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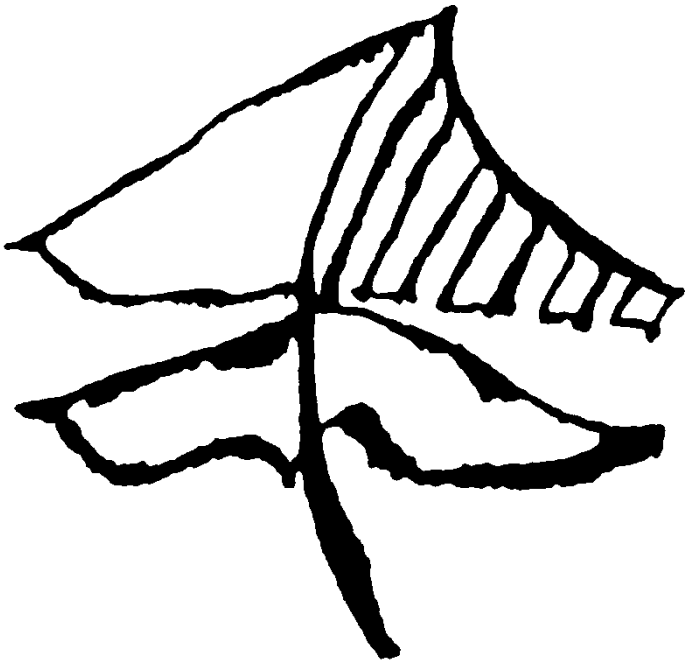

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Dear Readers!

Scientific Quarterly INTERCATHEDRA is the result of scientific, research and teaching cooperation of departments from Poznań, Zwoleń, Warsaw, Kraków, Tarnów, Trnava, Zlin, Žilina, Košice, Zagreb, Brno, Prešov and other Polish and foreign scientific centres dealing with issues of economics, organisation, programming, management and marketing, especially, but not only, in arboriculture.

No 29/3 contains articles ordered by the Editorial Board in 2012 and 2013 year - approved for printing following reviewers' positive opinions and necessary amendments.

This year, 2013, the Scientific Conference ECONOMIC FORUM in Laski has been suspended. So far, scientific meetings were held regularly: 17 years - from 10 September 1996 to 20 September 2012. 15 Conferences took place at Laski Halls of Residence, Forest Research and Education Centre, Forest Experimental Department in Siemanice. In 1996 the first Conference took place at Zielonka Halls of Residence, Forest Experimental Department in Murowana Goślina. In 2004 the ninth meeting took place in Kępno, at the training center of the Ministry of Industry.

The most important reason for suspending the Economic Forum Scientific Conference has been financial problems related to its budget.

The articles which represented high quality as they were prepared for a much earlier announced Economic Forum 2013 Scientific Conference and underwent a full verification process carried out by the Editorial Staff - are partially published in this volume of INTERCATHEDRA journal. The remaining ones will be published in subsequent issues following earlier verification.

Scientific Quarterly INTERCATHEDRA is published under the auspices of IATM - International Association For Technology Management. The members of this scientific network volunteered to write their reviews, prepare materials for publication and organised 17 scientific conferences. I would like to take this opportunity to thank them for their contribution and dedication.

Wojciech Lis

Władysława Łuczka-Bakuła[1]

CONSUMER ASSESSMENT OF ORGANIC FOOD MARKET

Abstract: The article presents the consumer evaluation of marketing mix on the organic food market in Poland. The analysis is based on surveys conducted among 248 consumers purchasing organic food in retail shops in the city of Poznań. The survey questionnaire consists of four groups of research questions reflecting the four marketing mix elements: product, price, place and promotion. The conducted research indicates that the place (poor distribution resulting in limited assortment) and promotion (low effectiveness of advertising campaigns generating demand) and actions are taken in order to improve them.

Key words: market, organic food, consumer, assessment

INTRODUCTION

Increasing environmental pollution, including the pollution in farming areas, contributes to a partial change of criteria in the choice of food by a growing population of consumers. Nowadays not merely economical factors (e.g. price), but also health factors (e.g. health safety, preservatives-free and pesticides-free production and ecological factors (environmental impact of production). Therefore, demand is increasing for organic food which has a number of the healthy and environmentally-friendly qualities desired by contemporary consumers. Organic food differs considerably from conventional food. As far as organic farms are concerned, they use mainly their own fodder or purchase organic fodder with just an addition of conventional fodder. Artificial fertilisers or pesticides are not used in the production of organic food products while manure, green manure and compost are allowed. Thanks to such restrictions, organic products do not contain chemical aromatics, preservatives, flavour enhancers or synthetic pigments.

Organic farming is a specific form of producing food and managing resources. Owing to the abandonment of artificial fertilisers and pesticides, it does not contribute to soil contamination or groundwater pollution and, at the same time, it enables farmers to produce high quality food requiring relatively low energy input. The main focus of organic farming is care for natural environment and preserving its quality, variety, animal wealth and producing high quality food. Organic food is produced using natural methods, in clean and safe natural environment, with no use of pesticides, antibiotics, growth hormones, artificial fertilisers or genetically modified organisms.

Increased interest in organic food consumption can be observed worldwide. Statistical data shows that this trend is likely to intensify in the future. The interest in organic food in Poland has been growing gradually because of low usage of agricultural chemicals in the centrally-planned economy and consumers' beliefs about the high quality of domestic products. Hence, until 1989, only a low level of greening in Polish agriculture could be observed. Also, in the first years of economic transformation, the demand for organic food did not show significant fluctuations due to low environmental awareness among consumers, unavailability of products and lack of a credible labelling system. Major changes took place only after Poland's accession to the European Union in 2004 when relevant legislature was adjusted to the EU standards and a system of support for organic farming was introduced, which resulted in increasing the supply of organic food and increased its market availability.

The estimated value of the organic food market in Poland amounts to approximately 700m PLN and it has increased by 20-30%. It accounts for abut 0.5% of the food market, which is a relatively low share in comparison with Denmark, Switzerland, Germany or Austria, where it constitutes 4.5%. The organic food market in Poland is still developing, which results from low

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demand and supply. The number of organic farms run applying organic methods and the number of consumers have been increasing since 2004. The area of organic cultivation reached over 650,000 ha and the number of farms amounted to 25, 900. However, the dynamic growth in the number of organic farms does not correspond with the range of products because some of the domestic production is sold as organic products whereas others are sold as conventional products. Non-processed products, i.e. fruit and vegetables, and slightly processed products constitute the majority of the range of products. The market is characterised by a shortage of meat and milk, dairy products and processed meat products. Therefore, in order to improve it in the future, it is vital to become familiar with consumers' opinion about the marketing mix in use.

METHODOLOGY AND RESEARCH OUTCOMES

In order to interpret the consumer evaluation of particular elements of the marketing mix applied on the organic food market, survey research was conducted in 2012. The research was conducted on 248 consumers purchasing organic food in retail shops located in the city of Poznań. The questionnaire consisted of four groups of questions corresponding with four elements of marketing mix: product, price, place and promotion. The respondents were mostly women (68%). The research shows that women buy organic food much more frequently than men and they constitute the majority of organic food buyers [Żakowska-Biemans 2005]. Half of the respondents belonged to two age groups, i.e. 30-34 year-olds and 35-39 year-olds. 20% belonged to the age group between 40 and 49 years-old, 12% and 10% belonged to 'younger' age groups, i.e. 18-24 and 25-29 year-olds respectively while only 6% and 2% belonged to the oldest age groups (50-59 year-olds and over 60 year-olds respectively). The participants of the survey included university and college graduates (78%) or secondary school graduates (each one in five respondents). No respondents had elementary or vocational education. These numbers show consistency with the research conducted on the organic food market, according to which its consumers mostly have either higher or secondary education [Pilarski, Grzybowska, 2002, pp. 53-64]. Most of the households consisted of three people while two-people households and four-people households in each case accounted for 20% of the studied group. One of the most important elements characterising consumers' economic situation is the average monthly income (net) per capita in a household. In the analysed group of organic food buyers, the most numerous group consisted of consumers whose income ranged from 2,000 to 3,0000 PLN per capita (24%), followed by the group of consumers whose income per capita ranged from 1,000 to 1,500 PLN and the group whose income exceeded 3,000 PLN (each of these groups constituted 22%).

Product

Consumers do not usually have difficulties in the perception of organic food. They are able to identify the features that determine its qualities which stimulate their purchase decisions. Although organic farming does not fully guarantee that its products are entirely free from transborder contaminations beyond the control of the farmer, they enjoy consumers' trust. The conducted research shows that a great majority of consumers (84%) claimed that organic food was both healthier and safer than conventional products. It was confirmed in another study which findings showed that health safety and naturalness were the basic attributes ascribed to ecological food by Polish consumers [Krupa, Krupa 2007, pp. 47, Zrałek, 2010, pp. 397]. According to consumers, the main distinguishing factors of organic food understood as grocery is its lack of preservatives or artificial pigments (81%) and natural production methods (78%) – fig. 1. These two attributes are recognised as the guarantee of high quality and an important element of preventing health disorders.

Organic food is subject to additional control and certification, which increases its added value and positively influences the perception of its high quality. However, due to some cases of deception, the choice of organic food requires certain knowledge about its labelling on the part of

the consumer. Therefore, it is important for the market of organic food to disseminate information on the rules and types of organic labels. The acceptance of a unified logo of organic production in the countries of the European Union, introduced in 2010, can be interpreted as a major success. According to the EU legislature, the label of organic food includes the name of the processing company, the names of its producer and seller and the code of the certified unit. Organic producers and farmers can use the EU organic logo on condition that 95% of the ingredients of the products were produced organically and the production process was supervised. This information corresponds with the high quality of organic products, which remains vital in consumers' choices.

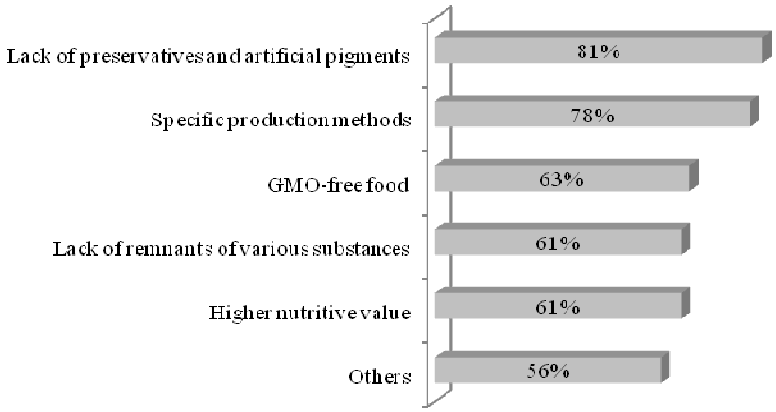

Figure 1. The qualities of organic food

Source: Author's own compilation based on survey research [n = 248].

The main reasons for purchasing organic food in the analysed group of consumers include prevention of health disorders in the family (77%) and the guaranteed high quality of products (69%). Other reasons include preference for healthy lifestyle (67%), taste (63%) and increasing food risk (61%). Recommendation by friends and fashion account for the least important factors. The choice of organic food, apart from satisfying one's own needs, constitutes an example of consumers' action taken in order to handle the growing problems of environmental and food pollution. However, it needs to be mentioned that not all the pro-environmental behaviours of consumers of organic food show consistency [Charter, 1992, pp. 35-37]. Some of them do not take into account the organic aspect of the products or even show ecological awareness. Consumers in the analysed group buy such organic products as eggs (58%), cereal (54%), fruit and vegetables (50%), honey (44%) and fruit and vegetable preserves, but also milk and dairy products (32% each) most frequently. The least frequently bought products include sweets (8%), plant fats and coffee and tea (18% each). The frequency of buying these products depends first of all on their importance in the diet.

According to consumers, the product groups which are undersupplied in shops with organic food, but also the groups which should be developed in the future include meat and its preservatives (71%), fruit and vegetables (63%), dietetic food (62%), food supplements (61%) and sweets (60%). At the same time, the product groups of organic food which are most widely available include cereal products, honey, fruit and vegetable preserves, juice, beverages and eggs.

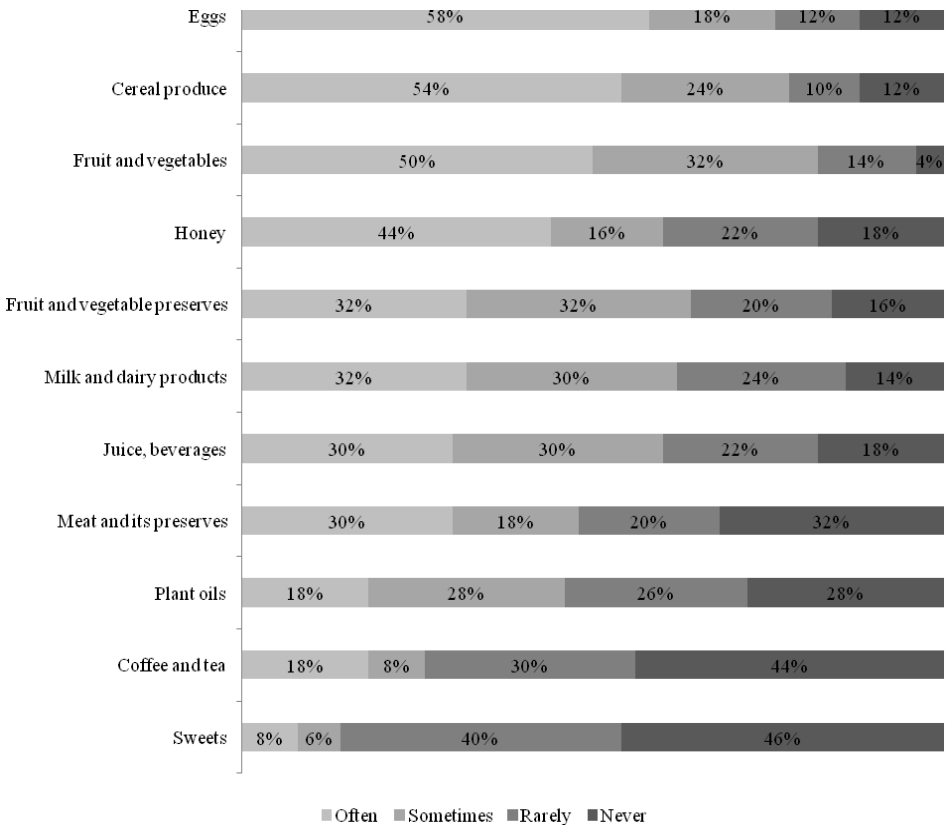

Figure 2. Frequency of buying selected organic products (%)

Source: Author's own compilation based on survey research [n = 248].

