international regulations and customs procedures. Furthermore, formal qualifications are still required in the traditional transport and logistics sector: for professional drivers, in addition to a driver's license of the appropriate category, an initial driver qualification is required (highschool education for motor vehicle driver or initial qualifications acquired in accordance with the Road Transport Act), as well as additional training and advanced training for individual types of transport and handling of goods (transport of dangerous goods, live animals, forklift operators, etc.).

For technical personnel, it is desirable that they have at least a secondary school diploma or a university degree/university degree in logistics, transport or economics (e.g. a logistics and forwarding technician), and knowledge of customs regulations and INCOTERMS is extremely important. In terms of skills, people working in the logistics sector need to have organizational skills, know how to manage inventory and warehouses, and be familiar with the processes of monitoring and optimizing transport, using ERP and WMS systems (SAP, Pantheon, 4D Wand, etc.) and know at least one foreign language (English and/or German). In the green logistics sector, focus group members highlighted specialized knowledge in the areas of sustainability, environmental standards (ISO 14001, ISO 50001), carbon dioxide emissions management, recycling and waste management are additionally required, as well as skills in using technologies such as electric vehicles, alternative fuels and smart energy management systems. Green logistics includes reducing CO_2 emissions, optimizing resources and sustainable transport methods. In Croatia, it is encouraged through EU funds and the Green Plan. Formal education that includes green logistics can be achieved in some studies in the fields of logistics, ecology, sustainable development or engineering, but learning through specialized courses prevails, such as sustainable supply chain management, product life cycle analysis (LCA), learning about EU emissions and sustainability regulations, and ISO systems, especially ISO 14001 (environmental management systems). Green logistics skills include analytical thinking (especially for emission calculations, route optimization, etc.), knowledge of CO_2 monitoring tools (e.g. EcoTransIT), reverse logistics management (recycling, packaging return), knowledge of alternative fuels and electric fleets, and management of EU-funded projects (e.g. green infrastructure). In the last 5-10 years, the growth of green practices has significantly changed the profile of required skills in logistics. Traditional logistics focused on delivery speed, transport price and cost reduction, while today's logistics emphasizes reducing CO_2 emissions, energy efficiency, the use of environmentally friendly vehicles and the circular economy, as well as the increased need for supply chain transparency and ESG reporting.

Digitization is integrated through tools such as optimization and analytics platforms such as Shippeo, Transporeon or Oracle SCM Cloud. Increasing importance is attached to knowledge of CO2 emissions management, the use of technologies such as IoT (Internet of Things) for tracking goods in real time and blockchain technology for transparency of supply chains, optimization of routes not only according to cost and time, but also according to emissions and the introduction of alternative fuels and the reduction of the use of plastic in packaging and storage. Also, specialist knowledge about energy management, logistics innovations in urban distribution and electric fleet management is increasingly sought after, so companies are introducing new jobs, such as green logistics specialists, sustainable supply chain consultants, coordinators for EU projects (energy efficiency, sustainable infrastructure), data analysts for logistics and sustainability, and fleet managers for electric and hybrid vehicles, and knowledge of the EU Green Plan, sustainability taxonomy and national strategies (e.g. Plan development of the green infrastructure of the Republic of Croatia). Regardless of whether it is traditional or green logistics, the focus group emphasized several skills that are important for working in this sector, such as communication and negotiation skills, the ability to work in a team and coordinate with partners, digital literacy and working with databases, knowledge of at least English and adaptability to changes (mostly in terms of digital transformation, ESG standards). Members of focus stated that there are obstacles to the transition of workers to greener logistics. The main obstacles include the lack of specialized and practical education programs focused on new technologies and green practices, the financial costs of additional education for individuals and companies, as well as insufficient connections between educational institutions and the labor market. Some of the most common obstacles that candidates face when seeking employment are the lack of practical experience in certain areas (experience in working with warehouse systems, delivery management or customs operations, but also knowledge of the changes brought about by ESG requirements, decarbonization or EU taxonomy), which affects not only young people and those retraining without previous work in the sector, but also people who have previously worked in traditional jobs in smaller companies. Furthermore, there is insufficient understanding of legislation and procedures, such as knowledge of customs regulations, INCOTERMS, documentation in international transport, and most of all EU regulations on green logistics, which is important for freight forwarders, customs declarants and import/export coordinators. There is still a lack of knowledge of professional terminology in a foreign language (German, English, Italian), but also of logistics IT tools such as SAP, Pantheon, TMS (Transport Management System), WMS (Warehouse Management System), as well as regional imbalances. For example, most logistics centers are located along highways and ports (Zagreb, Rijeka, Osijek, Split), and people in rural and continental areas who may have acquired appropriate knowledge do not have the opportunity to work in this sector without a drastic change in all living conditions (relocation or daily long commutes). Employees and employers are aware of the investments that need to be made for employee education, but there is still some resistance from employers because employers often do not want to invest their own funds in employee education due to the frequent fluctuation of workers, especially towards Western countries.

4.2.3. Green Jobs and Economy in Croatia

The demand for green jobs is growing across the EU, especially in sectors such as sustainable supply chain management, renewable energy logistics (such as managing wind farms or solar installations), and urban logistics based on electric vehicles and other sustainable solutions. Examples of good practice include logistics centers such as the one in Amsterdam that use renewable energy sources and energy storage technology to power logistics operations. The focus group believes that the demand for green jobs in logistics in Croatia is continuously increasing, stimulated by the ecological transition, the EU Green Plan and the digitization of the sector. Although the market is still developing, growth is particularly felt in urban centers and among companies associated with export-oriented sectors, e-commerce and logistics infrastructure. As the main reasons for growth, they cite the EU Green Plan and obligations to reduce emissions until 2030/2050, the introduction of ESG reporting (which is currently an obligation for large and medium-sized companies, but some of these companies already include their entire supply chain in the process of preparing for reporting), then the growth of green infrastructure: e-vehicles, solar storage facilities, smart logistics, but also incentives from NPOO (National Recovery and Resilience Plan), the Environmental Protection Fund and EU funds (incentives for the purchase of electric vehicles, etc.). The greatest growth in green logistics sectors is recorded by distribution centers that, through automation processes, the introduction of solar drives and energy efficiency, create jobs such as energy managers and inventory managers with sustainable practices, then companies that deal with urban logistics and deliveries that increasingly use electric vehicles, cargo bikes, optimized routes, but also parcel machines, and that need good planners of sustainable delivery routes and e-vehicle drivers. In the transport and forwarding segment, with the growth of telematics, multimodal transport, e-fuels, green route coordinators, CO2 emission experts are sought, and there is also a growing need for - green delivery|| options and recyclable packaging, but also intermodal system engineers, port/railway coordinators due to the development of intermodal hubs and efforts to reduce road transport through the development of ports and railways (Rijeka, Slavonia). Challenges in transitioning to green jobs include the need for additional specialist education, high initial costs of investing in technology and infrastructure, and resistance to change within traditional organizations. They believe that transition from traditional logistics jobs to green logistics roles in Croatia brings a number of challenges, but also opportunities. Given the rapid pace of change imposed by the EU Green Deal and the digital transition, the transition is not only a technical change but also a change in mindset, competences and work culture. The main challenges of the transition to green logistics in the Republic of Croatia include the lack of specialized knowledge and skills, as well as systematic (formal) education on environmental standards (e.g. ISO 14001), EU regulations on sustainability and decarbonization and the circular economy, which leads to difficulties in applying new technologies and interpreting legal requirements.

Green logistics requires knowledge of technological transitions and digital literacy, such as route optimization systems (GIS, telemetry), emissions and resource management software and ESG indicator monitoring and reporting systems The biggest challenge, especially for medium and small enterprises, is the lack of financial incentives and infrastructure, as they often do not have the creditworthiness to invest independently in a green fleet or solar storage, and do not use EU funds due to administrative obstacles or lack of knowledge. One of the challenges is the mindset, not only of workers, but also of business owners, especially smaller businesses, and resistance to change. The classic "this is how we've always done it" mentality is still present in traditional warehouses and transport companies. Likewise, green logistics is still not sufficiently known and recognized in Croatia, because there are no standardized certificates, but there is no comprehensive mindset either, and the economy as a whole is still too slow to accept the concepts of "green" and "sustainable". Members interviewed believe that targeted policies, incentives and educational initiatives are key to the development of green logistics in Croatia and the promotion of employment in this area. Policies that can improve the situation include encouraging investment in educational programs, tax breaks for companies implementing green technologies, and support for initiatives for the international exchange of experts and knowledge through programs such as Erasmus+ and Horizon Europe. These programs enable the exchange of experiences and good practices between EU member states. Furthermore, at lower levels – in small and medium-sized enterprises – additional subsidies for employing workers in green jobs (e.g. sustainable fleet coordinator, ESG analyst) should be introduced and made easier, as well as co-financing salaries for the first 12 months of employment in green roles (especially for young people and the long- term unemployed), as well as tax breaks for companies investing in green technologies and employee education. The offer of educational programs should also be expanded, with an emphasis on on-the-job learning and the expansion of CES education vouchers to more programs specific to green logistics (e.g. energy efficiency, circular economy, ISO 14001). In addition, as a reform is underway at the secondary education level, it is recommended to introduce vocational curricula that integrate green competencies into secondary schools and technical studies in logistics, as well as the development of centers of excellence for sustainable mobility and logistics that will cooperate with educational institutions at all levels. Employers should be enabled to co-finance the education of not only new but also existing employees, such as training on energy-efficient work and the use of software solutions that optimize fuel consumption, plan routes and monitor ESG indicators. Stronger monitoring and promotion of green jobs at the national level is needed, in order to influence all segments of society, and in particular the promotion of green logistics as an innovative and sought-after career path. They also believe that environmental policies, especially those related to the European Green Deal and EU climate regulations, have a positive impact on the creation of new jobs in the field of logistics by creating a need for new specialist profiles such as carbon footprint analysis experts, energy managers and circular economy experts. An example is Germany, where strict environmental regulations result in continuous job growth in the electromobility sector and energy management in logistics.

