

University of West Hungary

Theses of the doctoral (Ph.D.) dissertation

**ANALYSIS OF DETERMINATIVE FORMS OF FURNITURE OF EXCELLENT  
QUALITY FROM THE POINT OF VIEW OF DEVELOPING THE OPTIMAL  
PROPORTION OF FUNCTION AND AESTHETICS**

Réka Mária Antal

Sopron

2007

Doctoral School: József Cziráki Wood Sciences and Wood Technology  
Head: András Winkler DSc.

Program: Technology Woodworking Technology  
Head: Zsolt Kovács CSc.

Discipline: Science of Material Engineering and Technology

Supervisor: Zsolt Kovács CSc.

## **1. The Antecedents of the Research Work**

The literature about determinative forms, fashionable styles, functionality and aesthetic functions and the proportion of them was studied. The aesthetic functions have a special role on the point of view of analysis. The aesthetic quality is determined by the psychological functions. The designer's dream is to measure exactly the aesthetic or the psychological functions. The question was what is the proportion of functionality and aesthetic functions in the case of furniture? We have to determine this proportion to satisfy consumer demand. To establish this proportion, we must measure both functionality functions and aesthetic functions.

We don't know precisely an exact method to determine the proportion of functionality and aesthetic functions. There were some experiments but the exact determination of aesthetic functions was based on modelling of consumers' value judgements. The quality of two similar products can be measured on the level of function satisfaction. The satisfaction measure determines which product is better, more beautiful and more attractive.

Hegedűs separately analysed the role of aesthetic functions and formulated a new definition. He based on Miles's theory, that we buy a piece of furniture to use it and to take pleasure in it.

The proportion of functionality and aesthetic functions is optimal if it meets the demands of consumers.

The world of business is getting more complex than it was before. In recent years the habits of buying furniture changed. The fabrication of individual pieces of furniture increasingly comes to the front. A personal contact grows up between the customer and the furniture, which is a relationship of one product to one customer. Satisfaction of individual demands needs higher prices and higher quality. The competition is beginning in the market and emotion plays an important role in it.

## 2. The Scope of the Research

A lot of elements have a significant importance in producing furniture of outstanding quality. These elements are as follows: form, constituent units and their working functions.

The complex requirement in the research theme means the analysis of high quality pieces of furniture. Some families of furniture were selected to be analysed to display the proportion and harmony of work and aesthetics requirements.

Selected groups of furniture were chosen for practical analysis. The most important guidelines of the analysis are as follows:

1. To satisfy the needs of functionality
2. Technological aspects
3. Aesthetical aspects

Approaching the problem we started to analyse the aesthetics which can be considered the following way:

- function and meaning of the furniture for the individual
- sociological considerations
- semantic contents of signs of forms
- different style trends
- age characteristics of furniture

The analytical aspects of the investigation are generally guidelines for a theoretical and practical methodology of furniture design. We have taken the material and function into consideration as well as the industrial form and economic impact of the developed product, and also different styles and trends of styles.

The theoretical analysis (the role of habit, the influence of fashion, style trends) are supported by transmission into practice (analysis according to design, planning, production procedure and distribution).

The adjective „exclusive” refers to satisfying the demands of a special consumer group. Individual characteristic of the product gives the anatomy of elements of massive wood, the different processes of manufacturing, the form of construction, the property stress analysis, the combination with other materials, the world of style and its unrepeatable property and a piece of furniture must be sensitive to the material which was used.

When we design a piece of furniture, beside the satisfaction of functionality and aesthetics, the importance of design has been increasing. The static requirements are in connection with the functional approach. The designed and completed new product, furniture of excellent quality is not only expected to satisfy the aesthetic and functional demands, but it must satisfy the high demands of stability as well. The capacity of load bearing of furniture is mainly determined by the structure of materials and the stability of joints.

### **3. The Methodology of the Research**

The research was done by the consideration of the analytical aspects. The dissertation has three main parts, as follows:

- theoretical (secondary) analysis,
- practical (primary) analysis,
- formulating conclusions and theses according to the theoretical and practical researches.

The conclusions of the theoretical analysis are supported by the practical experiments.

