

**CIRCULAR ECONOMY IN THE FURNITURE
INDUSTRY:**

**OVERVIEW OF CURRENT CHALLENGES AND
COMPETENCES NEEDS**

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circular business training for the
furniture and woodworking sectors



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CIRCULAR ECONOMY IN THE FURNITURE INDUSTRY: OVERVIEW OF CURRENT CHALLENGES AND COMPETENCES NEEDS



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Introduction

The European furniture industry is currently facing a variety of economic, regulatory and environmental challenges. Increasing global competition with manufacturing growth in emerging markets, improved logistics and declined tariffs on foreign trade puts increasing pressure on EU-based companies. In the domestic market, increased demand for low-cost items makes it difficult for companies focusing on long lasting and quality products to compete. Moreover, increased raw material, labour and energy costs within the EU also challenge business as usual practices. In order to face these existing threats, new practices and out of the box thinking are needed to renew the sector and make it more sustainable.

The circular economy provides a promising avenue to create more value in the sector by addressing simultaneously resource constraints, consumer value and profitability challenges. The transition from linear to circular however requires significant changes at micro, meso and macro levels, from innovation at business model and value chain level to the introduction of supporting policy measures.

This report provides an overview on how the circular economy is currently being implemented within the furniture sector. By focusing on existing practices, challenges and opportunities at the micro-level, the main objective of this report is to identify the necessary skills and competences needed to support the transformation of furniture companies towards a circular economy.

This report was developed in the framework of FURN360 (www.furn360.eu), an Erasmus+ EU founded project aiming at developing a novel curriculum supporting companies from the furniture industry to implement circular practices.

1. The EU furniture industry in a nutshell

This section provides an overview of the European furniture industry, highlighting figures of production, consumption and waste generation.

1.1 Production and Consumption

EU Member States manufacture 28% of furniture sold worldwide – representing a €84 billion market, employing approximately 1 million European workers. Most of the companies in the sector are SMEs. Italy (€17.5 billion), Germany (€14.5 billion), UK (€8.8 billion) and Poland (€7.1 billion) are the most significant furniture producers by value. The most significant exporters are Germany (€9.5 billion), Italy (€9.2 billion) and Poland (€8.7 billion), whilst the largest importers are Germany (€11.8 billion), UK (€6.6 billion) and France (€6.0 billion). European Member States are major consumers of furniture, estimated at €68 billion per year, with the EU28 being a net exporter. The largest consumers by value being Germany (€16.8 billion), UK (€14.2 billion), Italy (€10.2 billion), France (€9.0 billion) and Spain (€4.4 billion). This equates to a EU28 consumption of ~10.5 million tonnes of furniture per annum. A significant proportion of consumption includes wooden furniture, kitchen units and mattresses. The domestic sector accounts for 82% of furniture consumption, with the remaining 18% associated with B2B (business to business) consumption. Based on a total EU28 consumption of €68 billion, and consumption of ~10.5 million tonnes of furniture per annum this would be equivalent to: €55.8 billion and 8.6 million tonnes of domestic furniture consumption p.a. and €12.2 billion and 1.9 million tonnes of business furniture consumption p.a.

1.2 Waste generation and treatment

According to European Federation of Furniture Manufacturers (UEA) statistics, furniture waste in the EU accounts for more than 4% of the total municipal solid waste (MSW) stream. Waste arising from commercial sources is assumed to contribute 18% of total furniture waste generation across the sector. Total annual EU28 furniture waste equates to 10.78 million tonnes. According to European Federation of Furniture Manufacturers (UEA) statistics, 80% to 90% of the EU furniture waste in MSW is incinerated or sent to landfill, with ~10% recycled. Reuse activity in the sector is considered low. Where reuse does occur, it is mostly through commercial second-hand shops, social enterprise companies or charities. Some

furniture items are also exchanged via free and paid exchange platforms (such as eBay), though the number of items traded in this way is difficult to quantify. With respect to remanufacturing, the size of the European sector is estimated to be €300 million turnover, employing 3,400 European workers (less than 0.1% of the total furniture industry).

2. Circular economy in the furniture industry: challenges and current issues

2.1 Circular economy in a nutshell

The model of a circular economy presents an alternative to this linear system of accelerating waste production. It aims to conserve natural resources by substituting products with services and designing things to be used again and again before the materials are recovered. Finally, materials are recovered and recycled back into new resources, reflecting the cycling of elements in natural systems, in which the waste from one process is the food for another.

The circular economy has been hailed by businesses, moreover, as a way to marry environmental sustainability with profitability. McKinsey and the Ellen MacArthur Foundation have suggested that a circular economy represents an economic opportunity of more than \$1 trillion globally.

The circular economy rests on three principles:

1. *Preserve and enhance natural capital* by, for example, selecting required natural resources wisely and choosing, wherever possible, technologies and processes that use renewable or better-performing resources.
2. *Optimise resource yields*, that is to say design for remanufacturing, refurbishing, and recycling to keep components and materials circulating in, and contributing, to the economy.
3. *Foster system effectiveness* by designing out “negative external impacts” such as reducing damage to human utility, and managing externalities, such as land use, air, water and noise pollution, release of toxic substances, and climate change.

6 key cycles can be highlighted to make furniture more circular:

- **Maintain** – using preventative maintenance to maximise product lifetime, e.g. a chair remains a chair;
- **Repair** – corrective maintenance , e.g. a chair remains a chair;
- **Reuse** – redistributing products through a change in ownership, e.g. a chair remains a chair;
- **Refurbish** – remanufacturing the product to optimize lifetime, e.g. by resizing a desk or changing the appearance of a chair through re-upholstering to extend ‘fashion’ service life, or resizing desks;
- **Re-purpose** – change functionality of the product, e.g. a desk becomes a table;
- **Recycle** – recovering the value of components and materials for feedstock as secondary materials in new products.

2.2 Existing challenges of the circular furniture industry

European environment bureau has identified the main challenges faced by the sector to move from a linear to a circular economy.

Materials and design challenges

- **Lower quality materials and poor design** – the move away from solid wood and metal furniture to cheaper materials, which restricts the potential for a successful second life. Weak product design and specification drivers – in relation to recycled content, reuse of components, product durability, and design for disassembly/reassembly, repair, reuse, remanufacture and recycling, the drivers for improvement are weak or absent.
- **REACH Regulation (on Registration, Evaluation, Authorisation and Restriction of Chemicals)** – legacy hazardous substances pose challenges and additional costs for recyclers, together with a lack of information on chemicals contained in products and on ways how to deal with them appropriately.

Demand-side challenges

- **Poor consumer information** consumers are rarely given guidance on how to maintain and repair furniture, in order to prolong and extend the product lifespan.
- **Availability of spares** – A lack of availability of spare parts encourages the purchase of new furniture over circular consumer patterns.
- **Weak demand for second-hand furniture** - the price differential between new furniture against the cost of second-life furniture, is not significant enough to drive more sustainable purchasing behaviour. This is coupled with poor awareness of the availability and benefits of sustainable furniture options, for both domestic and commercial purposes.
- **Poor demand for recycled materials** - end markets for recycled materials, post deconstruction, are underdeveloped, and in some cases, already saturated, with these associated market failures restricting further investment in recovery.

Closing the loop challenges

- **Limited collection and reverse logistics infrastructure** – currently there are weak drivers and underinvestment in the collection and logistics for furniture take-back. Producer responsibility mechanisms are not widely used in the furniture sector.
- **High cost of repair and refurbishment** – in many parts of the EU, transport and labour costs are high, making any significant repair and refurbishment costly, particularly where re-upholstery is required. In general, economies of scale and economic incentives are needed to make repair and refurbishment viable.