Environmental policies and regulations affect employment in several ways: by creating green jobs (the introduction of technologies that reduce CO_2 emissions and energy consumption creates new jobs in the production of electric vehicles, renewable energy sources, energy efficiency and sustainable waste management - such as electric vehicle charging station technicians, sustainable transport experts, etc.). Then there is the process of transforming existing professions that gain "green" components - e.g. truck drivers need to know how to operate vehicles on alternative fuels, logisticians use route optimization tools to reduce emissions. There is also a presence a loss of jobs in "brown" sectors, such as industries based on fossil fuels (e.g. refineries), which requires retraining of the larger amount of workforce.

In conclusion of the topic, the focus group members stated that the environmental policies in Croatia are already affecting the transformation of the logistics and transport sector, and this trend will intensify. Although green jobs are still present to a lesser extent, the accelerated development of EU policies, digitization and infrastructure projects opens up significant potential for new employment and retraining in green occupations.

4.2.4. Career Paths in Croatia

Professional development in logistics in the EU is characterized by the availability of numerous professional courses, certifications (such as APICS and CSCMP certificates) and internal training in large companies such as DHL or Maersk. However, additional initiatives are needed from the state to enable continuous education of employees in medium and small enterprises. The focus group cited as an example countries such as the Netherlands and Sweden, where employers often offer internal development plans for employees.

Formal education includes vocational and university studies related to logistics, transport and management, but programs specifically focused on green logistics are still under development. Some colleges and universities in Croatia are starting to introduce courses related to sustainability, green economy and environmentally friendly technologies in logistics. At the secondary education level, the Ministry of Science and Education has adopted new vocational curriculas that will come into force in the fall of 2025, which include special modules related to ICT and the application of environmental protection standards in transport logistics (transport logistics technician, road transport technician, etc.). Then there are various training courses offered by companies and professional training institutions, as well as industry associations such as the Croatian Chamber of Commerce and Industry and the Croatian Chamber of Commerce, e.g. workshops on route optimization, low-emission fleet management, use of renewable energy sources in logistics, ESG training. The focus group highlights a combination of formal education, practical experience, certifications and employer support as key factors for advancement in green logistics. The focus group identified digitalization and automation as the foundation of modern logistics operations. Their role is multifaceted: they enable cost reduction, increased delivery accuracy, better emission control, and create new jobs in the areas of data analysis, IT logistics management, and smart solutions development. As many logistics companies in Slovenia and Germany are using predictive systems for inventory management and delivery optimization, and the EU is promoting the use of digital companies through the Digital Transport and Logistics Forum project, Croatian logistics is only gradually introducing digital systems for fleet management, warehouse management, and transport tracking. Some large logistics centers and port infrastructures in Croatia (e.g. the Port of Rijeka, logistics warehouses of retail chains such as LIDL, etc.) are introducing smart systems to optimize operations and reduce environmental impact. There is still room for greater development of automation, especially in small and medium-sized companies, and the insufficiently developed infrastructure for advanced digital systems is also evident, as are more charging stations for electric vehicles, the need for better internet connectivity throughout the country, and digital employee training. However, with growing support from the EU and increased investment, strong growth is expected in digital and automated solutions that will shape the future of green logistics and jobs within.

4.2.5. Access to Training & Education in Croatia

Challenges of education both for employers and employees include high training costs, a shortage of instructors for specialized knowledge, low flexibility of existing educational curricula and poor alignment with real market needs. In green logistics, an additional challenge is the rapid development of technology, which often exceeds the capacities of educational institutions. The EU sees a solution in digital learning platforms and through investment in regional competence centers, which the members of the focus group also support, but they also emphasize certain problems related to such learning models. There is still a relatively small number of educational programs focused on green competencies and specifically green logistics, and current programs are not adapted to the needs of the labor market or are too slow for rapidly changing technologies and regulations. Many companies, especially small and medium-sized enterprises (SMEs), do not have enough budgets to finance additional education for their employees, but employees often do not have the opportunity or support to invest in professional development on their own. It has been noted that employees and employers are not always sufficiently informed about available programs and funding opportunities (e.g. EU funds, incentives for vocational training and workplace learning, as well as the possibility of using education vouchers). The problem is particularly pronounced in smaller communities, because quality education is more often held in larger cities, which makes access difficult for people from smaller communities or rural areas, because in addition to the cost of the education itself, it also involves travel and full-day absences from work. There is still resistance from workers due to business and private obligations, they often do not have time for additional education, and the lack of flexible learning models (online, weekend programs) makes it difficult to fit education into the work schedule, but also the lack of support from employers for investing in the development of employees in green competencies, but also the fear of "brain drain" (that employees will leave after training) can limit the encouragement of professional development.

4.2.6. Wage Levels and Job Security in Croatia

Salaries in logistics vary depending on the position, region and level of responsibility, but are on average competitive compared to other sectors. Salaries are growing in particular in the field of digital and green logistics, where the profiles in demand are rare. Influencing factors include the level of expertise, language and digital skills, the ability to manage complex supply chains and the willingness to be mobile. Salaries for professional drivers, depending on the type of transport, start from 900.00 euros onwards, salaries for lower-level warehouse workers from 800.00 euros onwards, while salaries for dispatchers go from 1,100 euros upwards, and for managers and specialists from 1,600.00 euros onwards. According to the experiences of employers and drivers included in the focus group, in addition to standard salaries, more and more employers are offering employees other benefits, such as tax-free bonuses, gift cards, additional days of annual leave, and for non-mobile staff, the option to work from home, which significantly affects the working conditions and income of employees.

In addition to the job, one of the factors is still the level of expertise and education, so as a rule, jobs that require greater expertise also have higher salaries, but the scope of work (international transport and complex planning) also brings higher salaries than local warehouses and distribution. Larger and international companies often offer higher salaries, benefits and opportunities for advancement, and there is also a gap in salaries for the same jobs depending on the location of the company, so salaries are higher in Zagreb, Rijeka and Split, and lower in smaller towns and rural areas. Progress is visible in the salary segment for experts who know digital tools, sustainable logistics and environmental standards.

The logistics sector offers a relatively high level of stability due to the continuous demand for supply services, especially in e-commerce and the healthcare sector. However, risks include the seasonal nature of some jobs, geopolitical crises that disrupt supply chains, and accelerated automation that can reduce the number of low-skilled jobs. On the other hand, new jobs are emerging in the domain of sustainability and digitalization.

Logistics is the foundation of the economy, so the demand for transportation, warehousing and distribution exists even in crises. The most significant example of the stability of a part of this sector is freight transport, which has endured enormous burden during the COVID pandemic, where the importance and role of transportation and logistics were particularly highlighted. The rapid growth of online commerce is creating new jobs in delivery, packaging, warehousing and planning. Regarding jobs in the logistics sector in Croatia, the geostrategic position of the Republic of Croatia (international routes, seaports, Schengen border) is also important, which also ensures activities in international traffic.

4.3. Country: Kosovo

Focus Group Participants:

- Government representatives (Ministry of Industry)
- Logistics industry company,
- Academia (professors of Tempulli and students from logistics department)
- Training agencies (Tempulli, VET center)
- Business associations (German Chamber of Commerce, AMRKS)
- Sustainability and urban planning company,
- Tech & innovation expert from a private company
- Media

4.3.1. Socio-Economic Structure in Kosovo

Kosovo's economy is primarily service-oriented, with additional contributions from construction, manufacturing, agriculture, and remittances. According to the Kosovo Agency of Statistics (KAS), the country's GDP growth in 2023 was approximately 3.5%, largely driven by public investment, household consumption, and continued financial support from the diaspora in the form of remittances (KAS, 2024).

Despite political and institutional challenges, Kosovo has maintained macroeconomic stability, supported by a young population and increasing entrepreneurial activity. However, the unemployment rate remains high- especially among youth and the informal sector continues to play a significant role in the economy.

The logistics and transport sector plays a moderate but essential role in Kosovo's economy, contributing approximately 6% to GDP and employing around 8% of the labor force (World Bank, 2023; KAS, 2024). While road transport dominates freight and passenger movement, the rail network is underutilized and poorly maintained.

Kosovo's road network has a total length of 2,379 km, including 137 km of highways such as R7 and R6, while the railway network is 333 km long, of which 103 km is freight, partially operational (currently the Pristina-Peć and Pristina-Skopje connections are operating). EU/EIB investments in the amount of €208 million are underway. € of railway modernization - including modern segments Hani i Elezit–Pristina and Mitrovica–border.

Among the more important are road connectivity projects: R7 Highway (Vërmica–Pristina, 101km, €824 million investment) and the planned Prizren–Tetovo highway worth €400+ million €, key to the connection with North Macedonia. There is also an increase in green initiatives and programs such as UNDP Boost II - "Kosovo Green Challenge**" (2023): support for 30 SMEs, 15 of which received grants (~€20,000 each) for the implementation of green and digital logistics solutions (e.g. circular economy, AI optimization, eco-production), but also projects of a wider spectrum, such as a package of measures from the EU and German support:

"Plastic Bag Reduction" and by-laws on packaging waste, which were launched at the beginning of September 2023, as well as the ECMI project "Cross-Border Green Deal" (May 2023-2025): focus on improving waste management and reducing air pollution in the border areas of Kosovo and Montenegro, considering that Kosovo is observed with one of the worst air quality indices in Europe.

Based on focus group discussions and survey questionnaires conducted as part of this study, major challenges in the transport and logistics sector include:

- **Underdeveloped rail infrastructure**, which limits multimodal transport opportunities and regional connectivity;
- **Inefficient border procedures,** causing delays and increasing trade costs, particularly at major crossing points such as Hani i Elezit and Merdare;
- **Limited adoption of digital logistics technologies,** including track-and-trace systems, customs automation, and freight platforms, hindering competitiveness and efficiency.

Addressing these structural issues through targeted investment, regulatory reforms, and cross-border cooperation will be crucial for aligning Kosovo's transport and logistics sector with EU standards and for fostering regional integration.