Price

According to the majority of consumers, organic food is too expensive, but worth its price (80%). 6% of the respondents claimed that the prices of organic products were neither expensive nor cheap and 14% claimed that organic food was too expensive and not worth its price. Nearly a half of the surveyed buyers of organic food (48%) described the level of prices as high whereas a slightly lower percentage (40%) described it as very high (fig. 2). No consumer of organic food from the analysed group described it as low. This propriety has been confirmed by numerous studies of ecological food which show that the prices of organic products are higher than those of relevant conventional products even by 30-100%. The differences result not only from higher production costs, but primarily from higher distribution costs and profit margins [Łuczka-Bakuła, 2007, pp.184-197]. One of the ways of decreasing the differences in prices is introducing and selling organic food in supermarkets or hypermarkets, as owing to the economies of scale, it is possible to decrease distribution costs. Apart from the questions included in the questionnaire, respondents indicated that the high price of organic products results from its high quality, but also the low efficiency of some distribution channels.

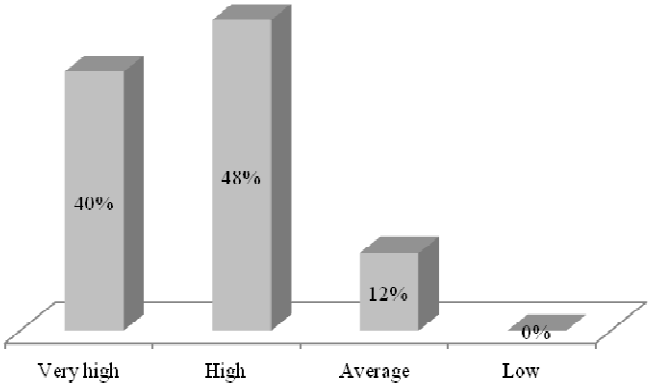

Figure 3. Assessment of organic food prices (%)

Source: Author's own compilation based on survey research [n = 248].

Nearly a half of the respondents (44%) declared that they would be ready to pay about 5-10% than they do now for organic food. An increase in the prices of organic products would pose a limit to their demand. At the same time, most consumers would still buy these products. It is first of all connected with a lower sensitivity of organic food consumers to price and their relatively high income and generally high health and environmental awareness.

Place

The studied group of consumers most frequently buy organic food in specialist shops (68.4%), which remain the most preferred spot of purchase by the respondents (fig. 3). Other preferred places of purchase included, among others, organic farms, super- and hypermarkets and the Internet.

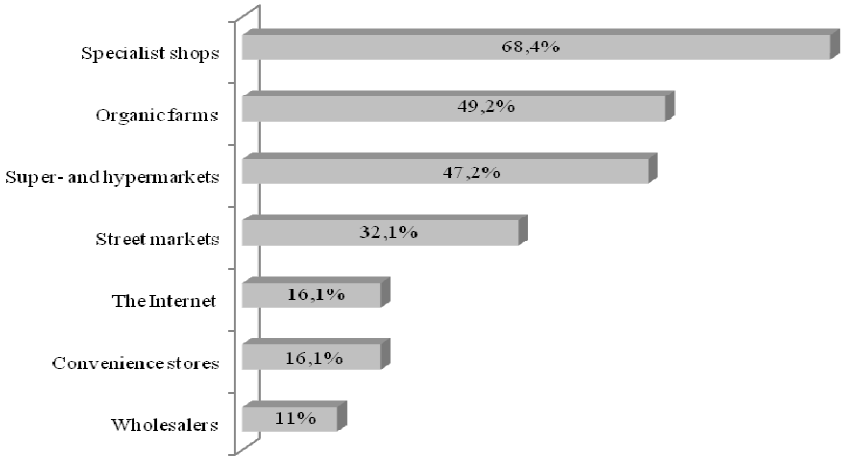

Figure 4. Places of purchasing organic food (%)

Source: Author's own compilation based on survey research [n = 248]

At present, the distribution of organic food is gradually moving from direct sales towards indirect sales. Although, direct sales still play a significant role, their meaning is decreasing while the meaning of indirect channels of distribution is on the increase, which corresponds with the world-wide tendencies in food trade.

It results from the conducted research that the availability of organic products is, to a certain extent, problematic, as 44% assessed it as sufficient and 16% as insufficient while 28% as good and 6% as very good respectively. The evaluation of availability of these products in other countries where markets are better developed is higher [Zabrocki, Liedtke 2010, pp.211-212].

Making organic food available in supermarkets and shopping centres, facilitating shopping by making all products available in one place is seen as an opportunity to improve the availability of organic food in Poland [Wilk, 2010, pp. 64]. Although organic food is more and more often present in super- and hypermarkets, consumers sometimes remain unaware of that fact. Some of them offer special stands with organic products. However, it still happens that these products are placed next to conventional products. Consumers are unaware of buying conventional products, which influences their opinions about the efficiency of distribution of organic food and may result in post-purchase dissonance, i.e. discrepancies between expectations and benefits provided by the product. Shops selling both organic and conventional products should make a clear distinction between these two so that consumers can easily differentiate between them. Organic food should be available in a clearly defined commercial space, e.g. on separate stands, placed in one area or in various places, according to the range of products. If organic products are placed in various parts of a shop, it induces additional spontaneous purchases by indecisive customers, but also by customers who were not even aiming to buy them. On the other hand, if products are displayed in one area, consumers can avoid incorrect purchases, but it is harder to win new buyers who could contribute to the increase in organic food.

According to 86% of the respondents, organic products should be more available on the market. The most frequently indicated places where the organic food assortment should be extended include super- and hypermarkets (30%). This expectation is connected with the fact that consumers prefer shopping in one place. Specialty shops were mentioned as the fourth, which may be viewed as a sign of consumers' satisfaction with their product range.

Promotion

The main aim of promotion is to reach the target group of prospective buyers and provide them with information playing a vital role in the choice and purchase of the product. This includes the information about the product features and its point of sale. As regards the studied group of consumers, 38% have not encountered any advertisements of organic products while 36% have seen this type of advertisement, e.g. various advertisements of juice, cereal produce, fruit and vegetables, dairy products (including milk and goat cheese), eggs, meat, sausages or preserves for babies.

A great number of respondents (37%) have seen advertisements of organic products on the Internet which is the best advertising medium for this type of products. According to respondents, the advertisements of organic products are rare and dull, but really necessary on the other hand, as their aim is to inform consumers about the health aspects and taste of organic food, as an encouragement to purchase these products and convey information about the place of their sales. The most frequently encountered type of promotion is tasting (testing) products (39%), followed by product presentations at various events (28%) which include fairs and exhibitions (fig. 4). The efficiency of holding exhibitions and fairs results, among others, from their longest tradition on the market of grocery products and relatively low financial inputs.

The all-Polish campaign entitled *'Organic food guarantees good taste'* run in 2012 contributed to the increase in consumers' awareness of ecological food. It is assumed that the campaign resulted in the increase from 5% to 11% in the number of consumers claiming to buy organic food.

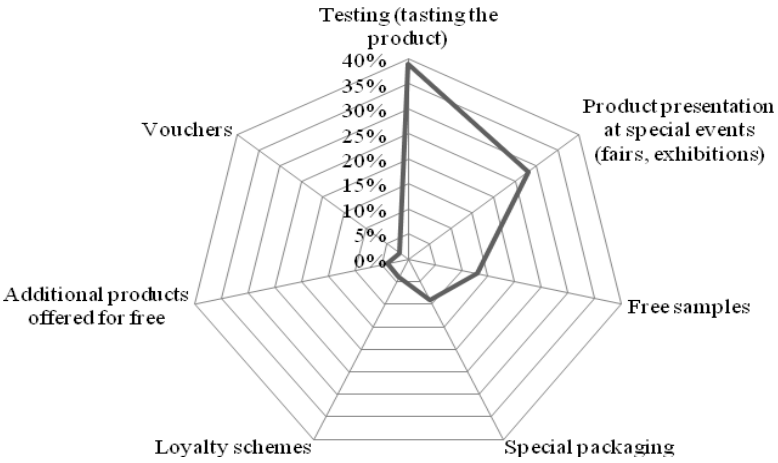

Figure 5. Types of organic food promotions (%)

Source: Author's own compilation based on survey research [n = 248].

However, it seems that it is not reflected in the increase in demand, which is reflected by the difficulties faced by organic food sellers. At the same time, traditional promotion activities run by some producers and processing companies have too limited a scope of influence. Promotion development seems to be possible by means of Internet forms of promotion.

CONCLUSIONS

The conducted research shows that distribution (limited range of products and poor availability) and promotion (low effectiveness of demand-generating promotion campaigns) constitute the weakest elements of marketing on the Polish organic food market. It results from the early stage of organic food market development, which influences both the level of prices and the development of distribution and promotion. The high level of prices can be diminished by selling in super- and hypermarkets, which can offer competitive prices owing to economies of scale and lower distribution costs. They increase the availability of organic food, with regard to both affordability and the range of products.

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Viktor Gotych, Ginter J. Hruzik, Marek Wieruszewski[2]

THE ANALYSIS OF SAWMILL LOGS SORTING ACUTENESS AT AUTOMATIC SORTING LINES

Abstract: The paper includes the results of measurements of timber logs sorting by a modern, equipped with the newest measurement and steering systems line for automatic pretreatment of timber materials. The examined research was made in one of sawmills of Pomeranian Voivodeship.

Key words: effectiveness, productivity, sawn logs, volume of products

INTRODUCTION

In each production process, one may distinguish three basic phases: pretreatment, processing and finishing. In sawmill processing, the pretreatment phase is based on proper preparation of sawmill logs for processing. One of key operations of pretreatment is relevant logs sorting. The acuteness of this step notably affects the material efficiency and sawmill production.

Today it is difficult to imagine a modern sawmill without automatic logs sorting lines. These technological lines are involved in: receipt of round material in a form of logs, its automatic measurement, manipulation, logs chock, and logs sorting-out into quarters. The efficiency and productivity of the entire technological process of sawmill treatment largely depend on acuteness of logs sorting by diameters.

Taking the progressing increase of round material into consideration, as well as its growing participation in general production costs, the need of reasonable material usage arises. Hence, increasingly requirements are made due to automatic measurement systems and logs sorting-out steering process. In modern sorting lines, single or two-level logs measurement systems are left in favor of more modern 3D systems, which make geometric and quality parameters mapping of wooden material precise. Such modern sorting lines declare to increase the acuteness of logs sorting from 75-85% up to 92-95%.

In this paper, the results of research concerning the analysis of sawmill logs acuteness by a modern, newly-installed sorting line were presented.

RESEARCH DATA AND ITS ANALYSIS

The research was made at newly-activated sorting line. Modern measurement systems of MICROTEC – 3D DiSHAPE 800 were installed. They facilitate measuring diameter with the accuracy of +/- 1mm; the length measurement of shorten logs is made in the range of 2 to 6m, with the accuracy of +/- 1cm.

The designed efficiency of lines for representative logs (length 12m, tapering 1cm/m, middle diameter 27cm, average weight 0,687 m3, average number of cuttings per a representative of 5 cuttings) presents as follows:

- Total time to work out a representative: 59 seconds,
- Number of representatives made within one hour:
  3600 s : 59 s = 61 pcs./1h. (244 logs)
- Thickness made within one hour:
  61 pcs. x 0,687 m3 = 41,9 m3
- Number of representatives made within one shift:
- 7 h 61 pcs./1h. = 427 pcs. per one shift (1708 logs)

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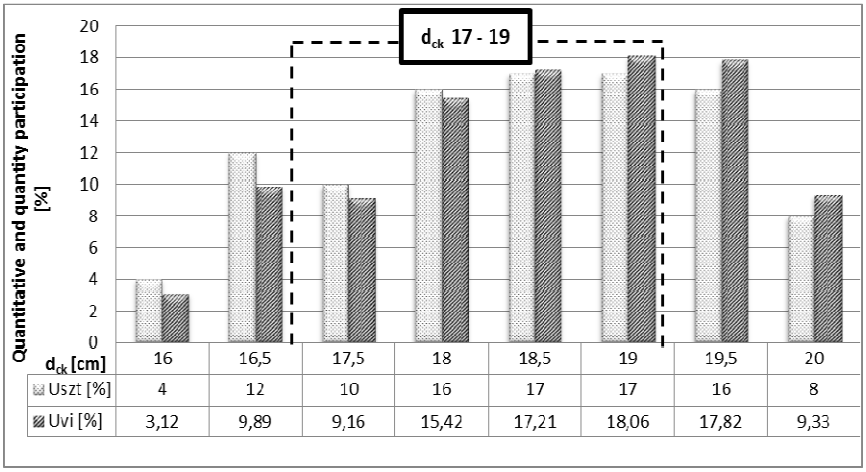
- Thickness made within one shift 427pcs. x 0,687 m3 = 293 m3
- Thickness made within one year 293 m3 x 243 days = 71200 m3

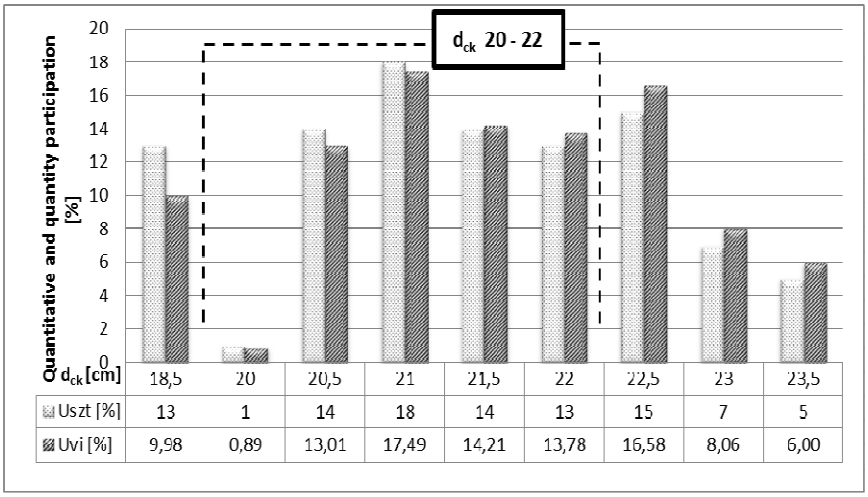
In order to set the acuteness of new sorting line for manipulation and material sorting, 20 most used quarters in a particular period were selected. The research was based on a direct measurement of two perpendicular logs diameters in a thinner ending without crust in the amount of about 100pcs./a quarter, transported to proper joists by clamp-trucks.

