Consumer Preferences for Wooden Garden Products and Related Requirements for New Products

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Abstract

Gardens have been a fairly neglected research topic, and wooden garden products, in particular, have been analyzed in only a few consumer studies. This article presents the results of a Finnish study designed to fill this knowledge gap by studying consumer preferences in three garden product categories: fences and decking, yard structures and garden furniture. The data were collected in Finland by means of a structured survey (n = 347) during the summer of 2011, and analyzed using standard multivariate methods. The most important aspects of product quality for all wooden garden products were their technical quality, functional properties and appearance. Additionally, some statistically significant differences were found in terms of product category, gender, age and preferred method for completing garden projects. The results support some earlier consumer study findings—e.g., women and older people tend to be more demanding consumers. Respondents also expressed requirements for new products, in particular for those with better technical quality.

Keywords: garden products, wood products, consumer preferences, quality, new product requirements.

Introduction

Gardens and outdoor areas form a key aspect of housing and contribute to the creation of general atmosphere in living spaces. Consumers appear to be increasingly interested in devoting both time and money to gardening and outdoor construction, based on the growing visibility of these aspects of housing and living, both in the media and at housing fairs. However, in addition to Saarikivi and Riihonen (2003), including estimates of the garden product market situation in Europe in the early 21st century, it is very difficult to find accurate information on the market size. The EU15 market for garden and outdoor construction was estimated at 45 billion euro in 2001, while the share for residential gardens was 25 billion euro (Saarikivi and Riihonen 2003). Although this information is slightly outdated, it is the most recent available and gives some indication of market size, which has only expanded since then.

Other interesting trends regarding the market for wooden garden products in Europe and North America exist, such as an increased competition between plastic and wooden furniture, and the rising environmental awareness of consumers, which is also associated with tropical deforestation and its consequent impacts on the market of imported garden furniture (see e.g. National Wildlife Federation (2010)).

Despite the importance of gardens in residential housing and living, surprisingly little previous research on these markets exists. Some interesting studies on gardens—for example, Connell (2004) and van den Berg and van Winsum-Westra (2010)—highlight the potential of garden product markets as an area of consumer studies. However, the small number of previous studies shows how large a knowledge gap exists in the garden market.

The knowledge gap is particularly significant in consumer preference analysis for wooden garden products. Nyrud et al. (2008) have studied consumer preferences for residential decks in Norway, and Roos and Nyrud (2008) included preferences for outdoor decking, but no other studies focusing on this market segment exist, to our knowledge. Analyzing distinct groups of both consumer segments and different garden products is a particular area where new insights on substitute material competition can be gained. For example, wooden garden products may have an advantage in consumer markets due to their natural and renewable material base and, usually, local origin. However, without conducting a solid market study, this assumption cannot be validated.

Our study aims to fill this knowledge gap by examining Finnish consumers' preferences for wooden garden products with extensive survey data collected from consumers visiting a holiday housing fair or a large do-it-yourself (DIY) store in the metropolitan Helsinki area in June to August 2011. Our

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study covers three product segments—i.e., wooden fences and decking, yard structures and garden furniture—while acknowledging the possible differences among various garden products. The focus of this article is on the perceived importance of wood product quality aspects to consumers, including the role of product attributes associated with eco-friendliness of products. Furthermore, based on consumer perceptions, we aim to analyze their expectations and requirements for new garden products and related services. We are particularly interested in analyzing the possibility of using environmentally related information to determine the competitive positioning of wood-based garden products and related services.

Our research questions are the following:

1) How do consumers evaluate various product attributes for wood-based garden products? Are there differences among the three specific product groups, or among different consumer segments?
2) Which different dimensions are present in the consumer evaluation of general garden product quality?

Based on (1) and (2), and qualitative responses gained from a subset of consumers in our sample, we will analyze which aspects of wooden products and related services are most in need of further development. We conclude by assessing the key managerial recommendations, which can be issued for product suppliers in the wood industry based on the identified needs for new products and services.

Theoretical Background

Product quality is generally considered a multifaceted concept—including, for example, perceived product quality, product performance and product durability (Garvin 1984). Wooden product quality has been examined, among others, by Toivonen (2011), and her study forms the theoretical basis of our research. Toivonen (2011) used a synthesis of earlier product and service quality research as an empirical approach, testing it on both business and consumer respondents in several European markets. Her results support the concept of multidimensional quality by showing that wooden product quality consists of the quality of the tangible product, quality of product-related intangible aspects, and supplier and service quality.

The multidimensionality of quality is made even more complex by differences in consumer perceptions. Consumer background may, for example, influence the relative importance of product attributes and consumers' values, attitudes and perceptions of products. In a recent study examining a range of durable products (Creusen 2010), functional product aspects (quality, ease of use, functionalities) and expressive product aspects (aesthetic and symbolic) related differently to demographic variables. First, female consumers consider both expressive and functional aspects more important than males do. Second, older people and those with higher income pay more attention to all three types of functional aspects (functionalities, ease of use and quality). And third, people with higher education levels attach less importance to symbolic aspects when purchasing products.

