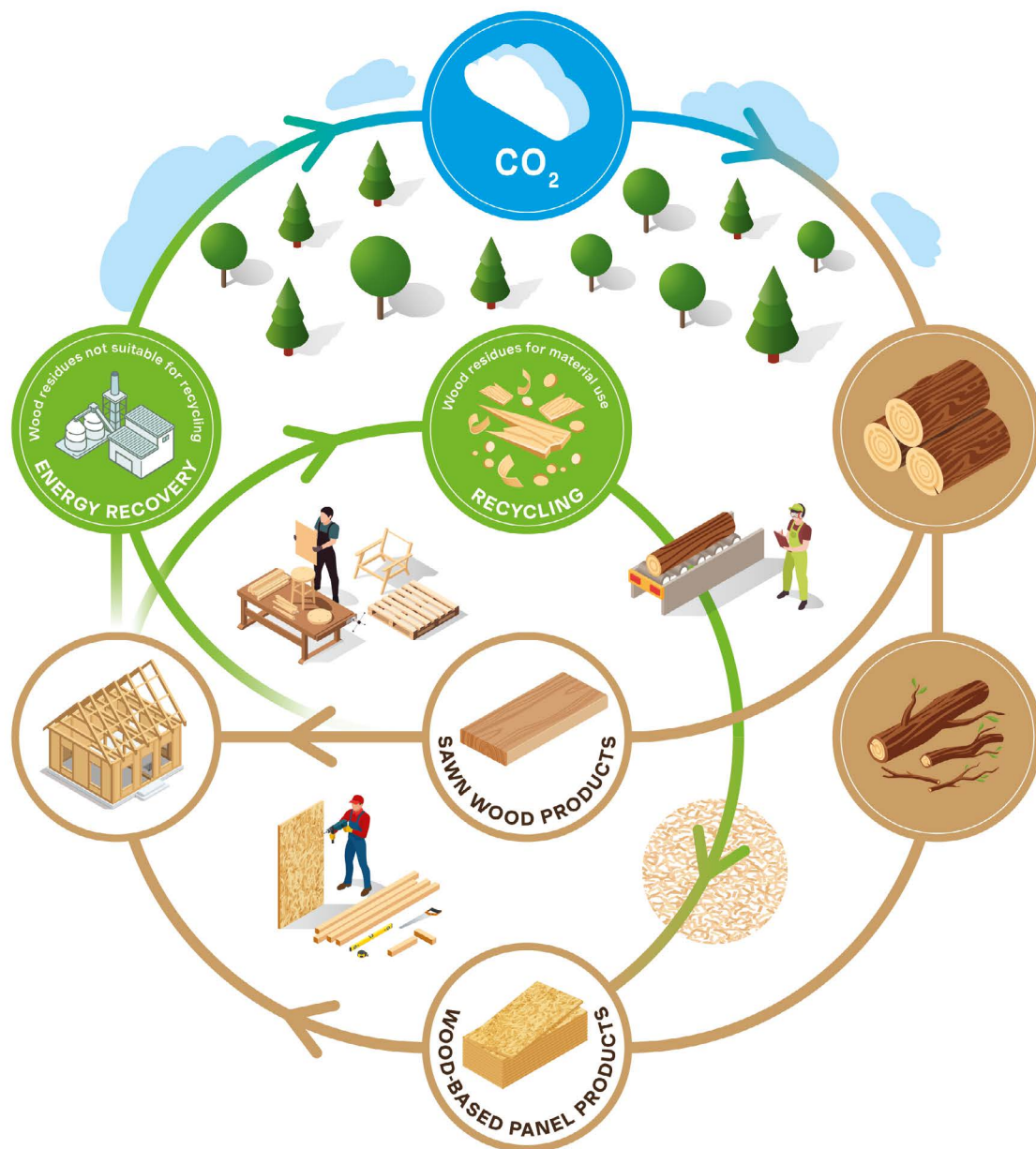




FINAL STUDY

BUILDING A RESILIENT EUROPEAN WOODWORKING INDUSTRY

by anticipating changes, increasing attractiveness,
building skills, and promoting inclusiveness





The RESILIENTWOOD project (Grant Agreement number 101051974) is co-funded by

the European Union and is granted under the Social Prerogative and Specific Competencies Lines (SOCPL) funding. The project aims to offer to Social Partners concrete recommendations to tackle specific challenges in the Woodworking Industries (WI) through strengthened social dialogue. It focuses on the adaptation of the industry and its outlook after the Covid-19 crisis, including the adaptation needs linked to expected technological changes and the need to increase the attractiveness of the sector for skills attraction and retention, with special attention given to gender balance. Possible solutions to these are investigated through a cooperation involving social partners and VET providers.



Disclaimer: The content of this publication reflects only the authors' views, i.e. that of the partners in the RESILIENTWOOD project. The European Commission is not responsible for any use that may be made of the information it contains.

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1. Introduction

1.1 SCOPE AND PURPOSE

The European woodworking industries are a major employer in particular in rural areas, where they play an important role in the social development of people in regions. At the European level, the social dimension is reflected in the European sectoral social dialogue for the woodworking sector of which the officially recognised social partners are the European Confederation of the Woodworking industries (CEI-Bois) and the European Federation of Building and Woodworkers (EFBWW). The two organisations have been active in social dialogue activities since the mid-1990s. This dialogue has resulted in the drafting of numerous joint positions, the organisation of events and meetings, the publication of documents and the participation in EU co-funded projects, all of which aimed at improving industrial policies, strengthening industrial relations, addressing the skills gap and attractiveness of the sector as well as improving the well-being of the workers and strengthening and promoting the European social dialogue.

The RESILIENTWOOD project is co-funded by the European Union and follows the same path. It complements the previous work carried out by the European woodworking social partners, e. g. in their joint project “Perspectives and challenges of the woodworking industries in Europe” (2017–2019), that focused on the attractiveness and working conditions of the sector and produced a first analysis (case study for Portugal) of the image of the sector among young generations. The project also builds on the “Bolster Up II” project, which aimed at fostering the concept of European Core Qualifications in the European furniture and woodworking industries. The current project incorporates new elements, notably the gender perspective and the post Covid-19 focus, that make it innovative compared to the previous projects. When considering the attractiveness to the younger generations, special attention is devoted to the role of education, and in particular student mobility and the possible contribution in the framework of the Erasmus+ Programme.

1.2 OBJECTIVES

1. Provide social partners with an overview of the latest developments of the woodworking sector in Europe, including the economic impact of the Covid-19 pandemic, as well as expected technological and organisational changes within woodworking companies in five countries (Sweden, Belgium, Italy, France and

The objective of RESILIENTWOOD is to offer social partners concrete recommendations to identify and tackle specific challenges in the woodworking sector through strengthened social dialogue. While some of those challenges have been known for some time (e.g. implications caused by the ongoing demographic changes in the sector’s workforce), others emerged with the recent Covid-19 pandemic and the energy crisis that followed. In particular the project focuses on the adaptation of the industry and its outlook in times of crisis, including the expected technological changes in the industry and its adaptation needs, as well as the need to increase the attractiveness of the sector for skills attraction and retention. The challenge is not just attracting young and passionate people to the woodworking field but, most importantly, keeping them there.

Overall, the project contributes to promoting and strengthening social dialogue in the woodworking sector in accordance with Article 154 of the Treaty on the Functioning of the European Union, and to suggest pathways and tools for the modernisation of the industry, mostly composed of SMEs. The project fully complies with the goals of objectives of the social partners’ Work Programme for the Sectoral European Social Dialogue of the Woodworking Industries 2022–2023 and 2024–2025.

Anticipation and adaptation to economic, technological and social changes is crucial for the European woodworking industry – a pillar of the forest-based bioeconomy – to remain a key contributor to the environmental objectives of the Green Deal, and notably the transition to a climate neutral and circular bioeconomy.

Dialogue between social partners and with education providers is key to retaining skills and attracting new ones and, when building the RESILIENTWOOD consortium, the European woodworking social partners have tried to do exactly that.

- Croatia) and in the European sawmill sector.
2. Stimulate the joint social partners’ discussion on four specific challenges and issues through dedicated workshops:
 - The adaptation of the industry and outlook after the Covid-19 pandemic and crisis



- Gender equality in the woodworking industry
 - Expected technological changes in the industry and adaptation needs
 - Increasing the attractiveness of the sector through mobility
3. Develop recommendations and guidelines for companies, VET and public authorities to overcome the

above-mentioned challenges, to be presented in the final report and final conference of the project.

4. Disseminate results within and outside the membership base of the European social partners of the woodworking sector.

1.3 PARTNERS

The RESILIENTWOOD project builds on a strong transnational dimension, with 8 partners involved, from 5 different countries and 3 European organisations. The consortium is composed of:

- 1 coordinator



The European Confederation of Woodworking Industries (CEI-Bois) represents 21 European and national organisations from 16 countries and is the body backing the interests of the whole industrial European wood sector: more than 180.000 companies, generating an annual turnover of 152 billion euros and employing 1 million workers in the EU.

- 3 partners, involved in the project management:



The European Federation of Building and Woodworkers (EFBWW) is a European trade Union Federation with members in the Building, Building Materials, Wood, Furniture, Forestry and allied sectors. The EFBWW represents blue- and white-collar workers from 76 national trade unions in 34 countries.



The Forêt, Cellulose, Bois-construction, Ameublement (FCBA) technology institute, whose mission is to promote technical progress, to participate in the improvement of yield and to guarantee quality in the industry. Its field



WOODWIZE is the paritary sectoral organisation for wood and furniture sector in Belgium. It boasts a thorough knowledge of the Belgian timber and woodworking sector and takes great care in transmitting to employers and workers, teachers and students! Training courses, information sessions and professional services help to make the sector both sustainable and safe.

The project has also been carried out with the support and contribution of 4 affiliate entities:

For CEI-Bois, these are:



The European Organisation of the Sawmill Industry (EOS) consists of national sawmilling federations and associated members from 11 European countries, representing 80% of the European sawnwood production.



The Croatian Wood Cluster (Hrvatski Drvni Klaster, CWC) is the oldest industrial cluster in Croatia, established in 2003. The CWC acts on the national level as a triple-helix organisation, and counts about 60 members from all sectors in the forest-based value chain. Its main objec-

tives are to enhance the sustainability and competitiveness of the sector by encouraging innovation, investments, research, knowledge and technology transfer.

For EFBWW, these are:



Federazione Italiana Lavoratori Costruzioni e Affini (FILCA-CISL) is the Italian sectoral union representing construction, wood, cement, brick, marble and stone workers. It is affiliated to CISL (Italian Confederation of the Workers' Unions) and represents around 243.000 workers in all provinces of Italy.



The Swedish Union of Forestry, wood and graphical workers (Facket för skogs- trä- och grafisk bransch, GS) was established in 2009 and organises workers in the forestry, woodworking and graphic industries in Sweden.

All project participants are equally represented in the project steering group and cooperate in the implementation of the project, the data collection and study production.

1.4 DATA GATHERING

The content of this report is based on a wide variety of data including, already existing research and scientific data, official national and European statistics and information received first hand from industry associations.

The country and sector specific data found in this report is also based on data collected with the contribution of affiliated project partners. It is based on both quantitative and qualitative information. The project partners developed a guiding questionnaire, and each partner held a dedicated national focus group in order to discuss and validate the data collection. For each country/subsector, the dedicated partner or affiliated entity has coordinated and conducted the collection and validation activities.

Workshops were organised after these focus groups, to further discuss the collected data, draw comparisons and prepare policy recommendations and guidelines found in this report.





2. The European Woodworking Industry

The European woodworking industries are the green engine of sustainable growth. Sawmills are an essential link in the chain for obtaining wood products from European forest resources. They are important economic players in rural areas and are particularly well established in Europe. As a result of globalisation, sawmills have become oversized and hyper-productive, but the crises (Covid-19, energy, etc.) leave them vulnerable in human and economic terms. They are moreover confronted with the uncertainties of raw material supply. However, sawmills are increasing market shares as consumers become more enthusiastic about wood products, especially in the construction sector.

The forest and timber sector is currently attracting particular interest because it is a key element in policies to combat global warming. On the one hand, it contributes to the storage of carbon in the forest ecosystem and in wood materials (carbon stock) and, on the other, to the

annual sequestration of carbon through the growth of trees (carbon flow).

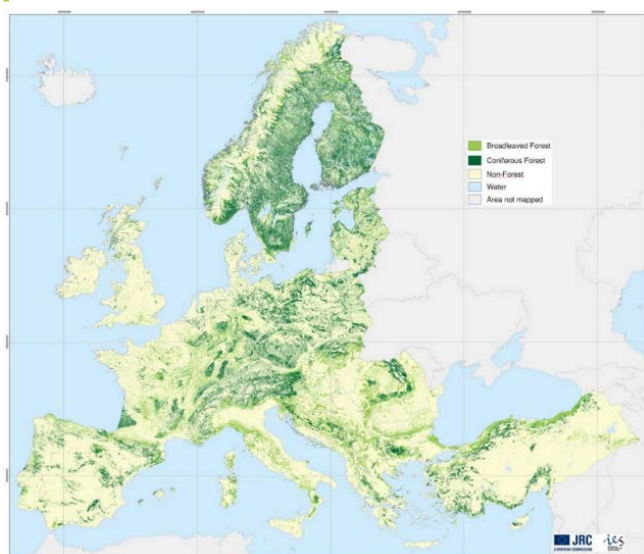
The challenge of remaining competitive and increasing the production capacity of our industrial sector (sawmills, panels, packaging, furniture, paper and cardboard, etc.) is enormous. In a context in which our wood resources could be used more and better to meet market demands, the development of uses for wood is necessary to support the decarbonisation of our economy (see RE2020 FR, direttiva sull'efficienza energetica IT, Gebäudeenergiegesetz 2024 GE, Cobrace BE, etc.) and our sovereignty over certain products, including wood, could be increased.

The 19th century saw the emergence of metal construction, followed in the 20th century by the spread of concrete construction. The 21st century could be the century of wood, a sustainable and renewable material.

2.1 KEY FACTS AND FIGURES

The European Union counts close to 180 million hectares of forests, covering 43% of its land area. EU forests are exceptionally diverse, with a large variety of forest types, characteristics and ownership structures. They provide multiple benefits for society and the economy, while being a major source of biodiversity.

Coverage of forest land across Europe



The wood sector proudly works with one of the few renewable sustainable raw materials, which is abundant in Europe thereby contributing to reinforcing European open strategic autonomy and security of supply amid an increasingly volatile geopolitical environment.

Over the last 50 years, forest area and the standing timber volume has seen a significant growth as shown by the EUROSTAT data. The analysis of the information in the "Evaluation of European forest potential" table below made it possible to quantify relevant parameters to understand the productivity of the forest:

- the annual volume of trees harvested is less than the annual production, so the stock of standing trees is not reduced,
- silvicultural work generates 822 rural jobs per 1 Mm³ (forest to log yard),
- one rural job in a sawmill provides 486 m³ of sawn timber.

Wood is a renewable resource, but it needs to be managed sustainably. The annual volume of roundwood harvested needs to be less than the annual growth that sequesters carbon-dioxide from the atmosphere in a process of photosynthesis. Using the photonic energy of



Evaluation of European forest potential ¹

FOREST	EUROPE
Forest surface	180 Mha (43% of land area)
Standing trees volumes (A) (hypothesis 1994 35%, hardwood-65% softwood)	22,084 Mm ³ (hardwoods = 7,730; softwoods = 14,350)
Annual production (B) (hypothesis 1994 35% hardwood, 65% softwood)	775 Mm ³ /year (hardwoods = 270; softwoods = 505)
ratio (B/A) • Indicates that the forest is increasing in size	3.51%
ratio (B/A) for hardwood	3.49%
ratio (B/A) for softwood	3.52%
Roundwood production volume (EUROSTAT) all species (2014) (C)	425,351 Mm ³
Ratio (C/A) • identifies that forest harvesting remains reasonable in relation to growth	1.9%
Industrial roundwood (EUROSTAT)	327,143 Mm ³
Employment in forestry and logging (EUROSTAT) (D)	517 480
Percentage of female workers (EUROSTAT)	20.5%
Ratio (C/D) • determines the number of employees to produce 1Mm ³ of roundwood	822
Volume of sawn timber (E) (including hardwood & softwood)	99,208 Mm ³
Employment in sawmill (F)	204,000
Ratio (F/E) • determines the annual volume of sawn timber (m ³) per employee	486

sunlight as a fuel, the chloroplast in needles and leaves turns approximately 800 kg of atmospheric CO₂ and soil water into carbon hydrates, from which the tree's cambium makes one cubic metre of lignocellulosic cell wall. The exhaust gas of the process (700 kg of oxygen) is released to the atmosphere. In addition to human activities, the volume of standing trees could be affected by natural hazards, such as wildfires, storms, and insect outbreaks. In such cases, the volume of standing trees can change in a matter of hours or days. At global level, players are faced with an increasingly restrictive regulatory environment, due to environmental issues and measures taken by governments to preserve forests.

Forest-based industries are a crucial part of Europe's modern industrial fabric. Biobased materials play an integral role in greening many of the 14 industrial ecosystems included in the updated EU Industrial Strategy. A major advantage of biobased materials lies in their potential use for the substitution of fossil-based materi-

als in various industries, including energy, construction, packaging and textiles.

The typical products of wood harvesting consist of industrial roundwood, sawnwood, veneers, wood-based panels and wood fuels. Wood products can be reused, recycled or incinerated with the energy recovery at the end of their lifecycle, just like other forest biomasses that are unsuitable for processing. Once harvested, wood is then sawmilled or otherwise processed to produce staple products of the forest industry such as pulp, paper, board products, paper goods and packaging. These goods serve to meet the demands of industries such as construction, carpentry, furniture and biomass and biofuel refining.

At this stage, we need to analyse whether the volume of wood is sufficient to satisfy the demands of an increasing wooden construction market and to optimise the value chain of wooden industries. In the process there has to

¹ Eurostat Statistical books "Agriculture, forestry and fishery statistics" 2015 edition. Re-elaboration of data by FCBA

Ratio between increasing tree volume according to the wooden market under available resource in Europe

EEC - 27 COUNTRIES	RATE OF INCREASING WOOD IN CONSTRUCTION		
	INITIAL	+10%	+20%
Roundwood production volume Mm ³	425	454	478
Ratio (Roundwood production volume over initial standing trees volume)	1.9%	2.06%	2.17%
Total job creation in roundwood production (estimation of female employment) at rate	0	+23 550 ; (+3 156)	+43 236 ; (+5 794)
Sawn timber Mm ³ and percentage to initial	98	104 ; 5.9%	110 ; 11.6%
Total job creation in sawmills (estimation of female employment) at rate	0	+12 051 ; (+2 470)	+23 609 ; (+4 840)

be a compromise between the appropriate wood in the right place and, at the same time, the wish to increase rural employment.

The allocation of suitable materials to mills, processes and products is crucial for the sustainability of the forestry-wood chains. All aspects of sustainability are influenced: environment, economy and society. If unsuitable material is allocated to a process, this will normally lead to losses in yield and value. The processing will be less efficient, with the use of more material, energy, etc than necessary per unit produced. Unsuitable materials may have to be redirected to other processes or mills, which means more transport. In addition, the quality, product functionality and customer satisfaction may be compromised.

The full climate mitigation potential of the forest sector is best achieved by the triple advantage of carbon sequestration, storage and substitution as offered by forests and harvested wood products. For example, timber buildings are key allies in decarbonising construction, as 1m³ of wood stores almost 0.9 ton of CO₂ and enables saving on average another ton of CO₂, compared to functionally equivalent materials.

The available European forests can provide wood resources following the increasing demand of wooden housing market as can be seen from the “annual production Mm³ per year /standing trees volume in Mm³” estimated in the above table.

The European forests are in a position to meet the growing demand for timber construction. Depending on the national species available, it will always be possible to import the necessary quantities and qualities. The creation of jobs depends a lot on the industrial policy of the companies around the concept of forest and sawmill 4.0, leading to investments (cut to length forestry machine, canter line, glued solid timber, etc) along the value chain to generate added value. As mentioned above, the allocation of the right tree (so the best lumber) for the purpose in the construction will optimise the transformation scheme. This can be done either by setting up a traceability system or by using tools to evaluate the resource towards the wooden quality on line.

Wood products are designed with circularity in mind allowing for reuse, recycling or recovery for energy production. Indeed, wood processing allows for by-products and residues to be efficiently used as raw materials for other wood-based products or energy. In the wood packaging sector, for example, recovery, repair and reuse of wooden pallets are already standard industrial practices.

The woodworking industry brings jobs and growth in rural, peri-urban and urban areas. 160 000 companies in the EU belong to the woodworking industry. They employ close to 1 million workers and generate an annual turnover of 194 billion euros. Wood products do not only contribute to rural and regional economies by offering jobs and economic value. They also provide recreational spaces, while supporting healthy and resilient forests.

EUR economic data on wood processing sector

EU27 2021	TURNOVER (BILLIONS OF €)	EMPLOYMENT (*1000 PEOPLE)	NUMBER OF ENTREPRISES (*1000)
All industries	32 448	156 124	30 983
All Wood Industries (WI)	538.6 → 1.7%	3 310.4 → 2.1%	406 → 13.1%
Woodworking sector NACE 16	194 → 36%	1021 → 30 %	160 → 39%

In light of the above, the woodworking industry is already a strategic value chain by virtue of its climate mitigation potential and contribution to growth. Therefore, its competitiveness should be ensured in the context of key EU policies, including the EU Industrial strategy, the EU Green Deal and the deployment of an EU circular bioeconomy.

Simultaneously, the industry is faced with a complex policy landscape at EU, national and international level, as underlined by a study¹ from 2016 commissioned by the European Commission, which indicated that as many as 245 policy items directly or indirectly affect the forest-based sector at EU level. Most of them are in the areas of agricultural and forest-related policies, climate change and energy policies, environmental policies, employment policies and product policies.

In 2020, the European Commission adopted a new Industrial Strategy to help Europe's industry lead the green and digital transformations and to drive Europe's competitiveness and sovereignty. The update of the EU Industrial Strategy highlights the need to promote an inclusive recovery from the pandemic and further accelerate the green and digital transitions in line with the EU Green Deal and Digital Decade and increase the resilience of EU industrial ecosystems.

Although wood is clearly the solution, when talking about a greening economy or a circular economy, the consumption of renewable raw material, energy consumption or the efficient way to use raw material are paramount. Changes in the demand due to the "greening" of the economy and jobs represent, on the one hand, a significant opportunity for the woodworking sectors regarding the creation of new jobs. On the other hand, they will also have an impact on the organisation of work (new market opportunities, new skills needs, etc.) and on working conditions (additional/new training, adapted health and safety conditions, etc).

The woodworking sector is derived from NACE 1600 (Eurostat, 2019) and includes:

- primary processing resulting in the production of sawn wood,

- secondary processing involving wood-based panels, solid-wood products, wooden pallets and other wooden packaging and bioenergy products, and
- tertiary processing to manufacture builder's carpentry and joinery products and wooden flooring.

The European timber and woodworking industries are a complex and labour-intensive sector. They rank as the EU's fourth largest manufacturing industry by number of companies, followed by furniture. The woodworking industries comprise a large number of SMEs, many of which are located in rural areas. Timber and woodworking companies are also highly varied, focusing on a wide range of products, and stages of timber processing along the supply chain. They include sawmills, planing plants, preservative treatment specialists, flooring manufacturers, plywood and other wood-based panel producers and makers of veneer, joinery, carpentry, construction products, pallets, packaging and more.

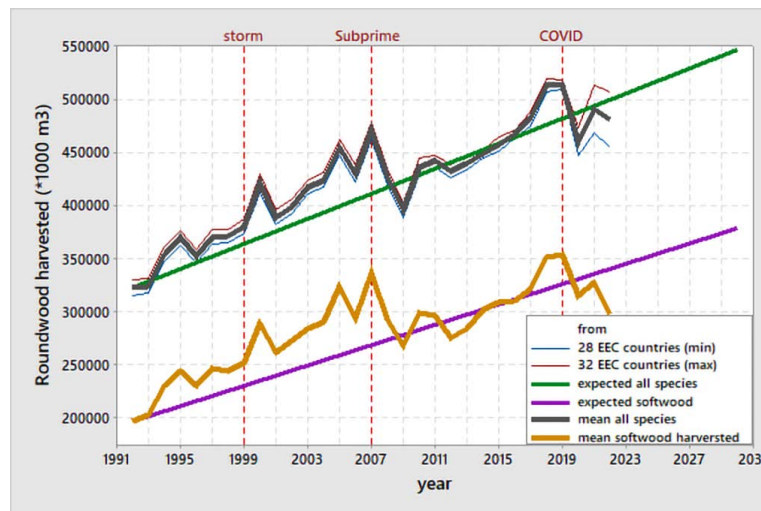
This study further contains a series of chapters focussing on the current situation in Belgium, Italy, Sweden, France and Croatia regarding the four topics presented in the introduction. A separate chapter on the sawmill sector is provided as well.

¹ Rivera León, L., Bougas, K., Aggestam, F., Pülzl, H., Zoboli, E., Ravet, J., Griniece, E., Vermeer, J., Maroulis, N., Ettwein, F., Van Brusselenm J. & Green, T. 2016. An assessment of the cumulative cost impact of specified EU legislation and policies on the EU forest-based industries. Brussels: DG GROW

2.2 ADAPTATION AND PROSPECTS IN TIMES OF CRISIS

The timber sector is highly dependent on the construction industry, which uses massive quantities of timber as inputs and reacts finely to crises, which is a good indicator whether it is positive or negative as shown below.

Roundwood consumption per year



Source: Eurostat - Re-elaboration of data by FCBA

The Covid-19 pandemic had a major impact on the construction sector, bringing work to a sudden halt. The global economic recovery (+5.6% and +4.4% world growth in 2021 and 2022 according to Coface), accompanied by a resumption of private building sites and public infrastructure construction driven by stimulus plans, led to an explosion in demand for wood, threatening the sector with a shortage. This led to an unprecedented rise in prices for material (up 377% in May 2021 over one year), before finally stabilising at the end of 2021 and in 2022. Wood is also highly dependent on the paper sector, which is benefiting from a sharp increase in demand for packaging paper due to the rise of e-commerce. This benefited the wood sector during the Covid-19 crisis but could reinforce inflationary pressures within the industry.

The EU Joint Employment Report 2024², as adopted by the European Council on 11 March 2024, shows that against the background of the post-Covid recovery and the good labour market developments, in 2022 all Member States had made progress towards their employment targets. However, for a large majority, further efforts are needed until 2030 to reach their targets, especially to improve employment rates of lower qualified individuals, older women (55-64) and young people (20-29).

Moreover, significant progress is needed to reach the EU target of 60% of adults in training every year by 2030, from a low level of 37.4% in 2016, in line with the ambition for Europe to remain competitive, innovative and inclusive, also in the context of the green and digital transformations.

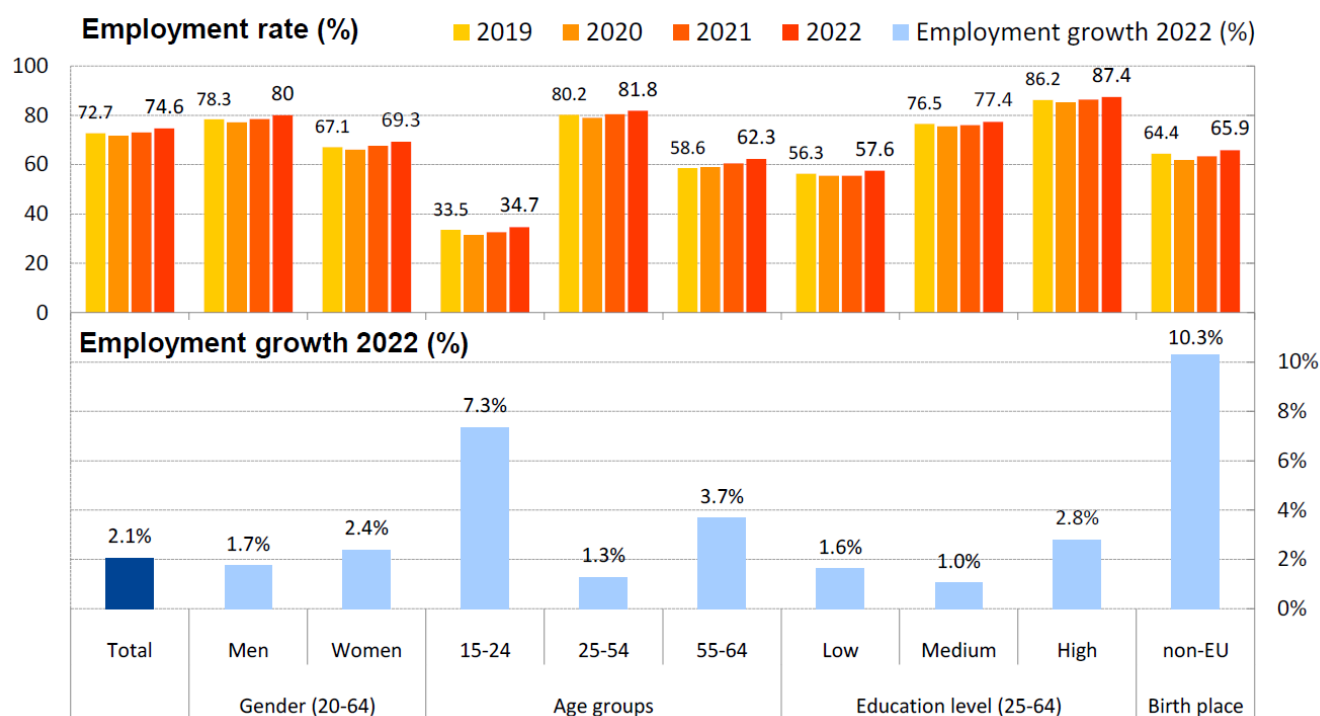
Labour market outcomes were strong on average in 2022 and 2023 and surpassed pre-pandemic levels in many cases. Although the EU economy has recently lost momentum, the labour market continues to demonstrate resilience in a context of shocks a.o. related to supply chains, energy prices and geopolitical instability. The exceptional support measures at EU and national level in the challenging socio-economic context of the last three years have contributed to this performance.