Policy challenges

- **Weak over-arching policy drivers** – typically furniture is not managed in accordance with the waste hierarchy, with reuse failing to be prioritised over recycling, incineration and landfill. Underinvestment in reuse, repair and

remanufacturing infrastructure limits the potential for furniture being managed in accordance with the principles of the waste hierarchy or the circular economy.

2.3 Opportunities to make the furniture industry more circular

Circular economy interventions have the potential to help counter the general challenges identified in the sector, with repair, refurbishment and remanufacture allowing value recovery, economic growth and job creation within the European furniture industry. Whilst recycling rates in the EU have improved through the introduction of policy mechanisms such as the Landfill Directive, there is minimal activity in higher-value circular resource flows, with remanufacturing accounting for less than 2% of the EU manufacturing turnover.

In terms of furniture in particular, whilst reuse of furniture is common, this tends to be on a small scale and with local social goals in mind rather than larger scale environmental and economic ones.

In order to support the transition, different supporting mechanisms could be promoted. The European furniture industries confederation EFIC supports a step-by-step approach, in order to grant a gradual, sustainable and realistic transition to the circular economy principles and where environmental sustainability principles are balanced with economically sustainable criteria.

As most of the companies in the sector are SMEs, supporting measures should be adapted to the size and scale of these companies. Educational (awareness of successful businesses cases, focused training programmes) and economical support (e.g. financial innovative projects, public incentives and technical assistance, circular tenders development) are key in order to support the transformation of companies. More precisely:

- **Production phase:** supporting incentives measures aiming at increasing resource efficiency through increased product life time, repairability, recyclability, efficient use of material.

- **Use phase:** measures to promote information and awareness to support consumer choices towards more responsible products, with a focus on materials sustainability information.
- **Disposal phase:** harmonization of Extended Producers Responsibility schemes that promote incentives for producers to take into account environmental considerations along the products' life, from the design phase to their end-of-life.
- **Circular procurement:** Public authorities at the National and European can boost circular economy principle in practice through public tendering. Green and circular criteria, as well as the promotion of novel business models (such as leasing of furniture) should be promoted.

3. Circular business models in the furniture industry: key skills and competences

As described before, supporting educational programmes are key to support companies on their transformation to circular economy. New skills, competences and capabilities are needed in order to implement circular business models. In the framework of the FURN360 project, we have identified throughout Europe 25 furniture companies active in the circular economy. Interviews, held between March and May 2018 in Belgium, Finland, Germany, Spain, France, The Netherlands, Italy and Sweden, allowed us to gather insights on the necessary skills and competences needed to develop circular business models relevant for the furniture industry. This section highlights the learnings of this research.

Table 1: Presentation of case studies

Code	Country	Circular business model	Informant position	Interview date	brief description of CBM
S1	Spain	clean loop /cascading loop	general manager	16-04-2018	FSC certified wooden frames for upholstered furniture, production of pellets
S2	Spain	clean loop	Manager	19-04-2018	Certified wood
S3	Spain	clean loop/short loop	CEO	20-04-2018	Eco designed furniture, transparency and reparability
S4	Spain	clean loop	Product and marketing manager	23-04-2018	Eco designed furniture
S5	Spain		Director	18-04-2018	furniture design using recycled material
S6	Spain	long loop	manager	16-04-2018	outdoor furniture design manufacturer
S7	Spain	clean loop	quality manager	16-04-2018	fixed seats and movable seating solutions for public spaces
S8	Spain	clean loop	Quality manager	18-04-2018	sustainable wooden door manufacturing
S9	Spain	long loop	technical director	20-04-2018	manufacturer of leather for the furniture industry using pre-consumer waste
S10	Spain	long loop	manager	13-04-2018	furniture manufacturer made of recycled wood
S11	Spain	clean loop	head of Administrative department	26-04-2018	manufacture of upholstered furniture
B1	Belgium	clean loop	Founders	23-03-2018	furniture design using unique reclaimed wood
B2	Belgium	long loop	project manager	11-03-2018	sustainable furniture design using local old furniture
B3	Belgium	long loop	coordinator	30-03-2018	
B4	Belgium	short loop	CEO	11-04-2018-	transformation of workspace through redesigned sustainable furniture

F1	France	long loop	CEO	21-03-2018 and 3-04-2018	interior design of spaces using reclaimed wood material
F2	France	long loop	CEO	9-04-2018	high end furniture designer made of reclaimed wood
F3	France	short and Long loop	director	20-03-2018	Social purpose through working with wood for urban furniture
N1	Netherlands	long loop and access loop	CEO	5-04-2018	design of sustainable furniture, leasing service
Se1	Sweden	clean loop, long loop, access loop	Founder	11-04-2018	design of sustainable furniture for public spaces
It1	Italy	clean loop, access loop	CEO	9-04-2018	design of modular sustainable furniture
De1	Germany	long loop, clean loop	manager	09.05.2018	Manufacturing of seating solutions with a focus on ecofriendliness
De2	Germany	long loop	director	19.04.2018	Manufacturer of furniture
De3	Germany	clean loop long loop	manager	09.05.2018	kitchen manufacturer with environmental concerns
De4	Germany	clean loop	manager	09.05.2018	Design of modular furniture
De5	Germany	long loop	manager	09.05.2018	Furniture manufacturer
Fi1	Finland	Access loop and short loop	sustainability Manager	21.05.2018	Furniture manufacturer and service provider in interior office solutions
FI2	Finland	Short loop	manager	25.05.2018	Retail of second hand design furniture

In order to provide a clear overview of these skillsets, we have classified the competences according to the various dimensions of the business model construct, using a backstage/frontstage approach.