According to Brandt and Shook (2005), very few attribute analyses are performed within the forest and wood products field, and even fewer have focused on consumer markets. However, some examples of studies on consumer preferences for wooden products exist. Jonsson (2005) analyzed consumer perceptions of different floor coverings, and compared wood to other possible materials. Wood flooring was considered aesthetically pleasing but expensive, while laminate floors were almost as visually appealing but easier to install. Toivonen (2012) investigated quality perceptions of Finnish consumers on interior wooden products and wooden furniture. The main finding was that perceived quality is multidimensional, fairly consistent among different products, and consumers appear to rank attributes contributing to tangible product quality over those influencing intangible quality. Recently, Lihra et al. (2012) studied the relative importance of attributes on consumer household furniture choices by using U.S. consumer data, and found it to be dominantly price driven (50%), while 20% was driven by product customization, 20% by delivery time and 10% by product customization time. However, by using two-step cluster analysis, they also found a segment, consisting mainly of women, that valued product customization more highly than other attributes.

Hardly any previous studies focusing on consumer preferences for garden products exist. Nyrud et al. (2008) is an interesting exception, having analyzed consumer preferences for wooden decks in residential buildings. Potential consumers in Norway were asked to compare five different deck models, made of different materials and with different surface treatments. Their sensory data results indicate that consumers prefer untreated, naturally decay-resistant wood. Decks with a homogeneous surface were the most visually pleasing. The importance assigned by consumers to the naturalness of decks is interesting and can be compared to our results.

In contrast, consumption based on green values or sustainability has become a popular research issue. Roos and Nyrud (2008) found "green consumers" most often to be women, in Swedish and Norwegian DIY markets stocking flooring and decking, and to display a low sensitivity to price. Green consumers also included a higher share of married couples/cohabiters, people with secondary education, less-advanced purchasing plans and stronger preferences for product warranty. Consumer interest in, and willingness to pay for, sustainability of wood products have been analyzed, for example, by Hansmann et al. (2006), Aguilar and Vlosky (2007) and Aguilar and Cai (2010). Their findings indicate that although sustainability orientation is high, awareness of labels conveying sustainability might be low (Hansmann et al. 2006). Consumers interested in certified products are more willing to pay a premium for them, as are consumers with higher income level (Aguilar and Vlosky 2007). Previous research offers some possibilities for comparison, although our study did not address all these issues.

We aim to expand the analysis of consumer preferences for wooden garden products by building on previous literature, in particular the operationalization of product quality in

Toivonen (2012 and 2011). We aim to especially address the question about which quality attributes contribute to the overall perceived product quality in the Finnish market for garden products.

Data and Methodology

Based on the literature review, the market for garden products and the related consumer preferences represent an area without substantial prior research. Because we wanted reasonably wide-ranging data in order to promptly answer the research questions, we decided on a quantitative approach. The data were collected by having consumers self-complete a structured questionnaire[1] modified from Toivonen (2012). The questionnaire was designed to broadly chart garden product preferences and included sections on background variables and opinions on the roles of gardens, product quality, new product requirements, information search channels, services related to garden products and garden product retailer attributes. This article focuses on product quality and new product requirements.

It was feasible to proceed based on a product quality measurement scale validated by Toivonen (2012), modified according to specific features of garden products. A 5-point Likert scale (1 = not important at all … 5 = very important) was used. Some attributes from Toivonen (2012), namely serviceability of the sales personnel, and warranty, payment and delivery terms, were included in the questionnaire sections focusing on services and sales, and hence are excluded from our analysis. Other attributes (such as producer reputation and supplier reliability, and ease of surface maintenance and functional properties) were combined into single items. We also included additional attributes, such as design and presence of forest certificates, to gather issue-specific information, because, for instance, eco-friendliness might be important in outdoor products (cf. Nyrud et al. (2008)). Many of the questionnaire items, such as a potentially complex term "technical quality," were clarified using examples in the questionnaire to ensure similar interpretation by the respondents. The questionnaire was pretested by five researchers, outside the authors, who reviewed the survey before its finalization.

To keep the questionnaire at a manageable length, but still ensure information gain about the perceived quality of different garden product types, three versions of the questionnaire were made, focusing respectively on fences and outdoor decks, yard structures and garden furniture. Otherwise, the three versions were identical. The categories were based on Saarikivi and Riihonen (2003), where garden products were divided into three categories—i.e., simple products, complex products and very complex products. Our categorization left out simple products, including sawed and planed products such as pillars, and split the complex products into two categories: fences and outdoor decks, and yard structures. Very complex products are therefore represented by garden furniture.

The survey was conducted by the second author at a holiday housing fair in Central Finland in June to July 2011, and in the garden section of a major DIY store in the Helsinki metropolitan region in July to August 2011. The second author approached customers at these locations, explained the aim of the research project, and handed out the questionnaires, which were returned to the researcher after completion. The respondents could also participate in a raffle, with the chance of winning gift certificates and other small prizes. This kind of sampling procedure makes it impossible to investigate characteristics of the whole consumer segment in Finland. Nevertheless, the data are sufficiently large to secure results indicative of the current situation regarding customers interested in wooden garden products.

