



TEAM HUB!

*Delivering sustainability
to the e-commerce
supply chain*

BACKGROUND REPORT

JUNE 2023



**Co-funded by
the European Union**

The TeamHub! Project is Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the Directorate-General for Employment, Social Affairs, and Inclusion. Neither the European Union nor the granting authority can be held responsible for them.

AUTHORS:

Sofia Gualandi, Barbara De Micheli
(Fondazione Giacomo Brodolini)

*Based on contributions from Team Hub Project
Partners: Jens Cassiers (ABVV-BTB); Heidi Erbsen,
Janika Bachmann and Sabina Trankmann (Tartu
University); Sanna Saksela-Bergholm (University
of Jyväskylä); Odile Chagny (IRES); Sofia Gualandi
(FGB); Dimitri A. Sotiropoulos and Alexia Mitsikostas
(ELIAMEP); Barbara Surdykowska (IPA); Pablo Sanz and
Marc Caballero (NOTUS); Ronny Keller (Ver.di)*

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Introduction

The *Team Hub!* project is a two-year project supported by the European Commission, Directorate-General for Employment, Social Affairs, and Inclusion, receiving funding under the call for proposals SOCPL-2021-IND-REL aimed at improving expertise in the field of industrial relations. Running for 24 months (August 2022 – July 2024), *Team Hub!* combines desk and empirical research, as well as mutual learning and networking activities, in order to analyse features and challenges of the e-commerce supply chain in a set of selected countries, namely Belgium, Estonia, France, Finland, Germany, Greece, Italy, Poland, Spain.

The Project brings together a trans-European consortium of universities, research institutes and trade unions from nine EU Member States, i.e., Italian Federation of Transport Workers (FILT-CGIL), Fondazione Giacomo Brodolini (FGB), Belgian Transport Federation (ABW-BTB), Hellenic Foundation for European and Foreign Policy (ELIAMEP), University of Jyväskylä (JYU), University of Tartu (UTARTU), NOTUS – Applied Social Research, Institute of Public Affairs Foundation (IPA/ISP), Institute for Economic and Social Research (IRES), German United Services Union (VER.DI)¹. This consortium jointly engaged in addressing the complexities and challenges of e-commerce supply chains, especially with regard to storage and delivery activities, through a set of desk and field research, training, and networking activities and the development of policy recommendations. The aim of *Team Hub!* is to analyse the implications of the e-commerce boom, following the COVID-19 pandemic, and to equip trade unions with the knowledge and skills necessary to propose a sustainable reshaping of business models and work organization in the supply chain, also in view of the digital revolution and environmental sustainability objectives.

The first phase of the project (**Study**) consists of a preliminary literature review aimed at producing country-level background analysis of the e-commerce and logistics national panorama. The goal is to identify and assess information and data about key trends and features in the e-commerce supply chains at national level, with a particular focus on key market players and dominant business models, working and employment conditions, social partners activities, and the geography of the supply chains in the covered countries. The output of this activity is the publication of nine Country Fiches offering country-level analysis of the e-commerce and logistics national panorama in Belgium, Estonia, Finland, France, Germany, Greece, Italy, Poland, and Spain².

Assessing and comparing the analysis conducted at national level provides an overview of the situation at European level. To this end, this Background Report illustrates key trends and ongoing dynamics in the e-commerce supply chain, outlining the issues deserving major attention by unions at national and EU level, and identifying key geographical areas for the storing and delivering of goods traded by major e-commerce companies.

The second phase (**Focus**) consists of an empirical qualitative research aimed at delivering a number of national case studies analysing e-commerce companies practices, working conditions of the employees of their supply chain, and union practices.

The third phase (**Join**) consists both in networking and mutual learning activities. Thanks to an e-commerce survey dedicated to logistics workers and workers representatives involved in National Assemblies, a set of data about working and life conditions are collected to be discussed during the International Mutual Learning Workshops, which will as well analyse interim findings of the previous phases of the project. Two

1 Full list of partners is available here: <https://team-hub-project.eu/partners/>

2 TeamHub Country Fiches are available here: <https://team-hub-project.eu/resources/>

International *Team Hub!* Days close the networking activities involving project partners, social partners, representatives of companies and workers.

The fourth phase (**Sum Up**) will collect the results of the project in a Final Comparative Report complemented by Policy Recommendations for national and EU policymakers to improve working conditions and environmental sustainability in the logistics sector.

A dissemination strategy (**Share**) entails the outcomes' promotion through scientific publications, media articles, and a final conference involving a wide audience of national and European policy makers, stakeholders, practitioners, and academia.

Methodology

Objectives

This Background Report shall be considered as the final result of the Team Hub Project's "Study" Phase, which is meant to build a solid problem definition for this project.

Research questions that this report is aimed at answering are as follows:

- Which are the business models and working conditions in the e-commerce supply chain? How do they affect employment and working conditions across different countries and geographical clusters and how are they going to change in the near future? How do the different models fare in terms of social sustainability?
- How is the rise of e-commerce affecting the global value chain? How are strongest players influencing the functioning of the market and the distribution of added value? Do unions have control over these trends and the direct and indirect effects on workers?
- How is the rise of e-commerce and the consequent development of last-mile logistics and of dedicated hubs affecting local development and environmental sustainability?

Through desk research across nine EU Member States, it was possible to develop a macro-level analysis identifying and assessing key ongoing trends and features in the e-commerce supply chain, in order to equip the partners' consortium with adequate background information for the following project's phases.

Partners' consortium provided national-level inputs adopting a common template following common instructions on methodology, style and sources. In particular, in order to obtain consistent and comparable results, national experts developed their research on the basis of a common template with guidelines for implementation (Table 1 below).

Table 1 – Common Template for Country Fiches

Information needed	Please, fill this form
Country	(...)
Researcher in charge	(...)
Macro-analysis on trends and developments in the e-commerce sector (sales, use of online channels by consumers/shops, market shares and presence of dominant players, employment and wage trends)	(...)
Qualitative analysis on the different types of existing business models, in particular concerning the relationships with workers and in the supply chain	(...)
Emerging issues in terms of employment, working conditions, health and safety of workers involved in storage and delivery activities for e-commerce major players	(...)
Geography of the e-commerce supply chains and presence of nodal points in EU and in the covered countries.	(...)
Social partners positions and main actions	
References <i>Sources: Literature, academic journals, general press, interviews with stakeholders and social partners, data from public and social partners registers, reports on sectorial developments drafted by public authorities and stakeholders, etc.</i>	(...)

These guidelines, together with two dedicated intermediate online project meetings and the constant exchange between the partners and the coordinator, allowed the drafting and publication of nine Country Fiches (see ANNEXES Section below), which illustrate in brief documents key trends and features of the e-commerce supply chain in the selected countries.

Country Fiches nourish this Background comparative report together with sectoral EU-level literature. As a consequence, this report covers the following topics, which correspond to the elements investigated at country level and reported in the Country Fiches, and which give structure to the sections of the Comparative Analysis below:

- I. Macro-analysis on trends and developments in the e-commerce sector (sales, use of online channels by consumers and shops, market shares and presence of dominant players);
- II. Qualitative analysis on the different types of existing business models (overview of the existing types, in particular concerning the relationships with workers and in the supply chain);
- III. Labour market and working conditions (employment and wage trends in the supply chain, emerging issues in terms of employment, working conditions, and health and safety of workers involved in storage and delivery activities for e-commerce major players);
- IV. Geography of the e-commerce supply chain and presence of nodal points;
- V. Social Partners activities and main actions.

Definitions³

This section is dedicated to ensuring clarity and linguistic consistency through the report.

The main focus of most definitions of e-trade seems to be on the sale of goods and services through digital networks, with the explicit or implicit exclusion of orders made by telephone calls, facsimile or manually typed e-mail (OECD, 2011). According to the broad OECD definition, e-commerce encompasses transactions in goods and services conducted over an electronic network. Online trade encompasses business to consumer, consumer to consumer, business to business. In order to more accurately capture the different types of transactions involved in the digital economy, further specifications⁴ are needed:

- **E-trade:** this concept is used for all forms of goods and services (both traditional and digital) traded internationally through electronic means;
- **E-commerce:** this concept is reserved to describe the purchase of traditional goods and services through digital means;
- **Digital trade:** this concept is used to define transactions involving digital goods and services.