Overall, the employment rate reached 74.6% in the EU in 2022, and rose further to 75.4% in Q2-2023, which is 2.5 pps above pre-pandemic levels (of Q4-2019). At the same time, the unemployment and long-term unemployment rates reached their lowest levels of 6.2% and 2.4%, respectively, in 2022 in the EU (further down to 6% and 2.1% in Q2-2023).

² European Commission, Directorate-General for Employment, Social Affairs and Inclusion, Joint Employment Report 2024 – Commission proposal, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2767/17157>

Employment rates in the EU-27

By gender, age group, educational attainment level and birthplace (%)



Source: Eurostat – JER 2024

Differences are nonetheless observed across sectors. The energy crisis dampened employment growth in highly energy-intensive sectors, while the information and communication technology (ICT) sector saw the highest employment growth, adding more than one million jobs between Q4-2019 and Q2-2023 (an increase of 16.9%). Employment in the construction sector increased by 6.6%, whereas in the energy-intensive manufacturing sector it has not yet recovered to pre-crisis levels.

Labour shortages are widespread across occupations and skills levels. Despite some easing in recent quarters, the job vacancy rate was at 2.7% in Q2-2023 in the EU, which is well above the average of 1.7% for the period between 2013 and 2019. In 2022, sizeable shortages were a.o. reported in STEM (particularly ICT) and construction.

In key sectors for the green transition, labour shortages have doubled since 2015, while training provision remains below average. In 2021, more than 60% of EU enterprises that recruited or tried to recruit ICT specialists encountered difficulties in filling such vacancies. Widespread labour shortages are driven by strong labour demand

despite the recent slowing of the economy. Factors limiting labour supply, e.g. population ageing and a falling trend in hours worked per employee, may also play a role. At the same time, labour shortages are importantly generated by the new jobs created in the framework of the green and digital transition and the lack of relevant skills in the workforce.

While employment rates increased for women as well as young and older people, the gender employment gap remains sizeable as does the share of young people neither in employment nor in education and training. The employment rate of young people (15-24) reached 34.7% in 2022, surpassing its pre-pandemic level of 33.5%, in 2019. However, as of Q2-2023, 11.1% of young people (15-29) were not in education and training.

Employment increased for all skills levels in 2022, but the gap between low- and high-skilled remains wide in the EU. The employment rate of people aged 25-64 surpassed pre-pandemic highs in 2022, for all educational attainments. With an annual growth in employment of 2.8%, the high-skilled workers saw the strongest increase

in 2022. The growth in employment was significantly lower for the low- and medium-skilled, respectively at 1.6% and 1%.

Like many other industries, the European woodworking industry, experienced significant shifts in employment dynamics as a consequence of the Covid-19 pandemic. The initial sharp decline in employment as lockdown measures and supply chain disruptions occurred was followed by a notable recovery in em-

ployment levels as restrictions eased and economic activities resumed.

The recovery of the woodworking industry after the Covid-19 pandemic period has been hampered by continued disruptions in the global supply chains and increased energy costs following geopolitical tensions such as Russia's military invasion of Ukraine. These factors kept labour demand subdued, with employment levels still lagging behind pre-pandemic figures.

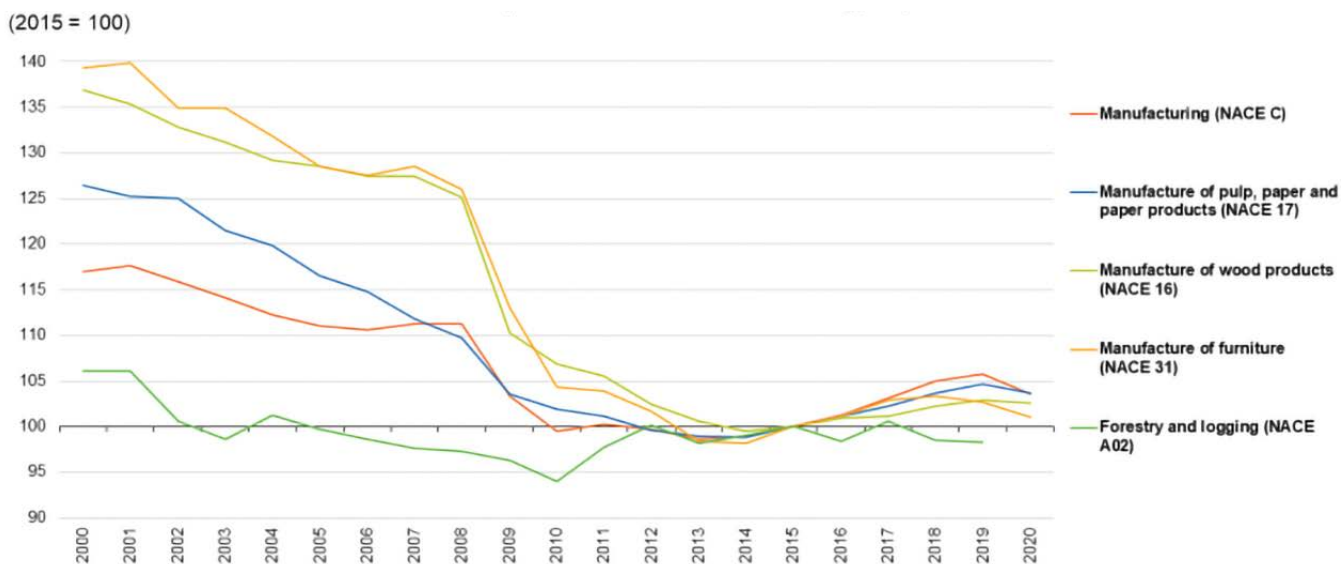
2.3 WOMEN REPRESENTATION

Women working in the European Union construction, wood and forestry industries continue to be severely underrepresented. There is an upward trend, but the pace is slow. In general, and as mentioned above, according to the EU Joint Employment Report 2024³, the labour market performance of women is improving.

The gender employment gap in the EU is at 10.3 pps in Q2-2023.

Across the EU, manufacturing employment fell by 11% between 2000 and 2020, while the largest losses among the three wood-based industries shown were recorded for furniture manufacturing (27 % fewer persons employed). Pulp, paper and paper products were less affected (18 % reduction in employment during the 2000–2020 period), while employment in manufacturing of wood products dropped by 25 % between 2000 and 2020. In comparison, the forestry and logging

Employment in wood-based industries compared with total manufacturing in the EU (2000-2020)



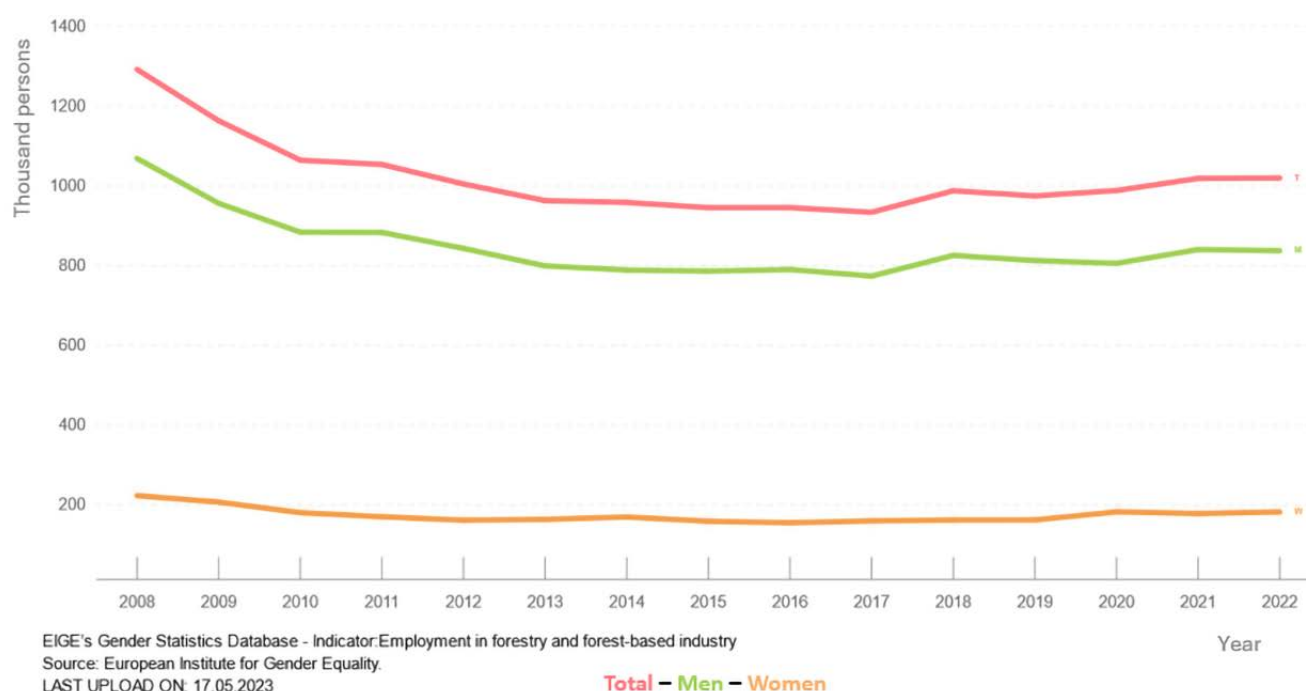
Source: Eurostat (online data codes: sts_inlb_a and nama_10_a64_e)

eurostat

³ European Commission, Directorate-General for Employment, Social Affairs and Inclusion, Joint Employment Report 2024 – Commission proposal, Publications Office of the European Union, 2023, <https://data.europa.eu/doi/10.2767/17157>



Employment in forestry and forest-based industry



industry had a decrease in employment of about 7 % from 2000 to 2019.

The graph above⁴ represents the evolution of employment in the manufacture of wood and of products of wood and cork except furniture manufacture of articles of straw and plaiting materials for EU 27 countries between 2008 and 2022 and illustrates the distinction between men and women. It clearly shows that over the years women representation remains at low levels, and no significant increase has occurred.

Other estimates using data from 69 countries confirm that women are significantly under-represented in the forest sector. They comprised less than a quarter of total employment in forest-related activities between 2017 and 2019. This figure may be explained in part by the nature of forest sector work. Tasks in logging and wood-based industries typically require intensive physical labour, which can hinder female participation. Rather, female workers tend to perform less physical tasks, such as silvicultural work but as well administrative duties.⁵ They are also involved in tasks relating to quality management. The woodworking industries, like many other trades, have stereotypically been practiced by men al-

though the share of women employed by the industry is slowly growing.

Some countries have recorded a higher percentage of women workers than others due to various factors such as national policies, cultural norms, and labour market conditions, there is still a significant gender gap in the woodworking industry, and more efforts need to be made to promote gender equality and diversity in the sector.

At European level, different strategies and systems have been developed to support gender equality. These include:

• 2030 agenda for sustainable development

Especially goal 5 "Achieve gender equality and empower all women and girls" is relevant as it foresees that gender equality is not only a fundamental human right, but a necessary foundation for a peaceful, prosperous and sustainable world. There has been progress over the last decades, but the world is not on track to achieve gender equality by 2030.

⁴ <https://eige.europa.eu/gender-statistics/dgs>

⁵ <https://ilostat.ilo.org/blog/forest-sector-employs-33-million-around-the-world-according-to-new-global-estimates/>

- **Gender Equality Strategy 2020–2025**

The EU Gender Equality Strategy delivers on the von der Leyen Commission’s commitment to achieving a Union of Equality. The Strategy presents policy objectives and actions to make significant progress by 2025 towards a gender-equal Europe. The goal is a Union where women and men, girls and boys, in all their diversity, are free to pursue their chosen path in life, have equal opportunities to thrive, and can equally participate in and lead our European society.

- **Directive (EU) 2023/970 of the EP and of the Council of 10 May 2023 on equal pay**

The Directive (EU) 2023/970 is intended to strengthen the application of equal pay for equal work between

men and women throughout the EU and reduce the gender pay gap. It has to be transposed into national legislation by 7 June 2027.

Nevertheless, the changing knowledge, skills and competence required in the construction, wood and forestry industries, the imperatives of climate change, and the shortage of workers present an opportunity for the industry to become more inclusive and gender balanced.

The globalisation of the timber sector is leading to the strengthening of industrial groups through the integration of 1st and 2nd transformation. These groups will offer a large number of jobs to women.

FOCUS: WOW 2023 - WOMEN IN WOODWORKING

Dynamic women in the wood processing and woodworking industry are definitely out there, even if they’re not always visible. Currently the ratio of females involved in the German wood and furniture industry is less than 20%, while in other countries, the figures are only slightly better. During the LIGNA trade fair in 2019 at Hannover, Germany, Deutsche Messe invited all women to attend the “WOW – Women of Woodworking” event.

And once again, with the motto to EmbraceEquity on the International Women’s Day 2023! LIGNA took the opportunity to celebrate all women from the woodworking community and was proud to be able to contribute to the best industry ever.



2.4 EXPECTED TECHNOLOGICAL CHANGES AND ADAPTATION NEEDS

When it comes to the skills needs: digitalisation, robotisation and globalisation have triggered profound changes in the way people work and the woodworking sector must find constant ways to adapt and invest in view of these new and future trends.

The combination of a quickly approaching labour shortage and the increasing price of raw materials is making it even more difficult for wood products to remain competitive. A growing use of automation and artificial intelligence is therefore expected in order to maintain efficiency and productivity.

Also worth noting in this context is the fact that the number of persons employed in the sawmill industry decreased by 4% in 10 years, as production (measured in m³) increased by 16%. This means that overall, the output per person employed increased by 21% from 2012 to 2022.

These evolutions imply that the industry will need skill profiles which are higher than what they used to be needed.

The industry needs to invest in training and education programmes to equip its workforce with the required skills and knowledge to operate and maintain new tech-

nologies and to adapt to changing market demands. At the same time, it needs to be more attractive in particular to women who remain underrepresented.

The wood products industry is undergoing a digital reform at high speed. Digitalisation enables efficiency throughout the value chain from forestry and raw material sourcing, forestry practices, through the entire logistical production chain to the end-product at retailers.

Advanced machinery and a high degree of sophisticated automation are improving the overall efficiency at every step of the process.

For example, while sawmills still turn logs into wood products, modern technology has revolutionised the operations at sawmills. High-speed lumber sorting systems, machine vision, lasers and scanners guide the logs on tracks, and optimise the cutting process, determining the grade and guides to the optimal way to cut the logs, ensuring high resource efficiency. The development of measuring technology helps improving the raw material yields and labour productivity.

Another example comes from the construction sector, where the digitalisation of the whole construction value chain make it possible to create a digital twin of the wood supply chain from forest to building (B.I.M.), where all actors are connected. The platform relies on indicators, standards, objects and graphics related to engineered wood products and also benefits from AI capacities. Actors along the supply chain can use this tool to improve the sustainable materials flows in building construction. The application can also be employed to simulate scenarios and test different designs as the twin model will be emulating reality. AI helps solving complexity in the growing multi-criteria analysis demand.

With new investments into equipment and machinery, the outcome is usually a rise in productivity both in raw material use and labour. Additionally, developments in technology have improved the industry's capabilities to improve quality throughout the production process.

The development of IT applications means there will be an improvement in internal flow of information as well as fulfilling customers' information needs.

These developments have a direct link to the skills needed as the industry moves to a more digital and computerised one. They also have an impact on the tasks that workers need to fulfil. These are becoming less monotone and more and more flexible, requiring broader competences and basic computer skills even at the lower entry levels.

In this context companies are facing difficulties finding skilled workers and there is a limited offer in terms of places where these workers can train. Moreover, while companies report that training implies high costs and involves taking away their workers from productive activities, they also clearly recognise the necessity to invest in education and training programmes that enable workers to develop and improve their skills in order to take up new positions within the industry. The retention of workers also plays an essential role for companies.



2.5 ROLE OF VET AND STUDENT MOBILITY

The woodworking industries, just as the wider manufacturing industry in general, is often perceived by the younger European generation as an “outdated and traditional” sector, low-wage economy, labor-intensive, and predominated by foreign contract workers. Many young people are unaware of the diverse career opportunities within the wood industry.

To increase the attractiveness of the wood industry through education, incorporating student mobility and an Erasmus-like programme for apprenticeships can be highly beneficial for the sector. Simultaneously, rebranding the wood industry to attract a younger workforce is of the essence, as well as fostering a long-life learning culture in the sector.

Implementing such programmes can enhance the sector’s appeal by showcasing its dynamism and international opportunities. In particular, the following benefits are recognised:

- **Global exposure:** student mobility allows apprentices to gain international experience, exposing them to diverse techniques, cultures and industry practices.
- **Skill development:** apprenticeships provide hands-on training, enhancing skills and employability. An Erasmus-style programme could standardise and elevate these experiences across borders.
- **Innovation and sustainability:** exposure to different markets and technologies can encourage innovative practices, including sustainable forestry and production methods.
- **Networking:** participants can build professional networks across countries, fostering collaboration and career opportunities.
- **Cultural exchange:** engaging with different cultures promotes adaptability and a broader perspective on global wood industry trends.

Vocational Education and Training (VET) institutions offer different types of training to overcome job mismatch issues by targeting professional occupations with similar professional profiles across industrial sectors, thus enhancing the reach of such training⁶. Therefore, it also

seeks to encourage the use of the various vocational training opportunities within the lifelong learning (LLL) context, as described in the Copenhagen Process (European Union, 2002).

Aligning VET programmes with Erasmus opportunities will favour complementary learning experiences while ensuring that skills and competencies gained are recognised across countries, facilitating mobility and employability. ErasmusPRO is part of the mobility opportunities offered to students in Education and Professional Training. This programme aims to allow students to have a professional experience abroad, in order to put the knowledge developed in the school context into practice in a working environment. ErasmusPRO is relatively recent and the wood industries should better explore how this programme could be used also to increase attractiveness in the sector. Nevertheless, it can be easily assumed that student mobility and an “Erasmus for apprenticeships” in the wood industries can play a crucial role in revitalising the sector, especially in achieving:

- **Skill enhancement:** apprentices gain hands-on experience with advanced techniques and technologies. Wood industries will be then stimulated to invest in modern machines as a result of high attractiveness capability compared to other schools/ VET providers.
- **Innovation and best practices:** sharing innovative methods and sustainable practices across countries enhances industry standards.
- **Career attraction:** highlighting the dynamic and international opportunities in the wood industry can attract more young talents.

The wood manufacturing industry is crucial in our economy and daily lives. Forestry and wood processing are at the heart of our future low emissions economy. As consumers become increasingly conscious of the impact of their purchasing decisions on the environment, the wood industries are capable of responding with sustainable and environmentally friendly products. At the same time, by embracing sustainability and innovation, wood manufacturing businesses can thrive with technological changes.

With this study, the social partners want to reiterate the fact that it is necessary to communicate to the public the fundamentally important role the wood products industry has in the EU economy, at the national and lo-

⁶ UNESCO, 2013



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cal levels, both now and in the future. Communications need to stress both the current strengths of industry and address the perceived weaknesses, in terms of industrial management, environmental performance, and the use of advanced technologies. At the same time, companies need to invest in workforce development and training in order to meet the demands of a rapidly evolving industry.

Within the ErasmusPRO programme, stakeholders could involve wood manufacturing stakeholders (e.g. employers, workers, educators, professional associations and government) aiming to plan, develop and implement human resources strategies that support the long-term growth and competitiveness of the EU wood manufacturing industry and meet the developmental needs of its workforce.

3. Case Studies

3.1 THE EUROPEAN SAWMILL SECTOR

3.1.1 Adaptation and prospects in times of crisis

As a result of the Covid pandemic, consumers all over the world were stuck at home. They could not go on holiday, spend money in restaurants, cinemas, etc. Central banks put in place very accommodative monetary policies and governments passed huge stimulus programmes. With consumers stuck at home, saving more money than they expected in the pre-pandemic era, many people decided to renovate their homes. The Do It Yourself (DIY) sector experienced an unprecedented boom during the pandemic, driving up demand and production of sawnwood, in particular of sawn softwood.

The figures shared during the International Softwood Conference of 2021 by John Herbert, Secretary General of the European DIY Retail Association (EDRA) and Global Home Improvement Network (GHIN), showed that the global sales of the EOS market reached 702 billion euros in 2020. The figures were even higher in 2021. The previous sales record was achieved in 2019, with 617 billion euros in a sector that traditionally is not really used to seeing dramatic changes in year-on-year sales. Production of sawn softwood increased to meet this booming demand, and peaked in 2021, having experienced a growth of about 15% in the 10 years to 2021.

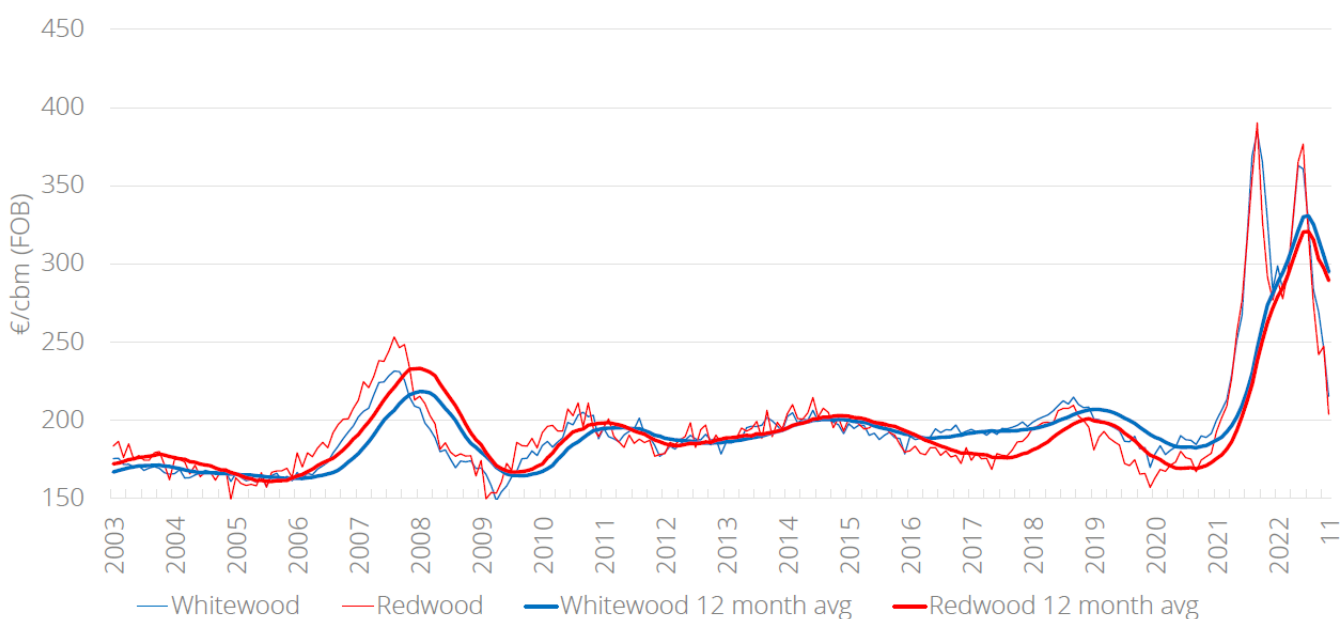
At the same time, prices dramatically increased as well, in particular in 2021, following the very high demand. The figure below shows the export prices of Finnish white-wood and redwood and is accurately representative of the spike in prices that the sector experienced.

After this situation, which was positive during and right after the Covid pandemic, 2023 proved more difficult for the sawmill industry, both in the softwood and in the hardwood sector.

The main reason for this development is connected to the challenges faced by the construction markets. Indeed, for the sawmill industry, construction markets are key, with over 50% of its products going directly to the construction sector, and some other segments strongly connected to the performance of construction markets (eg parquet and furniture).

The last couple of years have triggered an inflation bout across the developed world. For the first time in many years, Central Banks have been forced to massively increase interest rates. This has pushed up mortgage rates to levels unseen for at least 15 years on both sides of the Atlantic, which has had the effect of depressing demand in the construction sector. At the same time the cost of

Export Price of Sawn Softwood from Finland



Source: Finnish Customs

raw materials in the construction sector skyrocketed. All these factors combined to produce the slowest construction market in recent times and depressed demand for sawnwood.

Moreover the pallet sector, another important outlet which takes up about 20% of sawnwood produced in Europe, is also a typical bellwether of the economy as many goods are transported on pallets. And there too, the economic situation and overall performance of the sector contributed to a difficult situation on the sawnwood markets a.o. considering that the conflict between Ukraine and Russia has stopped imports of sawn timber.

An interesting phenomenon observed during the pandemic was the imbalance between supply and demand. Sawmills were at first surprised by the booming demand and needed some time to adjust production to the new reality. But they eventually rose to the challenge and production was raised in a very short period of time. For instance, in France, in 2021, sawmills were running at 120% capacity at times. Sawmills were equally surprised when demand then suddenly dried up. For a while, there was an overabundance of sawnwood in the market. The sudden price movements in the chart above are partly explained by this situation.

Labour availability was often challenging during the Covid pandemic as many workers were at home in quarantine or sick. The situation was even more tricky given the high demand sawmills were facing, which required production at full capacity.

The raw material issue was even more complex. The impact of the scarcity of workers due to the pandemic has also been felt in the availability of forestry workers. Mobilising wood has become a complicated operation, while the prices of the raw material were favourable during the pandemic, in the aftermath of the bark-beetle crisis in Central Europe. Indeed, the attacks of this insect meant that many affected trees had to be quickly harvested to prevent the spread of the pest to healthy trees. This implied a need for a much higher harvest in many Central European areas leading to an overabundance that pushed log prices down.

Securing raw material seems to be the main challenge for the years to come in the sawmilling sector, with spruce

being particularly challenging. Scientists and practitioners are unanimous in their assessments: the quantity and quality of supply of Norway Spruce across Europe will probably decline in the long-term because of monoculture and climate change. This is the lead species in the softwood sector, especially important in construction. Although there are still significant reserves of Norway Spruce, it is already pretty obvious that the future will look slightly different for the industry, with an increasingly diverse forest across Europe, with more hardwood and less softwood. A change in the face of the forests which is also fostered by European policies aimed at ensuring resilience and biodiversity.

Logistics proved to be another challenge as the pandemic turmoil caused freight rates to skyrocket and fall with unbelievable speed, making planning for deliveries of sawmills very difficult. Also, a shortage of truck drivers affected many sectors, including the European sawmill industry.



© François Sougnéz

Overall, during the pandemic period, the market and the situation for sawmills while challenging at times was in many instances favourable and the tailwinds definitely outnumbered the headwinds.

The war in Ukraine and the energy prices increase of 2022 were another significant event that abruptly changed the market trends. For softwood lumber availability in the EU, the impact of the war in terms of imports is significant. The EU in 2021 consumed about 8.3 million m³ of sawn softwood. Of this, 4.5 million m³ was imported from Russia, 1.1 million m³ from Ukraine and 2.6 million m³ from Belarus. Altogether, the market share of the three countries is slightly below 10%. However, given the significant slowdown in demand observed from H2 2022, there was no observable shortage of sawn softwood in the market. This can also be explained by the fact that it was still possible to import lumber from Russia and Belarus until July 2022, when the sanctions kicked in.

