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# Competitiveness Review

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# Market potential and determinants for eco-smart furniture attending consumers of the third age

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## Abstract

**Purpose** – This paper aims to discuss some of the findings of an ongoing "Green & Smart Furniture" (GSF) research project. It actually focuses on third-age consumers' behavior and interest in purchasing smart and eco-friendly wooden furniture, providing some critical implications for the successful design and production of GSF products in the framework of innovation and differentiation.

**Design/methodology/approach** – The methodology is based on empirical data gathered from consumer research across Greece. The target group for "smart and eco furniture", under the context of the present research, has to do with the third age, following the claims of many researchers that market orientation is essential for innovation success.

**Findings** – The present research promotes the development of innovation for furniture manufacturing industries, opening a new pathway in confronting the difficulties and strong competition. Firms should redesign their strategy, focusing on differentiation by including innovative products in their portfolio with high added value.

**Originality/value** – The present research is a prototype for the Greek and European furniture market, one designed to answer certain relevant questions regarding the drivers of innovation for the specific sector and the specific target group.

**Keywords** Market research, Green wooden furniture, Sustainability, Smart furniture, Third age

**Paper type** Technical paper

## 1. Introduction

The knowledge on environmental consequences of the materials that are being frequently used in a particular industrial sector constitutes enterprises being able to improve their products and their production processes through an environmental point of view and thus to accelerate their entry into the emerging markets of green products (Nedermark, 1998).

At a global level, many furniture manufacturers understand the responsibility they have in making environment-friendly furniture, as, in general, green products that are gradually being introduced in markets force the designers of the products to include environmental criteria in the production processes and in the final products (Maxwell and van der Vorst, 2003; Shapiro and White, 1999), and thus, the number of such enterprises is growing constantly (Frondel *et al.*, 2007; Epstein and Roy, 2006).

Regarding the Greek furniture sector, a related study by Papadopoulos *et al.* (2010) has shown that the majority of the Greek furniture enterprises strongly support green entrepreneurship and certification of wood with regard to its environmental impacts. Through this process, the firms believe that they will be able to develop new fields of entrepreneurial activity, based on certified ecological furniture products, enhancing their competitiveness and innovative activity (Trigkas *et al.*, 2011).

However, green entrepreneurship and information technology (IT)-based innovation are vague and risk-taking concepts for most furniture small and medium-sized enterprises. Furthermore, furniture manufacturers are not used to creating niche markets, a strategy quite common in the case of other products of low-and-medium technologies, such as cars, clothes and food.

The purpose of the present work is to encourage awareness by practitioners, managers, policy makers and all interested parties toward certain issues regarding eco-smart furniture product development, and more precisely:

- the existence of relevant niche markets, indicating that the third-age consumers can support the creation of lucrative niche and sub-niche markets;
- the highlight of certain features and specificities for relevant products and strategies that can support successful new product development and the creation of relevant competitive advantages; and
- the provision of third-age desire mapping regarding third-age consumers.

Findings contribute significantly to the opening of new ways of creating competitive advantages for the furniture sector, which nowadays is quite imperative: the furniture sector in developed countries is in a rather dramatic position due to China's entrance, and more specifically in the case of Greece due to the severe socioeconomic crisis combined with the lack of experience in knowledge-based product development and cooperation with high-tech sectors.

## 2. Literature review

### 2.1 Green wooden products

Eco-furniture or "green" furniture is defined as a furniture designed to minimize the environmental impact during its whole life cycle (Albino *et al.*, 2009; Baumann *et al.*, 2002) and thus furniture with characteristics of environmental compatibility, taking into consideration all the stages of furniture life cycle (Parikka-Alhola, 2008; Progetto Life, 2005).