Illustrations 1-4 below present the analysis of selected quarters: quantitative and quantity participation in percentage, with indication of nominal range of logs diameters in a thinner ending dck, without crust for a particular quarter.



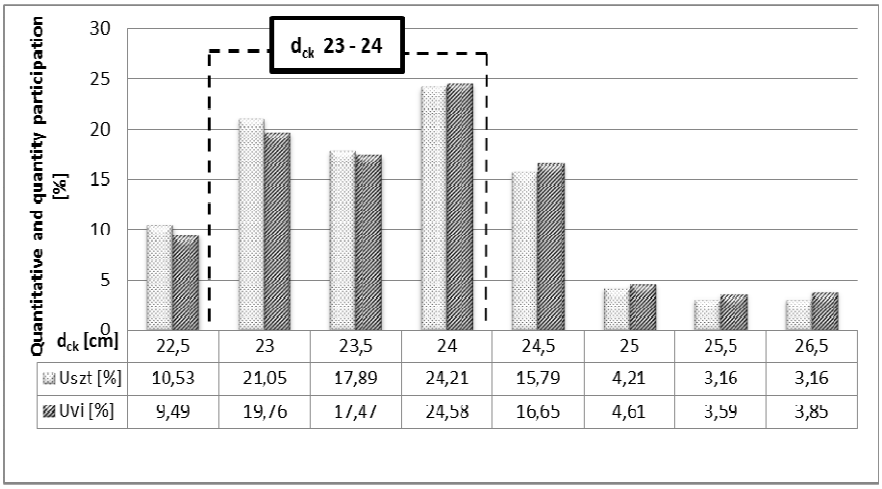
d_{ck} [cm]	16	16,5	17,5	18	18,5	19	19,5	20
Uszt [%]	4	12	10	16	17	17	16	8
Uvi [%]	3,12	9,89	9,16	15,42	17,21	18,06	17,82	9,33

Figure 1. Results of logs sorting acuteness with d_{ck} 17-19 cm (quarter 39) at automatic manipulation line for un-worked logs



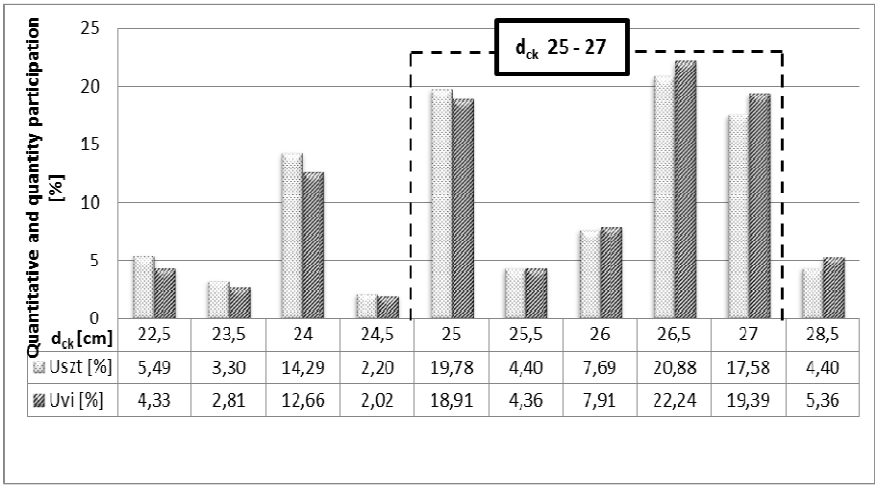
d_{ck} [cm]	18,5	20	20,5	21	21,5	22	22,5	23	23,5
Uszt [%]	13	1	14	18	14	13	15	7	5
Uvi [%]	9,98	0,89	13,01	17,49	14,21	13,78	16,58	8,06	6,00

Figure 2. Results of logs sorting acuteness with d_{ck} 20-22 cm (quarter 16) at automatic manipulation line for un-worked logs



d_{ck} [cm]	22,5	23	23,5	24	24,5	25	25,5	26,5
Uszt [%]	10,53	21,05	17,89	24,21	15,79	4,21	3,16	3,16
Uvi [%]	9,49	19,76	17,47	24,58	16,65	4,61	3,59	3,85

Figure 3. Results of logs sorting acuteness with d_{ck} 23-24 cm (quarter 15) at automatic manipulation line for un-worked logs



d_{ck} [cm]	22,5	23,5	24	24,5	25	25,5	26	26,5	27	28,5
Uszt [%]	5,49	3,30	14,29	2,20	19,78	4,40	7,69	20,88	17,58	4,40
Uvi [%]	4,33	2,81	12,66	2,02	18,91	4,36	7,91	22,24	19,39	5,36

Figure 4. Results of logs sorting acuteness with d_{ck} 25-27 cm (quarter 17) at automatic manipulation line for un-worked logs.

Analyzing the measurements of acuteness of logs sorting in particular quarters, one may conclude that it is significantly lower than declared by the producer of a sorting line and it is between 51 to 91%, what, undoubtedly, reflects in the effects gained as a result of material processing.

Detailed measurement results of all 20 quarters are presented in a table 1.

Table 1. The acuteness of logs sorting for selected line divisions for manipulation and material sorting

Quarter	Nominal division (cm)	Nominal lenght (m)	Number of correct logs (pcs.) / total number of all logs (pcs.)	Quantitative participationof logs (%)	Thickness of correct logs (m3) Thickness of all logs (m3)	Participation of weight of correct logs (%)
1	14 - 16	2,6	68 / 102	66,67	3,79 / 6,08	62,37
8	20 - 22	5,4	65 / 94	69,15	15,7 / 22,43	69,98
15	23 - 24	4	60 / 95	63,16	12,28 / 19,86	61,81
16	20 - 22	3	60 / 100	60	7,29 / 12,27	59,37
17	25 - 27	4	64 / 91	70,33	15,86 / 21,79	72,81
20	28 - 29	4	49 / 98	50	14,28 / 27,59	51,75
25	20 - 22	3,4	58 / 95	61,05	8,02 / 12,5	64,16
28	14 - 16	4	65 / 100	65	6,14 / 10,33	59,46
30	17-19	3,6	68 / 100	68	7,69 / 11,61	66,29
31	30 - 33	4	56 / 105	53,33	20,64 / 40,47	51,01
32	17 - 19	4,5	66 / 100	66	9,52 / 14,68	64,86
33	20 - 21	3,6	71 / 95	74,74	10,11 / 13,90	72,74
34	20 - 22	4,5	74 / 105	70,48	14,02 / 20,28	69,12
35	17 - 19	4,2	71 / 100	71	9,59 / 13,85	69,27
36	14 - 16	3,6	69 / 100	69	5,69 / 9,03	63,03
37	34 - 39	4	64 / 100	64	29,48 / 44,89	65,66
38	20 - 22	5,2	76 / 98	77,55	17,37 / 23,03	75,43
39	17 - 19	4	60 / 100	60	7,8 / 13,04	59,84
40	40 - 60	4	44 / 49	89,8	27,84 / 30,51	91,26
41	20 - 22	5,4	66 / 101	65,35	15,76 / 24,81	63,55

Such state of affairs can be explained by processing the material of lower quality class, and consequently, the material that has some shape defects such as curvature, flatness, bumps etc. Another factor that affects errors during logs sorting can be grimes of measurement fittings that, while normal, regular work, simply must exist.

SUMMARY

As a result of measurements of acuteness of logs sorting of newly-installed sorting line, equipped with modern measurement and steering systems, significant defects in sorted-out logs were stated. It was concluded that the installed line for manipulation and timber material sorting is not fully perfect, demonstrates some defects while sorting, that affect the decrease of production effectiveness and efficiency. So one needs to realize that when the material of lower quality class is sorted (with shape defects), even when using modern technological solution, the sorting acuteness is unsatisfactory.

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Emilia Grzegorzewska[3]

INVESTING ACTIVITIES OF WOOD SECTOR IN POLAND IN THE FACE OF GLOBAL CRISIS

Abstract: Companies' reaction to crisis events occurring in economy is, as a rule, decreasing operating costs and constraining investment projects. It results mainly from the passive attitude of the management in the face of the crisis. Only companies in good financial condition can invest in times of economic stagnation. The following article presents changes in the level of financial outlays for investment in wood sector companies (with the following businesses: paper and paper products manufacture, wood, cork, straw and wicker products manufacture, furniture production) compared to processing industry.

Key words: Poland, wood sector, global crisis, investment outlays

INTRODUCTION

In market economy companies start up, grow, fall into crisis and more often than not go bankrupt. As F. Borman used to say '... Capitalism without bankruptcy is like Christianity without hell" [Wieczerzyńska 2009]. Crisis and bankruptcy are a natural element of management. The most common reaction of the management board to a crisis situation is cutting operating costs and decreasing investment outlays. It is borne out by research findings entitled "Investment processes and company strategies in crisis" conducted by the Polish Agency for Enterprise Development (*Polska Agencja Rozwoju Przedsiębiorczości*) in 2009. According to the report more than 30% of micro, small and medium enterprises as top priority named, as regards planning for the next year that is 2010, cutting costs and saving [Orłowski et al. 2010]. Next ranked: reducing outlays on telecommunication services (13%), freezing salary increments (10%) and lowering prices of products and/or services (8%). Moreover, almost every tenth company declared cutting investment expenditure and deferring investment. Constraining or halting an investment in every tenth company referred to the purchase of machines, devices and means of transport. Second comes, as regards a change in the investment plans, construction or renovation of buildings. In various businesses the difference in constraining investment is connected directly with the object of the enterprise that is industrial and building companies were forced more often to reduce the purchase of machines and devices and transport companies reduced their means [Orłowski et al. 2010]. Relatively, in the face of crisis, not many companies adopt an active attitude, e.g. look for new markets or restructure the company, or undertake an investing activity the aim of which is company development. Such action is taken by companies which are in favourable financial condition.

INVESTMENT – DEFINITION AND TYPES

Investment is treated as an activity with deferred effects. It is taken in order to improve the overall effectiveness of management through the introduced technological and organizational improvements, which boost financial results leading to strengthening the company's position on the market [Wildowicz-Giegiel 2013]. Each investment entails bearing expenses which are to bring certain financial benefits, as well ensure company's survival and development [Rutkowski 2010].

In literature on the subject, two dimensions of investing are usually emphasised. Investment is usually treated as an expenditure which is to bring profits for the one who undertakes the investment, that is the investor (financial aspect), or a process in which capital is transformed into other goods (real aspect) [Różański 2006].

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Financial investments are outlays borne as part of a company, purchase of securities (shares, bonds) or placing money on bank deposits. In other words they are investments dealing with money circulation.

Real investment may have different aims and character. The following types are distinguished [Janik, Paździor 2010]:

- replacement investment, that does not lead to a change in company's production ability. The primary reason for undertaking an investment is consumption of fixed assets. The task of such investments is to keep productive capacity at the same level. On account of advanced technical progress replacement of the used assets is often impossible, and in some cases economically unjustified.
- modernisation investment, which is meant to modernize machines and devices. It is realized in the existing subject, on the same surface area, with the same infrastructure. In this way it has a sui generis character. It refers to company's assets and enables an increase in company effectiveness.
- development investment (new), which corresponds to the current technical progress and causes changes in spatial arrangement of the machine park. Its characteristic is a long time of preparation and implementation. It leads to freezing of the funds meant for investment, deferring of the investment effects and high risk.

ECONOMIC DIMENSION OF INVESTING IN WOOD SECTOR COMPARED WITH PROCESSING INDUSTRY

Interesting information on the subject of investing activities of Polish enterprises is derived from research findings conducted by Central Statistical Office - GUS and published yearly in "Statistical Yearbook of Industry" (*„Rocznik Statystyczny Przemysłu"*). According to the definition by GUS, investment expenditures are financial or real outlays, the aim of which is to create new fixed assets or improvement (rebuilding, extension, reconstruction or modernization) of the existing objects of the fixed assets, as well as funds for the so-called initial financing of the investment. Investment expenditure is divided into capital for fixed assets and other outlays.

Expenditures on fixed assets are:

- buildings and structures (comprising buildings and premises and objects of land and water engineering) machines, technical devices and tools,
- means of transport,
- other, that is expenditure borne when purchasing land and used fixed assets, live stock (initial herd) and perennial plantations, and also interests on the investment loans and credits and other costs for the investment period.

Other expenditure is the capital needed for the so-called initial financing of the investment and other costs connected with investment realization. The expenditure does not increase the value of fixed assets.

According to the analyses conducted by GUS, as regards dynamics of the values of investment expenditure, it follows that in processing industry the lowest level of the index in question was noted in the years 2009-2010. It was 81.9% and 87.0% respectively (table 1). In the following year there was an increase in the value of funds for investment of 14%, and as compared to the year 2005, it was an increase of more than 20%. In 2009 a significant decrease in the value of investment expenditure was noted in companies manufacturing products made from wood, cork, straw and wicker (34.7%) and in companies dealing with furniture production (26.3%). As regards the latter, the next year brought in a fall in the value of the discussed index of another 10%. In 2011 the situation of companies operating in the wood sector in terms of implemented investments stabilized. Dynamics of the investment expenditure in each of the analysed groups of companies were more

than 100%. It needs to be noted that in plants manufacturing wood, cork, straw and wicker products the dynamics of the value of financial means for investment were over 166%.

Table 1. Dynamics of the investment expenditure borne by enterprises from the wood sector in Poland compared with processing industry [%]

Itemization	2007	2008	2009	2010	2011	2011/2005
Industrial processing	118.4	107.0	81.9	87.0	114.0	120.5
Wood, cork, straw and wicker products manufacture	114.8	85.1	65.3	101.9	166.6	143.3
Paper and paper products manufacture	118.0	117.7	97.1	86.1	103.9	106.5
Furniture manufacture	138.7	99.7	73.7	90.3	108.3	88.0

Source: "Statistical Yearbook of Industry 2012", p.321-322.