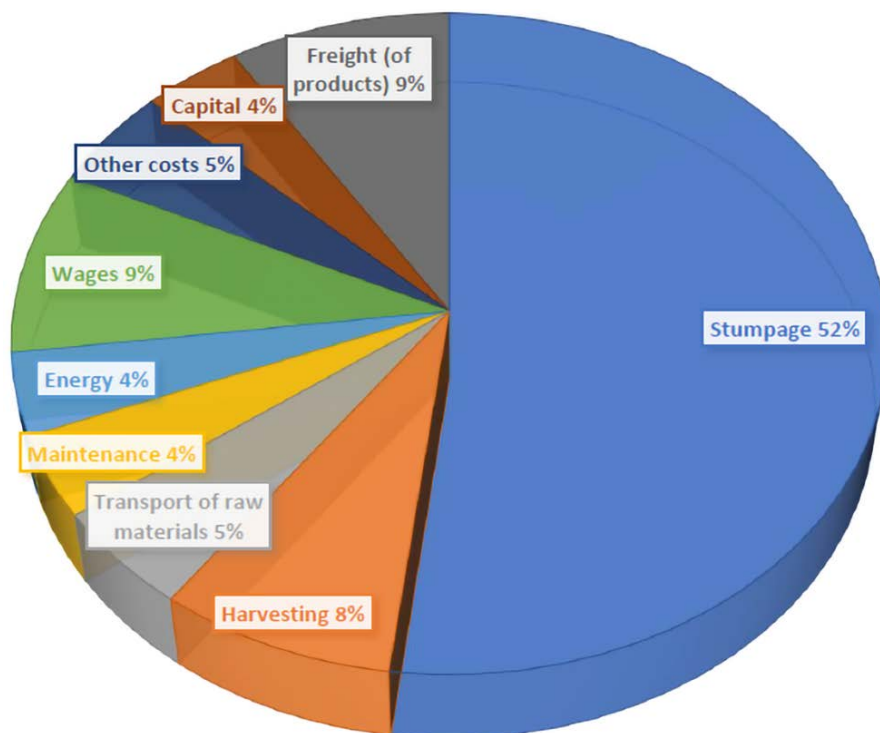
The increasing energy prices have obviously taken a heavy toll on the European sawmill industry. The pie-chart below shows the breakdown of sawmills operating costs from Finland a few years ago. In a normal situation energy would make up 4% of the costs. In Q4 2022, de-

pending on the countries, energy costs could make up as much as 12-15% of the total operating costs of sawmills.

While the winter was milder and energy prices overall in Q1 2023 a bit lower than many people expected, the situation remained pretty challenging for many sawmills across Europe. Raw material prices sharply increased and reached record-levels. Some plants, especially large ones were running only one shift. On the other hand, stock levels were still higher than expected despite a six-month slump. There was some inventory replenishment buying, but no hoarding like in 2021 and 2022. The slowdown was anticipated by many practitioners in the sector and it was probably not as strong as initially feared. Many challenges remain, in connection to the energy price increases. As a result of the slump in demand, sale prices for lumber have fallen back to the pre-pandemic levels. While the sawmill business was profitable for a couple of years, now many sawmills do not achieve break even.

Finally, it is also worth mentioning that, as a result of the high energy prices, by-products of sawmill processing have seen their prices sharply increase over the 2022-2023 winter, before falling dramatically.

Cost structure of the sawmill industry in Finland



Source: Finnish Sawmills



This decade is an important milestone for the industry, which will decide its fate for the coming years. The main adaptations and challenges are summarised below.

- **Adopting new technologies**

In the technological field, many developments are also both needed and expected in order to improve the yield of logs (at present hovering around 52–60%). The sawmill industry needs to invest in new technologies such as automation, sensors, robotics and data analysis, which will improve operational efficiency, reduce waste and increase output.

- **Raw material securing and availability**

In a fast-changing environment, adaptation to the new reality is a key. This will involve processing new species, finding new ways of adding value to our hardwoods, developing new standards, etc. Wood as a building material is gaining market share and momentum. More focus is expected on added-value products, such as engineered wood products, as well as traditional lumber. Responsible forest management, energy efficiency, and waste reduction to meet the growing demand for environmentally friendly products will be key.

- **Diversification**

The sawmill industry can explore new product lines and markets to expand its customer base and revenue streams. For example, producing engineered wood products such as cross-laminated timber (CLT) and laminated veneer lumber (LVL) can help the industry to establish an even stronger foothold in the construction market and benefit from the growing popularity of wood as a building material.

- **Collaboration**

The industry can collaborate with other stakeholders such as researchers, policymakers, and suppliers to develop innovative solutions and policies that address common challenges such as climate change, resource scarcity and competition from other regions in third markets. It will need to further position itself as a solution to climate change and proactively and positively show its role to policymakers.

- **Upskilling**

The industry needs to invest in training and education programmes to equip its workforce with the required skills and knowledge to operate and maintain new technologies and to adapt to changing market demands. At

the same time, it needs to be more attractive in particular to women who remain underrepresented.

3.1.2 Women representation

The proportion of women in the forest sector workforce remained fairly constant between 2008 and 2016, at around 13 % in forestry, 16 % in wood manufacture and 28 % in paper manufacture. In 2016, in Switzerland's forestry subsector, women represented 32% of the workforce, the highest level in Europe for this subsector. Lithuania employed the highest share of women (27%) in the wood manufacturing industry.⁷

Although women represented just 16% in wood manufacture, this representation is gradually increasing as key industry players lead the change on gender equity. The European sector is engaging in dismantling the barriers that prevent or discourage women from entering and advancing in the industry.

The sawmill industry continues to be male dominated, but the share of women is slowly growing. Some countries have recorded a higher percentage of women workers than others, due to various factors such as national policies, cultural norms and labour market conditions. The sawmilling activities involve a lot of heavy weight lifting, which is a limiting factor for the presence of women in the production. This is why they are mainly employed in administrative and support functions. And, when they are present in production, women tend to work in positions related to quality control or visual lumber grading as they show good aptitudes for sorting wood, a better sense of aesthetics and the ability to make quick decisions.

However, the gender gap in the sawmill industry remains significant, and more efforts need to be made to promote gender equality and diversity in the sector. Statistics from Finland show that in the independent sawmill industry, women make up an average of 12.3% of employees. There are many challenges to the further integration of women in the sawmill industry, including:

- **Perceived gender bias:** women may perceive the industry as being predominantly male-dominated, which may discourage them from pursuing a career in the sector.
- **Shortage of female role models:** there is a shortage of female role models in the sawmill industry, making it

⁷ UNECE/FAO, 2020: *Forest sector workforce in the UNECE region – Overview of the social and economic trends with impact on the forest sector*.

difficult for young women who want to pursue careers in this field to find inspiration and guidance.

- **Long-working hours:** the industry may require long working hours and inflexible schedules, which might not be compatible with family life and other commitments.
- **Limited job opportunities:** many women may not be aware of the job opportunities available in the sawmill industry or may not have access to the relevant training and education necessary for these jobs.
- **Stigma attached to manual labour:** there is still a stigma attached to manual labour jobs, which may discourage women from pursuing careers in industries like the sawmill industry

3.1.3 Expected technological changes and adaptation needs

Technological innovations in wood processing industries primarily focuses on optimising the utilisation of wood. The greatest cost item for the sawmill industry is wood raw material, often accounting for more than 70% of all operating costs⁸. Approximately four-fifths of sawn timber ends up as direct or as further processed products for construction. The most notable advances in sawmilling and machining concern productivity gains obtained through mechanisation, boosted by the introduction of computer-supported manufacturing processes.

In traditional sawmilling, human judgement was used to obtain the best possible yields from the material. With modern techniques, cutting patterns are optimised on the basis of the qualitative and quantitative collection of data concerning inputs, which is made possible by the development of increasingly refined sensors of form, defects and irregularities. The data is then analysed in terms of the demands to be met, the state of stocks upstream and downstream of the work position and priorities based on the product's rate of return. Products are produced following specific client orders, in a relatively short delivery time, with stocks kept low. The development of these techniques allows considerable improvements in product quality and business competitiveness.

Online control of sawmilling often using visible, infrared or X-ray imaging techniques is also common in sawmills. For example, sawmilling machinery is increasingly equipped with sensors, such as lasers, that take account of the tool's behaviour or the sawblade's passage through the wood in order to assist and optimise manual control.

In surface machining (planing, moulding, etc.), the trends are moving towards very high-speed machining, which can give a surface quality similar to that produced by sanding, while speeding up the work.

FOCUS: INNOVATIVE, CUSTOMISED TECHNOLOGY SOLUTIONS

The large Czech sawmill Labe Wood in Štětí is one of the most modern sawmills in Central and Eastern Europe. With a cutting capacity of more than 1 million m³ of log wood, Labe Wood produces at least 600 000 m³ of lumber a year, which is exported to all of Europe.

Top suppliers

The state-of-the-art plant technology for the high-performance sawmill, which went into operation in 2020, was supplied exclusively by well-known European suppliers, such as Springer. "When it came to equipping the sawmill, we looked for the best industry solutions available on the market. We opted for the globally successful company Springer because of its many years of experience and its customised plant designs," Radim Strava, Managing Director of Labe Wood, explains.

The log yard with a Taylor 1200 butt end reducer bypass, the sawmill infeed and the two sorting lines for main assortments and sideboards were supplied by Springer. The saw line was bought from Linck of Oberkirch/DE. Installation started in October 2019 and was completed just before the factory acceptance test in May 2021.



The log yard is designed for an annual capacity of 1 million m³ of logs in a two-shift operation. The two 3D scanners and the above-mentioned butt end reducer are the heart of the plant. The butt end reducer works with a reduction rotor on both sides in the bypass. The logs are sorted into 88 boxes.

Log yard Labe Wood

- Capacity: 1 million m³/year in a two-shift operation
- Feed speed: up to 200 m/min
- Infeed: from two sides with screw feeder log allocation unit
- Scanning: two 3D scanners
- Butt end reducer: Taylor 1200 butt end reducer with a reduction rotor on both sides in the bypass
- Sorting: in 88 boxes

42 logs per minute and an optimal gap

The sawmill infeed is designed for a feed speed of up to 170 m/min. “With a log length of 4 meters, this is more than 42 pieces per minute,” Springer Managing Director Timo Springer explains. The mechanisation expert delivered two independent lines, each with one infeed including a screw feeder, 3D turning and debarking. The logs are brought together with a screw feeder and are fed on to Springer’s special acceleration conveyor, which ensures an optimal gap between the logs. Springer was also responsible for the bark disposal and the connection to the adjacent paper and pulp mill. After the main timber and sideboards have left the Linck saw line, they are fed into two identical Springer lumber sorting lines. The high-performance servo allocation unit has a performance of up to 220 cycles per minute. The timber is sorted into a 20-level tray storage unit. After it has left this unit, the layers are cut. Whenever necessary, the timber can be dipped in a tank which contains a chemical for blue stain protection. The packaging unit with its double lifting table and tried-and-tested pivot tongue can take over up to 26 packages per minute. In the package removal area, Springer installed two Pascal presses.

Labe Wood is a joint project involving Mondi, Eco-Invest and Holzindustrie Maresch from Austria as well as Unitimber from Slovenia. The high-performance sawmill is located next to Mondi’s paper and pulp mill in the Czech Republic, where the wood chips from the sawmill are processed. Labe Wood employs around 220 people.

The family company Springer, which is headquartered in Friesach, plans, develops and produces machines and digital solutions for the wood-processing industry. All processes related to the transport, sorting and grading of wood as well as to automation are implemented at the highest technological level. Springer employs more than 700 people worldwide and is managed by third-generation family members Timo and Gero Springer.

Source: Timber Online - Article by Martina Nöstler (adapted for holzkurier.com; translated by Eva Guzely) | 09.03.2022)

The wood products industry is undergoing a digital reform at high speed. Digitalisation enables efficiency throughout the value chain. From forestry and raw material sourcing, forestry practices, through the entire logistical production chain to the end-product at retailers.

Although sawmills still turn logs into wood products, modern technology has revolutionised the operations at sawmills. Advanced machinery and a high degree of sophisticated automation are improving the overall efficiency at every step of the process. High-speed lumber sorting systems, machine vision, lasers and scanners guide the logs on tracks, and optimise the cutting process, determines the grade and guides the optimal way to cut the logs - ensuring high resource efficiency.

The development of measuring technology helps improve the raw material yields and labour productivity. With new investments into equipment and machinery, the outcome is usually a rise in productivity, both in the raw material use as well as labour. Additionally, the development in technology has improved sawmills' capabilities to enhance quality throughout the production process.

For example, wrapping a pack of sawn timber has been a manual process. However, there is a robotic option available for this job. Future innovations will be related to improving the features of sawn timber, by adding value. Timber's properties, in particular the resistance to decay and fire protection are being developed and improved.

The development of IT applications means there will be an improvement in internal flow of information as well as fulfilling customers' information needs. In long-term customer relations, IT will automate information flow and logistics. Customer's sales forecasts and stock needs will drive the future logging instructions. If necessary, customer specific logs can be tracked during different stages of the process. It is undeniable that the need for IT solutions will increase in the future. The significance of logistics will also be high, with changing customer structures, the sawmilling industry is delivering considerable volumes of sawn timber straight to customer's factories.

FOCUS: FINNISH SAWMILL TECHNOLOGY INDUSTRY

Since the 1800s, Finnish sawmill technology has been at the forefront of the industry, driving it forward. For the most part, the Finnish sawmill industry's success is based on local, world class technology and automation. Technology has had a large and significant impact on the whole industry, developing and maintaining a competitive edge internationally.

At the start of the 2000s, improvements in production yield were highlighted because of expensive raw material and the relatively falling price of by-products. The importance of automation, measuring and production steering systems is still growing.

Production line solutions even from the late 1970s have been kept in good working condition and useable by adding new controls and optimisation technology.

Providers of sawmill technology have had a significant impact on the product development of sawmills as well as with new technological solutions, as these are usually made possible with newly developed product technologies.

Finnish sawmill technology is also a successful export product.

3.1.4 Role of VET and student mobility

FOCUS: PROHOLZ AUSTRIA "URBAN RENEWAL OF A SCHOOL WITH CLT MODULAR ELEMENTS"

Development of wood construction skills in South-East Europe with the support of Austria

Well-educated skilled workers are key to a larger use of wood in construction. ProHolz fosters the appropriate education in Slovenian and Croatian universities and turns to future planners and architects with an international and cross-disciplinary workshop programme.

The idea of the workshop programme follows the principle of master programme: selected students work for a fixed amount of time on a real task and are supervised across the disciplines by recognised professors. The implementation of the plan will inspire the scientific exchange between Austrian, Croatian, and Slovenian universities. It makes it possible for prospective architects and planners to have specific experience of wood as a building material and to take advantage of existing Austrian know-how.

International and inter-disciplinary work

In the summer of 2016, **ProHolz Austria** organised for the first time, together with the Technical University of Graz, the masters programme “Urban renewal of a school with CLT modular elements” at the University of Maribor and at the University of Zagreb. 24 students, divided in 10 interdisciplinary groups, made up of both engineers and architects, have elaborated ideas for the renovation and the expansion of a school in Graz.

The focus is on prefabricated constructions with the use of cross-laminated timber elements. With a renovation of its façade, the school building, which was built in the 1970s, is supposed to be optimised from an energetic point of view. The programme included a series of lectures in the participant universities, several workshops with the teachers on the elaboration of the projects and specialised inputs from Austrian experts, such as architect Simon Speigner and structural engineer Richard Woschitz.

“With this Programme we educate students for the future, we reinforce the awareness over the potential of building with wood and we make Austria the leading country when it comes to modern building solutions with wood”. With these words Mr Christoph Kulterer, chairman of ProHolz Austria, illustrates the motives and the potential of the project.



EOS Member, Mr Christoph Kulterer, (on the right) with some students

Science of constructing with wood with a practical basis

The results of the Master Programme were presented on 1 September 2016 at the Wood Fair of Klagenfurt. Three projects were declared winners and were summed up by the participating teachers.

“The transfer of academic knowledge to practice has been done in an exemplary way. The proposed solutions are of high complexity from the static, technical and creative point of view” declared Prof. Miroslav Premrov of Maribor University.

“The workshops of Austrian professors and experts have led to a better understanding of cross-laminated timber, which is still a relatively young construction material; the working methods of the programme are valuable even in other sectors”, added Ivica Plavec from the University of Zagreb.

“Young experts, which will build the cities of the future, have received the best possible training through the confrontation with this real project, which is worth replicating”, stated Assistant Professor Vesna Zegarac Leskovar of Maribor University.

Prof. Vlatka Rajcic of Zagreb University added that “even the teaching staff had the occasion of exchanging knowledge and experience”.

“While beyond-the-border collaboration between universities takes usually place in research and development, in this case education on a real-life case has been given”, declared prof. Gerhard Schickhofer, TU Graz.

The Master Programme has proved to be a good format for know-how transfer and networking.

FOCUS: SKILLS FOR THE BALTIC WOOD INDUSTRY EUROPEAN QUALITY IN VOCATIONAL EDUCATION AND TRAINING

In October 2019, the training of the EU project was launched in Estonia, Latvia and Lithuania, with two thirds of the training taking place in companies in each country, as well as during mobility visits to companies in other Baltic States and one third taking place in the schools.



Participants in the first training sessions included 50 representatives from different manufacturing companies. They were piloting the work-based learning programme (WBL) at EQF 5 level in the woodworking industry for the following two years, so that it can meet the educational needs of the industry and become available to a wider audience.

The aims of the project are to provide some further education to people who are already working in the wood industry in company production, in order to raise them up to production managers or chief managers.

Smaller companies normally have one manager for the whole production process, whereas larger enterprises have different managers for different processes. So, the project came up with the idea of increasing the educational standard to make it suitable and worthy for both.

3.2 SWEDEN

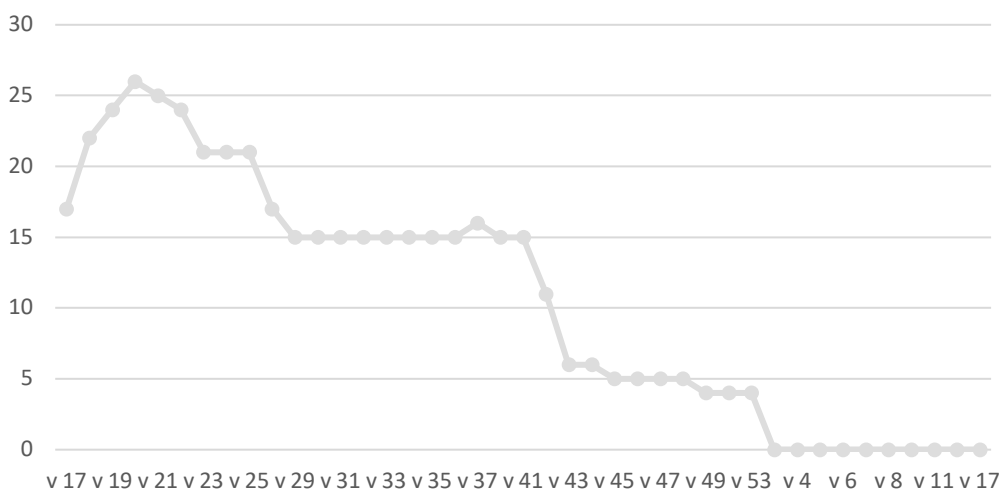
3.2.1 Adaptation and prospects in times of crisis

When the pandemic came, the national parties were quick to negotiate a short-time agreement to be ready at the beginning of March 2020. This happened at the same time as the regular collective agreement negotiations were ongoing. After that, the local companies started to negotiate and implement short-term contracts on individual companies. It only took 1-2 weeks between the time when the national short-time agreement was ready and the first companies signing local agreements.

Short-time work was a system where the State stepped in with financial support, the individuals accepted to work shorter hours and the companies could not lay off staff.

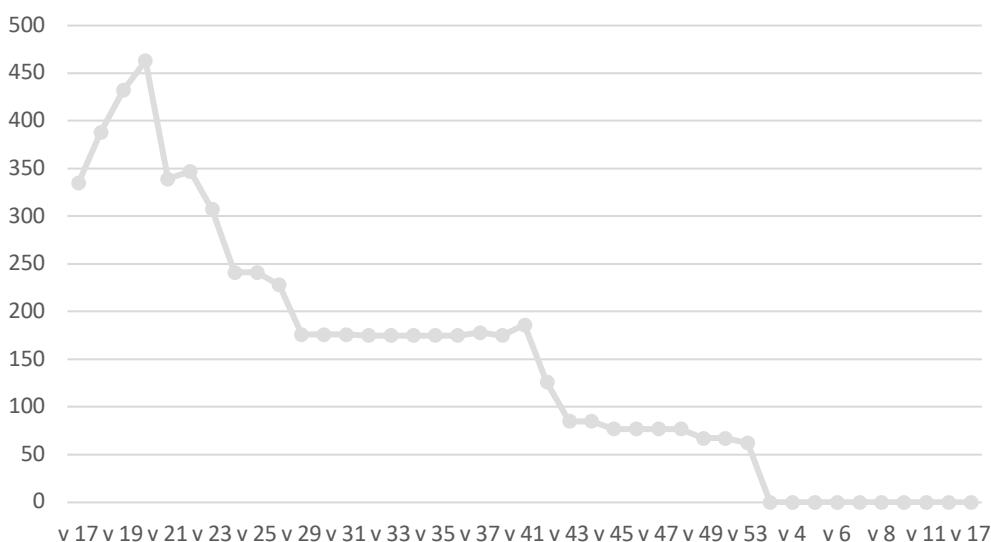
The graph below shows the number of sawmills that signed short-time contracts and how the development looked from April 2020 – April 2021

Number of sawmills with short-time agreement

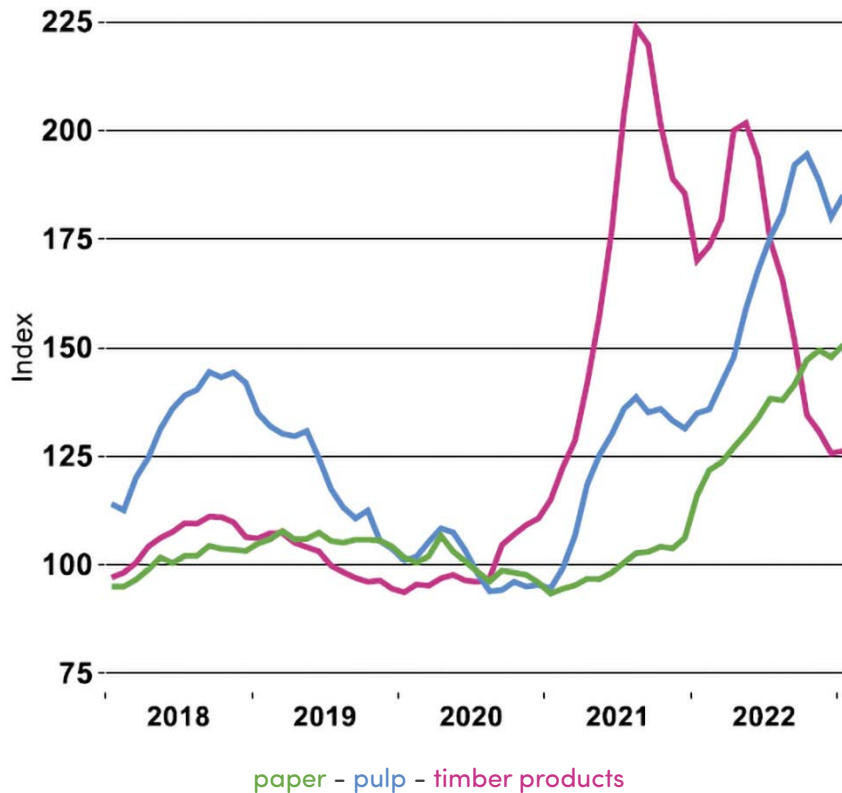


The following graph shows how many people were covered by the short-time work.

Number of employees that worked short-time



Export prices in the forest industry



Source: Statistics Sweden

In total, there were at most 26 contracts signed and 463 covered by short-time work.

It should be mentioned that all sawmills that signed contracts did not start using them, or alternatively only used them for a shorter period than the contract period they were signed for. But it was a security in the uncertain situation that arose.

Parts of the forest industry developed relatively well during the pandemic period, driven by an increased domestic focus. This was followed by a certain slowdown as, among other things, the home focus had passed. However, new black swans appeared when Russia invaded Ukraine. This created a concern about the availability of wood products in Europe as Russia has been the world's largest exporter of wood products. There was a buying pressure due to concerns about the supply and the prices of wood products rose again.

The war also brought new cost shocks, such as rapidly rising energy prices. This and a clear U-turn in monetary policy with rapidly rising interest rates produced a clear slowdown in Europe, among others, which hit

construction hard and the prices of sawn timber fell back again. Some countervailing force was that exports to other countries such as China and Egypt picked up again after the restrictions in China were finally eased. In the Egyptian market, the increase is explained by the fact that previous import restrictions were removed in the autumn.

After the invasion of Ukraine, there was great uncertainty about the role Russia would have in the world market for wood products and thus how the global market balance would develop. There is really no region that can fully compensate for a reduced supply of Russian wood products on the world market. There are already clear indications that Russia is having difficulty producing and exporting wood products, even to countries that have no sanctions or trade restrictions on Russian wood products. According to official figures, Russian production has fallen by around 15%, and their exports to China are falling significantly despite rising demand.

Another important segment within the forest industry is paper and cardboard. Production of these products decreased in 2022 by approximately 4% and deliveries



by 7%. A part of the paper and cardboard segment consists of graphic paper. The structural decline in graphic paper continued in 2022. The development is driven by reduced reading of paper newspapers and less demand for, among other things, office paper. Weaker demand and reduced profitability saw two mills shut down in 2021. This took full effect in 2022 and explains most of the almost 16% drop in production compared to the previous year. Corrected for the loss of capacity, production was broadly the same in 2022 as in 2021.

The production of packaging materials, on the contrary, has had an upward trend in recent years driven by, among other things, increased e-commerce and increased use of fossil-free packaging materials for food, for example. During 2022, however, deliveries declined by just over 2%. This is likely linked to the more subdued economic situation.

The prices of pulp and paper have also risen significantly in recent years (see graph above). The rise is largely due to high energy prices, which pushed up costs.

The Swedish forest industry is often largely self-sufficient in electricity and as much as 40% of the electricity requirement is produced internally at the mills, with the help of residual products from their own production. Several Swedish pulp producers are even net producers of electricity and produce 50–70% more electricity than they need themselves. Those who are not self-sufficient have in many cases secured their electricity supplies and prices. But, because electricity prices have been high for a relatively long period, more and more people have been affected when the contracts expired.⁹

Impacts of the Covid Pandemic

At first, when the pandemic broke out, there was concern about what would happen. A short-term agreement with financial support from the State was centrally negotiated. Several companies signed these agreements locally. However, as mentioned above, there were not that many who applied short-time work.

What happened otherwise, was more about organising the workplaces in a safe way, with access to laundry and the possibility to maintain a safe distance in production and in lunchrooms. The process, which had already started at many companies with increased demands and the need for broader competence, increased in pace during the pandemic. This highlighted that, as it

turns out, modern sawmills are vulnerable in the event of extensive sickness absence. There was an increase in the requirements for competence in more tasks than before and an increased rotation between tasks. In the long term, this is good for production and a basis for recruiting staff.

A few months into the pandemic, demand began to increase, and production followed. At several sawmills, it has never been so high.

Regarding the energy crisis in the fall of 2022, energy costs increased but there was still a margin to produce. The export market that Russia had to the EU and North America has given market shares. The energy crisis created more investments in northern Sweden, with a labour shortage as a result. When the energy crisis hit, it was initially difficult to get trucks running because of fuel prices. But production remained high and the company had margins on cost.

Adaptations for a relevant and competitive woodworking industry

Environment and sustainability issues are crucial areas for the future. It is important to emphasise that forests provide raw materials that are renewable and better than steel and concrete. The raw material availability is also a crucial issue and working with PEFC or FSC certification schemes is deemed of importance, as it guarantees a balance between economy, environment and social conditions.

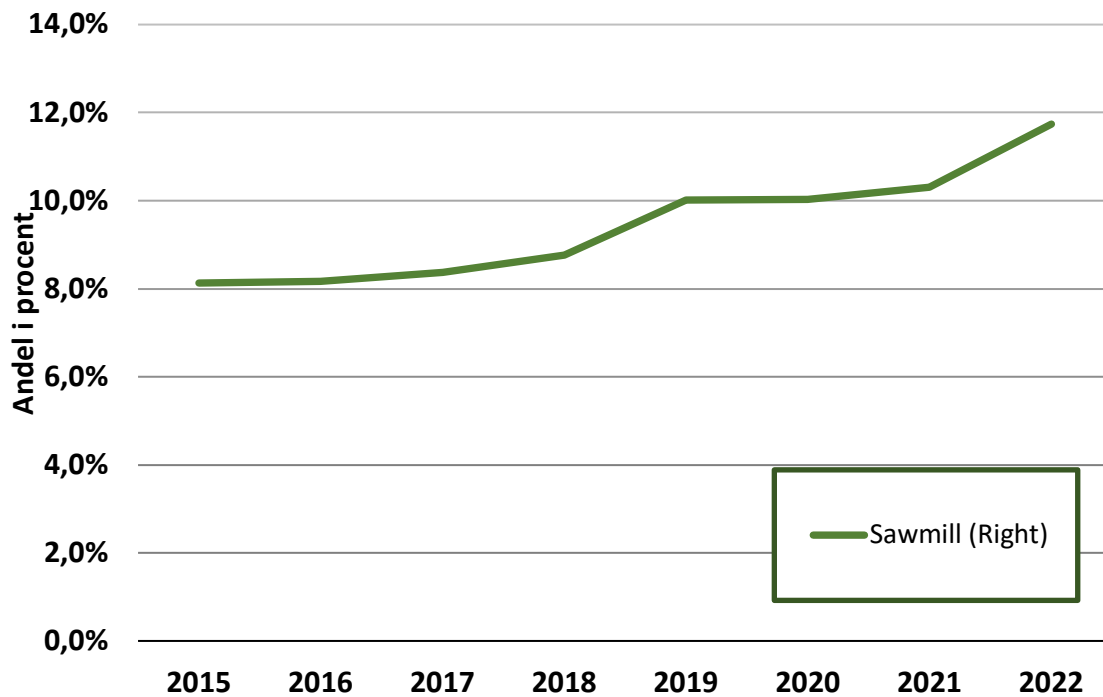
Several Swedish companies reported that there is more frequent discussion about increasing flexibility in order to deliver to several markets both geographically and product-wise. The evolution towards more developed wood products is also envisaged, for example glulam and more delivery of finished parts to the construction sector. Sawmills are working to achieve higher added value in production.

