



WHITE PAPER

SUSTAINABLE UPHOLSTERY FURNITURE: WHAT STRATEGIES AND TECHNOLOGIES?

LECTRA

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Lectra would like to express its appreciation and thanks to the panel of international furniture industry experts and specialists, each offering their unique views and experiences on the challenges and opportunities in the market. Contributors include: David Pambianco, CEO of Pambianco Strategia di Impresa; Nicola Coropulis, CEO of Poltrona Frau; Cindy Hodnett, executive editor for leading industry media company Bridge Tower Media; Ovidijus Jalonskis, CEO of Vilners; Pan Chaoping, Lean Production and Planning Management Director and Tu Jiahui, Director of Product Development, for Kuka Home; Steve Kooy, Technical Director Health and Sustainability from Bifma; and Clémentine Mitard Manteau, product marketing director at Lectra.

**Good design is
long-lasting and
environmentally
friendly.**

Dieter Rams

INTRODUCTION

Sustainability has become a critical focus across industries, especially in home furnishings. According to the Sustainable Furnishings Council (SFC), sustainability in this sector refers to the design, production, sale, and use of furniture in ways that aim to minimize negative environmental, health, and social impacts. This approach prioritizes the long-term well-being of the planet and its inhabitants over short-term gains, integrating principles that promote ecological responsibility throughout a product's entire lifecycle.

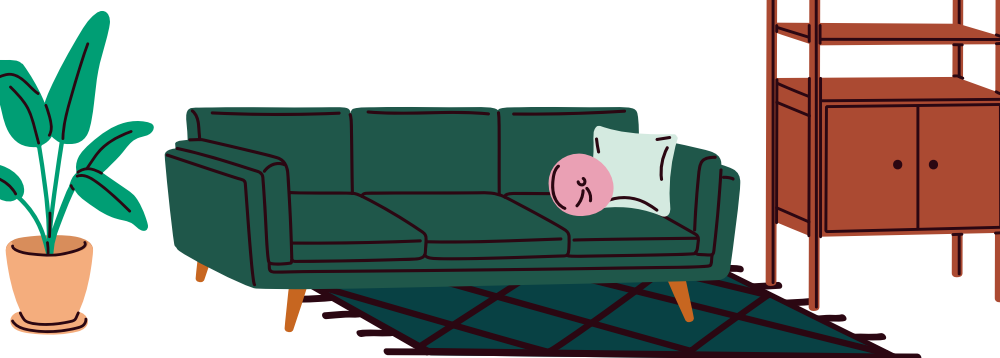
But incorporating sustainability in upholstery or furniture design is not a new approach, at least not in the minds of some designers and manufacturers. In 1976, German designer Dieter Rams introduced his principles of good design, which included "Good design is long-lasting" and "Good design is environmentally friendly."

A survey by the Center for Industrial Studies (CSIL) found **45%** of its manufacturer respondents cited "environmental sustainability" as a top priority in all areas of their business strategies.¹ According to a recent Furniture Today survey, the furniture industry gave itself an average of a "C" grade on its sustainability efforts. Many noted the industry's efforts but found the overall momentum lacking. Despite all this, **77%** of manufacturers believed sustainability should be a priority.²

"The meaning of sustainability is not only the certifications or sustainable products, it goes beyond. It needs to include also the business environment and the social levels, connecting everything to one place. And then we can call it a sustainable business," explains Ovidijus Jalonskis, CEO of Vilmers, a Scandinavian furniture company that is setting new standards for sustainability and customer-centric experiences.

But how can this be achieved? "By moving forward, upholstered furniture might be best served by defining sustainability as in this way: by connecting the manufacturing process from end to end and resulting in a sustainable business model," shares Jalonskis. "Balancing the social, environmental, and economic aspects of sustainability in the upholstered furniture industry is indeed challenging, however a circular approach that emphasizes material recovery, longevity, and the responsible management of resources throughout a product's life cycle can and will make a difference."

77%
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¹ CSIL survey among upholstered producers, 2021

² www.furnituretoday.com

Core components of sustainability in upholstered furniture

Sustainability in the upholstered furniture sector is driven by a focus on reducing environmental and social impacts across the product lifecycle. Key components of this effort include addressing packaging and emissions, ensuring material health, minimizing environmental impact, and upholding social responsibility standards.

But for Nicola Coropulis, CEO of **Poltrona Frau**, an Italian company focused on providing global living solutions in a sustainable way for international customers, “Sustainability also means durability. The products are handcrafted to last generations, and we offer a dedicated service team to restore and reupholster items, with collection and delivery services available worldwide.”

Eco-friendly manufacturing practices and sourcing

Central to sustainable home furnishings is the promotion of eco-friendly manufacturing practices and sourcing. 36% of CSIL survey¹ respondents chose “production process” as a key focus area for improving sustainability, and this can be achieved by adopting different manufacturing practices.