In this sense, both “e-commerce” and “digital trade” appear as subgroups of “e-trade”, as illustrated in the figure below.

Figure 1. Source: Huria, A. (2019), *Facilitating Trade and Logistics for E-Commerce: Building Blocks, Challenges and Ways Forward*, World Bank, Washington, DC, p. 9.

	Goods	Services
E-commerce	<p><u>Farmia</u> eBay Amazon (merchandise) Alibaba</p>	<p><u>Eance</u> <u>Freelancer</u> Professional services BPO-KPO E-banking Consulting</p>
Digital trade	<p>App stores (software, music, video, <u>mobile apps</u>) Amazon (e-books, videos) YouTube/Vimeo <u>3-D printed goods?</u></p>	<p><u>PayPal</u> <u>web advertisement</u> E-medicine IT outsourcing <u>Amazon Web Services</u> Cloud-based services</p>

³ This section is based on Huria, A. (2019), *Facilitating Trade and Logistics for E-Commerce: Building Blocks, Challenges and Ways Forward*, World Bank, Washington, DC. Available online: <https://openknowledge.worldbank.org/entities/publication/945fd5b2-24df-54f7-b4d9-d2ba97b7537e>

⁴ Ferrantino, M., Molinuevo, M (2016), *e-Trade for Development: Solutions for Analytical, Regulatory and Logistics Challenges - Concept Note P159123*, World Bank, Washington, DC.

For the purposes of this Background Report, and of the Team Hub Project in general, the focus should be on the sector of *e-commerce of goods*. This implies the need to provide definition for other concepts as follows.

Company E-shop: online website or application by means of which goods or services of a single business/company are sold over the internet (Oxford Dictionary).

E-Commerce Marketplace (E-shop): online platform or application that allows multiple businesses to sell products or services in a single online location. Different types of marketplaces are as follows: product-based marketplaces (e-shoppers can buy goods from various sellers); service-based marketplaces (clients can find and hire service providers like freelancers or independent contractors); peer-to-peer marketplaces (Individuals can buy and sell products and services with each other); B2B marketplaces (businesses can buy and sell products and services from other businesses). Hybrid forms exist, i.e., marketplaces where both products of external vendors/companies and products under the brand of the company operating the marketplace are traded.

When it comes to e-commerce and marketplaces, it is important to briefly outline the EU legal framework of reference. Regulation of online commerce has been generally left to the Member States for a long time. In relation to online services, the Directive 2000/31/EC of 8 June 2000 on certain legal aspects of information society services, in particular electronic commerce, in the Internal Market (so-called 'Directive on electronic commerce')⁵ has been referred as the basic regulatory legal framework. Considering that the Directive on electronic commerce was adopted in 2000, the current era of digitization brings necessity for new legal regulation to sufficiently reflect its dynamics and development.⁶ In order for the EU to be legally prepared for the digital age, two new legislative initiatives were launched related to the institute of the internal market, considered the EU interest in (offline and online) business and trade an securing harmonisation of Member States legislation⁷. These initiatives, referred to as 'Digital Markets Act' and 'Digital Services Act', completed their legislative process and came into force at the end of 2022 respectively as Regulation (EU) 2022/1925 of 14 September 2022 on contestable and fair markets in the digital sector⁸ (henceforth 'DMA') and Regulation (EU) 2022/2065 of 19 October 2022 on a Single Market For Digital Services and amending Directive 2000/31/EC⁹ (henceforth 'DSA'). The DSA and DMA aim to create a safer digital space where the fundamental rights of users are protected and to establish a level playing field for businesses in the European Single Market¹⁰. For the purposes of this section of the report, it is worth noting that four main categories of digital services are identified in the DSA and, in addition to the general obligations that apply to all platforms, specific provisions are set out for each type for implementation of the obligations of the DMA by 2024. In this classification, marketplaces (defined as online platforms that enable consumers to conclude distance contracts with business operators) are placed in the category of information storage service providers and specifically in the subcategory of online platforms.

E-Commerce Logistics (E-logistics)¹¹: complex multi-step process an e-commerce brand uses to get an order out the door and into the hands of the customer. Although this process differs for every company, the ecommerce logistics of an online store includes several components as illustrated below:

5 <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A32000L0031>

6 Rudohradská, S., Trescakova, D. (2021). *Proposals for the digital markets act and digital services act - Broader considerations in context of online platforms*. EU and Comparative Law Issues and Challenges Series, vol. 5, no. 1, 2021, p. 492.

7 Rudohradská, S., Trescakova, D. (2021). *Supra*, p. 493-494.

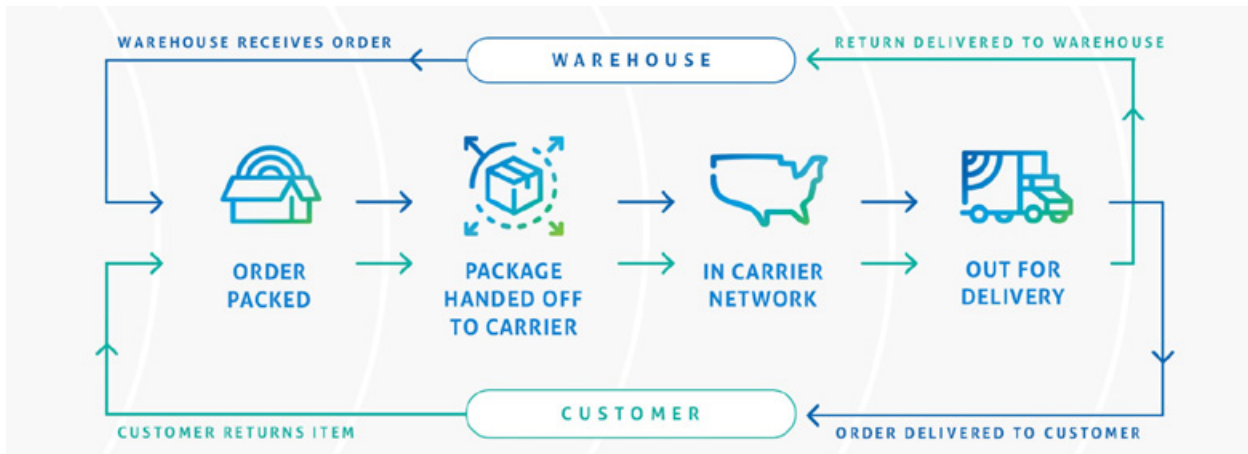
8 Legal reference: <https://eur-lex.europa.eu/eli/reg/2022/1925>; more details available here: https://digital-markets-act.ec.europa.eu/index_en

9 Legal reference: <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32022R2065>

10 More details are available here: <https://digital-strategy.ec.europa.eu/en/policies/digital-services-act-package>

11 Bowes, P. (2021), What is Ecommerce Logistics?, 05/25/2021. Available online: <https://www.pitneybowes.com/us/blog/what-is-ecommerce.html#:~:text=An%20ecommerce%20supply%20chain%20is%20the%20set%20of,that%20dictates%20the%20logistics%20of%20an%20online%20store>

Figure 2. Source: Bowes, P. (2021), *What is Ecommerce Logistics?*



E-commerce fulfilment involves all the steps in the e-commerce logistics process that occur within a warehouse up to the shipping stage. These can include **warehousing, storage, packing, and handing off the order to the carrier**. This also includes **inventory management** across other warehouses within the ecommerce supply chain.

E-Commerce Supply Chain: set of systems, processes, and infrastructure that supplies the product and delivers it to the customer. It represents the overall chain that dictates the logistics of an online store, including the following elements:

Figure 3. Source: Bell, R. (2022). *Last Mile Delivery Explained: Trends, Challenges, Costs & More. Merchants Fleet*. Available [online](#).