The data consisted of 347 responses, of which 201 were collected at the holiday housing fair, and 147 at the retail DIY hardware store during a one-week period. Thus, our data can be characterized to consist of a convenience sample. Responses were collected in an even distribution of the three product categories. Gender distribution of the data was also reasonably even, with 56% female respondents and 44% male respondents. From the gender perspective, respondents were randomly selected, thus representing the attendant population of these two locations. Samples from the two locations were found to be consistent by analyzing the profiles of respondents in terms of their background factors, and can thus be analyzed as a single set.

The data were analyzed using the Statistical Package for the Social Sciences (SPSS), with standard methods such as descriptive statistics, tests for statistical significance among groups (mainly Kruskal-Wallis and Pearson's chi-square tests), factor analysis for analyzing dimensionality of perceived product quality, and cluster analysis for customer segmentation (for methods, see e.g., Hair et al. 2009). Additionally, responses to the open-ended question about consumer requirements for new garden products were analyzed qualitatively for recurring themes and issues.

Results

Background variables

As **Figure 1** shows, the age distribution of our respondents is heavily skewed from the Finnish population toward the older end of the scale, illustrating the keen interest of these age cohorts in participating in holiday housing fairs and visiting retail DIY stores. Particularly**,** the age groups of 55 to 64 and 45 to 54 years are overrepresented, while the population under 34 is strongly underrepresented in the data.

Respondents were also considerably more likely to live in detached, terraced or semi-detached houses than the Finnish population as a whole, which is shown in **Figure 2**. However, data from this housing segment is useful for the preference analysis of garden and outdoor products, because people living in these housing types have their own gardens and are thus potential consumers of wooden garden products. When examined together, the distribution of these two background variables also makes sense because Finnish middle-aged people

[1] The questionnaire was designed and implemented in Finnish, the native language of both the researchers and survey respondents. It is available from the authors upon request (translated into English).

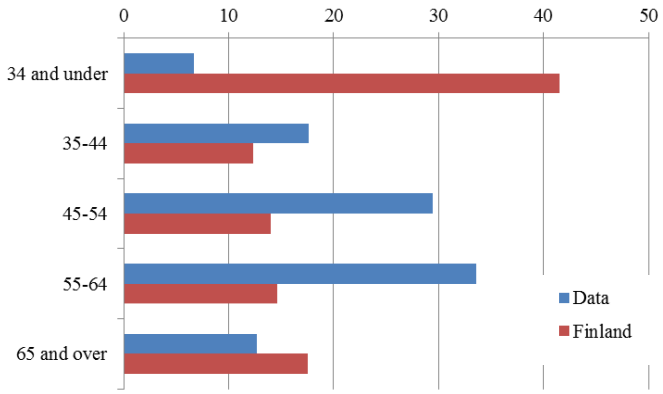

Figure 1. Age distribution of our data in comparison to Finnish population. Source of Finnish data: Statistics Finland 2012b.

tend to live in detached houses, while the majority of younger people living on their own reside in apartment buildings (Statistics Finland 2012a). Thus, the data are fairly representative of potential buyers of wooden garden products.

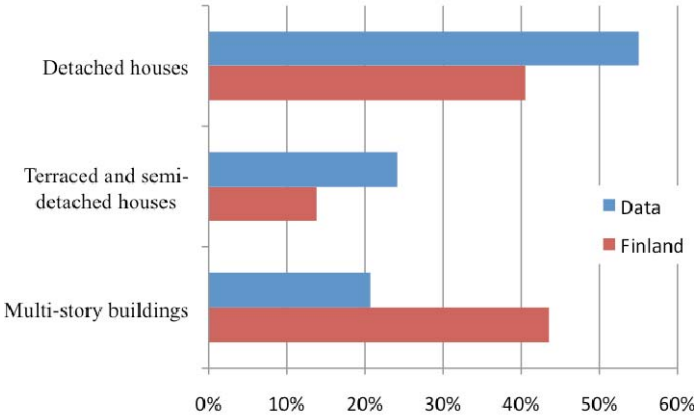

Figure 2. Housing type distribution in our data and in Finland. Source of Finnish data: Statistics Finland 2012a.

Respondents can also be categorized according to how they complete their garden improvement projects (**Figure 3**). A large majority of respondents indicated they usually complete the projects themselves: 51% of respondents chose only the DIY category to describe their behavior, while an additional 16.1% chose another category in addition to DIY. Respondent age did not influence the distribution of these categories, while gender had a slight, but not statistically significant, impact. As **Figure 3** shows, respondents were considerably less likely to buy only ready-made products or engage the services of a professional. Services are a less important component of the gross domestic product (GDP) in Finland than in the rest of the EU (Eurostat 2012). The reported low levels of service utilization in garden projects might be connected to this lesser importance, or might be a particular characteristic related to gardening as a leisure-time activity.