→ Reducing inventory and stock

On-demand manufacturing allows companies to eliminate overproduction because they **only produce what’s needed**. As a result, they don’t have excess material or product inventory. Additionally, the need for shipping and storing components and raw materials in bulk is eliminated, further reducing a company’s environmental footprint. **On-demand manufacturing** is a more sustainable option, and it offers furniture makers the ability to adapt to market fluctuations and improve customization.

For instance, **Poltrona Frau** combines sustainability and customization in various ways. Their products are made to order and fully customizable, offering consumers an extensive selection of materials—including various types of sustainable materials and leather (Pelle Frau Impact Less, FSC-certified wood, etc.), fabric, etc —and a choice of over 100 colors for each individual product.

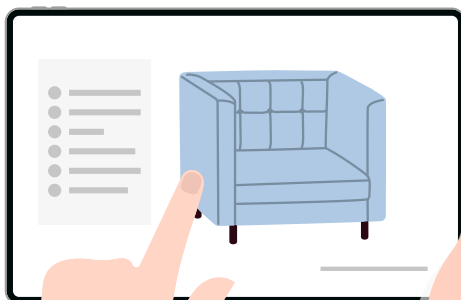
Thanks to technology, customers can view their personalized product through the configurator available on the website.

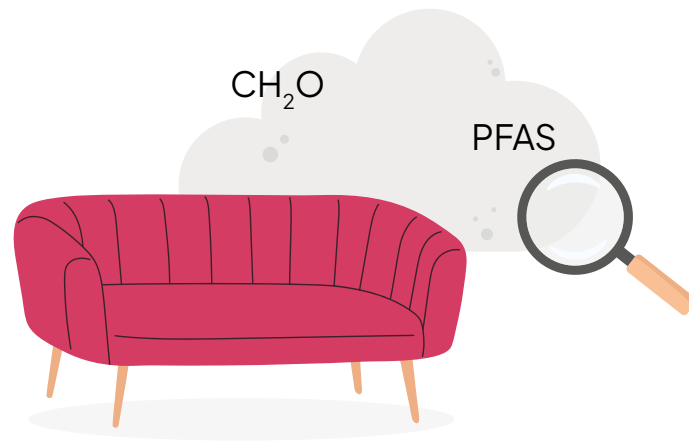
→ Reducing waste

Highly precise, **minimal buffer cutting and automated marker making** ensure that manufacturers limit both waste and cost per cut part. The use of technology enables manufacturers to optimize nesting with minimal buffer, amounting to 3% in material savings that represents 15% of reduction waste.

In terms of reducing waste, this applies not only to the manufacturing process but also to the shipping by using recyclable materials or cutting back on the amount used in packing and, ultimately, costing furniture businesses less.

Jalonskis cites his company’s replacement of cardboard and plastic packages with 100% recycled packaging materials, improving the customers’ experience, and reducing the company’s additional tax burden. He says, “In the end, we even saved money. You can find that sustainability can help you to improve your business, and the customers don’t need to pay extra for that.”





→ Reducing energy

Using renewable energy sources and optimizing manufacturing processes are efficient ways to reduce overall energy consumption. **Adopting new and upgraded cutting solutions that have been eco-designed is vital.** Energy consumption of the cutting equipment can be reduced 30% to 40% by making these investments. For instance, more efficient cutting machines with higher production capacity allows companies to produce more cut pieces within shorter periods, reducing the CO₂ emissions rate for each one.

By integrating these strategies, companies can significantly reduce their environmental impact while setting a positive example for the industry. Sustainability can help improve a business's bottom line without requiring the consumer to pay more.

Emissions

One of the most critical concerns in upholstered furniture is the reduction of harmful emissions, particularly volatile organic compounds (VOCs). The healthiest upholstered furniture doesn't add chemical flame retardants or stain-guard fabric coatings on its fabrics and should use natural latex or low-VOC certified foam in the cushions.

Formaldehyde, commonly found in adhesives and particleboard, is a known irritant and carcinogen. Over the past 20 to 30 years, there has been a significant push towards limiting its use in furniture.

Historically, emissions regulations were minimal, with manufacturers rarely required to meet strict standards. However, with growing awareness of indoor air quality's impact on health, regulatory bodies have implemented stricter guidelines. **Today, compliance with standards is a crucial indicator of a product's commitment to minimizing harmful emissions.**

Industry practices now include the use of low-emission adhesives and treatments. These ensure reduced VOC emissions, enhancing indoor air quality and consumer safety.

Material health

The material health of upholstered furniture is another core component of sustainability. This focuses on using non-toxic, safe materials throughout the product's construction. Regulatory frameworks, such as California's Proposition 65 (Prop 65), have been influential in shaping industry practices by requiring manufacturers to disclose harmful chemicals in their products.

A growing focus is on eliminating per- and polyfluoroalkyl substances (PFAS), often used for stain resistance. These "forever chemicals" are persistent in the environment and pose health risks. As a result, many manufacturers are now turning to non-toxic, water-based treatments and exploring safer, innovative materials like organic cotton, wool, and natural latex to meet health and safety standards without compromising product performance. Examples of non-PFAS coatings include coatings made from elements like silicon, oxygen, carbon, and hydrogen.