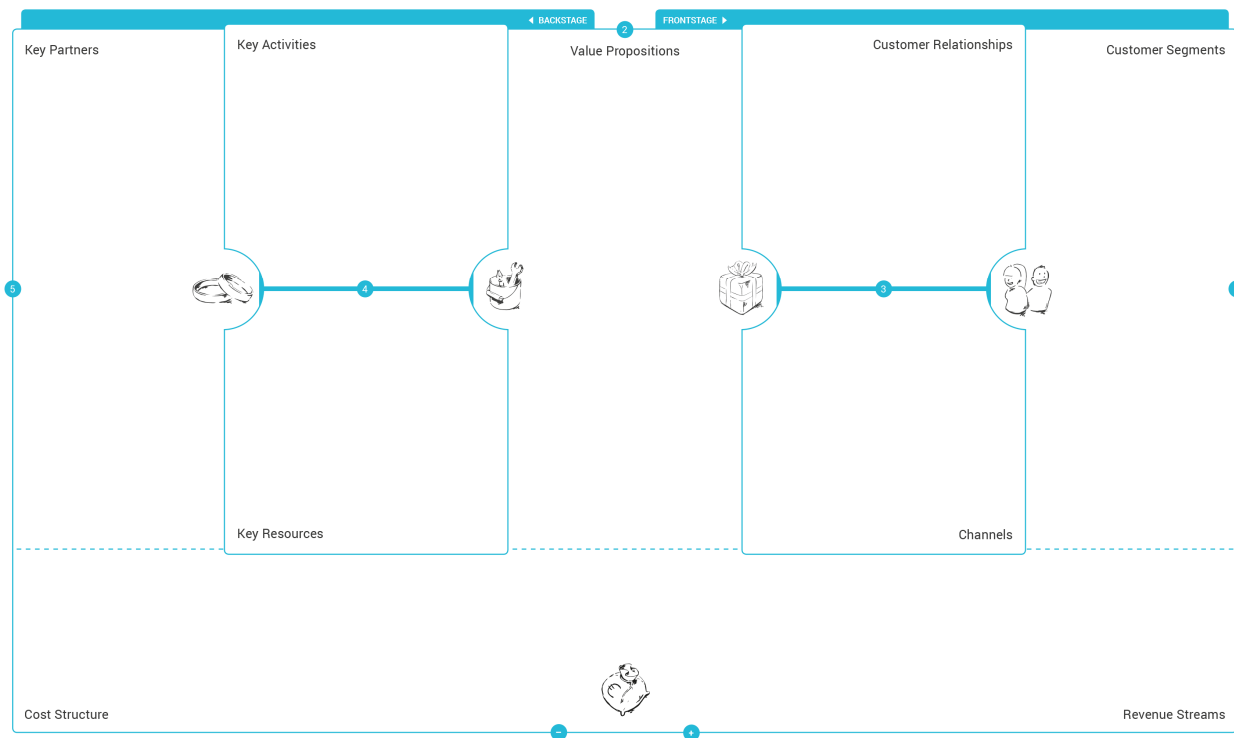


Figure 1: Business model construct

In the backstage side, we focus on the relevant skills necessary in the Resources, Activities and partners dimensions of the circular business model.

In the frontstage site, we highlight skills and competences in Value proposition, customer segments, customer relationships and channels.

Finally, we take a look at transversal competences that support both the frontstage and backstage of business model innovation.

3.1 Backstage skills

Key resources

Key resources are the main inputs that a company uses to develop its value proposition, service its customer segment and deliver the product to the customer. They are usually based on a combination of tangible and intangible resources. These assets support the creation of the end product and deal with the operational end of the business spectrum. They highlight the type of materials needed, the equipment required and the type of knowledge held by the staff employed. In the business models analyzed focusing on companies applying circular economy principles in the furniture sector, the following intangible resources were identified: 1) *Knowledge and skills in sourcing the right material and the right suppliers of ecological products*, 2) *Skills in acquiring new knowledge to process reclaimed material*.

Accessing the raw material (either reclaimed material collected locally or wood coming from sustainably managed forests) is the most critical aspect in the new business model development. This either requires knowledge and skills in developing a chain of custody certification for FSC/PEFC wood – if the strategy is to focus on responsible sourcing, or relevant skills in identifying and securing a stable source of reclaimed wood (either through partnerships with waste handling companies or local public authorities) if the business model focuses on reusing reclaimed materials. In the case of B4, the customer is also the provider of the raw material, as the company offers integrated solutions for upcycling existing furniture. Accessing this existing resource requires the implementation of a relevant logistics routine (collection, sorting, cleaning processes) that is only possible if the company has the right partners at hand. As they are driven by a strong ecological purpose, the circular furniture companies strive to use more ecological products in their manufacturing process. Finding substitutes to chemically processed glues, looking for alternatives to varnish by using natural oil – the use of ecological options requires to adapt existing manufacturing processes but also to search for the right eco-supplier.

Working with material which has previously been manufactured (in the furniture sector, the majority of circular business cases make use of reclaimed wood) has consequences on the way to handle and reprocess the resource: new skills need to be acquired throughout the production cycle (from design to manufacture) as the type of wood that is supplied generally comes in various batches and has different origins, different properties, and different

conditions. This needs to be analyzed, case by case. N1 manager, which has an extensive experience in working with reprocessed wood highlights this competence: *“Eight years ago we were learning things and today we still learn other things because there is always another type of wood coming up.”*

Despite existing studies highlighting the importance of clean technologies supporting the transformation to sustainable business models, technological novelties are often disregarded as the main resources necessary to produce circular furniture. On the contrary, working with reclaimed wood mainly requires manual work in order to put the wood back into its initial condition. As F1 manager points out: *“There is no need in technical innovation but in vision and adaptation depending on the material that you have to work with”.*

However, to make the transition successful, the staff needs to be aware of its limitations and search for new knowledge. This is often done through trials and errors in a process that is more timely than working with stable supplies. As B3 manager reflects, management has to communicate the sustainability values that drive the company to work in such manner, to make sure the staff understands and embraces this approach: *“you have to make sure that your co-workers want and can work in this way”.*

Key activities

Transforming a linear business model into a circular one calls for a number of key activities in order to operate successfully. Similarly to key resources, key activities are required to create and offer a renewed value Proposition, reach markets, maintain customer relationships, and earn revenues. Like key resources, key activities also differ depending on the business model type. In the furniture manufacturing sector, the production part is the main relevant set of activities. These activities relate to designing, manufacturing, and delivering a product of superior quality. As a circular furniture products aim to deliver a superior product with a minimum impact on resource use, *adopting, mastering and implementing eco-design skills* (1) is perceived the most important distinctive key activity along with *Research and innovation along untapped material use* (2).

Eco-design strategies are multiple and encompass various interventions throughout the life cycles of a product/service. Strategies such as design for environment, design for disassembly, design for modularity, design for recycling (design for material recovery), design for reuse and remanufacturing (design for component recovery), design for reliability,

design for maintainability, and design for end-of-life allow the manufacturer to increase the sustainability and circularity of their products to limit their impact on the environment in the various life-cycle phases. Circular furniture companies highlight the importance of these Design for X strategies. B4 manager for instance, stresses the significance of design for remanufacture as a key aspect in eco-design process to facilitate the transformation of used products into new ones. If most of the companies prioritize the use of eco-materials (ecological glues for instance) in their manufacturing process, thinking of the next life of the manufactured product seems to be more important to achieve a closed-loop process, as F1 founder discusses: *"we design our furniture in a way that we could easily assemble and disassemble the material and reuse it after its life cycle"*. Following a cradle-to-cradle approach N1 founder combines Design for Environment with Design for Remanufacture: *"We are also developing a new glue that would be biodegradable on 18-20 years so that we could reuse the wood when we get the tables back"*. Specific to the circular furniture sector, design skills are implemented once the resource (in this case the reclaimed wood) is acquired. B3 manager for instance stresses the need to *"readapt your design to the product and to the material"*. Eco-design skills however should not hide the need to develop products whose value proposition relies first on aesthetic. As F1 director points out: *"we think the environmental approach will only be successful if we offer a beautiful product. Design is at the service of the raw material, aesthetics at the service of ethics."*

Alongside eco-design capabilities, eco-innovation culture and environmental management system strategy are also highlighted. Larger scale companies interviewed have implemented environmental management systems to reduce their environmental impact. Innovation in using untapped material is also recognized as a recurrent pattern in circular furniture companies. Beyond product design and manufacture, circular companies in the furniture sector may also innovate to maximize the value of their waste. In the case of furniture manufacturer N1, the sawdust from the manufacturing process is sold to a local partner which uses the glucose present in the wood and mixes it up with out of date biscuits to make bio-alcohol. The pulp is used as filling for cat litter and compost, while a small part of the wood waste is also used to warm up a local farming facility. This cascading use of the various forms of wood by-products lead to close to zero-waste process, reinforcing both the environmental purpose of the company while providing additional revenues.

Key partners/network

Alongside Key Activities and Key Resources, creating a relevant value network of suppliers and partners is essential to make the business model effective. Opting for the right partnership is instrumental in making a business success or a failure. Reasons for partnership and collaboration may involve create new resource streams, access new skills or competences, create new markets presence or pooling resources to offer an integrated solution. If not all partnerships are key to the business, *the capacity to identify key actors and generate long-lasting collaboration* (1) is an essential feature of a successful business model innovation.

