

An empirical investigation of wood product information valued by young consumers

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Abstract

Recent media reports regarding wood products question the trustworthiness of wood origin declaration, the sustainability of production methods and the product quality. In light of this question, it becomes important to ensure consumer trust in wood and wood-based products. Current research indicates that providing product information enhances product trust and purchase intentions, while young consumers in particular seek detailed product information. However, it is necessary to determine which wood product information young consumers strongly value because providing a high amount leads to information overload. As information needs may vary between different consumer segments, the present work aims at identifying segments of young consumers and their preferred wood-product information. The importance of different wood product information items concerning the purchase decision was investigated with a German-language online survey (N = 185, age range 18–30). A cluster analysis revealed four consumer segments. Thereof, three segments (an environmentally oriented, an environmentally and quality oriented, and a quality oriented segment) valued the provision of wood product information. The preferred information types differed among the three segments. Overall, this paper provides insights into young consumers' preferences for wood product information and the consumer segments on which marketing should focus.

Introduction

Critical media reports on illegal timber felling, calls for boycotts of tropical wood products, marketing of cheap wood imitations consisting of paper or plastic sheet, and production processes with serious environmental impacts have increasingly occurred over the past several years. For example, news articles refer to non-reversible logging in rainforests (Vidal, 2013), the associated threat to biodiversity (Barnes, 2012) and consumer concern about fake wood (McKeough, 2014). Several consumer campaigns indicate that potential buyers care about these issues. Examples include the development of the buying guide 'Rainforest-Safe Kids Books' and a successful prevention of constructing the world's largest chip mill in a rain forest (Walker et al., 2013).

As a result, consumers' perception of wood as an eco-friendly raw material may be threatened. For instance, consumers are concerned about sustainability of forest management (Aguilar and Cai, 2010). In addition to being worried about environmental issues such as resource depletion or the utilisation of tropical timber, consumers also consider social issues, e.g. maintenance of workers' rights (Aguilar and Cai, 2010; Cai and Aguilar, 2013b). A trend involving consumers questioning the eco-friendliness of wood is dangerous because wood products usually possess high environmental friendliness, as wood is a CO₂-neutral renewable raw material which can also foster the realisation of cascading utilisation (Fraanje, 1997; Kim and Song, 2014). A cascading utilisation of wood implies that the timing of CO₂ emissions is postponed into the future through multiple material uses (Fraanje, 1997). To realize a more efficient resource utilisation, it is also important not only to use virgin material but also by-products and waste materials. An example is given by the furniture industry (Tsoumis, 2009): While solid wood boards are created primarily from forest wood, co-

products (sawmill by-products), secondary wood (recovered from waste wood) and wood from forest thinning are used for the production of wood-based panels such as particleboards. When considering that wood furniture can be reused again after a long utilisation phase, wood can be used up to 350 years before it is used for combustion (Fraanje, 1997). Nevertheless, these benefits will not be fully exploited without consumer acceptance of wood-based products.

To increase consumer trust in both wood itself and products made from wood, additional measures are needed. For a long time, certification was a commonly used approach to regain trust and enhance the purchasing disposition of sensitised consumers. Certifications are based on the assumption that consumers prefer to purchase wood products originating from sustainable managed forests (Anderson and Hansen, 2004). The most important European certification schemes are the Forest Stewardship Council (FSC) and the Program for the Endorsement of Forest Certification Schemes (PEFC) (Cai and Aguilar, 2013b; Roos and Nyrud, 2008; Yamamoto et al., 2014). In addition to certifying the forestland, these schemes also include a chain of custody certification, i.e. the traceability of the wood products to the forest of origin (Cai and Aguilar, 2013b; Yamamoto et al., 2014). Nevertheless, consumers seem to be confused by the high quantity and variety of certification labels they are confronted with every day, so that it becomes difficult to capture their meanings (Borin et al., 2011). In recent years, studies in the Business-to-Consumer (B2C) sector examined whether a precise provision of product information is a promising alternative to certification labels of Fast-Moving Consumer Goods (FMCG), using the example of the food industry. These investigations show that consumers have higher product trust and purchase intentions when detailed product information is available (Chen et al., 2008; Clemens, 2003; Gracia and Zeballos, 2005; Ortega et al., 2011; Ubilava and Foster, 2009). The provision of the information has even been identified as a strategy to overcome purchase barriers of green products (Gleim et al., 2013) and is partially demand driven, with an increasingly growing request being reported (Dimara and Skuras, 2003; Hobbs, 2003; Salaün and Flores, 2001). However, simple access to information is important because consumers' uncertainties seldom induce potential buyers to actively search for product information (Verbeke, 2008). Overall, the provision of product information seems to be particularly promising for young consumers as they seek longer and more for detailed product information and use this information precisely (Cole and Balasubramanian, 1993; Klein and Ford, 2003; Kanchanapibul et al., 2014). Hence, those consumers aged between 18 and 30 are particularly interesting (Kanchanapibul et al., 2014). These consumers are currently described as the most educated ones, being thirsty for knowledge and having grown up in a technological environment (Yeaton, 2008). The technologically well informed suggest that the information search behaviour of potential young consumers specifically relies on information and communication technology. Additionally, these consumers become increasingly active in the marketplace and are therefore an important generation for marketing research (Noble et al., 2009). Because of this, young consumers appear to be an interesting target group for initial investigations.