- **First mile:** distribution of a good/item from the manufacturer;
- **Middle mile:** long-distance transportation that includes going through customs, ports or hub storages and loading, as well as inland transportation. It brings goods to the final station before being loaded onto vehicles for delivery;
- **Last mile¹²:** short-distance transportation sent out from a local warehouse for its final delivery to the customer. Conceived as a network, the last mile distribution system is a collection of nodes/hubs (distribution centres) and links (roads) over which goods flow using specific vehicle technologies¹³. According to a simplification, last mile delivery consists of three elements: the distribution centre, the delivery vehicle, and the receiving point. With the rise of e-commerce, the models of these three elements are being revisited extensively:
 - **Distribution centre:** in the urban freight literature, the term *urban logistics spaces* encompasses all types of nodes in last mile distribution networks and includes (a) large distribution centres or warehouses generally located in the outskirts of the city; (b) platforms near city centres to enable freight transfer from trucks to light-freight vehicles, often referred to as urban consolidation centres; (c) urban freight-dedicated spaces at the neighbourhood level, such as the micro-deconsolidation platforms; and (d) solutions at the block and building levels, such as automatic parcel terminals.
 - **Delivery vehicle:** reference to medium-sized and small trucks and vans is made, as they are the most commonly used means of delivery at present.
 - **Receiving point:** reference to consumers houses and collection points shall be made. Today's consumers in the e-commerce world holds expectations for immediate delivery which puts a renewed pressure on the entire e-commerce supply chain.

Business relationships for the *e-commerce of goods* are basically of two types:

- **Business-to-Business (B2B) e-commerce:** trade relationship between companies based on digital means, which does not directly involve consumers (e.g. manufacturers and wholesalers or wholesalers and retailers, are considered B2B e-commerce companies).
- **Business-to-Consumer (B2C) e-commerce:** commercial relationship between a company and a consumer based on digital means (e.g. consumer buying a product from an online retailer). This is what is generally considered as "eCommerce business".

To conclude, the *Business-to-Consumer (B2C) e-commerce of goods* and its supply chain as extensively described above is the subject of this analysis.

Applying the European statistical classification of economic activities, the **NACE** (Nomenclature of Economic Activities) **sectors** of the business activities addressed in this report are as follows:

- **E-commerce: G** (Wholesale and Retail Trade), in particular **47.91** (Retail sale via mail order houses or via Internet).
- **Logistics: H** (Transportation and Storage), and in particular **52** (Warehousing and support activities for transportation) and **53** (Postal and courier activities).

¹² Huria, A. (2019), *supra*, p. 65 ff.

¹³ Merchán, D., Blanco, E. (2015). *The Near Future of Megacity Logistics. Overview of Best-Practices, Innovative Strategies and Technology Trends for Last-Mile Delivery*. MIT Center for Transportation and Logistics, Massachusetts Institute of Technology, Cambridge, MA.

Comparative Analysis

I. Macro-analysis on trends and developments in the e-commerce sector

A macro-analysis of current trends and developments of the e-commerce sector at EU level, with particular reference to the nine countries involved in the project, is offered in this section. A focus on the *business-to-consumer (B2C) e-commerce of goods* is proposed, given the exponential growth of this sector in recent years, as will be seen below, and given the complex supply chain that this sector entails, some elements of which are discussed in more detail in the following sections.

E-shopping is becoming increasingly widespread in the EU. Indeed, consumers appreciate the related advantages, such as shopping anytime and anywhere, accessing to a broader range of goods and being able to compare prices easily¹⁴. According to the 2021 European E-Commerce Report¹⁵, **internet use** and purchasing power are the main factors that impact the growth of e-commerce. During the **COVID-19 pandemic**, the **percentage of the population accessing the Internet increased**, which is coupled with the fact that lockdowns have led to an increase in e-commerce flows, as **online purchases increased** while stores were closed. This was confirmed in Country Fiches drafted to support this report. According to the 2022 European E-Commerce Report¹⁶, despite the expectation that e-commerce would slow after the relaxation of Covid-19 lockdown measures, many countries saw their online purchasing remain stable, although the sector has more recently experienced a contraction due to the reduction in consumption caused by rising energy costs as a consequence of the Russia aggression to Ukraine.

B2C e-commerce sector growth

The most recent EU-level e-commerce overview shows that European e-commerce experienced a **growth in turnover** in 2021. Eastern Europe experienced higher growth rates in sales than many Western European countries. However, Western Europe still holds the largest share of total turnover at 63%, compared to Eastern Europe's 2%.¹⁷ Looking at the EU-27, despite the lifting of the Covid-19 related measures and the UK leaving the EU single market, e-commerce turnover grew at a rate of 16% in 2021. The B2C e-commerce sector experienced an increase not far from doubling in recent years in almost all countries analysed in the project¹⁸, as showed in the following sections.

Starting from the **Central/Western countries, Germany** experienced constant growth in the e-commerce market, which over the long term (2011 – 2021) has shown an increase of +221% in total, compared to the +10% of the stationary retail in the same period. The most significative growth was reported in 2020, with an increase of +28,35%, compared to the +12,00% in 2019. The revenue forecast of the sector in 2022 is 103.30 billion euros (-4.1% vs. 2021). In **France**, the market for online trade in goods

14 Eurostat (2018), *Digital economy & society in the EU - A browse through our online world in figures*. 2018 ed., p. 13.

15 Lone, S., Harboul, N. & Weltevreden, J.W.J. (2021). *2021 European E-commerce Report*. Amsterdam/Brussels: Amsterdam University of Applied Sciences & Ecommerce Europe, p. 5. Available online: <https://ecommerce-europe.eu/wp-content/uploads/2021/09/2021-European-E-commerce-Report-LIGHT-VERSION.pdf>

16 Lone, S., & Weltevreden, J.W.J. (2022). *2022 European E-commerce Report*. Amsterdam/Brussels: Amsterdam University of Applied Sciences & Ecommerce Europe, p. 5. Available online: <https://www.eurocommerce.eu/app/uploads/2022/08/European-E-Commerce-Report-2022-LIGHT-VERSION.pdf>

17 Lone, S., & Weltevreden, J.W.J. (2022), *supra*, p. 7

18 The sources of the information and data reported in this section are the TeamHub Country Fiches, with particular reference to their sections entitled "Macro-analysis on trends and developments in the e-commerce sector". See below Annex Section of this document to access the Country Fiches.

represented around €67 billion in 2021, i.e., the 14.1% of total retail trade. The sector is growing strongly: on average +14% per year since 2010 (+32% in 2020, +7.4% in 2021). The COVID crisis had a net effect of accelerating e-commerce in products, with a doubling of the growth rate in 2020 compared to the trend observed over the average period (+32%, compared to +14% on average since 2010). The economic crisis linked to the war in Ukraine has brought a sharp halt. As a result of the rise in transport and delivery costs, the fall in household consumption and tensions in supply chains, as well as the rise in energy costs, e-commerce product sales fell by 7% in 2022. Even if, compared to its neighbours countries, B2C e-commerce in **Belgium** is not equally developed, the turnover e-commerce companies in this country in 2021 was 3% of total Belgian turnover (all sectors except financial), compared to the turnover for 2020 which was 1.96% of GDP.

Looking at **Southern countries**, the latest data in **Spain** shows that the e-commerce sector sales amounted to EUR 15.600 million in the first trimester of 2022, which meant an increase of 25.3% compared with the same trimester in 2021. B2C e-commerce demand increased as well in **Italy** in recent years, according to the following percentages: 2019/2020: +33%; 2021/2020: +21.3%. As for the breakdown by sector in 2021 in Italy, online purchases of products (2021 turnover: € 30,5 billion) have reached and surpassed service purchases (2021 turnover: € 8,9 billion). In 2022, e-commerce of products reached a turnover of € 33.2 billion, while online purchases of services reached a turnover of € 14.9 billion. While e-commerce is not advanced in **Greece** as in other EU Member-States, the value of online sales in 2022 occupied 7.7% of GDP, down from 8.1% in 2021, but up from 2.7% in 2017. The corresponding turnover in 2022 in euros was EUR 15.8 billion, a threefold increase over 2017.

As for **Eastern countries**, in **Poland** pandemic has proved to be a breakthrough for e-commerce, which is becoming a key purchasing channel. Total retail sales through e-commerce channels in Poland in 2021 exceed PLN 100 billion (around EUR 22 billion) and will grow at an average annual rate of 28.1%. In 2022, e-commerce in **Estonia** is estimated to make up 25% of total retail turnover, compared with the 3% only five years ago. This was possible due to the fact that total online purchases grew 50% in this country 2021 while stores were closed. The B2C e-commerce growth rate in **Finland** was +22%, whereas e-GDP was +2,43% (ERU 194 million) in 2020. The worth of e-commerce in Finland was EUR 6,8 million in 2021 and its annual growth is estimated to be 12.30%.

