

**Pablo VAN DER LUGT<sup>1</sup>**  
**Maxim LOBOVIKOV<sup>2</sup>**

<sup>1</sup> Delft University of Technology  
Faculty of Industrial Design  
Engineering  
Design for Sustainability Program  
Landbergstraat 15  
2628 CE Delft  
The Netherlands

<sup>2</sup> Forest Products Service  
FAO  
Via delle Terme di Caracalla  
00153 Rome  
Italy

# Markets for bamboo products in the West

**Available trade databases**, market studies and empirical information are analysed here to estimate the current size and potential of the bamboo market. The latter analysis uses the current wood market as a substitute market.



**Photo 1.**  
Various kinds of bamboo flooring.  
Photo A. van der Vegte.

Pablo VAN DER LUGT,  
Maxim LOBOVIKOV

## RÉSUMÉ

### DÉBOUCHÉS COMMERCIAUX POUR LES PRODUITS DU BAMBOU EN OCCIDENT

Depuis une dizaine d'années, les produits issus de la transformation industrielle du bambou ont pénétré dans les marchés du monde occidental développé et commencent à concurrencer les produits en bois. Cependant, en raison de la nouveauté de ces produits et du manque de données statistiques cohérentes sur le commerce et la consommation de produits en bambou, l'ampleur actuelle et potentielle de ce marché dans l'Union européenne et aux États Unis reste incertaine. Dans cet article, nous analysons les bases de données disponibles sur le commerce du bambou, les études de marché et des informations empiriques afin d'estimer l'ampleur actuelle et potentielle du marché, en s'appuyant sur les données du marché actuel des produits en bois.

**Mots-clés :** marché, potentiel, consommation, bambou, bois, Union européenne, États Unis.

## ABSTRACT

### MARKETS FOR BAMBOO PRODUCTS IN THE WEST

In the last decade, industrially processed bamboo began to compete successfully with wood products for the developed Western markets. However, because of the novelty of industrial bamboo products and due to a lack of consistent statistical data on their trade and consumption, it is unclear how large the current and potential market for bamboo in the European Union and the United States really is. This paper analyses available trade databases, market studies and empirical information to estimate the size of the current and potential bamboo market, using the current wood market as substitute market in the latter case.

**Keywords:** market, potential, consumption, bamboo, wood, European Union, United States of America.

## RESUMEN

### SALIDAS COMERCIALES PARA LOS PRODUCTOS DE BAMBÚ EN OCCIDENTE

Desde hace unos diez años, los productos procedentes de la transformación industrial del bambú han penetrado en los mercados de los países occidentales desarrollados y han empezado a competir con los productos de madera. Sin embargo, debido a la novedad de estos productos y a la ausencia de datos estadísticos coherentes sobre el comercio y consumo de productos de bambú, no se conoce con certeza la dimensión actual y la potencialidad de este mercado en la Unión Europea y Estados Unidos. En este artículo, analizamos las bases de datos disponibles sobre el comercio de bambú, los estudios de mercado y las informaciones directas con el fin de estimar el tamaño actual y potencial del mercado, basándose en los datos del mercado actual de los productos de madera.

**Palabras clave:** mercado potencial, consumo, bambú, madera, Unión Europea, Estados Unidos.

## Introduction

Because of its fast growth, good mechanical properties, low price and abundant availability, bamboo is widely recognized as a promising resource for sustainable development. However, traditional bamboo culm products imported from tropical countries only fill a small niche market in developed Western regions, including the European Union (EU) and the United States of America (USA). Since the early 1990s, new industrially manufactured bamboo products, mainly from India and China, have hit world markets, experiencing moderate but steady growth. Because of the relatively high prices paid for industrial bamboo products and their growing market share, more bamboo producing countries intend to develop modern bamboo industries for products such as panels (photo 1), paper, fabrics, charcoal and shoots.