While recent studies indicate that consumers value access to FMCG product information, research in the wood industry is still needed. The provision of product information is also discussed as an important marketing tool for durable goods and premium products (Clemens, 2003; da Silva et al., 2010). Nevertheless, it has been noted that providing a huge number of product information items might result in an information overload; it therefore becomes necessary to identify the items consumers especially value (Kehagia et al., 2007; Pieniak et al., 2013; Salaün and Flores, 2001; Verbeke,

2005, 2008). As the information consumers demand might vary between consumer segments, the valued information items also should be determined for different target groups (Dimara and Skuras, 2003; Verbeke, 2005, 2008). Because of this and the suitability of the young generation for an initial examination, this study aims to identify young consumers' wood product information preferences by identifying different consumer segments and their valued information items. Specifically, the following research questions are addressed:

- Which young consumer groups value the provision of wood product information?
- What information is relevant for the identified consumer segments and is therefore evaluated by young consumers as increasing their product trust and purchase intention?

The rest of this article is organised as follows: Section 2 refers to solutions enabling consumers to retrieve product information at the point of sale (POS), consumer studies concerning FMCG product information and first approaches regarding durable goods in the wood sector. The next section describes the methods of an online survey investigating young consumers' preferences for wood product information in Germany. Section 4 presents the obtained results for the identified consumer segments and their information preferences. The paper concludes with a discussion of marketing implications concerning how to address the different consumer segments and topics for further research.

2. Current state of research

2.1. Retrieval of product information at the point of sale

Existing consumer studies on the provision of detailed product information focused on FMCG and were carried out in the food sector (e.g. Clemens, 2003; Dimara and Skuras, 2003; Gellynck and Verbeke, 2001; Gracia and Zeballos, 2005; Hobbs et al., 2005; Kehagia et al., 2007; Ortega et al., 2011; Pieniak et al., 2013; Ubilava and Foster, 2009). Overall, these studies indicate that consumers associate access to product information with quality and safety assurance (Clemens, 2003; Dimara and Skuras, 2003; Hobbs et al., 2005), particularly when the information is provided in pre-purchase processes at the POS (Hobbs et al., 2005).

Consumers' information retrieval at the POS can be supported by technological applications. These help to overcome problems such as limited space or the static nature of information that has been printed on packaging (GS1, 2009). Additionally, these approaches help to minimize the threat of an information overload and to provide different consumer segments with their preferred information. Consumers' information access at the POS can be classified into two commonly used approaches (da Silva et al., 2010). First, consumers can enter an identifier (ID; e.g. ID-numbers or a number-letter combination), e.g. by using a kiosk machine or Internet-enabled mobile device such as a smartphone (Chen et al., 2008). When accessing the information with a smartphone, the consumer first must call up the associated mobile website before entering the ID. In contrast, the ID can be directly typed into the input form of the website when using a kiosk machine. Second, instead of entering a long HTTP URL and/or ID, an identification medium such as a bar code (e.g. Quick Response (QR) code) with an encoded HTTP URL (address of the mobile website with the desired product information) is scanned with the built-in mobile device camera (mobile tagging) of a smartphone or Internet-enabled 2D QR-code reader provided by the retailer. Scanning results in a faster and more precise information retrieval that no longer requires manual entry of HTTP URL and/or ID, which

is a time-consuming and error-prone task. Of the various types of bar codes, QR-codes are the most important and widely distributed mobile tagging technology because of their high reading speed, high accuracy, and superior functionalities (Kan et al., 2009). QR scanning allows consumers to retrieve product information at the POS in a convenient way. However, as this is a newer approach for consumers to access product information at the POS compared with entering an ID, e.g. an URL, utilisation barriers might exist. Nevertheless, both information retrieval approaches could be valuable for young consumers, as they often rely on technology to obtain further information and as they perceive technology as a tool that improves their lifestyles (Kanchanapibul et al., 2014).

2.2. Relevance of product information for the purchase decision

The previously explained access to product information could create or increase product trust (Chen et al., 2008; Clemens, 2003). Therefore, the extent of information depth is essential as it influences credibility (O'Brien and Teisl, 2004). Expanding the information spectrum seems to be especially promising when scepticism exists on the part of consumers (e.g. due to health or environmental crises related to the product or production methods); however, the threat of an information overload always should be considered. Another benefit of providing consumers with product information in pre-purchase processes is that this information can be regarded as an indicator of credence attributes (Hobbs et al., 2005). A few decades ago, indicators such as product price and appearance were sufficient to imply credence attributes such as product quality, but these indicators increasingly lose reliability (Salaün and Flores, 2001). However, it can be assumed that individual, situational and product-specific factors might influence the relevance of product information. In this context, purchase involvement appears an important concept that can be defined as the personal relevance of a buying decision (e.g. Petty and Cacioppo, 1986; Smith and Bristor, 1994). This motivational factor can vary across consumers, with high involvement resulting in deeper search behaviour and a utilisation of more information sources (Rijnsoever et al., 2012; Smith and Bristor, 1994). Because of this, purchase involvement might influence the type and amount of product information being valued.

