

# Building a Sustainable Joint between Rural and Urban Areas through Circular and Innovative Wood Construction Value Chains

 **D1.4**

## Holistic approach to the building with wood value chain

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# Holistic approach to the building with wood value chain.

## Public report D1.4

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## Executive summary

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WP1 defines the context in which the BASAJAUN project will address construction processes in connection with sustainable regional development.

This report investigates the wood construction value chain in three regions: France, Poland and Finland. For this purpose, we realize two survey, which estimates the strategic competitiveness of companies and identify the barriers of entry for new candidate of the value chain. Furthermore, we analyze the major opportunities for business innovative models and bottleneck, and identify the solutions to overcome, according the respondents. Our results provide evidence that:

- quality of good final product sold or delivery reliability are the most significant drivers of competitive advantage while the size of companies is of moderate or minor importance to gain market share – according respondents of three regions.
- all barriers to entry can be overcome or easy overcome for new enter, except capital requirements and government policy (especially in Poland).
- the governance of the wood value chain is broadly similar in three regions, even if there is some particularities (high importance in judicial governance in Poland, in collective governance in France).
- lack of cooperation, collaboration and common strategy between actors of the wood value chain as the main common bottleneck between three regions
- the most opportunities for upgrading is adopting new technologies and improving product and process by cooperation between several links of the wood value chain

## Document history

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## Glossary

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<i>Acronym</i>	<i>Full term</i>
BIM	Building Information Modeling
CLT	Cross-laminated timber
DIY	Do it yourself
FDES	Standardized document that shows the results of a product's life cycle analysis as well as health information, used to calculate the environmental and health performance of an eco-design building.
FSC	Forest Stewardship Council
ISO	International Organization for Standardization
IT	Information technology
LSL	Laminated strand lumber
LVL	Laminated veneer lumber
NGOs	Non-governmental organizations
OSB	Oriented strand board
PEFC	Programme for the Endorsement of Forest Certification
R&D	Research and development
SMEs	Small and medium-sized enterprises
VOC	Volatile organic compounds

# 1. Introduction

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This report aims to present results, findings, conclusions of task 1.4 - Definition of the future value chain. This task is part of WP 1 – Sustainable wood construction value chain. More specifically, this task takes a holistic approach analysis of the wood construction value chain with the following objectives:

- Objective 1: Identification of stakeholders involved in the building with the wood value chain and analysis of interactions among them (input-output products in their internal processes, data exchange.)
- Objective 2: International analysis of the wood value chains in European countries by qualitative methods; including strategic competitive advantages, barriers to entry, governance of value chain, collaboration between stakeholders, bottlenecks and opportunities for upgrading.
- Objective 3: Analysis of possible synergies among stakeholders in the wood value chain (for example industrial symbiosis opportunities, shared services...) with special attention to the adoption of innovative business models taking advantage of digitalization and industrialization of the processes.
- Objective 4: Use of modeling parameters to create a prediction tool estimating quality, process, volume and added value. The idea is to decrease the time of processing by using specific forest reverse statistical analysis (a type of forest, plants, quality of products) of plant previous results.

For a description of the future wood construction value chain, a description of the current value chain was needed. First two objectives (1 and 2) focused on the description of the current value chain and recognition of current opportunities. To reach these objectives, two very cross related approaches were used: survey methodology and value chain analysis methodology. Surveys were used for example to gather data needed for value chain analysis and map in local context - the last two objectives (3 and 4) focused on the description of the future value chain. The report is organized as follows. Section 3 present the survey methodology; Section 4 present the competitiveness in wood value chain and barriers to entry; Section 5 describes the structural analysis of wood construction value chain; Section 6 explores the opportunities for upgrading and improvements and Section 7 concludes.

## 2. Survey methodology of global wood construction value chain analysis

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### 2.1 Survey methodology

Methods used for the preparation of the report included survey research. This section describes survey methodology (see box 1), questionnaire content, sampling of respondents, their type and background. The holistic approach was reflected in the use of qualitative methods. For that purpose, a questionnaire was created and one-hour online interviews with respondents were conducted.

The first stage of analysis was the creation of the questionnaire and its content. Two partners, FCBA (France) and ITD (Poland) carried out this part. They prepared a survey questionnaire to meet objectives 1 and 2. Items of questionnaire were in the following order:

- Sources of competitive advantage in the wood value chain,
- Barriers to entry in the wood value chain,
- Governance of the wood value chain,
- Stakeholder's cooperation inside the wood value chain,
- Bottlenecks in the wood value chain,
- Opportunities for upgrading in the wood value chain.

Two surveys were drawn up based on those items:

- One for the experts from research and technology institutes, universities, or other organizations (annex 3)
- another version (annex 4) for companies directly related to wood processing activities (forestry, harvesting, 1st transformation, 2nd transformation, manufacturing, wood construction, renovation and demolition, recycling, services including architects and designers, intermediate traders...).

The core content of both versions of the questionnaire is more or less the same. There are only some small differences in details, which are more specific for companies and do not apply for other organizations in the wood value chain, or that would not make sense. To get better background information of our respondents, a questionnaire for companies had an additional item - employment.

Survey intended to gather information for value chain analysis. Consequently, value chain analysis methodology had a large influence on the content and format of the questionnaire. Open and closed questions were used. Closed questions were using a five-point Likert scale or YES and NO answers. This method was a convenient and simple solution while assessing and analysing some important factors. On the other hand, an interview in depth was required for some open questions, which focused on problems and solutions in the value chain. Closed questions answers were gathered in excel tables and analysed with excel aggregation and tools. Graphic schemes present results of closed question answers. Open question answers from all respondents were gathered, to sum up the most important points and findings.

### Box 1 Global wood construction value chain analysis methodology

This box describes the concept and methodology of value chain analysis used in task 1.4. The value chain describes the full range of activities, which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use.

Value chain analysis is a study of industries organized around particular products and their markets. The value chain concept is used as a model to describe the socio-economic reality. Conventional elements of value chain analysis include value chain mapping, market analysis and the assessment of chain governance.

Elements of value chain analysis are:

- Structural analysis,
- Economic analysis,
- Environmental analysis,
- Social and poverty analysis.

The following sources were used :

- Manual on Sustainable Value Chain Development - ValueLinks 2.0. by Andreas Springer Heinz, GIZ;2018<sup>1</sup>
- A handbook for value chain research, by Raphael Kaplinsky and Mike Morris (2001)<sup>2</sup>
- A guide to value chain analysis and development for overseas development assistance projects, by Australian centre for international agricultural research; 2016.<sup>3</sup>

Respondents to the survey were selected using purposive sampling because interviews require specific knowledge of interviewees. The survey included experts from specific fields and companies along the whole value chain from raw material to the end-use and recycling. The questionnaires were sent in early July 2020 and responses were collected until early October 2020.

Value chain analysis took place in three regions; France, Poland and Finland. Partners that conducted interviews were FCBA (France), ITD (Poland), LUKE, VTT (Finland), TEC (Spain). Partners needed to collect 15 questionnaires for each of the three regions. Approximately 3 months after sending out the surveys, a total of 44 responses were collected (15 from France, 15 from Poland, 14 from Finland). The survey results are presented below.

<sup>1</sup> Springer Heinz A., Manual on Sustainable Value Chain Development - ValueLinks 2.0, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2018

<sup>2</sup> Kaplinsky R. and Morris M., A handbook for value chain research, 2001

<sup>3</sup> Collins R., Dent B. and Bonney L., A guide to value chain analysis and development for overseas development assistance projects, by Australian center for international agricultural research, 2016

## 2.2 Type of respondents

The following results and figures were aggregated together from the results of all three regions (France, Poland, and Finland). 20 percent of women and 80 percent of men participated in the survey (Figure 1). A higher percentage of men respondents is due to the gender structure in the industry. Men represent the majority in senior positions, consequently, we got a higher share of feedback by men.

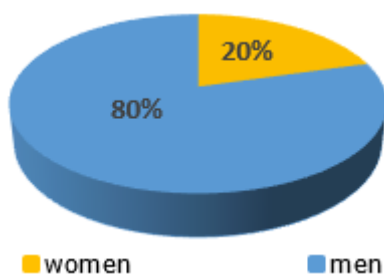


Figure 1 Gender of stakeholders participating in the survey

The main criterion of respondent selection was their type of activity linked to the wood construction value chain. The aim was to cover many different parts of the value chain, with two-thirds of companies and one-third of institutes and organizations. Actual percentage of respondents from companies was 61 % and 39 % percentage of institutes and other organizations, which is similar to our goal (Figure 2).

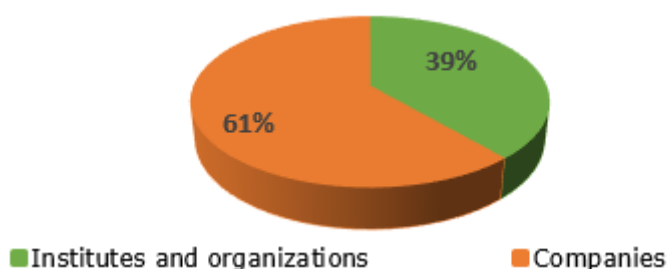


Figure 2 Respondents type of activity

Most of the respondents of institutes and organizations were from Technological and research institutes (53%). Universities represent 18% of those respondents and other organizations<sup>4</sup> - 29% (Figure 3).

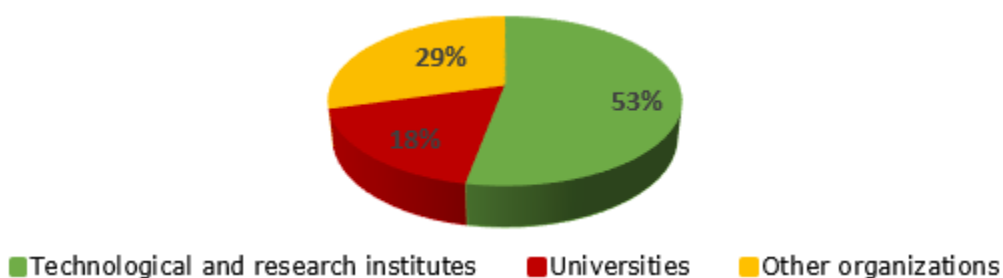


Figure 3 Institutes and organizations

The largest group of respondents (61 %) were companies representing various links of the value chain. Respondents representing wood construction companies and services (architects, designers,

<sup>4</sup> Other organizations meant various business clusters, innovative clusters, interprofessional wood associations or other associations in wood construction value chain.

intermediate traders) dominated (with 22 % and 26 % shares, figure 4). Conversely, demolition/renovation and recycling were represented by only 8 % of respondents. Moreover, 67 % of companies surveyed have a production site in a rural area and 33 % of them have a production site in an urban area<sup>5</sup> (Figure 5)

Differences in the represented share of each group occur due to different response rates from companies and because some groups-links are better represented on the market, with larger numbers of companies. Even though each link is not represented equally, our goal to get an opinion from each link of the value chain was reached.

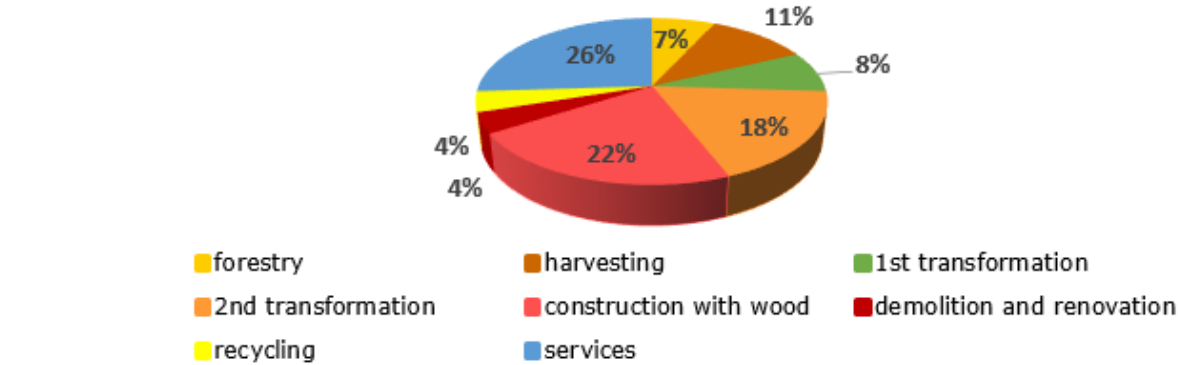


Figure 4 Companies

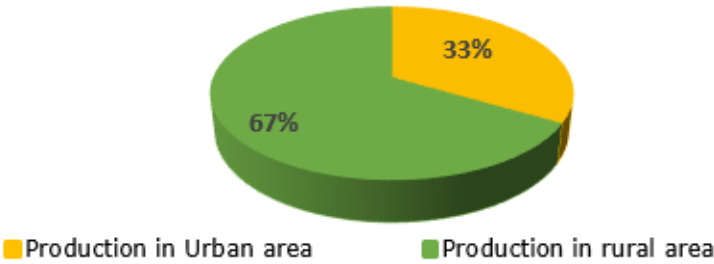


Figure 5 Main production site

### 2.3 Wood construction value chain analysis

In the case of our analysis, main attention goes to structural analysis, which means value chain mapping with a visual representation of the value chain system. Value chain maps identify products and end markets, business operations (functions), chain operators and their linkages, as well as the chain supporters. Value chain mapping is the most essential method and the core of any value chain analysis. All other topics of analysis, such as economic, environmental and social issues, build upon the basic value chain map.

<sup>5</sup> To differentiate between the rural and urban areas we used the following definition: in international standards, an urban area is a municipality or a group of municipalities presenting a continuous built area (no break more than 200 m long in the built area) and that has at least 2000 inhabitants. (Source: INSEE, France).

The economic analysis starts by indicating market prices, quantifying the volume of production and the market shares of particular segments in the chain. The data are used to determine the value-added along the stages. The second big subject is the assessment of chain competitiveness. The economic performance of the value chain can be benchmarked, i.e. the productivity parameters are compared with best practices of competing chains in other countries or similar industries.

To meet the objectives of Task 1.4 all aspects of structural and some aspect of economic analysis were included in our analysis. Regarding environmental analysis, only basic information on the ecosystems and natural resource base upon which the chain actors builds were included, without impact assessment.

### 3. Competitiveness of wood construction value chain and barriers of entry

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This section describes the assessment of parameters of chain competitiveness. Strategic competitive advantages and barriers to entry were analysed in details using the data from the survey.

#### 3.1 Strategic competitive advantage of wood construction value chain

Parameters of competitive advantages were included in questionnaire content and they were assessed on a five-point Likert scale by respondents. 5-means critically important, 4-important, 3-moderately important, 2-minor importance and 1-not important competitive advantage. Results from all three regions were aggregated and are visible in percentage share of each answer.

This part's goal is to describe the relative importance of different special skills of companies that can help them to keep a good position in the value chain to determine their prices or to bargain. A competitive advantage is the attribute that allows an organization or company to outperform its competitors.