3.2.2 Women representation

Sweden counted a total of approximately 13,000 workers in sawmills in 2017. The proportion of women between 2015 and 2022 has increased. In 2015, 8.2% were women and 93.8% were men. Correspondingly, in 2022, the proportion of women was 11.7% and 88.3% of men. An increase in the proportion of women by just over 32%. However, female representation is still at a low level. The

⁹ Industrial economists' business cycle report March 2023 - teknikföretagen.se, industriarbetgivarna.se

Percentage of women in the sawmill industry (2015-2022)



industry average in Sweden is the proportion of women 23% in total and among workers 19%.¹⁰ For applicable workers, the proportion of women in 2015 was 8% and in 2023 the proportion was 12%. An increase of roughly 33%.¹¹

Challenges for recruiting more women

The companies interviewed for this study share that there are more discussions ongoing about how the industry should attract more women and the various initiatives that are implemented to succeed. Some companies have written strategies to increase women's participation, but for most of them it remains a discussion. The efforts that are made are, for example, that certain jobs are targeted for women only or adapted and changed so that women can participate in production. Several companies have not isolated the discussion to attracting more women but extended it to working to attract more underrepresented groups.

Among the obstacles described to attract more women are the culture at the sawmills that needs to change and the fact that those who attend the industrial programme are only 10% of women.

The companies interviewed explained that the employ-

ment period is long. When workers start at a sawmill, they stay there. However, the attitude is changing, with those who have recently been employed staying for a shorter time.

3.2.3 Expected technological changes and adaptation needs

Technological development is ongoing and will continue. There is an ongoing development towards more Computer Numerical Control (CNC) machines and robots. This is partly to improve the working environment, but also for better quality and higher productivity. There are difficulties with the automations and that is maintaining flexibility in production (must specialise).

The requirements for training and competence among employees are increasing. The investment level requires higher technical knowledge. The simpler jobs are automated or require higher knowledge. The trend continues towards fewer people producing more. Since there are fewer people who must know several tasks, the demands for a broad competence increase. Companies have a need for broader competences today and there is greater acceptance among employees

¹⁰ Swedish Business Administration

¹¹ Facket för skogs- trä- och grafisk bransch



for this need.

Digitisation in the Swedish sawmill industry is high. Basic computer skills are required for all positions. This basic computer knowledge is generally good among the employees. However, there are skill gaps in production data.

Most interviewed companies testify that the willingness to invest during the pandemic remained high. Some describe that it even increased. Much of the investment deals with increasing automation in production, but also with increased capacity for drying and sorting.

During the energy crisis, there has been a lot of discussion and willingness to invest in creating own electricity production. Investments in favour of the environment were also mentioned with, a.o. the electrification of vehicles and the improvement of energy efficiency. Not only direct investments were envisaged but also changes in the organisation of production, with production changed to produce during times when it is cheaper.

It is important to point out that green investments do not affect work tasks that much. But the working environment is getting better, with, for example, lower emissions from electric trucks. However, the work of the maintenance staff is changing. The willingness to invest is based on the fact that it is important to be competitive.

3.2.4 Role of VET and student mobility

The parties in the industry have established a technical college. Riksföreningen Teknikcollege Sweden is a collaboration between companies, municipalities and education providers and aims to increase the status and quality of industry-relevant education.

The concept was initiated in 2004 by the Industry Council¹² and today there are 24 regional technical colleges where a region consists of at least three municipalities. The regions include a total of 150 training providers and over 3,000 collaborative companies. The region is run by a regional steering group and there is also a regional process manager, who has overall responsibility for the operational activities.

Each regional technical college is in turn made up of several local technical colleges consisting of nearby education providers, companies and municipalities. The work here is run by a local steering group. The

companies are active in the collaboration by influencing the content of the courses and sharing their expertise in different ways. They also contribute to the students being trained with modern and relevant equipment. The common goal is to increase the status and quality of industry-relevant education so that enough students choose them.

Since the concept was started, the technical college has been based on regional cooperation between at least three municipalities and is regulated via agreements between the parties concerned. Collaboration between municipalities provides the opportunity to share costs and benefit from each other's experiences and networks. A regional collaboration around, for example, education provision, marketing and tutor training aims to create increased resource efficiency for increased quality in the educations. Through the steering groups that exist within technical colleges, the companies are given the opportunity to, together with the training providers, develop training programmes for future skills needs and, in this way, influence their skills supply.

Smart industry requires the right competence

The companies and organisations behind the Swedish industrial validation have developed Industriteknik BAS together. Through an industry-wide validation model, employers, production staff, job brokers and training providers get clear information about what basic skills are required to work in industrial production. The basic concept ensures the basic level of competence that is necessary for today's industrial work regardless of tasks and industry. Thus, the certificate of competence works in companies in all industries. The basis for further development is laid with Industrial Technology BAS and a certificate of competence for 10 critical areas of competence.

The validation is performed through a web-based test that takes approximately four hours to complete. The result shows which competence exists and which needs to be developed. It facilitates the drawing up of a specific development plan.

All interviewees testify that it is difficult to get hold of competent personnel. Efforts and attempts are being made to increase the attraction of working in sawmills, a.o. by inviting school classes to company visits and participating in fairs and events.

¹² In order to follow and promote the application of the Industrial Agreement and otherwise deal with issues aimed at creating good conditions for the industry and its employees, the parties organise an industrial council consisting of leading representatives of all parties.

AREAS THAT ARE VALIDATED	ENSURES COMPETENCE TO
HEALTH, ENVIRONMENT AND SAFETY	Independently plan and safely carry out work in daily production.
IT AND AUTOMATION	Use a computer at work, understand how different systems affect each other and how data is stored and handled securely.
QUALITY	Work according to established instructions, evaluate results and be responsible for the correct action being carried out.
MATHEMATICS	Evaluate whether the answer to a calculation is reasonable. Using mathematics in problem solving.
MEASURING TECHNIQUES	Carry out measurements on products, assess which measuring instrument is most suitable and draw up measurement protocols.
PRODUCTION TECHNOLOGY - ECONOMY	Identify disturbances and be responsible for improvement measures.
DRAWING READING	Use the information contained in a drawing to solve a work task.
LANGUAGE – SWEDISH	Assimilate information in manuals and instructions and report according to company practice.
LANGUAGE – ENGLISH	Assimilate simpler information in speech and writing.
MAINTENANCE	Take appropriate action in case of deviation. Perform and document operator maintenance according to plan.

There are also geographical differences, with an industrial boom in northern Sweden where sawmills compete for labour against, for example, the mining industry and battery manufacturing. There aren't that many formal courses, but the industry has come together and created courses regionally. For example, a sawmill together with Träteknik has started a sawmill training programme that is financed by public funds. The training takes place externally. The first students graduated in August 2023 and several will be recruited to the sawmill. Several sawmills have joined this training and will recruit from it.

However, most of the training continues to take place internally at the start of employment and during the employment period. Several companies have training that everyone must undergo. Examples of training are hot work, forklift driver training, work at a height, Heart and Lung Rescue CPR, lifting devices and more. The Industrial Council is now working to review what skills are needed and which tasks are changing.

The crises did not affect the educational elements or the needs. During the pandemic and the energy crisis, a lot was invested in training, hot work, sorting training and lifting training. There has also been an increased use of digital educational efforts. The pandemic closed the factories to outside visitors and this affected the ability to take in trainees. The interviewed companies describe that there are opportunities for a career in the companies and that this is happening. However, not many companies have written down career plans.

3.2.5 Background

This chapter is based on 8 interviews with union representatives at companies with 50 employees and groups with over 1,000 employees. The majority of those interviewed are union representatives on company boards. The sawmills interviewed process softwood. Most are found in smaller towns or cities. Some are located just outside medium-sized cities. It also includes reports and statistics from Industriarbetsgivarna, the employer organisation, and GS union, as well as information from technical college.



3.3 CROATIA

3.3.1 Adaptation and prospects in times of crisis

The pandemic has further emphasised the importance of the wood industry in Croatia, as furniture production, wood processing and forestry occupy an important place in the Croatian economy. It is a sector that today generates more than 3% of national GDP, generated by about 1,250 companies that employ about 53,000 workers in forestry, which is about 30% of the workforce in the processing industry of the Republic of Croatia, and undoubtedly mobilises a large part of the workforce in underdeveloped rural areas. The global economic and financial crisis significantly affects the competitiveness of the sector. Therefore, the forest-based sector should continue with restructuring and consolidation processes.

The Covid pandemic hit the world economy hard. In the 2020–2022 period, most of the wood processing sector in the European Union was faced with a large increase in the price of wood and a shortage of wood products on the world market. A new shock appeared with the outbreak of the war in Ukraine and the appearance of additional complications on the market. After the big two-year oscillations, mainly after the drastic

rise in prices, a drop has been seen in orders on the German market (which is one of the most important for the Croatian woodworking industry), as well as a drop in prices or sales stagnation for most of the wood products, and a slowdown in the entire sector. It is difficult to correctly interpret the real reasons and causes of these oscillations, as it is probably a combination of several causes and factors, and Croatia was not an exception in all these processes.

Conditions of uncertainty caused by the initial effects of the Covid-19 pandemic resulted in a drop in income for the sector, but also in a drop in orders. Wood processing in Croatia fell by 7% on an annual basis, and furniture production by more than 14%. The fairs, where most deals and contracts are made for this production, were postponed until further notice. Optimism is shown by those manufacturers who have stepped into the demanding Chinese market. It is a very potent, but complex and demanding export market.

The movement of the volume of industrial production in the first nine months of 2020, in the area of wood processing activities, indicates the industry's resistance

Main sectoral data

YEAR	2016	2017	2018	2019
Wood processing and wood products				
Industrial production, %	3.6	11.6	1.0	-1.8
Average number of employees	16 980	17 998	17 943	18 207
Average gross salary, HRK	4 928	5 269	5 760	6 130
FDI, million EUR	4.51	5.72	7.73	16.35
Exports, thousand HRK	4 396 176	4 815 08	5 246 861	5 510 094
Imports, thousand HRK	1 930 048	2 259 116	2 508 355	2 657 924
Trade balance, thousand HRK	2 466 128	2 555 992	2 738 506	2 852 170
Furniture				
Industrial production, %	5.6	-2.7	-2.9	8.8
Average number of employees	10 753	10 835	11 216	11 425
Average gross salary, HRK	5 350	5 727	6 207	6 510
FDI, million EUR	5.82	-7.73	23.19	9.63
Exports, million HRK	2 614 053	2 449 172	1 999 177	1 945 007
Imports, million HRK	2 081 363	2 306 252	2 590 386	2 812 183
Trade balance, million HRK	532 690	142 920	-591 209	-867 176

Source: The State Bureau of Statistics

to the Covid-19 crisis, because with the exception of two months, production growth was recorded. The situation was somewhat different for the furniture industry, where a decrease in production capacity has been witnessed.

During the Covid-19 crisis, modern processing plants of medium production capacity suffered the most, which were earlier leaders in exports, but were consequently the most burdened by investments in the market and technologies. Therefore, due to the consequences of the pandemic, the market and overall business paradigms suddenly changed. In fact, strategies changed for the entire wood products industry, including revising the business goals of sawmills, fibreboard mills, construction wood processors, and solid furniture manufacturers.

In July 2022, the first official indications of a fall in the industrial production of wood processing (C16) of - 4% compared to June were already recorded, while in August a drop of - 10.4% was recorded compared to July¹³. In relation to 2021, production in August was - 8.3% lower than in August 2021. It should not be forgotten that afterwards, the indices were constantly increasing, and official statistics showed that the lumber industry went through one of the best periods in history, with a high growth rate.

Adaptations needed for the Woodworking industry to remain relevant and competitive in the future

The export orientation of the Croatian economy is a prerequisite for its sustainable and robust growth and development. Focusing on export-oriented production and development initiatives and activities of the economy is necessary to achieve the goals set in the strategic documents of the Republic of Croatia, as well as to achieve a development level that will bring the Republic of Croatia closer to the EU development average. The wood industry represents a strong sector in the Republic of Croatia, with noticeable export results, but it needs targeted stimulating development activities that will raise the level of quality, added value and finalisation of its products.

The discrepancy between the structure of exports and the global import demand is visible. While the global import demand is dominated by final products of greater complexity and added value, exports are dominated by wood products, with a high proportion of products with a low level of completion.

In order to reverse and change this structure, it is necessary to systematically influence the change of the entire sector and its position in the value chain of the industry. This cannot be done in the short term and must not put the existing companies in the sector at risk and in an unfavourable situation, but rather by stimulating their work and export results in the short term, and by stimulating the activities of innovation, research and development and the development of new products and solutions with more added value, in the long term and through them change the entire structure of the sector.

In addition to encouraging the export of the wood production and processing sector, it is necessary to detect the factors that will lead to the strongest economic growth and the strongest impact on the growth of the entire economy. These factors should be monitored continuously, with regular updates on an annual basis, which would be used in the overall strategy and action plans for the development of the sector and industry. Some of these key factors are:

- **Added value**

Both products and activities within the sector that bring different added value to products and services. It is necessary to use the innovation potential of the sector in order to position as much of the activities with higher added value as possible in the Republic of Croatia, leaving behind those activities at the lower level of the added value chain.

- **Level of product completion**

It is necessary to take into account which activities, companies and products are targeted and encouraged in the long term, with the aim of increasing the share of the sector with products of a higher level of finalisation.

- **Average salaries**

As each part of the industry value chain has its own added value, each activity of the sector has associated jobs with different added values, i.e. income level. In developing the sector, and encouraging the development of domestic companies, and in order to achieve a higher level of well-being, it is necessary to have an insight into the income map by jobs related to business activity within the sector.

¹³ Croatian State Bureau of Statistics

• **Innovation, research and development potential**

In every economic sector, the element of research and development and innovation is extremely important. It is closely related to the previous two factors. Precisely in the development strategies of the sector, it is advisable to put emphasis on identifying the parts of the industry that contain the most activity and innovation potential, and in order to successfully encourage and/or attract these parts of the industry.

3.3.2 Women representation

The exact number of women active in the Croatian woodworking industry cannot be officially confirmed, but it is estimated to be about 20% of the total workforce.

Interestingly, women are more and more being recognised as valuable members both as blue- and white-collar workforce, depending on the industry segment (for example, they are especially valued in the veneer and parquet production as blue-collar workforce, but also in the mountain areas where there is an increased challenge of finding workforce at all).

The biggest challenge of recruiting them are prejudices, in terms of their physical readiness to do the job. Another challenge might be long working hours and the traditional women's role within the family life they have, especially in rural areas, where most of the factories are located.

Other challenges are linked more to the low level of awareness about the job opportunities within the woodworking industry and prejudices linked to it as a primarily hard manual jobs that are traditionally reserved for men.

3.3.3 Expected technological changes and adaptation needs

The technological changes in the industry are mostly focused on better utilisation of the raw material. This is very much caused by the quality of the raw material linked to the climate changes that highly affects it. These changes are also mostly visible in introducing a higher level of AI technologies at all production levels, and it is to be expected that this trend will continue in the coming years as well.

The changes are linked to the higher orientation towards buyers' wishes as well. Special orders due to buyers wishes are present more than ever and this is one of the strategies recognised by some companies that want to

increase their competitiveness on the regional but also European and global markets.

Investment level

Companies for wood processing and furniture production are mostly not liquid and solvent to such an extent in terms of systematic investment, therefore withdrawal of EU funds is more effective. It is one of the tools for the realisation of planned investments that is faster and gives simpler access to credit funds, since, to date, all sectoral withdrawal potentials EU funds were not used. In particular, the use of EU funding refers to the development and opening of new markets outside of Europe, in which Croatian wood processors have so far barely participated.

Gross investments in new fixed assets show the strength of the sector and its capacity to invest in development, new assets, and capacities that represent the basis for further growth and development. It is evident that the total investments of the wood industry represent only about 5% of the total investments of the processing industry. The full export potential can only be achieved with investments in new products, technologies and processes, which is a limiting factor for the wood industry, looking at the data on the amount of investment. A slightly higher level of investments is present in small and medium-sized companies, which is in favour of activities to strengthen positions on foreign markets, and the majority of investments in the sector come from the sub-activity (C16.2.) "Production of wood products", with the fact that large entrepreneurs in the observed sub-activity activities do not record investments in new equipment or technology. Medium-sized entrepreneurs in the furniture industry recorded a somewhat stronger investment cycle in the past years.

Commercial banks still consider the activities in question to be risky, as a result of which they require maximum insurance for credit placements, along with a complex procedure for their approval. Problems with credit lines from banks limit the development of the sector due to difficult financing. Consequently entrepreneurs reduce, with a few exceptions, the level of gross investment in fixed assets.

Level of modernisation of the machinery used

The wood-processing sector in the Republic of Croatia is not efficient enough in converting the excellence of its ideas into market-effective products and services, which includes low-innovative production, a small share of research and development, insufficient commerciali-

sation of research and application of new technologies compared to the European Union average.

In order to increase the excellence of the wood processing sector, it is necessary to increase investments in research, technological development and commercialisation of innovations and the application of advanced (KET) technologies. It is necessary to modernise the existing ones and introduce new technologies, then it is necessary to introduce automation in the production process in order to speed up production.

As far as manufacturers of wooden floor coverings are concerned, it is important to highlight the company BJELIN, which is part of the Pervanovo Invest AB group led by Darko Pervan, a Swedish entrepreneur and innovator originally from Croatia – a world-renowned manufacturer of wooden floor coverings. In Croatia, BJELIN has factories in Ogulin, Bjelovar, Otok and Vinkovci with a total of over 1,700 employees, and by taking over Spačva they became the largest European veneer processor. In October 2020, Pervanovo Invest AB, the parent company of the group that includes Välinge Innovation and BJELIN, made a decision to invest in a high-tech, integrated and automated facility in Croatia for the mass production of reinforced wooden floors for the global market. The new factory is being built on an area of 330,000 square meters, the investment of which is estimated at 200 million euros, mainly financed with their own capital.

Modernisation impacts the production levels

In order to improve the business and increase exports of wood processing companies, it is necessary to increase investments in technological development and application of advanced (KET) technologies. It is necessary to modernise the existing ones and introduce new technologies, to introduce automation in the production process in order to speed up production. New and more innovative technologies will make it possible to reduce energy consumption and thus increase energy efficiency. One of the tools for the realisation of planned investments is more efficient drawdown of EU funds and access to credit funds.

In sawmill processing and the production of veneers and wooden panels, world trends are manifested in consolidation and globalisation, while furniture production, which is very sophisticated in a technologically developed world, is increasingly ready to approach the market individually to the customer. The national market is too narrow for such a dimension of production, therefore the structure and fragmentation have become

one of the brakes on the modernisation of production imposed by the ruthless competition on the world market. It is undeniable that a higher level of product finalisation is needed, and special attention should be paid to the national and international branding of the Croatian wood industry. Along with good and market-interesting furniture design, it is necessary to improve its aesthetic and functional quality. Trends are determined by the customer, and global trends today include ecological furniture as well as smaller profile furniture, multifunctional furniture, and technological furniture design.

3.3.4 Role of VET and student mobility

Many companies in Croatia still do not perceive that investing in the education and training of people is not an expense but an investment that enables the raising of the quality and skills of employees, that is, employee productivity. The implementation of a database would make it easier to connect the education system with business entities for wood processing and furniture production. Consequently, by raising the value of human capital, and by acquiring new knowledge, skills and values, it would be possible to increase competitiveness on the market.

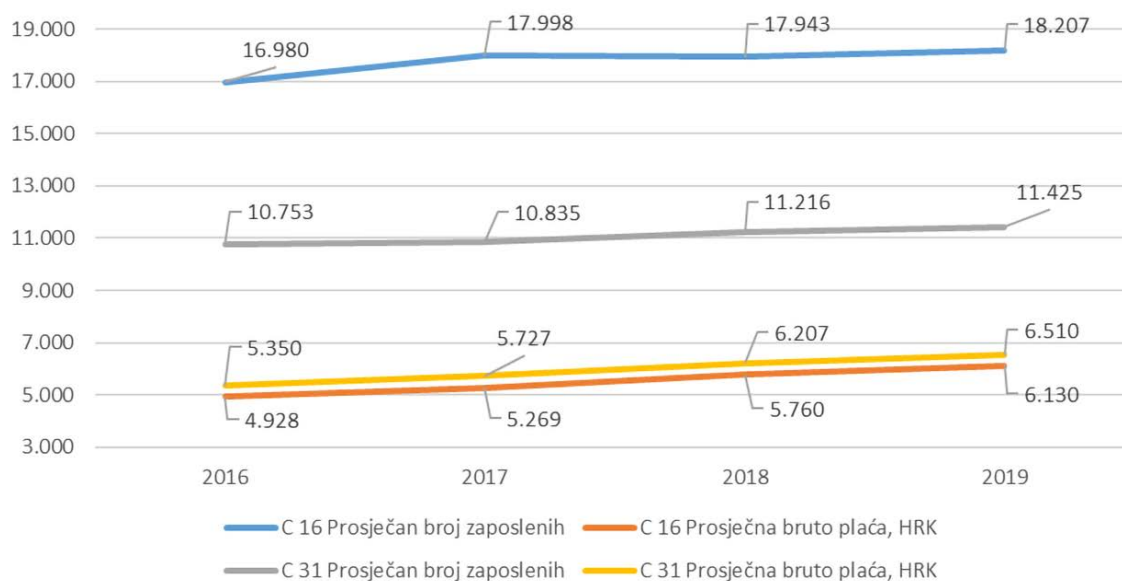
The wood industry employs about 11% of the total number of employees in the processing industry. There is also a continuous increase in the number of employees, which is accompanied by an increase in wages, but it is still far behind EU average salaries in that sector.

Wood processing and furniture production are labour-intensive activities that together employ approximately 10% of the total number of workers engaged in the processing industry, and approximately 1.8% of the total employed population of the Republic of Croatia. Due to the low level of added value in raw material processing, labour wages are relatively low compared to other European countries, as workers in the sector have an average monthly gross salary of HRK 6,320.

The implementation of incentive measures for employment in rural areas and the initiation of development measures, such as a safe and regular supply of wood raw materials for wood processing and furniture manufacturing companies are welcome, as well as sustainable and green public procurement of wood and furniture products. All of the above would have the positive effect of increasing the number of workers employed in wood processing.

In Croatia, sawmills are not yet technologically advanced and this has had an impact on the working conditions

Employees - average gross salary in the sector



C16 (wood processing) - average number of people employed
 C31(furniture manufacturing) average number of people employed

C16(wood processing) - average gross salary, HRK
 C31(furniture manufacturing) - average gross salary, HRK

Source: Croatian Statistical Office

that are often hard. Moreover, technological innovation is very much needed for what concerns the reduction of sawdust, level of noise and more expertise is needed in relation to concerns around the use of chemical substances. Companies should be assisted and supported in order to reduce the numbers of accident at work.

Most of the wood industries are located in rural or mountainous areas where there is not much job choice regardless of the industry. Consequently, there is not much local initiative when it's about looking for a job and the motivation is mostly basic and comes down to the proximity of the workplace. The structure of the employees is often not the result of the employer's needs, rather it decided by who is available on the labour market.

One of the more important elements that affects the quality of work is the reason why the worker decided to apply for a certain workplace. There are various factors that influence this decision, some of which are listed below. The answers that most often appear when hiring workers in sawmills are given in the graph below. These figures are the result of a questionnaire conducted in 23 wood processing plants.



Reasons given by workers for choosing a workplace



Source: Croatian Wood Cluster

The critical points for hiring labour in the wood processing sector are the following:

- Weak supply of local professional staff at the Employment Office.
- Poor information from employers about the competences resulting from a particular qualification.
- Weak interest of employers in hiring professional staff at secondary schools, but also at higher education levels.
- The majority of business entities do not have a developed awareness of global branding. They lack the international knowledge and experience needed for constant upgrading and adjustments to the specificities of the international wood and wood products sector.
- Weak connection and cooperation of educational institutions with employers at the local.
- Unrelated planning of educational policy and economic policy at the local and regional level.
- Poor information of students and parents about the possibilities of work and advancement in the profession.
- Unfavourable perception of the profession among the population.
- Long-term trend of young people losing interest in education in woodworking schools and higher education, mostly related to the stereotype of hard physical jobs in sawmills and the lowest salaries for employees in the processing industry.

There are secondary school directions for all 3 occupations in Croatia. However, companies are mostly

finding that the students are not very much interested and motivated to actively participate in the working/production process. The students are also very much focused on theoretical knowledge and not so much on the practical issues. Therefore, it would be important to involve them more in the production processes and to find a way how to motivate them to use the theoretical knowledge in the practical work.

In addition, there is a need to change the mindset about the lifelong learning process, which is critical for ensuring the sustainable and competitive working surrounding.

The existing VET systems are school based, with some practical work available in companies. Apprenticeships and student mobility are available, but not in a sufficient manner.

There is a paritarian organisation on a national level, mainly focused on the level of salaries, while other benefits for workforce such as protection at work or lifelong education are not that much in the focus.

The current state of mobility practices for apprentices or further training is mostly linked with the EU programmes. There is no sufficient offer of courses for adult learners and lifelong learning programmes offer should be significantly improved in order to keep the competitiveness of the industry. There are no incentives from the Government, they are mostly linked to the machinery modernisation which is one of the main obstacles when it comes to the topics of workforce.

3.4 ITALY

3.4.1 Adaptation and prospects in times of crisis

Covid-19

The impacts during the early stages of the pandemic mainly concerned production, its partial and total stoppage due to the measures introduced by the Italian government to contain the contagions and prevent the situation from escalating.

In a first phase, many companies closed their plants, the condition to keep them open was related to the Ateco codes¹⁴ defined in the D.P.C.M. (Decrees of the President of the Council of Ministers).

As part of the regulations introduced to contain contagion, anti-contagious protocols were negotiated and signed between the government and the social partners, as of 14 March 2020 (subsequently updated on 6 April 2021 and 30 June 2022). Trade union and employer representatives were assigned tasks and functions to contain contagion in the workplace.

The gradual reopening of the factories, the restart of production and the need to secure safe working environment and health conditions for workers were the main activities of the actors of labour representation.

In Italy, outbreaks in companies in the wood and wood-based sectors were minimal. In companies where representation and structured trade union relations are present, anti-infection protocols have made it possible to avoid the spread of outbreaks and to contain those that have developed.

The most common effects that surfaced from the testimonies of workers and their representatives mainly concern the impacts of anti-contamination measures within factories. Here is a brief overview of these impacts.

- The first effect was the closure of some plants. The use of the Covid-19 temporary lay-off fund ensured income support for workers. It should be noted that in some cases, where there were many hours of holiday and leave arrears, caused mainly by shift workers and continuous working time regimes, they were also cleared in order to avoid the economic losses related to the lay-off fund, which in Italy covers only part of the

income actually received by workers. In some cases the decision was taken by the companies, in some cases it was governed by agreements between the unions and company management.

- The second effect that was reported is related to the organisation of working hours and common spaces within companies. In order to avoid groupings, start and end times had been changed, avoiding overlaps between entering and leaving workers. Several difficulties were reported between the modification of timetables and certain areas where the plants are located that were congested with traffic. This aspect emerged in particular from companies located in industrial districts and zones. Other impacts on the quality of work life relate to the use of common areas. Canteens, locker rooms and other social spaces have been severely reduced, sometimes closed due to unsuitable dimensions for their use. These aspects have gradually changed between the start of the pandemic and the introduction of vaccines and organisational measures implemented from 2020 onwards.
- The third effect, made compulsory by the above-mentioned regulations, was the introduction of agile working, with simplified procedures. Many white-collar and non-production workers worked mainly from home. This aspect in particular was used both by large and smaller companies. Again, the progress of the pandemic and the development of vaccines has gradually reduced the use of this tool, which today remains mainly for the protection of fragile workers and those with pathological conditions considered sensitive to the impact of a Covid-19. These aspects described so far have tended to be discussed within the anti-contamination protocols within companies. The level of agreement between workers and companies was not always homogenous. In the early stages of the pandemic, the involvement on some issues was of a higher quality, as compared to when the situation tended towards improvement. In some cases, there were defections in the prior involvement of workers' representatives by companies. The protocols have given a positive impetus to the way in which RLS/Rlssa (workers' safety representatives) meet with companies. Part of this success is also related to the involvement of the RSU (unitary trade union representation) in health

¹⁴ ATECO is the nomenclature of economic activities by which it is possible to determine the relevant category of each business activity for tax and statistical purposes. The classification currently in force is ATECO 2007 update 2022. ATECO codes also serve other administrative purposes, such as registering a VAT number, determining the risk category for occupational safety

and safety issues, where they do not normally have a direct role.