Despite its advantages, it must be acknowledged that the provision of detailed product information is attended by costs. A few studies examined whether consumers are willing to pay (WTP) for having access to FMCG product information. WTP is commonly defined as a point measure of the maximum price a consumer would pay for one unit of a product (Miller et al., 2011). Overall, these studies report the existence of a WTP for the provision of additional information (Clemens, 2003; Hobbs et al., 2005). The stated WTP for the retrieval of product information is higher than the WTP for product-specific labels such as a mere quality certification label or a label presenting some additional product information (Ortega et al., 2011; Ubilava and Foster, 2009). The fact that a product-specific label is not valued as much as QR-code- and ID-number-based information retrieval results from consumers' scepticism concerning these types of product labels. This may be due to the complicated verification of the information provided by these labels (Ortega et al., 2011). Additionally, consumers need not compensate alone for the costs resulting from the information provision. Detailed product information might also be valuable in the B2B sector, e.g. by leading to an improvement of production processes or inventory and increasing trust among supply chain participants. Because of this, supply chain members might also be interested in this information, thereby being willing to bear at least some of the resulting costs.

2.3. Provision of wood product information to consumers

As shown above, several consumer studies investigated the relevance of retrieving FMCG product information. Analyses for durable goods are rare and studies concerning wood products are still missing. The results of FMCG studies concerning consumers' information preferences cannot be simply transferred to durable wood products because the required information is highly dependent on the considered product type (Giraud and Halawany, 2006).

However, a few studies in the wood sector already have considered the influences of providing consumers with a small number of selected wood product information items. Most of the existing studies refer to environmental effects of the wood product. Therein, the value consumers set on environmental issues is primarily assessed by the WTP for sustainable forest management certification. Overall, the existing research provides evidence that consumers value forest certification in diverse countries and are therefore willing to pay a price premium (e.g. Aguilar and Vlosky, 2007; Anderson and Hansen, 2004; Cai and Aguilar, 2013b; Hansmann et al., 2006; Husted et al., 2014; Veisten, 2007; Yamamoto et al., 2014). Interestingly, consumers favoured detailed eco-labels over simple eco-seals by ascribing a higher credibility to the former, thereby indicating consumers' preferences for more detailed product information (Teisl, 2003). Thus far, however, there has been little discussion of the consequences of providing consumers with further wood product information. Some studies indicate that disclosure of wood origin influences consumer preferences (e.g. Aguilar and Cai, 2010; Bigsby and Ozanne, 2002; Cai and Aguilar, 2013a; Veisten, 2007). Detailed material information also affected consumer acceptance of wood products (e.g. Anderson and Hansen, 2004; Bumgardner and Bowe, 2002; Roos and Nyrud, 2008; Scholz and Decker, 2007).

When considering providing consumers with detailed product information, two decisions must be made (Salaün and Flores, 2001): First, the information that should be accessible to consumers should be selected. Second, the information retrieval approach and the addressed consumers must be determined. Concerning the first issue, it should be noted that the observable tendency to convey increasingly more and detailed information bears the risk of an information overload (Verbeke, 2005, 2008; Salaün and Flores, 2001). This might lead to consumers being confused, disinterested or bored (Verbeke, 2008). Therefore, the type of information that consumers may request must be studied (Kehagia et al., 2007; Pieniak et al., 2013). Regarding the second issue, an approach that enables consumers to retrieve this information must be specified. Because of possible negative effects such as information overload, it is further suggested that different market segments be identified and that these segments be provided only with the specific information they demand (Dimara and Skuras, 2003; Verbeke, 2005, 2008). As consumers do not understand and correctly evaluate all information (Salaün and Flores, 2001), each information item must be examined to determine if further explanation is needed.

To the best of our knowledge, investigations considering consumers' evaluations of a wide range of wood product information are still missing. Therefore, we conducted a study to investigate which consumer segments should be addressed and which wood product information items are valued by these segments.

3. Methods

3.1. Procedure and participants

An online survey using Sawtooth Software was conducted to assess young consumers' wood product information demand and

to identify different consumer segments. Flyers inviting participation in the online survey were distributed at several residence halls and in surrounding areas of four German cities (Darmstadt, Frankfurt am Main, Goettingen, Muenster) from August until December 2013. Participants were additionally recruited through announcements in Internet platforms for students and do-it-yourselfers. As motivation for participation, respondents who completed the survey were automatically entered in a prize draw for two vouchers, each worth 15 Euro.

In the beginning of the survey, respondents were introduced to the two commonly used approaches to retrieve product information. Thereby, the differences between QR-code-based and ID-number-based information retrieval were explained. The assessment of product information items valued by young consumers was based on participants' imagining a purchase situation. To match the expected characteristics of the convenience sample of participants, we chose ready-to-assemble furniture as the product category. Specifically, participants were presented with two bookshelves available at a large furniture retailer that is frequently consulted by young consumers and consumers with a low-to-medium budget. Two products were introduced: a bookshelf made of solid wood (beech wood) and a bookshelf consisting of veneered particleboards (beech veneer). In addition, we chose bookshelf as the product category because Germany is one of the most important markets for wood furniture (Scholz and Decker, 2007). The online survey was pretested with 10 academicians and slightly modified in response to their comments.

In total, 205 persons participated of whom 20 participants had to be excluded. This was necessary as three showed missing answers and 17 were not within the age range of 18e30, which was selected according to the age scope for young consumers as defined by Kanchanapibul et al. (2014). Table 1 shows the respondent characteristics for the sample, which comprised 185 respondents. Gender was distributed nearly equally (47% were male) and mean age was 23.49 years ($SD \frac{1}{4} 2.89$). A majority of 91.9% were university students. Hence, the results may be generalised only to younger, well-educated people.