Twenty-four sources of competitive advantage were presented to the respondents. They expressed their opinion by assessing the importance of each item of competitive advantage (figure 6). According to the respondents from three regions (France, Poland and Finland), the most significant drivers of competitive advantage were:

- 88 % of respondents say that the delivery reliability is critically important or important.
- Likewise, good quality of final product sold and level of client service are decisive to gain in competitiveness (respectively according to 91 % and 84 % of respondents).

Finally, if 72 % of respondents consider that the size of company is of moderate or minor importance to gain market share.

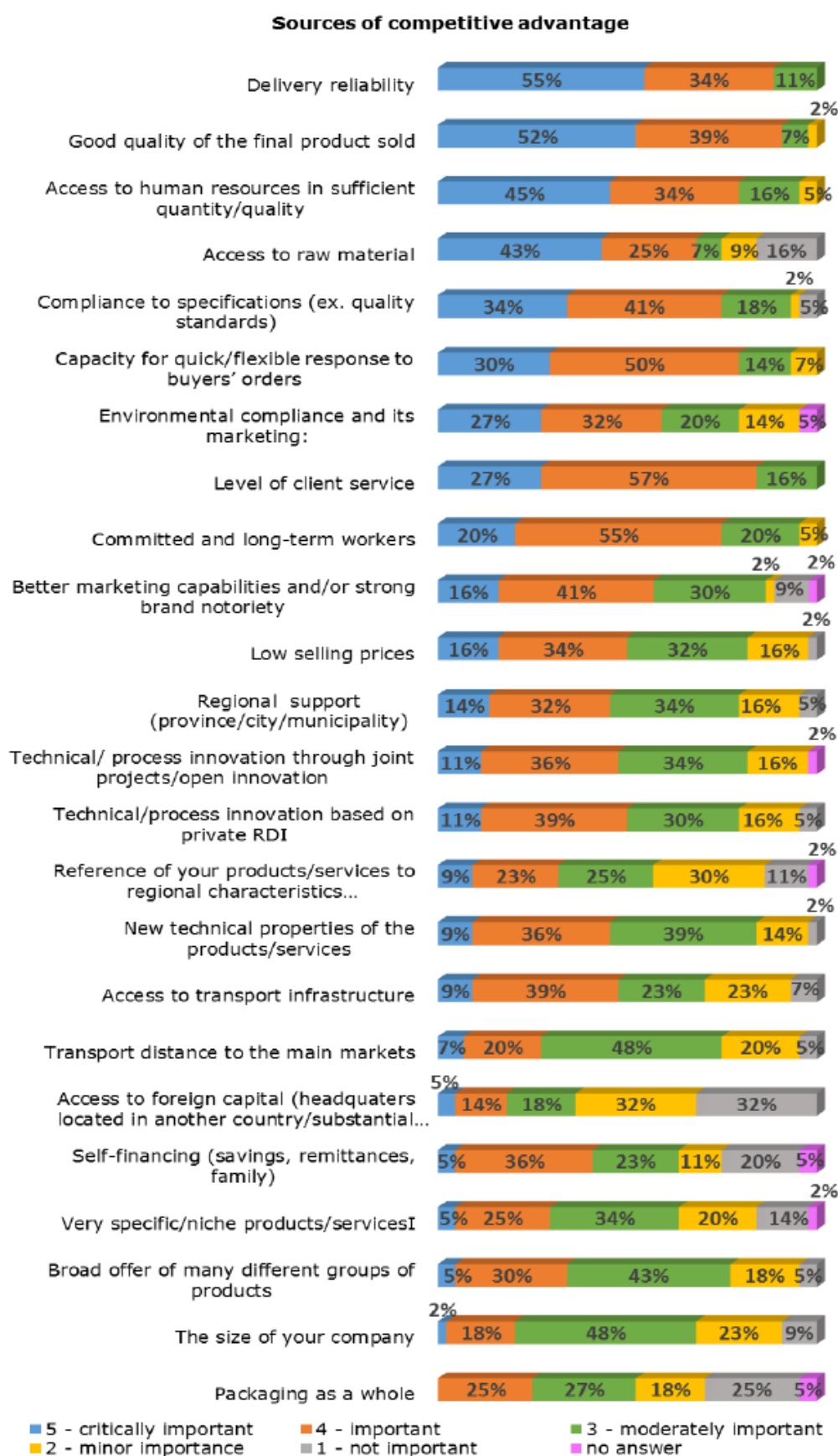


Figure 6 Sources of competitive advantage

### 3.1 Barriers to entry in wood construction value chain

The respondents were also asked to indicate barriers limiting the entry of new companies into the wood value chain. Companies that are part of the value chain tends to construct, or to take advantage, of barriers to entry. It is a way to protect one's company from competition. Barriers to entry are often regulatory or judiciary. Nine potentials barriers to entry were proposed to respondents but they could also add other barriers. Barriers to entry can exist in the form of patents, substantial capital requirements, government regulations, access to a proper distribution network, and technological expertise. Essentially, new entrants into a market will have to overcome multiple barriers if they are to compete with the already established companies. If the industry requires significant initial capital expenditures, smaller firms will simply be unable to enter the market.

All barriers to entry can be overcome or easy to overcome, according more than half of respondents, expect capital requirements and government policy (figure 7). These two exceptions come from the Polish respondents, who consider them as strong barrier, which is hard to overcome. In particular, 37 % of respondents consider that access to transport infrastructures is not a barrier to entry.

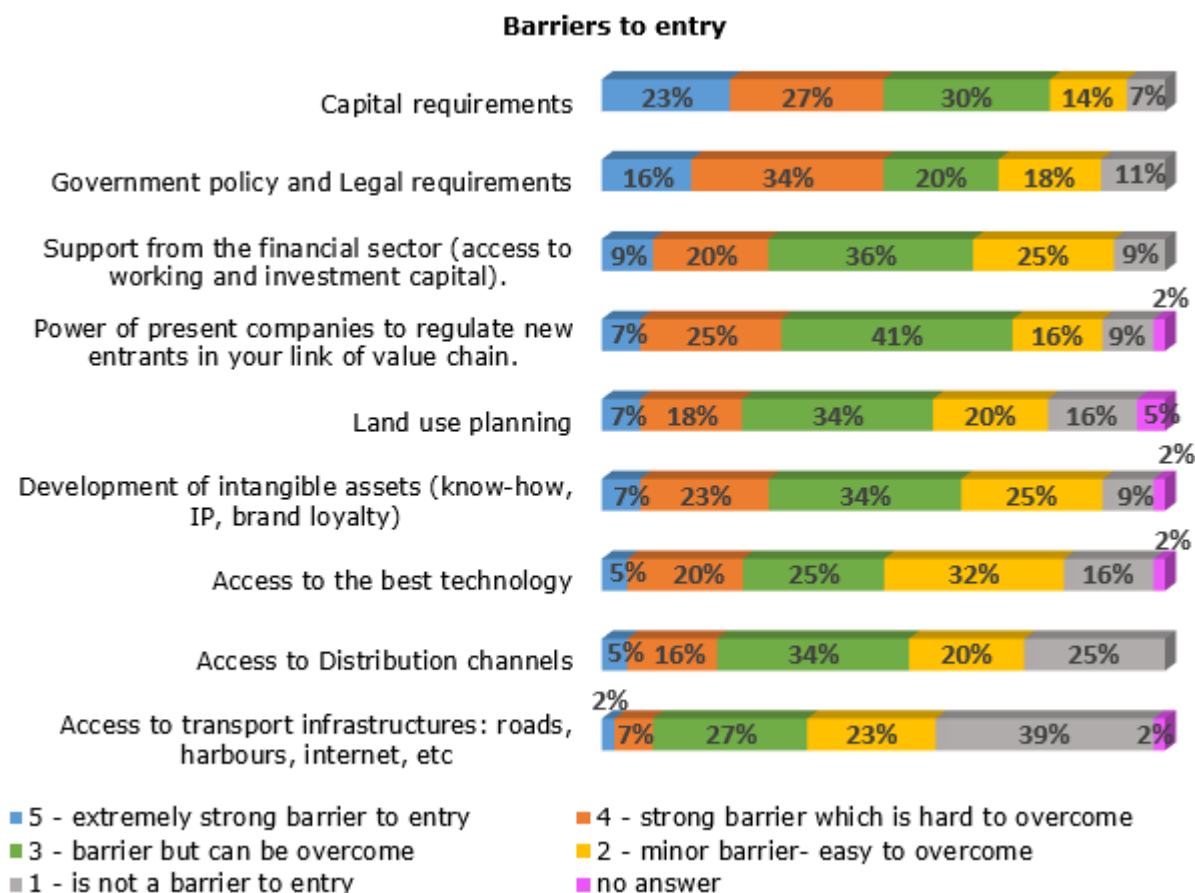


Figure 7 Barriers to entry

## 4. Structural analysis of wood construction value chains – value chain mapping

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The structural description of a value chain, which is value chain mapping, is the foundation and pivotal element of value chain analysis. A value chain can be characterized by eight generic elements, five of which constitute the basic value chain map at the micro-level:

- The marketed product or group of products defining the value chain
- The end market in which the product is sold to customers
- The series of value chain stages through which the product reaches the end market
- The enterprises or value chain operators conducting the business operations
- The business linkages between these operators

The remaining three elements in a value chain map are:

- Selected business linkages with subcontractors and operational service providers
- The support service providers at the *meso* level (industry level)
- Public agencies performing a regulatory function at the macro level

In value chain map, these elements are connected in a visual form. To achieve more detailed resolution some parts are enlarged and presented separately. There are a few rules to be observed for value chain mapping. The sequence of steps in value chain mapping is based on the above-described eight elements (see below) and the results from survey and research were implemented into general maps.

- a. Determining the end product,*
- b. Identifying and segmenting markets*
- c. Defining the sequence of stages of the value chain*
- d. Depicting operators and business models*
- e. Mapping business linkages*
- f. Differentiating the chain into several channels*
- g. Mapping operational service providers*
- h. Mapping support service providers and government institutions*

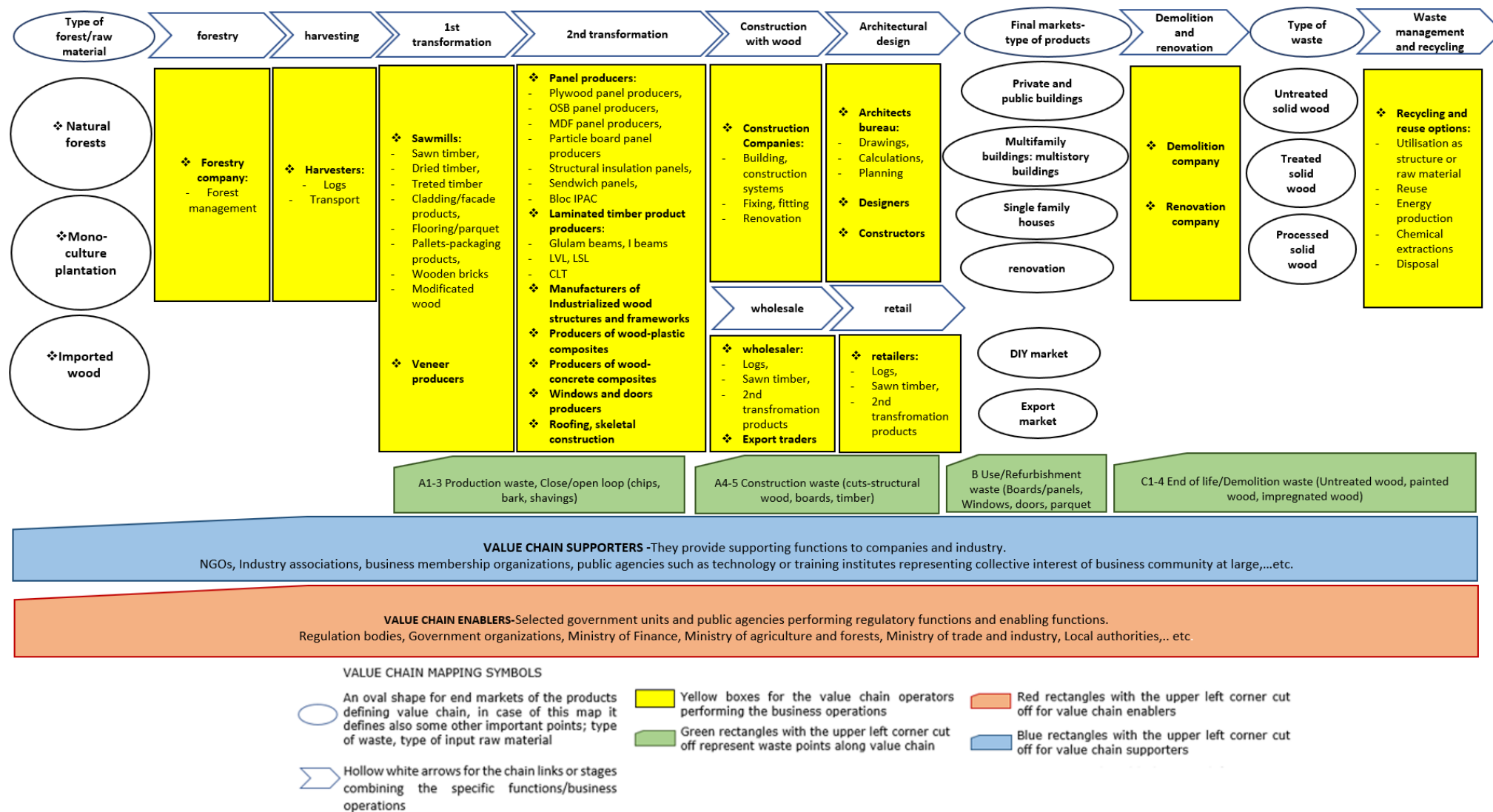


Figure 8 Value chain map

This overview map demonstrate the basic structure of the value chain and visualize major components using a symbol language. The eight generic elements (see above) can be describe by the following points:

*a. Determining the end products*

End products determined in the map are related to the BASAJAUN project context. The project main goal is to optimize the wood forest resources, to enable the construction of medium-sized buildings (16 dwellings with 4 floors). The medium-sized building represents the end product of the wood construction value chain. But if we zoom into that building, there are many different products like panels, beams, laminated timber, insulation, flooring, windows, roofing, wood composites, etc. Those products are also used in small houses, or larger scale private and public buildings. With different specifics, they present three general groups of end products of the wood construction value chain: single-story family house, medium-sized multistory buildings, larger-scale buildings (halls, schools, hospitals, etc.).

*b. Identifying and segmenting markets*

Consumer markets are the final destination of the end products. The market trends and requirements on those markets are key to the understanding of the value chain and its development. Therefore, it is the identification of end markets served by value chain. In most cases, there is more than one end market for a value chain, especially if end products come in different variants. Six end markets are identified: private and public buildings, multifamily buildings (i.e. multistory buildings), single-family house, renovation, DIY and exports markets.