Although bamboo markets are expanding, it is not yet clear how large the potential market for bamboo is, and where the limits for the current expansion are. Availability of trade statistics is limited, because the necessary customs codes are still missing. This means that bamboo products are registered under general code headings, which makes it difficult to separate bamboo from wood and other similar traded commodities. Even less information is available regarding industrial bamboo products. This paper attempts to fill the information gap about current and potential markets for bamboo products in the USA and the EU, by analysing existing trade databases, market studies and empirical data. The three most important trade statistics databases used either directly or indirectly for this article are the COMTRADE database (<http://comtrade.un.org/db>), the PIERS database ([www.piers.com](http://www.piers.com)) and the INBAR Database on the Bamboo and Rattan Trade (<http://www.inbar.int/trade/main.asp>). The COMTRADE database, managed by the UN statistics division, records trade in all available

products based on national trade statistics, and reports them internationally. The PIERS (Port Import Export Reporting Service) database is a commercial database which maintains extensive import and export data about cargo moving through ports in the United States, Mexico, Latin America and Asia. The INBAR Database on the Bamboo and Rattan Trade is based on COMTRADE data and records all existing import and export data for products based on bamboo and rattan.

The focus of this paper is on the USA and the EU, prior to its enlargement in 2004. These two regions represent the largest Western markets, accounting for up to 80% of the global bamboo trade. The study specifically focuses on Germany and the Netherlands, which pioneered industrial bamboo products in the EU. Furthermore, the paper focuses on consumer durables, i.e. products that yield services or a utility over time rather than being completely used up when used once. This is an important limitation in the research, because consumable bamboo products such as food and charcoal may also have a large potential on Western markets. The research concentrates on the sectors in which bamboo products are already in use, or where they show market potential and may replace wooden products.

## Problems with statistical data on the bamboo trade

Although the importance of bamboo as a valuable development asset is widely acknowledged, the exact scale of the bamboo trade is barely known. Tracking the international trade is difficult because of the lack of customs codes for bamboo. Information on national markets is incomplete and controversial.

Experts believe that the current value of the bamboo trade is in the range of US\$1.5-3 billion. China generates a very significant portion of global exports. The EU and USA markets consume over 80% of total bamboo imports. Bamboo exports are smaller compared to other main commodities such as bananas (US\$5 billion), cotton (US\$6 billion) and tropical wood (US\$35 billion) (LOBOVIKOV, 2003; HUNTER, 2003).

Trade in all available products is recorded through COMTRADE, which uses internationally agreed standard definitions and product coding. The current standard coding system is the Harmonized System (HS) published by the World Customs Organization (WORLD CUSTOMS ORGANIZATION, 2002). Unfortunately, only a limited number of HS codes are now available for bamboo. WARDLE (2003) specifies two groups of HS codes. One group (two codes only), identifies raw bamboo and rattan, especially for use in plaited products (HS codes 1401 and 4602). The second group of codes covers wood and plant products, which may include bamboo.

Practically all available HS codes include other plant materials along with bamboo. For instance, the product group 1401 ("bamboos or other material of a woody nature of a kind used primarily for plaiting") may also include other plant materials such as rattan, straw, willow, rushes, reeds and strips of wood. This problem is even more complex with the codes for further processed products, such as pulp, paper, flooring, roofing, panels, boards, composite materials and charcoal (INBAR, 2006). These products may include all kinds of wooden products besides bamboo.

**Table I.**  
New customs codes for bamboo, effective since 2007.

Code	Description
2005.91	Bamboo shoots
4402.10	Bamboo charcoal
4409.30	Bamboo flooring parts
4412.10	Bamboo veneer
4422.13	Bamboo flooring
4601.21	Bamboo mats
4601.92	Other vegetable materials of bamboo
4602.11	Basketwork of bamboo
4706.30	Pulps bamboo fibres
4823.61	Other paper, paperboard, cellulose wadding etc of bamboo
9401.51	Seats of bamboo
9403.81	Furniture of bamboo and rattan

To better serve specific national needs, countries normally apply two to three-digit extensions to the standard six-digit HS codes. For instance, China, India and Philippines apply two-digit extensions, while Japan adds three-digit extensions to the international six-digit codes. China and India, as the main bamboo producers, have quite comprehensive data on the bamboo trade. Many other bamboo producing countries have much more limited data (WARDLE, 2003; INBAR, 2006).