3.2. Selection of wood product information

The main objective of the survey was to investigate the relevance of different wood product information. A literature search was conducted to identify product information items that should be examined in the present study. The information was selected based on the following criteria. First, we chose information which either had a significant effect in consumer studies on FMCG product information or whose delivery to consumers was successful in practice (Clemens, 2003; Folinis et al., 2006; Gadema and Oglethorpe, 2011; Hobbs et al., 2005; Kehagia et al., 2007; Pieniak et al., 2013; Ubilava and Foster, 2009; Upham et al., 2011; Vanclay

et al., 2011). Second, we included information that predicted consumer acceptance of wood-based products in previous studies (e.g. Aguilar and Cai, 2010; Anderson and Hansen, 2004; Bigsby and Ozanne, 2002; Bumgardner and Bowe, 2002; Cai and Aguilar, 2013a; Gold and Rubik, 2009; Jonsson et al., 2008; Kalafatis et al., 1999; Macias and Knowles, 2011; O'Brien and Teisl, 2004; Park et al., 2012; Roos and Nyrud, 2008; Salazar and Meil, 2009; Scholz and Decker, 2007; Veisten, 2007; Weinfurter and Eder, 2009). Finally, we considered information whose influence on consumers' attitudes towards sustainable products is discussed in the current literature (Achabou and Dekhili, 2013; Essoussi and Linton, 2010; Fenning and Gershenson, 2002; Thompson et al., 2005; Tseng and Hung, 2013). This procedure led to a total of 18 wood product information items (e.g. country, carbon footprint, type of wood, date of wood harvest), 16 information items for the beech wood and two additional items for the beech veneer product (Appendix). The obtained wood product information items were assigned to one of four categories based on their information content: origin, environmental impact, material and illustration of the supply chain.

3.3. Measures

The online survey comprised questions about respondents' evaluation of the product information items and their explanation requirements as well as participants' information retrieval preference.

3.3.1. Product information relevance

Participants evaluated the relevance of the considered product information with regard to their purchase decision. To measure the importance of this information, two questions were assessed separately for each information item and the two product variants: Participants rated the influence on product trust ('The following information would increase my trust in the product.') and purchase intention ('If I had the following information, I would be more likely to buy the product.'). Responses were made on 5-point scales ranging from 1 (does not apply at all) to 5 (fully applies). Items and product sequence were presented in random order.

3.3.2. Additional measures

Participants indicated whether product information items must be further explained to be intelligible. Respondents also rated as how relevant they assess eight additional factors (quality, appearance, price, brand, durability, warranty, certification, environmental impact) related to the purchase decision compared to the product information. Again, responses were made on 5-point scales.

Additionally, respondents were asked if they were familiar with QR-code- and ID-number-based information retrieval prior to their participation and which of the two approaches they preferred. Finally, socio-demographic characteristics were assessed.

3.4. Data analyses

Data analyses began with descriptive statistics related to young consumers' preferences concerning information retrieval. The two ratings of the product information relevance (product trust and purchase intention) were averaged per information item (Cronbach's $\alpha \frac{1}{4} .89$); the associated dependent variable was named product information relevance. For further analyses, product information relevance was ipsatized across the 16 information items to eliminate the amount of acquiescence; i.e. each respondent's mean across all items was subtracted from each product information relevance score. Ipsatized scores allow identifying which

Table 1
Sample statistics.

	Frequency	Percent
Gender of respondent		
Male	87	47.02
Female	98	52.97
Age of respondent		
18e21	46	24.86
22e25	59	31.89
26e30	50	27.03
Profession of respondent		
University student	170	91.89
Employee	10	5.41
Other	5	2.70

product information items are specifically relevant for a single respondent. In the next step, we wanted to uncover common dimensions underlying the 16 product information items. A principal component analysis (PCA) of the ipsatized product information relevance of the 16 items was conducted, and the resulting dimensions were saved (factor scores). To identify segments of consumers in the resulting space, a hierarchical cluster analysis (Ward's method) was carried out on the factor scores. Finally, the revealed segments were described by their product information profile.

4. Results

4.1. Relevance of product information items and a comparison to other drivers of the purchase decision

Table 2 documents the means for the product information items. Participants demanded information referring to origin (mainly country and region), environmental impact and material. Two information items of the material category were the most important, namely type of wood (M $\frac{1}{4}$ 4.04, SD $\frac{1}{4}$.97) and health effects of additives (M $\frac{1}{4}$ 4.09, SD $\frac{1}{4}$.97). However, the environmental and material information items were also evaluated as being in need of an explanation. This refers in particular to carbon footprint (M $\frac{1}{4}$ 3.69, SD $\frac{1}{4}$ 1.30), additives (M $\frac{1}{4}$ 3.85, SD $\frac{1}{4}$ 1.08) and health effects of additives (M $\frac{1}{4}$ 3.86, SD $\frac{1}{4}$ 1.16) items. With the exception of the country and region information, product information items in the origin and supply chain categories were assessed neither as being particularly relevant nor in need of explanation.