In order to close the loop or reinforce the sustainability of the final product/service offered to the customer, collaboration skills and the ability to use external expertise are of high importance. Belgian company B4 for instance, when not able to produce all the furniture requested by the client, offered the customer Cradle to cradle certified products manufactured by other companies as part of an integrated solution. The results led to an increased overall sustainability of the final service provided.

Collaboration skills also provide access to new projects and resources. F1's partnership with a local authority gave the company entree to waste management facilities allowing the company to access abundant and regular wood waste flows. In this win-win partnership, the company provided the authorities with figures on the amount of diverted wood waste, thus supporting the regional recycling/reusing targets. In the Netherlands, N1 developed a long term partnership with a company recovering materials from buildings, allowing it to get access to untapped wood material.

Long term commitment and trust in partnership development is also perceived as key. B4 has been developing its network of suppliers for 25 years and can count on the strength of these relationships to deliver its services. The partnerships also extend to the clients side. Long lasting relationships with clients provide the best word of mouth advertising. F2 developed a steady set of complementary partnerships to support its development. First, with a French waste management company. The company located its offices on the waste management site in order to directly access the wood waste collected by its partner. The company also partnered with a used furniture collector. In order to increase its commercial reach at European level, the company teamed up with one of their client (a large office

furniture brand) to distribute their production, giving it more credibility and an extended customer outreach

3.2 Frontstage skills

Value proposition

The value proposition of a company provides a unique combination of products and services which provide value to the customer by resulting in the solution of a problem the customer is facing or providing value to the customer. In the furniture sector, if the conventional value proposition is to provide access to high-quality, functional design furniture, the emotional dimension of the product, translated in a strong responsible and sustainable ethos, is always combined to the functional and aesthetic dimensions generally promoted in the sector. In that respect, circular furniture manufacturers need to develop skills and competences associated to the *sustainable value* (1) associated with their offerings, while responding to their customer needs, through *product customization* (2) and *product uniqueness* (3) features.

Product customization is a strong feature in circular value proposition of the furniture industry. As Belgian company B3 coordinator states: “Everything is custom made”. Client needs and preferences are clearly identified. A matching between existing wood in stock and client preferences is being made. Similarly Italian furniture company It1 develops its kid’s furniture design with a strong focus on product personalization. Clients are invited to download tutorial on the company website to transform or upgrade the initial purchase, allowing the client to give a personal and unique feel to the product. Associated with product customization, *product uniqueness* is a common feature in circular furniture value propositions. Belgian company B1 for instance doesn’t search for the perfect wood but sees value in working with imperfect and unique trees with provides a sense of uniqueness to the product and offers a story to the client on the origin of the tree used to develop the product.

Associated services are often included in the value proposition. Beyond selling furniture, circular furniture companies often use their sustainability/circularity expertise as an added value to reach customers in need for an improved sustainability impact. Swedish company Se1 for instance, active in the B2B sector, highlights in its value proposition the increased sustainability image of public clients purchasing their furniture. This results in a *Brand booster* value proposition in which the client benefits from the sustainability value of the

furniture company. Similarly, French company F1 uses its communication skills combined with sustainability expertise: *"We make up a storytelling for our client so that it would also be easier for them to communicate about their sustainability actions on their social media. We provide the client with a communication strategy that is pre-established."*

Customer segments

Customer segments are the community of customers or businesses that a company is aiming to sell its product or services to. In order to remain viable, the product or service offerings must appeal to its target customer segment. In the circular furniture sector, customer segments are generally perceived as a niche market. Niche market refers to a customer segment with extremely defined characteristics and very particular needs. As a consequence, this segment expects a highly tailored product, custom made, to suit their needs. This in turn has a strong effect on the value propositions, distribution channels and customer relationships, all closely defined according to the preferences of this particular customer segment.

Companies applying circular economy principles in their business model and in their value proposition therefore directly target consumer driven by high green and sustainable values. In the B2C market, targeted segments are sensitive to the environmental and or social dimensions of the products or services offered. In that respect, furniture companies offering solutions fitting with circular economy principles do need to understand green consumption motives and behaviors and adapt their value proposition accordingly. Green certifications on one hand, or a compelling storytelling supports the customer in choosing a product close to its values. As several circular businesses in the sector include a strong social dimension (by employing staff with disabilities or facing employability challenges), the social purpose of the company leads to focus on customer segments sensitive to these issues. In the B2B market, targeted segments are often companies willing to improve their sustainability credentials by using furniture or interior design solutions that can be easily associated with a green image (through the purchase of products with a clear "recycled" look and feel).

Customer relationships

Customer relationships define the nature of the relationships that an organization develops with its customer segments. The customer relationships that a company opts for are based on their overall business model and directly impacts the customer experience. Companies active in circular furniture tend to create and maintain a strong personal relationship with their active clients. This has direct impact on customer acquisition, customer retention and sales increase. These personal relationships development requires specific dedicated skills which focus on engaging the customer through *trust and transparency* (1), *personal assistance* (2) and *community building* (3).

Building trust and confidence requires a high level of *transparency*. “*We always meet the client before we create a product so that we can explain who we are, what we do and why we do it.*” tells B3 coordinator. “*We invite people to see our workplace*”.

Personal assistance is also highlighted. As ecological furniture may need special after-care to keep its long-lasting properties, it is important to educate the client, provide resources and information on how to maintain the product. Education the client goes beyond product features: perception of reclaimed material is often perceived as a barrier to purchase from a customer perspective. A remanufactured product is often compared to a second hand or recycled product. Providing the client with the right communication is key to turn an initial negative perception into a positive, value creating message. Belgian company B4 for instance provides certificates to the clients showing the CO2 emissions reductions associated to their use of service.

Customer relationships can also be maintained through *Community-building* strategies. As an illustration, It1 created a community of users around their modular furniture products, with the goal of exchanging ideas on how to upgrade or transform their initial kid's tables and chairs. Organization of workshops with clients is also a favored strategy to reinforce community building. F2 regularly co-creation workshops where upcycling techniques are taught.

3.3 Transversal skills and competences

Beyond the different dimensions of the business model innovation and the associated skills analyzed in the previous section, it is possible to identify recurring skillsets that help shape the circular business model of the companies interviewed. These transversal skills influence and bridge several dimensions of the business models of these companies. Four transversal competences are presented below: *sustainability competences (1)*, *entrepreneurial competences (2)*, *systems competences (3)* and *user-centered competences (4)*.

Sustainability competences: Translating personal sustainable values into a new value proposition...

All informants are driven by strong personal values in relation to environmental challenges. Belgian company B1 developed its value proposition based on its knowledge about the finitude of resources and the need to apply a reuse principle in its business model. The founders all understand the need to change the existing linear model to make a positive impact. *"We want to produce something that has no or little impact on the environment"* states the founder of French company F1. These values also extend beyond the awareness of the environmental challenges. Translating a social purpose into a business model is what drives the companies who have added a social component (professional reinsertion of people with working disabilities) in their business model. These values are anchored in the companies DNA from the start due to the personal conviction of their founders. Companies with a longer business lifetime engaged in a transformation to realign their initial purpose with their current values. Belgian company B4 for instance, after calculating its carbon emissions footprint, realized it could do more by reusing used furniture/material in its process. The strong will to reduce the impact of its activities on the environment and climate is what drove the company to develop its circular services. Translating personal values into a renewed business model comes from the capability to be future oriented and embrace a long term orientation (Eccles et al, 2011): *"If you are future oriented and if what you do makes sense, you have to go for it. If not, do not start with it"* states N1 CEO. *"I'm not doing circular economy for myself but for my child and for the future generations to have a brighter future. This can only happen if we change things now."*

Entrepreneurial competences

Engaging in the circular economy does not come without bump. As the approach defies current businesses practices in the sector, it is therefore necessary to adopt an *Entrepreneurial mindset* to overcome all the unexpected challenges coming along, from the building of new supply chains, the adoption of different manufacturing processes and the utter complexity to convince consumers to purchase a product that might be perceived as “not new”.