E-shoppers

With regard to the **use of online channels by consumers** in the European Union, internet users have surpassed 90% of the population and 2022 share projections of **e-shoppers** (i.e., internet users buying goods or services online) showed exceeding 76% of the population¹⁹. A detailed analysis of the number of e-shoppers per country, with a focus on the countries analysed in the project, results in the following percentages in relation to the total population: Germany (82%), France (82%), Finland (81%), Belgium (80%), Estonia (77%), Poland (70%), Spain (71%), Greece (69%), Italy (59%).²⁰ Data show that e-commerce became a mainstream activity for consumers in recent years, with a steady increase in online purchases in all countries.

19 Lone, S., & Weltevreden, J.W.J. (2022), *supra*, p. 13

20 Lone, S., & Weltevreden, J.W.J. (2022), *supra*, p. 9

E-shops, marketplaces and dominant players²¹

Three **types of players** co-exist in e-commerce: (1) pure players (retail players operating solely online), (2) omnichannel/mixed players, which combine physical and online distribution channels in their sales strategy, and (3) traditional players (industrial, craft or agricultural companies) that market part of their production online via their website, local platforms or marketplaces. The clear distinction is disappearing as more and more companies are developing a hybrid form, and especially for online purchases, larger platforms have an advantage over smaller competitors in line with principles of economies of scale, which will be explained in the following lines.

The use of **digitalisation** in commerce and the digitisation capacity of companies plays a key role in this framework. In general, the size and pursuit to growth are the main reasons influencing the digitalization of companies: while bigger companies find digitalization as a necessity to expand services and operations, smaller companies see this more as an opportunity than as a necessity. Therefore, B2C e-commerce sector is dominated by large companies, which benefits the countries where these companies are more present, to the detriment of countries with an industrial landscape composed mainly of small and medium enterprises with a low rate of digitisation, such as Italy and Greece. In such countries commerce represents less of a share of total purchases than in other EU countries. For example, despite the growth of e-commerce in Italy, less than 15% of companies earn more than 1% from online sales, against an EU average of 20%. Considering the industrial landscape made up of 70% SMEs, the use of digital devices is growing but still few of them sell online: in 2021, only 60.3% of Italian SMEs reached at least a basic level of digital intensity. In Greece, the situation does not vary much, both in light of the severe economic crisis in the previous decade, that limited the development of ICT indicators, and of the industrial landscape characterized by an abundance of small and very small businesses active in e-commerce (70% of them have internet access).

B2C e-commerce dominant players were ranked in the countries involved in the project, establishing Amazon as the undisputed e-commerce leader when present in the country. This was confirmed in Belgium, France, Germany, Italy, Spain, while the company ranks second/third in Poland and Finland even without a national headquarter. The company does not even have a headquarter in Estonia and Greece, where its relevance is not well defined. Online sales in the fashion industry have developed a lot in recent years, with Zalando, H&M and Zara as dominant players in this segment of the e-commerce market. eBay defends its good market position in several countries, even if it is declining and cannot compete with Amazon and, somewhere, with AliExpress. Ikea, Carrefour and El Corte Inglés were also mentioned as ranking well in the various countries involved, combining physical and online shop functions. As a conclusion, the most popular online stores are intermediary platforms, with hybrid forms of companies both operating the marketplace and trading their own products that tend to emerge.

Focusing on the shipping market, **main players in e-commerce logistics** vary from country to country, although some retain a dominant role internationally. In all countries, national postal companies play an important role in the market (e.g., La Poste/DPD in France, Poste Italiane in Italy, B-Post in Belgium, Omniva in Estonia, Hellenic Post (ELTA) in Greece, Poczta Polska in Poland, Posti Group in Finland). Other express operators with a dominant presence shall be quoted: Amazon (often with a system of subcontracting the delivery service to smaller companies, which will be explained in more detail below), but also DHL, UPS, FedEx, Smartpost, PostNord, B-Post, and other players active at international and only national level.

²¹ The sources of the information and data reported in this section are the TeamHub Country Fiches, with particular reference to their sections entitled "Macro-analysis on trends and developments in the e-commerce sector" and "Qualitative analysis on the different types of existing business models". See below Annex Section of this document to access the Country Fiches.

Identification of dominant players in both e-commerce and logistics sectors makes it possible to state that there is still a division of the players acting in the two markets, but that e-commerce companies/marketplaces such as Amazon have realised that e-commerce and logistics are inextricably linked, and that the efficiency of the supply chain becomes crucial in this framework. Nowadays, this means that e-logistics is seen as a key asset within the business model of e-commerce companies, as can be seen in the following section. This also entails that nowadays, all large e-commerce companies have their own logistics centres to stock and sell their products. In parallel, there is also a trend in traditional logistics players to increasingly focus on offering the entire logistic process as a service, including storage and delivery (see reference to “integrated logistics” in the next section).

II. Qualitative analysis on the different types of existing business models²²

The analysis of the business model shall start from the assumption, well demonstrated in the previous section, that the world of commerce is experiencing a boom in B2C goods e-commerce. This trend, already measured in past years, accelerated rapidly during lockdowns due to the Covid-19 pandemic, as companies that based their business on the retail trade had to find an alternative channels to in-store sales. Currently, the majority of retail companies have integrated e-commerce as part of their business. This happened in two directions: either companies upgraded their websites to offer online sales services, or they decided to rely on e-commerce marketplaces to market their products online.

The online transition of the B2C commerce sector, i.e., the integration of internet-related digital technologies that connect retailers and consumers, is transforming both the retail and logistics sectors in terms of organisation of processes and organisation of labour force. This has been reported quite consistently in all analyses carried out at national level in the framework of the project.

Before describing the characteristics and changes that this has brought about in terms of the organisation of production processes and labour, it is necessary to emphasise that e-commerce is characterised by **low profitability**. In particular, the profitability rate of e-commerce achieved by pure players appears to be particularly low, if compared with margins of commerce in physical shops. For the pure players in particular, e-commerce mainly enables the **acquisition of data for user and customer profiling**. In the light of all this, it is evident that the viability of the e-business model depends above all on its ability to win new market shares in order to increase the volume of e-sales. And in this framework, **economies of scale** have a huge impact on costs and prices, which allows large e-commerce companies only to win the **trust of consumers** and therefore capture market shares. Indeed, market control and concentration are key in this framework, which produce a gap widening trend between large and small businesses involved in e-commerce, as the latter enterprises lag behind in terms of financial resources, skilled personnel and storage space.

E-commerce is based on a **multistage supply chain process** comprising several activities: the design and management of an online website or a marketplace; the online payment systems and the guarantee of security; the consumer data profiling; the customer service; the logistics activities for the delivery of the good. It is therefore possible to distinguish between an intangible part, where shopping takes place and sale agreement is finalised, and a material part, that of “integrated logistics”, i.e., that wide range of activities related to organisation, storage, shipping, transport, and distribution of goods. Indeed, the success of an e-shop is based on the rapid satisfaction of the consumer’s needs, desires and expectations.

²² The sources of the information reported in this section are the TeamHub Country Fiches, with particular reference to their sections entitled “Qualitative analysis on the different types of existing business models”. See below Annex Section of this document to access the Country Fiches.

In this sense, in addition to the user-friendly marketplace, the ease and security of payment and the tailor-made customer service, the speed of delivery of the goods acquire significant value. This is confirmed by the winning business and organisational **'omni-channel' model**, embodied by Amazon, entailing the synergic management of the various online and offline touchpoint between company and consumer to optimise the consumer experience.

Until recently, logistics and freight transport constituted a service to be outsourced by manufacturing companies, as it was considered of low added value thus to be delegated to commercial/contractual integration with third-party companies, which gave rise to a very fragmented sector consisting of chains of subcontracting, according to organizational models of the lower part of the supply chain (*lean production*). Nowadays, as explained above, logistics acquires a strategic role in the e-commerce supply chain, resulting in a renovated market concentration. Big logistics companies tend to deal with complex services, such as warehouse management, integrated supply chain management, data analysis and strategy development (so-called **contract logistics**, or "verticalization" of the supply chain). Players are converging towards the so-called **digital freight forwarders** business model, combining typical functions of marketplaces and software companies for the integration of information of the various partners in the supply chain.