Overall, the list of product information (total M $\frac{1}{4}$ 3.17, SD $\frac{1}{4}$ 1.06) reached a medium relevance concerning the purchase decision. Compared with other purchase decision drivers, i.e. appearance (M $\frac{1}{4}$ 4.59, SD $\frac{1}{4}$.62), quality (M $\frac{1}{4}$ 4.57, SD $\frac{1}{4}$.65), durability (M $\frac{1}{4}$ 4.39, SD $\frac{1}{4}$.73), price (M $\frac{1}{4}$ 4.31, SD $\frac{1}{4}$.80), environmental

impact (M $\frac{1}{4}$ 3.65, SD $\frac{1}{4}$ 1.06), warranty (M $\frac{1}{4}$ 3.48, SD $\frac{1}{4}$ 1.10), certification (M $\frac{1}{4}$ 3.30, SD $\frac{1}{4}$ 1.05) and brand (M $\frac{1}{4}$ 2.33, SD $\frac{1}{4}$ 1.21), the list of product information showed a lower relevance than did most of the other aspects.

The PCA of the 16 ipsatized items led to five components with eigenvalues over Kaiser's criterion of 1, but the scree plot suggested the extraction of two components. Fig. 1 illustrates the varimax rotated component plot by showing the correlations of all product information items with the two extracted components. Component 1 differentiates between material (i.e. material composition, type of wood, comments of the forest/plantation owners) and commonly used origin information (i.e. country, region, plantation or forest). Component 2 distinguishes between environmental information (i.e. sustainable forest/plantation management, carbon footprint, portion of recycling) and all supply chain as well as further origin information (i.e. name of the company, picture of the plantation or forest). The latter information is primarily demanded by respondents who differentiate only slightly among the considered items (i.e. date of wood harvest, date specification (processing), name of the company). This is shown by the within-subject SD across the 16 information items, which assessed the discrimination each participant had performed. The correlation of this discrimination performance with the components of Fig. 1 is $r \frac{1}{4}$.28 with the first and $r \frac{1}{4}$.54 with the second component. Hence, respondents located in the lower left area of the component plot only slightly discriminated the considered product information items.

4.2. Consumer segments and their information demand

A hierarchical cluster analysis on the respondents was performed using the two extracted components. Fig. 2 provides the results obtained from Ward's method leading to a four-cluster solution: an environmentally oriented (n $\frac{1}{4}$ 54), an environmentally and quality oriented (n $\frac{1}{4}$ 40), a quality oriented (n $\frac{1}{4}$ 31), and an unmotivated (n $\frac{1}{4}$ 60) segment. Individuals belonging to the environmentally oriented segment are located in the upper left area of Fig. 2, thereby demonstrating high values on component 2, which are related to environmental issues of the product. Members of the quality oriented segment show high values on component 1, suggesting that they mainly demand information about the product's material. Additionally, the environmentally and quality oriented segment takes an intermediate position between both segments.

The wording of the latter so-called unmotivated segment points to the low discrimination performance (within subjects, SD $\frac{1}{4}$ 1.00) found in that segment. The segments did not differ concerning age (means range between 23.36 (SD $\frac{1}{4}$ 3.01) and 23.76 (SD $\frac{1}{4}$ 2.92)), and neither age, gender nor their interaction could predict segment

membership.

Table 3 presents the ipsatized means for the product information separately for each segment. One product information item (health effects of additives) is valued by the three segments with a

high discrimination performance. Additionally, the environmentally oriented segment asks for all information items referring to the environmental impact and one item revealing the product's origin. For this segment, information about sustainable forest/

plantation management (M $\frac{1}{4}$ 1.28), carbon footprint (M $\frac{1}{4}$.92) and health effects of additives (M $\frac{1}{4}$.90) are particularly relevant. In contrast, the quality oriented segment solely values the retrieval of material information. Except for the information item presenting the comments of the producers (M $\frac{1}{4}$.85), the means of all material information items exceed 1.25, with type of wood being the most relevant (M $\frac{1}{4}$ 1.55). Several information items related to the product's material and environmental impact are relevant for the environmentally and quality oriented segment. This segment values information that is preferred by the environmentally

Table 2

List of the presented product information, means and SD for information relevance and explanation requirement (if assessed).

		Information relevance		Explanation requirement	
		Mean	SD	Mean	SD
Origin					
1	Country ^a	3.56	1.20	2.81	1.37
2	Region ^a	3.45	1.18	2.86	1.33
3	Name of the company ^a	2.80	1.15	2.63	1.38
4	Plantation or forest ^a	3.33	1.29	2.82	1.36
5	Picture of the plantation or forest	2.23	1.08	e	e
6	Comments of the forest/plantation owners	2.66	1.03	e	e
Environmental impact					
7	Sustainable forest/plantation management ^a	3.94	1.12	3.19	1.27
8	Carbon footprint ^a	3.47	1.20	3.69	1.30
9	Portion of recycling ^a	3.81	1.01	3.36	1.27
Material					
10	Type of wood ^a	4.04	.97	2.98	1.37
11	Material composition ^a	3.94	.92	3.38	1.23
12	Additives ^a	3.94	.99	3.85	1.08
13	Health effects of additives ^a	4.09	.97	3.86	1.16
14	Comments of the producers	3.01	1.09	e	e
15	Composition of the veneer ^a	3.82	.92	3.23	1.26
Illustration of the supply chain					
16	Involved companies ^a	2.81	1.12	2.63	1.27
17	Date of wood harvest ^a	2.08	1.02	2.10	1.27
18	Date specification (processing) ^a	2.13	1.00	2.19	1.32

^a For this information, participants also evaluated whether further explanation was required.