Before even grasping the challenges ahead, the idea leading to a renewed business model comes from a strong sensing of opportunities, as B3 manager states: *“In the beginning we already used scaffolding wood. People came to us to buy this wood and then saw what we could actually do for them. The opportunity appeared at the moment.”* Seizing the opportunity behind a circular business model however requires to understand the necessity of a *trial and error* approach, a feature shared by the majority of informants. This mindset is present in the young companies entering the market as completely circular, but also among the companies who went to a gradual transformation. Belgian company B4, who has been in active as a circular company for 10 years confirms: *“We still work on trial and error. We build our knowledge thanks to that and we still build knowledge”*. The acquisition of new skills often take time and patience, as N1 director points out: *“I had to test a lot of methods, do by trial and error to be able to reach the circular level that I have attained now. The more we make mistakes, the better. We have to learn by trial and error. It is the best way to improve oneself”*

As part of the entrepreneurial mindset often comes a *bricolage* skillset. In this make-do approach, often constrained to low investment and limited resources, time and personal conviction are the driving force to try out new ways to work with the wood. *“You have to work a lot, develop new techniques, and acquire common sense. You continuously have to ask yourself questions. You need to take time to try new methods”* asserts N1 founder. B4 manager: *“we search for solutions and try them out before you find the optimal solution.”*

User-centered competences

User-centered design tries to optimize the product around how users can, want, or need to use the product, rather than forcing the users to change their behavior to accommodate the product. This skillset is translated in practice by engaging the customer in a *co-creation*

process, offering an *integrated customer value creation process* and *meeting customer needs*.

In many customer-supplier relationships today, customers engage in dialog with suppliers during each and every stage of product design and product delivery. In this interactive process of learning together, firms and their customers have the opportunity to create value through customized, co-produced offerings. This co-creation process can assist firms in highlighting the customer's point of view and in improving the front-end process of identifying customers' needs and wants. This pattern is preponderant in the circular business models from the furniture industry. Given the resource versatility of reclaimed wood, the majority of companies in the circular furniture sector are focusing on custom designs. They involve customers from the first stage of the design process, inviting them to the facilities to look at the available raw material and select the most suitable ones to meet their expectations. This logic can often be extended to a stronger involvement of the customers, when for instance, workshops are organized at the client facilities to co-build the renewed interior with recycled wood materials.

Knowledge about customers' value-creating processes should not be based solely on hard data (such as customer satisfaction measures), but should incorporate a deep understanding of customer experiences and processes. This requires to be able to take into account the various dimensions inherent in the *customer value creation process*. Beyond the functionality associated with the furniture itself, companies active in the circular furniture business are able to engage the customer through highlighting other value dimensions: *Experiential and sensorial value*, through the creation of a unique aesthetic furniture design, but also *symbolic value*, by engaging the customer in experiencing the use of an ethical product, free of chemicals and made of reclaimed waste.

Another key aspect of user-centered capabilities is to *meet customer needs*. In the pre-purchase phase, it is important to support the client in making the right consumption choices. Firms in the circular furniture business act as sustainability expert and can advise on the right sustainable alternatives. Advice and support on taking care of the furniture in the post purchase phase is also of high importance, to maintain the lifetime of the product purchased.

Systems competences

Sustainability challenges are complex and interconnected in their nature. However they are often approached through single issue and technical dimensions rather than seeing it as a systemic issue. In order to understand the challenges, taking a systems approach and looking at these challenges in a holistic way, having a broad understanding of sustainability whilst also using tools such as systems thinking and mapping can facilitate the transformation of companies toward a circular economy. In that respect taking a systems perspective can also strengthen the value proposition of the business model.

B4 for instance, has managed to integrate different strategic activities internally due to its specific position in a holding group offering supporting complementary services, such as removal and logistics services. The understanding of the advantageous position of the company in its value net allowed the company to provide a holistic approach on the whole value chain of the circular solution (access to used furniture, removal, transport, sorting, storage and inventory, remanufacturing, interior design transformation services). Taking a value network approach also reinforced the quality of products/service offered by the company. *“You have to include architects, designers, and consumers in the story of the company, make it possible to think together and give advice to each other”.*

3.4 Overview of skills and competences

The table below provides an overview of identified skills and competences supporting the transformation to circular business models.

Business model block	Key process/routine	skills/competences	Example	Representative quote
Key Resources / key suppliers	Sourcing	Knowledge on accessing sustainably produced or reclaimed material.	B1 assesses different options of wood and resources based on its ecological impact (location, certification, etc...).	<i>"we need a clear understanding and knowledge of the different resources and raw materials" B1 founder.</i>
Key Resources/ Network	Sourcing	Knowledge on identifying the right eco-suppliers for material substitution.	B2 has identified the right eco-supplier for ecological oils.	<i>"We try to deal consciously with our material. We try to find raw material as close as possible to our production place to promote short-circuits" B2 founder.</i>
Key Resources / network	Sourcing	Skills in handling the customer as a provider.	B4 uses the old furniture from its clients as raw material for new furniture	<i>"our clients are important as we get the raw material from them" B4 CEO</i>
Key resources	staff training	Awareness of skills limitations and will to extend knowledge.	B2 manager had to train himself and work by trial and error.	<i>"There are different types of wood. I had to learn how to manufacture it and develop my technical knowledge by trial and error" B2 manager</i>
Key resources	staff training	Ability to communicate values to staff.	B3 founder stresses the importance of communicating the values behind the company to the workers remanufacturing the furniture.	<i>"You have to make sure that your co-workers want and can work in this way" B3 founder.</i>
Key Activities	Design	Skills on design for X.	B2 develops its product so that material can easily be recycled at its end of life.	<i>"We use steel table legs that can be completely recycled because we do not mix the alloys" B2 manager.</i>
Key Activities	Research and innovation	Innovation in untapped material use.	B1 tries to innovate in using parts of trees that would otherwise be used for biomass energy	<i>"We are also trying to develop design techniques to reuse branch tree tops to be able to upcycle" B1 founder.</i>
Key Activities	Waste management	Knowledge on recycling and cascading use.	N1 aims for zero waste processes by taking a cascading approach to its wood by products.	<i>"We have no waste. Waste is just waste because you call it that way, everything is raw material but you need to find the</i>