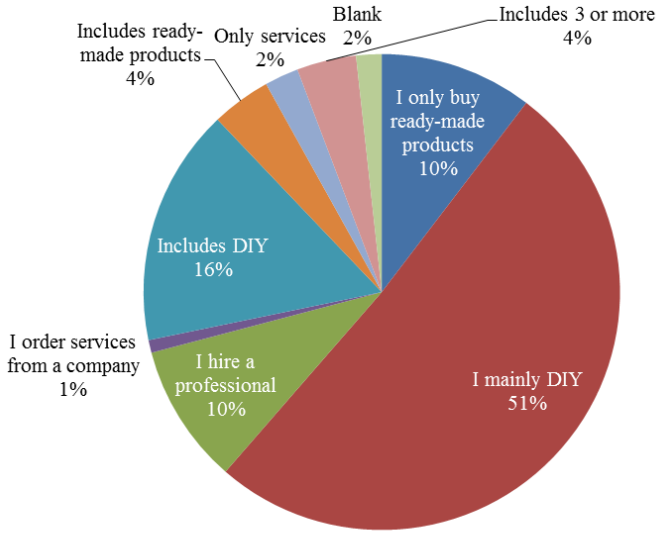

Figure 3. Completion of garden construction projects. The alternative categories were 'I only buy ready-made products,' 'I mainly DIY,' 'I hire a professional,' and 'I order services from a company.' Some respondents chose more than one category and thus 'Includes DIY' consists of 'I mainly DIY,' and another alternative, 'Includes ready-made products,' consists of ready-made products and one of the service components, and 'Only services' includes the two service categories

Perceived product quality

In regard to perceived product quality, respondents were asked to estimate the importance of each of the 12 product attributes (see **Table 1**) on a 5-point scale. On average, the most important product attributes in all product categories were technical quality, functional properties and appearance. Product information also received a high rating for fences and decking. According to the respondents in the case of yard structures design, domestic origin of the product and product-related services were important. Design, environmental friendliness, presence of certificates, and reputation and reliability of the manufacturer were found important in garden furniture.

Using the Kruskal-Wallis test, statistically significant differences were found only for the domestic origin of product, and for product-related services. The domestic origin of wood was particularly important in fences and decking, while product-related services were most important in yard structures. Overall, technical quality, functional properties, and appearance can be described as the most important aspects of product quality for wooden garden products, and these findings are fairly consistent among the three product groups.

Next, we analyzed the possible differences in the importance of perceived product attributes among respondents with different backgrounds in terms of gender, age and their expressed garden project behavior (self-completion/service utilization). As stated above, differences among product groups were found only in terms of importance of domestic origin of product and product-related services, and thus all product categories have been combined in the following discussion. Statistical significance was tested using cross-tabulation with Pearson's chi-square test.

Table 1. Importance assigned to aspects of quality according to age group, as percentages.

		1 (No importance)	2	3	4	5 (Very important)	Pearson chi-square, 2-sided
Technical quality	34 and under	0	0	0	31.8	68.2	0.379
	35–44	1.7	0	0	31.0	67.2	
	45–54	0	0	2.1	18.8	79.2	
	55–64	0.9	0	0.9	17.6	80.6	
	65 and over	0	0	2.7	10.8	85.5	
Functional properties	34 and under	0	0	9.1	31.8	59.1	0.142
	35–44	0	1.7	3.4	44.8	50.0	
	45–54	0	0	2.1	33.7	64.2	
	55–64	0	0.9	4.6	20.4	74.1	
	65 and over	0	0	2.7	24.3	73.0	
Appearance	34 and under	0	4.5	0	27.3	68.2	0.090
	35–44	1.7	0	3.4	32.8	62.1	
	45–54	0	0	2.1	35.1	62.8	
	55–64	0	0	4.6	32.1	63.3	
	65 and over	2.6	0	2.6	18.4	76.3	
Design	34 and under	0	4.5	18.2	36.4	40.9	0.767
	35–44	1.7	3.4	24.1	36.2	34.5	
	45–54	0	1.1	17.2	35.5	46.2	
	55–64	0	2.8	16.0	33.0	48.1	
	65 and over	0	0	13.9	30.6	55.6	
Domestic origin of product	34 and under	13.6	18.2	18.2	22.7	27.3	**0.000**
	35–44	1.7	3.4	36.2	39.7	19.0	
	45–54	4.4	4.4	18.7	37.4	35.2	
	55–64	1.0	2.9	12.7	36.3	47.1	
	65 and over	2.9	0	8.8	26.5	61.8	
Brand	34 and under	27.3	27.3	22.7	22.7	0	**0.032**
	35–44	8.6	29.3	39.7	13.8	8.6	
	45–54	13.8	14.9	43.6	21.3	6.4	
	55–64	10.7	22.3	28.2	23.3	15.5	
	65 and over	16.1	19.4	16.1	32.3	16.1	
Price	34 and under	0	0	18.2	50.0	31.8	0.758
	35–44	0	1.7	25.9	44.8	27.6	
	45–54	0	1.1	20.7	52.2	26.1	
	55–64	0.9	2.7	12.7	47.3	36.4	
	65 and over	0	0	17.1	60.0	22.9	
Environmental friendliness of product	34 and under	9.1	18.2	18.2	45.5	9.1	**0.000**
	35–44	0	6.9	24.1	41.4	27.6	
	45–54	1.1	1.1	18.9	40.0	38.9	
	55–64	0	1.9	18.7	32.7	46.7	
	65 and over	2.9	8.6	8.6	31.4	48.6	
Product has a certificate	34 and under	15.0	25.0	25.0	30.0	5.0	**0.027**
	35–44	1.7	13.8	29.3	32.8	22.4	
	45–54	4.3	9.7	28.0	34.4	23.7	
	55–64	3.1	9.3	19.6	38.1	29.9	
	65 and over	9.1	9.1	3.0	36.4	42.4	
Product-related services	34 and under	0	40.0	45.0	15.0	0	**0.000**
	35–44	10.5	17.5	29.8	33.3	8.8	
	45–54	7.3	12.5	28.1	35.4	16.7	
	55–64	5.6	15.9	16.8	33.6	28.0	
	65 and over	8.6	17.1	20.0	11.4	42.9	
Product information	34 and under	0	0	31.8	54.5	13.6	**0.001**
	35–44	0	14.0	17.5	38.6	29.8	
	45–54	1.0	2.1	15.6	40.6	40.6	
	55–64	0	2.8	10.4	41.5	45.3	
	65 and over	2.9	0	17.1	25.7	54.3	
Reputation and reliability of manufacturer	34 and under	9.1	9.1	27.3	45.5	9.1	**0.000**
	35–44	1.8	8.8	28.1	36.8	24.6	
	45–54	2.2	5.5	14.3	45.1	33.0	
	55–64	0	2.8	9.3	37.0	50.9	
	65 and over	0	2.8	13.9	27.8	55.6	