Several initiatives have been launched during recent years regarding furniture design and production that are environment-friendly. For example, the "Life Environmental Ecofriendly furniture project" was launched in Italy in 2001, which aimed at developing furniture prototypes with elements compatible to environmental protection, taking into consideration all the stages of furniture life cycle (Progetto Life, 2005). Another very interesting initiative was also the Finnish Furniture Panel, launched in 2004, which focused on environmental impacts of furniture during its life cycle, and further aimed at finding solutions regarding the development of the sustainable growth of the furniture industry in the country (Finnish Furniture Panel, 2005; Nissinen and Parikka, 2007). Additionally, several websites were developed, containing all the related information regarding issues concerning ecological furniture, for manufacturers as well as for the consumers (Ecosmes, 2005; Nordic Ecolabelling, 2003; GRIP, 1998).

### 2.2 Smart furniture

Smart furniture constitutes the future evolution and tendency in the furniture industry (Tokuda *et al.*, 2003; Zongdeng and Wenjin, 2010). Thus, a smart furniture product has the capability to alter a conventional space into an intelligent spot that includes computing systems (Ito *et al.*, 2003). As a smart furniture is equipped with computing networks, sensors (Mavrommati *et al.*, 2003) and several IT devices, it could offer many different services, either by itself or in cooperation with other devices and items of the everyday human environment under the context of a Ubiquitous Computing (UmpiComp) environment (Wuliji, 2009). UmpiComp environment regards the method of including and using computing systems in a way that makes them available to our everyday living environment, while also making them simultaneously "invisible" to the user (Weiser, 1993).

In a related study (Karvelas, 2007), some of the research projects in the field are presented, regarding smart furniture in networking to ubiquitous computing systems and environments, such as the *Dietary-Aware Dining Table,* the *Drift Table* and the *Key Table*, which were developed under the context of the *project for residential technologies of Equator IRC* as smart furniture embedding several functions based on sophisticated sensors and IT applications (Gaver *et al.*, 2004; Boucher *et al.*, 2006).

The EU is also giving special attention to the development of smart furniture for the third age through the funding of the Wider project (2014), to give the opportunity to furniture industries across Europe to innovate and differentiate from the competition and to produce these kinds of products.

### 2.3 Target group for eco and smart furniture

Aging in the third age is manifested usually through the reduction of stamina, wearing down of bones and muscles atrophy, slowing down of senses and spiritual capabilities,

loss of balance and slowing down of person's activity and mobility (Pheasant, 1986 in Comfurt, 2003; Burke, 1990).

The US Congress spends approximately $1.5tn for health care services on a yearly basis, and in the forthcoming years, the population of the third age is expected to become bigger than the younger one (AAHSA, 2003; Dishman, 2004). The percentage of the US population that is expected to be over 65 years old shows constantly a growing tendency, and this age group is foreseen to reach 18.2 per cent of the country's total population in 2025, with this tendency to be global (Dishman, 2004). In the same vein, Ruef (2012) reports an increase of the third age population from one-fifth of the French population in 2005 to one-third in 2020.

Therefore, the improvement in standard of living and the evolutions in medical science have contributed to the increment of the expected living, as during the second half of the twentieth century, expected living increased by 30-40 years (Huth, 1986, Pennathur *et al.*, 2003). Based on forthcoming evolutions in medical science and biochemistry, the expected living is foreseen to be further increased for 20-30 years during the next generation (Pennathur *et al.*, 2003). Thus, it seems that the development of products for the third age can constitute a fruitful market for quite a big range of products and, of course, furniture.

Many research efforts have been made internationally during the past few years regarding the design and development of products that would make the way of living of the aged people easier (Anderson, 1995; Demirbilek, 1999; Haigh, 1993; Naqvi *et al.*, 1994; Pinto *et al.*, 2000). Several projects try to improve the surrounding space of the elderly, especially in residencies, aiming toward confrontation or tempering of the negative consequences of aging (Comfurt, 2003; Jönsson, 2003; Pennathur *et al.*, 2003; Nikopoulos, 2010). For example, Brigitte Ruef (2012) presented a series of bath furniture especially designed for the elderly, such as a foldaway seat for showers, while Lanzavecchia and Wai (2012) designed and presented a collection of aids for the elderly with styling that is more domestic than medical.