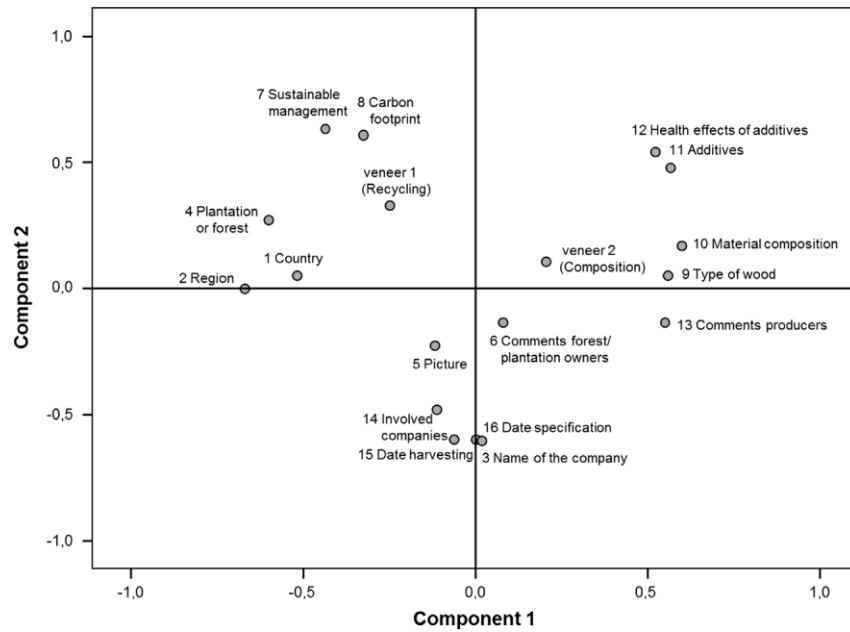


Fig. 1. Varimax rotated PCA plot.

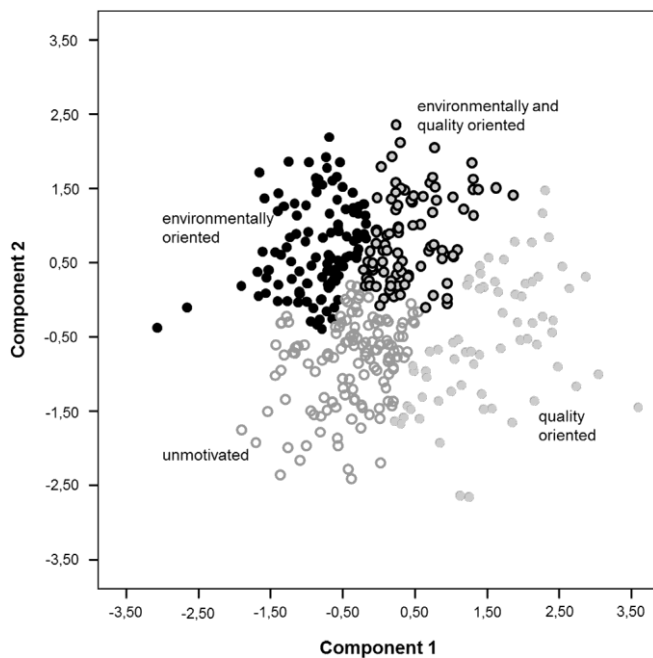


Fig. 2. Scatterplot of the four identified segments.

oriented (e.g. sustainable forest/plantation management ($M \pm 1.17$) and portion of recycling ($M \pm .86$)) as well as the quality oriented segment (e.g. additives ($M \pm 1.20$) and type of wood ($M \pm 1.11$)). As can be expected, the 'unmotivated' segment did not show a clear preference for specific information. In total, ten product information items were relevant for at least one of the three discriminating segments.

4.3. Young consumers' information retrieval preference

5.9% of the subjects had no knowledge about QR-codes and 40.0% no knowledge about ID-numbers prior to their participation.

More participants knew QR-codes than knew ID-numbers from hearsay (QR: 63.8%, ID: 49.2%) or used them regularly (QR: 30.3%, ID: 10.8%). Hence, 66.5% preferred information retrieval by means of QR-codes, while only 22.2% favoured ID-numbers.

5. Discussion and managerial implications

To the best of our knowledge, this is the first study investigating if young consumers (and especially which consumer segments) require detailed wood product information. The present work reveals that wood product information has medium relevance with regard to purchase decision and a lower relevance compared with most other considered factors determining purchase decision (i.e. the product's quality, appearance, durability and price). This might be partially attributable to the fact that one of the identified segments, the so-called 'unmotivated' segment, does not particularly value the product information delivery. Nonetheless, the provision is recommended because the respondents indicated that the information items lead to an increase in consumers' product trust and purchase intentions. Additionally, providing information about the environmental impact can influence the market success of products consisting of eco-friendly and CO₂-neutral materials, as the efforts for realising resource efficiency will fail without achieving consumer acceptance.

The present study identifies four consumer segments, of which three must be examined in more detail. Only the so-called unmotivated segment can be neglected, as it did not exhibit any information prioritization. Possibly, this segment might partially be ascribed to the method, as self-administered surveys bear a risk of including a proportion of participants showing a lack of motivation (Couper, 2000). Nevertheless, it suggests that in POS situations, a portion of consumers will not be interested in product information. The three other segments differed with respect to the wood product information that was deemed relevant, resulting in environmentally oriented, environmentally and quality oriented, and quality oriented segments. As supposed by Salaün and Flores (2001), respondents indicated that most of the information items require further explication and/or reference values to facilitate

Table 3
Comparison of the ipsatized product information means within the four segments (preferred information is highlighted).