In September 2003, the World Customs Organization (WCO) approved the INBAR/FAO (International Network for Bamboo and Rattan / Food and Agriculture Organization of the United Nations) proposal for the development of more specific HS coding for bamboo products, in order to map the bamboo trade more accurately in the future, and introduced twelve new six-digit customs codes for a number of bamboo and rattan products, such as bamboo shoots, flooring, boards and paper, effective

since 2007 (LOBOVIKOV, 2003). The new codes will not only improve bamboo and rattan statistics in the future, but also provide a basis for fairer and more stimulating trade tariffs. The new HS codes for bamboo are listed in table I.

More accurate statistical data on the bamboo trade will only become available through the new customs codes in a couple of years. Until then, only the existing primary data obtained through COMTRADE and secondary data from other sources can be used to estimate the current market share of bamboo products.

## COMTRADE statistics on bamboo

COMTRADE data, although insufficient, provide an important basis for expert assessments of the current bamboo trade (WARDLE, 2003). The data is available via the INBAR International Bamboo and Rattan Trade database (INBAR, 2006). The current market size for bamboo products refers to consumption figures. Country consumption consists of production and imports minus exports. Table II

**Table II.**  
Imports of traditional bamboo products to the West, US\$ 1 000.

Code description	Netherlands		Germany		USA		World Total
	2002	Average (1989-2002)	2002	Average (1989-2002)	2002	Average (1989-2002)	
140110 - Bamboo used primarily for plaiting (raw material)	4 821	4 467	2 541	2 477	4 692	5 542	50 000
Vegetable plaiting materials products							1 400 000
460110 - Plaits & products	0	612	0	578	0	693	
460120 - Mats & screens	6 357	3 234	6 189	5 564	25 882	16 568	
460191 - Plaited materials, not mats	2 229	1 331	1 901	992	6 962	4 343	
460210 - Basketwork	35 852	31 955	64 284	59 331	393 927	295 793	
940150 - Seats made of rattan, bamboo and similar materials	25 483	37 688	43 295	43 635	118 417	100 824	
940380 - Cane furniture made of rattan, bamboo and similar materials	15 907	17 566	30 366	33 733	393 683	231 055	1 500 000

Source: LOBOVIKOV, 2003; WARDLE, 2003; INBAR, 2006.

Note: the 'World' column refers to total trade instead of imports, and is based on rounded figures.

**Table III.**  
**Market size in the USA of various bamboo product categories**  
**based on 2004 import figures from the PIERS database.**

Category	Value (US\$ 1 000)	Market share (%)
Handicrafts	2 415	0.9
Kitchen articles	23 796	9.1
Basketry	70 645	27.0
Decoration	31 221	11.9
Garden	27 000	10.3
Raw material	15 654	6.0
Furniture	20 081	7.7
Furniture with woven parts	6 452	2.5
Cane based furniture	4 778	1.8
With other materials	3 289	1.3
Tables	1 794	0.7
Chairs	1 613	0.6
Crates	1 352	0.5
Shelves	473	0.2
Bedroom articles	185	0.1
Flooring	70 453	27.0
Flooring as such	64 600	24.7
Accessories	2 952	1.1
Without finishing	1 563	0.6
Finished	544	0.2
Parquet	455	0.2
Panels	154	0.1
Veneer	104	0.0
<b>Total</b>	<b>262 265</b>	<b>100.0</b>

Source: adapted from CORPEI, 2005.

## Bamboo PIERS trade statistics

For the USA, the PIERS database contains more specific data on bamboo product imports based on HS codes, including the identification of industrial bamboo products. The clustered values of these HS-based product groups into specific product categories are shown in table III (CORPEI, 2005). Note that at the moment, these specific import figures for bamboo products exist only for the USA in the PIERS database. Furthermore, the PIERS data, like the COMTRADE data, has many inconsistencies in classification that affect the accuracy of the results. Compared to the import figures for the USA in table II, the figures in table III are considerably lower, demonstrating that the HS codes include various other materials besides bamboo.