Thus, the target group for "smart and eco furniture" under the context of the present research has to do with the third age, to which the research could offer many solutions in improving their everyday living, through them becoming more independent, reduction of health care costs, improvement of their quality of life, securing spare time for persons who are involved in their treatment, improvement of their capabilities and cure up to a level through everyday treatment. Regarding furniture enterprises, such an effort could have economic benefits in case of mass production.

The aim of the research under the context of the *GSF – Green and Smart (Eco-logical) Furniture* project was to discover needs and wants of furniture consumers of the third age regarding smart and sheer ecological furniture, following the claims of many researchers that market orientation is essential for innovation success. Literature on eco-manufacturing and smart furniture indicated that creating new products which would satisfy both principles can lead to strong competitive advantages. Furthermore, it appears that the third age can support such markets. However, there is scarce evidence on what exactly to create, to whom to apply and what needs to cover or create. GSF market research was designed to answer certain relevant questions posed by the research team:

- Can the third age constitute a fruitful market for eco-smart furniture? Although certain third-age specificities have been marked by relevant literature and

designers present relevant projects, as seen above, the existence of relevant sustainable niche markets is highly questionable.

- What are top priorities for the third age? How uniform are the needs of people over 65? Third-age people are changing, but their perceptions seem to be stable and related to the elderly of former generations.

- Can existing desires create tacit ones?

## 3. Research method

A research instrument was developed to serve as the basis for collecting data pertaining to the study's parameters. All questionnaire items were constructed using self-typing five-point Likert scales. Furthermore, a number of questions were of multiple-choice type. Both are well-accepted practices in this type of research. It should be noted that most questions reflect perceptions of the interviewed sample to outline the trends regarding GSF for the specific target group. The items pertaining to each scale were pre-tested with five face-to-face interviews. The pre-testing process allowed the researchers to assess the content validity of items and ensure that interviewees understood the research instrument as was intended.

The questionnaire included four different groups of interest and a total of 23 questions. The first group of questions related to the general characteristics of furniture products that are currently used by the consumers. The second group included nine questions related to the awareness of the consumers regarding the meaning of ecology and the inclusion of technology in furniture products specifically, but also into their everyday living in general. The third group constitutes of questions related to the type, specific characteristics and elements of smart and ecological furniture which could be developed and the amount that the consumers are willing to pay extra in acquiring such a product. Finally, the fourth group was formed by questions regarding the profiles of the consumers who participated in the research to highlight the specific characteristics of the potential consumers of smart and ecological furniture.

The research was addressed to a random sample of 399 consumers from different regions of the country, namely, Central Greece, North Greece and Attica (including Athens, residence of 40 per cent of the total Greek population), during 2013. Questions were selected such that they were short and comprehensive for the best possible convenience of the participants.

Before the launch of the study, a content validity test was conducted regarding the questionnaire. This test was based on an extended literature review and discussions with furniture enterprises and expert scientists from the wood and furniture design and technology field and the intelligent systems field. A former research of Papadopoulos *et al.* (2013) on ecological furniture involved 85 furniture firms in Greece and Cyprus; five companies belonging to that sample were called to discuss the questionnaire of the present research.

Following this, a pilot questionnaire was tested with ten consumers. The pre-sampling results indicated the points that needed to be further clarified to improve the quality of the questionnaire (Dillman, 2000).

The construct validity was based on the test of unidimensionality of the elements constituting each factor, as well as the content validity of each factor separately. We used factor analysis according to the method of principal component analysis. Regarding the content validity of the research variables, the statistical factor of

Cronbach's alpha was used (Siomkos and Vasilikopoulou, 2005; Chantzoudis *et al.*, 2009; Sarigiannidis *et al.*, 2009).