		Consumer segments			
		Environmentally oriented (29%)	Environmentally and quality oriented (22%)	Quality oriented (17%)	Unmotivated (32%)
Origin					
1	Country	.85	.13	-.28	.37
2	Region	.76	-.10	-.67	.45
3	Name of the company	-.79	-.82	-.07	-.01
4	Plantation or forest	.83	-.10	-.91	.14
5	Picture of the plantation or forest	-1.11	-1.14	-1.11	-.71
6	Comments of the forest/plantation owners	-.87	-.50	-.45	-.39
Environmental impact					
7	Sustainable forest/plantation management	1.28	1.17	-.28	.45
8	Carbon footprint	.92	.55	-.55	-.12
9	Portion of recycling	.86	.86	.46	.25
Material					
10	Type of wood	.48	1.11	1.55	.56
11	Material composition	.36	1.09	1.39	.48
12	Additives	.63	1.20	1.26	.22
13	Health effects of additives	.90	1.35	1.44	.24
14	Comments of the producers	-.76	-.07	.85	-.36
15	Composition of the veneer	.35	.75	1.26	.40
Illustration of the supply chain					
16	Involved companies	-.51	-.77	-.36	-.09
17	Date of wood harvest	-1.52	-1.59	-.95	-.62
18	Date specification (processing)	-1.44	-1.52	-.86	-.62

intelligibility. While five to six information items were emphasized per segment, ten out of the 18 investigated information items were determined to be important after consideration of overlaps, thereby partially being in line with previous studies solely investigating a very limited number of wood product information items (e.g. Aguilar and Cai, 2010; Cai and Aguilar, 2013a, 2013b; Scholz and Decker, 2007). Specifically, the present study reveals that information about origin (country), environmental impact (sustainable forest/plantation management, carbon footprint, portion of recycling), and material (type of wood, material composition, additives, health effects of additives, composition of the veneer, comments of the producers) should be accessible to young consumers when intending to address all three segments. While one segment primarily focused on material information pointing to the product's quality, another one was mainly interested in environmental aspects. Beyond these, a third segment emphasized both types of information content. It must be considered that the environmentally oriented segment valued one product information item referring to the product's origin in addition to environmental information. However, the item revealing wood origin might also convey further environmental information in the sense of whether the wood originates from a tropical rain forest country.

From a marketing perspective, the present study highlights the need to provide young consumers with wood product information. Specifically, the results reveal that ten wood product information items are valued by the three identified consumer segments. The present study suggests that young consumers value product information items presenting environmental and quality information. Therefore, these issues should be highlighted in the promotion of those wood products, which are typically bought by the younger generation (e.g. bookshelves). However, it is not sufficient to state the product information; the information should rather be explained because the participants declared an explanation requirement for most of the information items. Nevertheless, the present findings do not imply that marketing can neglect the 'unmotivated' segment. Taking recourse in the Elaboration Likelihood Model (Petty and Cacioppo, 1986), the results indicate that three segments use the central path for information processing by being motivated to address the product information items. In contrast, one out of the four segments seems to rely predominately on the

peripheral path. As not all consumers are typically motivated for deep information processing, it is comprehensible that this segment was the largest of the four (32%). When intending to address the fourth segment, advertising considering more affective cues seems to be required instead of a focus on cognitive components.

The material category was the most influential one in the present study, with health effects of additives being the only information requested by all three segments. The necessity of making health information available was also reported in studies on consumers' preferences for access to FMCG product information (e.g. Kehagia et al., 2007; Pieniak et al., 2013). Marketing could reduce these health concerns by informing consumers about the effects of additives in general and/or disclosing them for the specific product.

Finally, marketing should engage with the transmission of the information to consumers. This study identifies QR-codes as young consumers' preferred method. Therefore, mobile web portals must be developed to provide product information to customers using QR-codes. An adequate structure seems to be necessary to arouse consumers' interest; while marketing must identify and adapt the relevant information, the design of the system falls into the scope of business information science. Close cooperation with business information science might also help marketers to address better the three segments. Due to the threat of an information overload, each of the segments should be provided with their specific information requirements (Dimara and Skuras, 2003; Verbeke, 2005, 2008). Business information science should create three information packages that consumers have access to after scanning the product's QR-code. This allows consumers to assign themselves to one of the three information packages. The product information items included in each package should be listed on the first page so that consumers can better understand the differences between environmental, quality as well as environmental, and quality information packages.

6. Limitations and suggestions for future research

Even though this study significantly contributes to a deeper understanding of providing young consumers with wood product information, leading towards increased product trust and purchase

intentions, the following limitations lead to suggestions for future research. First, as the present study comprises young German respondents, the generalisability of the obtained segments and their information preference to the broader population and other cultures must be examined in subsequent studies. It can be assumed that the three identified segments focussing to varying degrees on environmental or quality aspects might also emerge when investigating the broader population, as these issues are of special relevance concerning consumers' evaluation of wood products. Nevertheless, information preference also must be examined for an older and more diverse sample. As most of the respondents were well educated, it is worth investigating whether other consumer groups are interested in dealing with detailed product information to the same degree. Second, the results are based on ready-to-assemble furniture, specifically the investigation of young consumers' information preferences concerning bookshelves. Future studies should determine whether the obtained information preferences also hold true for other product categories. Consumers might value different product information items for other goods, e.g. products of the construction or pulp and paper industries. Additionally, product information items being valued by consumers might also vary within the furniture category. Third, the preference for QR-code- instead of ID-number-based information retrieval might also be partially related to participants' low mean age. Nevertheless, the favouritism of QR-codes is understandable, as scanning barcodes is attended by reduced effort on the part of consumers and a lower error rate than when entering ID-numbers. Finally, the present study does not include the actual purchase relevance for the respondent as well as the respondent's involvement. Future studies could address whether the amount of purchase involvement influences the perceived relevance of the information provision and which product information items are being valued.