*c. Defining the sequence of stages of the value chain*

Value chain stages leads from the supply of raw materials and inputs to the sale of the end products and recycling. That included listing of all business operations currently performed to create the products and sell them in the end markets defined earlier. The following stages were identified: forestry, harvesting, 1st transformation, 2nd transformation, construction with wood, architectural design, demolition and renovation, waste management, and recycling (see hollow arrows, figure 8). The aggregation of different business operations into one value chain stage responds to the business models of operators which include typical combinations of business operations. For example, all operators of 2nd transformations have similar business models, buy similar raw material, use similar procedures, technology, and sell through similar channels. They have common suppliers and partners.

*d. Depicting operators and business models*

Chain operator is the generic term for categories of enterprises combining a particular set of operations. The value chain operators are the owners of the product along the chain. They buy the main raw material, perform the productive processes, and pass on the semi-finished and final products to the consumers in end markets. Number and type of included operators in building process depend on required type of products, volume and share of the wood in final building.

#### *e. Mapping business linkages*

Business linkages are the connections between chain operators. Once the business linkages are established, an optional second step is to characterize the type of contractual relationship. This includes an assessment of the collaboration level and level of information flow. The relation between operators ranges from short term cooperation up to partnership and strategic alliance. The conducted survey assessed both, value chain collaboration and level of information flow (see annex 1).

#### *f. Differentiating the chain into several channels*

As a value chain serves several end markets and includes a variety of business models, its structure is differentiated into channels or sub value chains. The main criteria for differentiating channels derive from decisions made in an earlier step of the mapping exercise. They relate to the definition of the products, end market segmentation and the classification of operators. Six existing end markets are accessed by two main value chain channels. 1st and 2nd transformation companies can reach end markets with direct sales to construction companies, or through sales by wholesalers and retailers. At the distribution value chain frequently branches out into a variety of channels. Most recognized two channels are mapped on the value chain map.

#### *g. Mapping operational service providers*

The value chain operators not only have business linkages amongst themselves. They also deal with service providers that do not take possession of the product and thus are not part of the main value chain sequence. Outside suppliers of semi-products and services are not included on the map. For example, suppliers of energy, transporters, repair and maintenance services, advertisement agencies, accountants – financial services, etc.

#### *h. Mapping support service providers and government institutions*

The basic functions and chain operators constitute the micro level of the value chain, which includes the enterprises and some of the most relevant operational service providers. Apart from the micro-level, value chains can also be described in terms of the chain supporters that are in direct relationship with larger groups of chain operators and provide support services to the entire business community. The basic value chain map therefore is complemented by information on selected industry-specific actors such as:

- Support service providers at *meso* level (The “*meso*” level refers to the chain-wide agenda shared by all enterprises that have a similar size and business model).
- Development agencies represented by Research and technological institutes, universities, various business clusters, innovative clusters, interprofessional wood associations, or other associations in the wood construction value chain. The symbol for service providers uses blue rectangles with the upper left corner cut off.
- Public agencies performing a regulatory function at the macro level -value chain enablers represented by Regulation bodies, Government organizations, Ministry of Finance, Ministry of agriculture and forests, Ministry of trade and industry, Local authorities, etc. (see red rectangles with the upper left corner cut off, figure 8).

Analysts should be restrictive when illustrating macro-level organizations as most of them are not value chain specific. The macro-level should rather be analyzed in a separate institutional and governance analysis. This report focuses more on value chain supporters-development agencies which were included in survey interviews.

## 4.1 Wood value chain details

### 4.1.1 Wood value chain details in France

Gross added value in wood value chain in France accounted for 1.1 % of French GDP (25 billion €)<sup>6</sup> and concentrated 378 thousand jobs (full-time equivalents). Construction sector represents 50 % of gross added value.

Regarding French woodworking industries, the sold production are broken down as follow: industry of wood and product of wood and cork (29 %), industry of paper and paper product (51 %), industry of furniture (20 %).<sup>7</sup>

However, wood construction is a complex market in France as it encompasses both enterprises and industries manufacturing wood construction products, and companies installing those products and constructing buildings with a wood-based structure. For the last 20 years, wood construction has experienced either stability or slow increase of its market share on the construction market. This increase has namely occurred because of the development of technical products such as glulam, wood frame walls and Cross Laminated Timber (CLT).

According to recently published enquiry results of market share of different building and materials in 2018<sup>8</sup>, the market share of wood construction in the different sectors was as follows:

- Total new housing: 6.3% (individual houses: 9.4 % and collective housing: 4.3 %)
- Housing extension and heightening: 27.5 %
- Tertiary private and public buildings: 10.5 %
- Agriculture buildings: 25.2 %
- Industrial buildings: 18.8 %

2 thousand wood construction enterprises, representing 27 thousand jobs, have a turn-over of nearly 4 billion Euros in 2018 in which an amount of 1.9 billion Euro is specific to wood construction. The total turn-over of these enterprises is about 3 % of the total turn-over of the construction sector. For about ten years, there is a trend for the development of multi-storey buildings, which has been initiated and supported both by public and private initiatives.

<sup>6</sup> <https://vem-fb.fr/> : VEM is a tool to make all wood value chain economic indicator available in the same platform. With the delay in publications, the results is for 2017. But in the short term, there is no great change in the structure of economy (input-output, Leontief model).

<sup>7</sup> The National Institute of Statistics and Economic Studies collects, analyses and disseminates information on the French economy and society; ESANE 2017.

<sup>8</sup> CODIFAB - France Bois Forêt, Enquête Nationale de la construction Bois, 2019,

Coronavirus crisis has strongly affected the economic activities of the forest-wood sector in France (FCBA forecast)<sup>9</sup>. The lockdown measures led an unprecedented shock to supply and demand, generating impact on production, added value and employment. The forecast for production for 2020 and 2021 are respectively –7 % and –2 % (compared to 2019), in central scenario. These forecasts will be worse in case of double-hit scenario (what France is currently experiencing): –10 % for 2020 and –6 % for 2021. On the employment side, the decline would be relatively less significant, thanks to government support with partial activity system.

#### 4.1.2 Wood value chain details in Poland

Gross added value in the wood sector in Poland in 2019 accounted for 9 % of its value in industry. The furniture industry had the largest share in generating gross added value in the wood sector (37%). On the other hand, the share of the pulp and paper and paper processing industry and wood industries amounted to 32% and 31% respectively.

Sold production in the wood sector in Poland was 34.1 billion € and accounted for 8.9% of its value in industry in total. Sales dynamics in the wood sector in principle was lower than in industry on average and equalled 1.6 % in the wood industry, 2.3 % in the pulp and paper industry (together with paper processing), and 3.9 % in the furniture industry. The branch structure of the wood sector sales did not change in 2019 – sales were dominated by the furniture industry with a more than 35 % share, while the shares of the pulp and paper industry (together with paper processing) and the wood industry were 34 % and approximately 30 %, respectively.

Regarding the labour market situation in Poland, it is estimated that the sector employed 350 thousand people in 2019, of which 50 % in the furniture industry, 31 % in the wood industry, and 19 % in the pulp and paper and paper processing industry. The share of the sector within total employment in industry and manufacturing was 12 % and 13.8 %, respectively.

The number of enterprises in the wood sector in Poland amounted to 65.2 thousand in 2020 (they accounted for over 19 % of the number of enterprises in manufacturing and about 2 % of all registered economic entities). Almost half of the entities (48 %) operated in the wood industry (31.0 thousand), 45 % of entities were registered in the furniture industry (29.6 thousand), and 7 % in the pulp and paper and paper processing industry (4.6 thousand).

The wood industries also suffer from the consequences of the economic slowdown in 2020 due to COVID-19 crisis, but to various degrees in the 1st half of 2020 :

- sales in the pulp and paper industry remained at a level observed in the corresponding period of the previous year;
- the wood industry its decrease was 3.4 %;
- the furniture industry recorded the highest fall in sales equalling 10.2%.

It is assessed that of all wood industries it is the furniture industry that may suffer the most from the consequences of the crisis due to the decrease in demand for Polish furniture in the European countries, which are the main importers of it.

<sup>9</sup> [https://vem-fb.fr/images/PDF/Evaluation\\_de\\_limpact\\_de\\_la\\_crise\\_COVID-19\\_sur\\_la\\_fili%C3%A8re\\_for%C3%AAt-bois\\_VF.pdf](https://vem-fb.fr/images/PDF/Evaluation_de_limpact_de_la_crise_COVID-19_sur_la_fili%C3%A8re_for%C3%AAt-bois_VF.pdf)

### 4.1.3 Wood value chain details in Finland

The combined annual turnover of wood product and furniture industries is approximately 8 billion € in Finland. These sectors provide jobs for approximately 30,000 people and use 30 million m<sup>3</sup> of round wood. The total number of companies in wood product manufacture (furniture producers excluded) was 1,729 in year 2017. Out of these, 160 companies produced wooden houses, prefabricated house elements or modules. Most producers are small or medium sized companies with a strong will to grow. The national targets recently set for public sector construction, as well as the national carbon footprint review regulation coming into effect in 2025 will most likely boost the domestic use of wood in construction.

The total number of wood house manufacturing companies has decreased some 20 % during the past ten years. Now there are approximately 30 companies, mostly rather young SME's, producing wood elements for large-scale buildings (multi-storey apartment houses, public buildings). Growth in production of industrially prefabricated modules and building elements is clearly visible in the employment figures: the number of employees in element manufacture has doubled during the past five years. Now there is a lack of skillful workers, as well as structural designers for demanding wood construction projects.

Building construction has been active in Finland recently. The statistics indicate a clear shift from single-family house building to apartment house building, driven by demographic changes in the population as well as urbanization trend. Number of annually built single-family houses has decreased by 50% in twenty years. Since single-family houses use high volumes of wood products, the lowering trend in their building activity can be seen as a decrease in domestic wood product consumption figures, as well.

Wood construction has been high on the priority list of Finnish governments since the 1990s. Previously, the driving force of the political support has been the socio-economic benefits of wood construction, but recently the environmental issues, carbon sequestration potential in particular, have become the main issue. The Ministry of the Environment of Finland, which is responsible for the normative guidance of construction activities in Finland, has coordinated the Wood Building Programme since 2016. The programme aims at increasing the use of wood in urban development, public buildings, and large structures such as bridges and sports halls. Very ambitious goals to increase the use of wood in public buildings were published by the Ministry of the Environment of Finland in autumn 2020: by 2022 and 2025 wood should be the main construction material in 31 % and 45 % of all public buildings, respectively.

## 4.2 Wood construction value chain support providers

The competitiveness of value chains depends partly on the availability of services. For example, chain operators can outsource some services to perform business operations – these are operational services related specifically to the business models of companies. Support services, in turn, provide services that benefit groups of operators or the value chain as a whole. Therefore, our further analysis concentrates on the second category-support services provided by value chain supporters. Support services include:

- Sector-specific vocational training and education

- Applied research and technology development
- Publication of market and price data and other sector-specific general information
- Services of shared technical facilities, e.g. reference laboratories, research institutes
- Export promotion, trade fairs, exhibitions and business delegations
- Public relations and joint marketing of products
- Advocacy for common interests of the value chain business community<sup>10</sup>

Furthermore, the value chain supporters are divided into two main groups:

- Public research and training institutes, and specialized units of public administration. They provide information and other support services to the business community and assist enterprises.
- Private industry associations and business membership organizations. They provide support services to groups of value chain operators or for the entire value chain, such as export promotion or contributions to regulatory decisions

Besides enterprises survey also focused on value chain supporters. 17 respondents represented institutes or other organizations (see example for France, box 2).

#### Box 2 : The French region wood construction value chain support providers

The map below (figure 9) gives an overview of the main actors of support services in France. They were identified during the survey and in a review of the wood industry. The intention was to identify main value chain supporters and get overview of their integration. In France, many different support providers cover the value chain as a whole or only parts of it. The description focuses mainly on respondent comments. The wideness of blue rectangles presents the scope of their activities and development programs. Supporters presented with the widest blue rectangles at the bottom cover the whole value chain and are available for any company of interest.

At first, the role of institutes [1,5], which are one of the most important supporters of value chain can be related to technological, innovation, development, training, or research aspects or a combination of those aspects. They cover a large scope of the value chain from forest owners to the end of the use of products and recycling. They can cooperate with all links of value chain on different levels. With some stakeholders, they have opportunity-based cooperation. With others, they establish partnerships or strategic alliances. They cover a wide scope of activities, depending on the needs of companies. They provide technical solutions and operational improvements. Besides that, they provide assessment analysis of processes and product performance. Some institutes issue certificates, with internal standardization groups working on standards and collaborating with standard committees. For example, they can issue PEFC, FSC, product standards and compliance, or even processes standards like ISO 9001 and ISO 14001. They have a mandate for activities like issuing and auditing compliance to certifications. Regarding cooperation with

<sup>10</sup> Springer Heinz A., Manual on Sustainable Value Chain Development - ValueLinks 2.0, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2018, Vol. 2, Module 7, pp. 106-108.

standardization committees, difficulties with drawing up regulations occurring. It is a complex and long-term process while companies want it shorter and with less bureaucracy.

Besides cooperation with companies and standard organizations, Institutes have high levels of cooperation with public bodies and local communities. They can be a link between companies and other mentioned stakeholders (standard organizations, public organizations, local communities). Relations with administrations are based on trust. To meet some strategic plans in the forestry sector long-term alliance is requiring, even 20-30 years. Institutes can have many delegations around. They are active partners participating in European and international networks, so they can help companies with networking and entrance on foreign markets.

In map-Figure 9, there are also identified other organizations [13]. Most of them represent specialized units of public administration, which provide information and other support services to the business community and assistance to enterprises. Especially committees are in charge of promotion and communication along the whole value chain. Committees hold coordination of activities along whole value chain and communicate common policies.

Another general group of value chain providers are private industry associations and business membership organization-clusters. Support providers belonging to that general group are Business clusters [2,7,11], different interprofessional associations for forestry and wood construction [3,4,12], various cooperatives and unions [6,9,10], and other development [8] and industrial [9] organizations. In this report sometimes generalized expression is used for them – business clusters and other associations. Even though differences exist in their operating and development programs we use that common term, because their core activities are very similar. They provide services to groups of value chain operators or for the entire value chain. Activities such as promotion on the local level or export promotion, promotion of small and medium companies, investment promotion, contributions to regulatory decisions. They take over a lead role as change agents by advocating public support and working in the interest of the business community addressing the regulatory framework and collective goods, such as vocational training and other support services. Currently, a very important activity pursuit by them is the development of initiatives reducing the ecological footprint. They are providers working in the interest of the business community at large. Normally those business clusters and associations cover the specific scope of the value chain. In some case they cover only one value chain stage, for example, forestry [6], panel production [10]. On the other hand, there are associations stretching their activities almost along the whole value chain [2,3,8,9]. They can operate only on the regional level, national or even international level.