4.3.2. Job Requirements & Qualifications in Kosovo

Kosovo is at the beginning of the green transition - ambitious strategies, but they require implementation. In the transport and logistics sector, opportunities are growing for skilled positions in electric vehicles, sustainable supply chains, urban planning and green transport. The support of state policies and the possibility of using EU and UN funds is essential for the development of such jobs. Importantly, Kosovo introduced a Circular Economy Roadmap in 2023, aiming to transition to a circular economy covering key sectors, including waste management and transport. Legal measures such as extended producer responsibility (EPR) and deposit return systems have been adopted, although implementation is still hampered by a lack of secondary legislation.

Most common job qualifications in Kosovo include:

- **Secondary vocational education** (Transport and Traffic Technician, Car Mechanic, Electronics & Electrotechnics) some of whom are educated through a dual education system that strongly integrates learning at school and work for an employer

- Bachelor's degrees in business or technical fields like BSc in Logistics & Procurement, Business/IT with logistics electives, Bachelor in the field of Traffic and Transport Engineering and related fields (e.g. Smart Mobility, Urban Transport),
- Certificates in ICT, foreign languages, and driving licenses (C and CE categories) as well as the Certificate of Professional Qualification (CPQ) and Dangerous Goods (ADR) certificate, as well as professional programs in transport and logistics accredited by the Certified Institute for Logistics and Transport (CILT UK)

The logistics sector increasingly requires:

- Forklift operation licenses
- Knowledge in customs clearance procedures
- Digital skills (ERP, route optimization software)

According to the questionnaires, 46% of employers value experience over formal education. However, emerging trends include growing demand for eco-driving certificates and green logistics knowledge due to sustainability mandates.

4.3.3. Green Jobs and Economy in Kosovo

Kosovo's commitment to the green transition is reflected in its Energy Strategy 2022 -2031, which outlines decarbonization, solar and wind investment, and sustainable mobility as key priorities.

Focus group insights show:

- Growing demand for green skills in urban delivery (e-bikes, EVs) and reverse logistics
- 30% of logistics companies expressed interest in investing in carbon-reduction technologies
- Barriers include lack of fiscal incentives, upskilling costs, and regulatory ambiguity

Green Jobs in transport and logistics that are likely to be needed are Electric Vehicle (EV) Technician & Maintenance, Charging Infrastructure Technician (installation and maintenance of charging stations - increasing demand with the spread of e-mobility), Green Logistics Coordinator / Consultant who will plan sustainable supply chains: CO_2 reduction, route optimization, green procurement, as well as Multimodal Transport Planners (experts for combined transport (road + rail), encouragement of green transport) and Urban Mobility Planner (experts for SUMP and green transit plans (e.g. Pristina, Mitrovica), but also Circular Supply Chain Managers who deal with logistics of recycled materials in circular systems (waste, construction, packaging).

4.3.4. Career Paths in Kosovo

In general, Kosovo offers clearer career progression in sectors like ICT, banking, and public administration. In logistics, typical progression is:

Warehouse Operator → Dispatcher → Logistics Manager → Operations Director

The transport and logistics sector in Kosovo offers a wide range of career opportunities – from operational to managerial roles. Along with the growing focus on digitization and sustainability, new "green" professions are opening up, especially for young experts with knowledge of languages and digital tools. However, focus group results show:

- **Only 18% of logistics workers perceive long-term career stability**
- **Career stagnation is more prevalent among drivers and manual handlers**

Major gaps exist in structured mentorship or reskilling programs within logistics companies.

4.3.5. Access to Training & Education in Kosovo

Kosovo offers vocational training in logistics and driving through accredited VET centers and study programs Tempulli Academy. However:

- Most programs focus on basic skills
- Few cover digital logistics, AI in supply chains, or green transport

Focus group data indicates:

- 63% of workers in logistics lack access to sustainability training
- Regional disparities affect access - rural areas are underserved

Recommendations include:

- Development of modular e-learning for professional logistics training
- Public-private partnerships to subsidize green certifications.

4.3.6. Wage Levels in Kosovo

According to KAS and focus group data:

- Average monthly wage in logistics: €550 - €700
- Managers in logistics earn €900 - €1,200
- Drivers average €450 - €600

Key issues identified:

- Wage stagnation, especially for warehouse and dispatch staff
- Unpaid overtime in peak delivery seasons
- Gender pay gaps persist, female professionals in logistics earn 12% less.

4.3.7. Job Security in Kosovo

Job security in Kosovo's logistics sector is moderate to low, susceptible to automation, seasonal fluctuations, and regional instability.

Though detailed job-security stats specific to transport/logistics aren't available, the private sector leads employment in trade, manufacturing, and transport- areas plagued by temporary contracts and weaker stability .

In Kosovo overall, ~75 % of workers are on temporary contracts, with only 25 % having permanent contracts - a trend likely mirrored in transport/logistics_.

Focus group results show 52% of logistics workers fear job loss due to AI and self-driving technologies.

High migration of skilled workers has been reported - nearly 48 % of employers say skilled staff left for abroad within the past year. Transport and logistics firms aren't immune to this drain. However, upskilling in digital tools and sustainability is seen as the primary way to retain jobs.

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4.4. Country: Montenegro

4.4.1. Socio-Economic Structure in Montenegro

Montenegro's economy is predominantly service-oriented, with the services sector contributing approximately 78% to the GDP in 2023. The industry sector, which includes construction, accounts for 16%, while agriculture contributes 7%. The logistics and transport sector, integral to both industry and services, plays a significant role in facilitating economic activities, particularly in tourism and trade
Despite its importance, the logistics sector faces several challenges, especially in terms of the underdeveloped rail infrastructure. With only 251 kilometers of railway lines, the limited rail network hampers efficient cargo movement and increases reliance on road transportAnother key issue is the inefficient border processes. Delays at border crossings due to bureaucratic procedures affect the timely delivery of goods, impacting trade competitiveness. The last major hurdle is the limited adoption of digital technologies, despite several initiatives started in 2020 to align with the European standards. The sector has been slow in integrating digital logistics solutions, leading to inefficiencies in supply chain management.

4.4.2. Job Requirements & Qualifications in Montenegro

Employment in Montenegro's logistics sector typically requires secondary vocational education or a bachelor's degree in business or technical fields. Driving licenses for categories C and CE are essential for heavy vehicle operation. Proficiency in ICT, foreign languages, and knowledge of customs clearance procedures are increasingly valued.

The sector is witnessing a shift towards digitalization, necessitating skills in digital tools. Familiarity with Enterprise Resource Planning (ERP) systems and route optimization software are becoming increasingly sought after skills. Another aspect is the increasing demand for understanding of fuel-efficient driving techniques to reduce emissions. However, there is a noticeable gap in structured professional development programs, limiting opportunities for skill enhancement.

4.4.3. Green Jobs and Economy in Montenegro

Montenegro is committed to a green transition, as outlined in its National Strategy for Sustainable Development by 2030. The strategy emphasizes decarbonization, investment in renewable energy, and sustainable mobility. Thus there are several emerging opportunities in the logistics sector, such as the growing demand for roles in urban delivery using electric vehicles (EVs), reverse logistics, and maintenance of EV fleets. However, the remaining barriers include a lack of fiscal incentives, high costs of upskilling, and regulatory ambiguities. The potential for job creation is significant, particularly in areas like battery logistics and renewable energy supply chains.

4.4.4. Career Paths in Montenegro

Career progression in Montenegro's logistics sector typically starts off as a driver or warehouse operator at the entry level with a potential for becoming a dispatcher or logistics coordinator at mid-levels. Senior level jobs include positions such as Logistics Manager or Operations Director. However, the sector faces challenges, especially in terms of limited vertical mobility. There is a lack of structured mentorship and reskilling programs, leading to career stagnation, especially among drivers and manual handlers. There is also perceived instability in the field, as only a small percentage of logistics workers perceive long-term career stability. The demanding nature of the job, the low wages along with increasing demand for upskilling in the face of changing technology and regulations all mean drivers change or quit jobs often.

4.4.5. Access to Training & Education in Montenegro

Vocational education and training (VET) in Montenegro is undergoing reforms to align with labor market needs. Recent initiatives include the development of occupational standards and educational programs. However, challenges persist, especially since educational programs mostly emphasize foundational skills, with limited coverage of digital logistics, AI in supply chains, or green transport. Regional disparities add another layer of complexity, as access to training varies, with rural areas being underserved.

4.4.6. Wage Levels in Montenegro

According to the Statistical Office of Montenegro, the average gross monthly wage in October 2023 was €1,002, with a net wage of €803. In the logistics sector, drivers earn between €305 and €895 per month, whereas manager salaries range from €900 to €1,200. Key issues include wage stagnation, particularly for warehouse and dispatch staff, and the unpaid overtime, which tends to be common during peak delivery seasons.
There is also a lack of interest among the population, as Montenegrin people do not stay long in positions they feel are not worth the effort. Another exacerbating factor is the gender pay gaps. Female professionals in logistics earn approximately 12% less than their male counterparts.

4.4.7. Job Security in Montenegro

Youth unemployment (15–24) is high at 23.3%, and long-term unemployment represents 72.1% of total unemployment, indicating systemic instability. Efforts to digitally reform the Employment Agency are ongoing to improve matching and reduce unemployment duration. In transport, risks to job security include lack of strategic infrastructure planning, limited administrative capacity, and ongoing restructuring (e.g., in rail and maritime transport).

4.5. Country: Slovenia

Focus group participants:

- Representative from the Slovenian Traffic Safety Agency
- Representative from the 2TDK (Second Railway Track)
- Representative from Habjan Transport
- Representative from VET educational center Prometni center Blisk d.o.o.
- Representative from Institute for development of transport and logistics
- Representative from Institute of Traffic and Transport (by Slovenian Railways)
- Logistics industry representatives (Cargo X and EP Holding)
- Representative from higher education institution NOA

The focus group session took place online. In total 9 participants from diverse backgrounds were sharing their views.