Environmental impact

The environmental impact of furniture manufacturing extends beyond emissions and toxic chemicals. It significantly affects natural resources like water and contributes to climate change through deforestation and carbon emissions. In Europe, the EU Regulation against deforestation and forest degradation (the EUDR) has impacted producers, who must ensure that the materials used do not come from deforested land. The industry has made strides in sourcing sustainable wood, focusing on certified options like to ensure practices that protect ecosystems and promote legal harvesting.

Social responsibility

The concept of social responsibility in upholstered furniture is crucial, given the global nature of the supply chain. Around 40 to 50% of upholstered furniture is sourced from countries like China and Vietnam, where labor standards can be less stringent. This raises concerns about worker safety, fair wages, and ethical labor practices.

Brands play a critical role in verifying labor conditions, particularly in regions where local regulations may not adequately protect workers. In the United States, the Uyghur Forced Labor Prevention Act (UFPLA) bans imports of Chinese products made using Uyghurs. Leading companies are increasingly implementing social compliance audits and working with third-party certifiers to ensure their suppliers meet ethical standards. While voluntary efforts from industry leaders drive some progress, there is a growing call for regulatory frameworks to enforce minimum standards globally.

Voluntary initiatives (such as adhering to the Fair Labor Association or the Ethical Trading Initiative) promote fair treatment of workers throughout the supply chain.

Sustainability in upholstered furniture encompasses reducing harmful emissions, prioritizing material health, minimizing environmental impact, and ensuring ethical labor practices. As consumer demand for transparency and eco-friendly products continues to rise, manufacturers are adapting to these expectations, making significant strides towards a more sustainable and socially responsible industry. Additionally, the rise and pressure of environmental regulations highlights the urgent need for furniture players to adopt sustainability initiatives as the furniture, fashion, and automotive industries have.

ETHICAL STANDARDS

- _____
- _____
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Global perspectives on sustainability in upholstery manufacturing

As global awareness of environmental impacts rises, companies worldwide are exploring new ways to reduce their ecological footprint. However, sustainability practices in upholstery manufacturing vary significantly across different regions, influenced by local regulations, consumer preferences, and economic factors.

The shift in global supply chains due to demographic and geopolitical changes

Global supply chains in upholstery manufacturing have undergone significant shifts driven by demographic changes, geopolitical tensions, and disruptions from the COVID-19 pandemic. The demographic trend of aging populations in Europe and the U.S. has led to increased demand for durable, high-quality furniture that prioritizes comfort and longevity. This has driven manufacturers to focus on sustainable, long-lasting materials that cater to these preferences.

“Transparency and traceability are fundamental.”

Nicola Coropulis
CEO of Poltrona Frau

Geopolitical factors, such as trade wars and increasing tariffs, have prompted companies to reassess their reliance on Asian manufacturing hubs. Many businesses are exploring reshoring—moving production closer to their primary markets—to reduce dependence on international suppliers and mitigate risks associated with long supply chains. This shift has also been influenced by the need for better control over environmental standards and compliance with local sustainability regulations.

The pandemic exposed vulnerabilities in global supply chains, prompting manufacturers to adopt more resilient and sustainable practices. This transition has also highlighted the importance of digital technologies, such as AI and digital twin technology, in optimizing supply chains for greater efficiency and sustainability through transparency.

While the Digital Product Passport (DPP) has not yet been fully adopted, brands such **Poltrona Frau** are already taking the lead.

The 2025 pilot project will involve two of the brand’s most iconic products: the Vanity Fair and Archibald collections.

The aim is to redefine transparency and accountability standards, enabling customers to easily access relevant product information and gain a deeper understanding of a product’s lifecycle. “Transparency and traceability are fundamentals.” insists Coropulis.

Asia

In Asia, particularly in countries like China and Vietnam, which are major manufacturing hubs for upholstered furniture, sustainability practices are evolving but face many issues. The region has traditionally focused on cost-effective mass production to meet global demand, often at the expense of environmental considerations. However, rising international pressure, stricter import regulations from Western countries, and a growing domestic demand for sustainable products are gradually shifting this focus.



Countries like Japan and South Korea are leading the way in implementing sustainable practices, emphasizing the use of recycled materials and green manufacturing processes. In China, larger companies are beginning to adopt sustainability measures, driven by both government regulations and a shift in consumer preferences toward eco-friendly products. However, smaller manufacturers may still prioritize cost-efficiency over environmental impact, reflecting the economic pressures faced in the region.

Europe

European countries have been at the forefront of sustainability efforts in upholstery manufacturing. The EU has implemented strict regulations and standards aimed at reducing the environmental impact of various industries, including furniture. Policies like the **European Green Deal** and the **Circular Economy Action Plan** set ambitious targets for reducing carbon emissions and promoting recycling. As a result, many European manufacturers have adopted eco-friendly practices, such as using sustainably sourced wood, recyclable materials, and non-toxic dyes.