Their programs can have a value chain development project format limited in time or the format of a long-term support program depending on the capacity and the profile of the business membership organization. In fact, private associations are best placed to engage in value chain development on a permanent basis. The scope and duration of programs depend on the issue: Technological innovations are pursued in a project format. Skills development and consultancy for start-ups, information and networking are continuous services for member enterprises. Therefore, it is hardly possible to pinpoint particular formats for value chain development led by business membership organizations. In mature industries, business membership organizations may in fact be positioned as an appropriate

format for institutionalized value chain development. They analyse the value chains of their member enterprises and develop strategic documents to attract investors and to guide the design of value chain development projects and services<sup>11</sup> (see annex 2 for specific examples).

<sup>11</sup> Springer Heinz A., Manual on Sustainable Value Chain Development - ValueLinks 2.0, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2018, Vol. 1, Module 4, pp. 278.

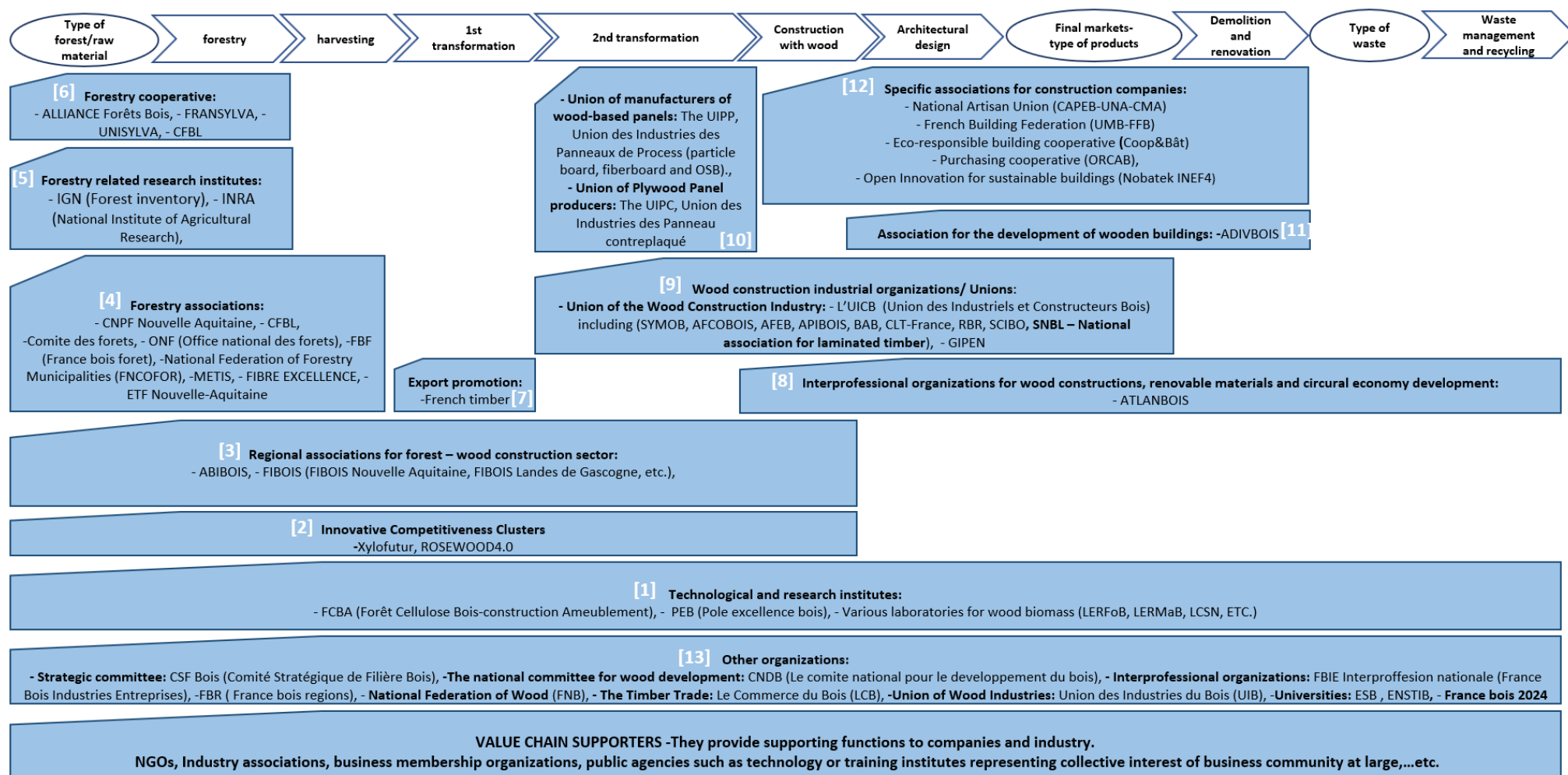


Figure 9 Value chain support providers

Reading note: [8] Interprofessional Organization for wood construction, removable materials and circular economy development cooperate with stakeholders starting at construction with wood stage up to waste management and recycling stage.

### 4.3 Stakeholders cooperation-linkages in wood construction value chain

Collaboration is a central function for achieving co-innovation in the value chain. Members share information, ideas, opportunities, problems and even business systems. Collaboration is possible when there is a shared vision between businesses, the presence of trust and commitment, compatible processes between businesses, open communication, cooperation and opportunities for mutual benefits. Chains that collaborate are able to develop products and services that are hard for competitors to imitate. This is one way how value chain can deliver a competitive advantage. Collaborative value chains represent the highest level of development.<sup>12</sup>

Part of the survey was dedicated to the assessment of collaboration and information flow level, to get an overview of gap spots and places for improvement. Respondents evaluated their relationships with other stakeholders (suppliers, buyers, institutes, clusters, consumers, local communities, standard bodies, public authorities, etc.) on a scale from 1 to 5. They were evaluating two different indicators of cooperation. At first, they evaluate the level of collaboration (1-short term/opportunity-based cooperation, 2-Repeated cooperation, 3-Long-term relations, 4-partnership, 5-strategic alliance). Secondly, they evaluated the level of information flow with stakeholders (1-no information flows, 2-a little information flows, 3-regular information flows, 4-intense information flows, 5-very intense information flows). Figure 10 below, combines assessment from all three countries (France, Poland, Finland). Due to different share of companies and organizations from different links of the value chain, the assessment scale was modified and simplified for purpose of mapping. It shows the level of collaboration and information flow with three different levels. Besides numeric assessment, respondents also got the opportunity to express themselves with open answers about this topic.

Value chain stages are represented in the middle of the map. The first general group of value chain support providers is represented in the upper blue rectangle (Institutes). The second general group of value chain support providers is represented with a bottom blue rectangle (business clusters and other associations). In both rectangles is an assessment of the level of collaboration and information flow with companies. Results are based on answers from 27 companies. Integration of side stakeholders (public authorities, standard organizations, local communities) with institute and clusters was also considered.

<sup>12</sup> Collins R., Dent B. and Bonney L., A guide to value chain analysis and development for overseas development assistance projects, by Australian center for international agricultural research, 2016, pp. 41.

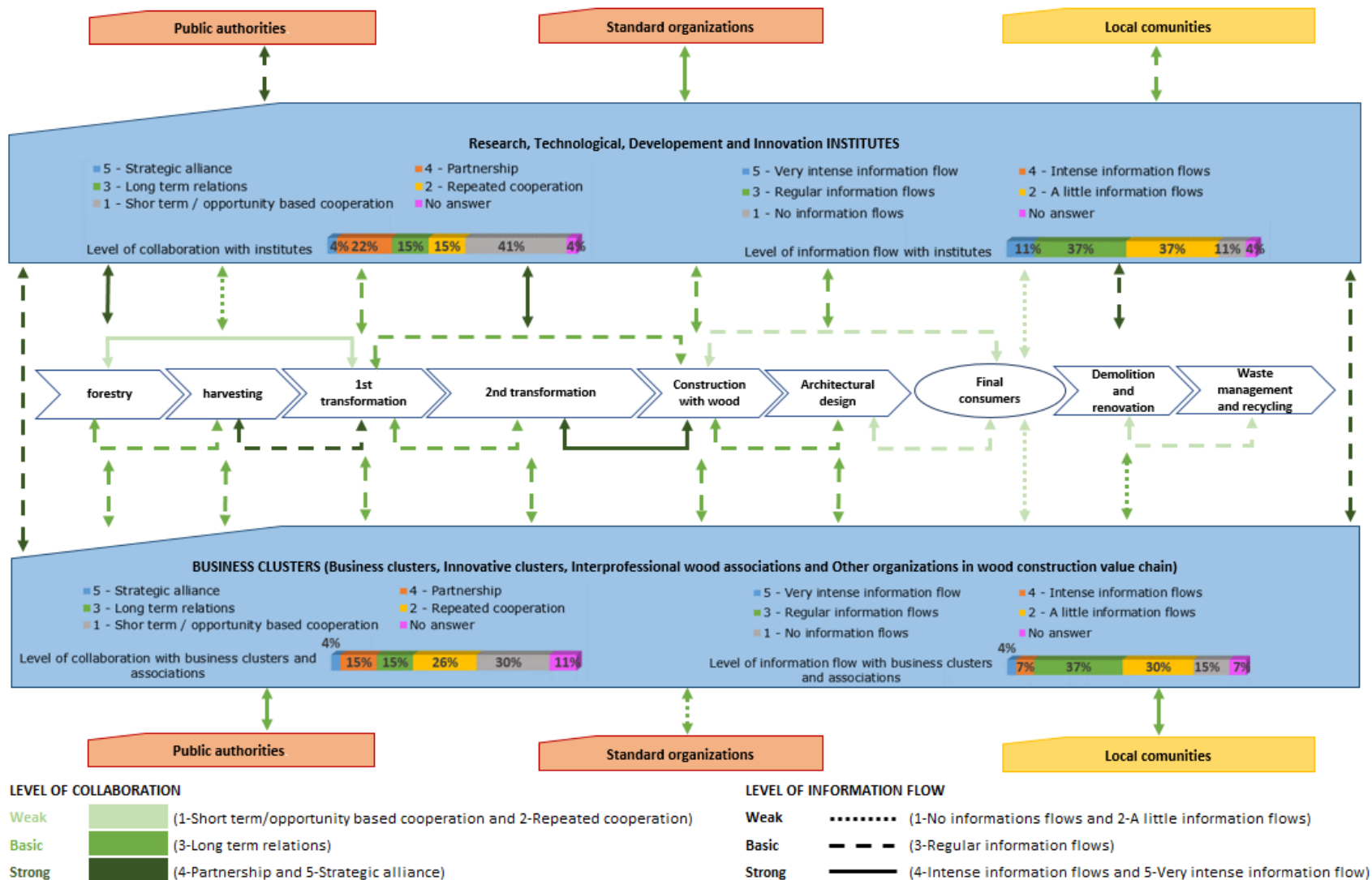


Figure 10 Value chain cooperation

Reading notes:

- 41 % of respondents from companies of three regions (France, Poland and Finland) asses that the level of collaboration with institute (Research, Technological, Development and Innovation) is short term or opportunity-based cooperation.
- 37 % of respondents from companies estimate that the level of information flow with business cluster and other associations is regular.

Horizontal linkages are transactions and contracts between sellers and buyers of intermediate and final products. By contrast, vertical linkages refer to the transaction between enterprises and value chain support providers. Those linkages comprise, for example, joint purchase, production activities and product development or joint marketing, promotion.

It is important to note that every business model includes statements on linkages in the business model canvas. In fact, business linkages always belong into the business models of both contract partners, “customer relations” on one side and “supply linkages” and partners on the other. Seeking chain development via the improvement of business models always has implications for business linkages as well. The choice of supply and marketing channels is part of the business model design.

The connection also works the other way: improving the business linkages helps the coordination of operators along the chain. Apart from the delivery of products and/or services, business linkages also include other important functions, especially the communication of market information, exchange of technology, and the organization of financial flows. Business model solutions and linkage solutions thus are closely connected. Starting from short-term and opportunity-based exchange on one end, partners enter into more and more diversified relations including mutual information exchange, logistical arrangements, embedded services and coordinated quality control. Small and medium enterprises cooperate to overcome the limits set by their small size. By pursuing business activities jointly and by sharing resources they achieve economies of scale. Often cooperation is necessary to increase the bargaining power towards business partners and get access to markets.

Value chain development requires business linkage solutions. Private operators have to adjust their business relations or determine new forms of contracting fitting their business models. The business community needs to coordinate input supply, production and marketing along the value chain to become more competitive collectively. Technical innovations make it necessary to get access to additional inputs and services. Business partnerships integrate more and more functions beyond mere buying and selling. Linkages also comprise exchange and flow of technical data and provide the basis for embedding services. Elaborating the details of a contract solution can benefit a lot from examining the business models concerned. Operators and business advisors should use the business model canvas to make sure that the contract solution works for both sides.<sup>13</sup>

Companies stated that better connection between 1st and 2nd transformation stage is needed. Beside that they want faster and reliable information along the value chain at right timing. Especially Information about future market needs, those are usually unreliable and available too late. Considering vertical information flow with institutes and clusters, companies are missing capacity for quicker standardization and labeling of products. Those processes require too much time and expenses. Smaller companies need to be integrated

<sup>13</sup> Springer Heinz A., Manual on Sustainable Value Chain Development - ValueLinks 2.0, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2018, Vol. 2, Module 6, pp. 64-72.

better to get more opportunities for financing-funding. For open innovation projects relations need improvements - trust is one of most important aspects to consider in open innovation projects. Companies in general lack of trust so that is a future challenge.

## 4.4 Value chain governance

In all countries, some rules are set by law, others by collective governance, and others by the main companies. Regarding the importance of different systems of setting and enforcing rules and standards in the wood value chain, the respondents are divided. A relatively significant part of respondents says they have no answers. Indeed, the part of no answer is 11 % on average (up to 14 % for collective governance system) against 1 % for the source of competitive advantage or barriers to entry (figure 11).