In paper industry companies falls in investment expenditure were smaller. In 2009, when in other industries of wood sector investment expenditure was significantly restricted, in this group of companies the analysed index was 97.1%. The effects of global economic crisis were more tangible a year later – then the dynamics of investment expenditure were at the level of 86.1%, and in the year 2011 it was 103.9%.

According to GUS research it follows that in 2009 the greatest value of investment expenditure was noted in companies manufacturing paper and paper products (figure 1). Over the analysed period the level of financial means for investment decreased from 1 933.6 million PLN to 1 682.6 million PLN, which is a fall of 13%.

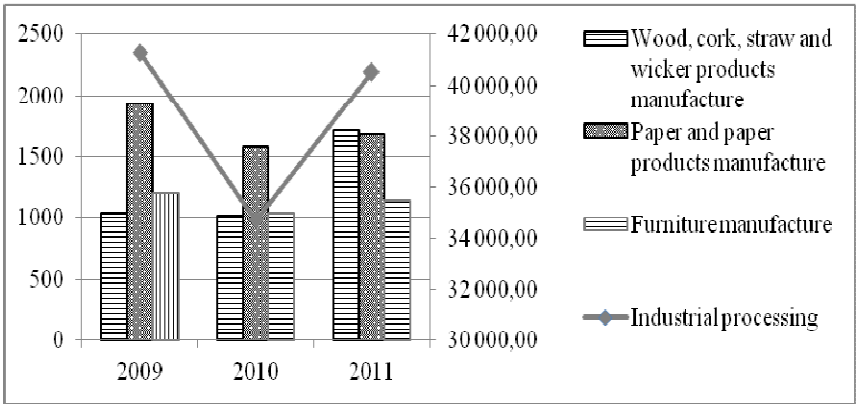

Figure 1. The value of investment expenditure borne in companies from wood sector in Poland compared to processing industry [million PLN].

Source: own study on the basis of "Statistical Yearbook of Industry 2012", p. 317-319.

The greatest increase, however, in the years 2009-2011 was noted in manufacture of wood, cork, straw and wicker products (from 1 037.9 million PLN to 1 716.4 million PLN). The smallest fluctuation in investment expenditure was noted in enterprises producing furniture. Over the analysed period, the level of investment expenditure decreased from 1 204.0 million PLN to 1 146.8

million PLN. When analyzing the whole C section "Industrial processing" of Polish Classification of Economic Activities (Polska Klasyfikaca Działalności PKD) attention has to be paid to a significant fall in investment expenditure in the year 2010. In this period the level of the analysed index lowered by more than 6.5 billion PLN which makes up 16% in comparison to the previous year. It needs to be emphasized, however, that in 2011 the value of financial means for investment increased again, to the level from the year 2009.

In the group of manufacturing companies, which comprises wood sector enterprises, financial means as a rule are spent on fixed assets. In processing industry in the years 2010 and 2011 the level of expenditure on fixed assets rose from 34 704 million PLN to 40 509 million PLN, most of which was spent on machines and devices (table 2).

Table 2. Investment expenditure on fixed assets in wood sector in Poland compared with processing industry [million PLN].

Itemization	Altogether	Buildings	Machines	Means of transport
Industrial processing				
2010	34 703.9	9 362.2	22 589.9	2 404.6
2011	40 509.1	11 026.1	26 754.7	2 275.3
Paper and paper products manufacture				
2010	1 579.0	265.0	1 222.0	87.3
2011	1 682.6	380.5	1 241.5	49.6
Wood, cork, straw and wicker products manufacture				
2010	1 018.0	254.0	655.0	106.0
2011	1 716.4	424.2	1 163.1	125.3
Furniture manufacture				
2010	1 043.0	359.0	526.0	257.0
2011	1 146.6	358.6	692.9	91.6

Source: own study on the basis of „Statistical Yearbook of Industry 2012", p. 327-329.

The level of this category of fixed assets increased of almost 20%. In all industries of wood sector a significant increase in investment expenditure on fixed assets was noted. The greatest dynamics of the analysed index were observed in companies manufacturing wood, cork, straw and wicker products, from 1018.8 million PLN to 1716.4 million PLN, most of which was spent on machines and devices. In terms of furniture manufacture the dynamics of the level of investment expenditure for fixed assets were 109.9%, and as regards paper industry – 106.6%. It needs to be noted, however, that in these two groups of companies a fall in the level of capital for means of transport was noted – 64.4% and 61.8%, respectively.

CONCLUSION

Effects of global economic crisis are tangible, to a lesser or greater degree, in all industries. It refers to companies of wood sector as well. In times of economic stagnation most companies decide to reduce operating costs and curb investment which manifests itself in decreasing the level of financial means for the investment in question. Only companies in good financial condition can adopt an active attitude towards crisis events.

Although the beginning of the global crisis dates back to 2007, its negative consequences appeared in Polish economy two years later. It manifests itself in, among others, analyses findings conducted by GUS in the field of investing activity of companies. In 2009 a significant decrease in

the level of investment expenditure was noted in companies manufacturing wood, cork, straw and wicker products (34.7%) and in furniture industry (26.3%). As regards the latter the next years also brought a fall in the index in question of another 10%. In 2011 the situation of companies of wood sector in terms of undertaken investment stabilized. The dynamics of investment expenditure in each of the researched group of companies were more than 100%. It needs to be noted, however, that the lowest falls were observed in companies manufacturing paper and paper products (2.9%).

In the years 2009-2010 the highest values of investment expenditure were noted, on average, in enterprises manufacturing paper and paper products, although it was then that a significant fall in the level of indexes was visible in the field. In 2011 investment expenditure in wood and paper industries was rather the same. Only the furniture industry noted minor differences in average level of financial outlays for investment. Funds in companies in wood sector were spent mostly on purchase of fixed assets, in particular machines and devices. These companies are part of a group of production plants. Thus, it is a natural phenomenon to invest in fixed assets.

Considering the better and better economic situation, of both Polish economy as well as the economies of other EU countries, the level of investment expenditure should increase gradually.

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Magdalena Jaworska[4]

THE STRUCTURAL ASYMMETRY IN THE DEVELOPMENT OF THE GREENFIELD FOREIGN DIRECT INVESTMENT

Abstract: The basic assumption of the study was the existence – on a global scale – of the unequal distribution of the manufacturing factors created by the foreign direct investment. The attempt of careful examination and later presentation of the findings on the asymmetric character of the greenfield international economic initiatives configuration, in relation to various sectors and space, was assumed to be the main objective of the following study. Empirical analysis of the investment projects, completed between the years 2003-2012, with the use of the selected statistical methods and indicators (of variability, correlation, structure, dynamics and investment readiness of economy) were employed for the accomplishment of the task. The research appeared to prove the asymmetric distribution of the greenfield foreign investment, basically due to the structuralized changeability of the global economy. Generally, this asymmetry concerned the value of the investments, the number of projects under realization and their concentration in particular sectors of economy. Particularly clear disproportions were observed in the geographical structure, whereas the unit value of the realized projects could have been described as relatively proportional.

Key words: greenfield investment, asymmetry, direct foreign investment, developed economies, developing economies.

INTRODUCTION

The companies are forced to make their activities more international, in particular due to the imperfect competition observed on the domestic markets and different economic, political, cultural, institutional and legal environment. Organization of manufacturing factors flow on international scale, that is undertaking Foreign Direct Investment (FDI), usually takes the form of, the so called, brownfield or greenfield investment. The first mentioned form concerns cross-border Mergers and Acquisitions (M&As) and means expanding the activities of the merged companies as the part of transnational corporations strategy (TNCs). The second one means the investments related to the construction of entirely new plants or factories and is referred to as greenfield investment.

International market transactions are executed in the worldwide environment. On one hand, it increases the development opportunities as the possessed assets can be used more efficiently, but on the other hand, the execution of such transactions is undoubtedly associated with additional risk taking. In that case, the intensity of investors' reaction to changes and their perception of determinants, both external and internal, is diverse and depends on the business type, the form of the executed project and the investment directions. Such behaviours can be explained, first of all, by the Vernon's theory of a product life cycle, in which he emphasizes the differences between particular countries concerning the level of their technological development and the existing barriers in information flow. The more detailed explanation can be found in the investment development path hypothesis that shows the relationships between the investment position of a given country, its economic development level and the structure of its economy. The third approach to the above mentioned matters is based on the location theory or *OLI* J.H Dunning's paradigm (Ownership, Location, Internalization), according to which the foreign investment undertaking process is closely connected with the coexistence of ownership, internalization and location advantages. [Dunning 2001]. The first and the third group of factors are both related to the enterprise, its strategy, reserves and potentials. They appear to be decisive in case whether the foreign direct investment is taken at

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all. The location advantage (the second group of factors) makes the investment oriented at a particular country [Polak 2008].

Disproportion in the development level of particular countries, fluctuation of economic indicators or the unique character of particular sectors of economy, observed in economic reality, lead to unequal – on a global scale – distribution of the manufacturing factors. The above statement has become the assumption for the analysis of the investment flow configuration accomplished in the form of a greenfield foreign direct investment. The main objective of this analysis was to examine and show the asymmetry observed in the development of greenfield investments, completed between the years 2003-2012, in relation to the economic space and sectors they were taken in.

SOURCE MATERIALS AND THE METHODOLOGY OF THE RESEARCH

The ex post (2003-2012) empirical analysis of the greenfield capital transfer, together with the use of the selected statistical methods, were employed in order to accomplish the objective of the study. Various measures, such as: the location measure (arithmetic mean), the variability measures (standard deviation, variability indicator), the relationship measure (Pearson's co-relation indicator) together with structure and dynamics indicators, were also used. Additionally, the measure of how open the economy is to any form of investment in relation to the Gross Domestic Product (GDP), was calculated.

The Internet statistical database (http: //unctadstat.unctad.org/) together with the reports, issued by the *United Nations Conference on Trade and Development* – UNCTAD, including, regularly published by the UNCTAD, the *World Investment Report* (WIR), were used as the main source of information. Therefore, the examined sectors of economy and groups of countries (developed and developing countries) match the classification and criteria applied by the UN.

However, the accessible data does not reflect the real picture of the international capital transfer. This may be caused by the fact that not all countries or investors inform about the investments under realization. [Lowder, Carisma 2011]. Moreover, it may be said that practically, only private enterprises' investments accomplished by big companies are included, basically because private investors are not interested in disclosing information concerning FDI types and locations. Due to the limited data and their presentation with regards to current not fixed prices, the picture of the empirical analysis may be slightly deformed, or it can even become the source of wrong interpretation of the data. Nevertheless, the data obtained for the needs of the analysis presented in the current study, allows to show the essence of the asymmetry observed in the development of global capital transfer, in quite a satisfactory way.

THE RESULTS OF THE RESEARCH

The decade that was assumed to be the subject matter of the current study, was found to be the time when, on average, 13 343 greenfield projects of their average value of 909 081 million USD, were under realization. However, these numbers, in particular years, took different values, that is, from 612 155 million USD (2012) up to 1 582 134 million USD (2008) and from 9 514 (2003) up to 17 281 signed contracts (2012), showing the change pace on the level of -2.6% in case of the value of the realized projects, and +4.1% in case of their number. Therefore, it may be concluded that the number of the greenfield investment activity showed the growing tendency, though at the same time the unit value of particular projects tended to decrease (Fig. 1) – on average, by 6.4% per year. Additionally, it is worth emphasizing that the changes taking place in shorter periods, (except for the situation observed in 2012) appeared with one year delay compared with the typical fluctuation cycles characteristic for the global FDI flow that had the form of the successive periods of decrease (2008-2009 and since 2012) and increase (2004-2007 and 2010-2011). The only element of the changes described above, that remained the same, is their character, that is, shortening of the

particular successive stages, their diverse intensity and relatively higher fluctuations in relation to the projects' value.

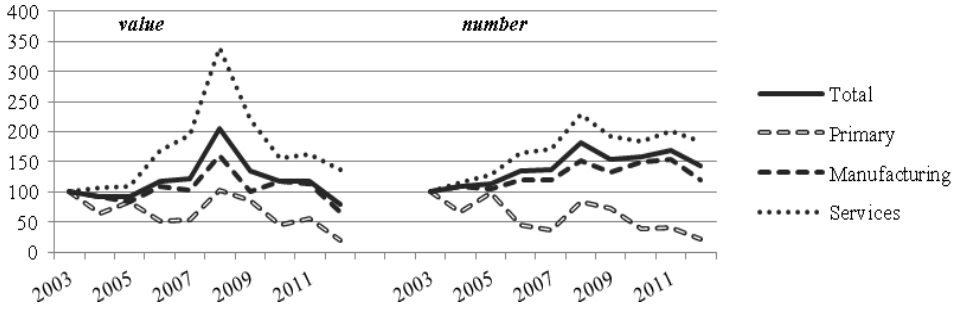

Figure 1. Number and value dynamics of greenfield FDI projects by sector/industry, 2003-2012 (2003=100, %)

Source: own calculations based on UNCTAD/WIR, UNCTADstat.

The distribution of the greenfield investment projects, realized in particular sectors of economy, showed that the main reasons for sector reorientation, were the decisions concerning enterprises undertaken in the basic industry (Fig. 1, Fig. 2), especially towards which, a clear decreasing tendency was displayed. Such a situation was significantly influenced by the global crisis that appeared in the mining industry. The economies that were affected most severely were those of the developing countries. Moreover, the role of the new forms of international production, referred to as non-equity modes (NEMs), mergers and profit reinvestment, often replacing traditional greenfield investments, taken by already existing investors, appeared not to be less significant [UNCTAD/WIR/2011]. There are a lot of reasons of the long-term trend leading to service sector domination over the manufacturing one, observed in types of economic initiatives. Among others, one that is mentioned quite frequently, is the entrepreneurs' being relatively cautious towards high value projects realization, and another one, is higher demand for services provided to various businesses, trade, finance and transport [UNCTAD/WIR/2013]. Moreover, considering the decline in the global investment demand, shrinking location potentials, more intensive support given to the domestic producers by particular countries, more intensive actions taken in order to keep economic security of particular states and the prepared preliminary forecast, relatively lower dynamics of the greenfield investment flow can be expected in the approaching years.