Gender was a statistically significant background variable for functional properties (sig 0.002), design (sig 0.034) and environmental friendliness of product (sig 0.006). Female respondents placed greater importance on all these product attributes. **Table 1** shows quality attribute ratings according to age groups. Age was a significant background variable for seven quality aspects, most of them intangible ones. Perceived importance of all seven aspects was greater in the older age groups. Interestingly, expressed garden project behavior was significant (sig 0.007) only in product-related service rankings.[2] Consumers who mostly undertook DIY projects gave lower importance rankings for product-related services than respondents who also utilized service providers, which is a logical finding.

Next, we conducted a factor analysis to explore the dimensionality of perceived product quality, which indicates the product quality attributes connected to each other. Factor analysis was first performed on all respondents, and then separately for each of the three product categories, to check for consistency. Differences among product categories were very small in this respect, and thus the results, which are reported and analyzed in full, include data for all three product categories. The final four-factor solution was given a Maximum Likelihood (ML) extraction with Varimax rotation. Bartlett's test of sphericity returned a sig. of 0.000, and the Kaiser-Meyer-Olkin measure of sampling adequacy was 0.804, suggesting a significant solution for factor analysis. The four factors jointly explain 55.2% of total variance in the data, which does not quite reach the commonly used threshold value of 60% (Hair et al. 2009). Nevertheless, the factor analysis in e.g., Toivonen (2012), whose components were the basis for our questionnaire, had similar explanatory power.

Factor analysis results are shown in **Table 2**. Product price was also included in the questionnaire, but because its communality was low (0.108) and it did not load on any specific factor, it has been left out of the final analysis. The fact that price was not connected to other attributes supports the argument by Toivonen (2011), that price is not a part of perceived quality of wooden products. We were interested in analyzing any links between price and other attributes, brand being one likely candidate, but none were found.

Factor reliability is sufficiently high, as shown by Cronbach's alpha (Hair et al. 2009). Based on its composition, factor 1 is labeled 'Environment and origin,' because it includes the environmental friendliness of product, product certification and, with a smaller loading, the domestic origin of the product. Factor 2 is called 'Intangible attributes,' because it contains the majority of intangible quality aspects included in the survey. Factor 3 contains only two items and is called 'Appearance,' while the fourth factor also contains two items and is called 'Practical aspects.'

These four factors show quite an interesting picture of consumer perceptions of quality of wooden garden products. Of particular interest, variables considered very important in all product groups, namely technical quality and functional properties, formed their own factor and were not closely connected to other attributes. The four factors that do emerge provide insights into Finnish consumers' perceptions of wooden garden products. These factors represent different dimensions of quality but are of varying importance to consumers, either on their own, or jointly with other quality attributes. The association of environmental friendliness with domestic origin of product is especially interesting for the Finnish woodworking industry, because it suggests it might be easier to market domestic products as environmentally friendly.

Table 2. Maximum likelihood Varimax rotated factor analysis of product quality attributes.

	1	2	3	4	Communalities
Environmental friendliness of product	**0.839**	0.216	0.098	0.105	0.771
Product has a certificate	**0.729**	0.234	0.047	0.084	0.594
Domestic origin of product	**0.454**	0.266	0.121	0.213	0.337
Reputation and reliability of manufacturer	0.301	**0.708**	0.122	0.184	0.641
Product information	0.225	**0.640**	0.120	0.174	0.505
Product-related services	0.123	**0.608**	0.176	0.035	0.417
Brand	0.279	**0.367**	0.101	0.017	0.222
Appearance	0.051	0.124	**0.977**	0.160	0.999
Design	0.141	0.252	**0.527**	0.130	0.378
Technical quality	0.113	0.054	0.128	**0.940**	0.915
Functional properties	0.155	0.244	0.192	**0.408**	0.287
Variance explained (%)	15.8	15.7	12.6	11.1	
Cronbach's alpha	0.773	0.727	0.687	0.622	

Customer segmentation

In addition to the factor analysis, we decided to examine whether customer evaluation of various quality aspects could be used to segment respondents into specific groups. A cluster analysis was performed by using k-means clustering, which is appropriate for this type and size of sample, and for exploratory purposes. In k-means clustering, the number of clusters must be determined before the process, and therefore we per-

[2] The analysis might be affected by a skewed sample because of the high number of respondents who chose DIY.

formed the analysis on a number of clusters ranging from two to five. In the end, we settled on three clusters. When the number of clusters was restricted to two, the final cluster centers of the two clusters were very similar to each other. In contrast, when the number of clusters was increased to four, some clusters held exceedingly small numbers of cases. Thus, the three-cluster solution displays the full range of data, while no clusters contain too few cases.