The theoretical analysis includes the summary of the analytical aspects, the survey of the role of determinative forms, formulate the relationships of the fashionable styles, definition of functionality and aesthetic functions and possibility of optimization of proportion of these functions. Three methods were applied to measure the optimal proportion of the functionality and aesthetic functions: questionnaire research, Ranking Method Quality Development (RMQD), and Failure Mode and Effects Analysis (FMEA).

Different groups of furniture were chosen for practical analysis and were prospected. The determinative forms were defined. The functionality and aesthetic functions and their optimal rate were presented on these selected groups of furniture.

The market and the situation of the Hungarian furniture industry were analysed by questionnaires.

### **4. Results of the Research**

The description of the furniture industry was made by means of publications and special literature. The conclusions were based on the examinations of exclusive pieces of furniture.

The customers' attitude was considered as the starting point of our hypothesis. The investigations were grouped around the functionality and aesthetic functions according to the scope of the research. The interpretation of the semantic content of the functions delimited the whole research. The functions express the relationship between the furniture and its user.

The world advanced toward a relationship one product – one customer based upon the national and international trends. This has been proved for furniture by our empiric research. An important thesis of our research is that the exclusive furniture satisfies individual needs.

An evaluating algorithm can be developed by using the RMQD. This method can be used very effectively for designing and marketing furniture (for the modelling customer satisfaction). Practical analysis proved the applicability of the algorithm.

According to the analyses it was established that:

- the competition was transferred from production to the market,
- the demands for exclusive furniture are increasing in the higher customer strata,
- the development of lifestyles has the most influence on the innovation of the furniture industry (furniture is a human-friendly product),
- the proportion of functionality and aesthetic functions has moved toward the aesthetic quality in exclusive furniture,
- the emotional motivations are increasing when people shop for furniture,
- the symbioses between the product and user speeds up the altering habits of shopping for furniture.

## **5. Theses of the dissertation**

**1.** According to the research the furniture economy is in for structural changes. The sweep of the individual demands can be emphasised based upon the results of the analysis. The relation between furniture and customers is based on the feeling economy and this can be expressed by the help of the one furniture - one customer relationship.

The decisive part of the individual demands is tending toward exclusive furniture according to the analysis. This was backed up by the examinations of quality too. It can be shown that exclusive pieces of furniture are custom-designed and correspond to the one product - one customer relationship in such a way.

**2.** It is well known that the system of functions can be divided on the basis of purchasing motivation into:

- functionality and
- aesthetic functions.

The demands of costumers are maximally satisfied when the proportion of functionality and aesthetic functions converge to the expectations of customers.

We can conclude by using the RMQD and FMEA that this affirmation is true for the exclusive products, too. The essential condition of the realization of the product's level expressing exclusivity is that the proportion mentioned above must reach a given measure (page 43. on the dissertation).

We suggested aesthetic numbers for the practical expression of the relation. We showed the applicability of the theoretical relation for furniture. We permitted of the numerical expression of the subjective value judgment for designing furniture.

This method can be used for concurrency analysis and for quality examinations.

**3.** It has been found, that the optimal measures of the proportion of functionality and aesthetic functions are realized on a higher quality level for exclusive furniture than for serial furniture.