In spite of the close relationship existing between the situation in the global economy and the intensity of the FDI flow [Jaworska 2013], the greenfield investments started becoming less significant in the structure of the transferred capital, mainly as the consequence of the earlier described changes. In 2003, the greenfield investments flow reached the level of 66% of the total capital flow (771 315 million USD), to end up on the level of only 22% in 2012 (612 155 million USD). Moreover, a clear negative tendency in the relationship between the growth of the global investment activity and the greenfield investments, could have been observed. In 2007, when the FDI reached its highest level, the greenfield projects made just 22% of the transfer, and in 2009 – over 44% (Fig. 2). This structural disparity concerned the investments recipients as well as their providers, additionally, it showed a clear asymmetric character, since the first group included mainly developed economies whereas the second one was dominated by the developing ones.

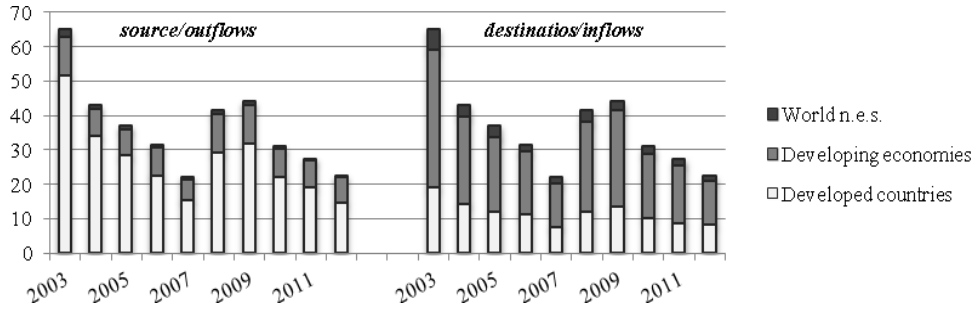

Figure 2. Greenfield FDI projects share in the global FDI transfer, 2003-2012 (%)

Source: own calculations based on UNCTAD/WIR 2013, UNCTADstat..

The object analysis of the investment projects allowed to determine the sector asymmetry in the configuration of the investment activities taken globally (Fig. 3). The value of the greenfield projects was found to be the highest in the food-processing and service industries, and at the same time, the service sector's share, especially concerning finance, showed the significant increase in relation to the basic manufacturing sector. In 2003, the money invested by the companies providing services reached the level of 42% of the total invested capital, whereas in 2012 this level grew by 12 percentage points. However, the unit value of those transactions was relatively low (60 million USD on average) and additionally, it showed the decreasing tendency. Economic experience proved that the investments planned to have a relatively long realization time, especially those concerning products not particularly prone to economic cycles (i.e. raw materials and agricultural products), appear to be relatively resistant to current economic trends. Such trend could have been observed in the basic sector where one investment project received, on average, over three times bigger financial support.

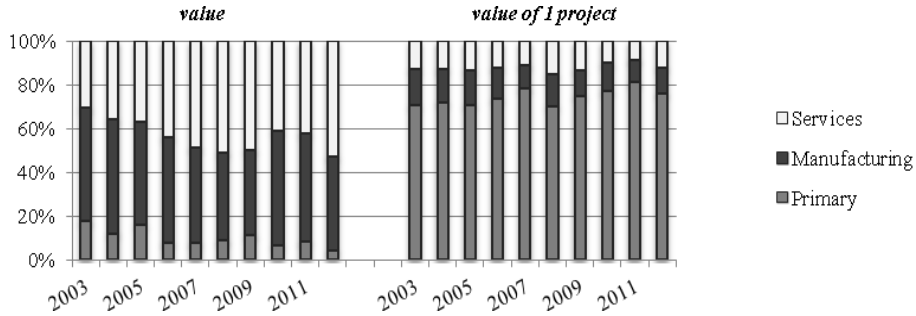

Figure 3. Greenfield FDI projects by sector/industry, 2003-2012 (%)

Source: own calculations based on UNCTAD/WIR 2013, UNCTADstat.

The greenfield investments are found particularly significant as far as the competitiveness and innovative character of the country where they are being accomplished, are concerned, especially because the flow of manufacturing factors is accompanied by the knowledge, technology, management standards, marketing tools etc. Having spotted the advantages of capital transfer, various economies tried to outdo one another in order to attract the potential investors, mainly by

means of offering them the best possible conditions for projects realization. These countries, with help of efficient economic policy, created investment friendly environment and stimulated the development of particular regions in order to make them look more attractive for potential investors. The increased number of the countries implementing special regulations concerning capital inflow, together with the growing number of regulations of the capital turnover facilitating character, resulted in the decrease of disproportions in the FDI distribution in relation to geographical structure [Jaworska 2013]. However, their important part was still determined by, the so called, overlapping capital flow, that is, between the countries being simultaneously the exporters and importers of capital [Rosińska 2007].

Progressing globalization, often referred to as the „advocate" of the changes appearing in the market, is said to determine the intensity of the internationalization process. In favourable conditions, it acts as the catalyst for expanding economic activities to foreign markets, though in time of a downturn in the economy, it hinders the internationalization process. From historical point of view, the negative influence of the exogenous factors on the value of international capital flow could have been clearly observed in 2008. However, in case of greenfield investments, taken at the same time, the situation appeared to be just opposite – the highest growth in investment value was recorded then. On one hand, it was the effect of the rise of raw materials prices and, on the other – the increased activity of the developing countries, which seems quite understandable, mainly due to the fact of their weaker connections with the American banking system. The countries from Africa, South America and the Caribbean showed a relatively strong resistance to the global economic crisis [UNCTAD/WIR/2009].

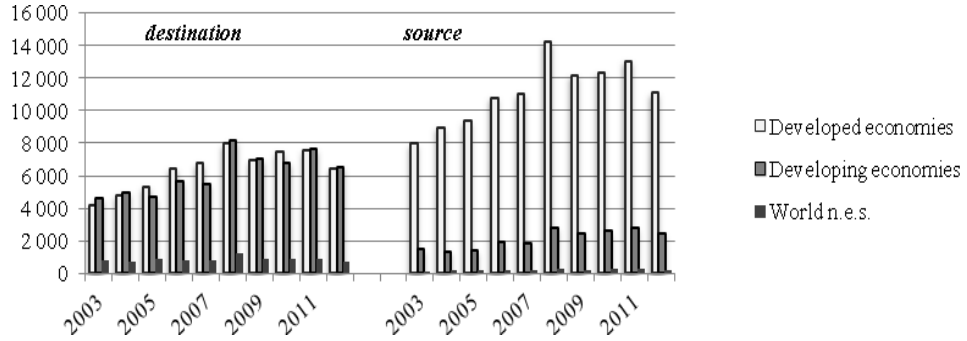

Figure 4. Number of greenfield FDI projects, by source and destination, 2003-2012 (million USD)

Source: own calculations based on UNCTAD/WIR 2013, UNCTADstat.

Market and reserves determinants, resulting from the reasons lying behind decisions about constructing new plants away from home countries, made the global greenfield capital flow significantly polarized. The capital provider's role was played by the developed countries. They also turned to be attractive venues for greenfield investment, however, the highest value of this type of investment was generated within the borders of the developing countries which appeared to be an ideal production base and the place where the goods made by the developed economies could have been easily sold. Between the years 2003-2012, the asymmetry of capital flow directions was most clearly visible in case of the total value of the projects, much less, with regard to their total number, whereas the spatial configuration of the project's unit value was characterized by a relatively high proportion [Fig. 4, Fig. 5].

It was found out that within the period of the studied decade, the investors from the developed countries initiated 110 520 projects, altogether, worth 6 588 799 million USD, and those from the developing countries, over four times less (20 704 projects of the total value of 2 291 202 million USD). The number of projects completed in both groups appeared to be very similar (603 505 and 61 179 respectively), however, the capital invested by the countries with lower development level almost doubled in value, compared with those better developed [Fig. 5]. It must be emphasized that greenfield capital inflow, as well as its outflow remained asymmetric in each year of the analysed period, regardless current economic situation, which means, also in the time of the global economic slump. As the consequence of the increased activities performed by the companies from less developed regions, earlier mentioned disproportions got decreased in favour of the developing economies. In this regard, a very important role was played by the countries referred to as BRICS (Brazil, Russia, India, China and South Africa), since they were responsible for over a half of economic initiatives taken either in the countries on the same development level or in those that were less developed [UNCTAD/WIR/2012]. In 2013, businessmen coming from BRICS areas joined the group of the most important investors active in Africa where the investment projects were mainly realized in the food-processing and service industries [UNCTAD/WIR/2013].

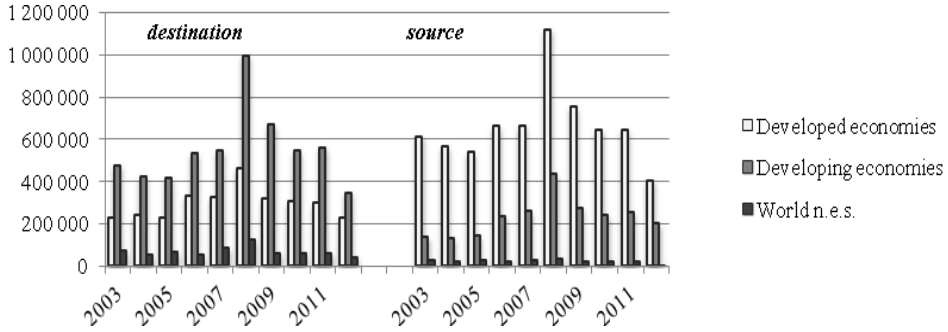

Figure 5. Greenfield FDI projects value, by source and destination, 2003-2012 (million USD)

Source: own calculations based on UNCTAD/WIR 2013, UNCTADstat.

The asymmetry existing in the development of the greenfield foreign direct investment was proved by the index showing how open and friendly, the particular economy is towards potential investment. This index describes the value of the projects in relation to a country's GDP and within the mentioned above decade, it showed relatively high changeability – generally speaking, its ups and downs reflected disturbances observed on the global market, due to the financial crisis. Simultaneously, retaining a clear decreasing tendency, the readiness for new investments turned up to take different forms regarding the capital recipients and its providers. The most intensive activity and a huge role of the greenfield investment emerged in the developing countries which, compared to the developed economies, happened to gain average annual level of their markets' readiness for investments, almost five times higher than the latter ones [Fig. 6]. A few potential reasons which might be the cause of such situation must be emphasized. Firstly, limited opportunities of investment development in the developed countries, mainly due to the already existing high level of accumulated reserves, secondly, increasing competitiveness of the companies from the developing countries due to the implementation of pro-investment policies, and thirdly, integration and regionalization processes resulting in signing numerous cooperation agreements.

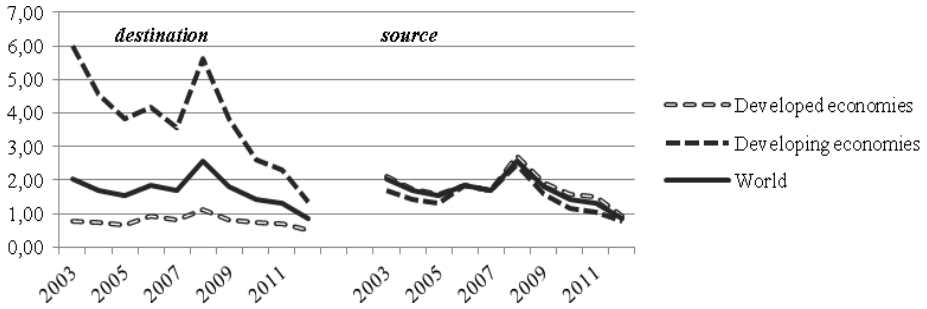

Figure 6. Economy readiness for Greenfield FDI projects index, 2003-2012 (%)

Source: own calculations based on UNCTAD/WIR 2013, UNCTADstat.

Investment attractiveness stimulants contributed to reallocations that appeared on the investment development path, and they led to the significant decrease in the lack of balance in the field of foreign investors' readiness for taking up new projects. With regard to the capital providers, the investment readiness index showed definitely different values. They displayed a relatively equal level concerning the subject countries' involvement into the greenfield global capital flow process.

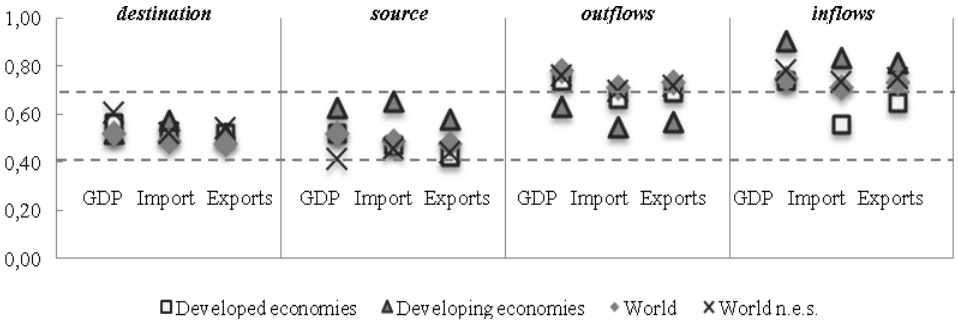

Figure 7. Correlation degree of changes in Greenfield FDI projects flow, GDP and international trade, 2003-2012

Source: own calculations based on UNCTAD/WIR 2013, UNCTADstat.

The pace of changes observed in the greenfield global FDI transfer, appeared to coincide slightly with the pace of the aggregate GDP and international trade increase. The character and strength of the above mentioned relationship was determined by the positive value of the Pearson's correlation index, calculated for this particular study. These values appeared to be in the range between 0.41 and 0.66 (Fig. 7). Its characteristic feature is the fact that they were found to be lower than those calculated for the global FDI inflows and outflows.

The accomplishment of the greenfield investment projects was found to be relatively less dependent on macroeconomic factors than it was observed in case of other types of enterprises, including capital transfer. It proved a certain regularity resulting from the fact that the greenfield projects are the ones of a long-term character and cannot be terminated earlier only due to the unfavourable conditions, and in addition, their main location are the developing countries, which means, the economies less affected by the global economic crisis. The developing countries cannot

be referred to as the ones showing practically complete positive feedback between economic growth dynamics and cross-border investment initiatives. In this case, the interregional projects initiated by the Asian companies, mainly from China and India, performed the leading role. Their advantage was determined by some characteristic features such as: flexibility, better adaptation to institutional environment and also to needs and preferences found in the developing countries, or strong desire for new markets search [Beule, Bulcke 2012].