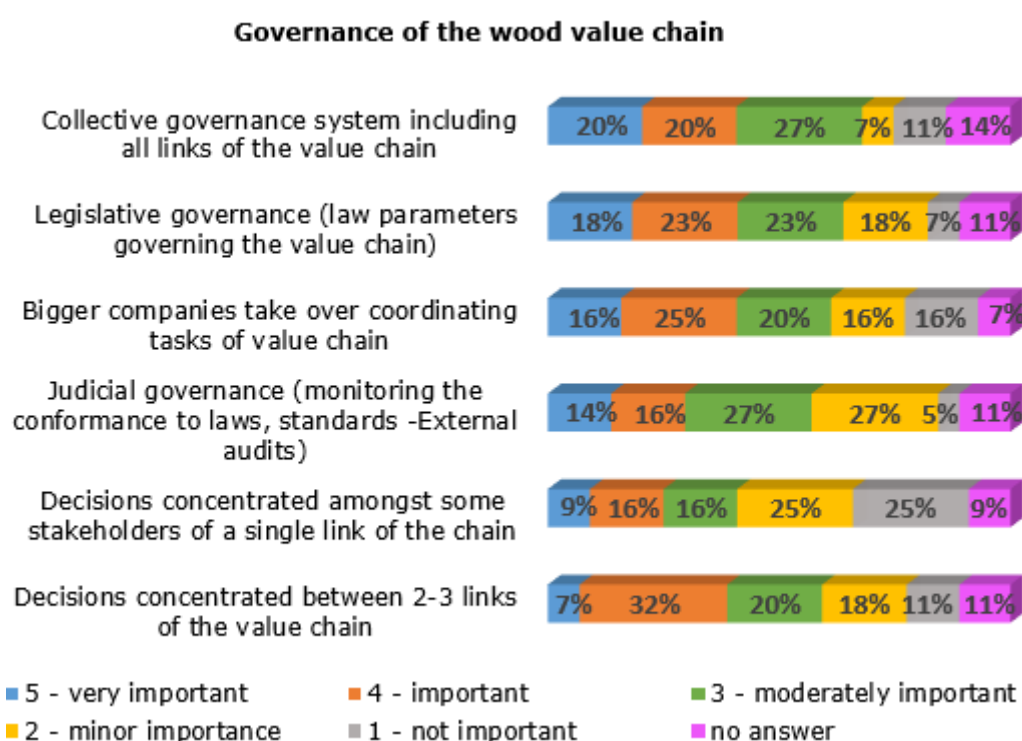
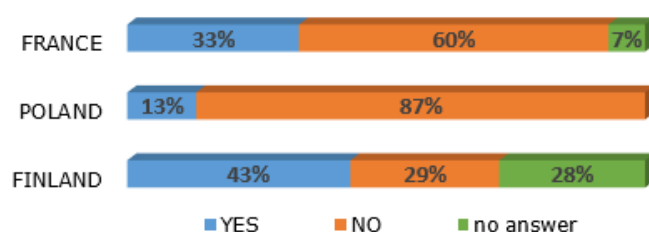


Figure 11 Governance of the wood value chain

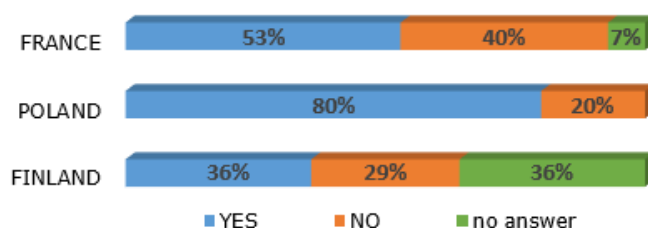
By region, the estimates are broadly similar. However, there is a relatively high importance in Poland on the subjects of judicial governance and concentration. Likewise, in France, the subjects of collective governance are considered important while this question is “only” moderately important for the Polish and Finnish respondents.

In particular, 87 % of Polish respondents consider that power of negotiation is not balanced between the companies (60 % for French). In Finland, only 29 % of respondents agree with this item, even if the part of no answer is high (28 %, against only 7 % for France and 0 % for Poland).

Power of negotiation balanced between the companies (by collective governance or not)?



The companies in different links of the value chain have the greatest bargaining power?



A few large companies in different links of value chain have the greatest bargaining power?

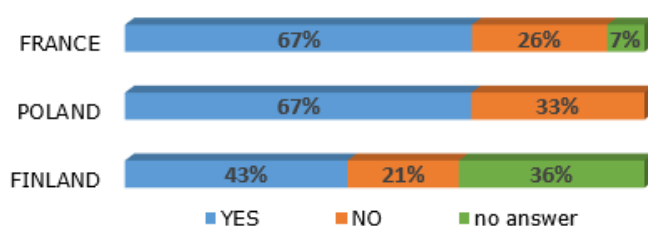


Figure 12 Negotiation and bargaining power

## 4.5 Bottlenecks and constraints in wood construction value chain

### 4.5.1 Value chain bottlenecks in France

There are many bottlenecks in the cooperation between different actors of the value chain in France, according to the respondents:

- Lack of efficiency in collaboration between actors
- Lack of common strategies (especially between 1st and 2nd transformation)
- Need to build long-term cooperation and some certificates such as ISO quality/environment etc. are not enough to build trusting relationships between companies
- Acceptability of logging (clear-cut for example): value chain actors must harmonize their position
- Find the real price of wood materials, especially in the building sector: consider wood as a superior-good and stop talking about the additional cost in the wooden building (in comparison to concrete or steel building)
- Technical bottlenecks between companies and institute about the evaluation of products

However, the area to improve cooperation in terms of the flow of information/ material flow are described on these points below, according to the French respondent:

- Cross value chain collaboration should be reinforced, but also cross-border to have a much more European approach with the creation of critical mass and capacities.
- Information flow improvements around wood technical development, technical products
- Facilitate market access for the new entrants, by sharing “good” information on the wood value chain
- Reduce intermediaries and get closer to end-users (especially for wooden building companies) and promote the creation of big companies that operate in several segments of the value chain
- Improve the digitalization of trees, in particular in order to have the same information (about quality for example) for all actors of the value chain

#### 4.5.2 Value chain bottlenecks in Poland

As in France, there are also some bottlenecks in the wood value chain in Poland, according to the respondents:

- Lack of cooperation and only a little experience of modern wooden building
- Lack of common strategy and reluctance to share technology at all links in the wood value chain
- Logistic problems and lack of exchange information
- Lack of understanding and experience in joint R&D in woodworking industry

Despite these bottlenecks, almost all respondents consider that there are areas for improvement, in particular with more communication between the actors.

#### 4.5.3 Value chain bottlenecks in Finland

Finally, in Finland, the bottlenecks are summarized as follow, according to the respondents:

- Lack of trust and collaboration due to a market competition between industry actors.
- Different power and interests between big, medium, and small companies for example in terms of market governance of round wood.
- Insufficiency and delays in information flows during all steps of construction projects.
- Insufficient recycling of building materials
- Insufficient consideration of bio-circularity and uses of demolished wood.
- Public regulation impact – especially side stream utilization.
- Insufficient communication between public authorities, which generates a lack of clarity on regulatory public policy (for example, on biodiversity conservation areas);
- Insufficient consideration of wooden building companies by the federation of construction industries (which is dominated by concrete industries);
- Lack of discipline “industrial timber construction” in the second level education of construction workers.
- Too many silos and deep gaps between the value chain actors and building materials.

- Insufficient standardization of connector databases, including delivery times, calculation versions, selection across multiple producers.
- Too few experienced designers, supervisors, and site managers;
- There is no or little educational (and specially re-education) programs for process management in timber construction.

However, the area to improve cooperation in terms of the flow of information/ material flow are described on these points below, according to the Finnish respondents:

- Increase the supply of industrially prefabricated wooden construction elements;
- Maintain the high quality of roundwood;
- Improve the quality and recyclability of building materials;
- Establish collaboration networks in the supply and value chains of building products made of wood;
- Increase public dissemination and promotion of wood products in construction, with specified focus by target groups of society and value chain.

## 5. Opportunities for upgrading and improvements

According to the respondents, the most significant opportunities, considered as huge or with many possibilities were:

- Adopting new technologies (65 %);
- improving products and process by cooperation between several links of the wood value chain;
- improving existing products

Conversely, 32 % of respondents consider that there is no possibility of relocating the production from rural to an urban area.

By regions, the Finnish respondents see more possibilities on technological aspects and product or process improvement, while the French think more that the improvements will come via relocations and reorganizations of value chains. For example, according to a Finnish respondent, the higher the degree of industrial prefabricated and modularization, the better the competitiveness of wood as a construction material. In addition, digitalization is needed throughout the value chain; partial digitalization leads to partial solutions and imperfect matches between the actors.

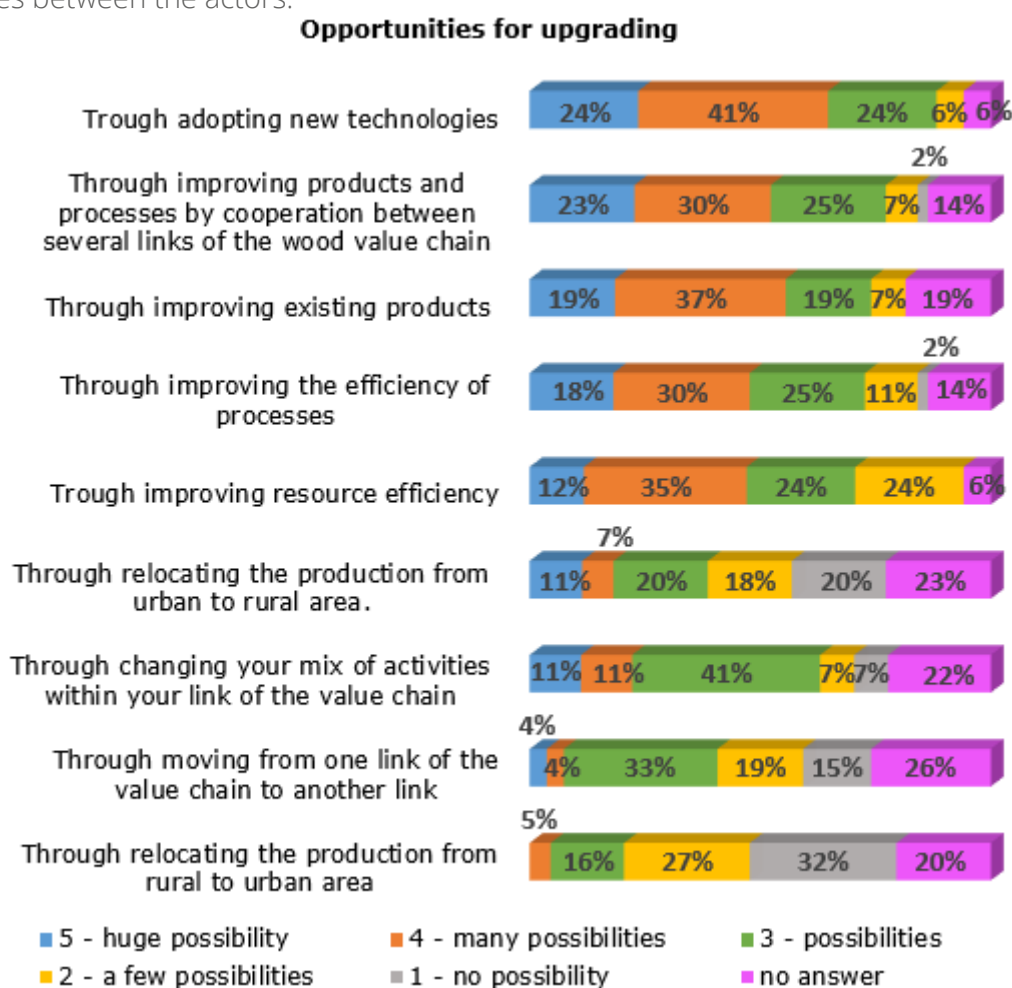


Figure 13 Opportunities for upgrading value chain

Respondents pointed out specific examples of opportunities above. For example;

- Transformation of low-grade roundwood into high-value products like CLT and LVL.
- Use of infrared and optic scanners that are used for grading systems.
- Introducing new material processing systems.
- Use of side stream products through different processes.
- New innovative products based on wood and its derivatives in cooperation with manufacturers of construction timber, wood-based panels, chemical industry (adhesives, resins, maintenance/protection) and related industries (production of windows/doors, flooring materials), IT (smart home), companies energy, water and sewage management and the R&D sphere.
- Optimization of the flow of materials and services at the level of order fulfilment.
- Increasing the scale of machine sorting of wood, increasing mechanization and automation of work (especially in SMEs).
- Increase in the quality of services provided.
- Introduction of more stringent standards for the density of particleboard in Poland.
- Innovative, tailored techniques for harvesting and skidding wood. Constant improvement of the process of timber harvesting and skidding, the use of modern equipment for timber harvesting and skidding in Poland.
- Joint development of new designs.
- Greater efficiency of biologically based insulation.
- Better networking of stakeholders.

Following two questions focused on blockades in the value chain and available labour with necessary skills for improvements and upgrading.

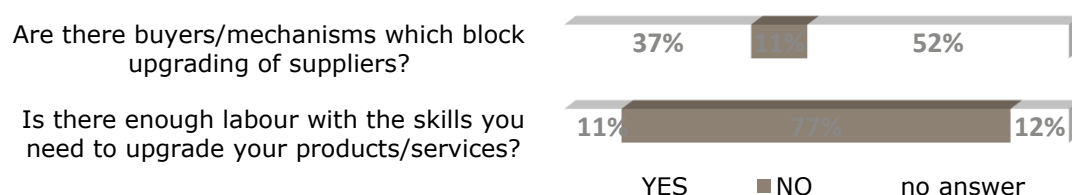


Figure 14 Value chain development constraints

Regulations are among the main blocking mechanism in France. It is difficult to get innovative solutions approved by offices. Difficulties also occur with high costs and the expense of testing. On the other hand, some companies do not want to evaluate and assess their products. For example, a buying company decides to meet specific standards. Therefore, also supplied products need to meet specific standards but some suppliers are not willing to upgrade products to the same level as their buyers. Consequently, suppliers can block improvement due to a lack of interest. In the case of Poland, difficulties arise at the beginning of raw material supply. There are wood raw material shortages due to the mechanisms of State Forests. They create an unadjusted wood raw material sales policy to the supply of wood raw material.

Regarding the availability of skilled labour, answers were unified in all three countries. The majority of respondents (77 %) share an opinion that there is not enough labour with the required skills for improvement and upgrading of their companies and value chain in general. It is important to note that they have a well-skilled workforce at some places but due to everyday business tasks, employees hardly focus on innovation and upgrading. They lack additional employees, especially new young professionals. Arising challenges with more and more wood construction projects creating a higher demand for skilled workers. In their opinion improvements should include better availability of training, also in terms of price. Better management and more attractive conditions including salary, better bonus system with additional bonuses. Easier and faster procedures related to the employment of immigrant workers. Improvements could also be done in learning institutions. Students are not sufficiently trained. Adapting the scope of education programs to the prevailing reality, educating students for practical work in the field. This is related to the fact that the capacity for the forestry at university level is limited due to the nature of educational programs that are set up to provide new functionaries in administrative workers. They need more people with practical skills. Companies also need a workforce with new skills in digital technologies. There should be a major link between architecture and forestry engineering, even industrial engineering. More young people need to be brought into the sector with a better promotion of woodworking jobs. Lack of effort is from both sides. There is missing stimulation from companies and missing enthusiasm from youngsters. Lifelong learning at all levels is also extremely important. It is not a goal to turn someone from labour into an academic, but to motivate them to improve the important skills. Lifelong learning for labour and academics is important to stay competitive.

