EDIH DATAlife Project

D6.3. Strategic report on digital & (WOOD)

EDIH-DATAlife Digital Europe Programme (DIGITAL)

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"The services contained in this Service Proposal, if the SME is a beneficiary of the PADIH, will be financed by the European Union-Next Generation EU and the Recovery, Transformation and Resilience Plan; and supported by the Ministry of Industry, Trade and Tourism and EOI"

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CURRENT STATE OF THE SECTOR: LEVEL OF DIGITALISATION, CAPABILITIES AND BARRIERS

Thanks to the sectoral roundtables organised within the framework of EDIH DATAlife, together with a mapping campaign and surveys of companies in the sector, relevant conclusions have been drawn on the current state of digitalisation in the wood sector.

Firstly, the vast majority of companies (around 90%) have a low or medium-low level use of new technologies, although there is also a favourable cultural base that drives the progressive incorporation of digital tools and a generalised proactive attitude towards adaptation.

This trend has also been observed at national level, as evidenced by research carried out within the Industria Hábitat 4.0 project[1], completed in 2018. According to this study, the average level of digitalisation among the companies interviewed in the sector is approximately two stages below that of the Spanish manufacturing industry as a whole, an industry which itself is not among the European leaders. The study also concluded that digitalisation represents a critical pathway to ensure the long-term competitiveness and survival of companies in the sector.

Secondly, the degree of digitalization varies depending on the size of the company. Larger companies are forced to digitize due to the complexity of their operations, while many SMEs concentrate their efforts on other actions that they consider more urgent. In addition, the following specific situations are identified:

- In family businesses, the perception persists that digitalization is not a priority, which reflects the need for a cultural change.
- Raw material suppliers do not always have the means for correct digitalization, as timber harvesting is often not their main occupation, but the added value to the final product.

[1] https://congresoindustria.gob.es/cnip/guia-para-la-digitalizacion-del-sector-del-mueble-industria-habitat-4-0/#:~:text=Seg%C3%BAn%20el%C2%A0estudio%20realizado%20dentro%20del,la%20supervivencia%20de%20nuestras%20empresas

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- Companies with greater digital maturity stress the importance of conducting pilot tests before undertaking significant investments, initiating local projects in the short term and gradually adjusting them to their needs.

Thirdly, the relevance of international projection is highlighted. There is a consensus that an isolated company has no future, so it is essential to be connected both locally and at European level, establishing collaboration networks that complement services and solutions. In this sense, it must be emphasized that the Galician sector operates within a broader context:

- **Galicia:** the sector is supported by the Galician Agency of the Forestry Industry (Xera), which publishes the Galician Forest-Wood Chain Report in collaboration with the University of Vigo. Research capabilities are provided by centers like CIS Madeira and the CIF Lourizán, with the latter being recently highlighted by the Xunta as a symbol of national forest research.
- **Spain**: at a national level, the sector is supported by the Ministry of Agriculture, Fisheries and Food (MAPA) through the Digitisation Strategy for the Agri-Food and Forestry Sector and Rural Areas and represented by confederations like UNEmadera and technological institutes like AIDIMME. The data situation is clarified by the Report about Forests and the Forest Sector in Spain (ISFE), published periodically by the SECF.
- **Europe**: the industry is represented by the European Confederation of Woodworking Industries (CEI-Bois), comprising over 160,000 companies. Relevant legislation is driven by the European Parliament. European networks that support innovation and knowledge exchange in the wood sector also exist, such as InnovaWood, of which XERA is an active member.

Finally, the results of the surveys reveal other key aspects about the level of digitalisation in the sector:

- **Automation Gaps**: the implementation of interconnected and intelligent systems between companies in the value chain is very low, reaching only 20% of the available automation potential.
- **Business models**: digital services are rarely used to create value or new business models (around 15% of their potential). Its application is mainly focused on efficiency and cost control.