In Scandinavia, particularly, there is a strong emphasis on using natural and sustainable materials like organic wool, linen, and recycled polyester. Companies like **IKEA** have also taken the lead by integrating sustainability into their core business model, committing to using only renewable or recycled materials by 2030.

Furthermore, European consumers are generally more willing to pay a premium for sustainable products, driving manufacturers to prioritize eco-friendly practices.

The United States

In the U.S., sustainability in upholstery manufacturing has gained momentum, but the pace and focus vary significantly across the industry. Larger companies and luxury brands tend to lead the way, emphasizing eco-friendly materials and processes. For instance, high-end manufacturers are increasingly using certified sustainable wood, recycled foam, and non-toxic adhesives. However, the market remains divided, with some consumers prioritizing cost over sustainability, leading to a slower adoption of sustainable practices among budget and mid-tier manufacturers.

The U.S. has also seen a rise in green certifications like **GREENGUARD**, which indicate that products meet rigorous standards for low emissions of volatile organic compounds (VOCs).

However, without uniform regulations at the federal level, adherence to sustainable practices can be inconsistent, driven largely by consumer demand rather than regulatory compliance.

South America

South America, particularly countries like Brazil and Argentina, is a significant source of **leather**. Leather production is deeply tied to the cattle industry, making it both a central resource and a controversial topic in sustainability discussions.

Leather is often scrutinized due to its environmental impact. Critics point to deforestation, greenhouse gas emissions from cattle farming, and the tanning process's ecological footprint. However, it's also worth noting that leather is a by-product of the meat industry, which frames its use as a form of waste minimization. This duality sparks ongoing debates about whether leather can truly be considered sustainable.



Challenges of sustainability in upholstered furniture

The upholstered furniture industry faces increasing pressure to adopt sustainable practices. However, achieving sustainability in this sector has its challenges.

Recyclability concerns

Upholstered furniture is notoriously difficult to recycle due to its composite materials. Typically made of a mix of wood, metal, foam, fabric, and adhesives, separating these components for recycling is labor-intensive and costly. Foam poses a significant issue because it is often treated with fire retardants and chemicals, making it unsuitable for simple reuse.

Consequently, many pieces of upholstered furniture end up in landfills, highlighting the industry's struggle with developing effective recycling solutions. The United States Environmental Protection Agency estimates that 9 million tons of furniture are thrown away every year.³ And in Europe, 5 million tons of furniture is discarded every year, the majority of which is destined for either landfills or incineration.⁴

76%
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Costs of sustainability

Incorporating sustainable practices into the production of upholstered furniture can be expensive. Sourcing eco-friendly materials such as organic fabrics, responsibly harvested wood, and recyclable metal components significantly increases costs. For many manufacturers, especially smaller companies, the investment required to overhaul supply chains, implement sustainable practices, and meet certification standards can be prohibitive. As a result, these costs are often passed on to consumers, making sustainably produced furniture less accessible and competitive compared to traditional offerings.

Adopting sustainable manufacturing processes requires significant investment in technology and equipment. Shifting towards greener practices, such as using water-based adhesives or energy-efficient machinery, involves high upfront costs and ongoing maintenance expenses. However, another way to offset the expense is through better upkeep of equipment. A predictive maintenance program can yield a 70 to 75% decrease of breakdowns and 35 to 45% reduction in downtime, according to the U.S. Department of Energy's Operations & Maintenance Best Practices Guide.⁵

Additionally, implementing circular economy principles, like take-back programs or refurbishing services, demands complex logistical frameworks that further add to the financial burden on manufacturers.

Uneven playing field

Sustainability standards and regulations vary widely across regions and markets, creating an uneven playing field for manufacturers. Companies operating in countries with strict environmental regulations face higher compliance costs, while those in regions with less stringent policies may continue using cheaper, non-sustainable materials. This disparity makes it difficult for responsible manufacturers to compete on price, particularly in a global market where cost is a significant factor for consumers. But there is hope. A recent U.S. study shows that 76% of Americans are willing to pay a higher price tag for eco-friendly furniture.⁶



³ www.architecturaldigest.com ⁴ eeb.org
⁵ www1.eere.energy.gov ⁶ www.statista.com

Labor shortages

The furniture industry is grappling with labor shortages, which are exacerbated by the specialized skills needed for sustainable manufacturing. Skilled artisans capable of working with eco-friendly materials and techniques are in short supply. Steve Kooy, Health & Sustainability Director for BIFMA, finds this to be an issue of concerns for manufacturers.

This issue is particularly concerning for manufacturers based in rural areas, where the access to skilled workers is more limited. Additionally, the existing skilled labor is aging out and efforts to recruit and train new generations to replace this expertise have been unsuccessful. This has led to increased competition for talent and rising labor costs.

“Skilled artisans capable of working with eco-friendly materials and techniques are in short supply.”