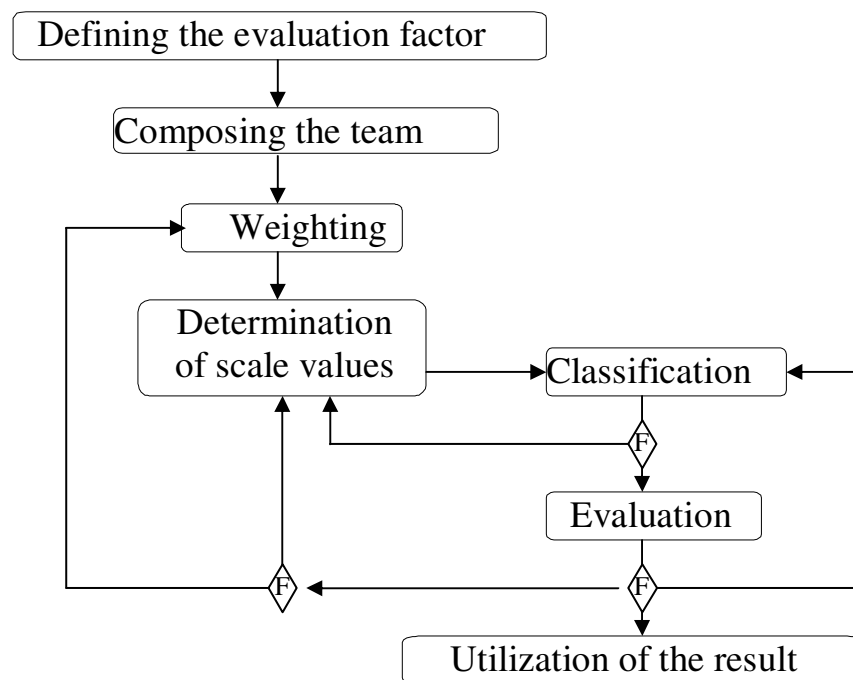
Examining the customers' attitude showed that the characteristics of the aesthetic quality (harmony between forms and colours, general formality, sight value, harmony) comes to the fore, with the same or higher demands for exclusive pieces of furniture. The status symbol has an identical value with this. The status symbol includes self-expression or self-realization for the exclusive pieces of furniture.

The analysis showed that spiritual (psychic) motivation has an important role in buying exclusive furniture. This emphasises the general appearance, which is expressed by the harmony of form and colour, and this is the basis of individuality and quality at the same

time. The ‘first meeting’ with exclusive furniture plays a significant role in the purchasing procedure.

4. The style features are basically expressed by the determinative forms according to our analysis (the style features can be affected by other characteristics too, like material or technology). We appointed the represent characteristics of the determinative forms. These characteristics are intuitive factors. Intuitive methods (team-work, brain storming, NCM) can be applied for their determination. The evaluation method of the research was based on ten selected characteristics: aesthetic experience, harmony of materials and colours, visible style features, harmonious appearance, typical dimensions of the structure, fashion, style clarity, faithfully, interior harmony and interior structure.

The algorithm can be seen in the following figure:



**Figure 1.: Evaluation Method** („F”- feedback point)

Utilization of the evaluation method:

- Design of exclusive furniture.

We integrated the ten characteristics into the complete function system of the furniture. The aesthetic functions were determined by using the selected characteristics in the design procedure. The exclusive furniture plans characterized by the determinative forms can be realised by the variations that have been worked out.

- Characterization of an exclusive piece of furniture.
- Matching and comparison of furniture, concurrency analysis.

We use the RMQD here. The realisation of the functions of the determinative forms must be defined. We rank by the correspondence percent.

A threshold value can be defined:

- The pieces of furniture that are situated above this threshold value are exclusive,
- The pieces of furniture that are situated below this threshold value are not exclusive.

**5.** FMEA could also be used in connection with aesthetic functions, assuring the quality of the product in the planning stage. The measure of the aesthetic functions is required for this, which was not possible till now, because of the absence of an appropriate method. This measure has become possible by the function values and the weight numbers of determinative style features suggested in the dissertation.

**6.** According to the research, it was established that the elements of ‘cultural quality’ formulated by Alvin Toffler are decisive for exclusive pieces of furniture. The prominence, the quantity and the variety significantly increase the quality of the furniture. The relations analysed by us, which are more specifying, can also be listed here:

- The proportions of the functionality and aesthetic values,
- The role of determinative forms,
- The relation between fashion and style.

**7.** The research affirms that the competition was transferred from production to the market. This means that the required quality product must appear on the market (good quality is the entrance to the market). The customers for exclusive furniture come out from the middle and upper strata. The upper ten’s attention is tending toward exclusive pieces of furniture.

It was proved, that the exclusive furniture’s customers’ decisions are mainly directed by their emotional motivations. An appropriate method based on intuition must be selected for measuring the realisation of function of the furniture. The team work applying creativity intensifying methods can be applied for this measurement.

**8.** It was established according to the research, that the symbioses of the functionality and aesthetic functions in exclusive furniture satisfying individual demands is effective so that the delectation (reflection of the aesthetic functions) changes the habits. The change of habits is the main mover of the market, so this extinguishes the fashion allowance property of exclusive furniture, and makes it a fashion follower.