				<i>contacts that can help you and use it" N1 CEO</i>
Network/key suppliers	sourcing	Collaboration and partnerships skills.	B2 developed a strong alliance with a local waste management organization to access its bulky waste.	<i>"Without the collection of the bulky waste and its supply of wood, the project could not have been conducted" B2 manager.</i>
Network/key suppliers	sourcing	Networking skills.	B1 has learnt to develop strategic partnerships with regional waste management authorities, to help them source relevant untapped material.	
key Resources/network	strategic	Pooling of complementarity skills.	B2 identified the right partners to fit with its existing competences.	<i>"I had the marketing and production skills while he had access to the material and has a good network and corporate skills" B2 manager</i>
Value proposition	Communication	Building and communicating a sustainable image.	<p>B1 founders learnt about sustainability in their education and automatically translated it in their brand identity</p> <p>B2 highlights environmental, aesthetic, local and social value in their marketing</p>	
Value proposition	design	Product uniqueness development	Company B1 highlights imperfection from trees to create unique products	<i>"We work with third choice wood because it has imperfections such as knots and cracks which is what we are searching for" B1 founder.</i>
Value proposition	design	Product customization	B2 involves the client in selecting the form of the end product	<i>"we discuss with the clients about the type of wood he wants, the dimension and the finishing work of the furniture" B2 manager</i>
Customer segment	Communication	Knowledge on green consumption motives and behaviours.	B3 develops its promotion mix to attract green-minded consumers	<i>"we target people that have a social and ecological self-conscience" B3 coordinator</i>

Customer relationships	Manufacturing	Transparency in product manufacturing	company B1 invites clients to visit their facilities to explain their manufacturing process	<i>"The fact that the people can see the origin of their products begins to be important again" B1 founder.</i>
Customer relationships	Communication	Personal assistance: educating the client	B1 informs their clients on the ecological impact of their product	<i>"We have the responsibility to communicate the best choice to our client" B1 founder</i>
Customer relationships	Communication	Community-building	B3 aims to implement workshops for the clients to create a stronger sense of community	<i>"..organize some events when families can come, have a drink, see the workspace. We would like to bring people together". B3 coordinator.</i>

Overview of transversal competences

Business model block	Key process/routine	skills/competences	Example	Representative quote
Value proposition, Key Resources	Strategic vision	Awareness and education on global environmental challenges and the will to act upon it.	Company B1 founders have received trainings on the principle of circular economy in their education	"the way we are consuming for the moment is not sustainable so we try on a small scale to go towards the good direction"
Key Resource/Key activities	Strategic vision	Translating a social purpose into a business model.	B2 redesigned his business model by taking into account the social motivations behind it.	"the cooperative wanted to enable professional reintegration and to work locally by using an abundant local resource." B2 manager
Key resources	Strategic	Entrepreneurial mindset.		<i>"You need the power and challenge to work in such a way" B1 founder</i>
Value proposition	Strategic	"Think outside the box" skills.	B4 looks at space use inefficiency as a driver to offer new value proposition to its clients	<i>"We try to motivate our clients to use their space differently, to find the optimal use of the workspace" B4</i>
Key activities	manufacturing	"Trial and error" approach to innovation.		<i>"We had to do a lot of things for the first time so we were always encountering problems. in the end we learnt to deal with these problems" B1 founder</i>
Key activities	manufacturing	"Bricolage" skills.	B1 used reclaimed wood to begin with because it was cheap and easily accessible	<i>"In the beginning the free material was useful because we didn't have the capital to invest in other wood" B1 founder.</i>
Value proposition/key activities	design	Cocreation with customers	B1 offers "build your space" workshops for its clients	<i>"we bring our tools, material and knowledge and we boost the participants" B1 founder</i>
Value proposition	value creation	Understanding of the various dimensions of the customer value creation	F1 highlights aesthetic and symbolic value beyond functional value in its value proposition	<i>"we work with enterprises that are interested by our design and the</i>

				<i>environmental message of our products” F1 Founder</i>
Value proposition	value creation	Responding to customer needs	B3 starting designing upcycled furniture to meet customer demand.	<i>“Our clients were asking for furniture made of reclaimed material. We wanted to do what our clients like. the clients are part of the story. B3 manager</i>
key resources / key partners	Strategic	systems mapping and understanding	B4 has created a systemic circular solution based on its position in its value net involving different companies from the same group	<i>“We have a real chain operation”</i>

4. Examples of circular furniture cases

4.1 Green furniture – Sweden



Green Furniture Concept makes sustainable design for public interior areas. Configurably winding, seamless seating and acoustic lighting from Green Furniture can be found in places like Dublin Airport, Topanga Mall (LA) and Stockholm Central Station.

Green Furniture Concept was born out of a deep desire to be a leader in sustainable furniture design and production. Sustainability has guided the development of the company and is part of its soul as a company. From early on, the management has committed to integrating environmental sustainability into its business processes and continuously improve its environmental work.

Green furniture aims to be ecologically sound in all aspects: in its everyday mission and through its products. The company strive to keep its products integrated in the natural cycle or in a technical cycle free of waste. The Nordic Ecolabel is used as a base standard for

each product development. Those standards are exceeded by, for example, using natural hard wax oil instead of varnish and upcycled instead of virgin materials.

“When I started making furniture I was shocked by how smelly furniture manufacturing was, literally, with glues and coatings, and I decided to make a difference. The Green Furniture brand was introduced at the Stockholm Furniture Fair in 2010, based on the idea of creating sustainable modern classics. Furniture with heart and soul, pieces that say something about both your taste and your sense of responsibility. Design that is better because it is made according to sustainable principles, made to the highest standards of quality, so that your piece can be with you for a long time. Furniture made using strong emotional language that forges a relationship between the piece and people.” Johan Berhin, Founder.

Green furniture philosophy is that eco-friendliness should also make better furniture in terms of function and aesthetics. Hard wax oil is not only equally resistant to varnish, it imbues the wood surface with an utterly different feel and scratches can be easily touched up, just like shoe polish, to keep your furniture always-like-new. Upcycled wooden planks not only provide good solid wood, they carry a story of origins and the wise use of resources while adding life and uniqueness to the design.

More info: www.greenfc.com

4.2 L'ESTOC - Spain



L'Estoc designs, produces, and sells furniture made from recycled materials and disused objects. Its goal is to improve and dignify the life of people with intellectual disabilities, fostering development through work. The combination of materials is the house trademark: From wooden blinds the company makes benches or screens, a door can become a table, and a crib is turned into a child desk.

A social lens to the circular economy

“We believe that a sustainable economy can be obtained not only from the environmental point of view, but also from the social one. For this, we transform recoverable materials into a valuable resource through a unique creative process that helps normalize the lives of people with disabilities.”

In Catalonia there are 378.000 registered people with disabilities, 10.6% of which are of the intellectual type. Almost 55% of them are of working age, but only 78.000 actively work. L'estoc offers a wide range of possibilities for labour integration. The worker gets involved from the beginning in the whole process with a piece: Fixing, treating, polishing, painting,

and varnishing. The activity is stimulating, fosters creativity, and gives visibility to the skills of people with disabilities.

L'estoc has been awarded the programs for Social Entrepreneurship of Momentum Project by BBVA and Esade (2015), La Caixa Foundation (2012) and the Generalitat de Catalunya (2011).

More info: <http://lestoc.com/en/estoc/>

4.3 ARCADIA DESIGN – Italy



“We embraced the circular economy principles because we believe that objects should never be thrown away, but always transformed,” explains Massimo Germani., co founder of Arcadia Design, an Italian innovative start up based in Central Italy.

The company designs EASYDiA + EASYoLo a set of **modular chairs and tables** for children from 18 months up to 10 years, which offer space to customization and are designed under **circular economy principles**. Their modular structure stimulate reuse, transformation, customisation and imagination, that adults and children can share: assembling the pieces when they get the pack, customising or replacing modules over time, disassembling their chair or table when no longer needed and giving them a new beginning, making one new suggested products or invent new ones.

“Rather than fix interiors, we prefer to conceive objects that you can modify and make of them exactly what you want. So a chair and a table become a toy for children, a photo frame for the family, an armchair for young people”.