4.5.1 Socio-Economic Structure in Slovenia

Slovenia is a small open economy (20,271 km², 2.1 million inhabitants) strategically positioned at the crossroads of major European transport corridors. As the most developed former Yugoslav republic and an EU member since 2004, Slovenia enjoys significant logistical importance despite its small size (EBRD, 2021).
Slovenia's logistics sector contributes approximately 7.4% to the national GDP, with the Port of Koper serving as the primary economic engine for coastal regions. The port's significance extends beyond national borders, functioning as a critical gateway for landlocked Central European countries (Focus Group). This strategic position has created significant regional economic disparities, with coastal areas experiencing substantially higher wages and employment rates compared to inland regions.
The country's unemployment rate (approximately 4.7%) remains below the EU average, though the logistics sector faces acute labor shortages, particularly in specialized roles requiring combined technical and sustainability competencies (Focus Group). These shortages reflect broader demographic challenges, including:

- An aging workforce with 23% of logistics professionals approaching retirement within 5-7 years
- Outward migration of skilled workers to higher-paying positions in neighboring Austria and Italy
- Insufficient educational pipeline for emerging technical specializations (Focus Group)

The country has shown economic resilience, particularly during the COVID-19 pandemic, when authorities implemented a multi-pronged policy response totaling approximately 6.5% of GDP. The fiscal impact of the main measures was estimated at around 3% of GDP, with fiscal policy remaining expansionary throughout this period (Weyerstrass et al., 2023). This resilience stems from Slovenia's strong export orientation, developed service sector, significant public infrastructure investment, and effective labor market policies.Slovenia's transport infrastructure presents a mixed picture compared to regional peers:

- Port facilities: The Port of Koper represents one of the most technologically advanced and environmentally conscious port operations in the Adriatic region.
- Intermodal capabilities: Limited compared to Western European standards, though significantly more developed than in other Southeast European countries (Beškovnik & Twrdy, 2012)
- Railway network: Despite €17 billion in planned modernization investments, the railway infrastructure remains underdeveloped compared to road networks, with 80% of inland freight transport being road-based (Beškovnik & Jakomin, 2010) compared to around 57% in Northern European countries (Huderek-Glapska, 2023).

The strategically important Divača-Koper railway project (2TDK) aims to enhance connectivity between Slovenia's only commercial port and the hinterland, aligning with EU green policies to shift freight from road to rail. Slovenia's air transport sector faces similar sustainability challenges to other Central and Eastern European countries, including environmental concerns, infrastructure deficits, and workforce issues (Huderek-Glapska, 2023).

Slovenia faces several distinctive socio-economic challenges affecting its logistics sector development:

- Spatial constraints: With 56-58% of territory covered by forests and 34% dedicated to agricultural use, the country faces significant land-use limitations for industrial development (Lampič et al., 2023)
- Green transition financing: Despite being an EU member, Slovenia received proportionally less funding from the EU Recovery Facility (€1.8 billion in grants, representing a smaller percentage of GDP than the EU average) (Focus Group)
- Regional disparities: The concentration of logistics activities in Koper and Ljubljana has created significant economic imbalances, with salary differentials of approximately 30% between coastal and inland regions (Focus Group)
- Energy costs: Logistics companies report energy costs representing 18-22% of operational expenses, significantly higher than the EU average of 12-15% (Focus Group)

EU Benchmark Comparisons

Slovenia's logistics sector demonstrates distinctive patterns when compared to EU averages:

- Warehouse worker wages in Slovenia (€950-1,300/month) represent approximately 60% of the EU average but are 35% higher than in Croatia and more than double those in Bosnia and Herzegovina (Focus Group)
- Senior logistics managers (€3,200-4,500/month) earn approximately 70% of comparable positions in Austria and Italy, creating significant cross-border labor flows (Focus Group)
- Sustainability implementation in Slovenian logistics companies shows mixed results compared to EU standards, with environmental areas covered at 42%, social areas at 44%, and economic sustainability dimensions at just 26% (Logožar et al., 2022)

Public vs. Private Sector Dynamics

The Slovenian logistics sector demonstrates complex public-private relationships that significantly impact its development:

- Port of Koper operates under a hybrid ownership model, with the state maintaining significant control while incorporating private operational elements
- Public infrastructure investments prioritize road networks over rail, contrary to EU sustainability directives but aligned with immediate economic imperatives
- Private logistics companies report regulatory compliance costs 15-20% higher than EU averages, particularly in environmental compliance requirements (Focus Group)

SME-Specific Challenges

Small and medium enterprises in Slovenia's logistics sector face distinct challenges:

- Limited access to green transition financing, with 68% of SMEs reporting difficulty securing funds for sustainability improvements
- Disproportionate regulatory burden, with compliance costs representing 4-7% of revenue compared to 1-3% for larger enterprises
- Skills acquisition barriers, with 72% reporting inability to compete with larger firms for specialized talent (Focus Group)

Slovenia's socio-economic structure presents both advantages and challenges for its logistics sector. While benefiting from strategic geographic position and EU membership, the country faces significant challenges related to demographic trends, regional disparities, and sustainable transport transitions.

4.5.2 Job Requirements & Qualifications

Technological transformation has shifted skill demands toward interdisciplinary competencies, with 33% of openings targeting professionals proficient in data analytics, AI, and IoT (CEDEFOP, 2015). Focus group participants unanimously observed a paradigm shift where foundational technical skills (warehouse management, SAP systems) remain essential but are now augmented by digital literacy and certifications like ISO 14001. The Port of Koper's expansion necessitates bilingual specialists in multimodal transport (International Trade Administration, 2023), while warehouse automation requires certified mechatronics training. Moreover, focus group participants highlighted significant barriers including a 42% skills gap in cybersecurity among mid-career professionals and psychological resistance to increased responsibility hindering cross-subsector mobility. Despite alignment with German dual-education models, credential recognition delays persist (Bernik & Širok, 2022), reinforcing participants' emphasis that the ideal candidate combines technical proficiency with carbon accounting capabilities and circular economy design aptitude.

4.5.3 Green Jobs and Economy

Slovenia represents a unique case study in the development of green logistics within the Southeast European context as it has successfully positioned itself at the intersection of major European transport corridors while simultaneously navigating the transition toward more sustainable logistics practices (Lampič et al., 2023).

Slovenia's physical geography presents both opportunities and constraints for green logistics implementation. The country's strategic position at the crossroads of Baltic-Adriatic and Mediterranean corridors affords significant logistical advantages despite its relatively small size. However, this geographic advantage also creates environmental pressures that must be balanced against economic imperatives. The concentration of logistics activities in specific regional nodes, particularly the Port of Koper and the Ljubljana metropolitan area, has created economic disparities that influence green transition implementation rates across different parts of the country (Focus Group).

Environmental sustainability integration into Slovenia's logistics sector reveals significant implementation gaps. Research examining top logistics companies operating in Slovenia indicates uneven adoption of sustainability practices, with environmental areas covered at 42%, social areas at 44%, and economic sustainability dimensions at just 26% (Logožar et al., 2022). This pattern suggests that while awareness of sustainability imperatives exists, comprehensive integration remains incomplete. The implementation of EU Green Deal mechanisms imposes significant operational burdens. Carbon Border Adjustment Mechanism (CBAM) compliance remains particularly problematic, with 60% of Slovenian logistics enterprises reporting inadequate preparation for forthcoming reporting obligations. Concurrently, alignment with sustainable finance taxonomy standards creates capital access barriers, as companies struggle to qualify for green investment portfolios. Most notably, the expansion of Emissions Trading System (ETS) coverage to transport logistics will increase operational expenditures by 8-12%, necessitating comprehensive cost restructuring across supply chains (Focus Group).

Moreover focus group data reveals that Slovenia faces acute shortages in specialized green logistics roles, including green logistics managers and sustainable supply chain analysts. This skills gap represents a significant barrier to sector development, as companies struggle to find qualified personnel who understand both traditional logistics operations and sustainability principles.

Transitioning from traditional logistics roles to green operations requires systematic skills pathway development. Critical priorities include identifying transferable competencies between conventional and sustainable logistics models, particularly in warehouse operations and route optimization. Comprehensive gap analyses reveal acute shortages in emerging specialties like carbon footprint accounting and circular supply chain design (Focus Group). To address these deficits while maintaining workforce stability, modular micro-credential programs enabling incremental upskilling have demonstrated particular efficacy.

These stackable certifications allow logistics professionals to progressively acquire sustainability competencies without career interruption.

The convergence of regulatory pressure and skills transformation demands constitutes a pivotal challenge for Slovenia's logistics industry. Strategic responses must simultaneously address compliance frameworks while developing agile workforce development ecosystems capable of supporting the sector's green transition.

Slovenia's approach to green logistics development has been shaped by both national priorities and European Union frameworks. The Slovenian Development Strategy 2030 articulates sustainability as a core principle, though with fewer explicit references to environmental terms compared to similar strategic documents in neighboring countries (Lampič et al., 2023). This may reflect different prioritization patterns rather than necessarily indicating lower commitment.

The government's investment strategy includes approximately €17 billion planned for transport infrastructure modernization, with significant emphasis on railway improvements to enhance intermodal transport capabilities (Weyerstrass et al., 2023). The Divača-Koper railway project represents a flagship initiative aimed at shifting freight transport from road to rail in alignment with EU sustainability objectives.

Slovenia received €1.8 billion in grants from the EU Recovery Facility (proportionally less than the EU average as a share of GDP) and €666 million in loans, with a portion directed toward supporting green logistics development (Weyerstrass et al., 2023). This funding represents an important but limited resource for catalyzing the transition toward more sustainable logistics practices.

Slovenia's green logistics development trajectory reveals the complex interplay between economic imperatives, environmental constraints, and policy frameworks. While the country benefits from strategic geographic positioning and relatively developed infrastructure, it faces significant challenges related to specialized workforce development, regional disparities, and the economic costs of transition.