The USA is the largest Western consumer of bamboo, with annual imports of almost US\$300 million in bamboo products, 95% of which come from China. Imports of bamboo products in the USA grew considerably between 2000-2003, by 98% in volume and 127% in value. About 57% of imports are flooring and baskets, which are the largest bamboo markets in the USA (CORPEI, 2005). Furthermore, the flooring market is growing steadily (VON REITZENSTEIN, 2004). The market for bamboo poles and strips for various uses in the USA is estimated at US\$15 million (90% from China), 30% of which is used for decorative purposes in gardens and parks, such as garden wood, fences, gates and gazebos. This product group has a bigger potential for the USA market than for the EU, because the tropical appearance of bamboo products is more highly appreciated in the USA than in the EU, where bamboo is perceived more as a niche product for specific purposes, for example in zoos and theme parks (photo 2) (VON REITZENSTEIN, 2004).

shows the figures for bamboo imports to the West based on existing HS codes. Import figures are a good reference for consumption in the West, since bamboo hardly grows in these countries and local production is low.

The statistical data presented has certain limitations. The figures may be either under- or over-estimations. Over-estimations may occur because the aggregates represented also include rattan, willow, osier and other vegetable materials besides bamboo. On the other hand, the established INBAR database presenting values for existing HS codes does not include many important bamboo products that are not easily identified in national or international statistics, such as bamboo pulp, paper, flooring, roofing, panels, boards, composite materials and charcoal. INBAR studies in China show that HS codes identify only about a third of the total bamboo trade (LOBOVIKOV, 2003). Nor do these figures cover production, trade and consumption of bamboo and rattan within the exporting countries themselves (INBAR, 2006). After the introduction of the new HS codes, the database will provide more accurate trade statistics.

Import quantities vary significantly across the various product groups. Most product groups are rather small, but three are of considerable size: basketwork (table I), seats made of rattan, bamboo and similar materials (table I) and cane furniture made of rattan, bamboo and similar materials (table I). Import values range from tens of millions of US dollars in the Netherlands to hundreds of millions in the USA. These figures are small compared to the import figures for wood products. Products in the groups mentioned mostly target saturated low-end markets without much growth potential. Meanwhile, new industrial bamboo products are showing a vigorous tendency to take over an essential share of the wood market, but are still missing from the HS codes. Additional trade statistics for the Western countries presented below were therefore derived from different sources.

## Previous market studies and empirical data

A few market studies that are available for bamboo products in Western markets (i.e. HELD, 2003; CORPEI, 2005) have encountered similar problems arising from the ambiguity and limitations of the current HS codes for bamboo, as mentioned before. These studies have to use secondary market data from other sources such as companies, branch organizations and industrial trade databases, which might jeopardize the accuracy of results. The bamboo market studies mentioned have largely focused on the flooring market, which has the highest growth potential. For other promising products (such as veneer and boards), information from these studies was supplemented by empirical data gathered from bamboo companies by the authors. Tables IV and V below compare the consumption of high-potential industrial bamboo products with consumption in the competing and more highly developed wood sector.

The consumption of bamboo flooring in the EU was estimated at 0.67 million m<sup>2</sup> in 2003. Of this volume, 95% is from China, while the rest comes from Australia, Vietnam and the Philippines. However, bamboo flooring consumption is growing steadily, especially for engineered bamboo flooring. ZAAL (2006) estimates that the bamboo flooring market in the EU already amounted to about 900 000 m<sup>2</sup> in 2005. Further growth is expected due to the recent interest in bamboo flooring among big retail chains such as IKEA, and the DIY sector. The largest bamboo flooring consumer is Germany, with an estimated market share of 50%. France, Holland, Belgium, Switzerland, Austria and Italy share the rest of the EU market, with individual market shares of around 7% (CORPEI, 2005). The market size for bamboo flooring in the USA is 6 times larger than in the EU: approximately 0.7 million m<sup>2</sup> for the EU in 2003 versus 4.2 million m<sup>2</sup> in 2005 for the USA (CORPEI, 2005; MALIN, BOEHLAND, 2006). Note however, that USA market figures for flooring may include high quality boards used for the top layer of flooring, which make up a separate

section in the EU data. Table V shows consumption figures for the other high-potential bamboo products for Western markets.