To answer the question on the future opportunities for companies in the value chain to cooperate and innovate together, the points of view of respondents are summarized below:

- Promote an alliance between traditional business models and manufacturing industries
- Valorise side streams and create a joint venture to cover a huge part of the value chain
- Digitalization tools to connect rural and urban areas (Amazon as an example). The use of digital technologies intensifies the cooperation of enterprises in the value chain.
- Define together with the process and logistics before going digital, or even robotics, which is particularly suited to timber construction
- Promote joints projects and knowledge transfer.

Concerning the processes/ tasks that need to be digitalized, the answers below:

- Digitalization need to cover all parts, from the resources, through the improvement of the performance of transformation processes and technologies, customers services, management, controlling of the financial accounting, financial auditing, sale and marketing
- More web trading, with customer service options
- Data stocks of suppliers, materials, availability, prices and more available statistics in general (for example about clear-cut)

## 6. Conclusions

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Over the last few decades, the wood sector has experienced a revolution in industrial wood processing activities, creating new opportunities for employment, income and economic growth for large industrial groups. Nevertheless, the industrialization process has not benefited SMEs in the same way. However, it is particularly small enterprises that are increasingly facing competition and trade barriers, as well as pressures to introduce new technologies and production systems. As a result, these industries may lose opportunities to participate effectively in global value chains and may be unprepared to compete in national and regional markets.

The importance of wood construction value chain in construction is increasing in parallel with the rise of the urgent need for climate change mitigation. This report describe in detail the entire wood value chain in three regions (France, Poland and Finland) and highlight the most drivers sources for improve companies competitive advantage but also the future solutions needed for overcome the bottleneck in wood construction value chain cooperation and collaboration.

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- <sup>4</sup> Other organizations meant various business clusters, innovative clusters, interprofessional wood associations or other associations in wood construction value chain.
- <sup>5</sup> INSEE, ESANE France
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- <sup>20</sup> <https://vem-fb.fr/>

## 8. Annex

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### 8.1 Annex1. Value chain map linkages

Mapping business linkages – Business linkages are the connections between chain operators, indicated by the black arrows between the yellow rectangles depicting the groups of operators. The direction of the arrow is the flow of products. business linkages are not visible on the value chain map above. You can find a more detailed map with business linkages and the flow of products in annex 5. They are not included in figure 8 to reduce the complexity of the map and to make it more transparent. For the orientation of production flow, follow the direction of value chain stages from left to the right. It starts with the source of raw material-forests and it follows through stages and operators to the end product and at the end to the recycling phase. Even though the value chain in figure 8 ends with the waste management and recycling stage that does not mean the end of the material- flow. Waste and material from this stage can be used back in 2nd transformation stage as raw material for new products, or it can be reused in the construction stage. Circular economy can be reached with reuse or recycling of different type of waste identified with green rectangles.

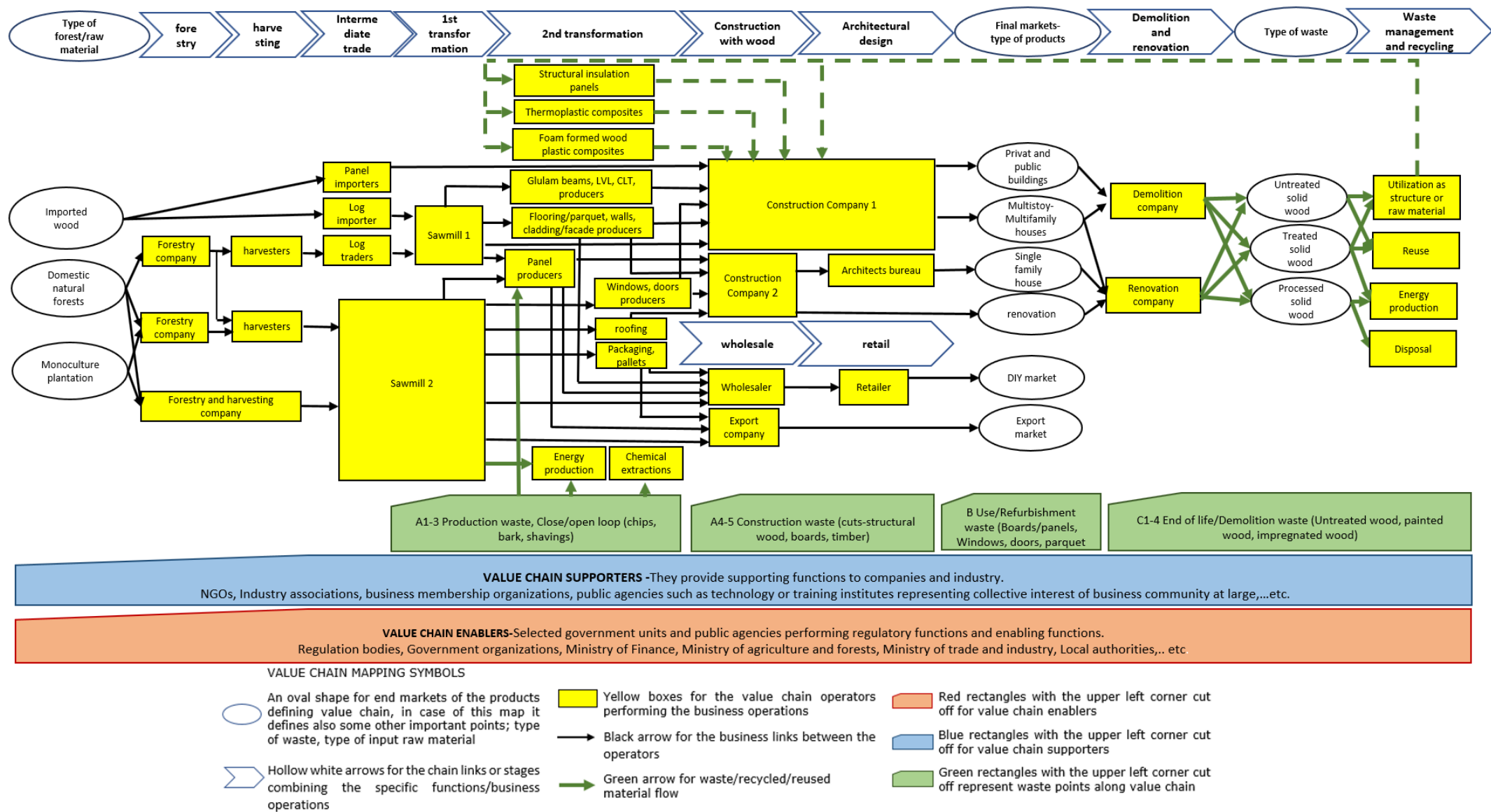


Figure 15 Value chain map linkages

## 8.2 Annex 2. Wood construction value chain providers in France

Specific examples of activities, services and development programs of clusters and associations in France :

- [2] Xylofutur - mobilizes its networks and partnerships to provide solutions adapted to SMEs in the wood sector. It primarily targets SMEs in the industrialization phase of R&D projects. It provides financially supported actions aimed at the digital transformation of SMEs in the timber industry, both in terms of infrastructure and managerial culture, in order to ensure competitiveness on the national and international levels. Examples of activities:

- Innovations in technologies (robotization, digitalization, etc.) or innovations in processes in the wood industry;
- Increase digital design (BIM) and associated digital construction techniques;
- Development of new marketing methods;
- Designing connected products (integration of wood and digital solutions)
- Optimizing of logistics chains and tools;
- Processing data and improving customer relations.

- [3] FIBOIS New Aquitaine - A network for development of the regional sector. Established from the merger of the four "historic" associations of the sector present in the Aquitaine, Limousin and Poitou-Charentes territories. Aims to represent and gather all the players in the regional forest wood and paper sector in an open dialogue and service of a common and ambitious vision for the future.<sup>14</sup>

- [4] CNPF New Aquitaine - The Regional Forest Ownership Center - supports silvicultural management of the forest. Driving force for sustainable management. It drafts a Regional Sylvicole Management Scheme for private forests. This document sets out the main rules for the management of private forests, taking into account the specific human, geographical and natural features of the region. It participates in the implementation of the PEFC certification of the forests of New Aquitaine. It provides most of the development and forestry extension in the region, in collaboration with the Chambers of Agriculture and the local associations. It is the key player in supporting forest growers in the reconstitution of stands affected by natural disasters. Organizes technical meetings, training.<sup>15</sup>

- [6] Alliance Forêts Bois is the leading forestry cooperative group in France, created and administered by private forest owners, serving 40,000 forest owners who are members, through 13 regional agencies. 3 key professions:

- Forestry Council: Managing and making a sustainable profit from the forests of members.
- Forestry work: Plant, maintain, improve-"cultivate forests"
- Use and commercialization of timber: to meet the needs of industry and add value to members' timber.

Key annual figures of the Alliance group:

- 20 million trees planted, i.e. 17,000 ha of reforestation, 55,000 ha of silvicultural work, 3 million m3 of wood mobilized and marketed.<sup>16</sup>

<sup>14</sup> <https://www.fibois-na.fr/> [accessed 21.10.2020].

<sup>15</sup> <https://nouvelle-aquitaine.cnpf.fr/n/le-role-du-crpf/n:2388> [accessed 21.10.2020].

<sup>16</sup> <https://www.allianceforetsbois.fr/> [accessed 21.10.2020]

- [6] Fransylva is the cooperative of "Private Foresters of France". It represents forest owners and private forests with French and European public authorities. It is a partner in the forest-wood sector and non-governmental organization.

- [8] ATLANBOIS - Interprofessional organizations for wood constructions, renewable materials and circular economy development- whose mission is to develop different uses of wood in the construction and energy sector. Their activities combine the renewal of the resource, training, communication, providing expertise and know-how of regional companies. They have information flow with companies, individuals, project owners, communities, regulators.

- [9] Union of wood construction Industry – UICB – brings together 9 associations or merged unions, 3 professional organizations and brings together 11 business branches around the interests of wood construction and the wood construction industries. They have a lot of members like builders, constructors, or wood industrial product producers from 2nd transformation (glulam producers, CLT producers, etc.). Their projects depend on the particular requirements of companies. It includes work on different projects like fire safety, environmental aspects, testing, costs of buildings and building materials, financing of projects, etc. They have information flow with companies, architects, local authorities and sometimes with final consumers.

- [9] Syndicat National du Bois Lamellé (SNBL)- National association for laminated timber - brought together French industrial manufacturers and builders of laminated timber, to defend their interests and develop the use of laminated timber in France. The SNBL has been integrated within the UICB since 2019. All members are committed to a quality approach, validated by an ACERBOIS-Glulam certification. They are also proactive when it comes to respecting the environment. As a result, used wood is guaranteed "from sustainably managed forests", mainly from Scandinavian and France. The proportion of French wood has increased significantly in recent years. The adhesives used are low emissivity and guarantee maximum respect for air quality, meeting and exceeding the regulatory constraints. Their activities:

- Realization of life cycle analyzes (LCA) of laminated timber
- Technical actions on fire resistance (publication of a technical note) and smoke toxicity test campaign, highlighting the qualities of laminated wood in the event of a fire
- Research actions on VOC emissions (tests carried out by the FCBA); on the mechanical behavior
- Action with public authorities to increase the presence of wood in the French construction
- Sustained communication with contractors and project management
- Communication campaign "Laminated wood in the city"<sup>17</sup>

- [9] CLT France - France association was created in July 2014 to contribute to the development of cross-laminated wood panels in France. It allows its members to work collectively to develop a common quality policy through technical and economic research actions. Association integrated into the UICB in 2019. CLT France, therefore, benefits from a guarantee of representation of its interests, both in terms of standardization work and in terms of regulation.

It intends to bring together all the actors of the CLT in France. The members come from different professional backgrounds but share the same ambition of developing CLT products and processes. The association, therefore, bringing together different professional profiles:

- Industrial panel manufacturers
- Builders and design offices
- Owners, promoters and developers

<sup>17</sup> <http://www.uicb.pro/snbl/> [accessed 21.10.2020]

Actions aimed at increasing the outlets for CLT with technical, standardization, quality and promotion activities.<sup>18</sup>

- [9] APIBOIS - The wood-based I-Beam Industrial Union was created in 2001 with the objectives of integrating this innovative product into French constructions and developing its market. In 2019, the union joined the UICB. Its main mission is oriented towards technical actions, allowing the characterization of the various "I-beam" systems and therefore their enhancement (fire resistance, thermal characteristics, acoustic performance, etc.). Beyond national action, the UICB aims for European ambitions with a gradual harmonization of procedures, thus authorizing standardization. APIBOIS has set up an annual statistical follow-up in order to better understand the development of this innovative product on the French market. Some concrete actions:

- Realization of the FDES with an environmental characterization of I-beams
- Production of a Technical Prescription Book (CPT), harmonizing the prescriptions according to the systems
- Action to characterize I-beam systems (fire, acoustics, environment, thermal ...)
- Production in partnership with CAPEB and distribution of a Memento guide intended for construction professionals, supporting the choice, design and implementation of the material
- The profession is also very involved in the CTB-PI brand, managed by the FCBA.<sup>19</sup>

- [9] SCIBO - Union of Manufacturers of Industrialized Wood Structures and Frameworks - brings together industrial companies producing industrialized wooden frames and other products (industrial beams, floors, walls). Together, these manufacturers are committed to a quality approach, validated by certifications such as CTB-CI, Socotec Qualité, etc. Activities of the union:

- facilitating progress and allowing effective promotion of industrialized timber structures.
- Active participation in standardization actions of manufacturing products and its implementation at national and European level (NF EN 14 250; NF DTU 31.3; EC5, )
- Seat in committees (collective agreement)
- Research programs, giving rise to technical publications on the themes: seismic safety, wind, acoustics, fire risk
- Environmental assessments, Life Cycle Analysis (LCA),
- Environmental and Health Data Sheet (FDES)
- Communication and documentation<sup>20</sup>

- [10] The UIPP brings together almost all French manufacturers of wood-based panels, particleboard, fiberboard (MDF) and OSB. The overall turnover of this industry in France is over 1.2 billion euros and directly employs around 3,000 people. There are currently 20-panel production sites, spread across the country.<sup>21</sup>

- [11] ADIVBOIS - Association for the development of wooden buildings – example of association where architects, project designers and other developers have discussions during meetings. They share ideas and development perspectives for the future. Association provides an environment for knowledge flow.

- [12] ORCAB - Organization of Building Artisans Purchasing Cooperatives- provide technical exchanges between members of the purchasing cooperative. Group purchasing is based on massification and pooling of

<sup>18</sup> <http://www.uicb.pro/clt-france/> [accessed 21.10.2020]

<sup>19</sup> <http://www.uicb.pro/apibois/> [accessed 21.10.2020]

<sup>20</sup> <http://www.uicb.pro/scibo/> [accessed 21.10.2020]

<sup>21</sup> <http://www.uipp.fr/uipp-presentation.html> [accessed 21.10.2020]

purchases for craft businesses, through a competitive and modern network of cooperatives. It allows the distribution of national brand products exclusively to professionals.<sup>22</sup>

Operational and strategic information is exchanged, there is also a flow of knowledge – know-how. Positive consequences of information flow are that you are not alone in business, sharing ideas, the complementary skills.