## 4. Results
The analysis of the first group of the research's questions delineated the contemporary use of furniture in residences and their specific characteristics regarding people of the third age. Spending most time in their living room (40.4 per cent) and kitchen (32.6 per cent), the target group places great importance on chairs (27.9 per cent) and tables. Wooden furniture was favored by the participating consumers in regard to everyday use.

In all, 54.4 per cent of the target-group consumers admit that they are not willing to replace conventional furniture with green and smart ones unless these are cheaper (Figure 1). This finding is quite normal considering the squeezed income in the current difficult economic climate in Greece during the past four years. However, there are also three more criteria that seem to have a significant role in purchasing GSF:

(1) health condition (50.4 per cent);

(2) assistance of GSF to everyday living (49.4 per cent); and

(3) environmental protection along with the improvement of their everyday living conditions (49.1 per cent).

The last criterion confirms previous relative studies (Papadopoulos *et al.*, 2010; Trigkas *et al.*, 2011) regarding the role of environmental protection in developing new target groups and markets for the furniture and wood sectors in Greece and in general, as well as for the development of new entrepreneurial opportunities under the context of *green entrepreneurship*. The awareness of contemporary consumers regarding environmental issues indicates that the area of green furniture should be an alternative aspect under consideration by furniture enterprises when forming their competitive strategies.

The analysis of the answers to the third group of questions indicated characteristics and properties desired by GSF in regard to:

• environmental and natural resources protection;

• technology and its applications; and

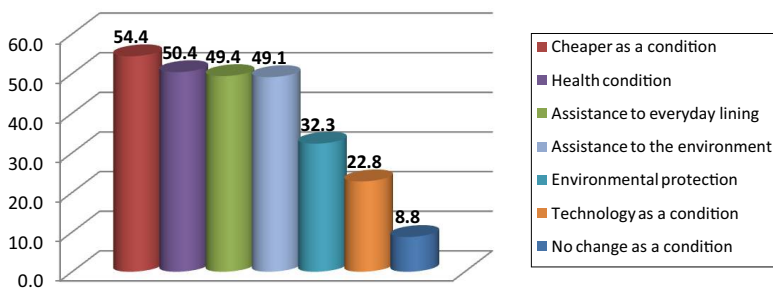• specific needs and demands of end-users and their surrounding space.

**Figure 1.**
Criteria for changing conventional furniture with smart and ecological ones

Therefore, the most important criteria using a five-point Likert scale (with 1 as very much) appear to be:

- sustainability regarding natural resources' use (ranking 1.72);
- production processes that are environment-friendly (1.74);
- energy saving during production and use (1.79); and
- manufactured by using recyclable materials (1.82).

Attributes such as ergonomics, safety, use of ecological finishing materials, the ability of reusing the components in the end of life cycle and the use of innovative materials follow at a lower significance ranking (Table I).

The familiarity of third-age consumers with technology was further explored, as well as the range of inclusion of computing systems into several technological applications and functions. In all, 36.3 per cent of the respondents consider the use of technology as a good idea, 31.6 per cent consider it as quite necessary and 25 per cent stated that technology helps a lot in their everyday living. These consumers seem to have more familiarity with technology, mainly regarding applications such as the use of mobile phones (2.54); home automations such as automatic wind screens and lighting (3.39); use of audiovisual means such as TV, DVD and projectors (3.43); and use of IT and internet (3.79 and 4.00, respectively).

Focusing more on the specific characteristics and properties of smart furniture, the analysis of the results has revealed that the anthropocentric design constitutes the basic property of the furniture product, followed by technological characteristics. Such attributes could be the capability of warning the person at home regarding potential health problems or the capability to communicate with the users and interact with the environment.

These findings could be further correlated with the results of Table II, regarding the aims that smart furniture should achieve. Thus, at a declining significance ranking, the participants consider that smart furniture should facilitate user's everyday living > execute some routine activities > secure an independent everyday living of the person > generate a pleasant environment inside the house.