Table V shows that besides flooring, other industrial bamboo products, such as bamboo boards, play a significant role in the Western market. First of all, the market for solid boards for furniture and interior applications is growing, but it is expected that bamboo veneer will have the biggest growth potential for these purposes (VON REITZENSTEIN, 2004). The EU is the main consumer of bamboo veneer, with around half of world consumption. Germany and Italy are the main consumers in Europe (CORPEI, 2005). Because of the relatively low price and the ease of production and use, the market for bamboo veneer in the EU is expected to grow by several million m<sup>2</sup> annually in the next few years. According to Moso International, the European market leader in the bamboo veneer trade, consumption of bamboo veneer has almost doubled in the last two years (ZAAL, 2006).

Finally, Germany (70%) and Austria (20%) are the largest consumers of high-quality bamboo boards used for the top layers of laminated flooring, which is perceived as a separate product group. The total consumption (2.4 million m<sup>2</sup>) amounts to 0.9% of the total laminated flooring market in the EU, estimated at 252 million m<sup>2</sup> (CORPEI, 2005).

It may be concluded that for industrial bamboo products in the West, the flooring market is still the most important. Besides flooring, new markets for industrial bamboo products such as veneer and panels in the West are developing vigorously, especially for interior decoration and furniture.



**Photo 2.**  
Fence of bamboo poles in the Rotterdam zoo in the Netherlands.  
Photo P. van der Lugt.

**Table IV.**  
Consumption of bamboo and wooden flooring  
in the EU and USA, 1 000 m<sup>2</sup>.

Countries	Year	Bamboo	Wood
Netherlands	2005	150	n/a
Germany	2002	n/a	21 000
	2003	300-350	n/a
	2005	450-500	n/a
EU	2003	670	95 000
	2005	850-900	n/a
USA	2005	4 200	n/a

Sources: VON REITZENSTEIN, 2004; CORPEI, 2005; MALIN, BOEHLAND, 2006; ZAAL, 2006.

**Table V.**  
Consumption of various industrial bamboo products in the West compared to wood consumption  
in the EU and USA.

Countries/products	Year	Bamboo (m <sup>2</sup> )	Bamboo (m <sup>3</sup> )	Wood (m <sup>3</sup> )
Netherlands	Veneer	2003	n/a	30 000
		2005	25 000	150
	High quality boards for top layers of flooring	2005	50 000	
	High quality boards for furniture and special interior projects	2005	25 000	
Germany	Veneer	2003	n/a	436 000
		2005	300 000	1 800
	High quality boards for top layers of flooring	2005	200 000	
	High quality boards for furniture and special interior projects	2005	75 000	
European Union	Veneer	2003	n/a	1 753 000
		2005	575 000	3450
	High quality boards for top layers of flooring	2003	2 400 000	
	High quality boards for furniture and special interior projects	2003	2 400 000	
USA	Veneer	2003	US\$ 140 000	662 000

Sources: ITTO, 2004; CORPEI, 2005; ZAAL, 2006.  
Note: consumption data for bamboo veneer is available only in m<sup>2</sup>. For a better comparison with wood veneer consumption, cubic meter figures were calculated and added to the table based on a standard veneer thickness of 6 millimetres (ZAAL, 2006).

## The wood market as a potential substitute market

### Potential market

The potential market for a product consists of the amount of people with a certain amount of interest in the product. Considering such aspects as financial means, access and qualification of the consumer to use the product, the "available qualified market" is a lot smaller than the potential market (KOTLER *et al.*, 2001). Depending on the industry and product, the potential market can be very dynamic, and may shift drastically depending on conditions and time. There are various methods to estimate the potential market for a new product or material. If available, patterns of sale and adoption of very similar or analogous products to the one about to be introduced are often the best indicators of potential (LEHMANN, WINER, 2005). To estimate the potential market for the new industrial bamboo products, the current market for wood products can be considered as a very suitable analogous substitute market, since industrial bamboo products are very similar to various wood products. Both markets trade natural and similarly processed materials, which have similar aesthetic and tactile features. In other words, current consumers of wood products in the future may also be interested in buying bamboo substitutes. Because of the stable global demand for wood and the increasing interest in sustainably produced timber, the potential market for industrial bamboo products is expected to grow.