- The fourth and final effect was the screening and control campaign of workers' conditions, especially in the early stages of pandemic. There were companies that, in agreement with the RSU, set up control and screening campaigns both in the company and in third-party health facilities. In some cases this was appreciated by the workers. However, in the second phase of the pandemic, there was some extra tensions, especially due to the introduction of the green pass. Along with this, there was an initial difficulty in finding masks and sanitising gels, which were not always available. In this regard, it should be pointed out that in some companies sanitising gels have been produced, thanks also to the market diversification of some industrial groups. While in other companies, experiments have been carried out together with universities to convert some machinery and produce masks for protecting the breathing systems.

As a consequence, a leap has been made in the quality of health and safety relations. It can be said that, perhaps never before as in this case, were the consequences between cause and effect of people's behaviour to prevent the spread of contagion evident to all parties. In the anti-contagious protocols, there was a health and safety discussion in which the parties were in particular harmony.

Other benefits relate to the introduction of agile working. In Italy, the legislation has been in force since 2017, but it had never been taken into consideration by the woodworking industries, not even for the part relating to clerical work, be it of an accounting or administrative nature. These experiments also represented an impulse to define, or attempt to define, guidelines on agile work that would find space within national bargaining.

It should also be mentioned that the simplified procedures lasted until the end of 2022 and therefore some contractual provisions introduced in the Woodworking Collective Agreement (and others) were suspended until the end of the state of emergency.

In general, it could be thought that the different working hours of woodworking companies may also have opened up areas for reflection within the RSU and the workers. Especially considering the presence in several cases of standard working hours, when companies and

the sector have very flexible needs. This applies more to companies producing furniture and decoration, while those related to the production of panels already have continuous and more flexible working hours.

Besides the effects directly experienced by workers in their workplaces, there were also effects concerning the procurement of materials and the availability of labour. Here, too, a brief overview of these impacts is provided.

- The workers interviewed reported different situations with respect to the type of production in their company. One of the most common features related to the difficulty of finding maintenance-related items. Some of them were not available, others had a disproportionate price increase compared to the good. Obviously, awareness of these difficulties was known to the workers involved in maintenance, logistics and purchasing departments.
- Other companies, which, for example, supplied hospitals and sanitary equipment with their products, had more difficulties with fulfilling orders.
- In the upholstery companies, the lack of materials was a consequence of the closure of the catering business which made the market for tanning and leather scarce, as well as problems in finding woven leather and foams. Along with these problems, the finding of steel and iron and its cost was a major difficulty for the continuation of production.
- It was also reported that one of the panel manufacturing companies, already being a leader in material reuse and in the supply chain of wood waste, was actually able to consolidate a prominent position and expand its distribution network.

The positive elements of these effects could be the opening of certain markets and market diversifications. The supply chain underlines how the nature of consortia offers more possibilities to tackle difficulties with a more effective systems approach.

Energy crisis

The effects of rising energy costs are among the most significant in the last period. In all companies, employee representation was informed and familiarised with the impact on companies.

The main differences concerned the nature of these companies and whether or not they had started to ad-



dress the energy issue prior to the price shock that began in May 2021. In general, prices in 2022 were three times higher than in previous years.

Among the surveyed companies, 3 out of 4 already had a price containment policy under control. In some companies, photovoltaics were introduced on a massive scale. In those companies where cost control activities were in place, good practices were developed with respect to office temperatures, lowering the thresholds, very energy- and temperature-consuming electric stoves were disposed of, and even the modulation of overtime was rescheduled in the afternoons.

Both for companies that had already started a path of energy cost strategy and for those who started similar work after the outbreak of the pandemic. The introduction of solar panels in some companies limited the impact, and in other companies it triggered a major investment plan.

The more structured companies have been able to take advantage of the benefits of sheds built using geothermal methods, which have paid for themselves in full thanks to the economic independence that has been generated. But this policy began more than a decade earlier and brings together corporate sustainability and the desire not to have walls in the sheds, to allow employees to see outside. The policy of producing beautiful things also passes through a healthy working environment.

Regarding the labour shortages that were reported in some cases, the response of some companies was to promote team-building activities, particularly on technical profiles to broaden their scope of action in the plant. In this case, the need to build structured union relations on the issue of professional profiles emerged on the part of the workers.

In some cases, companies had started trading to lock in the cost of supplies prior to energy speculation. This ability to negotiate had positive effects during 2022, but it is showing a marked increase in the re-pricing phase.

The positive effects of the above dynamics are mainly driven by a greater sensitivity that has developed on the behaviour of workers within the factories, particularly where energy interventions were less developed.

Raw material

The sourcing of the raw material, in this case wood, was reported by workers as a dynamic to be addressed.

Once this need was met, some workers mentioned CNC work as a fundamental part of this strategy.

In furniture production, it appears to workers that competitive strategies need to be improved, in particular by enhancing product delivery times and margins. Potential production capacities are often stated to be insufficient. Better work could be done in respect to how much production is dispersed in organisational inefficiencies. Another common theme in the furniture industry remains product diversification. In some cases, this approach to improving the quality and type of product is the result of a generational transition between owners. Workers report a policy of innovation between companies that come from a historical family tradition and new generations of entrepreneurs who open up to new product solutions.

Lastly, there is also a need to modernise the organisation of work and for the respective social organisation to evolve in terms of the quality of relations between the parties, which are sometimes seen as conflictual or disinclined to dialogue.

The companies agree on several development factors necessary to secure the future of the companies. In particular, they converge on careful product quality control. In addition, a principle of sustainability is developed in both production and product durability, which is intended to be more durable and with the possibility of end-of-life product transformation into reusable materials. Much attention has also been focused on the sustainability of energy costs. Another aspect necessary to achieve the companies' goals is an evolution of organisational models and necessarily also of labour relations.

Workers express different sensitivities to the strategies of the companies in which they work. The strategy on the part of the workers is mainly regarded as stable. In some cases it is the result of strategies initiated several years earlier. In other cases they are industrial policies that evolved after a company crisis or an evolution on reference markets.

A common element that distinguishes these evaluations is that the pandemic has accelerated some reflections and emphasised aspects on which solutions must be found to reflect the sectoral change taking place. One should remember that in Italy, after the sudden slowdown in February, March and April 2020, furniture, interior design and panel factories experienced a boom in requests for market changes as a response to the pandemic. Being

confined at home has changed the approach to the world of furniture, which until then had been based on stable solutions with a lasting characteristic.

The need to adapt spaces to the simultaneous presence of more than one person at home has produced a very strong demand in the market for new furniture and solutions and has radically changed the approach to furniture as a durable good. These trends have forced many companies to confront rapid and unforeseen changes. Many solutions have sustainability as their first objective. Flexibility and continuous improvement are some of the aspects on which the parties have been and are still being confronted in order to respond to a highly dynamic sector.

The companies' strategies are largely unchanged. The difference that can be noted is related to belonging to a leading group on material reuse and control of the reuse materials supply chain. Basically, the companies' core principles are based on continuous improvement, digital and product innovation with a focus on raw material sourcing.

3.4.2 Women representation

Surveys conducted among workers and their representatives show that the educational level of workers is not always known. It is mainly medium-low on the blue-collar side and much higher on the white-collar side. In some medium-small companies there is a greater balance. The educational qualification held by the majority of employees is a lower secondary school qualification (Liceo, etc.). The most educated employees are in the clerical field, but a university degree is not very common. Employers also report that the main qualification is a high school diploma. There is little presence of higher education diploma or degree. Again, the percentage of top qualifications is concentrated in offices.

The number of women present on the RSU side is often unknown as well, but is considered lower than the presence of men. Higher education levels depend on the size of the companies. In some cases, it is not known, in others it is between ten and twenty per cent. In some companies there is a leap to as much as forty per cent of higher education level.

The figure relating to the presence of female workers in training as well as their number in recruitment remains fairly unknown also. The reflection that needs to be made on these responses by workers and their representatives is that the instruments under Italian law, especially the two-yearly equality report provided for by Legislative Decree 198 of 2006, is little known and little used by both workers and companies. Reflection on policies for hiring women has begun in the large groups, but in general a substantial difficulty in finding personnel willing to work in a shift-organised factory, regardless of gender, is reported. In smaller companies, policies for recruiting women were mainly developed in offices, but research is always done on both sexes. With respect to training or policies to recruit women, none of the companies gave significant information on this topic, except for one that is assessing the benefits of the gender equality certification introduced in Italy.¹⁵

The number of hires over the years has increased in almost all workplaces, but they remain as in many industrial activities characterised by a majority of male workers, particularly in the production departments. There has been a slow but gradual leap towards more women employment. However, no representative organisation is aware of policies to recruit more women workers, neither in the company nor in the sector. The only approach returned from a corporate context concerns the need to increase the presence of women in offices.

Overall, companies reported difficulties in hiring labour. Both because of the scarcity of people willing to work in shifts, and because they are located in highly industrialised areas and compete for job profiles. In addition, the collective agreement for wood does not have competitive salaries, even though proposals are sometimes made to workers, especially those with medium-high job profiles, who are at a higher level than the collective agreement.

Workers' interviews indicated that the length of service within the companies is broadly similar. Workers enjoy a high level of experience, particularly in production departments. The known average ranges from a minimum of 10 to 15 years to a maximum of more than 30 years of service. The youngest companies are those that have hired an increasing number of workers after the turnover of retiring workers. This is confirmed by companies, who

¹⁵ Companies that certify for Gender Equality can benefit from the contribution relief provided, the savings related to the signing of sureties, and the concrete possibility to access financing and participate in tenders. Law 162/2021 translated the strategies contained in the European Union's Action Plan on Gender Equality for the period 2021-2025 and amended the previous regulatory framework represented by Legislative Decree No. 368 of 6 September 2001, implementing Directive 76/207/EEC on the implementation of the principle of equal treatment for men and women as regards access to employment, vocational training and promotion, and working conditions.



reported medium to high seniority, with most profiles having between 10 and 15 years' seniority. Others, being solid and serious companies, have had to provide for a turnover policy and have brought the average seniority to around 7 to 8 years.

3.4.3 Expected technological changes and adaptation needs

All companies surveyed indicated technological changes in several areas. The most recurring one relates to automation, but advances are also reported on the subject of ergonomics and load handling within companies. The implementation of integrated manufacturing, which is connected to company accounting systems is a step that is not only necessary but has already begun. The main reasons are efficiency and optimisation of production processes. Supporting cost management, accounting and sustainable processes are also of interest to the companies surveyed, who see technology as an ally in competing on costs and making the working environment better. Machine set-up times can be greatly reduced and represent a lower expenditure of energy.

Another recurring aspect relates to changes in the production set-up, with a focus on organisational models. The tendency that workers have returned on these models mainly concerns the transition from a traditional to a lean organisation (in particular, elements related to lean production are mentioned). In some cases, however, elements for company management accounting are being introduced, both to establish a lean model and to account for production activities that were not previously recorded.

An element that is considered significant is that in most cases these changes are implemented by a logic that is passed down from the management to the production levels without a direct involvement of all workers. In some cases this approach creates conflict situations that in turn make the transition to the new organisational models slow and difficult. This is confirmed in most cases by poor communication and, above all, a lack of employee involvement in the study phase of the new models.

Other changes relate to upgrading machinery and setting up tools to move towards lower energy consumption, both for cost management and sustainability of

the production process, also in relation to raw material procurement. Referring to the Italian situation, at company level, workers believe that these are elements to keep companies competitive, but in some cases an absence of dialogue and explanation emerges, which causes confusion among workers' representatives and workers themselves.

Digitalisation

The level of digitisation is considered to be developing and expanding. It certainly concerns certain aspects related to management programmes for company accounting, even if deep differences are noted between companies that have always had an accounting programme and those that are only implementing it in recent years (In Italy, a boost to the development of production facilities arrived in 2016 through the Industria 4.0 Plan).¹⁶

The activities most affected by these elements of digital investment were the sawmilling, joinery for the furniture and furnishings industries, investing resources mainly on CNC machines. There have also been digitally driven modernisations on foaming equipment for seating and upholstery. Overall, investments have also been made on the physical infrastructure to implement lean models (screens, channels and feed tunnels).

From the point of view of some companies, these investments fell on all departments. Not only because of the implementation of the management and accounting models described earlier, but because of the need for consistency in the introduction of lean organisational models, which have as their prerogative the connection between departments and the production structure.

In some cases, digitisation also took place in warehouses and in the predictive maintenance part of departments with high-tech digital machinery.

For companies, the greater the spreading of digitisation, the better the chances of steering processes of change and organisational innovation. All companies report a good presence of digitisation in their plants. In some cases the influence is on all departments, in others on most of them. Some companies, in particular large groups, point to the need to extend digitisation elements to their supply chains, but also see workers' skills as an area for improved training.

¹⁶ The Impresa 4.0 National Plan was presented in September 2016 by the Minister of Economic Development Carlo Calenda. The plan envisaged a series of measures to incentivise the development of Industry 4.0 in Italy and encourage the technological and digital transformation of production processes. The plan aimed to create a favourable environment for businesses that wanted to grow and innovate, offering them support in investment, digitisation, training, productivity and competitiveness

Investments

The levels of investment are not always known by the RSU. A basic lack of sharing is expressed by them and especially in the ergonomic choices that are made in the departments when new machinery or other digital elements are introduced. In most cases, companies are aware of public interventions, although it was not possible to ascertain in what form they used these funds.

In most cases, companies reported that Covid-19 slowed down investments. Where this did not happen, it was mainly due to the fact that they were already underway prior to the pandemic.

The machinery, as mentioned in the report, is in the process of modernisation. In some cases the machinery is new and just changed, in particular due to process innovation strategies introduced by some companies. In others they are gradually being replaced, also due to investment policies that had already begun before the pandemic. Overall, it is described as substantially modern, with some peaks of excellence in the panel industry, which has the longest production press in Europe. In general, all companies have an average new level of their machinery.

Production is generally affected by several effects, which are the offspring of digitalisation. Strong changes are reported in management with regard to work progress and proper company accounting. The influence of modernisation and innovation has had several effects on production. Both in the optimisation of processes and in the development of management programmes capable of monitoring performance and the production cycle efficiently and effectively. Where the level of automation is high, one of the effects has been the management of physical space for production. In these cases, it has been necessary to respond by doubling and sometimes even tripling the space available to companies in order to accommodate more people.

In furniture and upholstery work, workers emphasised that the craftsmanship quality of the work is facilitated. Both in cutting (digitally assisted by the machine) and in the quality control of workmanship. In fact, digitisation is improving the quality control of the product produced in the company.

In some companies however, workers' representatives reported a difficulty in keeping up with the innovation of machinery and the training to be carried out for its proper use. Moreover, this more frequent use of automation creates unease with respect to maintaining employment levels, which are perceived to be at risk. In the most technologically advanced companies, where progressive automation was the result of industrial choices made early on, the level of automation is highly developed and continues to change. There too is a need to change the training that is carried out within the company. Sometimes, workers feel that the focus on training is contradictory to the actual needs that arise during work. These are aspects that should be debated between the social partners and the level of the training plan in place in Italy today.

The impact of innovations has been significant on skills needs. In some cases, it has resulted in greater training needs for employees. Training becomes a necessary tool for managing business complexity. Business upgrade perspectives are a feature reported by all companies. Some have expressed a need for a different organisational model, others are considering the implementation of cloud services across different business needs. In some companies, personnel is working with a system of online and asynchronous training. In general, however, interviewees find it difficult to perceive the aspect of continuous training behind the company's choices.

3.4.4 Role of VET and student mobility

The main channels known by the workers' representatives on these issues were alternance school-work¹⁷ and internship, which is one of the main channels for young people to enter the world of work. At the last place on the side of the workers is knowledge of apprenticeship, which is however used residually by companies.

Interviewed companies reported various ways of entering the world of work through channels linked to vocational training. Among these tools, the most widespread are internships, apprenticeships, alternance school-work. The latter is the one that poses the greatest obstacles due to the need to identify a tutor in the company.

The picture that emerges is that vocational apprenticeships are little used and in some cases thoughts are

¹⁷ *Alternanza scuola lavoro is an educational method that offers high school students the opportunity to gain work experience in companies, public bodies or associations, in line with their curriculum. The aim is to integrate theoretical training with practical training, orient students' future choices and facilitate their entry into the world of work.*

being given to setting up an in-house academy to deal with the training and placement of professional profiles needed by companies. Practices of student transfer and mobility are almost unknown, or companies have not been able to respond.

The courses used by workers are mainly those related to occupational health and safety and related updates, which, depending on the risk profile, tend to amount to eight hours per year. There are no specific plans in the interviewed companies, except for the use of inter-professional funds on which workers are not involved or consulted.

The courses mainly used by companies are compulsory refresher courses to be held at least once a year. In some cases, companies have a training plan based on the needs of the employees, which is cross-referenced with their current skills and those they are going to acquire. Other topics reported by company management are English language and communication principles.

In the companies surveyed, workers are not aware of any bilateral bodies, but they are aware of some regional structures such as equality advisors or inter-professional funds.

The topic of bilateral bodies in the sector is also little known by companies. Generally speaking, among the bilateral bodies mentioned are the national one established by the wood industry collective agreement called OBL (Osservatorio bilaterale del legno) and the regional parity council, which, however, is not a true bilateral institute. On the national institute, the opinions are that in its current form it is of no help to companies' challenges.

The presence of students in companies is substantially scarce. Rare examples come from a particularly technologically advanced company that manages to attract students, but it remains an isolated case among the interviewees. The sector does not tend to be chosen after school, except where there are actual institutes dedicated to training young people to work in the wood industry. Examples include the wood school in Lentate sul Seveso and the State Higher Education Institute in Sacile and Brugnera in the province of Pordenone.

Apart from compulsory training on machinery, which was extended by the government in the first phase of the contagion spread, the most significant result concerned the introduction of remote models by companies.

The pandemic actually slowed down training activities within companies, particularly during the first part of the spread of the infection. Then, activities suspended during the acute phase of the spread of the Covid-19 virus gradually recovered.

The workers' representatives had no opportunity to intervene in this aspect because they have never discussed it with the companies or have never received any assessment from the company management on this group of questions.

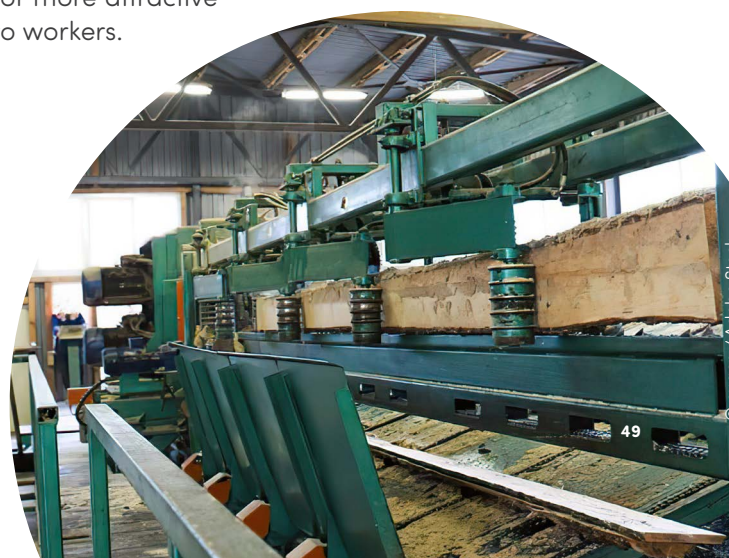
Companies are faced with a substantial lack of knowledge of mobility for apprentices within Europe, and the same applies to student mobility, although this occurs in very few cases but is more linked to the dynamics of alternating school and work. In fact, both companies and students are unaware of this potential. As it was not possible to involve students in the interviews of companies and workers, this statement should however be taken with due caution.

The overall assessment is that there is a lack of knowledge and awareness of the tools available to complement and support the training of companies and workers that depletes the sector's ability to respond.

The main training content deals almost exclusively with compulsory training and fails to address the dynamic gap between the skills needed for sector transition and those currently available to industry.

Hence, there remains enormous room to move from a generic training to one that both fulfils training obligations and equips workers in the industry with soft and hard skills, most of whom will be called upon to radically change the way they work.

This goal can only be achieved through cooperation with companies to make the sector more attractive to workers.



3.5 BELGIUM

3.5.1 Key facts and figures

The wood sector in Belgium is quite heterogeneous and groups together forest extraction (PsC125.01), sawmills (PsC125.02), timber trade and import (PsC125.03), manufacturers of furniture, seating, wooden panels, wooden construction elements (trusses, parquet, etc.), wooden packaging (crates and pallets, etc.), frames and mouldings, brooms and brushes, etc., in short, all finished and semi-finished products in wood (PC126).

The wood supply chain comprises the entire value chain from the extraction of the raw material wood, through its processing into semi-finished and finished products, to the distribution of these finished products.

Different stages are distinguished.

1st wood processing

In PC125, there were 3,459 male and 95 female workers in 545 companies in Belgium at the beginning of 2020. In Q2 2022 there were 3,575 men and 93 women working in 520 PC125 companies (3 subcommittees).

For the different subcommittees, this is distributed as follows:

- PsC125.01: early 2020: 159 employers, Q2 2022: 159 employers = stable
- PsC125.02: early 2020: 129 employers, Q2 2022: 121 employers = slightly decreasing
- PsC125.03: early 2020: 249 employers, Q2 2022: 240 employers = slightly decreasing (mainly due to economies of scale, including through acquisitions)

Forest extraction (PsC125.01)

Timber extraction involves wood as a raw material (unsawn logs, small roundwood). Forest extraction is required in the management of a forest resource. This is part of the harvesting of the forest and is done according to well-defined, environmentally friendly standards that are set according to the state of the stands and management objectives.

The forest operator's role is to estimate the lots of standing timber offered for sale by public and private owners, purchase them, cut the trees and process them (felling, stripping, crosscutting and sorting), haul them out (by horse or tractor), distribute the standing timber and roundwood according to the qualitative needs of the

processors and ensure transport and marketing. The sequence and progression of various operations within forest extraction depend on numerous parameters, including climatic factors, the general and special conditions laid down in the specifications and the vegetation stage of each of the tree species. Because of these limiting factors, a flexible and structured organisation or, in other words, professionalisation of these enterprises is required.

In view of the diversity and multiplicity of the products, the most favourable markets for homogeneous batches are sought after, with respect to the consumers/purchasers, including sawmills, peeling veneer companies, off-rollers, panel industry, paper industry, pole industry, etc.

In Belgium, the sector has a limited number of small companies, 159 in total, and many self-employed workers (+/- 1,500). 80% of this subsector is in the Walloon region of the country. None of the Flemish companies employs more than 10 workers.

Sawing, cutting, peeling, drying (PsC125.02)

In this rather complex subsector, a distinction should be made between hardwood sawmills (oak, beech, maple, ash, poplar, etc. for a total > 238 000m³), softwood sawmills (mainly spruce, pine, douglas fir for a total > 2 910 000 m³), cutting and peeling companies and companies dedicated to drying and preserving wood.

Their common objective is to get the best out of the raw material (roundwood) and give it as much added value as possible by offering users (contractors, furniture manufacturers, pallet builders, wholesalers, etc.) semi-finished products that meet their qualitative and quantitative criteria. For quality products, wood is graded, dried, planed and packaged according to the rules of the craft.

The sector has 121 companies (mainly SMEs) in Belgium. Again, these are mainly small companies (with an average of 10 workers). In recent years, significant investments have been made in new sawing and processing facilities and in the construction of drying kilns to increase quality and productivity.

The 1st timber processing sector does not produce waste. Indeed, the companies value the shell wood as chips for the manufacture of paper pulp, for fibre board mills



or for making pellets. The bark is used as compost or serves as fuel for the internal drying kilns.

This subsector is divided roughly equally between Flanders and Wallonia.

The timber trade and timber import sector (PsC125.03)

It comprises the activities related to the wholesale or retail sale of wood, wood-based panels and finished products, which are partly or entirely in wood, such as parquets, panelling, interior and exterior joinery. The timber merchant guarantees a minimum stock of 250m³ and 2,000m² of surface area. This requires space, which is why you will often find these businesses just outside built-up areas.

All 240 companies in Belgium are SMEs, employing together slightly less than 2,000 workers. About 65% of wood traders are located in Flanders. Timber traders offer various services to private individuals and professionals. They play an important role in the wood processing. They themselves are responsible for making some of the wood ready for consumption: preservation (52% of companies), natural or artificial drying (20%), planing or profiling of sawn wood (67%), sawing of board material, and they are also responsible for delivery.

The wood import trade group is made of +/- 40 wood importers (for 600 workers), who are responsible for the global procurement and import of raw or semi-finished wood. These companies are mostly the supplier of companies operating in the wood and furniture sector. Some of these importers also do wood processing themselves. These companies are very active on international markets and have to comply with strict European rules, which aim to curb the import of illegally logged timber. Consequently, they are subject to strict customs controls.

2nd wood processing

PC126 counts 2,049 companies (vs. 1,875 companies at the beginning of 2020), with 13,739 blue-collar workers (stable) and 6,050 white-collar workers in Belgium, of which about 80% of employment is in Flanders (Q2 2022). PC126's area of jurisdiction has been extended since 1 April 2021 to include white-collar workers from those companies. This means that the employee population in PC126 has increased by 44%! We also see a slight increase in the number of white-collar workers in the sector. Among blue-collar workers, the male-female ratio is 91% men and 9% women. Among white-collar workers, just under 50% are women.

The wood industries

These include the production of wood panels (36 companies for 3,112 workers = 31%), wood construction elements (225 companies for 3,151 workers = 19%), wood packaging (60 companies for about 1,000 workers = 11%) and miscellaneous wood products (56 companies for a good 500 workers = 3%).

The wooden construction elements product group is strongly linked to the construction industry. It involves the industrial production of doors, windows, parquet, trusses, rafters, wood preservation, timber frame construction and timber construction. Building with wood has been on the rise in recent years. In addition to timber frame construction, new timber techniques are being developed, making timber the most climate- and environment-friendly building material.

The wood panel product group is the largest group in the wood industry and includes companies producing chipboard, MDF, OSB, plywood and veneer. By extension, there are producers specialising in board finishing, such as veneered or laminated boards, veneer parquet, laminate flooring, etc. Their share in the sector has grown from 21.5% in 2010 to 31% in 2022.

The wood industry is a high-tech sector and to be and remain successful, investments in both machinery and human capital are very important. The wood industry is also struggling with labour market tightness and mismatch between supply and demand resulting in a large number of bottleneck vacancies. Therefore, numerous sectoral initiatives target young people or vulnerable groups in the labour market to teach them the right attitude and/or basic skills to get started in the wood industry.

After the Covid-19 crisis, which initially had a very negative impact on the wood and furniture sector due to the lockdown but had a rather positive impact after the reopening of business, a major materials crisis broke out in 2021, resulting in sharply rising commodity prices. The end of 2021 saw some light at the end of the tunnel again, but the war in Ukraine created a serious energy crisis in 2022, making it very difficult for companies to remain operational without compromising necessary profitability. Wage costs have also been rising very rapidly again in recent years, partly due to automatic indexation, which follows inflation rates.

This makes it very difficult to estimate how the sector will evolve in the next 2-3 years. Since 2022, the num-

ber of vacancies in the sector has fallen by more than 25% compared to 2021. Companies are therefore very reluctant to hire new people, precisely because there is also great uncertainty for them in the medium term.

3.5.2 Adaptation and prospects in times of crisis

Impact of the Covid-19 crisis on the wood sector

The Covid-19 crisis broke out in March 2020, and continues to have a severe impact on the timber and furniture sectors. The lockdown, introduced in mid-March, brought a blow to business confidence. For furniture and seating production, that confidence dropped to minus 60% and only in June did a slight recovery emerge. The furniture trade also suffered heavily during the lockdown, but fortunately the first signs of recovery appeared in May and continued in June. In the woodworking industry, the very negative figures of April and May were followed by the start of recovery in June.

During the summer months, activity in the combined wood and furniture industry improved sharply and confidence recovered almost to pre-Covid-19 levels. Yet, the question arose whether this indicated a temporary improvement or a sustainable one. There was certainly pent-up demand in the summer, stemming mainly from the fact that some customers could not be supplied for weeks or months beforehand. About the outlook, many companies were rather pessimistic, especially those producers who are targeting the construction market.