With regard to the **shipping process**, the modern logistics sector implies the setting of different stages of transport of goods, which can be summarised in the following categories (well defined in the definitions section above): **first mile, middle mile, and last mile**. Last mile logistics services allow the delivery of goods from delivery stations to costumers (at home or at collection points). Indeed, the control over the entire logistics chain and the efficiency of logistics services for the delivery of goods underpins the ability of an e-commerce company to make profits. Although in rare cases reported in the analysed countries logistics is an in-house managed service (own employed carriers and vehicles), in the vast majority of cases e-commerce companies rely on **subcontracting chains**, especially in the last mile delivery service, where external logistics service providers (both major logistics players and SMEs and micro logistics companies) are used. Basing delivery activities on subcontracting chains means that no direct employees are present and that forms of (often bogus) **self-employment** are frequent, the consequences of which will be described in the following section.

Focusing on types of **warehouses** involved in this supply chain organisation, three types of sites can be mentioned: **logistics centres**, where customer orders are processed and made ready for shipment (packed, addressed, etc.); **sorting centres**, where packages delivered from the logistics centres are sorted by distribution area; **distribution centres**, where shipments are prepared for delivery to the customers. Given that the activity of warehouses is highly dependent on the variability of e-commerce flows, a high use of **fixed-term contracts for temporary staff** has been recorded in several countries analysed, especially to cover peaks periods (e.g., at the end of the year). In these contexts, temporary workers are hired directly and/or by the extensive use of **temporary work agencies**.

This organisational and business model have an impact on the employment and working conditions of workers involved in different parts of the supply chain, which will be analysed in the next section in the light of their social sustainability.

Finally, against this dominant model, some countries such as Spain and Finland reported that an alternative business model is emerging, especially in the sub-sector of last mile parcel delivery. This model is based on eco-friendly and social inclusive approach.

III. Labour market and working conditions²³

The growth of the e-commerce market, well documented in the first section of this section in all countries analysed, would suggest an increase in jobs in the same sector. However, measuring **employment trends** in the e-commerce sector is quite difficult due to a general lack of data in the countries involved in the analysis. E-commerce companies tend to engage in a multi-channel approach, where also e-commerce is incorporated, resulting in the difficulty of obtaining indicators as well as disaggregated and comparable data specifically related to e-commerce. Strong fluctuations are also linked to the high rate of temporary and precarious work. E-logistics employment trends are difficult to be reported as well, even if an overall increase in jobs in this sector was reported in Germany, Italy and France. However, precise measurements are also difficult in this area, due to the high rate of subcontracting and fake self-employment caused by the presence of many small and micro enterprises in the delivery section of the supply chain, reported in Germany, France, Italy, and Greece.

With regard to **wage trends**, the same reasoning can be replicated. Wage levels vary greatly from country to country and the lack of disaggregated data for the e-commerce and e-logistics sectors makes it impossible to provide general assessments. In most countries, there is also a lack of collective agreements dedicated to the sector of e-commerce, apart from France where since 2021 a collective agreement for distance selling is in place. In Spain, the impossibility of offering estimates stems from the fact that e-commerce related activities are covered by different multi-employer collective agreements (retail, IT, etc.) and wages greatly vary according to region and type of occupation. In Italy, e-logistics sector and related minimum wage was included in the Logistics, Freight Transport and Shipping national collective agreement, where there is still no express reference to e-commerce. In Belgium as well, collective labour agreement negotiated within Joint Committees 140.03 (transport & logistics for blue-collars), 226 (transport and logistics and international trade for white-collars) applies. In this framework, Germany was the only country to report a substantial increase trend in remuneration in the sector. However, high rate of subcontracting, fake/dependent self-employment, temporary and intermittent labour contracts suggest a pattern of **precarity and low remuneration** in part of the supply chain, especially in warehouse and delivery activities.

Looking at **working conditions** of workers involved in storage and delivery activities for e-commerce, several common elements can be reported in the country analysed.

Outsourcing of last mile delivery activities is reported to be widespread in several countries. The outsourcing of activities can be formalised through a variety of legal solutions pertaining to the field of corporate/commercial law, which may vary from country to country, and which may include groups of companies, subcontracting contracts, storage contracts, transport contracts, etc., which correspond to the various ways of integrating activities in the supply chain. This set of corporate strategies allows the main company to organise a decentralisation of activities while maintaining a management and coordination role, as well as economic conditioning, over all the companies part of the supply chain. Transferring the reasoning from commercial law to labour law, this results in a split between the party holding the employment contract (the employer being one of the smaller companies integrated in the supply chain) and the subject who indirectly benefits from the work performance (the main enterprise outsourcing the activity). This implies a formal separation between the party essentially exercising employer power (the main company) and the party bearing employer responsibilities (the small company integrated in the supply chain) toward workers. This mechanism is at the basis of a 'flight' system from collective bargaining, because the extension of collective agreements applied to the main company to its entire supply chain is not automatic, which triggers in some countries a system of downward collective bargaining with a

²³ The sources of the information reported in this section are the TeamHub Country Fiches, with particular reference to their sections entitled "Labour market and working conditions". See below Annex Section of this document to access the Country Fiches.

strong impoverishment of working conditions in the lower parts of the supply chain.²⁴ This reasoning on wages and other rights set via collective bargaining, valid in various analysed countries including Italy, applies in Belgium, *mutatis mutandis*, to minimum wages set by sector within joint committees, where a sort of 'shopping' between joint committees for less protective conditions can be observed by companies. Regarding countries where a statutory minimum wage is in place, the social dumping problem is confirmed as, in most cases, for small subcontracting companies is difficult to control and enforce labour rights, while for subcontracting self-employed no minimum wage is foreseen. The exception of Poland should be mentioned, where all workers, included the self-employed, are entitled to the universal statutory minimum wage (albeit not very high amounts).

This all implies a structural precariousness of labour conditions and an increase in certain risks, such as **excessive work pressure, longer working shifts, intensification of the work rhythm** and sometimes illegal practices such as **informal/undeclared work**. The risk occurring in the sector, linked to this "contractual integration", is that of reduction in the protection of workers employed by the subcontractors compared to those reserved by the client company for its workers. As explained above, outsourcing allows the main company to hold the organizational synergy arising from the concentration of production in a single "technostructure", without however suffering the effects resulting from subordination, with the effect that the workers of the contractors are not recognized the same economic, regulatory and union protections, increasing inequalities. This is even more true in cases of **bogus self-employment** with substantial dependence on the client, implying the shift of all work-related risks to the worker. This is coupled with the lack of trade union rights and lack of collective bargaining, which is always linked to widespread subcontracting, fake self-employment and the presence of small and micro enterprises in the supply chain.

Severe working conditions are reported in **warehouses** as well, such as **working overtime**, increase in **night work, physical constraints** linked to the carrying of **heavy loads and repetitive movements** (e.g., receiving or shipping goods in warehouses), which dramatically impact on health and safety at work. Workers are mainly employed through **fixed-term, on-call or temporary contracts**, due to frequent seasonal peaks. Due to the use of interim contracts (both for starters and to cope with business peaks), turnover is high and experienced staff regularly opt for a different or more stable working environment, which implies recurring labour shortages as reported in some countries.

The phenomenon of subcontracting, high turnover rate and intermittent work described above often brings with it the violation of pay, contribution, and OSH regulations. The related **job insecurity** brings with it a number of risks, well highlighted by the scientific literature and reported in the country analysed, related to **lack of skills and training, inadequate knowledge of the working environment, insufficient provision of personal protective equipment, and lack of OSH surveillance**.

The issue of working time and rhythm of work was addressed in all the countries analysed. Everywhere **intense work rhythms, low predictability of working time** ("benching" phenomenon), **very long shifts** and **night shifts** were reported. Related high rate of **accidents at work** and occupational diseases of the musculoskeletal system were reported as well in some countries.