The product is entirely made in Central Italy and based on a careful research on sustainability criteria, partly in collaboration with University Milan Bicocca: all solid wood, a limited edition in local chestnut again from Central Italy, to cut transports and support the maintenance of local woods, finishings that are totally water-based, non-toxic and certified for food contact.

More info: <https://www.arcadiya.net>

4.4 BRÜHL - Germany



With their range of durable, sustainably manufactured furniture made from eco-friendly materials, Brühl contribute to the conservation of our planet's finite resources.

The company intend to make furniture “more resource-friendly” in terms of overall resource consumption and wants to make sure that it “can be used for longer and in a better way”. All manufacturing steps throughout the entire product life-cycle take ecological, sustainability and health-related aspects into account. For example, values lie far below the legally permitted employee exposure values for adhesives; in fact, they are almost below the detection threshold. All of the materials used are also carefully examined with regard to their environmental compatibility and durability to ensure that the furniture has a particularly long life-span. Some of the designs are fully recyclable, and leftover materials are recycled. Brühl sources the renewable resource wood from certified sustainably managed forests (FSC), and wherever possible locally.

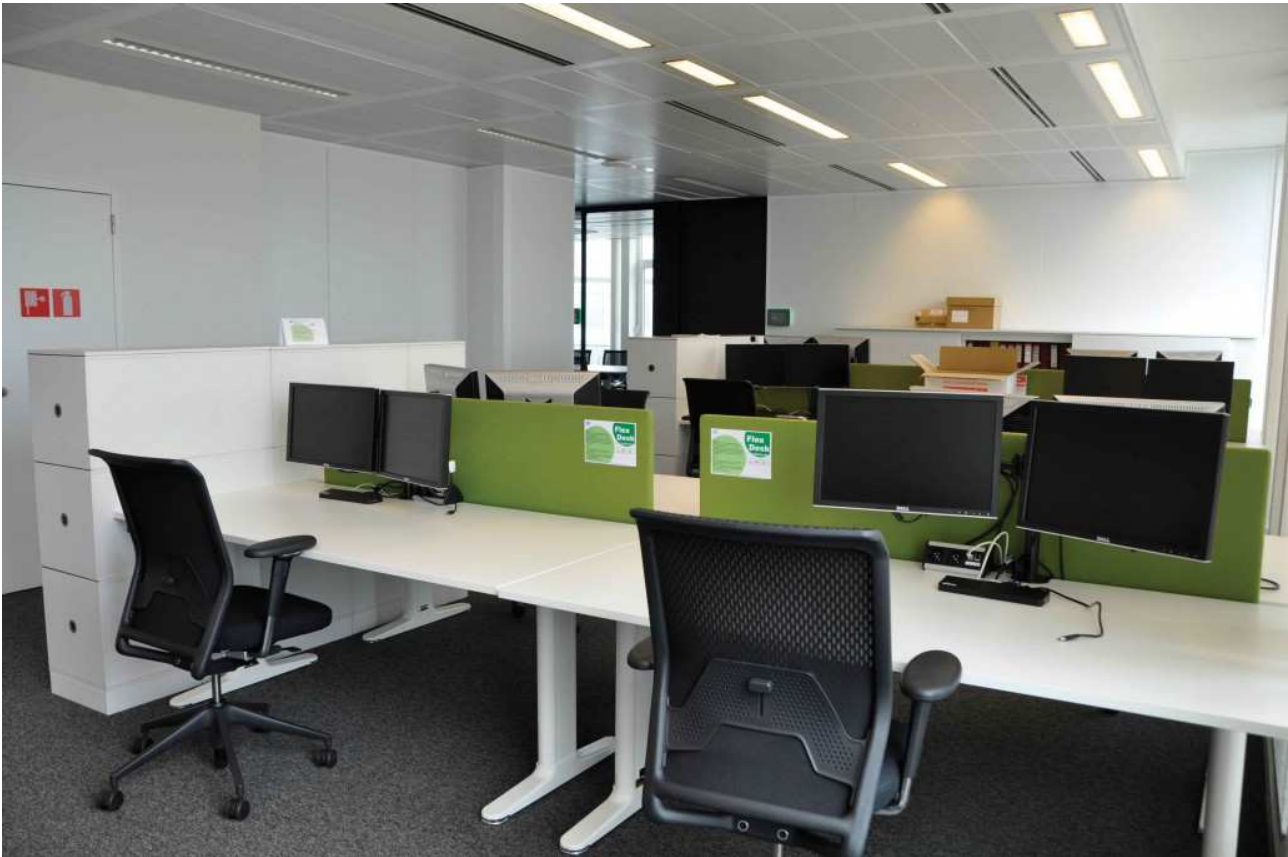
Leather suppliers use salt-free preservation techniques that save water. Oliva leather, for example, consists of hides that have been tanned with the aid of plant-based methods and therefore almost completely without the use of chemical substances. When it comes to the

textiles used, Brühl is also always on the lookout for even more environmentally-friendly solutions in cooperation with sustainability-focused suppliers. All of the fabrics used comply with the Oeko-Tex® standard or bear the EU-Flower eco-certificate. Due to the high quality of the fabrics and the careful and precise finishing of the covers, the seating furniture is exceptionally durable and has a particularly long life-cycle. Much of the furniture also features removable covers, which more or less doubles its life-span.

In 2002, the company's environmental commitment earned brühl the Bavarian Environmental Medal for special contributions towards environmental protection and regional development. In 2009, brühl was the first furniture manufacturer in Germany to be awarded the "Blue Angel" eco-label for particular eco-friendliness. brühl has also been a certified carbon neutral manufacturer since 2017.

More info: <https://bruehl.com/>

4.5 NNOF – Belgium



Nnof stands for 'nearly new office facilities': office furniture that is almost new. The Vilvoorde company design offices with mostly recycled material, which usually comes from the customer's previous interior. Chairs are re-upholstered, tables are given a new top layer, cupboards are disassembled and transformed into new furniture. The end result does not look like a thrift store, but simply as a new interior.

How did they get there? *"Around the turn of the century I started to read a lot about climate change, our handling of raw materials and all the problems that awaited us",* explains managing director Didier Pierre. *'That was not fun. Our group already had a moving company at that time, and another company that offered furniture management for offices. We measured our climate impact and showed that we reduced our emissions every time we repaired office furniture. It made us think: could we not go much further? We knew very well how much office furniture was simply thrown away. Often we had to dispose of a whole interior for the same customer with our moving company, and then to install brand new furniture with our furniture management company. It was absurd. We decided to invest much more in repairs. In the last two years we have also committed ourselves to re-working: we*

now use tablets from old tables to make seating furniture, for example, or we design a rack system made from used table bases. If customers leave us somewhat free, we can reuse a very large part of their interior.

Why is it working so well? Nnof is more sustainable and cheaper. *“That is surprising, but actually it makes sense, because we do not buy raw materials, only for the final layer. And I have no illusions: our customers choose us mainly because of the price advantage. But they do agree that they choose sustainably. And that is good.”*

More info: www.nnof.be

4.6 HERSO – The Netherlands



The Dutch wood working company Herso uses reclaimed wood to make new products, from furniture to floors.

Herso uses wood from old floors, furniture, cut offs from carpenters and of course their own. They select good pieces of wood, even small ones, to use in their designs. Iron pieces, such as nails, are also reused, while sawdust is used to make bio-alcohol, cat litter, and compost. In the rare case they need to use new wood, it is always FSC approved.