The Covid-19 crisis caused a sudden and completely unexpected drop in demand, and lower productivity was offset by higher direct costs. It also necessitated the purchase of mouth masks, hand gels, modification of signage. The introduction of one-way traffic, installation of Plexiglas, adjustments to dining areas and sanitary facilities, etc. entailed additional (unforeseen) costs. There are also companies that have made ICT investments to enable working from home, had to pay additional hourly wages due to stoppages of production lines to decontaminate them. Not every company registered production losses, as in some cases pending orders could still be finished. Nevertheless, in July, 1 in 4 companies reported that falling demand had a significant impact on production.

Impact on investment and innovation

Half of companies indicated that the Covid-19 crisis would have no impact on planned investments for 2020. On the other hand, however, the other half of companies in the sector said they would invest less than planned.

41% of them said they would postpone investments until 2021 or even later. 22% would go through an investment freeze in 2020 and the remaining companies stated that they would sharply reduce the size of their planned investments. Nevertheless, making investments is very important to remain competitive in the international market.

Six in 10 companies said they would continue to invest in research and development (R&D) and innovation. However, a number of companies found themselves having to make very substantial cuts there. These companies made it their priority to survive the crisis with as few cuts as possible. Yet, innovation remains the key to success in our manufacturing companies. It allows more expensive production costs to be translated into products with higher added value, so that their production can still be profitably maintained.

After the summer, order levels were on the rise due to an increase in export orders, but also due to an increase in domestic demand (cf. resumption of construction activities and project market). Orders came mainly from immediate neighbouring countries and, to a lesser extent, from the United States.

The post-summer order book was better filled in several companies than it was after the 2019 summer break. For the vast majority, this is due to catching up after the lockdown. But, alongside that catch-up, some companies noted that a structural improvement was emerging. 75% of companies were no longer experiencing supply problems. However, some of them were still faced with a lack of raw materials or limited supplies from EU and non-EU countries.

Covid-19 measures seemed to have an increasing impact on productivity. In one in 10 companies, those measures had a 15% negative impact on productivity. In addition, there were signs of Covid-19 fatigue.

At the trough of the crisis, an average of 62% of employees were temporarily unemployed. Between April 2020 and August 2020, temporary unemployment in the furniture sector fell from 52% to 5.5%. In wood processing, a drop from 25% to 2.5% was recorded. Most companies indicate that temporary unemployment would remain an important tool. 40% of companies assumed that they would have to lay off workers in the future.

Almost all companies acted when an employee showed Covid-19-symptoms in the workplace. The rules (cf. con-



tact GP, testing, respect quarantine) were applied, but there was a lot of confusion about them and sometimes it negatively influenced productivity.

The energy crisis

The figures below are based upon the results of an energy survey conducted in August 2022 by Fedustria, the Belgian Federation of Wood and Furniture Industry. 52 companies completed the survey, with more large companies (63% of more than 50 employees) than SMEs (37% of respondents).

	SHARE OF ENERGY COST IN TURNOVER (IN %) - AVERAGE	
	BEFORE THE ENERGY CRISIS	DURING THE ENERGY CRISIS
Woodworking industry	2.5	4.68
Furniture industry	1.43	2.24

All companies reported an increase of the energy cost in turnover. The wood-processing industry itself has on average been impacted twice as much as furniture production. With regards passing on increased energy prices to customers, 1 in 3 companies reported failing to pass on higher energy prices to customers, even a limited portion of them. Only 1 in 4 says 'Yes, or largely anyway'. One out of two companies reported that production was still profitable. The other half responded it was not profitable to produce. 16% of responding companies have had to shut down production lines because of high energy prices.

Companies were asked what their achievable maximum price (the 'pain threshold') was, beyond which producing is no longer worthwhile (unprofitable). Their answer is given in the table below. This table illustrates 'the middle' company (the median), so half of the companies are above it, but the other half of the companies are below it. The differences between companies are very large,

even within each of the four subgroups. For wood and for furniture, electricity is by far the most important energy source. For wood (median 100 for electricity), the range is between 60 and 300. For furniture (median 200), the range is between 65 and 250.

	MEDIAN MAXIMUM PRICE PER MWH	
	FOR ELECTRICITY	FOR GAS
Woodworking industry	100	35
Furniture industry	200	100

As many as 8 in 10 companies responding to the survey use renewable energy. In the vast majority of cases, this is solar energy (86% of those using renewable). But biomass/wood combustion plants also score quite high, with one in three reporting this. No doubt this is an opportunity in wood and furniture companies. Also to be noticed: wind energy is not indicated by any of the participating companies.

In the vast majority of companies generating their own renewable energy, this helped reducing energy bills. This is reported by 8 out of 10 companies that are in this case. On average, it appears to push energy bills down by an estimated 27%. Interestingly, 2 out of 10 companies that generate their own renewable energy say that this has little or no impact on their overall energy bill. These are mostly (very) large companies, where renewable energy (even with all roofs filled with solar panels) covers only a small part of their energy needs.

Almost 6 in 10 participating companies (57%) indicated that there are obstacles preventing them from generating their own (renewable) energy. More specifically, these obstacles include space (52% of respondents), permits/environmental regulations (44% of respondents), financial obstacles (41% of respondents), other reasons (37% of respondents), or administrative reasons (30% of respondents).

THE MAIN CONCLUSIONS OF THIS SURVEY CAN BE SUMMARISED AS FOLLOWS:

- All companies report that the share of energy costs in their turnover has increased on a one-year basis. On average, for the first half of 2022 compared to the first half of 2021, this is roughly a doubling of electricity bills, and times three for gas bills.

- There are very large differences, firstly between subsectors, and secondly between companies, even within the same subsector. What is clear is that wood companies have been hit twice as hard as furniture manufacturers.
- The fact that manufacturing has become, or threatens to become, uneconomic under the high energy prices (August 2022) is a reality for no less than one in two companies. As a result, one in four companies expected to have to temporarily shut down production lines before the end of the year. Temporarily at least, as no company in the survey mentioned that it would have to shut down production permanently, at least not at the time the survey was taken (August 2022).
- Generating their own renewable energy, especially in the form of solar power and their own wood burning, is certainly one (part) of the solution: companies reduce energy dependence and also lower the cost of the final energy bill (although 20% of the companies sitting in that case say they hardly notice that difference, if at all). But to generate (more) renewable energy, interested companies sometimes have to overcome major obstacles.

The main solutions that emerged were:

- **A price 'cap' on electricity prices** (81% of respondents); alternatively, a revision of the electricity price formation mechanism was put forward (adjustment of the Merit Order price formation mechanism).
- **A European price 'cap' on gas prices.** Half (49%) of respondents indicated this. It has been consistently pointed out that the key to solving this energy crisis lies in controlling/reducing gas prices. All the rest flows from it.
- **Compensation for increased energy costs through the EU Temporary Crisis Framework (TCF)** (49% of respondents). This means financial support for energy-intensive companies making losses due to the energy crisis. But there are fears that this TCF would be used very selectively and that most companies would not qualify for it. To qualify, the energy cost must be doubled compared to the year before. The extra cost on the doubling would then be compensated at 30%. This is the basic rule as proposed by the EU. For energy-intensive companies (energy cost > 3% of production value) 50% support could be given.
- **Tax support or subsidies for investments in renewable energy** (45% of respondents). It is the way to become (more) energy independent. Although this is not really possible for all companies, when e.g. the energy needs of the company far exceed the possibilities of renewable energy, or when the obstacles to generate renewable energy are too great (often cited).
- **Temporary discontinuation of CO₂ emission tariffs** (30%). The 'green movement' is against this, and it is not followed by the Belgian government nor the European Commission for the time being.

Adaptations to remain relevant and competitive

Economic growth continued in the wood sector until early 2022. Since 2022, the situation has changed significantly, because of the energy crisis and uncertainty in the markets. In 2022, there was 25% fewer job openings from the wood sector. Yet these proved to be relatively difficult to fill and remained open longer and longer.

Almost all wood professions have been catalogued as bottleneck professions, mainly for qualitative reasons, sometimes also quantitatively. And this is despite the many apprentices choosing wood education. This means that there is still work to be done regarding the quality of the intake! The reform of secondary education can be a turning point in this. For example, the number of students in technical education "wood" is slightly increasing, after many years of (slight) decline. This brings some hope.

Despite the lack of success of Dual Learning, steps should be continued in the right direction. That is why commitments to this form of learning should be continued, through the addendum Dual Learning. To have enough apprenticeships, but also to increase the quality of the apprenticeships and the guidance provided by the mentor(s) in the company.

The quality of wood education and wood training should not only be improved, but the woodworking industries also have to be "marketed" with a positive image. The wood sector is not old fashioned, is not only craft. Woodworking companies are (very) modern and future oriented. They include "factories of the future". This positive image of the wood sector should be communicated to



the public. Because who doesn't want to (go to) work in an innovative company?

The professions of the wood sectors have to be better known and promoted, thus stimulating positive study and career choice of students. The promotion of STEM is an important route for this. Therefore, work should be continued with fellow sectors to promote the "hard" technical professions and finality directions as STEM directions. STEM in the manufacturing industry can thus form a new guideline for additional promotional actions.

Offering a quality education in a rapidly evolving sector (technical and technological) is only possible if the teacher is "with it". Investments should therefore continue in the professionalisation of teachers. Well-informed and well-trained teachers and lecturers in turn transfer their knowledge and experience to students and trainees. Thus, they are optimally prepared for a smooth transition to the labour market.

Higher timber education can also contribute to meeting the current and future needs for higher technical education within the timber sectors.

Vision on competence policy & lifelong learning

Today, the manufacturing industry in wood and furniture focuses on high-quality custom-made products. The level of finishing is high and there is a tradition of craftsmanship. The flexibility of the craftsman must remain. Yet... the 4th industrial revolution has also made its appearance in wood and furniture companies. Automated production equipment has become more accessible. Connecting different machines, recording different production steps and performing this itself, automated, is starting to become commonplace. It is sometimes a difficult balance between automation, flexibility and craftsmanship, which automation does not eliminate, but is filled in differently. Mass customisation and one-piece production flows in a lean production environment, augmented reality on the shop floor, collaboration with cobots, digital twins and virtual product development are already a reality. But no matter how fast technology evolves, this cannot be achieved without humans. Human-centred production is key here: self-managing teams, personal growth, knowledge, talent and competence management depend on human interaction.

The wood industries should respond to these constant and ever faster technological changes. The sectoral offer of labour market-oriented and high-performance training courses has been updated, but should also be fur-

ther updated, expanded and/or adapted in the coming years. In this way, companies have and/or find enough competent staff to remain competitive and employees can continue to grow or acquire new, required competences, keeping their chances on the labour market intact. Companies also have every interest in this. An employer must ensure that the right competences are always present within the company. This means not only ensuring that the right people are entering (welcoming new employees is an important element here), but also that current employees are given opportunities (based on newly developed competences through training) to move on to other, often 'more abstract' positions, such as those demanded in the Industry 4.0 era.

The wood sectors shall continue to focus on strategic competence and talent management, with a focus on workable careers. Companies have to be guided towards performing and strategic competence and talent management. Training actions shall be adapted to the target group and the training approach aimed at optimally improve the skills of the target group concerned. In this way, workers from the wood sectors can strengthen their position on the labour market and keep up with the rapid technical and technological developments in the sector.

To meet the major challenges facing the sector (digitisation and automation, circular economy and the EU Green Deal, new technologies and products, etc.), companies need motivated, expert and up-to-date trained staff. Sustainability and the rise of circular entrepreneurship in wood and furniture companies require adapted knowledge, skills and competences. In cooperation with the European social partners, the changing competence needs of the future in the wood and furniture sectors shall be identified.

The challenge lies in making sufficient and appropriate digital learning tools available to workers in the wood sectors. There needs to be a link with existing or new intersectoral initiatives where possible. Work on new digital learning materials and the development of new e-learning modules should continue.

Vision regarding retention, workable work and outflow

Working on 'workable work' is an important point of attention for the wood and furniture sectors. Various actions have therefore been set up around workable work. One of the spearheads in the sectoral workability policy is the provision of services around a sectoral safety and welfare policy. This operation has since gained some

notoriety and is starting to bear fruit. A sector action plan ‘workable work’ is being developed, based on the one hand on the sectoral workability monitor conducted by the Foundation Innovation and Labour – Flemish Social Economic Council (StIA – SERV) in 2021 and on the other hand on the results of a sector project on psychosocial well-being completed in August 2023.

Outflow cannot be avoided, unfortunately. Employers are encouraged to also give older workers sufficient (training) opportunities. Older workers can e.g. be encouraged to induct newcomers or provide support in taking on new tasks. Not only technical knowledge transfer is important, but good coaching in terms of culture and soft skills is becoming increasingly important for the younger generations. And, when employees do have to say goodbye, focus should be on re-employment, preferably in the sector, through sectoral outplacement assistance.

Also, the wood and furniture sectors are part of a larger economic environment. The woodworking sectors survive and grow thanks to cooperation with other sectors. Intersectoral cooperation and synergies strengthen makes every sector stronger.

3.5.3 Women (and underrepresented groups) representation

The share of women represented in the various subsectors of the woodworking industries is described in the “Key facts and figures” section above.

Vacancies in the wood sector are getting filled with relative difficulty. Thus, almost all wood professions are catalogued as bottleneck professions, mainly for qualitative reasons, sometimes also quantitatively.

List of bottleneck professions¹⁸

- Interior fitter (m/f)
- Exterior joinery worker (m/f)
- Interior joinery worker (m/f)
- Workshop joiner (m/f)
- Woodwork operator (m/f)
- Furniture maker (m/f)
- Furniture and wood technician (m/f)
- Furniture upholsterer (m/f)

Other bottleneck occupations also found in the wood and furniture sector:

- Stitcher (m/f) a.o. in seat upholstery (listed as assembly operator clothing and textile products)
- Mould maker (m/f) (a.o. in model making)
- Setup operator CNC machine tools (m/f)
- Maintenance mechanic (m/f)
- Maintenance electrician (m/f)
- Industrial automation technician (m/f)
- Truck drivers
- Technical managers

Companies are therefore encouraged to not only reach to women, but also in a broader way to employees with a migrant background, the occupationally disabled and the less educated. The sector photo shows that certain disadvantaged groups are underrepresented in the wood and furniture sectors.

An analysis of the characteristics of vacancies for bottleneck occupations shows that for most bottleneck occupations, the level of study does not matter, with the exception of woodworking operator and joiner. The profile of jobseekers with these occupational aspirations shows that these are often low-skilled workers. Few jobseekers are women with occupational aspirations for a job in the woodworking sector. A very limited group of jobseekers with professional aspirations for a job in the wood sector are 55+ (on average 1/10 of jobseekers).

In order to realise sufficient inflow (and through-flow) in the future, the wood sectors are making additional efforts to convince employers to appeal to this groups of potential employees. Raising awareness is a very important element in this. But it is also long-term work. Efforts towards an inclusive entrepreneurship should therefore be sustained.

According to Arvastat (data from Flemish PES), the wood sector has seen an increase in vacancies over the past five years (with the exception of 2020 because of the Covid-19 epidemic), although the sector shrinks slightly every year. Many subsectors are still very labour-intensive. Furthermore, labour turnover is low in the wood sectors. Looking at sectoral job mobility, fewer workers joined in 2019 (13%), than left (16%).

Employment rates/participation in employment in Flanders

	SECTOR	AVERAGE PART OF WORKERS
1. Gender		
Male	91.10%	51.5%
Female	8.90%	48.5%
2. Age		
50+	33.7%	30.4%
3. Origin		
% Belgian origin	77.80%	76.0%
% Foreign origin	17.50%	19.3%
% Origin unknown	4.70%	4.6%

Source: NSSO

The proportion of women, employed within the wood sectors, is significantly lower than the Flemish average. We know that the timber sector is a typical male sector. This can (partly) be explained by the fact that there is little intake of girls into wood education, despite sectoral efforts to promote wood professions to girls as well. The table below shows the inflow and outflow figures for wood education for the 2019-2020 school year.

Inflow and outflow in wood education (2019-2020 school year)

EDUCATION	GIRLS	BOYS	TOTAL
In			
Professional education	70 (6.01%)	1,093	1,163
Technical education	25 (3.92%)	612	637
Specialised education (youngsters with physical and/or mental problems)	12 (5.52%)	205	217
TOTAL	107 (5.30%)	1,910	2,017
Out			
Professional education	20 (2.02%)	968	988
Technical education	13 (3.70%)	338	351
Specialised education (youngsters with physical and/or mental problems)	12 (5.52%)	205	217
Dual Learning	3 (1.63%)	181	184
TOTAL	48 (2.75%)	1,692	1,740

Source: Vlaams Ministerie van Onderwijs en Vorming

Looking at the other underrepresented groups in the workforce, the proportion of +50ers employed within the wood sectors is higher than the Flemish average. And, looking at the migration background of 'workers of foreign origin', we find that Eastern Europeans are well represented in the wood sectors. For the employment of workers of Turkish, African and Asian origin, the wood-working industries score below the Flemish average.

In 2019, 3.4% of employees in the wood sectors (Flemish Region) received a target group reduction for low- or medium-skilled young people. 15% of employees in the wood sectors received a target group reduction for incumbent employees or recruited non-working jobseekers older than 55. For 21.4% of the employees in the wood sectors employed in the Flemish Region, the employers received a Flemish support premium for the employment of persons with a work-limiting disability. If we compare this to the Flemish average, we see an above-average participation of target group reductions in the wood sectors.

Wage gap between men and women

The table below contains the average gross (hourly) wages of full-time working men and women (in euros), the wage gap, the number of employees in the sector, the share of women in the sector, the part-time employment rate of men and women, the wage tension (the gap between the 5th and 85th wage percentile).

Figures refer to workers employed by companies with at least 10 employees in Belgium for 2018. Figures refer to PC 126 only, figures for PC 125 are not available.

NACE REV2	SECTOR	WAGES WOMEN	WAGES MEN	WAGE GAP	NR FULL-TIME WORKERS	SHARE WOMEN	WOMEN IN LEADING POSITIONS	PART-TIME EMPLOYMENT RATE - WOMEN	PART-TIME EMPLOYMENT RATE - MEN	WAGE TENSION
8	Other mining and quarrying	22.23	20.62	-7.80%	1,921	13.90%	10.00%	19.20%	11.30%	50.20%
10	Manufacture of food products	18.76	20.42	8.10%	61,57	36.00%	35.40%	33.00%	9.80%	51.10%
11	Manufacture of beverages	20.4	21.71	6.00%	8,186	21.40%	17.50%	23.30%	7.20%	53.10%
12	Manufacture of tobacco products	19.56	23.76	17.70%	1,055	55.10%	50.00%	26.70%	11.30%	51.90%
13	Manufacture of textiles	17.17	19.82	13.40%	16,246	37.20%	31.60%	18.10%	7.30%	53.10%
14	Manufacture of wearing apparel	17.92	23.12	22.50%	3,725	73.00%	80.00%	22.40%	7.00%	51.30%
15	Manufacture of leather and related products	17.83	20.36	12.40%	1,003	42.90%	40.00%	26.10%	4.70%	56.60%
16	Manufacture of wood and of products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials	17.42	17.42	0.00%	7,936	16.20%	12.50%	35.70%	3.60%	45.10%
17	Manufacture of paper and paper products	19.61	22.47	12.70%	10,479	23.70%	20.20%	22.40%	3.90%	54.30%
18	Manufacture of paper and paper products	19.49	21.67	10.10%	10,127	30.20%	26.00%	27.20%	5.50%	56.30%
19	Manufacture of coke and refined petroleum products	30.25	34.91	13.30%	3,296	19.50%	14.10%	13.20%	5.70%	63.20%
20	Manufacture of chemicals and chemical products	24.49	27.38	10.60%	41,615	23.00%	17.60%	22.90%	6.80%	52.70%

Source: Institute for Gender Equality and FPS Employment, Labour and Social Dialogue



The table shows that, based on average gross (hourly) wages for full-time work, there is no distinction between men and women. When corrected by working hours, the average gross monthly wage is 4.6% less for a woman than for a man. With this, the woodworking industries score better than the Belgian average. Overall, i.e. measured over the entire Belgian economy, a woman earns on average 9.2% less than a man when corrected for working hours.

35.7% of women have part-time employment contracts. Although we cannot prove this with specific figures, part-time work in the wood sectors is often a matter of personal preference or because of factors beyond the employer's control. Indeed, an analysis of vacancies from the wood sectors shows that all vacancies are for full-time employment, with the possibility of 4/5 employment sometimes being offered.

3.5.4 Expected technological changes and adaptation needs

Technological innovations in wood processing industries are very well introduced in Belgium. Ecology and the environment have made their mark on current business practices in wood industry companies in recent years. Corporate social responsibility, sustainability and circular economy are not unknown concepts in the sector.

The woodworking industry is characterised by far-reaching technology: Industry 4.0 and digitalisation is the fourth step in the industrial evolution of the sector. At the time, high-tech production processes made repetitive work disappear and made mass production possible. Meanwhile, because of wage, energy and environmental costs, that mass production has largely disappeared towards low-wage countries. Automation is followed by 'interconnectivity' between people and machines and between machines themselves. Typical of the Belgian wood sector is 'craftsmanship' and the need to produce individualised products. The flexibility and skills of the craftsman are of a very different order to the highly automated production processes. Belgian companies are looking for the right balance between that craftsmanship and automation. But the path of digitisation is already set and will continue.

That road requires the necessary human capital. Today, finding and retaining suitable employees remains one of the biggest challenges. As mentioned above, there are a lot of "bottleneck professions" in the sector. In addition, technical managers and CNC machine operators are

also bottleneck occupations. In the future, the need for specialised personnel will increase.

The wood industry is a high-tech sector and to be and remain successful, investments in both machinery and human capital are very important. The wood industry is also struggling with labour market tightness and mismatch between supply and demand resulting in a large number of bottleneck vacancies. Therefore, numerous sectoral initiatives target young people or vulnerable groups in the labour market to teach them the right attitude and/or basic skills to get started in the wood industry.

The wood products industry is undergoing a digital reform at high speed. Digitalisation enables efficiency throughout the value chain. From forestry and raw material sourcing, forestry practices, through the entire logistical production chain to the end product at retailers.

3.5.5 Role of VET and student mobility

Belgium is a federal State comprising three Regions (Flanders, Wallonia and Brussels) and three Communities (Flemish, French, and German-speaking). Citizens can access three different education and training (VET) systems: Flemish (BE-FL), French-speaking (BE-FR) and German-speaking (BE-DE). In the Brussels Region both BE-FR and BE-FL systems coexist. Despite multiple authorities being responsible for education, training and employment, as well as diverging VET systems, there is political consensus on specific issues. At all levels, VET policies involve social partners in a tradition of social dialogue.

Belgium compulsory schooling duration is long. From 2020/21, children are required to attend school from the age of 5 until 18, unlike most European countries where compulsory schooling ends at age 16. This makes the duration of compulsory education and training in Belgium among the highest in Europe. Reducing the age for starting obligatory schooling is based on findings that participation in pre-primary education is a strong protector against early school leaving.

Another distinctive feature is the high number of actors in the VET system. This is split between the three Regions (Flanders, Brussels, and Wallonia) and the three Communities (Flemish, French and German-speaking), which overlap but do not coincide. Added to this, the school system is also split into multiple networks (public and subsidised private education), each of which is re-

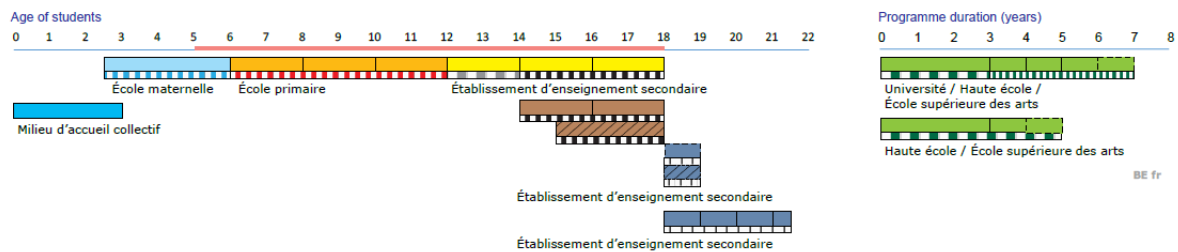
quired to pursue common objectives, including common certification, common occupational profiles and VET standards, while benefiting from a certain autonomy in their own organisation.

The plurality of political actors can lead to divergent political priorities and strategies in the country. Policies are formalised in several government strategies and plans drawn up in each Region, dealing with, for example, language learning, new technologies, sustainable employment, training for young people or matching workforce skills to labour market needs. Though exam-

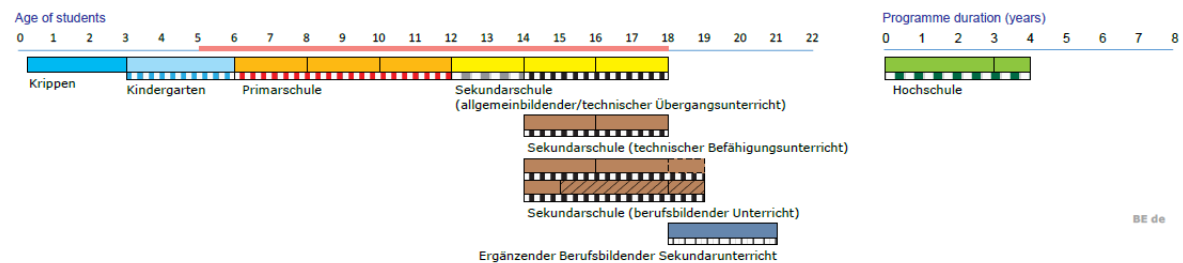
ples of strong cooperation exist within the individual Communities, collaboration between the Communities themselves mostly takes place through informal talks. On selected topics (for example, the Covid-19 crisis has led to further collaboration in education) or when consensus is needed (such as positions to take at EU level), communication is carried out in a more coordinated way. There are, however, also some common points of reference for the country. The 2020 National reform programme sets a common goal to improve the performance and inclusiveness of the country's education and training systems, and better tackle skills mismatches.

The structure of the Belgian education systems

Belgium – French Community

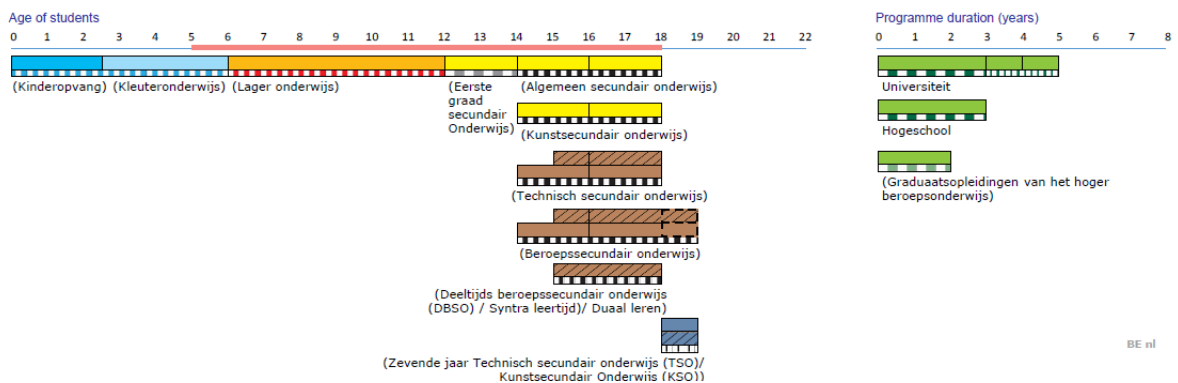


Belgium – German-speaking Community



Note. *Krippen* starts from 3 months.

Belgium – Flemish Community



Source: European Commission¹

¹ European Commission / EACEA / Eurydice, 2023. *The structure of the European education systems 2023/2024: schematic diagrams*. Eurydice Facts and Figures. Luxembourg: Publications Office of the European Union.



The concept of 'school basin' is also a distinctive element, created and developed in BE-FR. There are 10 basins corresponding to 10 geographic areas, which face specific socioeconomic and education challenges. Though VET is, by nature, decentralised in Belgium, this is perhaps more so in the French Community compared with Flanders: the Flemish Region and Community are represented by the same parliament and government (and hence the same administration) whereas these bodies are split between the Regions and the Community in BE-FR, leading to a stronger need for collaboration on the ground. This collaboration can be observed in several agreements, such as that on the validation of competences, renewed in March 2019, the OFFA, which coordinates dual learning, and FormaForm, which brings together organisations responsible for vocational training. The BE-DE Community is different still, with some regional competences linked to employment.

The high number of different political actors involved in the VET system sometimes makes cooperation between partners challenging. Agreements regarding the validation of competences are split between Communities, and more coordination is needed to ensure competences are recognised nationwide. Different legislative frameworks due to policy choices can cause complications for pupils, students, or employers who are seeking interregional educational mobility.