### Comparison between wood and bamboo consumption

A brief overview is given above of the existing consumption figures for wood products in the West. Comparisons are based on market data provided by the International Tropical Timber Organization (ITTO), which divides the total wood trade into primary wood products (logs, sawn wood, veneer and plywood) and secondary processed wood products (SPWPs - furniture, mouldings and other manufactured wood products). The data is based on COMTRADE and ITTO statistics supplied by the ITTO member countries (ITTO, 2004).

If we first refer back to tables IV and V, we can compare consumption of the most important bamboo product groups in the West with consumption for the same products in wood. Table IV shows that with an estimated consumption of 0.67 million m<sup>2</sup> in 2003, the bamboo flooring market represents a marginal role, accounting for 0.7% of the wooden flooring market in the EU. The total flooring market in the EU in 2003 is estimated at 2 000 million m<sup>2</sup>. With a consumption of 95 million m<sup>2</sup>, wooden flooring makes up 5% of the total flooring market in the EU. Sales of flooring made of natural materials such as wood grew up by 5% in 2004. Growth is likely to continue due to the popularity of engineered wooden flooring. A threat to natural wood and bamboo is posed by the fast growing laminated flooring sector (fake wood), which already accounts for 11% of the total flooring market (CORPEI, 2005). The consumption of another promising industrial bamboo product, veneer, also pales in comparison with consumption of wood veneer (3 450 m<sup>3</sup> per year in the EU compared to 1 753 000 m<sup>3</sup> for wood).

Consumption data for primary wood products (ITTO, 2004) shows that the USA is the largest Western consumer in all categories of primary wood products, except for veneer, where the EU is the largest consumer. The data show the enormous size of

the wood trade and consumption compared to that of bamboo. For example, the estimated value of the bamboo commodity trade worldwide is US\$1.5-3 billion, which corresponds to the import value of all primary wood products in the Netherlands – US\$1.8 billion in 2004 (CBS, 2006).

Almost the same can be said about SPWPs. Bamboo consumption in the various SPWP sectors in the West is marginal compared to wood consumption. For example, in 2002 the total value of wooden furniture imports (based on HS codes 9401.61, 9401.69, 9403.30-60) in the Netherlands alone (US\$1 billion) was almost as high as total worldwide imports of bamboo and cane furniture parts (US\$1.3 billion).

### Forest certification as a promising trend for bamboo

Finally, the growing popularity of wood certification (e.g. PEFC and FSC), guaranteeing sustainable production of the wood, may also affect bamboo consumption in the future. Consumption of certified wood is growing strongly, especially in the EU. This is mainly due to the powerful lobby of public organizations, NGOs and governments, which reveals the growing importance of Corporate Social Responsibility (VAN DER LUGT, OTTEN, 2007).

Because of the demanding requirements during production of certified wood, its availability is low, while demand is high. A global market survey by the FSC reported that demand exceeded supply by at least 10 million m<sup>3</sup> of round hardwood in 2005 (FSC, 2005). Because of the gap between demand and supply, the prices of certified wood are still relatively high.

In contrast to wood, bamboo is perceived as an inherently sustainable resource by many Western consumers, because of its rapid growth and abundant availability. For example, the Governmental Construction Organization in the Netherlands (*Rijks Gebouwen Dienst*) accepts non-certified bamboo along with certified wood in its constructions (VAN DER LUGT, OTTEN, 2007).



## Roadmap for bamboo commercialization

The above shows that unlike traditional bamboo products, new industrial bamboo products, such as flooring, veneer and solid boards, have high potential. The current market share of bamboo products is still marginal compared to rival wood products, but is steadily growing.

Because of the accelerating development of the industrial bamboo sector, virtually any wood product can be also produced from bamboo. High-end industrial bamboo products such as Plybamboo and Strand Woven Bamboo generally have a number of competitive advantages compared to hardwood and softwood (coniferous) products, based on their aesthetics, mechanical properties, production rate and eco-friendliness. The market for tropical and certified hardwood is an especially interesting target for industrial bamboo prod-

ucts, since in many circumstances, industrial bamboo is not able to compete economically with softwood. In the future, various cheaper industrial bamboo products, such as Bamboo Mat Boards, might be able to compete with softwood in Western markets. Current consumption of hardwood products can provide an estimation of the potential market for industrial bamboo products in the future. Existing markets for hardwood are large and signify major potential for industrial bamboo.