Table 3 shows the results of the cluster analysis. The cluster centers in cluster 1 are at the 'very important' level for most variables, indicating that respondents in this cluster (135 respondents, 39%) are particularly demanding about garden product purchases. Ratings in cluster 2 are considerably lower, and it can be assumed that respondents in this category are not as demanding. Cluster centers for intangible aspects, such as brand name, are particularly low. This cluster is significantly smaller than the others, including only 25 respondents (7%). In the third cluster, only technical quality and functional properties are rated as very important, while the rest of the variables have lower ratings. Consumers in this category can thus be deemed to value practical aspects of product quality above all other aspects. This cluster is also large, with 123 respondents (35%).

Cross-tabulation with the Pearson chi-square test was used to find out more about the respondents in each cluster. Age was a significant background variable (sig 0.001) for determining cluster membership. More than half of the respondents 45 years and over belonged to cluster 1. Respondents under 45 were most commonly in cluster 3. Cluster 2 was not the most common for any age group, but 33% of respondents 34 years and under were in that cluster, and thus formed the majority of that cluster.

Using both age and gender as differentiating variables produced distinctions among the clusters. Women 55 years and over were particularly likely to belong to cluster 1, with around 70% of them falling into this group. Women in the age group 45 to 54 are evenly split between clusters 1 and 3, and more than half of women under 45 years belong in cluster 3. Male respondents tend to be in either cluster 1 or 3. Men in age groups 35 to 44 and 55 to 64 are mostly in cluster 3; men in age group 45 to 54 are in cluster 1; and men 65 and over are evenly split between clusters 1 and 3. Men 34 years and under are an exception, with half of them in cluster 2. They are the only group for whom this is the most common cluster. Thus, it seems reasonable to conclude that women over 55 form the most demanding wooden garden product consumer segment, while men and women under 55 place more emphasis on practical aspects, and men 34 years and under are probably the least-demanding segment.

Table 3. Results of cluster analysis including final cluster center values (5 = very important… 1 = not important at all).

	Cluster		
	1	2	3
Technical quality	5	4	5
Functional properties	5	4	5
Appearance	5	4	4
Design	5	4	4
Domestic origin of product	5	3	4
Brand name	4	2	2
Price	4	4	4
Environmental friendliness of product	5	3	4
Product has a certificate	4	2	3
Product-related services	4	2	3
Product information	5	3	4
Reputation and reliability of manufacturer	5	2	4

Developmental needs of products and services

In addition to quality perceptions, we wished to explore the most important developmental areas of wooden garden and outdoor products. The focus was on new product and service aspects, instead of product development methods. Respondents were asked to indicate the importance of seven variables (tangible and intangible ones) on a 5-point scale, and additionally to answer an open-ended question about the types of new products or product groups they would like to see. Again, no differences appeared to exist among the three product categories. There were 62.3% of respondents who believed technical product quality to be very important, making it the clearest developmental need (**Figure 4**). It was followed by the development of environmental friendliness, the domestic origin of wood products, and customization of products according to customer needs. The least-pertinent developmental need was incorporating services into the products.

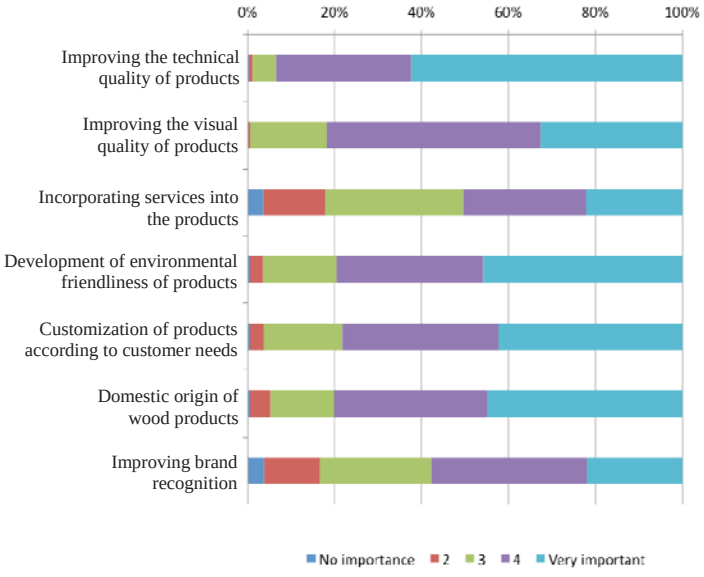

Figure 4. Shares of customers (in percentages) evaluating the importance of developmental needs of wooden garden products.