## 6. PROCEEDINGS, PRESENTATIONS AND POSTERS

### *Articles, proceedings*

1. Antal R., Gergely L. (1998): **VI. Faipari Szaktalálkozó – Székelyudvarhely**. Magyar Asztalos Faipari szakfolyóirat, 1998/06 pp.29.
2. Antal M.R. (1999): **Egyedi bútorok világa**. Intarzia Faipari szakfolyóirat (Románia), Székelyudvarhely 1999/6, pp.10.
3. Antal M.R. (1999): **Exkluzív bútorok formáinak elemzése a használati-esztétikai funkciók optimális arányainak kialakítása szempontjából**. "Tavaszi Szél" '99 Fiatal magyar tudományos kutatók és doktoranduszok III. világtalálkozója. Utókiadvány, Budapest, 1999, pp.41.
4. Antal R. (1999): **A használati és esztétikai funkciók aránya a bútoroknál**. Intarzia Faipari szakfolyóirat (Románia), Székelyudvarhely 1999/8, pp.6.
5. Antal R. (2000): **"Form Forum '99"**. Magyar Asztalos és Faipar 2000/1., pp.36-37.
6. Antal R.(2000): **"Forumul International de Design"** Intarzia (Románia) 2000/1., pp.16-17.
7. Antal M.R. (2001): **Irodater, munkahely elrendezés**. Irodabútorok 2001/2002, pp.25-27.
8. Antal M.R. (2001): **„Otthoni iroda” kialakításának szempontjai**. Magyar Asztalos és Faipar 2001/12, pp.84-85.
9. Antal M.R., Kovács Zs. (2002): **Az FMEA (Hibamód- és Hatás Elemzés) módszer alkalmazhatósága a bútorok tervezésénél előforduló hibák megelőzésére**. Faipar 2002/3, pp.3-8.
10. Antal M.R. (2002): **A divat és más tényezők hatása a stílus kialakítására**. Faipar 2002/8, pp.

### *Posters*

1. Antal M.R. (1999): **Exkluzív bútorok meghatározó formáinak elemzése a használati-esztétikai funkciók optimális arányainak kialakítása szempontjából**. „Tavaszi Szél” Posztergaléria, Budapest, 1999.
2. Antal R. (1999): **Analysis of determinative forms of furniture of excellent quality from the point of view of developing the optimal proportion of work and aesthetic functions**. Form Forum '99 the 1<sup>st</sup> International Design Meeting of Transilvania University of Brasov, Brasov, 20-22. November, 1999.
3. Antal M.R. (2000): **Exkluzív bútorok meghatározó formáinak elemzése a használati-esztétikai funkciók optimális arányainak kialakítása szempontjából**. „Tavaszi Szél” Posztergaléria, Gödöllő, 2000.

## *Presentations*

1. Antal M.R. (1997): **Épületek nyári felmelegedési viszonyait befolyásoló tényezők elemzése.**V. Faipari Szaktalálkozó, Székelyudvarhely (Románia), 1997
2. Antal M.R. (1998): **Beszámoló a bútorok használati és esztétikai funkcióiról.** "A XX. Század műszaki és tudományos megvalósításai" OSZN Kolozsvár (Románia), Faipari Szakosztály, 1998 október 16-18.
3. Antal M.R. (1999): **Exkluzív bútorok használati-esztétikai funkcióinak elemzése.** Doktori beszámoló, Sopron, 1999. április 22.
4. Antal M.R.(2000): **Egyedi bútorok** "Faipar 2000" VIII. Faipari Szaktalálkozó, Székelyudvarhely 2000 május 19. "Industria Lemnului 2000 - Faipar 2000", Intarzia folyóirat külökiadványa, Székelyudvarhely (Románia), 2000 május 19., pp. 13.
5. Antal M.R. (2002): **A divat és más tényezők hatása a stílus kialakítására.** A magyar tudomány napja 2002 Tudományos Konferencia, Sopron, 2002 november 28.
6. Antal M.R. (2003): **Faipari termékek tervezése az értékelemzés felhasználásával.** VII. Nemzetközi Értékelemzési Konferencia, Budapest, 2003 április 24-25.