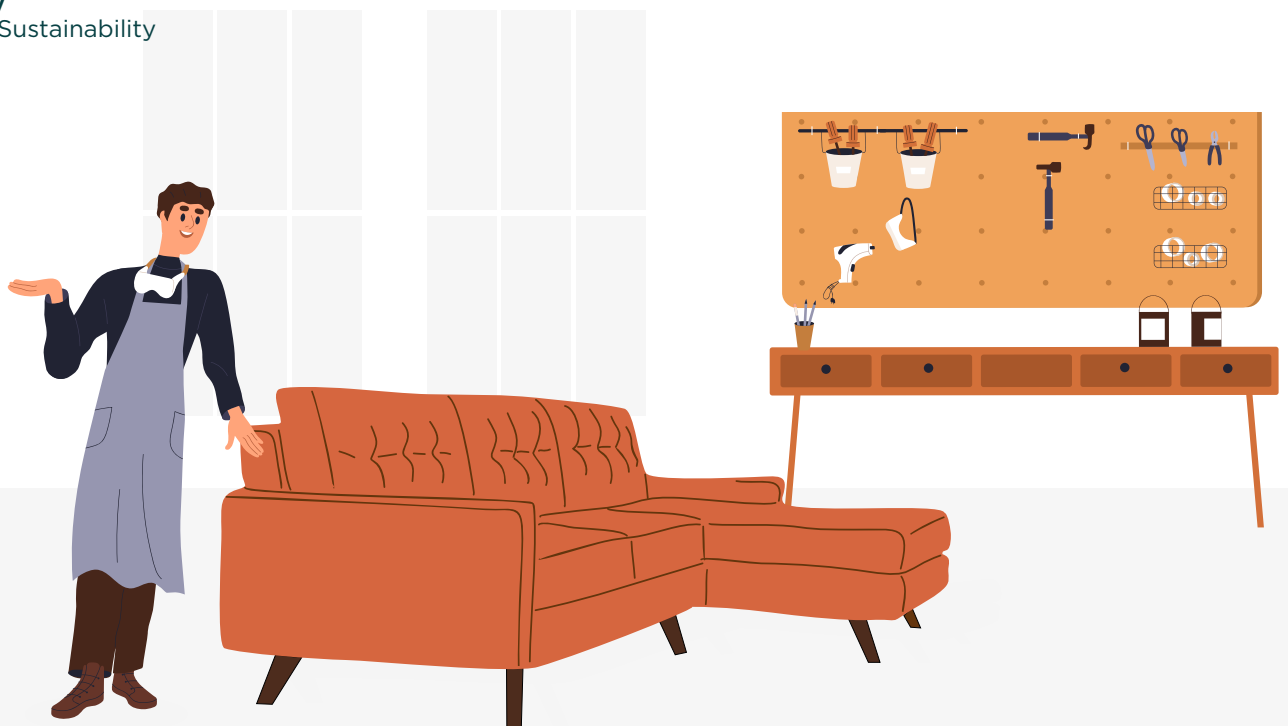
Steve Koy
Health & Sustainability
Director
BIFMA

To lure younger workers to the industry, companies are not only improving flexibility in terms of hours, but they are also creating **internal training programs** and **sponsoring low-cost educational programs** to train the demographic.⁷ For example, Coropulis explains “Poltrona Frau collaborates with the Renzo Frau Professional Institute for Industry and Craft in Sarnano, Macerata. Through this initiative, the aim is to train the next generation of artisans by teaching them to **recycle waste materials into valuable products.**”

Adopting new solutions that have employee safety and comfort in mind is also important. Offloading and feeding processes are often the most physically demanding for cutting equipment operators. Ergonomic, intuitive equipment and technology work to lighten operators’ daily workload by automating these non-value-added tasks.

Supply chain disruptions and near-shoring

Global supply chain disruptions have prompted many furniture manufacturers to bring manufacturing back closer to home markets. It can reduce transportation delays but also increase labor costs, exacerbating the overall economic burden even as it reduces dependency on foreign suppliers. While near-shoring or reshoring can lead to improved quality control and shorter lead times, it also introduces new challenges, such as the need to rebuild domestic supply chains that support sustainable material sourcing. Finding local suppliers that meet high sustainability standards can be difficult and costly, further complicating the industry’s transition to greener practices.



⁷ www.wsj.com

Consumer trends and sustainability marketing

Consumer demand for sustainable products is growing, but there is still a gap between interest and actual purchasing behavior, mainly due to higher prices and limited availability. Consumers care about sustainability, but they don't want to pay anything extra for sustainability. They have doubts about the quality," explains Kooy. For some the real question is should the responsibility for promoting sustainable upholstery lie with the consumers or the manufacturers? "My perception of sustainability is that it is not really a consumer issue, but a corporate issue," says David Pambianco, CEO of **Pambianco Strategia di Impresa**, a Milan Italy-based consulting firm that assists fashion, luxury and design companies in setting up and implementing their development strategies.

Furthermore, consumers may struggle to discern genuinely sustainable products from those that are merely marketed as such, due to a **lack of standardized certification**. This creates challenges for brands attempting to build trust and differentiate their offerings in an increasingly crowded market focused on sustainability claims.