CONCLUSIONS

The accomplishment of international commercial transactions takes place in the global environment. Its changeable character leads to unequal distribution of powers in the international arena. Further on, it involves cyclic fluctuation of international investment flow and geographical and sector reorientation, that in consequence, cause the disproportions with regard to location and structure. The conducted research proved the existence of asymmetry also in the configuration of the greenfield economic initiatives. The asymmetry concerned the investment value, the number of projects under realization and their concentration in the basic sectors of economy.

However, the most visible structural disparity, displaying the asymmetry features, was found in the relationship between the investment recipients and its providers. With regard to the investment value, the group of capital exporters was dominated by those from the developed countries, whereas the major capital importers came from the developing economies. This asymmetry, though, was characterized by some kind of inconsistency regarding the investors' activity in relation to the number and the unit value of the realized projects and also particular countries activity towards investment. The number of the completed projects and a single transaction value turned out to be relatively proportionally divided between the groups of the above mentioned countries. At the same time, it must be emphasized that the asymmetric character of the spatial configuration softened. It basically happened due to the pro-investment political efforts taken by different governments, since they began to perceive the greenfield investment as the chance of the country's competitiveness and its innovative character upgrade. The indicator that proved the asymmetry in the greenfield investment development was the economy readiness for new investments index. In spite of its significant changeability, it managed to distinguish a clear divergence between the capital recipients and providers, however this divergence was observed to show a visible decreasing tendency.

The lack of balance, found in the development of the greenfield investment projects, proved the existing polarization in the development of the global economy and the economies of particular countries. Nevertheless, the disproportion decreasing tendencies resulting from the increased activities of the developing countries, including the BRICS group, seem to constitute a significant symptom of the structural changes currently taking place in the world.

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Martina Kalamárová[5]

THE CULTURAL HERITAGE AS A CULTURAL CAPITAL

Abstract: The article is focused on a cultural heritage. It points out the meaning of cultural heritage for the individuals and for the society. It reports a new perspective on cultural heritage as cultural capital, its perception as a bearer of cultural and economic values. The overview of economic valuation techniques used for estimating cultural heritage is also presented in this article.

Key words: cultural heritage, cultural capital, values of cultural heritage, economic valuation techniques.

INTRODUCTION

Cultural heritage is a set of tangible and intangible goods with great historical and cultural value and features of people´s identity, therefore is worth of preservation for next generation. This article reports a new perspective on cultural heritage as cultural capital, its perception as a bearer of cultural and economic values.The objective of the article is a theoretical definition of cultural heritage as a cultural capital, an elaboration of the overview of cultural heritage values and the economic valuation techniques. Material, needed for processing this article, was obtained in secondary research, where we analyzed existing available literary and internet sources which deal with issues of cultural heritage and values. For theoretical definition of cultural heritage the comparative method of the theoretical works of Slovak and foreign authors, who deal with issues of cultural heritage, was used. In addition for unifying the concept of cultural heritage at the global level the documents of the international organizations such as UNESCO, ESPON, ECON and ICOMOS were analyzed. The overview of economic valuation techniques was made on the basis of case studies of valuating cultural heritage worldwide. During processing the article we apply methods of analysis, synthesis, abstraction, comparison, induction and deduction.

THE CULTURAL HERITAGE

Cultural heritage is one of the subsystems of culture that forms an integral part of social life. When specifying the exact content of the cultural heritage concept, we rely on the opinions of various authors who agree that the definition of cultural heritage is complicated, versatile and largely depends on human experience and values.

Davison (1991, p. 1) considers cultural heritage as everything what people value from the past. A similar definition is a definition of Howard (2003, p. 1), who considers the cultural heritage as a very broad concept that includes everything that people want to protect. Rigante and Nijkamp (2004, p. 1) define cultural heritage more broadly as the evidence of human achievements and links with the outside world. The concept of heritage is not fixed , but generated by the community, people who attach a value to certain objects which makes the object specific and different from the others.

A number of Slovak and foreign authors, as well as international organizations such as UNESCO, ESPON, ECON, ICOMOS deals with cultural heritage in their work. While in Slovak literature (Nový, 1996; Majlingová, 2002; Sokolovský, 2000) is a cultural heritage perceived as a part of the culture and the attention is focused on its historic monument nature, in the foreign works cultural heritage becomes wider phenomenon. Macháček (2004) deals with cultural heritage as a factor of local development and examine the economics of cultural heritage utilization. The theoretical works of authors such as Gražulevičiute (2006), Rypkema (2005, 2008), Greffe (2004),

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Silberberg (1995), Asworth a Larkham (1996) provide a basis for examining the use of cultural heritage. The issue of the cultural heritage use is an interest to international organizations like ICOMOS (1979), ECON (2003) and ESPON (2004). They devote their activities to promoting the compatible use of cultural heritage which means the use of a wide variety of opportunities offered by cultural heritage while respecting the preservation of its values.

The formal definition, which is part of the documents and conventions of UNESCO, is used as a way of understanding and unifying the concept of cultural heritage at the global level. The concept of cultural heritage was for the first time defined by Convention Concerning the Protection of the World Cultural and Natural Heritage (UNESCO, 1972). Concept of cultural heritage has been extended by Convention for the Safeguarding of Intangible Cultural Heritage (UNESCO, 2003) and it also included intangible cultural heritage.

UNESCO in Database of National Cultural Heritage Laws (2003) defines two main categories of cultural heritage:

- Tangible cultural heritage:
    - immovable cultural heritage (monuments, archaeological sites, etc.),
    - movable cultural heritage (paintings, coins, archaeological objects, etc.),
    - underwater cultural heritage (shipwrecks, underwater cities, etc.).
- Intangible cultural heritage (oral traditions, performing arts, rituals, etc.).

The authors like Navrud and Ready (2002), Bedate, Herrero and Sanz (2004), Kurowski (2007), Riganti (2005), Throsby (2001, 2007), Sable and Kling (2001) conceive cultural heritage as a cultural capital.

THE VALUES OF CULTURAL HERITAGE

The cultural heritage offers the values important for the society what is evident from the definition of cultural heritage. Understanding these values leads to the need to define cultural heritage as a cultural capital. Throsby (2001, p. 46), according to the traditional economic theory, identifies three general forms of the capital - physical, human, natural and added fourth form – cultural capital. Cultural capital is easily distinguishable from these three forms of capital and Throsby (2001, p. 46) defines it as an asset that embodies, stores or provides cultural values, which adds to the defined economic value. The concept of cultural capital is a useful tool for defining the cultural heritage in a way that connects interest of experts in cultural heritage values and rational economic approach to its assessment.

Many foreign authors as Navrud and Ready (2002), Bedate, Herrero and Sanz (2004), Kurowski (2007), Riganti (2005), Throsby (2001, 2007), Sable and Kling (2001) dealt with the issue of the cultural heritage values in their publications. Their papers were the basis for the elaboration of next overview of the values that are attributed to the cultural heritage (Figure 1).

The value can be judged from the perspective of the user as the individual and collective. Categories of individual values correspond to the way how individuals experience cultural heritage, through either use or non-use value. These categories of values together form the economic value of cultural heritage, which can be defined as “the amount of welfare, that heritage generates for society and it is the sum of all benefits obtained from a cultural heritage resource” (Ruijgrok, 2006).

Use value is the value that accrues to individuals, households, or firms through the direct consumption of heritage services. This value can be perceived in various ways, for example through the ownership of heritage goods, pleasure in living or working in a heritage building, but this value also accrues to tourists visiting heritage sites. Use value is reflected in market processes and can be expressed in terms of the prices that are charged for cultural goods and services. It can be measured for example by an entrance fee to a historical building used as a museum or a rent of a historical building used for housing or business (Throsby, 2007).

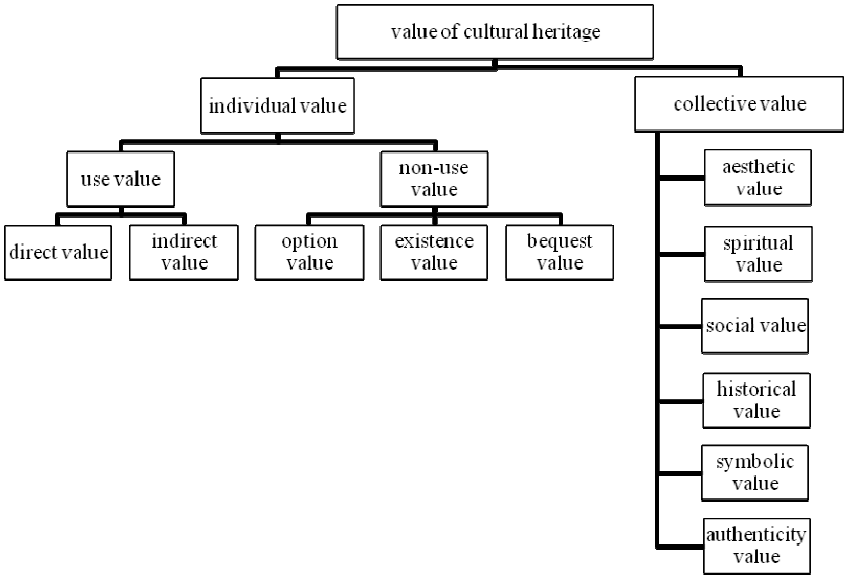

Figure 1. The values of cultural heritage

Source: Own elaboration based on Navrud and Ready (2002), Bedate, Herrero and Sanz (2004), Kurowski (2007), Rigante (2005), Throsby (2001, 2007), Sable and Kling (2001)

Non-use value is usually also called passive value. It is because certain resources are considered valuable independently of any use. Non-use value is perceived by individuals, but is not reflected in market processes, because it is derived from the attributes of cultural heritage, which are classified as non-rival and non-excludable public goods.

Non-use values include (Kurowski, 2007):

- Existence value which is associated with the fact that people can benefit from the knowledge and awareness of the existence of cultural heritage.
- Option value which results from the possibility of using cultural heritage in the future.
- Bequest value which arises from a desire to pass the values of cultural heritage to future generations.

Throsby (2001, p. 4) suggests that in addition to the individual values, there are also collective values that can be truly assessed only in the collective sense. This consideration leads to the definition of cultural value that is added to the economic. Qualities, included in the cultural value, may affect the individual value and they can be reflected in the economic assessment. However some of these values may be fully acknowledged just in the collective sense. According to Throsby (2001, p. 7) cultural value generally means certain cultural wealth. Cultural values are attributed to the cultural heritage and the society can derive benefits from the existence of these values.

The concept of cultural values by Throsby (2001, p. 84) is subdivided into several categories:

- Aesthetic value - cultural heritage abounds with beauty in its basic sense, whether it is internal or external feature or whether it occurs only in the consumption of the viewer. Under the general understanding of the value we can see the relationship of the cultural heritage to the country in which it is located.

- Spiritual value - the value transmitted by cultural heritage can contribute to a sense of identity in the community as a whole, as well as the individuals in it. It may help to define the concept of human civilization and civilized society.
- Social value - interpretation of culture as shared values, considering a group of people together, encourages social value, which may be reflected in terms of contributing to social stability and cohesion in the community. Social value may help to make the community a desirable place for living and working.
- Historical value - helps in defining the identity, provides the connection between the past and reveals the origins of the presence.
- Symbolic value - cultural heritage expresses information that helps the community in interpreting its identity. Value as a representation of symbolic meaning is important for the educational function, the level of knowledge and understanding of the community.
- Authenticity value - cultural heritage is valuable for its own existence, because it is real and unique.

THE VALUATION OF CULTURAL HERITAGE

The estimation of the economic value of cultural heritage has increasingly been recognized as a useful tool for policy-making. Several economic valuation studies have been conducted world-wide, authors as Choi et al (2010), Tuan and Navrud (2008), Ruijgrok (2006), Riganti and Nijkamp (2005) deal with the problematics of valuation of cultural heritage in their publications.

Typically in valuation studies is to estimate total economic value, which includes both types of values – use value and intangible non-use value (figure 2).

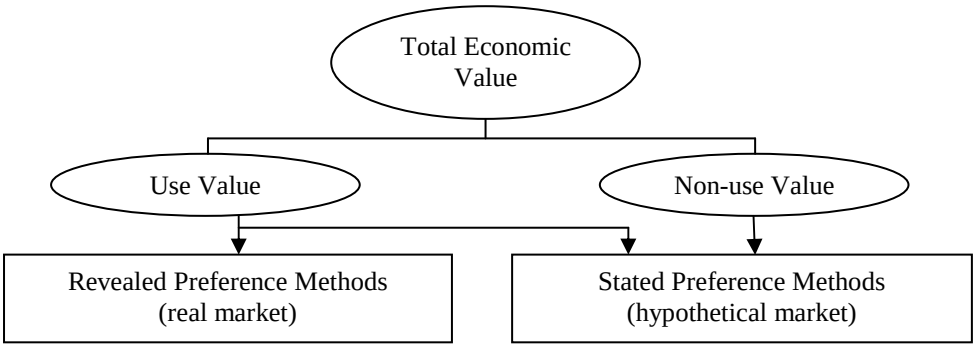

Figure 2 Economic valuation techniques

Source: Choi et al. (2010)

The use of economic valuation techniques vary depending on the presence of reliable market data.

Revealed preference methods are applicable when market data are present. These methods include travel cost method and hedonic pricing method. Travel cost method is based on attributing the total cost of travel from visitor´s place of origin to the heritage site. The aim is to provide a measure of the use value of a heritage site by creating a demand curve based on user´s utility maximization (Bedate et al., 2004). Hedonic pricing method is a statistical calculation procedure that results in a percentage of property values that can be attributed to the historical characteristics of a building and its environment. The relation between historical characteristics of the object and the price of the object are presented by regression model (Ruijgrok, 2006).

When reliable market data are no available, researchers have to create hypothetical market and use stated preferences methods as contingent valuation or choice modeling. Contingent valuation method is a survey method that enable to measure people´s willingness to pay for visit the heritage object or for the conservation. Respondents (not necessarily users of good, also non-use values can be considered) are asked their willingness to pay for the benefits received (Riganti, Nijkamp, 2005). Choice modeling is a technique based on measuring nonmarket values by series of questions called "choice sets", which involve a choice between a constant "status quo" situation and a number of different "proposed" situations, to survey the respondents. Respondents are asked to choose one preferred option from more alternatives for each question (Choi et al., 2010).