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- **Sustainability**: there is an incipient interest in leveraging digital transformation to advance sustainability, with approximately 25% of the potential currently in use.
- **Trazability and Regulation**: one of the most prominent concerns among the partners is the adaptation to the new Regulation on Deforestation-free Products (EUDR), which requires guaranteeing the full traceability of wood to be able to market it in the EU. Compliance will require advanced digital data management, traceability and document verification solutions.
- **Digital skills of employees**: there is a widespread concern about these, with a potential for progress measured of close to 50% in skills and digital empowerment. In this sense, within the framework of the project, a gap analysis was carried out, identifying several training needs with no or only partial coverage:
- **Application of new technologies for improved energy efficiency**: the current training offer is not specifically tailored to the needs of the food/wood sector.
- Advanced GIS applications, particularly those related to the Galician Forest Inventory: no dedicated training currently exists in this area.
- **Data spaces**: no specialised training has been identified.
- **Introduction to data spaces**: only one relevant European training course was found, primarily oriented to the agro-food sector.
- **Presentation of success cases to support the initiation of digital transformation processes**: although continuous workshops exist (mainly from IGAPE) to promote enabling technologies, they generally lack in-depth success cases and reach a limited audience.
- **IoT sensors and devices**: a new master's degree in IoT is planned for 2024 and HIBA offers free courses covering forest sensing, but these do not address factory-specific applications.
- **Technologies to ensure wood traceability in line with EUDR regulation**: this is a topic of significant concern for the sector, yet training options are extremely limited due to its high level of specificity.

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- **Technologies for data collection and integration**: no specific regulated training exists. Some non-regulated courses cover data acquisition (e.g., HIBA Remote Sensing), but they do not fully meet the sector's requirements.

These conclusions are consistent with the evidence reported by national and European institutions. The wood and furniture sector in both Spain and Europe is characterised by a high degree of fragmentation, predominantly composed of micro and small enterprises.

- In Spain, 88% of furniture companies have fewer than 10 employees, while only 1.6% exceed 50 staff—yet these larger firms account for nearly half of the sector's total turnover.[2]
- Similarly, at the European level, the industry comprises around 180,000 mostly small-scale enterprises, making it a critical but structurally atomised pillar of the EU bioeconomy.[3]

These sources emphasise that this widespread dominance of SMEs and family-run businesses poses a significant barrier to digital transformation, as limited financial and human resources constrain the adoption of advanced technologies, integrated systems and data-driven solutions.

For this reason, both the European Union and the Spanish government have adopted specific and targeted strategies to accelerate digitalisation in the forestry and wood sectors. Among them are the EU's New Forest Strategy for 2030 and the National Digitalisation Strategy for the Agri-Food, Forestry and Rural Sectors, promoted by the Spanish Ministry of Agriculture.

In this context, efforts by the Galician forest administration to address some of these challenges should also be highlighted, particularly through the public tools inside the *Digitalization & Decarbonization" (D&D) strategy*:

- The **Galician Continuous Forest Inventory (IFCG)**, which combines satellite remote sensing, LIDAR technology, and fieldwork to provide precise and

[2] https://www.feriahabitatvalencia.com/el-sector-espanol-del-mueble-mantiene-el-pulso-productivo-a-pesar-del-contexto-geopolitico-y-la-dana/#:~:text=mayor%20parte%20de%20las%20empresas,Comunidad%20Valenciana%20con%20el%2011%2C6

[3] https://www.cei-bois.org/press-releases#:~:text=The%20Autumn%20General%20Assembly%20of,represent%20more%20than%20180%2C000%20companies

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updated information. This marks "a before and after for the sector" in forest planning.

- The **Forest Traceability (FORTRA)** initiative, which uses blockchain technology for wood traceability.
- The collaborative application **Bikenta,** which provides a digital tool for sustainable forest management and FSC certified product traceability. The advanced version, Bikenta MPLUS, was co-financed by FEDER funds and uses LIDAR data to elaborate predictive reports on wood structural qualities.