Rather than just selling their products, Herso has a sort of deposit money arrangement. In essence, you rent the products. During its use, the product keeps a value that is determined beforehand. At the end of use the product can be handed in, so that Herso can use it again to make new furniture and floors. All Herso's tables are solid and made by hand. They only use biodegradable glue.

The company also takes on various projects, such as the no-waste floor of Circl, a circular pavilion in the Netherlands. The floor is the size of a football field and made from wood from all sorts of sources, such as a villa from the 50s, old furniture, a hardwood terras, window-frames, and an old door. All this waste wood is turned into a beautiful wooden floor. And Herso promises that when the pavilion is deconstructed in 25 years, that they will make new products from the floor.

More info: www.herso.nl

4.7 Figueras International Seating - Spain



The Figueras Group is the global specialist in the design and manufacturing of high-end fixed seating and movable seating solutions for public spaces, crafted through design, innovation and engineering since 1929.

Figueras wants to make a significant contribution to improving the environment and believes in eco-design and taking a sustainable approach to manufacturing. That's why the company has complied with ISO 14001, the global, officially-recognized, voluntary standard that certifies Figueras' exemplary environmental performance.

In 2017, Figueras Seating also obtained certification, in accordance with international standard UNE-EN ISO 14006. This certification applies to product design and encompasses environmental aspects such as the integration of product sustainable materials, eco-friendly production processes, non-toxic materials use and. All considering the complete lifecycle of the products.

More info: <https://www.figueras.com>

4.8 Mobles 114 - Spain



Mobles 114 editions specialises in producing contemporary furniture and fittings and is based in Barcelona. The m114 brand, founded in 1973, is committed to improving the quality of public places and homes with unique, timeless designs.

Mobles 114, an agent of change towards a sustainable model.

Aware that 70% of the environmental impact of products and services is determined during the design stage, Mobles 114 sees design as a means of bringing about paradigmatic changes towards a sustainable model.

Committed to better products, from the design stage through to manufacturing, distribution and marketing, the company strives for environmental coherence in its final product.

Mobles 114 brings history and stories to life, turning them into good quality furniture, long-lasting, sustainable and of great beauty. In many of its projects it collaborates with designers who are sensitive towards the environmental issue, who look for functionality and aesthetics using natural, local materials with a comprehensive view beyond the item of furniture itself.

The company applies various eco-design strategies in its production: 100% recycled and recyclable materials; locally sourced or produced materials or natural materials; designs that are easy to assemble and dismantle; products made from a single material whose components can be recycled at the end of their life cycle, and minimal volumes to reduce

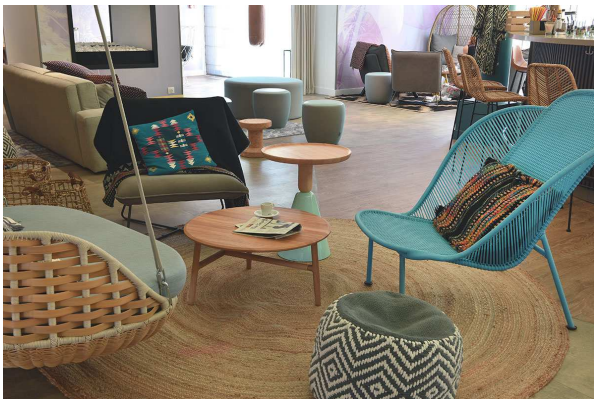
consumption as a result of transport; as well as a design that emphasises high quality and durability in the final product.

Products that never go out of fashion, that last because they offer something more than just a mere function, because they remain coherent in each phase of the process of design, manufacture, distribution, use and useful life. These are well-designed items of furniture, well-made and well-conceived from the beginning to the end.

Mobles 114 thereby becomes an agent of change towards a more sustainable and responsible consumption, influencing its chain of suppliers and also its clients with a sustainable, competitive proposal: a benchmark in finding eco-innovative solutions in the furniture industry.

More info: <http://mobles114.com>

4.9 SANCAL - Spain



SANCAL, one of Spanish leaders on upholstery furniture, is dedicated to the production of sofas, chairs and any upholstery furniture possible to be developed. Their products are well-known for the effort and passion that the company put in the design procedure. For Sancal design should be *“a source of: Innovation, to develop new concepts and improve existing products. Simplicity, to make our lives easier. Closeness, to make the new familiar. Creativity, to thrill us”*.

Quality and sustainability

“We reject the premise of the throw-away society, carefully designing pieces that will stand the test of time”

Sancal have both the ISO 9001 and ISO 14001, yet its concern goes beyond the requirements of any norm. Within its manufacturing process Sancal starts with wood from renewable sources and carefully separate their residuals for recycling. In addition, solar panels on their two factories with near 15.000 m² produce all the necessary electricity.

Design towards a circular economy

“Our premise is to design products which go forward with us, which bring value and allow us to create personal, singular spaces.”

Sancal has a particular design far from the conventional and without the limitations of the perfectly-matched environment; a contemporary style, timeless and eclectic with which it evolves. Since the first steps all products are designed thinking in the future with an environmental point of view, thinking in their efficiency, durability and reusability.

One of the best examples is the “rock” table. A Life Cycle Analysis was done to re-design this product with minor environmental impacts. Thus, new environmental friendly materials were introduced, as well as the materials used for packaging. Due to this new “rock” table design it has been optimized the use of raw materials, decreased polluting waste, and improved the efficiency of product transport.



More info: <https://sancal.com>

4.10 Artek – 2nd cycle - *Finland*



Artek was founded in 1935 by four young idealists: Alvar and Aino Aalto, Maire Gullichsen, and Nils-Gustav Hahl. Their initial goal was “to sell furniture and to promote a modern culture of living by exhibitions and other educational means.” Today, the company manufactures furniture, lighting, and accessories designed by Finnish masters and leading international designers. It stands for clarity, functionality, and poetic simplicity.

Artek's current management believes that the values instilled by Aalto during the 1930s - good quality, sourcing local materials and using them economically - tick many of the boxes required of sustainable manufacturers today. *"Aalto and his circle wouldn't have used the word 'sustainability',"* says Tom Dixon, the British furniture designer who became Artek's creative director in 2004. *"But if you look at what they did at Artek with modern eyes, it has all of the underpinning characteristics."*

In 2006, Artek began collecting used Aalto chairs and stools, searching them out from flea markets and old factories, schools and shipyards. This led to the founding of the Artek 2nd Cycle initiative, which offers these re-discovered pieces for sale, beginning a second

cycle in their lives. Today, Artek 2nd Cycle is Artek's platform for pre-loved furniture. The brand offer re-discovered furniture and lighting for sale, beginning a second cycle in their lives. Artek 2nd Cycle store, in the heart of Helsinki, is a meeting point connecting collectors, customers, and designers. The store invites visitors to browse, buy a beautifully aged piece of furniture, discover a rarity, or simply learn more from Artek experts. Artek 2nd Cycle not only showcases the longevity of Artek furniture, it also promotes conscious consumption – the idea that what we buy should be carefully chosen, cherished rather than disposed – and seeks to honour the natural materials that have gone into producing these enduring designs. As Alvar Aalto once said, *"Nothing is ever reborn, but neither does it totally disappear. And that which has once been, will always reappear in a new form."* Circular thinking?

More info: www.artek.fi/2ndcycle

5. References

- European Environment bureau, 2017. “Circular economy opportunities in the furniture sector”
- Rebus, 2017. “REBUS Furniture Sector report”
- EFIC, 2017. “The Furniture Industry and The Circular Economy - Policy paper”