Those are not all the actors and development projects in wood construction value chain in France. Those particular examples only provide better understanding of the role of service providers and principles behind development projects. They will also help understand the topic of the next section – value chain cooperation, where the level of collaboration and level of information flow of operators and service providers are assessed and presented.

<sup>22</sup> <http://www.orcab.coop/front> [accessed 21.10.2020]

### 8.3 Annex 3. Survey for companies: Global analysis of the wood value chain by qualitative methods

## Informed Consent for Anonymous Interview / survey

This general informed consent model is designed to support BASAJAUN researchers in the deployment of an informed consent procedure that intends to comply with the ethical standards acknowledged by the European Commission in H2020 projects regarding research with human participants when inviting them to participate in an **anonymous interview/survey** designed to avoid the processing of any personal data.

If this anonymity cannot be achieved by design, an informed consent that also asks for consent regarding personal data processing and that complies with General Data Protection Regulation and national law must be used.

Support of ethics experts and/or data protection officers or legal departments must in any case be sought to **adapt the model to the specific cases**.

Project acronym	BASAJAUN		
Project Name	Building a Sustainable Joint between rural and Urban areas through circular and innovative wood construction value chains		
Grant Agreement no.	862942	Financed by	EUROPEAN COMMISSION
Start date	01/10/2019	End date	31/09/2023
Programme	H2020	Website	www.basajaun-project.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862942

## 1. INFORMATION SHEET

### 1.1. PURPOSE OF THE STUDY

This document is used to inquire about building with wood value chain for BASAJAUN project, financed by the European Commission. We are thankful for your cooperation.

The project itself take a holistic approach to improve and upgrade building with wood value chain. It's goals are to create better environment for rural development, to improve added value in construction sector and to create an open innovation platform. This will be a platform where companies can connect, innovate together, improve and upgrade their added value in value chain.

The purpose of this survey is to highlight from your point of view the most critical problems and most convenient solutions, for the value chain area you experience. Open and closed questions will be used. Final objectives are to recognize the most critical points in value chain, barriers, interactions among stakeholders and opportunities for improvement. A special attention will be paid to the adoption of innovative business models taking advantage of digitalization and industrialization of the processes.

We will do it by following agenda:

- competitive advantages
- barriers to entry
- governance of wood value chain
- stakeholders cooperation
- bottlenecks in wood value chains
- opportunities of upgrading

**Research method** - The research method will be an online interview/survey. The interview/survey will take 60+ minutes.

**Results of the study** - The results of the study will be integrated in the project report "D1.4 – Holistic approach to the building with wood value chain". As the interviews/surveys are anonymous, and the responses will be aggregated into conclusions, no personal data will be processed nor published.

**Risks, discomforts or disadvantages versus benefits of participating** - No particular risks, discomforts or disadvantages are foreseen for participants in this study. On the other hand, with your answers you would be providing an important contribution to research and development in the area of wood-construction.

In any case, your participation shall be entirely voluntary, and you have the right to refuse to participate and to withdraw participation or data at any time (before giving consent or after) without any consequences.

**Consent expression** - If you agree to participate, your consent will be expressed by ticking a box at the end of this information sheet.

**Questions or clarifications:** For any questions or clarifications that you may need, please ask the contact researcher(s) identified here below (section 1.4 of this information sheet).

## 1.2. INFORMATION / DATA NEEDED TO PERFORM THE STUDY

The anonymous information that you may provide will be exclusively used to perform the study.

*This model assumes:*

-that the informed consent form only includes date and a tick-box to give consent. The reason of this is avoiding handwritten signature, because some handwritten signatures may include personal identifiers / data (name and surname).

It will be removed at the date of completion of the study.

*This model assumes:*

- that the GA obligation of keeping records for a period of five years after the payment of the balance (Article 18) can be met by documenting the methodology followed to perform the study instead of keeping the information itself (interviews/surveys answered by participants)

- that the information provided by participants will not be re-used for further research purposes.

The study is expected to conclude by 30/09/2020.

*Date of the expected approval of the periodic or final reports of the project period where the deliverables related to the study will be approved by the EC.*

## 1.3. ANONYMITY OF THE INFORMATION PROVIDED

Information on anonymisation procedures, during the study including possible publications, and organisational and technical procedures put in place. For example:

- The interview/survey has been designed to avoid obtaining personal data from you
- Only generalized, broad categories are used regarding, gender or type of occupation, type of company
- The researchers will perform an anonymity check before merging the anonymous information resulting from participants answers and delete, pseudonymise, generalise or categorise any datum that could lead to indirect identification of the participant or any other third person
- The informed consent form only includes date and a tick-box to give consent
- Privacy in publications: the anonymisation procedure assures also that only anonymised information and conclusions will be used in any possible publication arising from the research study or containing references to it.
- All information provided by participants will be deleted at the date of completion of the study.

## 1.4. ORGANISATION RESPONSIBLE and CONTACT RESEARCHER(S)

Institut technologique FCBA (Forêt Cellulose Bois-construction Ameublement) is the organisation responsible of this study within project BASAJAUN.

The contact researcher(s) you can contact regarding the participation in this study:

- Jean-Denis Lanvin [jean-denis.lanvin@fcba.fr](mailto:jean-denis.lanvin@fcba.fr)
- Jean-Luc Kouyoumji [Jean-Luc.KOUYOUUMJI@fcba.fr](mailto:Jean-Luc.KOUYOUUMJI@fcba.fr)

## 2. CONSENT SIGNATURE PAGE

I hereby declare:

- I am 18 years or older and I am competent to provide consent;

*This model assumes that the research is not involving children (or other persons unable to give consent). If it does, the guidance included in EU Grants: Horizon 2020 Guidance —How to complete your ethics self-assessment: V6.0 – 23.07.2018 [http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/ethics/h2020\\_hi\\_ethics-self-assess\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/ethics/h2020_hi_ethics-self-assess_en.pdf)*

- I have been fully informed about the aims and purposes of this study and the conditions of participation;

- I understand that there is no compulsion to participate and that, if I choose to participate, I may at any stage withdraw my participation.

..... Date (dd/mm/yyyy)

☐ Tic box for acceptance (X)

## SURVEY: Global analysis of the wood value chain by qualitative methods

Gender: ☐ Female ☐ Male

From what link of the value chain? :

- ☐ forestry
- ☐ harvesting
- ☐ 1st transformation (sawmills)
- ☐ 2nd transformation (material for wood construction, panels, LVL, window frames, etc.)
- ☐ construction with wood
- ☐ demolition and renovation
- ☐ recycling
- ☐ services (architects and designers, traders, software developers etc.)

Your company's main production site is located in a rural or urban\* area? .....

*\*Definition of an urban area: in international standards, an urban area is a municipality or a group of municipalities presenting a continuous built area (no break more than 200m long in the built area) and that has at least 2000 inhabitants (Source: INSEE, France).*

### A. Concerning EMPLOYMENT in the wood value chain, in the case of your company:

1. Number of full-time employees: .....
2. In your company, what % do we find of higher educated employees? Employees with higher education (at least bachelor's degree, that is: high school diploma + 3 years study): .....
3. Gender issues:  
% of men/women in the company: ..... men / ..... women  
Amongst women, what % are of higher education (see above for definition): .....%  
Amongst men, what % are of higher education: ..... %

## B. The SOURCES OF COMPETITIVE ADVANTAGE in the wood value chain:

This part's goal is to describe the relative importance of different special skills of contractors that can help them keep a good position in the value chain to determine their prices or to bargain.

A competitive advantage is the **attribute** that allows an organization or company to outperform its competitors.

### 1. Concerning the SOURCES OF COMPETITIVE ADVANTAGE in the wood value chain

Could you say, for each source of competitive advantage, **how important a role it plays in the success of your company** in the **wood value chain of your country**?

Try to assess the wood value chain holistically, if you feel this is not possible, please specify the link of the wood value chain you are assessing:.....

*These criteria are suggested by Kaplinsky and Morris in "Handbook for value chain research" and were completed with some BASAJAUN project partners' contributions.*

Sources of Specific competitive advantages	1: not important	2. minor importance	3. moderately important	4. important	5. critically important
Good quality of the final product sold					
Broad offer of many different groups of products					
The size of your company					
Low selling prices					
Access to raw material					
Access to human resources in sufficient quantity/quality					
Committed and long-term workers					
Compliance to specifications (ex. quality standards)					
Delivery reliability					
Level of client service					
Transport distance to the main markets					
Access to transport infrastructure					
Capacity for quick/flexible response to buyers' orders					
New technical properties of the products/services:					
Very specific/niche products/services					
Technical/process innovation based on private RDI					
Technical/ process innovation through joint projects/open innovation					
Environmental compliance and its marketing:					

Reference of your products/services to regional characteristics (typical/traditional/regional)					
Packaging as a whole					
Better marketing capabilities and/or strong brand notoriety					
Regional support (province/city/municipality)					
Self-financing (savings, remittances, family)					
Access to foreign capital (headquarters located in another country/substantial share of capital owned by foreign company)					

2. Does your company have to adapt its competitive strategy often or is it fairly stable? Why?

.....

.....

3. Are there any new players emerging in your link of value chain and causing changes on the market ? If so, how often and what changes on the market are forcing?

.....

.....

**C. Concerning BARRIERS TO THE ENTRY in the wood value chain:**

Each company that is part of a value chain tends to construct, or to take advantage, of barriers to entry. It is a way to **protect one's company from competition** (Source: Kaplinsky and Morris: a Handbook for value chain research). Barriers to entry are often regulatory or judiciary.

1. For a company wishing to enter the wood value chain in your country, could you say if the following barriers to entry are key or not?

Try to assess the wood value chain holistically, if you feel this is not possible, please specify the link of the wood value chain you are assessing:.....

Barriers to entry	1: is not a barrier to entry	2: minor barrier- easy to overcome	3: barrier but can be overcome	4: strong barrier which is hard to overcome	5: extremely strong barrier to entry
Access to transport infrastructures: roads, harbours, internet, etc					
Access to Distribution channels					
Access to the best technology					
Development of intangible assets (know-how, IP, brand loyalty)					
Land use planning					
Government policy and Legal requirements					
Capital requirements					
Support from the financial sector (access to working and investment capital)					
Power of present companies to regulate new entrants in your link of value chain					
Other regulations Example, if you wish:					

#### D. Concerning the GOVERNANCE of the wood value chain:

##### 1. Who sets the formal/informal rules and standards?

*In all countries, some rules are set by law, others by collective governance, others by the main companies. But in each country, there are probably a few major ways to set standards and rules.*

*Example in France, coming from the meat value chain: all professional federations of this value chain have decided that all suppliers of the chain, from farmer to meat wholesaler, must be paid 21 days after invoice. It has been approved by Government.*

*Second example in France: complying with PEFC FSC is becoming a pre-requisite for forest owners selling to some cooperatives or paper industries, even though there is no law to enforce it.*

\*What is the importance of different systems of setting and enforcing rules and standards in the wood value chain in your country?

(1: no importance; 2: little importance; 5: very important).

	1	2	3	4	5
Decisions concentrated amongst some stakeholders of <u>a single</u> link of the chain					
Decisions concentrated between 2-3 links of the value chain					
Collective governance system including all links of the value chain					
Bigger companies take over coordinating tasks of value chain					
Legislative governance (law parameters governing the value chain)					
Judicial governance (monitoring the conformance to laws, standards - External audits)					

##### 2. Who has greater power in negotiating contracts, in bargaining?

*Think of the main product of your company or of the relations that account for the biggest share of supply/sale for you.*

\* Power of negotiation balanced between the companies (by collective governance or not)? YES/NO

\* The companies of a particular link in the value chain have the greatest bargaining power? YES/NO

If yes, which link? .....

\* A few large companies, in different links of the value chain have the greatest bargaining power? YES/NO

If yes, in what links are they?.....

3. Did you implement any common management system with your partners? Examples: TQM-Total Quality management system, lean production, ISO 9000 Quality management system, ISO 1400 environmental management system.

.....

## E. STAKEHOLDERS' COOPERATION inside the wood value chain:

### 1. Formal/informal cooperation between suppliers and buyers **in the wood value chain:**

To answer this question, please think of the main product of your company, or of the relations that account for the biggest share of supply or sale in your company. Criteria such as: necessity or not of inspection, information exchange (rarely or very frequently and in an informal manner), ordering procedure (stressful or well known), contractual relationship, shared expertise and payment terms, can describe the level of cooperation between buyers and sellers.

Tick the box under the answer for your company/organization, with an „X ”

Level of your collaboration with:	Short term/ opportunity based exchange	Repeated transactions	Long term relations	Partnership	Strategic alliance
Main Buyers					
Main Suppliers					
Research institutes					
Business clusters					
Example of collaboration with other links in value chain (forestry, sawmills, architects, recycling, construction companies, etc.):					

\*To which stakeholders you provide services, supporting functions? What are this services and support functions ?

.....

\*Which services, supporting functions, resources you outsource?

.....

\*Do you share any services, key resources, technology, functions (joint purchase, joint marketing) with your stakeholders?

.....

### 2. What is level of information flow with your stakeholders?

Level of information flow with:	No information flows	A little information flows	Regular information flows	Intense information flows	Very intense information flows
Main Buyers					
Final consumers					
Main Suppliers					
Research institutes					
Business clusters					
Example of information flows with other links in value chain (forestry, sawmills, architects, recycling, construction companies, etc.):					

\*If possible, give a concrete example of an information flow between companies of distinct links of your value chain: .....

\*What type of information is exchanged (operational or strategic) ? .....

How?..... \*With what positive consequence(s)? .....

\*Is there any flow of knowledge or Intellectual Property in between stakeholders?

.....

3. Material flow

a) What are your main inputs and who are your main suppliers?

.....  
.....  
.....

b) What are your main outputs and who are your buyers?

.....  
.....  
.....

c) Can you draw the part of the value chain-connections covered by your company? (You can also include flow of inputs, outputs, flow of waste )

**F. BOTTLENECKS in the wood value chain:**

1. What problems do you see in the cooperation between different actors of the value chain?

*Please give 1->3 examples. Please indicate in what link(s) of the value chain are the actors.*

.....

2. Are there any areas to improve e.g. in terms of the flow of information/material flows?

.....

### G. OPPORTUNITIES OF UPGRADING in the wood construction value chain:

To upgrade is to raise the quality of a product/service, raise the classification and usually the price of it and/or to extend the usefulness of it in comparison with the competitors (Merriam-Webster Dictionary, "Handbook for value chain research" - Klapinsky and Morris)

#### 1. What are the prospects and possibilities of upgrading, for your company:

Try to assess the wood value chain holistically, if you feel this is not possible, please specify the link of the wood value chain you are assessing:.....