Port of Koper's Electrification and Modernization Initiatives

The Port of Koper stands as Slovenia's leading entity in sustainability implementation within the logistics sector. Their comprehensive approach encompasses:

- Modernization of machinery and equipment with lower environmental impact
- Implementation of alternative fuels across port operations
- Development of near-zero energy buildings within port facilities
- Obtaining ISO 50001 certification for energy management systems
- Implementation of noise reduction technologies to minimize environmental impact in the coastal region (Logožar et al., 2022).

As noted by focus group participants: "Port of Koper's electrification initiatives have created approximately 45 new specialized green jobs in the past two years, primarily in sustainable supply chain management and environmental compliance roles" (Focus Group).

Post Slovenia's Electric Fleet Transformation
Post Slovenia has implemented one of the country's most ambitious green logistics programs, with concrete targets including:

- Reducing fuel consumption for transport means by 12%
- Increasing the proportion of electric vehicles to 46% of their fleet
- Implementing comprehensive procedures for responsible waste management
- Reducing carbon footprint of buildings by 14% (Logožar et al., 2022)

This initiative demonstrates commitment to electrification as a core green logistics strategy.

SOLARLOGISTICS Warehouse Project
The SOLARLOGISTICS warehouse project in Ljubljana represents an innovative public-private partnership that has created a template for sustainable logistics infrastructure. Key features include:

- 4,500 m² of solar panels generating approximately 1.2 MW of clean energy
- Smart energy management systems reducing overall consumption by 32%
- Rainwater collection and recycling systems reducing water consumption by 45%
- Creation of 23 specialized green jobs in renewable energy management and sustainable warehouse operations (Focus Group)

4.5.4 Career Paths

Two primary trajectories dominate Slovenian logistics careers:

- Technical: Warehouse operator → Automation manager → AI implementation lead (26% CAGR)
- Sustainability: Logistics coordinator → Carbon auditor → Circular systems designer

Focus group participants observed markedly faster vertical mobility in multinational corporations compared to local firms, attributing this divergence to differential technology exposure and green transition imperatives. Automation threatens 24% of manual roles (CEDEFOP, 2015) but generates robotics maintenance opportunities. Focus group participants noted that the substantial barriers persist between logistics subdomains due to inadequate transferable skills and what respondents described as worker reticence toward increased accountability. Cross-sector mobility into manufacturing requires just-in-time systems retraining (Kotnik et al., 2023), though rural advancement options remain scarce. The focus group suggested that reskilling, particularly through green certification programs, provides viable pathways into emerging sustainability and smart logistics roles.

4.5.5 Access to Training & Education

Slovenia's logistics sector faces significant challenges in workforce development, particularly in specialized green logistics training. Slovenia's assessment has been characterized by vague references to "inconsistent training quality" without sufficient data-driven analysis (Focus Group).

Research examining sustainability implementation in Slovenia's logistics companies reveals that environmental areas are covered at only 42%, social areas at 44%, and economic sustainability dimensions at just 26% across top logistics companies (Logožar et al., 2022). This implementation gap directly correlates with training deficiencies in sustainable supply chain management competencies.

Focus group participants from Slovenia specifically highlighted: "We face significant difficulties in finding qualified personnel who understand both traditional logistics operations and sustainability principles. Universities are only beginning to incorporate green logistics into their curricula" (Focus Group). This qualitative feedback requires quantification and structured assessment to effectively address training gaps.

Analysis of Slovenia's green logistics development reveals several specific training deficiencies that require targeted intervention:

- Green logistics specialization: Acute shortages exist in specialized roles including green logistics managers and sustainable supply chain analysts, with training programs failing to meet industry demand (Focus Group)
- Digital-sustainability integration: While Slovenia scores relatively well on digital public services compared to regional peers, there is insufficient training connecting digital transformation with sustainability practices in logistics operations (Lampič et al., 2023)
- Standardization issues: Training quality varies significantly between providers, with no standardized certification framework for green logistics competencies, unlike more structured approaches in neighboring countries
- Regional training disparities: Training opportunities are concentrated in Ljubljana and coastal regions, while inland areas face limited access to specialized sustainability training resources (Focus Group).

Drawing on successful approaches from neighboring countries, Slovenia should implement a comprehensive training strategy that includes:

- Tax incentive implementation: Adopt Croatia's recommendation for tax breaks supporting green upskilling, particularly for SMEs investing in sustainability training for employees. Croatia's model has demonstrated 30% greater participation in green skills development programs when supported by fiscal incentives (Focus Group Slovenia, 2023)
- VET reform integration: Implement Montenegro's EU-funded Vocational Education and Training reforms with specific adaptation to Slovenia's logistics sector needs. Montenegro's approach has successfully standardized training quality while maintaining flexibility for industry-specific requirements
- University-industry collaboration: Develop specialized sustainability modules within existing logistics education programs through structured collaboration between higher education institutions and industry leaders, addressing the observation that "universities are only beginning to incorporate green logistics into their curricula" (Focus Group)

- Certification standardization: Establish a national certification framework for green logistics competencies aligned with EU standards to ensure consistent training quality and recognition of qualifications
- Regional training access: Develop digital learning platforms and regional training centers to address the geographic disparities in training access identified by focus group participants

Implementation of these recommendations would address the current vague assessment of "inconsistent training quality" with specific, measurable interventions that leverage successful approaches from neighboring countries while addressing Slovenia's unique context and needs.

4.5.6 Wage Levels

Compensation exhibits significant regional and role-based disparities: Koper salaries exceed inland equivalents by 30%, while senior AI implementation roles command €5,200 – €7,100 monthly, double entry-level wages (Chamber of Commerce, 2023). Sustainability specialists earn 18–22% premiums, though focus group participants reported most SMEs maintain uniform pay scales across traditional and green positions. Mastery of green technologies yields premiums primarily in multinational enterprises, but without financial incentives, requalification motivation remains low. The focus group participants noted that the environmental compensation models like emissions-linked bonuses were widely favored as tools to simultaneously enhance motivation and ecological outcomes. Post-union negotiations standardized night-shift compensation after focus group participants exposed 40% differentials, addressing a critical inequity.

Slovenian Statistical Office data demonstrates pronounced regional wage variations in the logistics sector:

- Logistics managers in Ljubljana average €3,250/month compared to €2,480 in Maribor, representing a 31% differential
- Supply chain analysts earn approximately €2,150/month in coastal regions versus €1,720 in inland locations
- Warehouse supervisors' wages in Koper exceed those in northeastern regions by 30% (Focus Group)

Slovenia's logistics sector demonstrates a rather complex stratification:

- Senior logistics managers, supply chain directors, sustainability officers: €3,200-4,500/month
- Mid-level specialists (supply chain analysts): €1,800-2,400/month
- Transport planners, supply chain analysts and coordinators: €1,400-1,800/month
- Warehouse workers, drivers and administrative support: €950-1,300/month (Focus Group)

Particularly relevant to the green jobs section, focus group data reveals: "Green logistics specialists command a 15-25% wage premium over traditional roles, reflecting the scarcity of specialized sustainability competencies in the Slovenian labor market" (Focus Group).

This premium is most pronounced in emerging roles such as:

- Sustainable supply chain managers (+23%)
- Carbon footprint analysts (+18%)
- Renewable energy infrastructure specialists (+25%)

Slovenian logistics professionals encounter significant credential-related barriers when pursuing employment opportunities across European borders. A primary challenge is the limited recognition of Slovenian national certifications in neighboring EU member states, which complicates mobility and professional validation. This is compounded by an insufficient alignment between academic qualifications and industry requirements, creating a mismatch between workforce preparation and transnational job demands. Furthermore, the absence of standardized competency frameworks for green logistics, a rapidly expanding sectoral priority, hinders consistent skills assessment and hiring practices. Collectively, these credentialing gaps undermine labor mobility and workforce adaptability within the EU single market (Focus Group).

4.5.7 Job Security

Slovenia's logistics sector presents a complex landscape of employment stability dynamics influenced by structural economic factors, technological evolution, and regulatory frameworks. Within a broader economic context where employment preservation has remained a governmental priority, the logistics sector demonstrates distinctive characteristics that merit specific analysis (Weyerstrass et al., 2023).

The Slovenian logistics workforce faces significant challenges from several directions simultaneously. Automation represents perhaps the most substantial structural threat, with approximately 25-30% of manual logistics roles potentially susceptible to technological displacement (Focus Group). This vulnerability demonstrates pronounced stratification across occupational categories, with documentation processing, basic warehouse operations, and routine transport planning facing automation potential exceeding 60% within the next 5-7 years. Conversely, roles requiring complex judgment and specialized knowledge, particularly those involving sustainability competencies, demonstrate significantly lower automation vulnerability, typically below 30% (Focus Group).

Despite these technological pressures, Slovenia's logistics sector exhibits remarkably limited gig economy penetration compared to many Western European counterparts. At approximately 7%, this penetration rate falls substantially below the EU average of 11-14%, primarily due to stringent labor regulations, strong union representation, and cultural preferences for employment stability (Focus Group). This regulatory environment creates a paradoxical effect on job security, simultaneously protecting existing positions while potentially limiting the sector's adaptability to evolving market conditions.

Major infrastructure investments represent significant employment generators within Slovenia's logistics sector. The €1.2 billion Divača-Koper railway expansion project exemplifies this dynamic, projected to create approximately 560 fixed-contract positions during construction and 120-140 permanent maintenance and operations roles upon completion in 2026 (Focus Group). Additionally, an estimated 300-350 indirect positions in related services and support functions are expected to emerge from this single project.