Aims regarding the health of the user, such as the function of becoming a warning device in health and safety issues and the monitoring of the person's health in general, follow with a ranking of 2.03. Chi-square test has shown that a statistically significant

| Characteristics and properties of ecological furniture | Rank | SD |
| --- | --- | --- |
| Preservation of natural resources | 1.72 | 0.963 |
| Environment-friendly production process | 1.74 | 1.042 |
| Energy saving | 1.79 | 0.971 |
| Use of recyclable materials | 1.82 | 0.938 |
| Safety and ergonomics | 1.86 | 0.937 |
| Use of ecological varnishes | 1.91 | 1.148 |
| Material reusability | 2.02 | 1.113 |
| Use of innovative materials | 2.37 | 1.193 |

**Note:** Ranking 1 to 5, with 1 = very much and 5 = not at all

Table I.
Criteria that ecological furniture should meet

**Table II.**
Properties and
characteristics of
smart furniture

| Properties and characteristics of smart furniture | Rank | SD |
|---|---|---|
| Facilitation of user's everyday living | 1.40 | 0.760 |
| Facilitation of user's routine works | 1.73 | 1.137 |
| The independent everyday living of users | 1.87 | 1.062 |
| Pleasant environment inside the houses | 1.88 | 1.064 |
| Its function as a warning device regarding user's health and safety issues | 1.89 | 1.130 |
| Monitoring of user's health | 2.03 | 1.510 |
| Securing the user's privacy | 2.07 | 1.189 |
| Interaction with other furniture | 2.26 | 1.286 |
| Communication with person outside the house | 2.49 | 1.383 |

**Note:** Ranking 1 to 5, with 1 = very much and 5 = not at all

correlation exists between groups of ages and the property of facilitating communication with other people outside the house (Pearson $\chi^2$ = 33.53, for a significance level >99.9 per cent, approx. sig = 0.001) and monitoring of person's health (Pearson $\chi^2$ = 32.51, for a significance level >99.5 per cent, approx. sig = 0.005). Hence, the older the person, the bigger becomes the need of communication with other people and the monitoring of their health.

Thus, anthropocentric design is significant for smart furniture with the potential to facilitate user's everyday routines in a pleasant environment inside the house with parallel simple and easy-to-use technological support in health issues such as monitoring and warning.

Finally, the three most important factors that influence the participants' decision in purchasing GSF appear to be price, quality and functionality of the furniture, as presented in Table III. The rest of the factors follow, such as safety and ergonomics, environmental protection, technology and the design.

The above-mentioned factors of Table III correlate with each other, and the correlation analysis using the Pearson correlation coefficient (Pcc) indicates that at a significance level of 0.01, the factors that affect each other positively in order for a consumer to buy GSF are as follows:

- quality in relation to raw materials used for manufacturing (Pcc = 0.606), functionality (Pcc = 0.469) and ergonomics and safety (Pcc = 0.412);

**Table III.**
Factors and range of
influence in
purchasing smart
and ecological
furniture

| I/D | Factors | Rank | SD |
|---|---|---|---|
| 1 | Price | 1.40 | 0.821 |
| 2 | Quality | 1.43 | 0.750 |
| 3 | Functionality | 1.53 | 0.820 |
| 4 | Safety and ergonomics | 1.60 | 0.862 |
| 5 | Raw materials | 1.70 | 0.926 |
| 6 | Environmental protection | 1.81 | 1.009 |
| 7 | Technology | 2.29 | 1.295 |
| 8 | Design | 2.40 | 1.326 |

**Note:** Ranking 1 to 5, with 1 = very much and 5 = not at all

- price in relation to quality (Pcc = 0.365) and functionality (Pcc = 0.229);
- functionality in relation to safety and ergonomics (Pcc = 0.626) and raw materials used in manufacturing (Pcc = 0.560); and
- design in relation to technology (Pcc = 0.624) and ergonomics and safety (Pcc = 0.455).