	1: no possibility	2: a few possibilities	3: possibilities	4: many possibilities	5: huge possibility
Through changing your mix of activities within your link of the value chain					
<b>Explain if you wish:</b>					
Through moving from one link of the value chain to another link					
through improving existing products					
<b>Example if you wish:</b>					
through improving the efficiency of processes					
<b>Example if you wish:</b>					
through improving products and processes <b>by cooperation between several links</b> of the wood value chain					
<b>Example if you wish:</b>					
Through relocating the production from rural to urban area					
Through relocating the production from urban to rural area.					

#### 2. Are there buyers/mechanisms which block upgrading of suppliers? Which?

\*Group/type of buyers: .....

\*Mechanisms: .....

#### 3. Training and quantity of labour available:

\*Is there enough labour with the skills you need to upgrade your products/services? YES/NO

\*Idea(s) of improvement in this field? .....

#### 4. Which trends will your organization follow in the future? Where do you see opportunities for cooperation and open innovation with other organizations?(especially related to digital technologies)

.....  
.....

#### 5. Which processes/tasks needs to be digitalized for cooperative upgrading of value chain?

(examples: customer services, marketing, sales, production, management, controlling and finances, etc.).....  
.....

#### 8.4 Annex 4: Survey for companies: Global analysis of the wood value chain by qualitative methods

### Informed Consent for Anonymous Interview / survey

This general informed consent model is designed to support BASAJAUN researchers in the deployment of an informed consent procedure that intends to comply with the ethical standards acknowledged by the European Commission in H2020 projects regarding research with human participants when inviting them to participate in an **anonymous interview/survey** designed to avoid the processing of any personal data.

If this anonymity cannot be achieved by design, an informed consent that also asks for consent regarding personal data processing and that complies with General Data Protection Regulation and national law must be used.

Support of ethics experts and/or data protection officers or legal departments must in any case be sought to **adapt the model to the specific cases**.

<b>Project acronym</b>	BASAJAUN		
<b>Project Name</b>	Building a Sustainable Joint between rural and Urban areas through circular and innovative wood construction value chains		
<b>Grant Agreement no.</b>	862942	<b>Financed by</b>	EUROPEAN COMMISSION
<b>Start date</b>	01/10/2019	<b>End date</b>	31/09/2023
<b>Programme</b>	H2020	<b>Website</b>	www.basajaun-project.eu

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 862942

### 3. INFORMATION SHEET

#### 1.5. PURPOSE OF THE STUDY

This document is used to inquire about building with wood value chain for BASAJAUN project, financed by the European Commission. We are thankful for your cooperation.

The project itself take a holistic approach to improve and upgrade building with wood value chain. It's goals are to create better environment for rural development, to improve added value in construction sector and to create an open innovation platform. This will be a platform where companies can connect, innovate together, improve and upgrade their added value in value chain.

The purpose of this survey is to highlight from your point of view the most critical problems and most convenient solutions, for the value chain area you experience. Open and closed questions will be used. Final objectives are to recognize the most critical points in value chain, barriers, interactions among stakeholders and opportunities for improvement. A special attention will be paid to the adoption of innovative business models taking advantage of digitalization and industrialization of the processes.

We will do it by following agenda:

- competitive advantages
- barriers to entry
- governance of wood value chain
- stakeholders cooperation
- bottlenecks in wood value chains
- opportunities of upgrading

**Research method** - The research method will be an online interview/survey. The interview/survey will take 60+ minutes.

**Results of the study** - The results of the study will be integrated in the project report "D1.4 – Holistic approach to the building with wood value chain". As the interview/surveys are anonymous, and the responses will be aggregated into conclusions, no personal data will be processed nor published.

**Risks, discomforts or disadvantages versus benefits of participating** - No particular risks, discomforts or disadvantages are foreseen for participants in this study. On the other hand, with your answers you would be providing an important contribution to research and development in the area of wood-construction.

In any case, your participation shall be entirely voluntary, and you have the right to refuse to participate and to withdraw participation or data at any time (before giving consent or after) without any consequences.

**Consent expression** - If you agree to participate, your consent will be expressed by ticking a box at the end to this information sheet.

**Questions or clarifications:** For any questions or clarifications that you may need, please ask the contact researcher(s) identified here below (section 1.4 of this information sheet).

#### 1.6. INFORMATION / DATA NEEDED TO PERFORM THE STUDY

The anonymous information that you may provide will be exclusively used to perform the study.

*This model assumes:*

*-that the informed consent form only includes date and a tick-box to give consent. The reason of this is avoiding handwritten signature, because some handwritten signatures may include personal identifiers / data (name and surname).*

It will be removed at the date of completion of the study.

*This model assumes:*

*- that the GA obligation of keeping records for a period of five years after the payment of the balance (Article 18) can be met by documenting the methodology followed to perform the study instead of keeping the information itself (interviews/surveys answered by participants)*

*- that the information provided by participants will not be re-used for further research purposes.*

The study is expected to conclude by 30/09/2020.

*Date of the expected approval of the periodic or final reports of the project period where the deliverables related to the study will be approved by the EC.*

#### 1.7. ANONYMITY OF THE INFORMATION PROVIDED

Information on anonymisation procedures, during the study including possible publications, and organisational and technical procedures put in place. For example:

- The interview/survey has been designed to avoid obtaining personal data from you
- Only generalized, broad categories are used regarding, gender or type of occupation, type of company
- The researchers will perform an anonymity check before merging the anonymous information resulting from participants answers and delete, pseudonymise, generalise or categorise any datum that could lead to indirect identification of the participant or any other third person
- The informed consent form only includes date and a tick-box to give consent
- Privacy in publications: the anonymisation procedure assures also that only anonymised information and conclusions will be used in any possible publication arising from the research study or containing references to it.
- All information provided by participants will be deleted at the date of completion of the study.

#### 1.8. ORGANISATION RESPONSIBLE and CONTACT RESEARCHER(S)

**Institut technologique FCBA (Forêt Cellulose Bois-construction Ameublement)** is the organisation responsible of the study within project BASAJAUN.

The contact researcher(s) you can contact regarding the participation in this study:

- Jean-Denis Lanvin [jean-denis.lanvin@fcba.fr](mailto:jean-denis.lanvin@fcba.fr)
- Jean-Luc Kouyoumji [Jean-Luc.KOUYOUMJI@fcba.fr](mailto:Jean-Luc.KOUYOUMJI@fcba.fr)

#### 4. CONSENT SIGNATURE PAGE

I hereby declare:

- I am 18 years or older and I am competent to provide consent;

*This model assumes that the research is not involving children (or other persons unable to give consent). If it does, the guidance included in EU Grants: Horizon 2020 Guidance —How to complete your ethics self-assessment: V6.0 – 23.07.2018*

[http://ec.europa.eu/research/participants/data/ref/h2020/grants\\_manual/hi/ethics/h2020\\_hi\\_ethics-self-assess\\_en.pdf](http://ec.europa.eu/research/participants/data/ref/h2020/grants_manual/hi/ethics/h2020_hi_ethics-self-assess_en.pdf)

- I have been fully informed about the aims and purposes of this study and the conditions of participation;

- I understand that there is no compulsion to participate and that, if I choose to participate, I may at any stage withdraw my participation.

..... Date (dd/mm/yyyy)

☐

*Tic box for acceptance (X)*

## SURVEY: Global analysis of the wood value chain by qualitative methods

Gender: ☐ Female ☐ Male

### A. The SOURCES OF COMPETITIVE ADVANTAGE in the wood value chain:

This part's goal is to describe the relative importance of different special skills of contractors that can help them keep a good position in the value chain to determine their prices or to bargain.

A competitive advantage is the **attribute** that allows an organization or company to outperform its competitors.

#### 4. Concerning the SOURCES OF COMPETITIVE ADVANTAGE in the wood value chain

Could you say, for each source of competitive advantage, **how important a role it plays in the success in the wood value chain of your country?**

Try to assess the wood value chain holistically, if you feel this is not possible, please specify the link of the wood value chain you are assessing:.....

*These criteria are suggested by Kaplinsky and Morris in "Handbook for value chain research" and were completed with some BASAJAUN project partners' contributions.*

Sources of Specific competitive advantages	1: not important	2. minor importance	3. moderately important	4. important	5. critically important
Good quality of the final product sold					
Broad offer of many different groups of products					
The size of company					
Low selling prices					
Access to raw material					
Access to human resources in sufficient quantity/quality					
Committed and/or long-term workers					
Compliance to specifications (eq. Quality standards )					
Delivery reliability					
Level of client service					
Transport distance to the main markets					
Access to transport infrastructure					
Capacity for quick/flexible response to buyers' orders					
New technical properties of the products/services:					
Very specific/niche products/services					
Technical/process innovation based on private RDI					
Technical/ process innovation through joint projects/open innovation					

Environmental compliance and its marketing:					
Reference of products/services to regional characteristics (typical/traditional/regional)					
Packaging as a whole					
Better marketing capabilities and/or strong brand notoriety					
Regional support (province/city/municipality)					
Self-financing (savings, remittances, family)					
Access to foreign capital (headquarters located in another country/substantial share of capital owned by foreign company)					

**B. Concerning BARRIERS TO THE ENTRY in the wood value chain:**

Each company that is part of a value chain tends to construct, or to take advantage, of barriers to entry. It is a way to **protect one's company from competition** (Source: Kaplinsky and Morris: a Handbook for value chain research). Barriers to entry are often regulatory or judiciary.

2. For a company wishing to enter the wood value chain in your country, could you say if the following barriers to entry are key or not?

Try to assess the wood value chain holistically, if you feel this is not possible, please specify the link of the wood value chain you are assessing:.....

Barriers to entry	1: is not a barrier to entry	2: minor barrier- easy to overcome	3: barrier but can be overcome	4: strong barrier which is hard to overcome	5: extremely strong barrier to entry
Access to transport infrastructures: roads, harbours, internet, etc					
Access to Distribution channels					
Access to the best technology					
Development of intangible assets (know-how, IP, brand loyalty)					
Land use planning					
Government policy and Legal requirements					
Capital requirements					
Support from the financial sector (access to working and investment capital)					
Power of present companies to regulate new entrants in your link of value chain					
Other regulations Example, if you wish:					

### C. Concerning the GOVERNANCE of the wood value chain:

#### 4. Who sets the formal/informal rules and standards?

*In all countries, some rules are set by law, others by collective governance, others by the main companies. But in each country, there are probably a few major ways to set standards and rules.*

*Example in France, coming from the meat value chain: all professional federations of this value chain have decided that all suppliers of the chain, from farmer to meat wholesaler, must be paid 21 days after invoice. It has been approved by Government.*

*Second example in France: complying with PEFC FSC is becoming a pre-requisite for forest owners selling to some cooperatives or paper industries, even though there is no law to enforce it.*

\*What is the importance of different systems of setting and enforcing rules and standards in the wood value chain in your country?

(1: no importance; 2: little importance; 5: very important).

	1	2	3	4	5
Decisions concentrated amongst some stakeholders of <u>a single</u> link of the chain					
Decisions concentrated between 2-3 links of the value chain					
Collective governance system including all links of the value chain					
Bigger companies take over coordinating tasks of value chain					
Legislative governance (law parameters governing the value chain)					
Judicial governance (monitoring the conformance to laws, standards - External audits)					

#### 5. Who has greater power in negotiating contracts, in bargaining?

\*Power of negotiation balanced between the companies (by collective governance or not)? YES/NO

\*The companies of a particular link in the value chain have the greatest bargaining power? YES/NO

If yes, which link? Plywood...no

\*A few large companies, in different links of the value chain have the greatest bargaining power? YES/NO

If yes, in what links are they?.....

#### D. STAKEHOLDERS' COOPERATION inside the wood value chain:

##### 2. Formal/informal cooperation between organizations **in the wood value chain:**

Criteria such as: necessity or not of inspection, information exchange (rarely or very frequently and in an informal manner), ordering procedure (stressful or well known), contractual relationship, shared expertise and payment terms, can describe the level of cooperation between organizations.

Tick the box under the answer for your organization, with an „ X ”

Level of your collaboration with:	Short term/ opportunity based cooperation	Repeated cooperation	Long term relations	Partnership	Strategic alliance
Companies					
Public authorities					
Business clusters					
Standards organizations					
Local communities					
Example of other collaboration:					

\*To which stakeholders you provide services, supporting functions? What are this services and support functions?

.....  
.....

##### 4. What is level of information flow with your stakeholders?

Level of information flow with:	No information flows	A little information flows	Regular information flows	Intense information flows	Very intense information flows
Companies					
Public authorities					
Business clusters					
Standards organizations					
Local communities					
Final consumers					
Example of other information flows:					

\*If possible, give a concrete example of an information flow between organizations of distinct links of your value chain:

.....

\*What type of information is exchanged (operational or strategic) ? .....

How?..... \*With what positive  
consequence(s)? .....

\*Is there any flow of knowledge or Intellectual Property in between stakeholders?

.....

E. **BOTTLENECKS in the wood value chain:**

3. What problems do you see in the cooperation between different actors of the value chain?

*Please give 1->3 examples. Please indicate in what link(s) of the value chain are the actors.*

.....

4. Are there any areas to improve e.g. in terms of the flow of information/material flows?

.....

**F. OPPORTUNITIES OF UPGRADING in the wood construction value chain:**

*To upgrade is to raise the quality of a product/service, raise the classification and usually the price of it and/or to extend the usefulness of it in comparison with the competitors (Merriam-Webster Dictionary, "Handbook for value chain research" -Kaplinsky and Morris)*

**6. What are the prospects and possibilities of upgrading in wood value chain:**

Try to assess the wood value chain holistically, if you feel this is not possible, please specify the link of the wood value chain you are assessing:.....

	1: no possibility	2: a few possibilities	3: possibilities	4: many possibilities	5: huge possibility
Trough improving resource efficiency					
<b>Example if you wish:</b>					
Trough adopting new technologies					
<b>Example if you wish:</b>					
Through improving the efficiency of processes					
<b>Example if you wish:</b>					
Through improving products and processes <b>by cooperation between several links</b> of the wood value chain					
<b>Example if you wish:</b>					
Through relocating the production from rural to urban area					
Through relocating the production from urban to rural area.					

**7. Training and quantity of labour available:**

\*Is there enough labour along the value chain with the skills to upgrade products/services? YES/NO

\*Idea(s) of improvement in this field? .....

**8. Where do you see future opportunities for companies in wood value chain to cooperate and innovate together? (especially related to digital technologies)**

.....

**9. Which processes/tasks needs to be digitalized for cooperative upgrading of value chain?**

(examples: customer services, marketing, sales, production, management, controlling and finances, etc.).....

.....

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Basajaun is a European innovation action about sustainable building with wood. The main objective is to demonstrate how wood construction chains can be optimized to foster both rural development and urban transformation whilst being connected with sustainable forest management in Europe. The consortium comprises 29 partners from 12 countries including 8 leading research and technology organizations, 3 universities, 15 companies and 4 other public and sectoral organizations. The project is coordinated by the Tecnalia Research and Innovation Foundation in Spain





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