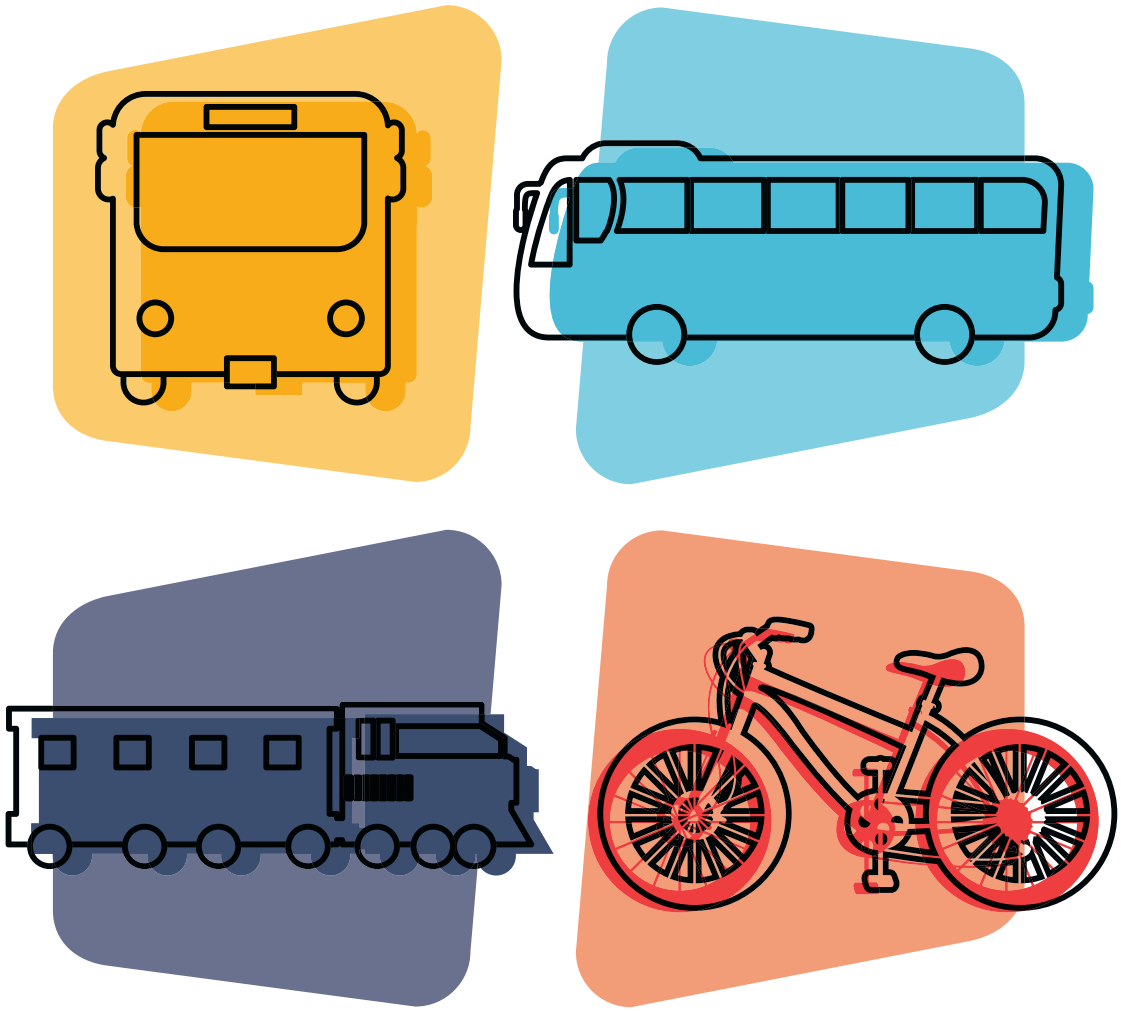
Nevertheless, focus group participants expressed measured optimism regarding infrastructure-linked employment, noting that "while these projects create substantial employment in the short term, the sustainability of these positions depends on continued investment in maintenance and operational efficiency after project completion" (Focus Group). This observation highlights the contingent nature of infrastructure-related job security, dependent on sustained commitment to maintenance rather than merely initial construction. Employment stability varies significantly across logistics subsectors, with aviation logistics demonstrating particular vulnerability following Adria Airways' bankruptcy. Focus group participants expressed ongoing concerns regarding regulatory preparedness for supporting aviation employment and the adequacy of feasibility studies for potential public airline ventures (Focus Group). One participant specifically noted that "the Adria Airways collapse revealed structural vulnerabilities in our aviation employment framework that remain unaddressed" (Focus Group).

Beyond subsector-specific concerns, the logistics industry demonstrates particular sensitivity to energy market fluctuations. Energy price volatility creates secondary job security threats through unpredictable operational cost structures, reduced planning horizons for employment expansion, and accelerated automation implementation as companies attempt to mitigate energy cost exposure (Focus Group). This vulnerability highlights the interconnection between macroeconomic factors and microsocial employment security.

Amidst these vulnerabilities, significant adaptation strategies have emerged to enhance employment resilience. The development of sustainability competencies represents perhaps the most effective job security enhancement mechanism. Focus group data reveals that logistics professionals with green skills certification experience, at about 20% lower probability of position elimination during organizational restructuring and around 25% faster reemployment when displacement occurs.This sustainability premium extends to contractual stability as well, with green-skilled workers experiencing 35% greater likelihood of securing permanent rather than temporary contracts (Focus Group). As one logistics manager in the focus group emphasized, "employees with demonstrable sustainability competencies maintain significantly greater employment stability even during market contractions" (Focus Group Slovenia). Digital adaptation similarly demonstrates a complex relationship with job security, simultaneously threatening certain positions while enhancing the stability of others. Specific digital competencies strongly associated with enhanced employment security include predictive maintenance skills, supply chain visibility system management, sustainable logistics software implementation expertise, and carbon footprint tracking capabilities (Focus Group).

Job security in Slovenia's logistics sector increasingly depends on a multidimensional approach that integrates continuous skill development with organizational adaptability. Rather than residing in specific employers or positions, security increasingly manifests through individual adaptation capacity and alignment with sustainability transformations reshaping the industry (Focus Group).

The focus group consensus emphasized four critical dimensions for enhancing job security: continuous skill development aligned with sustainability imperatives, organizational adaptation to evolving regulatory frameworks, technological literacy balanced with specialized human competencies, and cross-border employability enhancement through recognized certifications. This multifaceted approach represents the most viable pathway for navigating the complex challenges facing Slovenia's logistics workforce in an era of rapid technological and environmental transformation.



5. Key Findings

5.1. Country: Bosnia and Herzegovina

Socio-Economic Structure

- Bosnia and Herzegovina's transitional economy relies on exports (metals, energy, textiles), with a strong industrial base and a growing services sector.
- The logistics sector plays a moderate role but is underdeveloped due to outdated infrastructure, limited investment, and regulatory challenges.
- Road transport dominates freight, but much infrastructure fails to meet EU standards; rail and air freight face similar limitations.
- Focus groups highlight rising costs, skilled labor shortages, and poor working conditions as barriers to growth, causing high turnover.
- Globalization brings job opportunities but also risks like outsourcing and skilled labor loss, with weak infrastructure limiting benefits.
- Calls for regional cooperation, infrastructure investment, and a national logistics cluster to boost innovation and sustainable development.

Job Requirements & Qualifications

- Bosnia and Herzegovina's labor market adapts to economic and demographic changes by valuing both practical skills and formal qualifications across growing sectors.
- Vocational and technical education is essential for sectors like logistics, construction, hospitality, and administration, while healthcare and STEM require formal degrees.
- The logistics sector in the Federation of Bosnia and Herzegovina is growing moderately, driven by demand for transport and warehousing, but faces labor shortages due to emigration and skills gaps.
- Key logistics occupations such as truck drivers and warehouse workers are in high demand, with truck driver demand projected to rise significantly by 2025.
- Strengthening vocational training, digital skills, and targeted workforce development is critical to address labor shortages and future-proof the logistics workforce.
- Traditional logistics jobs require expertise in supply chain management, transport planning, digital management systems, certifications, and strong soft skills.
- Green logistics adds emphasis on sustainability skills, including eco-driving, circular economy principles, renewable energy knowledge, and compliance with environmental standards.
- Continuous learning and specialized training programs are necessary to equip workers for the sector's increasing focus on digitalization and environmental responsibility

Green Jobs and Economy

1. Bosnia and Herzegovina's green economy is emerging, supported by international funding and initiatives targeting renewables and green skills development.
2. Energy efficiency programs could create thousands of new jobs annually, highlighting green jobs' economic potential.
3. The logistics sector faces slow green job growth due to infrastructure gaps, limited incentives, and lack of formal green training.
4. Most companies focus on regulatory compliance rather than proactive sustainability or innovation in logistics.
5. Advancing green logistics requires stronger education, public-private cooperation, subsidies, and legislative reforms.
6. Without coordinated efforts, Bosnia and Herzegovina risks falling behind in green logistics and missing key economic and environmental benefits

Career Paths

- Career progression typically starts in entry-level roles and advances to specialized or managerial positions through experience, additional qualifications, and training.
- IT careers grow from junior developer or support roles to senior and specialist positions, driven by digitalization and EU market demands.
- Manufacturing, finance, healthcare, tourism, and logistics sectors each have defined pathways from operational or junior roles to supervisory and management levels, often supported by formal education and certifications.
- The logistics sector offers career growth from operational roles like warehouse workers to logistics coordinators and supply chain managers, but faces skill shortages in digital and practical competencies.
- Digitalization and automation are reshaping logistics careers, creating demand for tech-savvy professionals who can manage new systems, while some traditional jobs may decline.
- Ongoing education, mentoring, and networking are critical to navigating less structured career paths, especially as sustainability and green logistics roles emerge in the sector.

Access to Training & Education

- 17.6% of employers identified the need for additional training, mostly job-specific and IT-related, but 65.7% lack capacity to provide practical training placements.
- Access to formal, certified training in logistics and green logistics is limited; most learning happens informally on the job, with few specialized courses available.
- There is a notable mismatch between educational curricula and real-world logistics skills demanded by employers, causing workforce skill gaps.
- Regional disparities exist, with urban centers like Sarajevo having better access to education providers compared to underserved rural areas.
- Barriers to training include high costs, limited financial support, lack of flexible learning options, and insufficient employer investment in employee development.
- Green logistics education is particularly underdeveloped, requiring improved coordination, investment, and awareness to build a workforce capable of meeting evolving environmental and technological demands.