Interestingly, perceived importance of product and service development needs did not differ among respondents with different garden project completion styles. In contrast, statistically significant differences were found in terms of gender and age. Gender was statistically significant in the case of improving environmental friendliness of products (sig 0.000), because women rated it more important. Importance ratings assigned to different developmental needs are listed by age group in **Table 4**. Age was a statistically significant background variable in all the developmental needs, except in improving the visual quality of products. The importance of every other developmental need increased in older age groups, indicating that older consumers have more requirements for wooden garden products.

The open-ended section of the survey was tailored to the three product categories, and thus responses differ according to which kind of questionnaire was received. Interest in the open-ended section was fairly low, with only 69 respondents (19.9%) answering it. Several specific product requirements emerged in all product categories, but our focus is only on the broader themes brought up by the study.

The development ideas suggested for fences and decking were related to their ease of maintenance and durability, and the environmental friendliness of garden products. Ease of maintenance included improved weatherproofness, lower maintenance needs, and higher decay resistance. Pressure-treated wood is one solution to improving durability, but respondents' opinions on its utilization were divided. Some

Table 4. Importance of product and service development needs according to age group, as percentages.

		1 (No importance)	2	3	4	5 (Very important)	Pearson chi-square, 2-tailed
Improving the technical quality of products	34 and under	0	5.0	15.0	50.0	30.0	**0.014**
	35–44	0	1.9	7.5	41.5	49.1	
	45–54	0	0	3.3	31.1	65.6	
	55–64	0	1.0	5.7	26.7	66.7	
	65 and over	2.5	0	2.5	17.5	77.5	
Improving the visual quality of products	34 and under	0	0	35.0	45.0	20.0	0.099
	35–44	0	0	22.6	58.5	18.9	
	45–54	0	0	17.8	52.2	30.0	
	55–64	0	2.0	17.3	40.8	39.8	
	65 and over	0	0	8.3	52.8	38.9	
Incorporating services into the product	34 and under	15.0	40.0	20.0	25.0	0	**0.001**
	35–44	5.8	11.5	42.3	23.1	17.3	
	45–54	2.3	15.9	35.2	31.8	14.8	
	55–64	1.0	12.2	28.6	30.6	27.6	
	65 and over	2.6	5.3	23.7	34.2	34.2	
Development of environmental friendliness of products	34 and under	0	20.0	25.0	35.0	20.0	**0.000**
	35–44	0	2.0	30.0	30.0	38.0	
	45–54	0	3.4	13.6	42.0	40.9	
	55–64	0	0	12.7	33.3	53.9	
	65 and over	5.6	2.8	16.7	19.4	55.6	
Customization of products according to customer needs	34 and under	5.0	5.0	20.0	50.0	20.0	**0.015**
	35–44	0	7.5	28.3	43.4	20.8	
	45–54	0	2.2	20.2	31.5	46.1	
	55–64	1.0	2.0	13.7	34.3	49.0	
	65 and over	0	2.7	10.8	29.7	56.8	
Domestic origin of wood products	34 and under	0	20.0	25.0	20.0	35.0	**0.024**
	35–44	1.9	3.8	28.8	26.9	38.5	
	45–54	1.1	4.4	12.2	38.9	43.3	
	55–64	0	2.9	9.5	39.0	48.6	
	65 and over	0	5.0	12.5	30.0	52.5	
Improving brand recognition	34 and under	10.0	25.0	25.0	30.0	10.0	**0.004**
	35–44	0	28.8	26.9	30.8	13.5	
	45–54	5.7	11.4	30.7	35.2	17.0	
	55–64	2.0	6.1	25.3	41.4	25.3	
	65 and over	2.9	5.9	20.6	32.4	38.2	

respondents wished for a greater range of pressure-treated products, while others requested new, non-pressure-treated options. The latter might be connected to environmental friendliness and the utilization of naturally durable wood materials, which also emerged as an issue of its own.

The greatest number of requirements for yard structures was expressed for specific products, mainly a variety of sheds and cabins. The broader issues suggested by respondents were design, and environmental and child friendliness. Respondents made suggestions for modern, new and simple designs, as well as a greater range of ecological products, or even products made from recycled materials. The needs of small children should also be taken better into account.

Specific product requirements dominated respondents' garden furniture wishes. Design and new materials were the main themes that emerged from the answers. Desirable design aspects were simplicity, modernity, stylishness, new design and the ability to customize and alter products. It was interesting that respondents wanted to see new materials in use. They specified a wish for increased domestic tree species utilization, particularly of rarely used species, such as alder, mountain ash and larch. Respondents also wanted weatherproof products suitable for year-round use, natural products and products that consider children's needs.