"Following the pandemic, consumers were willing to make large home furniture purchases due to government stimulus programs and increased home-centric lifestyles" explains Kooy. However, now that the financial support has ended, economists are forecasting consumption patterns are expected to stabilize, with sales forecast to remain relatively flat. Further impacting purchasing, particularly in Western countries, is increased interest rates.

Moreover, the generational shift in consumer habits, particularly among younger generations, suggests that materialism may be on the decline, affecting demand for new furniture. Kooy adds, "Economists have suggested the aging baby boomer population may also influence future sales, as the potential for their homes to be sold or downsized could lead to a surge in furniture purchases."

According to Kooy, the demand for sustainability comes from different places depending on the market. "In the commercial world, it's definitely the architects and designers call for it." He feels, however, that on the residential side, it is the companies who feel they are part of the area and want to be environmentally responsible as a result driving demand, as well as businesses who want to differentiate themselves from the competition.

"My perception of sustainability is that it is not really a consumer issue, but a corporate issue."

David Pambianco
CEO
Pambianco Strategia di Impresa



Strategies for sustainability

Adopting sustainable practices in the upholstered furniture industry is no longer optional; it is essential for long-term business success and environmental responsibility. Technological innovations will continue to play a crucial role in enhancing sustainability and customization for upholstery manufacturers, however embracing a sustainable design philosophy is also vital. "This means emphasizing longevity and timeless aesthetics to reduce the need for frequent replacements. Thoughtful design can lead to products that remain relevant and functional over time, minimizing waste," says Coropulis.

There are key strategies that companies can implement to enhance sustainability:

Education and consumer awareness

Educating consumers about sustainable furniture options is vital for driving demand and encouraging responsible purchasing decisions. Many consumers are not fully aware of the environmental impact of their furniture choices. Beyond reducing the carbon footprint, ethical labor practices are another critical area of focus. The supply chain often involves multiple stages of production, and it is essential to ensure fair wages and safe working conditions at each step.

The challenge is that many consumers prioritize cost over sustainability and social responsibility.

Companies can help bridge this gap through certifications and transparent labeling, which show the environmental impact of products, much like the organic food industry did. Industry-wide efforts, such as sustainability campaigns and clear labeling, can help bridge this knowledge gap. Certifications play a key role in this effort by providing a recognizable mark of quality and sustainability that consumers can trust.

Regulations and recognized sustainability certifications

The last decade has seen heightened attention on the environmental impact of consumer goods, and the upholstered furniture industry is no exception. Governments worldwide are increasingly focusing on sustainable materials and processes, pushing companies to adopt greener and more ethical practices. By proactively adopting these regulations, companies can reduce their regulatory risks and enhance brand loyalty. Consumers are more likely to support brands that prioritize sustainability, especially as environmental concerns continue to grow.

Certifications play a crucial role in maintaining and demonstrating social responsibility.

But it can be challenging for consumers to determine which products are genuinely sustainable and ethical. To address this issue, various internationally recognized certifications have been established to validate the eco-friendly claims of home furnishings, such as:

→ FSC (Forest Stewardship Council)

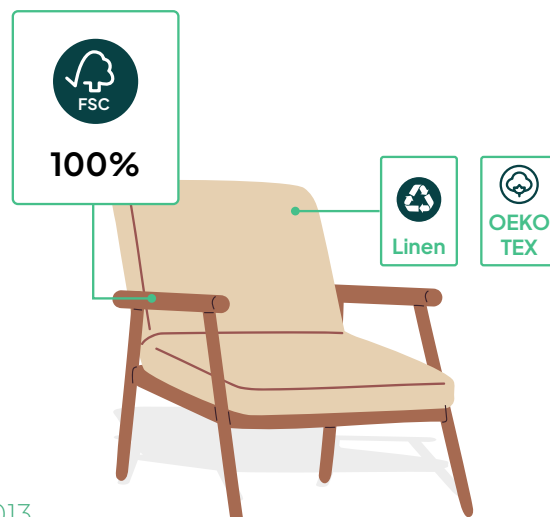
Ensures that wood products come from responsibly managed forests that provide environmental, social, and economic benefits. FSC-certified products support forest conservation and responsible forest management, reducing deforestation and habitat destruction.

→ OEKO-TEX

This certification focuses on textiles, guaranteeing that the fabrics are free from harmful chemicals and safe for human use. It is particularly crucial for upholstered furniture and bedding, as it ensures the materials do not pose health risks to consumers.

→ Cradle to cradle

This certification assesses the product's entire lifecycle, from raw material sourcing to disposal, promoting a circular economy. It ensures products are designed for reuse or recycling, minimizing waste.



European Eco-label is the only official European eco-label that can be used in all member countries of the European Union. It is based on a global approach that considers the product's life cycle, from the extraction of raw materials, manufacturing, distribution and use, right through to recycling or disposal after use. Quality and use are also considered.

In the U.S., the **GREENGUARD certification program** focuses on indoor air quality, certifying products that emit low levels of volatile organic compounds (VOCs). GREENGUARD-certified furniture contributes to healthier indoor environments by reducing the risk of chemical exposure. BIFMA LEVEL Certification is a comprehensive certification that assesses furniture products for environmental, social, and economic sustainability. It considers the entire supply chain, ensuring that certified products meet high standards for sustainability.