Industrial bamboo can target high-volume industrial markets, such as the building industry where bamboo might substitute hardwood in applications such as decking, cladding, flooring, interior decoration and laminated beams. Smaller high-end niche markets should not be neglected, including yacht coverings and exclusive products (photo 3). Margins in these sectors are high and the image of bamboo as a cheap material might be altered as an additional spin-off. However, the integra-

tion of product development capacity through the involvement of Western designers will prove crucial for any chance of success in such markets.

Although industrial bamboo can theoretically compete on the product level with hardwood products, it should be remembered that industrial bamboo is still a relatively new commodity. The bamboo sector still lacks the necessary organizational, institutional, product development, marketing and distribution infrastructure (VAN DER LUGT, OTTEN, 2007). Therefore, besides product properties, many other factors related with the production chain may negatively affect competitiveness of the new bamboo products. This will result in an eventual realized market share that will still be considerably lower than the potential market of (hard)wood products it is seeking to substitute. If the bamboo industry can develop further into maturity and overcome these bottlenecks, industrial bamboo could become a true competitor for hardwood in the twenty-first century.



**Photo 3.**  
Bamboo design chairs.  
Design and photo M. Groenen.

## References

- CBS, 2006. Statline database. Accessed July 2006, available at <http://www.cbs.nl/en-GB/menu/cijfers/statline/toegang/default.htm>. Leidschendam, The Netherlands, CBS.
- CORPEI, 2005. Estudio de mercados internacionales para potenciales productos ecuatorianos derivados del bambu (in Spanish). Guayaquil, Ecuador, CORPEI, 129 p.
- FSC, 2005. FSC news. Estimated size of FSC global market revised to US\$5 billion. April 25th. Available at [http://www.fsc.org/en/whats\\_new/news/news/40](http://www.fsc.org/en/whats_new/news/news/40). Bonn, Germany, FSC.
- HELD C., 2003. Documentos del proyecto Guadua-Bamboo de la Union Europea sobre las investigaciones en los mercados alemanes para productos de bambu (in Spanish). University of Freiburg, Germany, 122 p.
- HUNTER I.R., 2003. Bamboo resources, uses and trade: the future? *Journal of Bamboo and Rattan*, 2 (4): 319-326.
- INBAR, 2006. Database on bamboo and rattan trade. Accessed December 2006, available at <http://www.inbar.int/trade/main.asp>. Beijing, China, INBAR.
- ITTO, 2004. Annual review and assessment of the world timber situation. Yokohama, Japan, ITTO, 255 p.
- KOTLER P., ARMSTRONG G., SAUNDERS J., WONG V., 2001. Principles of marketing, third European edition. Harlow, United Kingdom, Pearson Education Limited.
- LEHMANN D.R., WINER R.S., 2005. Product management. United States of America, McGraw-Hill Irwin.
- LOBOVIKOV M., 2003. Bamboo and rattan products and trade. *Journal of Bamboo and Rattan* 2 (4): 397-406.
- MALIN N., BOEHLAND J., 2006. Bamboo in construction: is the grass always greener? *Environmental Building News* March 2006 (e-magazine).
- VAN DER LUGT P., OTTEN G., 2007. Bamboo product commercialization for the west. A state of the art analysis of bottlenecks and opportunities. INBAR Technical Report no 29. Beijing, China, INBAR, 94 p.
- VON REITZENSTEIN E., 2004. Market survey on bamboo parquet in Germany. Procurement strategies, current market situation and market potential for new suppliers from Latin America. University of Freiburg, Germany, 45 p.
- WARDLE P., 2003. Statistics on resources, production and trade. *Journal of Bamboo and Rattan*, 2 (4): 351-369.
- WORLD CUSTOMS ORGANIZATION, 2002. Harmonized commodity description and coding system, third edition. Brussels, Belgium, World Customs Organization.
- ZAAL R., 2006. General manager Moso International, Interview. Hoorn, The Netherlands.