Learners leaving the education system without a certificate/ diploma of secondary education have the possibility to enter adult education. This is a parallel, modularised formal education system that allows adults to obtain academic and professional qualifications at primary and secondary levels in all Communities, including (apart from BE-FL) at tertiary level. The system is central to lifelong learning because it recognises skills acquired from formal, non-formal or informal learning in pursuing a learning path leading to qualifications corresponding to those provided through full-time education.

Another distinctive feature is the strategic importance of social partners. Strategy, policies and all measures involving employment and VET are negotiated with social partners, leading to formal sectoral agreements. Social partners are directly involved in organising programmes of alternating work and education, and continuous vocational training through framework agreements.

Main challenges and policy responses

Despite the different socioeconomic and education contexts within Belgium, the VET systems face many similar

challenges. The coexistence of three official languages in Belgium remains a key challenge in all Regions, also having an impact on interregional mobility. Knowledge of the language of instruction is an important matter within VET, especially for better integration of newcomers. In response to this need, in Brussels for instance, jobseekers are offered language job vouchers to improve their language skills and employment chances.

Lifelong learning is also a major challenge, as participation in adult education and continuing education/training remains comparatively low in Belgium. Currently, low participation (especially in Wallonia at 6.6% in 2019) and low involvement of companies in training results in a lack of qualified work force among the already employed people to respond to the evolution of needs. This is particularly the case in relation to ICT skills and jobs, which results in companies being underprepared for tackling the digitalisation of the workplace. Efforts are also made to expand the offer of adult education, literacy and language learning. Policies aim at increasing synergy between the worlds of work and education. For example, until 2017, companies were obliged to allocate 1.9% of wage costs to support lifelong learning programmes; a new inter-professional agreement signed by social partners from the private sector has since then established the rule that each employee has the right to five days of training per year. Some measures have also been implemented to increase or maintain the number of employees aged 45+ in companies. Improving the provision of, and access to, lifelong learning is high on the political agenda.

The need for digital transformation in terms of training provision and labour markets was underlined by the Covid-19 crisis. Due to lack of equipment and of adequate competences in distance learning (among both teachers and students) the provision of distance learning faced some difficulties. The Communities introduced several measures to tackle these challenges. In BE-FR, FormaForm and the Institute for in-service training (IFC) developed new courses to help teachers adapt to online teaching. In Flanders, support for teachers was provided via Klasse (a magazine for teachers of the Flemish education ministry) and KlasCement (an education portal of the Flemish education ministry where teaching materials and learning resources are shared by teachers and students following teacher training). These changes are expected to have a long-term impact on teaching methods. From a wider perspective, initiatives such as GO4Brussels 2030 and Digital Wallonia are aiming to build towards the future of work.



Youth unemployment remains a major concern for Belgian authorities, a challenge which has been exacerbated by the Covid-19 crisis, as the so-called 'Covid generation' is being severely affected by the lack of internships and higher dropout rates due to distance learning. Dual education is often promoted in the Regions and Communities as a measure to reduce inactivity among young people, but mainly as a learning path that makes alternate learning possible for more young people, with the goal of improving their qualifications. There is already a long tradition of dual learning in the German-speaking Community, which is now being expanded to higher education. In BE-FL, in 2019, a new system of dual learning was implemented, allowing secondary learners aged 15 and older to combine their studies with training at a company. Different tools and campaigns have been developed to promote this new method of work-based learning, which will be extended into higher and adult education in the future. The range of training opportunities and the number of students involved is increasing every year. It will replace the two current apprenticeship schemes and encompass selected professional fields, which are covered in technical and vocational upper secondary education programmes. In BE-FR, the French-language Office for Dual Training (Office francophone pour la formation en alternance – OFFA) was created to coordinate and promote dual training. Dual education was also made possible in higher education; it has been available in both bachelor and master programmes since 2016.

Giving renewed value to VET is considered a shared challenge, and the three Communities are aiming to improve the performance of their education systems. In the Flemish Community these reforms include improvements to the school curriculum, a thorough review of teacher training, language measures and language integration pathways, as well as preventing early school leaving. At the same time, the government in Flanders continues to work on the reform and update of the education curriculum. In the French Community, the decree relating to steering the system sets seven objectives for improving outcomes, student progress and the equity of the system, and encourages all schools to set individual objectives and action plans to contribute to these overarching objectives. The provisions relating to the reinforcement of nursery education, the language of learning and individual support for pupils in difficulty, which came into force in September 2019, also aim to increase pupil performance and reduce failure. From the perspective of greater equity in the system, the reform removes early selection mechanisms and the relegation of the most socioeconomically fragile students. In the German-speaking Community, a range of projects are planned, such as the promotion of lifelong language awareness, multilingualism, citizenship education, media education, integration of people with special needs and with a migrant background, technical and vocational training, support for teachers, and the design of modern learning environments.

3.6 FRANCE

3.6.1 Key facts and figures

On 12 December 2015, 195 countries signed a historic climate agreement at the COP 21 in Paris. The first international agreement since the Kyoto Protocol to commit a majority of nations to a collective mechanism for reducing greenhouse gas emissions, it set the target of limiting global warming to 1.5 degrees or even 2 degrees by 2100 and achieving carbon neutrality by 2050.

Overall, buildings accounted for 36 per cent of global energy demand and 37 per cent of energy-related CO₂ emissions in 2020¹⁹. While the level of emissions in the sector is 10% lower than in 2019, reaching levels not seen since 2007, this is largely due to plant closures, the slowdown in economies, the difficulties faced by households and businesses in maintaining and financing access to energy, and the decline in construction activity. Efforts to decarbonise the sector have played only a minor role.

Collectively, industry stakeholders must seize the opportunity of the Covid-19 period of economic recovery to drive transformation towards decarbonisation of the sector. The sector must simultaneously meet a projected near-doubling of global demand for energy services in buildings and at least a doubling of floor space as developing economies continue to respond to the grow-

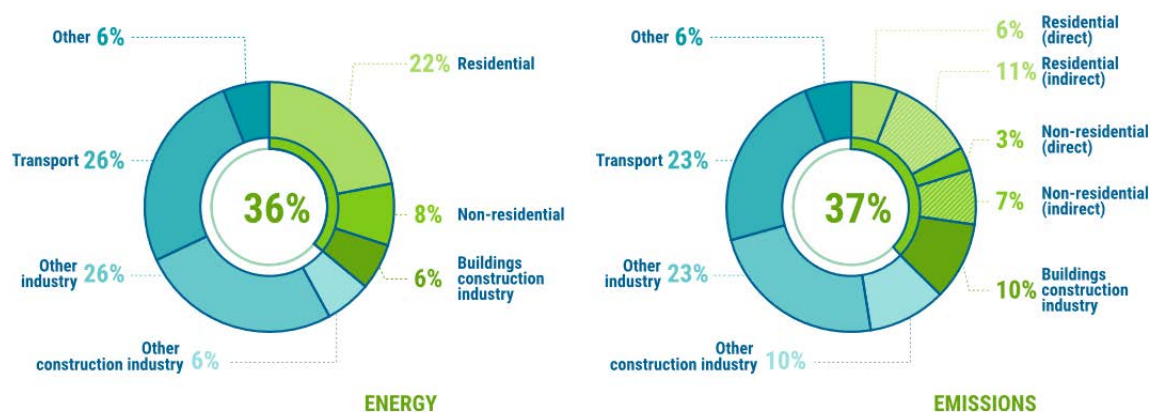
ing demand for building floor space, access to energy services and economic activities.

The carbon footprint of building and construction is the 3rd largest source of greenhouse gas (GHG) emissions in France, accounting for 43.8 million tonnes of CO₂ equivalent in 2021²⁰. The building sector accounts for 43% of France's annual energy consumption and generates 23% of France's greenhouse gas emissions. To reduce these levels, France is regulating, encouraging and raising awareness among those involved in the sector (construction and renovation of buildings). The aim is threefold:

- to reduce the energy consumption of buildings,
- to reduce energy bill costs, and
- to reduce the carbon footprint of buildings.

These objectives are constantly being adapted to current environmental challenges: new energy and environmental regulations (RE 2020), as well as new regulations on energy consumption in tertiary buildings, should enable to move even further towards the widespread use of positive-energy and low-carbon buildings. The Climate Plan sets a target of carbon neutrality by 2050. All sectors of the building industry are concerned (single-family homes, apartment blocks, commercial buildings), whether new or existing, for construction, renovation or operation.

Buildings and construction's share of global final energy and energy-related CO₂ emissions, 2020



Notes [AIE 2021a "Tracking Clean Energy Progress"]: "Buildings construction industry" is the portion (estimated) of overall industry devoted to manufacturing building construction materials such as steel, cement and glass. Indirect emissions are emissions from power generation for electricity and commercial heat.

19 GlobalABC
20 INSEE, 2022

The forestry-wood construction sector is therefore receiving particular attention today, as it is a key element in policies to combat global warming. On the one hand, it contributes to the storage of carbon in the wood materials (carbon stock) and, on the other, to the annual sequestration of carbon via the growth of trees (carbon flow). As the EU's 3rd largest country in terms of forest capital, the forest in mainland France (more than 60% of the total forest area is covered by broadleaved trees) is not only significant (17.1 million hectares; 2,760 million cubic metres (Mm³) of standing trees) but also constantly growing.

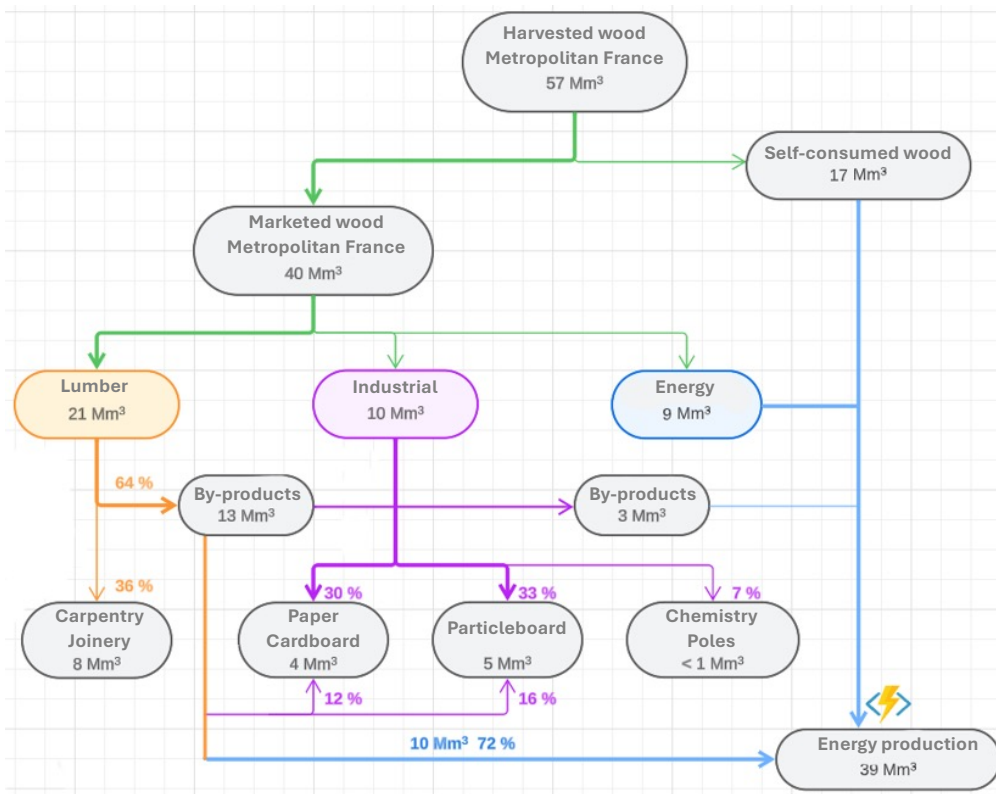
The annual gross biological production of production forests averages 87.8 Mm³ per year, while only 40 Mm³ (2021) of wood is harvested each year for a quantity of sawn products of around 8.7 Mm³ (2021). 17 Mm³ is also harvested for self-consumption on private energy. The rate of harvesting could be increased slowly in order to move towards sawmill production of 10 Mm³, which was the low point in the 1980s, spread over at least 6,130 sawmills.

3.6.2 Adaptation and prospects in times of crisis

Faced with societal challenges such as the decarbonisation of the economy (see RE2020, renewable heat, the end of plastic packaging, etc.), the development of uses for wood could increase and restore sovereignty over certain products that are currently imported. Without a strong, diversified industrial base that is resilient to crises, there is a risk that recourse to imports will worsen. It should be borne in mind that the current trade deficit is around 6.5 billion euros, to the detriment of employment and activity in rural areas, and at a time when France benefits from a forestry resource that provides it with an already substantial base of sovereignty in terms of wood. The percentage of timber harvested, processed and consumed in France is around 63%, although it could be higher. It was 88% in the 1980s.

The challenge of competitiveness and increasing production capacity in the 1st transformation industrial sector (sawmills, panels, packaging, furniture, paper-cardboard, etc.) is enormous, while wood resources could be used more and better to meet market demand. Markets

Volume of wood consumed in processing



Source: Agreste (2023), « Récolte de bois en 2021. Hausse de 8,9 % de la récolte de bois pour répondre à la demande », Primeur, n° 3



demand products of consistent quality (aesthetically and structurally) over time. The use of wood in construction falls within the scope of the Construction Products Regulation (CPR) and must be CE marked. This implies the need for a specific wood classification for the structure.

The economic weight of the wood processing sector remains too low, representing just 3.5% of the wood industry, which in turn accounts for just 2% of French industrial activity as shown below.

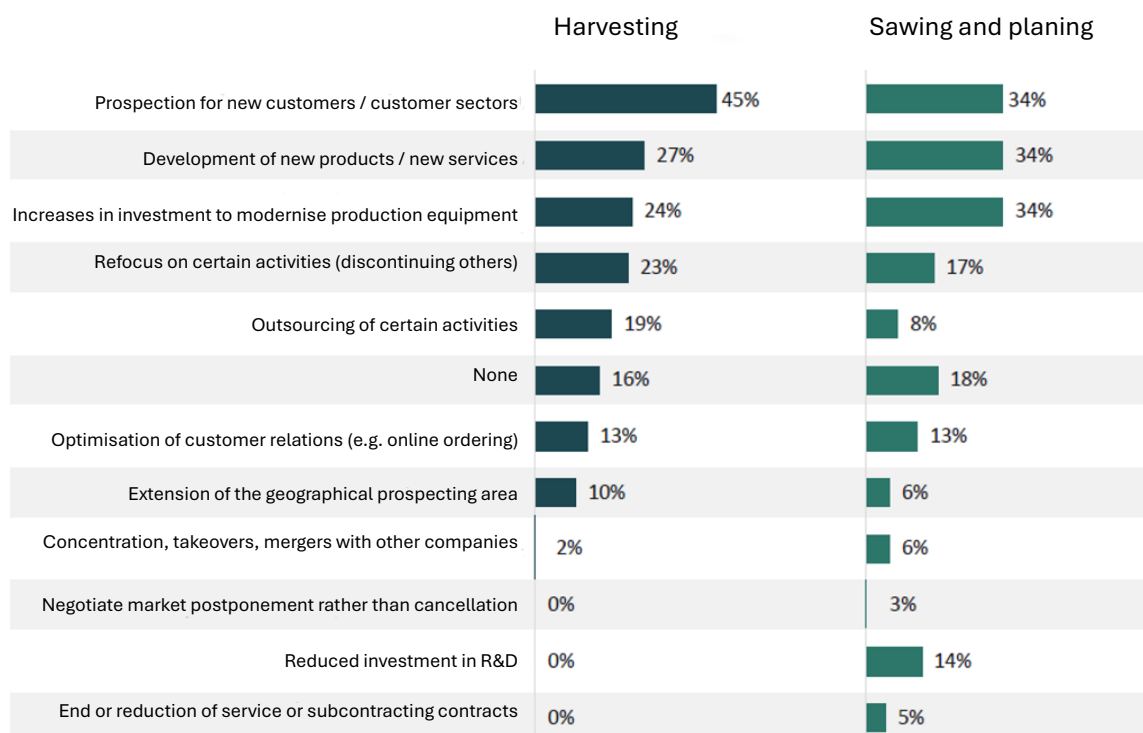
French economic data on wood processing sector

FRANCE (2021) INSEE	TURNOVER (BILLIONS OF €)	EMPLOYMENT (*1000 PEOPLE)	NUMBER OF ENTERPRISES (*1000)
All industries	4 341	29 535	4 498
All Wood Industries (WI)	85 → 2.0 %	437 → 1.5%	60 → 1.3%
Woodworking sector NACE 16	14.57 → 17.1%	60.5 → 13.8%	11,156 → 18.5%
1st Wood Transformation (WT) NACE 1610	5.92 → 7.0 %	20.6 → 4.7%	2,689 → 4.5 %
Segmentation % WT / WI	7.0%	4.7%	4.5%

The Covid crisis and the rise in energy prices have reshuffled the cards for the future of the French primary processing industry, not only in terms of staff and working conditions, but also in terms of the purchase price of round timber. On the other hand, the selling price of sawn timber has risen significantly, enabling manufacturers

to rebuild their cash flow and invest. Post-crisis strategic reorientations, depending on the company's sector, are nonetheless leading to a reduction in spending, especially on forward-looking items (R&D and subcontracting) aimed at regaining market share.

Strategic reorientations implemented by companies in the sector Harvesting and 1st transformation - post Covid



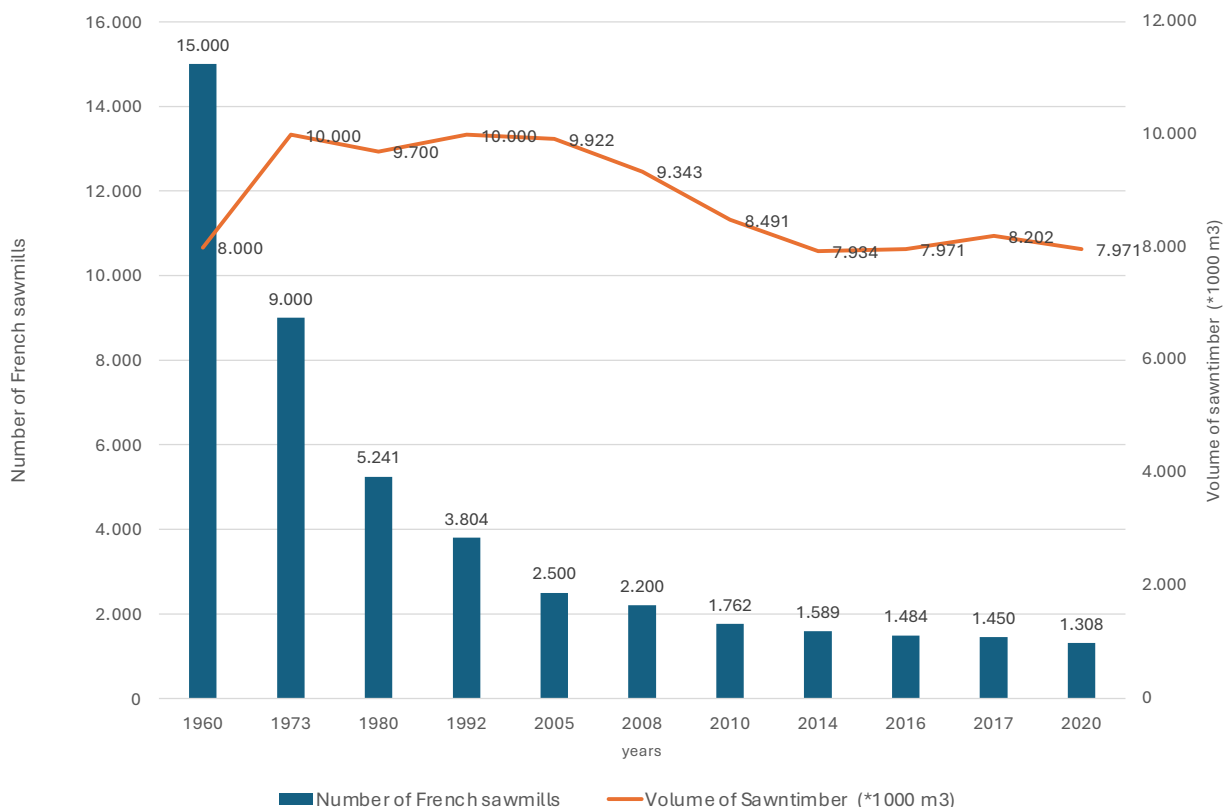
Source: Questionnaire KYU/AKTO - Impacts de la crise sanitaire sur les entreprises de sylviculture, d'exploitation forestière et du travail mécanique du bois – étude Diag'active mai 2021

Adaptation and prospects in times of crisis

Sawmills are under threat because of the concentration of marketing in favour of large processors in order to face up to international competition. Not only has the number of sawmills fallen by a factor of ten over the last 60 years, but for the last 15 years the sawmill sector has been producing just 8 Mm³ of sawn timber a year,

despite annual investment of over 250 million euros and exceptional forest resources. This ranks France as the fifth-largest producer of sawn timber in Europe, far behind Germany with its 22.8 Mm³. Is it possible to regain the volume of sawn timber lost since the crisis, so as to reach the symbolic threshold of 10 Mm³ again by 2025?

Number of French sawmills and sawn timber production (Mm³) (1960 - 2017)



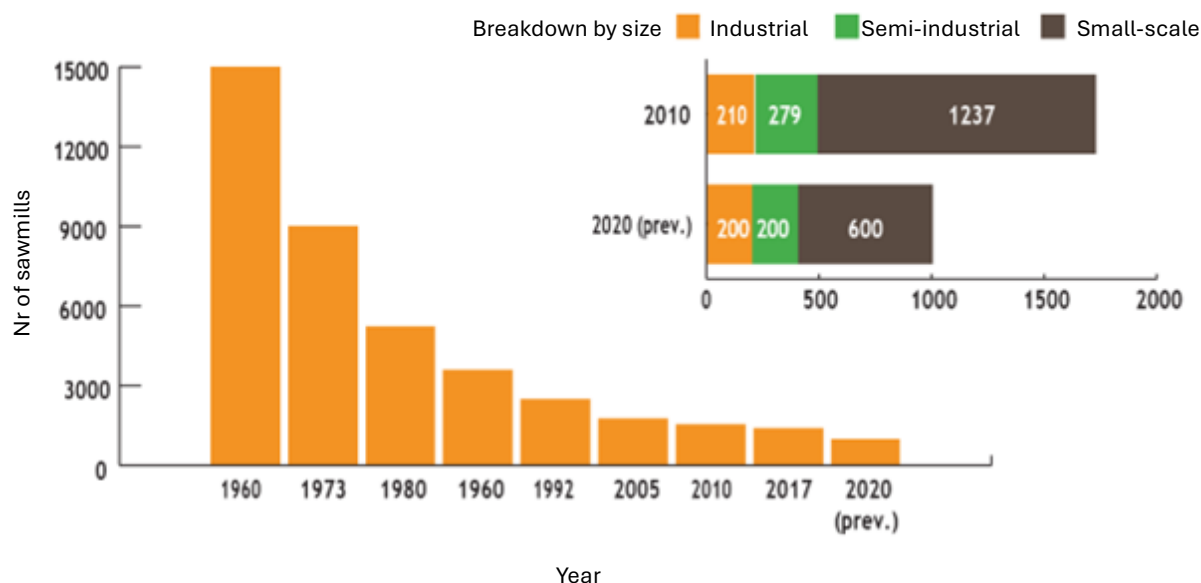
Some sawmills are also threatened by a shortage of raw materials, particularly oak for export. Furthermore, 2022 was a record year for oak log exports to China. More than 30% of the harvest was diverted from its intended use. Other French hardwood species (birch, aspen and beech) are not being harvested at present, due to low demand and/or industrial facilities that are often unsuitable. Timber manufacturers are mainly dealing with softwoods, and demand is rising. With Russia no longer exporting its oak, China deciding to preserve its forests, and the post-Covid recovery boosting the market, prices are rising, boosting cash flow but weakening the supply chain in the short term.

The question of the capacity of the French timber industry's industrial facilities remains a key issue, in the light of the controversy surrounding the export of French oak to China, which returned to Europe processed and having generated high added value.

Number of sawmills

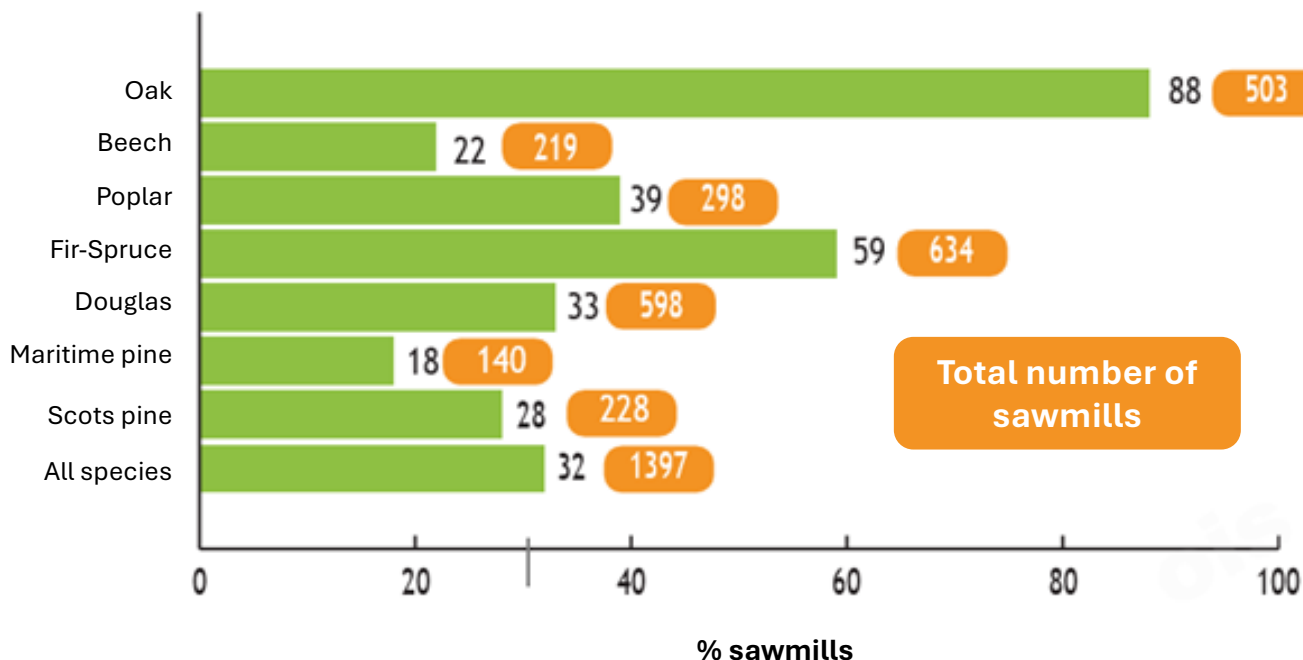
"We have gone from over 5,200 sawmills in 1980 to 1,500 today. This loss of 1,100 sawmills per decade has been accompanied since the 2008 crisis by a drop of 1.5 million m³ in the volume of sawn timber", explained Maurice Chalayer in his summary of the Observatoire des Métiers de la Scierie study (2019). It should be noted that only 79 of these sawmills (6%) produce more than 20,000 m³ of sawn timber per year.

Identification of sawmills by type (small-scale or industrial)



Depending on the source and the year, the data varies considerably but is generally consistent. The latest data from Agreste indicates that in 2021 there were 1,326 sawmills in France.

Breakdown of French sawmills by main species cut



Modernising the plant's facilities

With the reduction in the number of sawmills since the 1970s (the number of French sawmills has been estimated at less than 1,326 in 2021), the volume of sawn timber in France has been very significantly reduced, unlike other European companies, even if yields have improved. In fact, the annual ratio at European level between round-

wood harvested and the number of employees shows a constant progression with lesser number employees.

Companies in the sector invest over 250 M€ a year. By way of comparison, a Canter line represents more than 10M€ excluding civil engineering costs, with between 30% and 40% of public funding (FEDEAR, etc.).