Through sustainable practices and recognized standards, the home furnishings industry can play a crucial role in reducing environmental impact and promoting a healthier, more ethical approach to manufacturing.

Better use of Industry 4.0 technologies

A significant challenge for the furniture industry is avoiding a "race to the bottom" according to Kooy in terms of cost-cutting while striving to maintain sustainable standards.

"From a purely economic perspective, making things cheaper and more profitable is often at the expense of the environment," he says. However, the intersection of economy and ecology, or what we call "Econogy"⁸, is driving businesses to merge corporate social responsibility (CSR) with profitability. Brands no longer need to choose between sustainability and economic growth—both can coexist and fuel each other.

This can be achieved by leveraging Industry 4.0 technologies such as robotics, artificial intelligence, and the Internet of Things. For instance, identifying fabric or leather defects before cutting allows for more precise placement and reduces material waste. This process, often supported by **advanced scanning systems**, ensures that only usable portions of the material are cut, minimizing scrap.

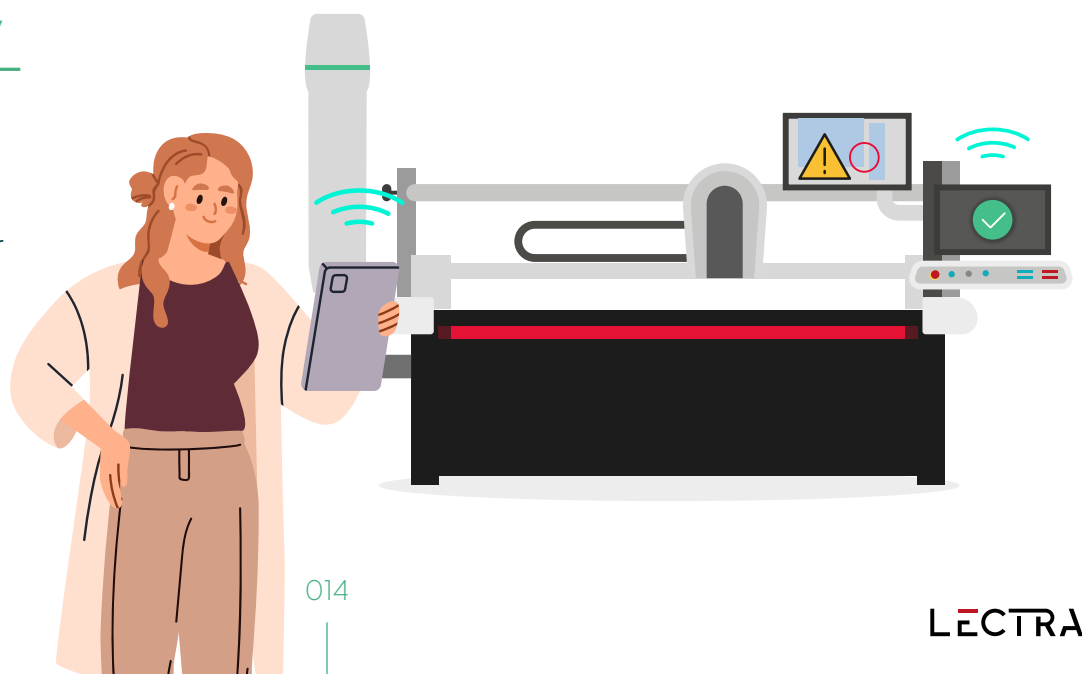
Digitalization ensures **efficient planning, cutting, and optimization of the fabric-cutting processes**. Its automated workflow and advanced data analytics provide complete control and visibility over cutting room operations, optimizing material consumption, eliminating production of defective pieces, increasing use of long-life consumables, and improving the comfort and contentment of workers.

"Digitalized cutting techniques have boosted our manufacturing efficiency. We are now able to handle smaller batches and reduce costs. The resulting products are of a better, consistent quality," says Pan Chaoping, Lean Production and Planning Management Director for **Kuka Home**.

In the future, AI and machine learning will be increasingly used to optimize production processes and reduce waste. Pambianco believes AI can be very useful: "If you go through TikTok, you see a lot of people showing how they have refurbished their room. AI can be something that can help manufacturers to be quicker in developing new projects and more efficient in terms of cost."

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Health & Sustainability Director
BIFMA



⁸ www.forbes.fr

AI and machine learning combined with digital twin technology ensure efficient traceability throughout the supply chain, enhancing sustainability and ethical practices. Customers and manufacturers can verify the sourcing of sustainable or recycled materials, while also ensuring adherence to sustainability certifications. Digital twin technology also promotes a circular economy thanks to providing more transparent data on material usage and recycling.