A reliability test was further used to estimate the significance of the factors of eco-smart furniture (GSF) as presented in Table III. The test with a Cronbach's alpha of 0.831 indicated a considerable internal consistency of the items in the scale. To make the interpretation of the factors that were considered relevant, a rotation of the factors retained followed and two factors emerged as best to describe GSF from the factor analysis: GSF value regarding the best relation between price and quality (1 and 2) and a combination of eco-design with intelligent systems (7, 8, 6, 4, 5, 3 following the numbering of Table III). These two parameters accounted for 62.4 per cent of total eigenvalue.

Based on these findings, it is speculated that the added value for the GSF consumer is significantly related to economic factors, which is quite expected within the context of the severe Greek economic crisis. Qualitative characteristics and facilitation of everyday routine of users follow, indicating that the main criteria regarding the decision of purchasing GSF are not substantially different of those for the conventional furniture. Nevertheless, firms will have to detect these specific elements that will allow them to achieve differentiation during production, including the incorporation of sophisticated technology and environmental protection in their products.

The functions of smart furniture should secure convenience and adjustments to individual anthropometrics and kinesiology according to age and safety. The average consumer of the third age, according to the research, thinks of multifunctional furniture, which will furthermore contribute toward the reduction of everyday living cost through the satisfaction of a wider range of needs.

Of significant importance are also the findings presented in Figure 2, which concern the extra amount of money that the consumers are willing to pay to buy GSF. A rather satisfactory 27.4 per cent state that they are willing to pay 5-10 per cent extra for GSF compared to conventional furniture. Adding the percentage of those who are willing to pay an extra 1-5 per cent (22.4 per cent) and an extra 11-15 per cent (18.6 per cent), a
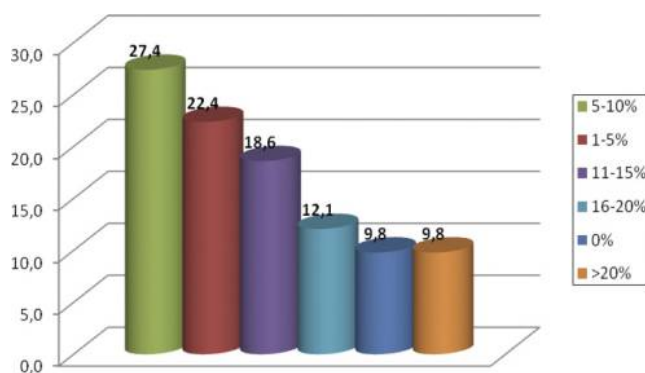


Figure 2.
Extra amount of money that consumers are willing to pay for a smart and ecological furniture

cumulative percentage of 68 per cent of the research sample seems willing to pay up to 15 per cent more for GSF in relation to a conventional furniture.

These findings are quite significant, as besides the economic downturn and its dramatic consequences to the family income and the furniture sector in Greece, consumers are willing to pay extra for the added value of a furniture product with technological and ecological innovations to satisfy specific needs. This information is quite valuable for the furniture manufacturing sector; it actually can constitute an important recommendation regarding competitive strategies based on differentiation. Reconsideration of low-cost business strategies toward innovation and differentiation is quite sufficient to secure a significant part of the internal market and, furthermore, to boost extroversion within the crisis context (Papadopoulos *et al.*, 2012, 2010; Trigkas *et al.*, 2012).

Thus, according to the above-mentioned results, it seems that there exists a "critical mass" of consumers of GSF in Greece, which can constitute a significant market for innovative Greek furniture enterprises during the period of the economic recession. Furthermore, the specific type of furniture can also support export activities, which are rather rare for the Greek furniture sector.

Using *cluster analysis*, we tried to focus more on the preferences of the target group of potential GSF consumers in relation to their specific characteristics and profile, such as their age and income. Table V presents the basic GSF properties and characteristics in relation to the consumers' age. Thus, it seems that for almost the sum of the age groups, these properties are convenience in maintenance and cleaning and the convenience in moving the furniture, especially for those aged over 66 years, as well as supporting in changing positions when sitting. The capability of warning for health problems seems to play a significant role for those aged over 75 years (Table IV).

