

## Sustainable Practices in Furniture Design: Can Green Practices Influence Competitiveness?

David L. Nicholls, Research Forest Products Technologist, Pacific Northwest Research Station, Juneau, AK

[david.l.nicholls@usda.gov](mailto:david.l.nicholls@usda.gov)

Matthew S. Bumgardner, Research Forest Products Technologist, Northern Research Station, Delaware, OH

### Carbon Sequestration in Furniture



Figure 1. Furniture products have been sequestering carbon for centuries. An example is this colonial era dressing table constructed in the mid-1700s. Wood products that are sufficiently dry and well-preserved (and well designed) are capable of lasting centuries with essentially no change (Photo source: <https://study.com/academy/lesson/colonial-furniture-history-characteristics.html>)

### Embedded Biomimicry Designs



Figure 4. Biomimicry can include furniture embedded with living organisms, such as this table (the "Stitch Table" by Greg Zukie) including a center strip of plants (Photo source: Sayuti 2016)

### References

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### Introduction

Furniture represents a significant component of hardwood utilization and production internationally, and sustainable design practices are becoming more widespread in response to increased consumer demand for green products. In this research, we consider ecosystem services - the benefits people derive from ecosystems - from a secondary wood products perspective. We review and synthesize the literature surrounding the design, use, and disposition of wood furniture and related products in global markets. An overarching theme is to consider how firm competitiveness can be influenced, or even enhanced, by green practices in design and associated communications with consumers.

### Methods

- Reviewed literature regarding ecosystem services derived from furniture design and manufacture, focusing on the influence of design on product competitiveness
- Included key terms green manufacturing, green supply chains, eco-design, sustainable materials, biomimicry, and eco-labeling
- Literature search carried out using Google Scholar in early 2020
- Other articles based on cross-referencing/author knowledge
- International in scope, focused on recent publications (79 articles included)
- Most papers based on research conducted in N. America, Europe, and Asia

### Ecodesign vs. Traditional Design

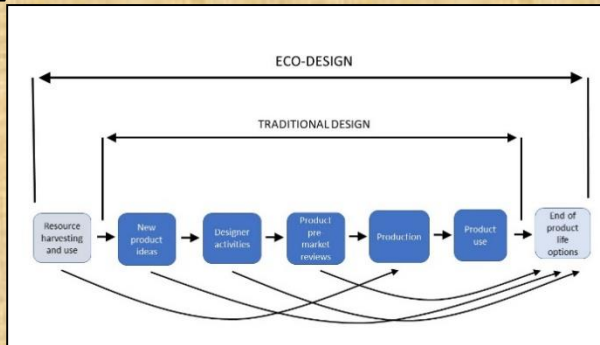


Figure 2. A conceptual model of traditional and eco-design processes for furniture product development [adapted from Knight and Jenkins (2009) and Bumgardner et al. (2001)]

### Biomimicry in Chair Design



Figure 3. Biomimicry principles in chair design by Lilian Van Daal. The plant cell structure enhances not only appearance but also structural attributes of the soft seat product (Photo source: Lizonova and Tončíkova 2019)

### Results and Discussion

#### Green Manufacturing and Supply Chains

- Product design can be an important enabler of sustainable supply chain mgt.
- Eco-design extends traditional design (Fig. 2)
- Eco-design principles include:
  - use of recycled materials
  - low energy consumption
  - reduced product weight
  - less waste during manufacture
  - greater use of reusable packaging
  - longer life-spans

#### Drivers of Sustainable Design

- Green manufacturing becoming increasingly important in effective marketing
- Small firms can use sustainable design strategies to become globally competitive
- Effective eco-design often requires commitment early in product design process
- Role of designers can vary from firm to firm

#### Furniture Design - Vertical Supply Chain Considerations

- Standard-driven greening (design plays a key role)
- Mentor-driven greening (relationships and interaction based)- environmental impact reduced due to flexibility and innovation
- Retailers communicate environmental initiatives to consumers
- Retail buyers use different cues that manufacturing personnel (supply chain challenges)

#### Marketing Sustainable Design – Green Communication

- European eco-labels for flooring and furniture
- Ecolabels can increase consumer confidence
- Effective ecolabels are simple- use fewer materials, have shorter supply chains, favor solid wood
- Effective ecolabels should evoke an emotional connection with potential customers (Fig. 5)

### Ecolabels (Floors & Furniture Example)



Figure 5. EU ecolabel for floors and furniture, providing product details and emotional connection to consumers (Source: [www.ecolabel.eu](http://www.ecolabel.eu))

### Conclusions

- Sustainable design can help competitiveness
  - well designed / emotionally appealing
  - longer lifespans can lead to greater environmental benefits
- Designers can work directly with consumers (make-to-order)
- Designers can help create computer programs for consumers to rapidly customize furniture
- Sustainable design is most effective when companies commit early in product development
- Sustainable design drivers can be market-based and/or regulation-based
- Creativity and imagination is key to successful design of high value hardwoods