CONCLUSION

Cultural heritage is a set of tangible and intangible goods with great historical and cultural value and features of people´s identity, therefore it is worth preserving for next generation. Cultural heritage is conceived as specific form of capital – cultural capital.

Many features of the cultural heritage can be characterized as public good characteristics. Cultural heritage is extremely immutable and has an untransferable nature. The important feature that distinguishes it from normal economic goods is that it cannot be substituted in case of loss or damage. It is specific because of its collective nature, in view of the large number of persons using it simultaneously. It has not only value to individuals who own or live in historic object, but it has also value for well-being and quality of life of a community.

The economic value of cultural heritage is the amount of welfare that heritage generates to the society – material and immaterial forms of welfare. That welfare is more than financial benefits, but also external benefits to the area where the heritage is located. Cultural heritage can be valued in a wide variety of ways, from the aesthetic and emotional pleasure, sense of place and identity to the positive economic benefits as heritage tourism, job creation, household income creation, city center revitalization, etc.

This contribution of cultural heritage to social welfare constitutes legitimate arguments for the public support. It may have different forms of governance ranging from private to public ownership and management. The economic valuation techniques are the methods for estimation the benefits of cultural heritage and serve as a basis for managing cultural heritage and decisions about further investments and public resources for maintenance and preservation. Capturing the benefits, estimating and expressing values of cultural heritage in monetary terms is recognized as a useful tool for policy-making.

The knowledge of the values of cultural heritage, the appreciation that it has the cultural values in addition to its economic value, has meaning not only for the purpose of its protection, but also to guide appropriate use of cultural heritage in order to preserve its values for the next generations.

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RENEWABLE ENERGY SOURCES AND WOOD PRICES

Abstract: Economic and environmental aspects of generating energy from renewable sources in various forms: thermal, electric and mechanical have been presented in this article. Utilization of those resources and their promotion has been imposed on us by the climate convention but substantial level of pollution in large cities of our country contributed to that as well. RES share in the production of electricity and heating in Poland is regulated centrally by the directive of Minister of Economy. RES utilization is gradually becoming more rational in our country. It levels the prices of biomass for energy sector which has a visible impact on the level of round wood prices in Poland.

Key words: renewable energy, emissions, wood prices

ADMISSION

Due to a high and still growing prices of energy – conventional energy sources such as (coal, petroleum and natural gas) ever more often are being replace by renewable energy sources – RES. To put it in simple terms energy from RES is the energy generated from fossil fuels and other abundant natural resources. The article will present the aspects of RES share in the production of electricity and heating in Poland in accordance with the convention of which Poland is a signatory.

RENEWABLE ENERGY

It uses RES primary energy from nature that is solar energy, wind energy and biomass energy, as well as kinetic energy of running water and internal earth heat in the processes of transforming those types of energy into technologically usable forms. Common feature of RES defined in that way is their ability to renew themselves which makes them almost impossible to deplete. RES are constantly filled up through natural processes taking place in the environment. Following adequate transformation they provide energy in various forms: thermal, electric and mechanical. Appropriate and professional RES utilization contributes to a lower level of environmental pollution which is especially high in urban agglomerations heated burning coal and wood. Solid fuels such as coal and wood - are very serious pollutants – as they emit carcinogenic *Polycyclic Aromatic Hydrocarbons* and ashes cumulating in the atmosphere. [Lis 2011b]. On the 25th of November 2013 city of Cracow councillors (Cracow is the third most polluted city in Europe) – were the first in Poland to issue an official ban on using coal and wood in household boilers in that agglomeration.

Accessibility of RES is not the same in various parts of our globe. Those resources are present everywhere, however, they are found in different forms. One of their most significant drawbacks is their temporary, very often hard to predict, usability. They are often not accessible at times when they are mostly needed and useful (photovoltaic energy is abundant in the summer but mostly needed in winter). The lack of storage possibilities makes the popular utilization of those resources rather difficult.

PROMOTING RENEWABLE ENERGY

The issue of promotion of RES including biomass has been present in the European Union and in Poland for many years now. Political declarations of the countries within the European Community were collected in 1996 in a so called "White Book of Renewable Energy Sources" [Biała Księga]. Where the issues related to the impact of RES on energy security, environment

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protection and stimulating economic activation of local communities have been discussed. The decisions from the "White Book or Renewable Energy Sources" have been frequently undertaken during various scientific conferences and climatic forums. Recently during a climatic Conference of the Parties - 19 session of the United Nations Framework Convention on Climate Change which took place in Warsaw from the 11th of November till 22nd of November 2013 it was accompanied by a meeting of the parties of the Kyoto Protocol.

In the EU Directive 2001/77/EC (Directive 2001/77/EC) related to the promotion of the production of electricity from renewable energy sources political targets, also included in the "White Book or Renewable Energy Sources", have been articulated - Official Journal of the European Communities, L. 283/33, 27.10.2001 [DIRECTIVE 2001].

LIMITS ON THE EMISSIONS OF GREENHOUSE GASES AND ON TRADING THEM

An important document regulating issues related to RES is Kyoto Protocol, where Poland has obliged itself to a significant reduction in the level of emissions of greenhouse gases to the atmosphere. Among greenhouse gases there are: water steam – the most popular greenhouse gas in the atmosphere, carbon dioxide (CO_2), methane (CH_4), freons (CFC) – the most popular of them being CFC-12, oxides of nitrogen (NO_x) – the most popular being suboxide of nitrogen (N_2O), halon gas and industrial gases, most frequently used in fire extinguishers: perfluorocarbons - PFC, apafluran – HFC and sulphur hexafluoride - SF_6.

Kyoto Protocol came into force on the 16th of February 2005. Its resolutions embraced the period between 2008 and 2012. The parties have undertaken to limit, within that first-round, the emission of greenhouse gases to atmosphere by 5,2% in comparison with the set level. For Poland the base year was 1988 – then the largest emission of greenhouse gases in our country was recorded. In the protocol, a limit on the emissions of greenhouse gases was determined individually for each country. It meant the need to invest in expensive technologies, which caused the production to be transferred to other countries especially those based in Asia, where the demands in terms of environment protection were lower and not strictly observed.

The protocol also indicated other solutions, which enabled reaching desired reduction of emissions on a global scale. It has been proposed that emission trading between countries - convention parties will be allowed. Kyoto Protocol introduced the following mechanisms facilitating the realization of the commitment [Materiały 2012]:

1. Emission Trading. Countries - parties have been allocated a certain number of credits related to allowed emissions, expressed in tonnes CO_2 – AAU (Assigned Amount Unit). If they are not used domestically they might be traded on a free market.
2. Joint Implementation. Country – party may play a part in the reduction of emissions in another country through financing the investment or implementation of pro-ecological technologies. For such reduction the country that undertook the investment obtains a certain amount of Emission Reduction Units. Private individuals may participate in transactions. An active participant of that mechanism in our country was Norway.
3. Clean Development. Country – party may invest in developing countries which did not have any emission limits imposed on them. For that it is given a Certified Emission Reductions (CRE).
4. Mechanism Activating CO_2 Absorption by plants. A country which is not a party in the Convention increases the share of plants in the process of CO_2 reduction which may be done through afforestation, for which it receives Removal Units.

Within the European Union Emissions Trading Scheme. Transactions both purchases and sales of units of reduced emissions started in the European Union as of the 1st of January 2005. Initially they only embraces CO_2 emission.

Kyoto Protocol, as the superior Union law, has been automatically integrated in our legal system. As far as the assigned units are concerned Poland ranked third just behind Russia and Ukraine. The only administrator of the allocated units is Polish government. [Lis 2011c].

Within the European Union Emissions Trading Systems parties which were assigned emission allowances may sell their emission surplus. Poland selling a so called Hot Air, that is a surplus of AAU (Assigned Amount Units) to those countries that wish to purchase them adds annually a dozen or so of billions of zł to the state budget. The biggest sales market for Polish AAUs is Japan. In order to fulfil its commitment to Convention resolutions Japan has to reduce the emissions or purchase approximately 170 million tons of ERU, CER or AAU annually [Umeda 2004].

POLISH REGULATIONS CONCERNING RES SHARE IN GENERATING ENERGY

In Poland issues related to renewable energy are regulated by the consecutive directives of the Minister of Economy (previously: Minister of Economy and Labour) – concerning detailed scope of obligations related to obtaining and presenting the certificates of origin for remission, payment of substitute fee, purchase of electricity and heating generated from renewable energy sources and the obligation to confirm data on the volume of electricity generated from RES. All those directives have been presented in table 1. They were issued from 15.12.2000 till 18.10.2012. They increase the required share of energy from RES from 2,65% in 2001 to 12% in 2013, and the target 20% is to be reached in 2021 (table 1). Between 14.08.2008 and 18.10.2012 – no directive was issued. However, a few projects of such directives were drafted and successively published on the internet [Czopek 2012]. All of them between 2010 and 2012 – kept level of energy generated from RES at 10,4%. Table 1 shows exemplary figures recorded in the project from 19.07.2010.

Analysing table 1 it can be stated ex post, that only three tables have a practical meaning: namely those issued in 2000, 2006 and 2012. In tables from 2003, 2004 and 2005 – the figures recorded in year 2000 were repeated – for ratios within the range from 2,65% to 3,6%. Similarly, in the table from 2008 and all subsequent projects – figures between 7% and 10,4% - did not change until 2012. Since 2013 and only since that year – there are new figures from the directive issued in 2012.

In 2013 a 12% share of energy generated from renewable resources was recorded.

ENERGY PRODUCTION FROM RES BETWEEN 2010 AND 2013

From the analysis of changes (table 2) in the power installed in Polish renewable energy sources and the number of units classified as individual types of RES within the period from 30.06.2010 till 30.06.2013 it may be concluded that there is a systematic increase in the share of wind energy (from 44% to 59,5%) and biomass (from 11% to 18,8%) and a decrease in the share of hydroelectric power stations – from 42% to 18,7%.

Within the period from 30.06.2010 till 31.12.2012 the number of power stations using biomass in Poland grew from 15 to 27, and their installed power grew from 252,5 MW to 820,7 MW. In mid- 2010 biomass power stations generated 11,1% of energy and at the end of 2012 the share increased to 18,6%. During the first half of 2013 the number of biomass power stations grew by 6 reaching the total number of 33, and the share of power installed there increased only slightly reaching 18,8%. There is also a systematic increase in the number of installations and the power of those stations using biogas and photovoltaic power stations – using solar energy. Their total share however, fluctuates around 3%.

The number of power stations co burning biomass with coal for which it's difficult to determine the power since it depends on the proportions of the two components in a specific process– increased successively, from 40 to 47 within the period from 30.06.2010 till 31.12.2011. In 2011 a further 33% increase in power being generated using biomass was recorded in industrial energy sector. There was also an 18% increase using the technology of co-burning in energy industry (portal of green energy – 24.10.2012).

Table 1. Required share of electricity generated from RES in the total volume of electricity sold to end consumers

Rok	Estimated share of electricity generated from RES in %							
	Directive of the Minister of Economy from							
	15.12.2000	13.05.2003	9.12.2004	19.12.2005	**3.11.2006**	14.08.2008	19.07.2010	**18.10.2012**
	Dziennik Ustaw - Nr/poz. - Journal of Laws – No. /item							
	122/1336	104/971	267/2656	261/2187	**205/1510**	156/969	project	**poz.1229**
2001	**2,65**							
2002	2,65							
2003	2,65	2,65						
2004	2,85	2,85						
2005	3,10	3,10	3,10	3,10				
2006	3,60	3,60	3,60	3,60				
2007	4,20	4,20	4,30	4,80	**5,10**			
2008	5,00	5,00	5,40	6,00	7,00	7,00		
2009	6,00	6,00	7,00	7,50	8,70	8,70		
2010	7,50	7,50	9,00	9,00	10,40	10,40	10,40	
2011			9,00	9,00	10,40	10,40	10,40	
2012			9,00	9,00	10,40	10,40	10,40	10,40
2013			9,00	9,00	10,40	10,90	10,90	**12,00**
2014			9,00	9,00	10,40	11,40	11,40	13,00
2015						11,90	12,50	14,00
2016						12,40	14,00	15,00
2017						12,90	15,40	16,00
2018							16,70	17,00
2019							18,70	18,00
2020								19,00
2021								20,00

original data - Directive of the Minister of Economy from the day ... concerning detailed payment of substitute fee, purchase of electricity and heating generated from renewable energy sources and the obligation to confirm data on the amount of electricity generated from RES.

In the first quarter of 2012, for the first time in history the number of power stations co-burning biomass and coal decreased by 2 reducing the total number of those units to 45. By mid 2013 – further 4 were closed. Finally, at the end of June 2013 there were 41 power plants co-burning coal and biomass. A withdrawal from low efficient processes of co-burning coal and wood, which started in 2012, has up till now proved to be a successful and stable strategy.

High cost of "green" energy has a negative impact on the competitiveness of the whole economy. Modernization of energy blocs in Polish power plants just recently was linked to intensive adjustment processes facilitating burning biomass, in most cases wooden biomass. Only modernizations undertaken in power plants and combined heat and power plants within the last three years embraced installation of additional boilers and technological lines able to use agricultural biomass. [**Lis 2011a**]. It presented a significant headway in the gradual reduction in wood usage by power industry. Year 2012 brought about a turn in that very negative trend and caused the reduction of the share of not efficient power plants co-burning coal and biomass in Polish energy system. Following that, in 2013, a radical (by 1/3) decrease in the prices of energy chips and sawdust, as well as certificates of origin, payment of substitute fee, purchase of electricity and heating generated from renewable energy sources, took place.