What are the main reasons that our target group would decide to pay an extra amount of money? The research indicated (Table V) that there are actually different criteria for different ranges of percentages of extra amounts. More precisely, the actual purchase price and the level of quality are the main criteria for people who are willing to pay 1-15 per cent more for GSF. The actual price seems to be the only criterion for paying more than 20 per cent, as there is a common perception that GSF will be rather expensive. However, the people who seem willing to pay an extra amount of 1-5 per cent expect also better ergonomics, safety, functionality and assurance that environmental protection has been taken into account during production. On the contrary, the results show that the willingness of the consumers to pay an extra amount from 16 to 20 per cent has to do mainly with the design of a GSF.

## 5. Discussion – conclusions

Findings indicated that eco-smart furniture can constitute a significant alternative for furniture manufacturers to confront conventional cheap furniture, create new markets and add value. Furthermore, the third age, which has been indicated by relevant literature as an interesting consumer group, appears to have a quite different image than the perceived one. Wooden furniture is still the first preference of the participants of the research, regarding everyday use. Thus, wood could constitute the basis for the construction of green-smart furniture, as it is by its nature an ecological material having a minor environmental footprint in relation to other materials. This property can be even of greater value when wood comes from certified sustainable managed forests and if the

| Age groups | Furniture attributes | Rank |
| --- | --- | --- |
| <50 years | Safety | 1.50 |
| | Convenience in maintenance and cleaning | 1.56 |
| 50-55 | Moving the furniture | 1.56 |
| | Convenience in maintenance and cleaning | 1.73 |
| 56-60 | Convenience in maintenance and cleaning | 1.70 |
| | Safety | 1.75 |
| 61-65 | Adjustment to anthropometrics | 1.61 |
| | Supporting in changing position from sitting into vertical and vice versa | 1.74 |
| 66-70 | Safety | 1.75 |
| | Moving the furniture | 1.77 |
| 71-75 | Convenience in maintenance and cleaning | 1.47 |
| | Moving the furniture | 1.50 |
| 76-80 | Convenience in maintenance and cleaning | 1.39 |
| | Warning relatives for health problems | 1.61 |
| >80 years | Convenience in maintenance and cleaning | 1.00 |
| | Moving the furniture | 1.00 |
| | Supporting in changing position from sitting into vertical and vice versa | 1.00 |
| | Adjustment to anthropometrics | 1.00 |

**Note:** Ranking 1 to 5, with 1 = very much and 5 = not at all

Table IV.
Groups of consumers
according to age and
furniture attributes

| Extra amount (%) | Criteria in purchasing | Rank |
| --- | --- | --- |
| 1-5 | Quality | 1.12 |
| | Safety – ergonomics | 1.12 |
| | Environmental protection | 1.16 |
| | Price | 1.16 |
| | Functionality | 1.16 |
| 6-10 | Price | 1.20 |
| | Quality | 1.20 |
| 11-15 | Quality | 1.65 |
| | Functionality | 1.71 |
| 16-20 | Design | 4.00 |
| >20 | Price | 1.19 |

**Note:** Ranking 1 to 5, with 1 = very much and 5 = not at all

Table V.
Groups of consumers
according to the
extra amount they
are willing to pay in
purchasing a GSF
and purchasing
criteria

wood products bear the relevant labeling at European and international level according
to UNECE and FAO (2012).

The criterion of price in relation to the quality plays the most fundamental role in the
purchasing decision of GSF and the willingness to change conventional furniture.
Modern consumers who belong to the third age seem to have a great awareness
regarding environmental issues, a fact that enterprises should take into consideration
and include to their planning and strategy.

GSF properties and characteristics of special interest seem to be the promotion of
sustainability in natural resources use, the environment-friendly production process,

energy saving during its production and use of recyclable materials (when other than wood).