Emerging **digitalisation, automation** and **remote monitoring** of the e-commerce supply chain is changing the content of existing jobs, creating the need for training and retraining programmes for existing staff to be able to perform these new tasks. Technological innovation, both in the warehouses and delivery process, generates continuity with very few breaks and considerable physical and mental stress and fatigue to workers, as reported in all countries involved. The introduction of new technologies

24 The scientific literature on the subject is abundant. See, for e.g., Faioli M., Fantoni G., Mancini M. (a cura di) (2018), *Lavoro e organizzazione nella logistica 4.0*, Working Papers Fondazione G. Brodolini, n. 14.

does not necessarily eliminate the OSH risks, but it certainly has the effect of modifying the risk factors for workers.

Eventually, the logistics and delivery sector is characterised by a very high proportion of **migrants**, as reported especially in Germany and Italy. Posted workers and third-country nationals dominate this labour market, being a target group extremely difficult to reach by trade unions.

A significant case is that of Spain, where the *Royal-Law Decree 9/2021 for the Amendment of the Workers Statute Law in order to protect the labour rights of workers dedicated to delivery in the framework of digital platforms* (the so-called 'Riders Law') is currently under implementation. This law aims at protecting the rights of the delivery workers by tackling the extensive use of the fake self-employment professional relation between e-commerce (delivery) players and their workers and forcing the delivery companies to hire delivery workers on an employment contract bases, rather than using service contracts. The actual implementation of the Royal-Law Decree 9/2021 could be the base to tackle the situation of other e-economy business model based on the use of fake service relations between the economic player and the workers (fake self-employed). This could be the case for other branches of the e-commerce supply chain, as parcel last mile delivery.

IV. Geography of the e-commerce supply chain and presence of nodal points²⁵

Geography of the e-commerce supply chain, e-logistics flows and presence of warehouses (both big hubs and smaller distribution point for last mile delivery) in the covered countries strongly depends on the geographical location and shape of this country in relation to other European countries, the size of the country, and the distribution of population and wealth in the country's territory.

Focusing on **countries' geographic position in Europe**, the central placement of Germany, France and Belgium makes them transit countries for European logistics flows, both for the arrival of goods at the main ports (e.g., Antwerp port in Belgium, Hamburg port in Germany, Le Havre and other French ports on the Atlantic Ocean) and for the transport of goods across the continent.

Germany is a key player in the e-commerce and logistics market as its central position in Europe make it a transit country for logistical in land transport, even when no loading or unloading takes place. The major logistics hubs are concentrated around these cities: Berlin, Düsseldorf, Frankfurt, Hamburg and Munich. Germany is considered one of the largest markets after the US for Amazon and many other e-commerce retailers due to its size and high average household income, which has led to an enormous increase in logistics flows and logistics space in the country.

Historically, **French** warehouses have been widely deployed along a north-south logistics corridor that is still very dynamic, and many facilities are also being developed around the major French cities, with a concentration around Paris as well as on the Atlantic arc around Rennes, Nantes and Bordeaux. While warehouses and logistics platforms' cover large land areas in this country, it is difficult to estimate the proportion of this area accounted for by e-commerce only.

Belgium as well occupies a central position in Europe and, hosting one of the largest import/export European ports as well as big logistics hubs in Brussels and Liège airports, is subject to strong logistical flows and is a major player in logistics in Europe.

²⁵ The sources of the information reported in this section are the TeamHub Country Fiches, with particular reference to their sections entitled "Geography of the e-commerce supply chain and presence of nodal points". See below Annex Section of this document to access the Country Fiches.

Considering its location in eastern Europe on the north-eastern border of Germany, it is not surprising that logistics flows and warehouses in **Poland** are highly concentrated in the western, southern and central regions of the country (near Warsaw).

For **Estonia**, some national e-commerce business maintains their own warehouses, merging or expanding operations regionally, usually in the Baltic states and in Finland. However, the majority of goods arrive in the region from hubs located in Central Europe, especially in countries quoted above. This was consolidated during and after the Covid-19 pandemic, partly because the previous engagements with China to increase economic ties, strengthen e-commerce ecosystems and facilitate logistics and trade weakened in those years. Logistics flows and warehouses are mainly located around the capital city of Tallinn.

With regard to **Spain**, the geographic distribution of e-commerce activity in the country is coherent with the distribution of the population, as the sectors try to cover those areas where more sales are issued. Therefore, main warehouses are located in the surroundings of Madrid, in the northeast (Basque Country, on the border with France), and along the Mediterranean coast. Nevertheless, the latest trend is to locate the main warehouses in regions not belonging to but close to large urban areas (as provinces of Toledo and Guadalajara, close to Madrid) due to lower labour protections in their regional collective agreements.

When it comes to the **geographical conformation** of the countries involved, very relevant for example for Italy, Finland and Greece, it can be seen that warehouses and logistical flows are concentrated in the parts of the territory of these countries that are closest to the rest of Europe, and which often correspond to the richest and most populous regions of these countries.

In **Finland**, the geographic isolation of the country implies that commerce retail sale is focused mainly on the domestic market. One reason for the slow international integration has to do with logistical and transport challenges, such as operation of deliveries over long distance, considering the considerable size of the country. However, the logistic and transport network in Finland is not irrelevant and covers the entire country, but the logistic centres in Finland are indeed located in the south of the country, mainly around Helsinki and Sipoo, while the north of the country remain a bit isolated.

Specular reflection can be made for **Italy**. The country's geography and infrastructural conformation, together with the distribution of population and wealth in the country, which is concentrated in the north, results in centralisation of logistics flows in the north of the country²⁶. In particular, the logistics epicentre of the so-called "Milano Zone", comprising the north-central and north-eastern regions, is estimated to collect about 40% of Italian logistics in aggregate terms of volumes, employment, GDP, transport, e-commerce, etc.

The geography of logistics in **Greece** follows the pattern of centripetal economic development of the country. Business activity evolves around the two largest non-insular urban centres, Athens and Thessaloniki. Variation regarding e-commerce developed where physical shops have expanded their business activities to include e-commerce, impacting especially in Northern Greece, Crete, Patras, as well as smaller cities in the Eastern Aegean islands.

Moving away from the macro logistics flows and focusing on the dynamics of **last mile delivery** at national level, is a trend towards the multiplication of distribution centres in the peripheral areas of cities was reported in almost all countries analysed. It seems that post COVID-19 revolutionized the geography of logistics, increasing the load breaking points and bringing distribution centres (medium-sized warehouses for the final stage in the delivery process) closer to industrial and manufacturing production areas, through so-called processes of "regional globalization" and "relocation" not so far from urban agglomerations.

26 The measurement of logistics flows made it possible to detect 578 million shipments in Italy in 2021, with a breakdown of 57% in the north, 23% in the centre, and 20% in the south.

Exception shall be made for Belgium, where the dominance of foreign e-commerce companies implies that the logistics distribution points for these platforms are not entirely located in Belgium. The small size of the country, and consequently the accessibility for delivery of a large proportion of customers from warehouses located in border country, is certainly part of this. Another phenomenon is the development of extensive network of **parcel lockers** in urban city centres, as alternatives to domicile delivery. In this framework, Finland and Poland recently became the first and second countries in the world with the largest number of parcel lockers per 100,000 residents.

In this composite logistical geography, the transport of goods from one warehouse to another is almost entirely ensured by **road transport**. In particular, large trucks in the first- and middle-mile phase and medium-sized and small trucks and vans in the last mile delivery phase are involved. It was reported in several countries that the EU-level green and zero-emission objectives, as well as the higher fuel costs reported in recent months, are impacting on the logistics market and boosting the environmental sustainability efforts of companies.

V. Social Partners activities and main actions²⁷

National social partners are aware of the positive trend of the e-commerce market reported in the last years, as well as of the direct and indirect impact of this development on employment and working conditions in the supply chain, as reported in the previous section. Nevertheless, their control over these trends and the related responsiveness and ability to implement solutions widely vary from country to country and highly depend on the political context, the structure of industrial relations at national, the fragmentation of the sector and the actual bargaining power of the parties involved.