Discussion

According to our study, technical quality, functional properties and appearance were the most important product attributes in every wooden garden products category. The main differences in terms of demographic factors were the higher ratings given by female respondents for functional properties, design and environmental friendliness, and the higher ratings given by older respondents to mainly intangible attributes (7 out of 12). It is interesting to compare our findings with those of Creusen (2010) on Dutch consumer perceptions of functional and expressive product aspects of durable goods. In both studies, women were more interested in aesthetics and ease of use. Interestingly, Creusen (2010) found that older people place greater emphasis on functionalities, ease of use and quality. These findings are not directly supported by our data, where older respondents overall gave higher rankings to different quality aspects, but the differences were only statistically significant for some intangible aspects. No differences in perceived importance of technical or functional properties were found. However, the differences between these two studies might stem from different product categories used in the studies, or might signify that, for older people, quality consists of more intangible aspects.

In terms of green consumption, our results show that Finnish women and older consumers planning to purchase garden products assign greater importance to environmental friendliness than do other groups. Older respondents also regarded product certification more highly, which is comparable, to an extent, with previous research (Roos and Nyrud 2008). The results might indicate that these groups include a greater proportion of green consumers, but unfortunately our data are not suitable for confirming this, because our measurement instrument regarding environmental friendliness of products was too simplistic. It should be noted, however, that interest in certification and eco-friendliness might not signify a better understanding of certificate content, or result in greener consumption (cf. Hansmann et al. 2006, Aguilar and Vlosky 2007).

The cluster analysis did not show a clearly environmentally oriented group of consumers, and thus our results can be considered merely a preliminary indication on this topic. Practical aspects stood out in one cluster during the clustering, in contrast to another cluster showing high requirement levels for all product attributes. It is also interesting that our factor analysis results differ quite substantially from those reported recently by Toivonen (2012), where dimensionality of product quality could be divided clearly into tangible and intangible aspects, and intangible aspects were further split into two separate factors. Intangible product aspects also stand out in our data, but the composition of factors 'Environment and origin,' 'Appearance' and 'Practical aspects' is different from those in Toivonen (2012). This result might be due to differences in the covered product categories, temporal differences in terms of data collection and target group, or our attributes list, which was somewhat modified from Toivonen (2012).

It might be possible to utilize our multivariate analysis findings in marketing and new garden product development, to respond to customer needs. In terms of customer segments, it is possible either to focus on practical product aspects in developing product marketing, or strive toward developing all-round excellence. The identified product quality dimensions could offer more scope for targeting marketing efforts, although it is self-evident that consumers are likely to find importance in more than one quality dimension. Nevertheless, it might be possible for woodworking companies, for example, to emphasize their sustainability and green credentials, to aim to develop an outstanding service and supplier reputation, or to focus on the design and appearance of new products. In particular, the environmental angle might offer advantages over competing, imported garden product materials.

The last issue we address concerns the requirements for new garden products. Respondents believed improving technical quality to be the principal issue, but other aspects, such as customization, were also considered important. Respondents also expressed their desire for new kinds of design, new products and more eco-friendly products, among other things. These requirements coincide somewhat with general trends in gardening, which include a focus on garden structures and establishment of "instant" gardens (Freeman et al. 2012). Consumers might hope for products that make creating their own gardens faster and easier. However, it is important to remember that respondents in this sample engaged overwhelmingly often in DIY gardening projects and did not consider incorporating services into the products as necessary. The key requirement might therefore be the development of products that simultaneously look good and have good technical properties but can be installed by consumers without the help of professionals. These products could help consumers achieve attractive gardens with less hassle or the need to learn how to complete garden projects themselves.

Conclusions

It is clear that, as argued by Toivonen (2012), consumers' perceived quality of wooden products, including garden products, is a multifaceted issue. The three most crucial aspects of product quality for Finnish garden product customers appear to be technical quality, functional properties and appearance. However, when our data were analyzed according to different background variables and by using factor and cluster analysis, interesting differences and variety emerged in our sample of Finnish consumers. For example, intangible aspects and environmental values are perceived important by some consumers, while they are not universally at the top of the list for all consumers.

Some of the findings of this study support those of earlier research. Our results were in line with, for example, Creusen (2010), confirming that women tend to be more demanding as consumers of durable products, with a greater focus on aesthetics and functional properties. Green consumers might also need to be targeted by the wooden garden products marketing field. For example, it would be interesting to analyze whether consumers are willing to pay more for environmentally friendly garden products, and in this case, which product or material features would be the most decisive ones. Another interesting topic would be the less-studied topic of product customization (see, however, recently Lihra et al. 2011), and particularly how much consumers are willing to pay for products that meet their exact specifications.

Any sector that wants to retain its competitive position must engage in new product and service development. In our study, development of technical quality of garden products was found to be the prevalent requirement, but other needs such as design would also seem to merit further research. It would be especially interesting to explore what the expressed wishes, such as for a new kind of design or use of new materials, would entail. Although much in use, these are rather vague concepts, and finding more concrete information about them would require the use of different research methods. One interesting possibility would be utilizing visual tools.

Overall, there seems to be plenty of scope in this field to gaining better understanding of existing and latent consumer needs.

Our study has given some new insights into the mindset of Finnish consumers in terms of their wooden garden product preferences. While practical aspects and appearance matter the most on average, some consumer groups find other product attributes are at least equally important. More detailed and more narrowly focused studies would be needed to gain better understanding of the importance of cultural aspects related to garden products consumption. Collecting a comparative international data set would also be interesting, particularly when the different role of gardens in different societies and climate zones is kept in mind.

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