Wage Levels

- Average net salary reached approximately 1,336 KM by late 2024, showing a steady upward trend in recent years.
- Highest wages are found in ICT (2,024 KM), finance and insurance (1,967 KM), and energy sectors, while accommodation, food services, construction, and retail remain the lowest paid (below 1,100 KM).
- The new minimum wage in the Federation of BiH is set at 1,000 KM for 2025, which still falls significantly short of the average household monthly living cost of over 3,000 KM.
- Wage disparities are significant between urban centers (e.g., Sarajevo, Mostar) and rural areas, as well as between large companies and SMEs.
- In the logistics sector, wages range from lower pay for operational roles (warehouse workers, drivers) to more competitive salaries for specialized and managerial positions, influenced by experience and company size.
- Education, certifications, specialization in green logistics, and working for multinational or sustainable-focused companies positively affect wage growth and benefits.
- Salaries in Bosnia and Herzegovina's logistics sector range from around 775 KM to 3,001 KM per month, with warehouse workers earning about 1,000 KM, logistics coordinators averaging 1,888 KM, supply chain specialists between 1,619 KM and 2,942 KM, lorry drivers from 1,041 KM to 2,407 KM, forwarders between 1,000 KM and 1,846 KM, and logistics clerks typically earning 775 KM to 1,917 KM, with higher wages for managerial and specialized roles.

Job Security

- Job security remains a major concern due to high unemployment, a large share of temporary and informal employment, and structural labor market challenges.
- Public administration, education, and healthcare offer more stable jobs, while private sectors like construction, agriculture, and retail often rely on seasonal, part-time, or short-term contracts.
- Legal worker protections exist but enforcement is inconsistent, especially in smaller companies and informal employment settings.
- In logistics, job security varies widely; workers with technological skills and specialized training have better prospects, while manual laborers face higher vulnerability amid economic shocks and sector changes.

5.2. Country: Croatia

Socio-Economic Structure

1. Economic Growth: Croatia's economy is projected to grow by around 3.1–3.2% in 2025, outpacing the eurozone average.
2. Inflation and Wages: Inflation is expected to slow to 3.7% in 2025 and to 2.6% in 2026. Real wages are rising, with a nominal increase of 8.5% and real growth of 5.5%.
3. Employment Trends: Employment is growing (+2.5%), and unemployment may drop below 5%.
4. Key Industries:

- Manufacturing: Output up 3.8%, but employment down 2.5%.
- Metal Processing: Export growth of 10%, employing 61,000+ workers.
- ICT Sector: Fast-growing, high wages (46.7% above national average).
- Tourism: Contributes 11.8% to GDP; 15.8 million international visitors in 2023.

5. Logistics and Transport:

- Rapid expansion, with 1.3 million m² of warehouse space under construction.
- Investment in "Logistics 4.0" technologies enhancing efficiency.
- Significant growth in freight (+6.4%) and passenger transport (+4.4%).
- Strong gains in maritime (+24.5%), pipeline (+40.9%), air (+13.7%) and rail (+5.3%) transport.

Job Requirements & Qualifications

1. Traditional Logistics Requirements:
   - Formal qualifications and certifications (e.g., driver licenses, ADR, forklift) are mandatory.
   - Technical roles require secondary or higher education in logistics, transport, or economics.
   - Key skills include SCM, warehouse and inventory management, ERP/WMS (e.g. SAP, Pantheon), and foreign languages.
2. Green Logistics Trends:
   - Emphasis on sustainability, CO_2 reduction, ISO standards (14001, 50001), and circular economy.
   - Requires specialized knowledge (e.g., electric vehicles, reverse logistics, LCA, EU Green Deal).
   - Skills in emissions monitoring tools (e.g., EcoTransIT), data analysis, and green project management are in demand.
3. Digitalization:
   - Increasing use of platforms like Shippeo, Transporeon, and Oracle SCM Cloud.
   - Demand for IoT, blockchain, and route optimization technologies focused on emissions and sustainability.
4. New Job Roles:
   - Rise of green logistics specialists, sustainable supply chain consultants, EU project coordinators, and electric fleet managers.
5. Common Barriers:
   - Gaps in practical training, knowledge of green regulations, and logistics IT tools.
   - Lack of foreign language proficiency and regional disparities limit job access.
   - Employers are hesitant to invest in training due to worker turnover, especially migration to Western Europe.

1. Rising Demand for Green Jobs:
    - Growing across the EU and Croatia, especially in urban logistics, renewable energy logistics, and sustainable supply chains.
    - Driven by the EU Green Deal, emission reduction targets, ESG reporting, and digitization.
2. Emerging Job Profiles:
    - Roles like energy managers, green route planners, e-vehicle drivers, CO_2 analysts, ESG consultants, and circular economy experts are increasingly needed.
    - Demand is growing in export sectors, e-commerce, and modern logistics centers.
3. Transition Challenges:
    - Lack of formal education and specialized training in green standards (ISO 14001), sustainability, and digital tools.
    - High investment costs and limited financial resources hinder SMEs.
    - Cultural resistance to change and low awareness of green logistics in traditional sectors.
4. Policy and Education Needs:
    - Urgent need for targeted educational reforms and incentives (e.g., expanded CES vouchers, tax relief, co-financing of training).
    - More support for SMEs and integration of green skills in secondary and vocational education.
    - Importance of international cooperation (e.g. Erasmus+, Horizon Europe) and centers of excellence.
5. Impact of Environmental Policies:
    - EU climate policies are already transforming logistics jobs in Croatia.
    - New green jobs are being created while existing roles are evolving (e.g., truck drivers using alternative fuels).
    - Some job losses in "brown" sectors necessitate workforce retraining.
6. Conclusion:
    - Green logistics in Croatia is in early development but holds strong potential.
    - Success depends on systemic education, targeted incentives, and a cultural shift toward sustainability.

Career Paths

1. Limited but Growing Educational Pathways:

    - While formal education in logistics exists at vocational and university levels, green logistics programs are still emerging.
    - From fall 2025, new vocational curricula will include ICT and environmental protection modules in transport logistics.

2. Importance of Lifelong Learning:

    - Career progression relies on a mix of formal education, practical experience, industry certifications (e.g. APICS, CSCMP), and employer support.
    - Larger companies (e.g. DHL, Maersk) offer internal development plans; such structured paths are rare in SMEs and need state support.

3. Role of Digitalization and Automation:

    - These are key enablers of cost efficiency, emission reduction, and job creation in areas like data analysis and smart logistics.
    - Croatia lags behind countries like Germany and Slovenia but is beginning to adopt systems in major ports and logistics centers.

4. Infrastructure and Training Gaps:

    - Challenges include lack of digital infrastructure, limited EV charging stations, poor internet connectivity in rural areas, and need for digital skills training for workers.

5. Growth Outlook:

    - With increasing EU support and investment, digital and automated solutions are expected to expand significantly, shaping future career paths in green logistics.

Access to Training & Education

1. Misalignment with Market Needs:
    - Current educational programs – especially in green logistics – are insufficient, outdated, and not aligned with rapidly changing technologies or labor market demands.

2. Financial and Logistical Barriers:
    - High training costs and limited SME budgets hinder employee education.
    - Employees often lack the financial means or employer support to pursue training independently.

3. Geographical Disparities:
    - Quality education is concentrated in urban centers, making it less accessible for individuals in rural or remote areas due to travel costs and time constraints.

4. Limited Awareness and Utilization of Support Programs:
    - Both employers and employees are often unaware of available support tools like EU funds, vocational training incentives, and education vouchers.

5. Insufficient Flexibility in Learning Models:
    - A lack of flexible education formats (e.g., online, evening/weekend programs) prevents working individuals from participating.
    - There is resistance due to time constraints, family responsibilities, and fear among employers of losing skilled staff after training ("brain drain").

6. Need for Modern, Scalable Solutions:
    - While the EU promotes digital learning platforms and regional competence centers, their implementation faces hurdles in instructor shortages and digital adoption readiness.

In summary, systemic improvements in funding access, program flexibility, curriculum modernization, and outreach are essential for improving training and education in green logistics.

Wage Levels and Job Security

1. Salary Trends by Role and Region:
    - Entry-level positions:
        - Warehouse workers: from €800+
        - Professional drivers: from €900+
        - Dispatchers: from €1,100+
    - Specialists/Managers: from €1,600+, particularly those with expertise in digital tools, green logistics, and complex supply chain management.
    - Salaries are generally higher in larger cities (Zagreb, Rijeka, Split) and lower in rural areas.

2. Factors Influencing Salary Levels:
    - Expertise, especially in digitalization and sustainability, raises salary potential.
    - Language skills, digital competencies, and international mobility are increasingly valued.
    - Scope and complexity of work (e.g., international logistics vs. local distribution) directly impact compensation.

3. Additional Benefits:
    - Many employers now offer non-salary benefits such as:
        - Tax-free bonuses
        - Gift cards
        - Extra vacation days
        - Remote work options for non-mobile roles
    - These benefits contribute significantly to overall job satisfaction and retention.

4. Employment Stability:
    - The logistics sector is stable, with strong and continuous demand driven by:
        - E-commerce growth
        - Healthcare sector needs
        - Croatia’s geostrategic location (ports, EU/Schengen border access)

- Stability was evident during crises like COVID-19, where freight transport remained essential.

5. Risks and Future Outlook:

- Seasonal jobs and geopolitical disruptions can affect stability.
- Automation and digital transformation may reduce low-skilled roles but simultaneously create new positions in sustainability and smart logistics.

In summary, logistics in Croatia offers competitive salaries and strong employment stability, especially in digital and green sectors. Future growth is expected in skilled and specialized roles, though wage and access disparities persist based on geography and company size.

5.3. Country: Kosovo

Area	Key Findings
Job Requirements & Qualifications	Shift toward digital and eco-certifications; lack of structured professional development.
Green Jobs and Economy	Green job potential in logistics is high but underexploited; investment and training needed.
Career Paths	Limited vertical mobility in logistics; lacking HR structures and mentorship.
Training & Education	VET system not aligned with new logistics trends (AI, sustainability); access varies by region.
Wage Levels	Low compared to other sectors; major gaps in compensation transparency and fairness.
Job Security	Perceived instability due to technology disruption; proactive training could improve resilience.