In most of the countries involved in the analysis, where trade unions are influential players in the debate and sectoral industrial relations are developed, **negotiating and claiming efforts** focused mainly on the conditions of workers employed in warehouses and last mile delivery services, with regard to remuneration, working time and rhythms, occupational health and safety (COVID-19 related and others), excesses of subcontracting and false self-employment resulting in precariousness and economic dependency, and digitalisation-related risks. These trade union demands resulted in demonstrations and **strikes** at company level in the warehousing and delivery sectors, as well as in the international labour and environmental **grassroot campaign** “Make Amazon Pay”²⁸ active in more than 35 countries, including Italy, Belgium, France, Germany, Spain, Poland.

With regard to **collective bargaining** in the sector, the reference to “e-commerce” in collective labour agreements is still missing in most of the country analysed. National sectoral bargaining in some cases has been conducted by the national logistics and transport unions, precisely because of the importance of the section of the supply chain related to warehousing and last mile delivery. This happened indeed in Germany (Ver.di), Italy, (FILTR-CGIL, FIT-CISL, UILTRASPORTI), and partly in Belgium (ABVV-BTB - joint committee n. 140.03 for transport & logistics for blue-collars, but also n. 226 on logistics and international trade for white-collars, and others joint committees). In Spain, there is not a “socially constructed e-commerce sector” and social partners’ positions and actions results fragmented across different sectors and companies, while in Greece there was an overlap between the activities of the General Confederation of Workers and several factory-based unions with divergent agendas in large businesses in the logistics sector. Similarly, in Finland, e-commerce is intertwined in other commerce activities and therefore trade

²⁷ The sources of the information reported in this section are the TeamHub Country Fiches, with particular reference to their sections entitled “Social partners positions and main actions”. See below Annex Section of this document to access the Country Fiches.

²⁸ More information are available online: <https://makeamazonpay.com/>

union involvement (especially PAM and PRO unions), showing that a form a hybridization of commerce and e-commerce has become the new normal. In France, since 2001, distance selling sector holds a dedicated collective agreement.

Generally speaking, given the high rate of subcontracting and false self-employment in most of the country analysed, the coverage rate of collective bargaining is low and sectoral trade unions reported difficulties in reaching and unionising workers even where they are well rooted. German trade union Ver.di is strongly engaged in the national campaign “CEP Action Plan” aims to bring about a legislative initiative to ban the use of subcontractors in the courier express parcel (CEP) services, i.e., last mile delivery sector. On the issue of couriers, it is worth mentioning the advanced national-level collective agreement signed by Italian Unions and Assoespressi, the employers’ organisation representing about 100 delivery companies operating in subcontracting the “last mile” distribution of the Amazon supply chain, including few historical delivery companies and the numerous ones born on Amazon’s stimulus, or survived thanks to their integration into the Amazon’s supply chain. In Spain, an important action line for trade unions in the e-commerce sector especially regarding parcel delivery is the extension of collective bargaining and workers’ committees, which are still not frequent in the sector.

Greater organisational and negotiation difficulties were encountered in Estonia and Poland, also considering the weakness of the industrial relations system in these countries. In Estonia, efforts by the E-Commerce Association and the Logistic and Freight Forwarding Association for raising awareness and the development of legislation related to distribution and related activities were reported. In Poland, while large e-commerce companies are not members of employers’ organizations, which significantly hinders social dialogue in this industry, it seems that unions have not yet developed an effective strategy for organizing couriers, while some successes were reported in warehouses and distribution centres.

Many countries involved reported the importance of strengthening **labour inspections** in the sector, which is heavily affected by labour and OSH regulations violations. As an example, in Belgium, several warehouses of companies doing last mile delivery were raided by the labour inspectorate in 2022, reporting many violations including undeclared work, workers with part-time contracts actually working full-time, child labour, etc. Court cases about these inspections are still ongoing. This led to a Ministerial legislative initiative that provoked a huge of public debate, while it is currently unclear whether, how and when this legislative proposal will be voted on.

For the **employers organisations’** main positions reported in countries involved, they are more focused on ecological transition, digitalisation and automation of the sector, emerging professions and related workers’ upskilling and reskilling needs.

Conclusion

By way of conclusion, the review of the comparative analysis in the light of the research questions makes it possible to understand whether the first phase of the project (Study) allowed to provide satisfactory answers or whether further research is necessary. Outcomes and forecasts emerging from the comparative analysis are reported and synthetised in the table below.

RESEARCH QUESTION 1	
<i>Which are the business models and working conditions in the e-commerce supply chain? How do they affect employment and working conditions across different countries and geographical clusters and how are they going to change in the near future? How do the different models fare in terms of social sustainability?</i>	
Outcomes from the comparative analysis	Forecasts emerged from the comparative analysis
<p>The business model that has emerged and is now dominant in the sector is described in detail in Section II. The common trend reported is that the majority of retail companies have integrated or are integrating e-commerce as part of their business. The online transition of the B2C commerce sector is transforming both the retail and logistics sectors in terms of productive processes organisation and management of labour force. Considering that e-commerce is based on a multistage supply chain process, the winning business and organisational model proved to be the 'omni-channel' model, entailing the synergic management of the various online and offline touchpoint between the business and consumer to optimise the consumers experience. With regard to the shipping part of the process, three stages of the transport of goods can be identified: first mile, middle mile, and last mile delivery. The vast majority of e-commerce companies rely on subcontracting chains, especially in the last mile delivery service. As for the storage process, tree types of warehouses can be mentioned: logistics, storing, and distribution centres. Activity flows in these sites are subject to frequent variations related to seasonal peaks.</p>	<p>To make a forecast on the near future, it must be underlined that big e-commerce and logistics companies tend to deal with complex services, such as warehouse management, integrated supply chain management, data analysis and strategy development (so-called contract logistics, or "verticalization" of the supply chain).</p> <p>Players in this field are converging towards the so-called digital freight forwarders business model, combining typical functions of marketplaces and software companies for the integration of information of the various partners in the supply chain.</p>

Section III clarifies how the business model affect **employment trends**. In the light of the omnichannel model, where all supply chain activities are interlinked, measuring employment trends in the pure e-commerce sector is quite difficult due to a general lack of disaggregated data. E-logistics employment trends are difficult measure as well, even if an overall increase in jobs is reported, due to the strong fluctuations linked to seasonal peaks, as well as to the high rate of subcontracting and fake self-employment.

Employment in this sector has rapidly increased and can be expected to continue to rise, even if more slowly, in the next years.

Section III clarifies as well how the business model impact on **working conditions**, which tend to be poor. As for shipping, and especially last mile delivery activities, structural precarity of labour conditions linked to the widespread outsourcing and subcontracting processes is reported, as well as the increase of certain risks such as bogus self-employment, excessive work pressure, longer working shifts, intensification of the work rhythms, lack of trade union rights and collective bargaining coverage. As for storage activities, the precarity of labour conditions is linked to high rate of fixed-term contracts, on-call and intermittent contracts, or agency work, due to frequent seasonal peaks, while the poor quality of work is mainly due to the low predictability of working time, the frequency of overtime, the night work, and the physical constraints linked to the carrying of heavy loads and repetitive movements. As for wage trends, precarity in both parts of the supply chain is linked to low remuneration, generally speaking. Job insecurity brings with it a number of other risks related to lack of skills and training, inadequate knowledge of the working environment, insufficient provision of personal protective equipment, lack of OSH surveillance and related high rate of accidents at work and physical occupational diseases.

As for overall **working conditions** in the supply chain, it is currently only possible to imagine an improving outlook in countries with a strong trade union presence and collective bargaining activity in the sector. To date, however, the “race to the bottom” observed in the last years is still underway, with enormous pressure on working and wage conditions in the transport and logistics sector in particular. A change of direction from contract insecurity (duration and interim) combined with ever-increasing flexibilization to the benefit of the employers is not foreseeable.

It is rather difficult to imagine an improving trend without legislative intervention. An interesting track of research could be, for instance, to investigate on how to anchor the recent European regulatory development in the sector (i.e. DMA and DSA, see methodological chapter above) to a better protection of supply chain workers, given the absence of labour provisions in that legislative package. Here, the European debate on subcontracting chains and corporate sustainability due diligence could play an interesting role as well. Certainly, the European single market suffers from the fragmentation of labour and social conditions and protections at national level, which allows companies to benefit from social dumping. Only with common European labour and social security standards in the sector, that works upwards in the long run, this mutual competition can be avoided.