Additionally, **virtual and 3D prototyping** are emerging as game-changers. Manufacturers can avoid the costly and resource-intensive process of creating multiple iterations by using digital models instead of physical prototypes. Kuka Home's Director of Product Development Tu Jiahui adds, "3D design and product development solutions allows Kuka to connect product development and production processes and address any feasibility or quality issues. This reduces material usage and accelerates the product development cycle, making it both environmentally and economically beneficial."

Customization and modularity are increasingly becoming central to business models, especially in the context of sustainability for upholstered furniture. "It doesn't make a lot of sense for a lot of furniture retailers to have thousands of fabrics for consumers to choose from in a store—that's a little bit overwhelming," says Hodnett. **"There's going to have to be a digital component to all customization efforts moving forward."**

"Many companies are hoping to reduce their impact by extending the lifetime of their product," explains Clementine Mitard Manteau, product marketing director at Lectra. "We see some companies that are even proposing to renew the cover of your furniture, to make the product last longer, opening the door to the possibility of customizing the product even two or three years after the purchase."

This trend supports sustainability in several ways: it **reduces waste** by allowing customers to only order what they truly want, **avoids overproduction**, and **extends the lifespan of products** through easy replacements. The modular approach also means products can be upgraded or changed rather than discarded, contributing to a more sustainable product lifecycle.

With customization on the rise, on-demand production will play an even more vital part of the future. It will become more efficient, allowing brands to go from order reception to cutting in minutes by automating and streamlining the entire manufacturing process for one-off products and small series. Automation ensures this doesn't add unnecessary costs, making sustainable, made-to-order products more accessible to consumers.

"Automating our customized production allows us to reduce time to market by being able to create and process a wide variety of markers quickly," explains Rob Page, Production Director for **Plumbs**. Adding "We can produce patterns for each sofa and send them directly to cutting room through the cloud. The scanner attached to the cutter enables them to improve pattern-matching accuracy, cut faster, and increase fabric savings."

"Automating our customized production allows us to reduce time to market by being able to create and process a wide variety of markers quickly."

Rob Page
Production Director
Plumbs



Transportation, logistics, and consumption patterns

High transportation costs and shifting supply chain strategies present challenges for sustainability. The rise in fuel prices and stricter emissions regulations have increased the cost of moving goods. To mitigate this, companies are rethinking their logistics strategies by localizing production and sourcing materials closer to the point of sale.

“I think that the most powerful strategy for a furniture brand is to secure the supply of raw materials locally and ensure that local demand is sufficient to sustain the business before expanding activity globally,” Clementine Mitard Manteau shares. This reduces transportation emissions and aligns with the trend of reshoring, where companies move manufacturing back to their home countries to gain greater control over quality and sustainability.

Additionally, adapting to broader economic shifts, such as aging populations and changing consumer spending habits, is crucial.

For instance, older consumers may prefer durable, high-quality furniture, while younger consumers might prioritize eco-friendly and modularity options.

For instance, older consumers may prefer durable, high-quality furniture, while younger consumers might prioritize eco-friendly and modularity options. Understanding these demographic trends can help companies tailor their offerings to meet evolving consumer demands.

Emerging business models

One of the most promising trends is the rise of circular economy initiatives. From a manufacturing perspective, the primary economic challenges in the next few decades are related to stricter regulations and the rising costs of production. Circularity, or the idea of designing furniture to be easily disassembled and recycled, is a major focus. Instead of the traditional linear model of “take, make, dispose,” the circular economy focuses on extending the life cycle of products through **recycling, remanufacturing, and upcycling**. This reduces waste and conserves valuable resources but could increase costs as manufacturers adapt.

Another potential development in this area is the EU’s digital product passport, which would track product composition and recycling potential.

“This system makes the supply chain more transparent for the consumer, helping consumers make more informed decisions, particularly with older materials, such as foam treated with flame retardants,” explains Kooy.

Leasing programs, or the Furniture-as-a-Service (FaaS) business, is another innovative model gaining traction, particularly in Europe. Instead of selling furniture outright, companies lease their products to consumers, who can return them after a set period. The returned furniture is then refurbished and leased out again, reducing waste and promoting a more sustainable use of resources. This model aligns well with work places, as well as younger consumers who prefer flexibility and sustainability over ownership.



Conclusion

Despite the numerous challenges facing the upholstered furniture industry, significant opportunities exist to advance sustainability. Variability in sustainability practices across different regions, demographic shifts, and geopolitical changes all contribute to the complex landscape of global upholstery manufacturing. However, with the increasing emphasis on circular economy models, advancements in manufacturing technologies, and growing consumer demand for eco-friendly products, the industry is well-positioned to make substantial progress.

The future of sustainability in upholstery manufacturing will likely be driven by a combination of regulatory shifts, industry 4.0 technologies, innovations, and changing consumer preferences. As companies continue to adapt and evolve, those prioritizing sustainable practices are expected to gain a competitive edge, build stronger customer loyalty, and contribute positively to the environment.

In summary, while the journey toward full sustainability in upholstered furniture is challenging, it is also filled with **immense potential**. The transition may be gradual, but the collective efforts of manufacturers, policymakers, and consumers hold the promise of **a more sustainable future for the global furniture market**.