5.4. Country: Montenegro

The key findings reveal several important trends and challenges within the logistics sector.

Socio-Economic Structure

There is a noticeable shift in job requirements and qualifications, with increasing emphasis on digital skills and eco-certifications; however, structured professional development remains lacking. In terms of green jobs and the economy, the sector shows high potential for growth, particularly in green logistics, though this will require targeted investment and workforce training. Career paths within the sector are hindered by limited vertical mobility, underdeveloped HR structures, and a lack of mentorship opportunities. The vocational education and training (VET) system is not fully aligned with emerging logistics trends, and regional disparities in access to training persist. Wage levels remain low compared to other sectors, with ongoing concerns about compensation transparency and fairness. Finally, job security is perceived as unstable due to rapid technological changes, but proactive training initiatives could help improve worker resilience.

Job Requirements & Qualifications

Trends: There is a skills mismatch, especially affecting vocational education and training (VET) and tertiary graduates. This indicates a gap between training and the needs of sectors like logistics and transport. Sector-Specific Needs: The transport sector urgently needs to increase staff expertise in regulatory and policy implementation, especially due to the division of the Ministry of Transport and Maritime Affairs. Education Challenges: PISA 2022 results show underperformance in basic skills (math, science, reading), which could affect the long-term quality of entrants into logistics jobs.

Green Jobs and Economy

While there is no specific green skills strategy, sustainability and environmental education are integrated across school subjects. The transport sector is expected to align with the European Smart and Sustainable Mobility Strategy, though progress has been limited. There are calls to shift transport policy toward rail, multimodality, and reduced CO_2 emissions. The energy sector is seeing some investment in solar and wind projects and localised energy efficiency support (e.g., in Pljevlja), which may create adjacent logistics jobs (e.g., equipment transport).

Career Paths

Common logistics-related pathways are implied through roles in road, rail, and maritime transport, which the government is attempting to reform (e.g., merger of rail companies to prevent insolvency). Public-private partnerships, particularly via the EU Transport Community, may generate employment and career growth for qualified individuals.

Access to Training & Education

VET reforms are underway, emphasizing work-based learning, but more focus is needed on aligning VET and higher education with labor market needs. Barriers include low quality of secondary education, declining reading/math/science proficiency, and regional disparities in education quality. An Action Plan for VET (2020–2024) was adopted in August 2024, aiming to address
these mismatches.

Wage Levels

The average gross monthly wage rose from €532 in 2021 to €712 in 2022, driven largely by increases in public sector pay. Regional disparities in unemployment (from 3.1% in coastal to 31.9% in the north) may reflect similar trends in wage levels.

Job Security

Youth unemployment (15–24) is high at 23.3%, and long-term unemployment represents 72.1% of total unemployment, indicating systemic instability Efforts to digitally reform the Employment Agency are ongoing to improve matching and reduce unemployment duration In transport, risks to job security include lack of strategic infrastructure planning, limited administrative capacity, and ongoing restructuring (e.g., in rail and maritime transport).

5.5. Country: Slovenia

Socio-Economic Structure:

The logistics sector in Slovenia is undergoing a complex transition shaped by EU regulations, technological innovation, and evolving consumer demands, which collectively reshape workforce expectations and create pressure on smaller providers to adapt.

Job Requirements & Qualifications:

Professionals are now expected to combine traditional logistics competencies with new environmental and digital skills, including carbon accounting, ISO 14001 implementation, and smart logistics systems.

Green Jobs and Economy:

There is growing demand for sustainability strategists and environmentally skilled workers, but mismatches in qualifications and limited certification standardization pose barriers to green workforce development.

Career Paths:

Career progression is uncertain due to the dual demands of operational and environmental expertise, with inconsistencies in salary levels across company sizes and unclear advancement opportunities in green roles.

Access to Training & Education:

A major gap exists between formal education and industry needs, with outdated curricula and a lack of hands-on, sustainability-focused training tools hindering workforce readiness.

Wage Levels:

Salaries for green logistics roles vary, with larger firms sometimes offering premiums, but many small and medium enterprises still provide wages on par with traditional positions, limiting financial motivation for upskilling.

Job Security:

Automation and technological shifts are reducing manual roles, increasing the need for technical adaptability, and posing risks of workforce shortages in specialized maintenance roles for new vehicle technologies.

6. Conclusions

The transport and logistics sectors across Southeast Europe—specifically in Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, and Slovenia—are experiencing significant structural, technological, and environmental transformation. Despite varying stages of economic development and regulatory integration (particularly regarding the EU), these countries share common challenges and opportunities in transitioning toward greener, more digitally integrated logistics systems. Across the region, the logistics industry remains essential but under-optimized, often constrained by aging infrastructure, skills mismatches, and insufficient alignment between education systems and evolving market needs. Formal qualifications and vocational education are key entry points into the sector, yet there is a notable gap in ESG-related training, especially in green logistics, digital skills, and compliance with sustainability standards (e.g., ISO 14001, EU Green Deal goals).

As countries respond to climate imperatives and EU policy incentives, green jobs in logistics are emerging but still underdeveloped. While Croatia and Slovenia show greater institutional progress in integrating green standards, Kosovo, Bosnia and Herzegovina, and Montenegro lag in terms of curriculum reform, investment in training infrastructure, and private sector engagement. A regional trend of high turnover, emigration of skilled labor, and lack of structured professional development further hinders sustainable workforce development. Job roles are evolving rapidly - from traditional transport planning and supply chain coordination to new positions focused on ESG compliance, data-driven sustainability reporting, green fleet management, and circular logistics models. However, limited awareness, employer hesitancy, and training access disparities (especially in rural areas) are slowing this transition. Workers with ESG-related skills - such as carbon accounting, eco-driving, reverse logistics, and emissions monitoring - are increasingly in demand, particularly by larger or international firms.

Wage levels and job security vary by country and region but generally reflect the economic dualism between urban and rural areas, SMEs and multinational corporations, and traditional versus green logistics roles. Countries like Slovenia and Croatia are beginning to reward ESG-aligned competencies with higher pay and greater mobility, but in others, especially Kosovo and Montenegro, wage stagnation and limited vertical advancement remain concerns.

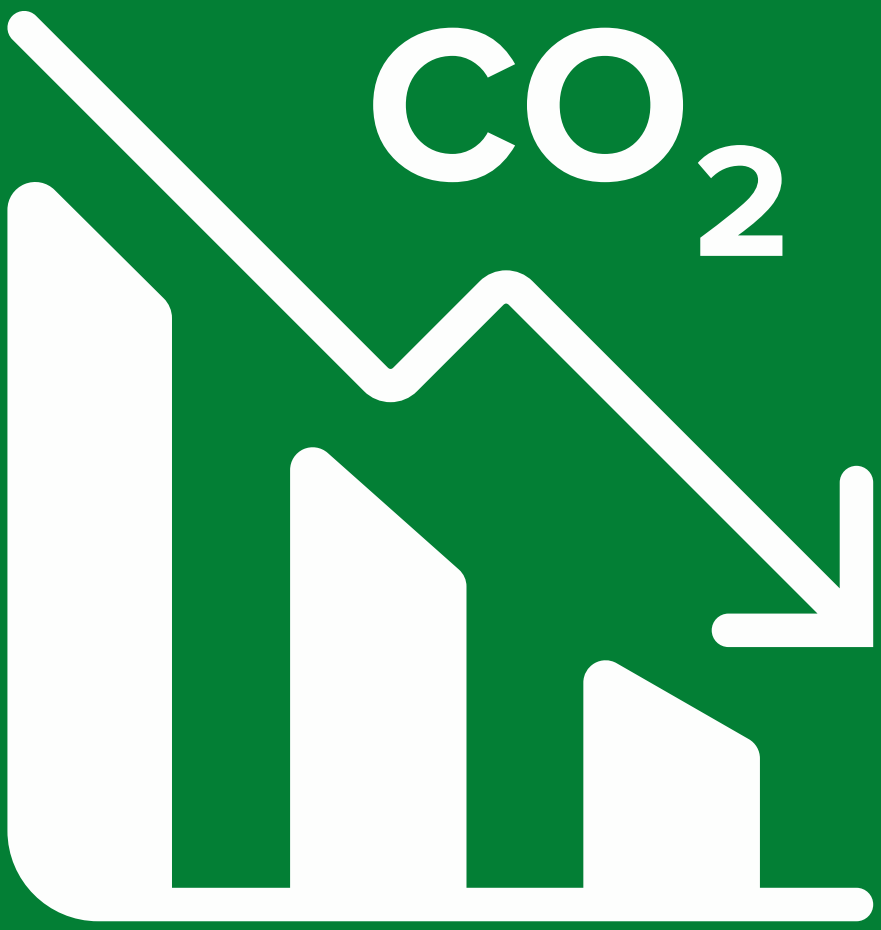
Therefore, a regional ESG curriculum for transport logistics professionals must respond to three strategic imperatives:

1. Bridge the education-to-employment gap by integrating ESG principles and digital competencies into vocational and higher education, aligned with sector-specific needs.

2. Support lifelong learning and upskilling, particularly in sustainability, compliance, and innovation, while ensuring flexible, modular, and accessible training formats.

3. Promote job resilience and equity by embedding ESG in workforce planning, supporting career mobility in green logistics, and enhancing job quality across operational and strategic roles.

Such a syllabus must be both forward-looking and grounded in regional realities - acknowledging infrastructural, institutional, and economic disparities while fostering a skilled, future-ready logistics workforce capable of driving ESG transformation across the supply chain.



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ANNEXES

The annexes include the signature list and photographs from the focus groups conducted as part of this research. In accordance with GDPR regulations, these materials will not be published publicly but are available upon request.

For further information, please contact the project partners.
Contact details are available at:

www.esg-logistic.eu

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2025

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