The development of the e-commerce sector according to the business model described above entails the emergence of **geographical clusters** that mirror this development. Geography of the e-commerce supply chain, e-logistics flows and presence of warehouses (both big hubs and smaller distribution point for last mile delivery) at national level strongly depends on the geographical location and shape of the country in relation to other European countries, as well as the size of the country, and the distribution of population and wealth along the national territory. While a detailed comparative analysis can be found in Section IV, it can be summarised that focusing on **countries' geographic location** in Europe, the central placement of some countries (i.e., Germany, France Belgium, and western Poland) makes them a key transit zone for European logistics flows, both for the arrival of goods at the main ports and for the transport of goods across the continent. On the other hand, when it comes to the **geographical conformation** of the countries involved, very relevant e.g., for Italy, Finland, and Greece, it can be seen that warehouses and logistical flows are concentrated in the parts of their territories that are closest to the rest of Europe, and which often correspond to the richest and most populous regions of these countries.

To make a forecast about the **geography of the e-commerce and e-logistics flows** in EU in the near future, the geographically central and peripheral position of European countries, as well as the population density of the different countries must be considered. In more peripheral countries, as well as in less densely populated countries (i.e. smaller markets), e-commerce companies can be less interested to further develop networks, and the value seen in the product must be higher to offset the higher costs.

RESEARCH QUESTION 2

*How is the rise of e-commerce affecting the global **value chain**? How are **strongest players** influencing the functioning of the **market** and the distribution of **added value**? Do **unions** have control over these trends and the direct and indirect effects on workers?*

Outcomes from the comparative analysis	Forecasts emerged from the comparative analysis
<p>On the one hand, the digitalisation of trade and the digitisation capacity of companies plays a key role (see Section I). B2C e-commerce sector is dominated by large companies, which benefits the countries where these companies are more present, to the detriment of countries with an industrial landscape composed mainly of SMEs with a low rate of digitisation and capacity to integrate related technologies and skills. In this framework, big players are converging towards the so-called 'digital freight forwarders' business model, combining functions of marketplaces and software companies for the efficient integration of partners composing the value chain (Section II).</p> <p>On the other hand, the rise of e-commerce (see Section I) is implying a transformation in the management of the physical value chain, where e-logistics acquires added value and becomes a key asset due to its strategic role for the rapid satisfaction of consumer needs. Large companies tend to implement a "verticalization" of the supply chain, integrating and controlling a range of complex services (warehouse management, integrated supply chain management, data analysis and strategy development, organisation of delivery activities) that, until recently, were considered as services to be outsourced by manufacturing companies as they were considered low value-added according to a lean production strategy (Section II).</p>	<p>The progressive centralisation of the e-commerce sector in the hands of dominant players, such as Amazon, and the verticalization and integration of the logistics supply chain, imply a trend towards market concentration.</p>

The B2C e-commerce sector experienced a rapid increase both in terms of business turnover and use of online channels by consumers in the EU in recent years, as showed in Section I. The most popular e-shops are intermediary platforms (marketplaces). Identification of dominant players in both e-commerce and logistics sectors makes it possible to state that there is still a division of the players acting in the two markets (See section I), but that e-commerce companies/marketplaces such as Amazon (leader of the sector) have realised that e-commerce and logistics are inextricably linked, and that the efficiency of the supply chain becomes crucial within the business model of e-commerce companies, as explained above.

In this framework, it is necessary to emphasise that e-commerce *per se* is characterised by low profitability (see section II). For the pure players in particular, e-commerce mainly enables the acquisition of data for costumers profiling. Therefore, the viability of the business model depends above all on its ability to win new market shares in order to increase the volume of e-sales.

National **trade unions** seem to be generally aware of the growth and concentration of the e-commerce market, as well as of the direct and indirect impact on working conditions in the supply chain, as reported above. Nevertheless, their control over these trends and the related responsiveness and ability to implement solutions widely vary from country to country and highly depend on the political context, the structure of industrial relations, the fragmentation of the sector and the actual bargaining power of the parties involved. (Section V).

Where trade unions are influential players and sectoral industrial relations are developed at national level, **claiming efforts and strikes** focused mainly on the conditions of workers employed in warehouses and last mile delivery services, with regard to remuneration, working time and rhythms, occupational health and safety (COVID-19-related and others), excesses of subcontracting and false self-employment resulting in precariousness and economic dependency, and digitalisation-relater risks.

Given the high rate of subcontracting and false self-employment, the coverage rate of collective bargaining is low and sectoral trade unions reported difficulties in reaching and **unionising** workers even where they are well rooted.

Forecasting market trends and the distribution of added value in this framework cannot disregard the impact of **economies of scale** on costs and prices, which allows large e-commerce companies only to win the trust of consumers and capture market shares. **Market control and concentration** are key in this framework, which produce a gap widening trend between large and small businesses involved in e-commerce, as the latter lag behind in terms of financial resources, skilled personnel and storage space. The distribution of added value does not even take place within large businesses, given the unfavourable working conditions and wage trends reported.

It is difficult to forecast the ability of national trade unions to respond to the challenges of e-commerce and e-logistics, especially given the intersection of economic sectors, the international distribution of the supply chain, and a strong push towards outsourcing in this area. National collective bargaining, where present, in most cases has been conducted by the national sectoral **logistics and transport unions**, precisely because of the importance of the section of the supply chain related to warehousing and last mile delivery. Therefore, a tendency to centralise negotiating powers in the hands of the social partners in this economic sector can be imagined (NACE Sector: H), with the risk of less attention being paid to collective bargaining concerning the intangible part of the supply chain.

This assessment can be transposed to the European level, where the European Transport Workers' Federation²⁹ proves to be involved in a number of activities for a fairer logistics. However, trade unions in the service, tertiary and commerce sector, both at international (UNI Global Union³⁰) and European level (UNI Europa Commerce³¹), are also making efforts to capture and improve conditions in e-commerce.

RESEARCH QUESTION 3

*How is the rise of e-commerce and the consequent development of **last-mile logistics** and of dedicated **hubs** affecting **local development** and **environmental sustainability**?*

Outcomes from the comparative analysis	Forecasts emerged from the comparative analysis
<p>Focusing on the dynamics of last mile delivery, the rise of e-commerce brought to a multiplication of distribution centres (i.e., medium-sized warehouses for the final stage in the delivery process) in the peripheral areas of cities. COVID-19 revolutionized the geography of logistics, increasing the load breaking points and bringing distribution centres closer to industrial and manufacturing production areas, through so-called processes of “regional globalization” and “relocation” not so far from urban agglomerations. Another phenomenon is the development of extensive network of parcel lockers in urban city centres, as alternatives to domicile delivery. (Section IV)</p> <p>The impact of this trend on local development other than the transformations on urban geography were not investigated and are difficult to assess at this stage.</p>	<p>Forecast about the impact of logistics hubs and last mile delivery flows on local development are, among others, as follows: increasing of urban traffic and increasing road safety risks, due to the fact that deliveries are carried out via wheeled vehicles and the ever-increasing pressure to deliver as fast and as much as possible. Furthermore, the growth of e-commerce at the expense of offline commerce is implying a shift from retail premises to logistics sites, revolutionising local commerce to the detriment of small stores. This has as well an impact on urban geography, but it can only continue in countries with free space for the construction of logistics areas.</p>
<p>With regard to environmental sustainability of the sector, in addition to the issue of land consumption implied by the multiplication of logistics hubs and warehouses, the transport of goods from a warehouse to another and from a distribution centre to the consumer and then to customers houses or parcel lockers is entirely ensured by road transport, with important implications in terms of pollutant emissions.</p>	<p>As for the environmental sustainability of the e-logistics sector, the EU-level green and zero-emission objectives, as well as the higher fuel costs reported in recent months, are impacting on the market and boosting the transitional efforts of some companies towards the use of hybrid or electric vehicles.</p>

ANNEXES

Country Fiche – Belgium: [countryfiche-Belgium.pdf \(team-hub-project.eu\)](#)

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*Delivering sustainability
to the e-commerce
supply chain*