Beyond the limitations of the present study, future research must address two major issues related to the profitability of providing this service and its implementation. On the one hand, the present study suggests that the provision of wood product information may offer an additional service for young consumers, contributing to the strategy of product differentiation and providing competitive advantages. The role of product information as a market leverage instrument needs to be considered in subsequent studies of the economic component. A cost-benefit

analysis must clarify if the provision of wood product information is profitable. Before the analysis, the resulting benefits for the companies of providing consumers with detailed wood product information must be examined, e.g. an increase in sales rate and willingness to pay (WTP) a price premium for the new service. Determining the WTP for a product and the change in sales rate due to the provision of wood product information becomes especially important for young consumers. As suggested by this study, whether they can afford the required surcharge must be investigated. The revealed benefits must be compared with the investment and recurring hardware and software costs for the development of the system. The matter of how number of supply chain participants and the price and sales rate of the product can influence the profitability of the investment also should be examined.

On the other hand, a close collaboration with business information science is essential to implement the findings of this study. Future studies should address whether (and how) current information technology and systems can satisfy young consumers' demands regarding the provision of the identified wood product information. In this context, explanation of terms and/or reference values such as statistics and benchmarking values must be considered so that consumers can better assess the information about a specific product. Simultaneously, marketing research should address the optimal presentation type motivating young consumers to retrieve the information. Concerning the estimation of product information having a medium relevance compared with other factors driving the purchase decision, it would be interesting to assess whether the product information is also influencing the evaluation of these factors. Some of the other factors respondents emphasized most were credence attributes (e.g. product quality, durability). As consumers cannot evaluate such values reliably before purchase, it should be examined whether product information may also function as their indicator, thereby reducing consumers' uncertainties and leading to a further increase in purchase intention.

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Appendix. The presented product information items, their abbreviations and references.

	Abbreviation	Product information item	Reference
Origin			
1	Country	Country of wood origin	Bigsby and Ozanne, 2002; Park et al., 2012; Veisten, 2007.
2	Region	Region of wood origin	Aguilar and Cai, 2010; Cai and Aguilar, 2013a; Macias and Knowles, 2011; Pieniak et al., 2013; Ubilava and Foster, 2009.
3	Name of the company	Name of the company where the wood comes from	Clemens, 2003; Hobbs et al., 2005; Kehagia et al., 2007; Ubilava and Foster, 2009.
4	Plantation or forest	Declaration whether the wood originates from a plantation or forest	Bigsby and Ozanne, 2002; Fenning and Gershenzon, 2002.
5	Picture of the plantation or forest	Picture of the plantation or forest where the wood comes from	Clemens, 2003.
6	Comments of the forest/plantation owners	Comments of the forest/plantation owners (e.g. additional information about the forest/plantation, wood characteristics)	According to Clemens, 2003.
Environmental impact			
7	Sustainable forest/plantation management	Sustainable forest/plantation management (i.e. no more deforestation than growing)	Anderson and Hansen, 2004; Bumgardner and Bowe, 2002; Kalafatis et al., 1999; O'Brien and Teisl, 2004; Pieniak et al., 2013.

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	Abbreviation	Product information item	Reference
8	Carbon footprint	Carbon footprint (total amount of greenhouse gas emissions occurring during the production and supply of the product)	Gadema and Oglethorpe, 2011; Salazar and Meil, 2009; Upham et al., 2011; Vancly et al., 2011.
veneer 1	Portion of recycling	Portion of recycling and waste wood	Achabou and Dekhili, 2013; Essoussi and Linton, 2010; Gleim et al., 2013; Tseng and Hung, 2013; Weinfurter and Eder, 2009.
Material			
9	Type of wood	Type of wood (e.g. oak, beech, walnut)	Bumgardner and Bowe, 2002; Kalafatis et al., 1999; Scholz and Decker, 2007; Veisten, 2007.
10	Material composition	Material composition (solid wood, wood particle or wood fibreboard, veneer, etc.)	Anderson and Hansen, 2004; Jonsson et al., 2008; Tseng and Hung, 2013.
11	Additives	Additives (e.g. chemical additives, lacquers, adhesives)	Kehagia et al., 2007; Roos and Nyrud, 2008.
12	Health effects of additives	Health effects of the used additives	Clemens, 2003; Gleim et al., 2013; Gold and Rubik, 2009; Kehagia et al., 2007.
13	Comments of the producers	Comments of the producers (e.g. product characteristics, instructions for installation and maintenance)	Clemens, 2003.
veneer 2	Composition of the veneer	Composition of the veneer (wood or plastic film)	Jonsson et al., 2008.
Illustration of the supply chain			
14	Involved companies	Companies where the raw material has been processed to the final product	Folinas et al., 2006; Kehagia et al., 2007; Thompson et al., 2005.
15	Date of wood harvest	Date when the wood was harvested	Clemens, 2003; Folinas et al., 2006.
16	Date specification (processing)	Date when the wood was processed	Clemens, 2003; Folinas et al., 2006.

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