Regarding the "smart" – technological characteristics of the GSF, the significant ones are the ability to warn for health problems of the person, the ability to communicate with the end-users and the ability to interact with the environment, with ergonomic design as a core element. Thus, the participants in the present research consider that "smart" furniture should facilitate their everyday routine and secure independence of the person. Regarding the specific technological applications that could be included to smart furniture, users seem to be more familiar with the technology of mobile phones, followed by the use of audiovisual means and use of computers and the internet.

The main criteria regarding the purchasing decision of GSF do not substantially differentiate in relation to conventional furniture products, a fact that can direct furniture enterprises toward the development of their competitive advantages. Nevertheless, regarding their manufacturing strategy, they should detect these elements that differentiate them from competition and allow them to achieve their targets, including sophisticated technology and environmental protection in their products.

The majority of the sample state that are willing to pay an extra amount of 9 per cent in average of the price of a conventional product, while the 2/3 of the consumers could afford a 15 per cent extra amount. This percentage is of great importance if we take into consideration the reduced available income of the consumers because of the economic crisis in Greece during the past four years. This percentage is higher than the one found in a relevant study regarding the furniture market with regard to only ecological characteristics (Papadopoulos *et al.*, 2013). Ten per cent of the consumers state that they are not willing to pay extra; a fact that can be explained because of the reasons mentioned above.

These findings are quite encouraging regarding the existence of potential GSF consumers in Greece and indicate that third-age consumers are willing to purchase GSF that includes sophisticated characteristics and properties focused on their needs, which also comply with ecological standards. The capability in warning a user's familiar person for health problems, seems to play a significant role for ages over 75. These ages are those that usually need medical care.

The present research is the first in Greece and at the European level, according to our knowledge. We could argue that it promotes the development of innovation for furniture manufacturing industries, to approach an extended range of consumers, through the production of GSF. Thus, a new pathway is opening in confronting the difficulties and strong competition that the furniture sector faces at the national and European level, as well as crisis recovery (Papadopoulos *et al.*, 2013). Furthermore, findings constitute an optimistic message toward the furniture manufacturing sector; firms should redesign their strategy (Papadopoulos *et al.*, 2009), focusing on differentiation by including GSF products in their portfolio, and innovating through the production and promotion of furniture products with high added value. This fact could secure a share of the domestic market and boost extroversion, which is of great importance. Table VI provides some implications for managers and entrepreneurs in the field as derived by the GSF research. This optimistic thesis is further certified by the findings of a previous study regarding only ecological furniture (Papadopoulos *et al.*, 2013), where Greek and Cypriot

| No. | Managers should take into consideration |
|-----|------------------------------------------|
| 1 | Eco-smart furniture constitutes a significant niche market which can further be developed in more niche markets (e.g. over 75, men and women of third age, etc.) around the globe |
| 2 | Consider the value of wood from certified sustainable managed forests and the relevant labeling at European and international level according to UNECE and FAO in case of wood products |
| 3 | Build the right picture of third-age consumers against conventional image and perception (e.g. "old", "helpless", "ignorant", "naïve"); on the contrary, third age of today: Has a great awareness regarding environmental issues which is translated in natural resources use, the environment-friendly production process, energy saving during production and use of recyclable materials (when other than wood) Familiarity with modern technologies such as use of audiovisual means, IT and internet is growing and several applications are considered as fundamental |
| 4 | Do consider differences according to age that turn into marketing challenges; e.g.: Everyday routine and independence appear to be top priorities for "smart" furniture designed for the third age under 75 Warning for health problems and medical facilities seem to play a significant role for ages over 75 However, all groups appreciate convenience in movement and cleaning, safety and dimensions' adjustments (anthropocentric design) |
| 5 | Price, quality and functionality have still significant influence on buying decision. Actually, managers should bear in mind that the main criteria regarding the purchasing decision of GSF do not substantially differentiate in relation to conventional furniture products |

Table VI.
Proposed
implications for
managers in the field

enterprises consider the development of ecological furniture very positively, without mentioning the inclusion of "smart" elements.

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