KEY TECHNOLOGIES IN THE SECTOR

The surveys carried out within the framework of EDIH DATAlife reflect the current situation of the wood sector in Galicia in relation to the use of digital technologies:

- Widespread use of **cloud services** for office tasks, email, shared documents and other basic tools.
- Very limited use of industrial robots.
- Increasing incorporation of sensors and data capture systems in industrial plants.
- High sensitivity towards **physical cybersecurity** ("*hard*"), although lower in digital solutions.
- Total absence of **additive manufacturing or 3D printing** in the surveyed sample.
- Still basic use of **management software** focused on administrative processes.

In addition, based on answers to questions designed jointly by the DATAlife teams and the Madeira e o Deseño (CMD) cluster, technologies of interest for future incorporation were identified among the surveyed companies:

- **MES (**Manufacturing Execution Systems) and **blockchain** systems.
- Algorithmic and robotic automation applied to production processes.
- Sensorization and the and Industrial Internet of Things (IIoT) adapted to the needs of the plants.

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- Immersive technologies such as **virtual reality** (VR) and **augmented reality** (AR).
- 3D printing.
- Search for applications of **generative AI** in specific processes.

This survey allows us to situate the wood sector in Galicia in terms of its level of technological maturity, priority technologies and the main needs detected. Based on these, various lines of action with associated projects and their success indicators (KPIs) are proposed, which are shown in the table attached on the last page of the Annex.

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TEN KEY RECOMMENDATIONS FOR PUBLIC ADMINISTRATION

1. Promote **specialized digital training** programs in artificial intelligence (AI), Internet of Things (IoT) and data management aimed at the wood sector.
2. Funding **digital traceability pilot projects** to ensure compliance with the European Regulation on Deforestation-free Products (EUDR).
3. Encourage the creation of an **interoperable and secure sectoral data space** that facilitates collaboration between companies.
4. Promote the adoption of **European digital sustainability standards** and eco-labelling schemes.
5. Promote public-private collaboration in industrial automation, especially to accelerate adoption in SMEs.
6. Stimulate investment in sensorization technologies and Life Cycle Assessment (LCA) tools.
7. Facilitate access to **digital computing and simulation infrastructures** (High Performance Computing – HPC, AI).
8. Encourage **digital integration along the entire value chain**, from the forest to the final piece of furniture.
9. Strengthen aid for the **digitalisation of rural SMEs**, to avoid territorial gaps.
10. Incorporate **digital traceability as a requirement** in green public procurement policies.

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ANNEX I. STRATEGIC DIGITALISATION PLAN FOR THE TIMBER SECTOR

LINE OF ACTION	PROJECT	SCOPE	OBJECTIVE	INVOLVED AREAS	KPIS
Automation of administrative and documentary tasks	Document generation and validation system (contracts, budgets, reports)	Integration of language models (LLMs) with existing ERP	Reduce document preparation time by 50%	Administration, purchasing, sales	- Reduction in document preparation time- Decrease in manual administrative tasks
Production and logistics optimization	Intelligent production planner	Predictive demand models and dynamic manufacturing planning	Reduce downtime and unwanted stock	Production, warehouse, logistics	- Increase in plant productivity- Reduction in downtime- Decrease in unwanted stock
Customer service and internal support	Multichannel chatbot (web, WhatsApp, intranet)	Automatic responses to FAQs and internal document consultation	Free up 30% of human resources in customer service	Commercial, after-sales, HR	- Average customer response time- Reduction in customer service workload
Intelligent stock and traceability management	Consumption and materials prediction system	AI to optimize purchases, inventory rotation and minimize stock-outs	Reduce immobilized stock by 20%	Logistics, purchasing, production	- Improvement in stock rotation- Reduction in immobilized stock
Marketing and product personalization	Content generator and intelligent 3D configurator	Automate content creation for social media, catalogs, web and personalized designs	Improve customer acquisition and accelerate conversion	Marketing, sales	- Increase in conversion rate- Increase in potential customers captured