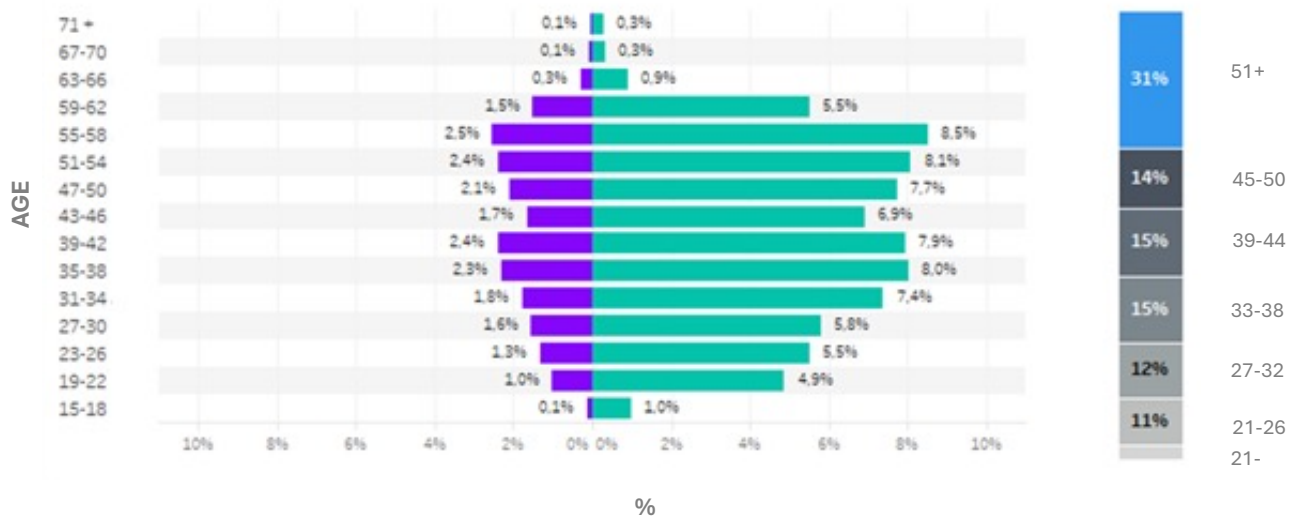
Impact of number of employees

The 1610A NACE code is estimated to have 15,415 employees [latest version of INSEE’s ESANE (French Elaboration of Annual Company Statistics) system] for the year 2020. This population is distributed according to the following age pyramid. It is worth noting the high proportion of players in the age group (> 50 years):

French age ranking for working sawmiller people

SALARY AGE PYRAMID (W / M)

BREAKDOWN



Source: INSEE 2022

For more than a decade, companies in the forestry and wood industry have been experiencing real recruitment problems, some due to a lack of motivated applicants who enter the industry “by default”, and others due to a lack of applicants. In fact, recruitment problems differ depending on the sector of activity. The lack of applicants for jobs in forestry (silviculture and logging), sawmills and wood energy are the most critical situations. The jobs of forestry work operators no longer attract many people, as they are considered to be too physical, poorly paid and too exposed to the vagaries of the weather, not to mention environmental pressure.

3.6.3 Expected technological changes and adaptation needs

Regaining sawmilling volume (2 Mm³ to reach 2008 levels) will therefore require continued and intensified modernisation of the “remaining units” and the “installation-creation” of new units, in both softwood and hardwood. This is certainly a debate that needs to be opened up, given the tensions that this entails both in terms of the areas of supply to be shared and relations with existing producers (especially for small and medium-sized structures

that see a resource “pass them by” because they don’t have the “backbone” to “pay the price”: a devastating situation for regional planning). Without underestimating societal pressures, today’s consumers – and wood is one of them – who are “close to bio-based products” do not want to have an industrial company on their doorstep. Less reliance on imported products will mean removing a number of obstacles. Some of these are highlighted in the systemic diagram above, and ignoring them is looking at the problem only through the small end of the spyglass. Some of the obstacles have already been highlighted in “the reasons for the decline” of sawmills and can be taken up again, in order to lead to another more detailed study, in collaboration with producers.

Support the sawmill owners, especially the craftsmen and semi-industrialists who, as “master craftsmen”, are at the heart of their production organisation, acting as “conductors of the orchestra”, and who find it very difficult to take their eyes off the ground and look to the future... In any case, “the business cannot be played” by going it alone! A collective effort is needed, and why not consider a “Sawmilling Progress Plan” with the objective of “+ 2 million m³ by 2025”?



A plan that can only be built around production systems that take into account:

- outlets for products versus available forest resources,
- the company’s financial resources and financial aid,
- the company’s culture, positioning and marketing approach,
- human resources, including employee qualifications and the attractiveness of the profession.

A plan that can only “work” if downstream partners, i.e. those who make the market, are involved. This was also suggested by Philippe Siat, industrial sawmiller and President of the Fédération Nationale du bois, at the general meeting in December 2018: “It’s up to the downstream sector to pull the industry forward, and we must all contribute to this”.

In the end, if the volume is exceeded, that will be fine; if it is not, and remains at the same levels as at present, an opportunity will have been missed, and it will be talked about for a long time the difficulties of increasing sawing volumes compared with our European colleagues, who are managing to do so... without losing sight of the fact that ‘Germany’s sawmills’ are what they are today thanks to reunification, subsidies, employment aids and, above all, very favourable, large-scale supply contracts.

3.6.4 Women representation

Nearly one in four employees in the French timber industry is a woman, and women are more likely to be employed in production-related jobs (a third of them, compared with a quarter in VSEs), but also in sales (1/5 compared with 1/10) or transport, logistics and handling.

Women occupy more diversified positions in larger companies. The consolidation of companies and/or their

opening up to other products to increase added value will encourage the recruitment of female staff. Since 2020, regulations have required companies with more than 50 employees to publish a gender equality index.

This index measures a score out of 100 points using 5 indicators:

1. The gender pay gap, out of 40 points;
2. The gender pay gap in individual pay rises, out of 20 points; and
3. The promotion distribution gap (only in companies with more than 250 employees), out of 15 points;
4. The number of female employees receiving a pay rise on their return from maternity leave, out of 15 points;
5. The number of people of the under-represented sex among the 10 highest earners, out of 10 points.

This law comes from Europe, which has been taking an interest since 2019 through a strategy in favour of gender equality 2020–2025 presented to the European Commission in March 2020²¹. This strategy is intended to serve as a guideline for the EU’s actions in the fight for gender equality. Its objectives include putting an end to gender-based violence and prejudice, ensuring equal participation and opportunities in the labour market, and achieving a balance between men and women in decision-making and politics.

The results of the index, which have risen steadily since it was first introduced, demonstrate year after year the effectiveness of this system, how well it has been taken on board by French companies and its ability to help practices evolve. As of 1 March 2024, 77% of the companies concerned had published their score, confirming the upward trend (72% in 2023, 61% in 2022 and 2021 and 54% in 2020 at the same date). By the end of 2023, 86% of companies had published their score. The average

Breakdown of women (wood processing)

BREAKDOWN OF WOMEN	LESS THAN 10 EMPLOYEES	BETWEEN 10 AND 49 EMPLOYEES	50 EMPLOYEES AND ABOVE
Support functions	55%	38%	28%
Production, processing	26%	38%	34%
Trade, purchasing, sales	11%	14%	19%
Transport, logistics, handling	7%	10%	19%
Maintenance, goods and equipment	1%	1%	1%

Source: *Panorama statistique emploi et formation professionnelle Branche du Travail mécanique du bois – Exercice AKTO 2022*

21 EUROPEAN COMMISSION Brussels, 5.3.2020 « A Union of Equality: Gender Equality Strategy 2020–2025 » https://commission.europa.eu/strategy-and-policy/policies/justice-and-fundamental-rights/gender-equality/gender-equality-strategy_fr

Number of student and course for wood sector and France

LEVEL OF QUALIFICATION FRANCE ISCED 2011	PERCENTAGE OF STUDENTS PER LEVEL OF QUALIFICATION (FRANCE)	VET AVAILABLE (FRANCE)
levels 0 – 2 for	4.4%	
All French Wood sectors	14.8%	39
All French Sectors	85.2%	
levels 3 – 4	28.5%	
All French Wood sectors	4.4%	39
All French Sectors	95.6%	
levels 5 – 8	67.1%	
All French Wood sectors	0.8%	38
All French Sectors	99.2%	
Total	100%	116

score declared by the companies remains at the high level observed in 2023, with a score of 88% in 2024 (86% in 2022). It has increased by 4 points since 2020 (84/100), and this year it has risen by one point for companies with between 50 and 250 employees (from 87 to 88).

3.6.5 Role of VET and student mobility

On the company side, the lack of manpower is due to a real problem of notoriety and a problem of low image. The study carried out as part of the “EDEC”²² done in 2019 shows the 4 challenges facing companies in the timber industry:

- Boost the attractiveness of the wood industry,
- Build and deploy pathways to employment,
- Adjust the flow of graduates,
- Promote local skills pools.

Often unknown, these professions are not (any longer) in demand, and while training establishments are struggling to recruit apprentices, companies are snapping up these young graduates.

The situation for wood energy companies looking to recruit is even more complex: there is currently no initial training on the specific features of their businesses, and they only have recourse to on-the-job training. Although the wood construction sector is less prone to a poor image of its trades, it too suffers from recruitment problems, often due to a lack of motivation on the part of applicants, who enter the sector by default.

The search for efficiency and maximum yield is at the heart of the economic issues at stake, to ensure that economic profitability is conducive to the sustainability of this activity. The question of human resources and training is therefore central to the 1st transformation of wood.

The current workforce is ageing (1/3 of employees in this sector are over 50) and the number of people trained is far from sufficient to replace the positions available. Only the equivalent of 12% of the jobs needed for saw-milling are being trained. At least twice as many would be needed to compensate for those retiring!

The introduction of new techniques (mechatronics, hydraulics, etc.) and technologies (IT, data management, etc.) requires “multi-tasking” staff, often accessible via BTS and/or “bachelor” degrees, unfortunately more oriented towards the wood construction industry.

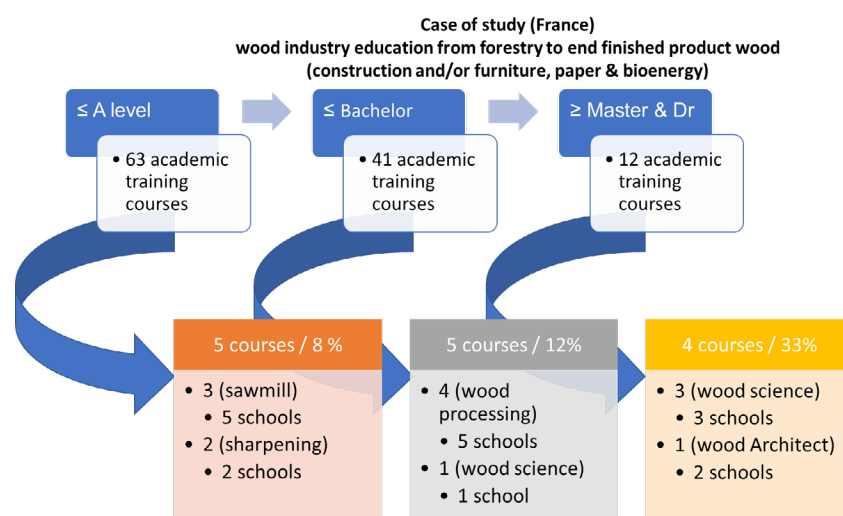
The stakeholders in the wood industry²³ have compiled a list of the 116 continuing training courses available: training courses offered in France, including full-time continuing education, apprenticeships and alternating courses. Some of these courses offer the same level of qualification and can be duplicated in several areas. Compared with the number of students in all sectors combined, the average annual number of students in the wood industry is 2.5% of the national average as shown above.

The wood industry is essentially (if not exclusively) accessible after vocational training. Young people from

²² The Employment and Skills Development Commitment (EDEC) is an annual or multi-year agreement between the State and one or more professional organisations or branches for the implementation of a negotiated action plan aimed at anticipating the consequences of economic, social and demographic change on jobs and skills and adapting training and qualifications to these changes.

²³ <https://www.metiers-foret-bois.org/formations>

Breakdown of diploma courses by level of training



general or scientific backgrounds do not identify existing wood and bio-sourced materials training courses as being accessible to them, apart from engineering schools.

This breakdown highlights trades dedicated to 1st transformation. At this level of analysis, it is important to differentiate between courses in terms of their names, as follows:

- **Training leading to a qualification:** this is training leading to a qualification that gives entitlement to ECTS credits. This training enables you to practise a profession, as a national jury looks at the skills acquired and validates the content through an RNCP (national directory of professional certification). This training can be provided on a continuous or alternating basis (ESB type). Individual training accounts can be used to access the training. These courses often require expensive equipment, and this management involves operating costs that block these courses. Schools and universities that already offer initial training and also offer additional training are recognised by Qualiopi without the need for certification.
- **Complementary training:** this is also training leading to certification but does not give entitlement to ECTS credits. These courses are given by certified organisations and are designed to provide additional training, but not a specific profession. These courses are listed in a RS (specific directory) and are given for a few days at a time. Individual training accounts can be used to access training. In 1st transformation sector, FCBA²⁴ provides around thirty training courses for professionals.

3.6.6 Synthesis and conclusion

Based on the existing data and the impact of the crises (Covid and energy prices), a projection has been drawn up with a view to once again aiming for the 10 Mm³ sawn timber threshold in 2025.²⁵

- Outlets for products versus available forest resources.
- The company's financial resources and financial aid.
- The company's culture, positioning and marketing approach.
- Human resources, including employee qualifications and the attractiveness of the profession.

The barriers to be overcome were listed, as well as the means to be implemented to facilitate an increase in sawmill production (increased investment).

- Technological and digital modernisation of industrial tools.
- Better recognition of their contribution to climate and environmental issues.
- Not forgetting the stabilisation of jobs in rural areas.

But one has to be able to do this in a fragile environment (economic crisis, recruitment, storms, insufficient equity capital, financial difficulties, human resources, health of entrepreneurs, transfer, health crisis wood, etc.). These unforeseen constraints delay projects, postpone them, or cancel them altogether. In the context of the crisis and the accelerating pace of change in businesses and skills, the development of training is the priority.

²⁴ The training courses provided by FCBA are QUALIOPi certified by AFNOR.

²⁵ <https://www.ign.fr/projections-bois-carbone-foret-francaise-2023-2024>



4. Conclusion



The European woodworking industries are a key player in the development of a sustainable and circular bioeconomy. They are set to play a pivotal role in the green and digital transitions. The raw material they use – wood – combines the triple advantage of carbon sequestration, storage and substitution. It stands out as the best ally in the fight against climate change and in meeting the ambitious targets set by the European Union for 2040 and 2050, by reducing CO₂ emissions, removing carbon from the atmosphere and thereby decarbonising the built environment.

In today's rapidly changing environment, anticipating changes (be it in technology or consumer demands) has never been more crucial. For a sector often regarded as deeply rooted in traditions, it is important to show how forward-looking it is and a cornerstone in the fight against climate change. To ensure the transition of the sector (and of our planet), it is key to be able to count on an abundant, varied and skilled workforce.

Building skills and inclusiveness lies at the heart of sustainable growth and prosperity. In an industry consisting almost exclusively of SMEs, nurturing talent, fostering diversity, and creating opportunities for all is of vital importance. From apprenticeships that pass on secular techniques to training programmes that incorporate the latest technologies, the woodworking industries have a unique opportunity to empower individuals, strengthen local communities and shape a future where talent knows no limit.

During the course of the RESILIENTWOOD project, social partners and training providers have had the opportunity to meet on various occasions, to organise thematic workshops, to carry out company visits and to engage in numerous exchanges with experts. Drawing on these experiences and testimonials, they have now put forward a series of recommendations designed to anticipate changes, increase attractiveness, build skills and inclusiveness in the European woodworking industries.

These recommendations are the result of this project. They stress the importance of life-long learning, social dialogue and social partners' involvement, as well as the need to attract and retain a skilled workforce.

Above all, the partners recognise that if the woodworking industries are to contribute to a more sustainable and resilient economy, a reliable and affordable sustainable raw material availability is a sine qua non.

Finally, the project partners underline that these recommendations should not be considered as an exhaustive list of actions to be implemented at the different levels mentioned. Rather, they form a list of suggestions, ideas and food for thought designed to inspire stakeholders, and to be considered and adjusted according to different national and local cultures and realities.



5. Policy Recommendations

5.1 EU INSTITUTIONS

- In today's global context, Europe cannot, and should not, cede its role as a manufacturing leader to others²⁶. Policymakers and all stakeholders shall therefore adopt policies that ensure a reliable and affordable sustainable raw material availability, a sine qua non for the development of jobs within the European woodworking value chain. They need to recognise the importance of a more stable outlook for future harvested timber supply, to support long-term investments in capacity expansion, state-of-the-art technologies and higher value-added production. Policymakers shall support manufacturing industries and their workers by fostering innovation, sustainability, facilitating the development of circular business models and skills development. By investing in these areas, the EU will strengthen the competitiveness of European industries, create quality jobs, and ensure a fair and inclusive transition to a more sustainable economy. Full support and a long-term vision are needed.
- Policymakers shall strive to complete the single market, a.o. by harmonising as much as possible the performance of construction products and standards for construction products, as this would open up opportunities for companies providing wood building solutions and enable them to scale up.
- Policymakers shall create "Career Pathway Roadmaps" for the manufacturing sector, in collaboration with the social partners, companies and training providers, in order to guide students towards accessible and appropriate certificated and vocational school programmes, which may need to be created where they do not exist.
- The new European fiscal rules should facilitate investments for professional education and training. Investment in training, education and life-long learning needs to be among the public spending priorities and exempt of financial cuts to secure a skilled workforce for a successful digital and green transition.
- The European Commission shall provide more tailor-made information and support material in all EU languages for potential users of Erasmus+ programmes, including Erasmus+ for apprentices. In particular, smaller firms need easy access to the programmes and support for the application procedures.
- The European Education and Culture Executive Agency (EACEA) shall provide detailed data on the use of Erasmus+ programmes, including Erasmus+ for apprentices on a yearly basis. The Erasmus+ for apprentices shall be better equipped financially and with corresponding staff at EACEA.
- Considering the fact that the European woodworking industries comprise a large number of SMEs in rural areas, the use of European structural funds should be considered to create more attractiveness in those regions through education, upskilling and reskilling as well as preurban infrastructure for socio-cultural activities. European (or national) structural funds shall also be used to support the establishment of economic clusters with other types of companies and manufacturing industries, which would lead to a supportive business environment and interconnected companies, thereby increasing collaboration, facilitating access to talents and markets, improving raw materials supply, reducing costs, etc.
- Engineers, architects, designers, etc. should also acquire more skills in the use of wood sustainable products and processes to integrate timber into their projects in the best possible way to maximise durability, service life as well as reuse, repurposing, recycling and waste management. The New European Bauhaus Academy can facilitate the upskilling and reskilling in the wood construction ecosystem in order to support this objective.

²⁶ Letta, E. (2024) *Much more than a market: Speed, security, solidarity: Empowering the single market to deliver a sustainable future and prosperity for all EU citizens.*



5.2 EU SOCIAL PARTNERS

- The European social partners shall enhance communication between the European actions/policies/programmes and the national social partners/companies. International benchmarking and cross-border study visits shall be encouraged to foster mutual understanding and help identify the best practices in each country in order to determine the ones that can be transposed and/or adapted from one country to another. Policymakers shall provide full support and incentives to make these initiatives more successful.
- The European social partners shall promote and support Vocational Education Training (VET) as it plays a critical role in skills development through the recognition of qualifications, while considering the differences between Member States. Indeed, VET is highly valued by employers due to its emphasis on practical job skills required in modern workplaces. Policymakers shall provide full support and incentives to make these initiatives more successful.
- The European social partners shall promote the concept of European core qualifications, supporting the structured improvement of the quality of apprenticeships underneath the harmonisation of VET structures or curricula.
- The European social partners shall regard the wood-working industries in the broader context of the manufacturing industries and seek cooperation with other sectors (e.g. maintenance, automation, etc.). This could include implementing and promoting diversity and inclusion initiatives to create an inclusive work environment. The stakeholders concerned shall make the most effective use of existing mechanisms and tools at the supranational, national or local level, such as support and structural funds, dedicated programmes and structures, etc.
- The European social partners shall support a better and more frequent use of the Erasmus+ programmes and a.o. encourage increased mobility for apprenticeships and cross-border cooperation.
- The European social partners shall promote diversity and inclusion through mentorship programmes, networking events, portrayals and promotional materials to share best practices, success stories, and strategies in order to demonstrate that manufacturing, and woodworking, is a welcoming and inclusive industry.

5.3 NATIONAL SOCIAL PARTNERS

- A sound functioning social dialogue shall be the key to commonly identify challenges and develop solutions. This shared responsibility is crucial to improve the effectiveness of the organisations involved and to promote social cohesion.
- National social partners shall engage in negotiations regarding skills development, training opportunities, as well as vocational education and training for employees in collective agreements.
- National social partners shall promote on-the-job learning and work to improve the right for training period, and provisions regarding the costs and form of training.
- National social partners shall promote a generational relay. In a sector where the average age is increasing and facing difficulties to hire specialised workers, a company policy of generational turnover shall be promoted. The social partners will have to promote the voluntary part-time employment relationships of outgoing workers or other forms of flexible arrangements for aging workers, avoiding income losses, maintaining the social security contribution equal to full-time and company seniority, favouring specific schemes for hiring young people and women.
- National social partners shall engage in Erasmus+, e.g. by creating information points for companies and apprentices, supporting the dissemination of information material and guidance for the use of Erasmus+. Where appropriate, they can establish provisions for apprentice mobility within the framework of collective agreements, ensuring the right of every apprentice to have a certain period of apprenticeship in another country.
- National social partners are requested to engage in European structures and initiatives, including the participation in public consultations.

5.4 NATIONAL OR REGIONAL AUTHORITIES

- The responsible national or regional authorities shall consider life-long learning for all as a priority. They shall therefore invest in education and training programmes that enable workers to develop the skills needed in relation to emerging technologies, improve existing skills, or take up new positions within the industry.
- The responsible national or regional authorities shall offer incentives to companies that provide pathways for career advancement, continuous learning, and skill development, particularly having a focus on young professionals, women and other underrepresented groups in the labour market.
- The responsible national or regional authorities shall support and encourage company policies for generational turnover, with specific actions to avoid income losses of outgoing workers.
- The responsible national or regional authorities shall reduce barriers and increase permeability in education and training, in particular between vocational training and higher education.
- The responsible national or regional authorities shall put in place a system for formal and non-formal learning validation, in cooperation with social partners and trade/industry associations.
- The responsible national or regional authorities shall engage with companies to support the establishment of apprenticeship programmes, also tailored for women, which will provide individuals with hands-on training and experience while earning a wage, helping to bridge the gap between classroom learning and real-world application and providing a pathway towards employment in the woodworking industry.
- The responsible national or regional authorities shall foster the recognition of qualifications by eliminating all existing barriers, and focussing on competences and the recognition of core profiles and core qualifications.
- The responsible national or regional authorities shall explore curriculum enhancement possibilities with educational institutions and social partners to update and align curricula with the skills needed in modern manufacturing, including the woodworking industries.
- The responsible national or regional authorities shall facilitate the establishment of affordable childcare services and family support programmes to help employees balance work and family responsibilities. Guidelines and recommendations shall be drafted on work-life balance of workers with caregiving responsibilities, through part-time work, remote work, flexible hours, gender-balanced use of parental leaves and childcare subsidies.
- The responsible national or regional authorities shall provide leadership and management training specifically aimed at women to help them advance in their careers. Additionally, they shall establish mentorship schemes connecting women entrepreneurs and employees with experienced business leaders to provide guidance, support, and career development opportunities.
- The responsible national or regional authorities shall provide support to companies who engage in creating an inclusive workplace and take measures for the activation of underrepresented groups in the labour market, a.o. over-55-years-old unemployed, women, young people, low-skilled workers, people with a migrant background, persons with disabilities, etc.
- The responsible national or regional authorities shall tap into a diverse talent pool and contribute to the integration of refugees into society and include them in the work environment. They shall offer language and skills training programmes for refugees to help them overcome language barriers and develop the necessary skills for the workplace. This can include language classes, vocational training, and job-specific skills development.
- The responsible national or regional authorities shall encourage skills validation for people with a migrant background as soon as possible during their integration and inclusion process for their swift integration into the labour market.
- The responsible national or regional authorities shall provide targeted incentives to companies who decide to adapt their infrastructure to take account of gender equality, e.g. the construction of dedicated sanitary and changing facilities, the acquisition of adapted personal protection equipment, etc.



- The responsible national or regional authorities shall support companies in the development of human resources policies which a.o. objectify their recruitment and selection processes to overcome stereotypes, draft vacancies in an inclusive manner, provide for role models and mentoring, participate in awareness campaigns against harassment, provide first support in case of violence.
- The responsible national or regional authorities shall support a good collaboration between schools and higher education institutions to educate on the use of the same modern equipment and technologies that are used in companies.
- The responsible national or regional authorities shall facilitate collaboration between industry and public employment services, technical teaching institutes, design institutes, universities, VET institutions and schools.
- The responsible national or regional authorities shall support data collection on skills needs and the link between them and their use in education and training systems content. In many cases, the sectoral and regional levels are the most relevant for gathering reliable data on skills needs. Moreover, the responsible national or regional authorities shall support a system of fast job profile updates, together with workers and first line managers, at the same pace of the fast-changing technologies to create modern descriptions of the needed production skills and competences.
- The responsible national or regional authorities shall, in collaboration with the social partners, create platforms for training providers and companies engaged in the support of Erasmus+ actions.
- The responsible national or regional authorities shall provide incentives to companies who are active in developing the next generation of wood products, as they play a significant role in driving innovation within the manufacturing industry and because they are essential if we are to achieve the objectives set as part of the green transition. Targeted support can be envisaged through grants, loans, and technical assistance programmes aimed at overcoming barriers to innovation, such as limited access to finance and resources.
- The responsible national or regional authorities shall support collaboration between different sectors and higher education to work on innovative projects, a.o. in the field of design, to facilitate the transfer of research to industry and foster the development of new circular biobased products.

5.5 COMPANIES

- The industry shall further enhance collaboration with policymakers to define long-term objectives and strategies, while fostering strong partnerships with educational institutions in order to bridge the gap between theoretical knowledge and practical skills.
- Companies shall build on life-long learning to achieve greater agility and show commitment to their employees' career advancement. Employee training should be based on appropriate skills assessments, designed according to the workers' and employers' needs, and based on the expected developments in the industry and workers' tasks. This assessment shall be part of a worker's competence development cycle and re-evaluated regularly. The European skills passport could prove a valuable tool for effectively presenting a worker's skills and competences.
- Companies shall apply and improve skills intelligence. They shall contribute to identifying new skills shortages and needs, monitor supply and demand for skills, identify positions for which there is a shortage of skilled workers and collect and share with the national sectoral social partners data on sectoral needs (skills gaps, skills mapping and development, skills forecasts).
- Companies and local VET institutions shall be facilitated and encouraged to establish a cooperation to define the required skills and cooperate to boost innovation on both levels (machinery, teaching methods, etc.).
- Companies shall collaborate with schools, colleges, and vocational training institutes to promote STEM education and technical training opportunities.

- Companies shall consider the possibility of setting up a network to share the costs for training during working hours. These networks could a.o. be useful for establishing joint training centres, exchanging employees, sharing training mentors or counsellors depending on the companies' structures. These networks could also prove valuable to capitalise on the know-how and experience of older workers (more than 15% of woodworkers) and facilitate the transfer of knowledge from older workers to newcomers.
- Companies shall plan a voluntary generational relay, allowing a work organisation that provides flexibility for part-time employment relationships of older workers so that they can transfer know-how and experience, while maintaining the social security contribution equal to full-time employment, and favouring specific schemes for the hiring of young people and women.
- Companies shall organise dedicated visits aimed at educating and inspiring young people and women

about the modern technologies they use in their operations. These visits shall not only showcase the innovative techniques, but also emphasise the climate benefits inherent to wood-based products and how they contribute to sustainable practices and mitigating climate change through carbon sequestration, storage and substitution. Companies can attract the younger generations by fostering environmental stewardship and promoting the transition to a more sustainable future.

- Companies shall engage in Erasmus+ programmes and offer international experiences to students and/or their employees and welcome students and/or employees from other countries in their premises, thereby improving the workers' skills and the attractiveness of the industry.
- Companies shall be more closely involved in forest issues and develop synergies with forest operators in order to ensure a constant wood supply.

5.6 TRAINING PROVIDERS

- Training providers shall intensify collaboration with the sectoral social partners, companies and their national authorities.
- Training providers shall identify the skills needs that are emerging in today's rapidly changing job market through consultation with the industry and adapt curricula and qualifications to match the recent and expected technological changes (artificial intelligence, imaging technology, data management, etc.) as well as product innovations (new or lesser-known timber species, hybrid products, etc.).
- Training providers shall provide further education opportunities to trainers and teachers, thereby enhancing their skills, knowledge, and instructional capabilities.
- Training providers (continuous or work-related training) shall consider rebranding and refocusing certain educational programmes and course names to make trainings and courses more attractive to youngsters and in line with their interests and concerns and to stay as close as possible to actual and future trends.
- Training providers shall offer flexible learning formats, in line with the schedule and commitments of workers with caregiving responsibilities (just in time training). This should enable workers to freely opt for the format that best suits their needs: online courses, workshops, massive open online course (MOOC), part-time apprenticeships, etc.
- Training providers shall create networks for an increased use of Erasmus+ programmes, mainly targeting on the exchange of students, apprentices and supporting companies and individuals in using the Erasmus+ programmes.
- Training providers shall provide continuous professional development programmes and certifications to enable professionals across various sectors to stay updated on the latest trends, best practices, and technologies related to the circular economy. These programmes provide opportunities for skill enhancement, networking, and knowledge exchange, enabling professionals to play a more active role in advancing the development of a circular biobased economy within companies and communities.