Table 2. Capacity installed in Polish renewable energy sources

Situation on	30.06.2010				31.12.2010			
Renewable energy source	Number of units	The installed capacity			Number of units	The installed capacity		
		quantity	entity	%		quantity	entity	%
WI	347	1000	MW	44,04	378	1095,587	MW	45,98
WO	733	947		41,71	737	948,363		39,80
BM	15	252,5		11,12	16	259,490		10,89
BG	133	71		3,13	136	79,478		3,34
PV	2	0,012		0,00	2	0,012		0,00
WS	40				41			
Together	1270	2270,512		100,00	1310	2382,93		100,00
Change					40	112,418		4,95
Situation on	30.06.2011				31.12.2011			
Renewable energy source	Number of units	The installed capacity			Number of units	The installed capacity		
		quantity	entity	%		quantity	entity	%
WI	453	1351,866	MW	48,64	526	1616,361	MW	52,46
WO	737	946,345		34,05	746	951,389		30,88
BM	19	393,050		14,14	19	409,679		13,30
BG	149	87,773		3,16	171	103,487		3,36
PV	4	0,104		0,00	6	0,1124		0,00
WS	42				47			
Together	1404	2779,138		100,00	1515	3081,028		100,00
Change	94	396,208		16,63	111	301,890		10,86
Situation on	30.06.2012				31.12.2012			
Renewable energy source	Number of units	The installed capacity			Number of units	The installed capacity		
		quantity	entity	%		quantity	entity	%
WI	619	2188,941	MW	57,60	696	2496,748	MW	56,54
WO	762	957,379		25,19	770	966,103		21,88
BM	22	533,410		14,04	27	820,700		**18,58**
BG	184	119,414		3,14	199	131,247		2,97
PV	8	1,251		0,03	9	1,289		0,03
WS	45				43			
Together	1640	3800,395		100,00	1744	4416,087		100,00
Change	125	719,367		23,35	104	615,692		16,20
Situation on	30.06.2013							
Renewable energy source	Number of units	The installed capacity						
		quantity	entity	%				
WI	795	3079,596	MW	**59,49**				
WO	782	968,944		18,72				
BM	33	972,872		18,79				
BG	220	153,494		2,97				
PV	14	1,750		0,03				
WS	41							
Together	1885	5176,656		100,00				
Change	141	760,569		**17,22**				

Windmills - WI
Hydro-energy plants - WO
Biomass power plants - BM
Plants burning biogas - BG
Solar energy plants - PV
Plants co-burning biomass and coal - WS

For co-burning installations capacity cannot be determined

Source: own study based on: Lis 2012, www.ure.gov.pl

Since 2013 a successive, rational calming of "green energy" market has been taking place, prices of wood waste translate onto the prices of round wood.

Dramatic reduction in the subsidies for biomass burning in the processes of generating electricity and heating stimulated power industry to limit the utilization of bio-components in their technological processes, especially wooden biomass, that is energy chips, sawdust, briquettes, pellet – generated from wood waste produced by wood industry (especially, but not only, in sawmills, or companies producing pallets and wooden packaging, as well as elements of garden architecture and so on) and from arbomass and round wood that is technologically useless[**Lis 2011b**]. It is an unexpected side effect of generally adequate process of rationalizing round wood usage in Poland. However, there are signals of uncontrolled "leakage" of that type of wood abroad mainly to Germany and Austria.

SUMMARY

Round wood prices still in 2012 were determined by energy industry and its almost unlimited demand for highly subsidized biomass burning, mainly co-burning it with wood. Changes in Polish legal regulations significantly limited that irrational burning of biomass from technologically usable wood.

There have been visible and positive changes in the way Poland understands and approaches renewable energy sources and effects of their adequate usage. From an approach that at any price aimed at reaching ratios negotiated with the European Union, that is burn any volume of biomass and in any form, so as to keep the desired ratios, to a more selective and managing approach. To burn only that biomass that is technologically useless for production (for example from wood biomass only those elements that no longer represent any value for wood industry) and at the same time to burn it in such a way so as not to lower the parameters of electricity and heating produced using installations from industrial energy sector. The possibilities of using biomass at local boilers in villages and small towns are still versatile. However, even here one needs to take into account emissions of ashes and benzoalfapyrene since they are emitted by wood being burnt.

Actions at the level of European Union are still vital regarding cross-border movement of technologically valuable biomass, especially the one generated from wood. That problem cannot be solved by any country national legislation alone.

Using biomass for the production of second generation biofuels is also very valuable, as such fuels are promoted by subsidies and EU programmes.

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RETRO-INNOVATION VERSUS FAMILY LIFE CYCLE AS A PREDICTOR OF BEHAVIOUR

Abstract: This paper describes the retro-innovations and their importance for customers in the family life cycle. The accelerated rate of technological and social change left people disconnected and suffering from stress. The majority of social problems are symptoms of future shock. New products and services are designed to connect us with the past in ways that are nostalgic, interactive and environmental. This can be called an example of a unique kind of innovation - new technologies, new products or experiences that are designed around connecting us with the past that is nostalgic. Something called Retro Innovation.

Key words: retro-innovation, innovation, family life cycle.

INTRODUCTION

Innovation is the application of new solutions that meet new requirements, inarticulate needs, or existing market needs. This is accomplished through more effective products, processes, services, technologies, or ideas that are readily available to markets, governments and society. The term innovation can be defined as something original and new that diffusions the market or into society. One usually associates it to new phenomena that are in some way important. A definition of the term, in line with these aspects, would be the following: "An innovation is something original, new, and important - in whatever field - that diffusions into a market or society (Frankelius, 2009).

In business and economics, innovation is the catalyst to growth. Economist J. Schumpeter, who contributed greatly to the study of innovation, argued that industries must incessantly revolutionize the economic structure from within, that is innovate with better or more effective processes and products (Schumpeter, 1943). In addition, entrepreneurs continuously look for better ways to satisfy their consumer base with improved quality, durability, service, and price which come to fruition in innovation with advanced technologies and organizational strategies (Heyne, Boettke, Prychitko, 2010).

The modern man gets shock from rapid changes. The accelerated rate of technological and social change left people disconnected and suffering from "stress and disorientation"—future shocked. Therefore developments in the global economy have focuses the traditional balance between customer and supplier. New communications and computing technology, and the establishment of reasonably open global trading regimes, mean that customers have more choices, variegated customer needs. Businesses therefore need to be more customer-centered. This new environment has also amplified the need to consider not only how to address customer needs more astutely, but also how to capture value from providing new products, services and customers' attitudes from different perspectives (Teece, 2010). We will focus on the perspective of retro-innovation in relation to the Family life cycle.

Family life cycle marketing is a method for separating the aspects of the family market at different stages of life. The marketing technique takes the size of a person's family into consideration, along with a potential customer's age and professional status (King, Media, 2013). We apply it in relation to retro-innovation.

With the rise in computing power, there has been an acceleration of the rate at which we build on new information technologies, leaving us clutching awkwardly for things we recognize from the past. The pace of change at times seems so overwhelming that it’s no wonder that sometimes we

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want to be transported back to an earlier era. The accelerated rate of technological and social change left people disconnected and suffering from "stress and disorientation"—future shocked. Currently retro-innovation is one of the possible tools to maintain the right balance between the accelerated rate of technological and social change, and customer companies (figure 1).

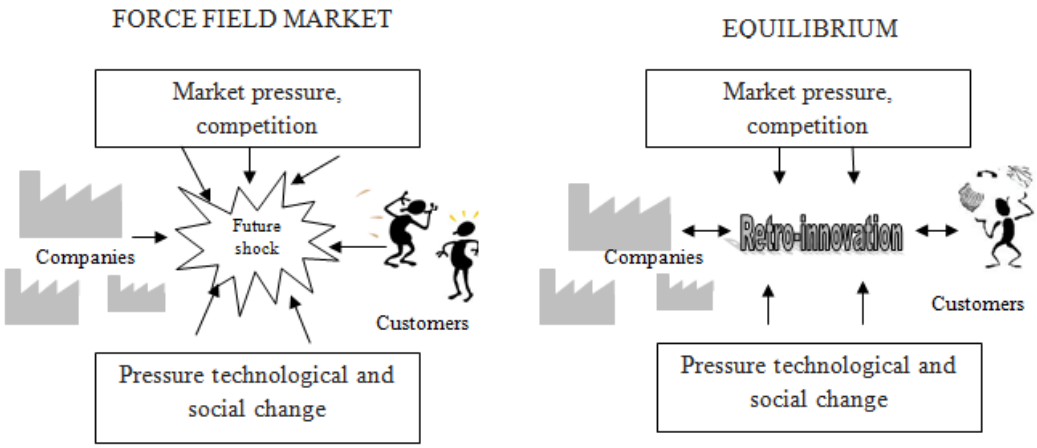

Figure 1. Future shock and relationship retro-innovation in creating a balanced market

This can be called out as an example of a unique kind of innovation - new technologies, new products or experiences that are designed around connecting us with the past that is nostalgic. Something calls as retro-innovation. Retro Innovations roughly fall into three categories:

- Innovations that authentically mimic a product or experience of the past to transport the user back into a gone era.
- Innovations that use a nostalgic format to meet a new need.
- Innovations that use a new format to meet an old need (Chunduri, 2013).

Retro-innovations express a desire to reconnect with something essential that appears to be missing from our modern lives: an appreciation of opacity; an authenticity that looks and feels real; and a more romantic relationship with business that transcends a merely transactional mechanism.

METHOD

Retro-Innovation versus Family life cycle as a predictor of behaviour, these were assessed at different stages family life cycle, as follows:

- Young single phase,
- Newly Married Phase,
- Full Nest Phase,
- Empty Nest Phase,
- Pensioners Phase.

Research method is a survey where we asked using the questionnaire of respondents. For objectivity of the survey respondent sample was defined using the following:

$$n = \frac{Z^2_{1-\frac{\alpha}{2}} * S^2}{H^2} = \frac{1,96^2 * 0,5^2}{0,1^2} = 96 \text{ respondents} \quad [1]$$

Where:

n - Sample size,

$z_{1-a/2}$ - Confidence level – 95 %,

H - Confidence interval of +/- 10 %,

s - Standard of Deviation – 0,5

In the questionnaire we asked for:

- What is a retro-innovation? (your view)
- Would you buy a retro-innovation?
- Why would you buy a retro-innovation?
- Which type of retro-innovation would you buy?

The sample size is an important feature of any empirical study. At each stage of the family life cycle 20 questionnaires were completed and the total number of respondents was 100. The results are processed into contingency tables.

RETRO-INNOVATION AND FAMILY LIFE CYCLE AS A PREDICTOR OF BEHAVIOR

The first type is an open question. All the answers can be categorized in two groups:

- Retro-product re-produced,
- Retro-design for new products.

If we divide this response rates so retro product again produced 28% answered a retro design for new products answered 72% (figure 2).

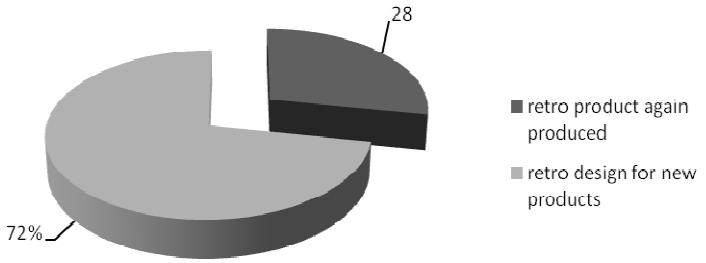

Figure 2. Types retro-innovation according to respondents

Table 1 shows the relationship life cycle of the family to buy a retro-innovation. Positive attitude towards the retro-innovation have Empty Nest Phase and Phase Pensioners - more than half would have bought a retro-innovation.

Table 1. Relationship Retro-Innovations and Family life cycle

In %	Would you buy retro-innovation?	
	yes	no
Young single Phase	5	95
Newly Married Phase	10	90
Full Nest Phase	20	80
Empty Nest Phase	75	25
Pensioners Phase	60	40

The most commonly by retro-innovation purchased as a gift (table 2). Younger phases of the life cycle of the family, as Young Single Phase and Phase Newly Married, retro-innovation buys because they are "cool". Collector answers the other question. He would have bought a retro-innovation in antiquarian collection.

Table 2. Relationship opportunities for shopping of Retro-Innovations and Family life cycle

In %	Why would you buy retro-innovation?			
	As a gift	For pleasure, I like retro style	It is "cool"	other
Young single Phase	30	5	65	0
Newly Married Phase	40	10	50	0
Full Nest Phase	70	20	10	0
Empty Nest Phase	65	30	0	5
Pensioners Phase	90	10	0	0

The Family Life cycle prefer the following types of retro-innovation, as shown in Table 3. The initial phase of the Family life cycle have mostly category other. Here you can find the retro-innovation especially like to return in retro-clothing. Gradually in subsequent phases of the Family life cycle in other categories begins indicate retro-toys and retro-clothes. And he also mentioned retro-pram. The respondents are the older, more food you want to mention your childhood and therefore their interest retro- foods (for example: the potato sugar).

Table 3. Relationship Types of Innovations and Family life cycle

In %	Which retro-innovation should you buy?			
	electronics	cars	food	other
Young single Phase	10	5	15	70
Newly Married Phase	25	0	10	65
Full Nest Phase	5	5	30	60
Empty Nest Phase	20	15	50	15
Pensioners Phase	5	15	60	20

CONCLUSION

Research shows new concept of retro-innovation. Identifies the retro-innovations and how it affects behaviour customers in relation stages of the Family life cycle versus innovation. Through segmentation we can distinguish smaller groups of your customers and therefore allow you to communicate with different types of customers in ways that are most appropriate for a given group.

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PREFERENTIAL ACQUISITION FORMS OF LEASED AGRICULTURAL LAND OF THE STATE TREASURY?

Abstract: The agricultural land lease represented a primary form of agricultural areas management of the State Treasury. One of the elements of legal protection of the lessee with the aim of securing the durability of production business, and thereby often the survival of the farms after the termination of that relation, is a special form of leased land acquisition. Among the special forms of purchase one can enumerate: a pre-emption right, the right of precedence acquisition, lease with the purchase option and the way of land privatisation provided in the Act of September, 16th 2011. This paper is an attempt to assess these instruments from the point of view of its aim execution. Since it appears that the legal position of lessees is relatively weak and the powers they are entitled to are questionable in practice.

Key words: lease, land acquisition, privatisation, ZWRSP (Agricultural Property Stock of the State Treasury – APSST), ANR (Agricultural Property Agency – APA)

INTRODUCTION

Agricultural land lease is one of the forms of land acquisition to create or enlarge existing farms. However it is an unstable institution and its termination on time and first and foremost premature can cause serious effects for running a production business, consequently also for farm functioning. Taking into consideration that the lease was a dominant form of state agricultural land management the legislator provided special forms of purchase enabling the lessee to acquire the land to secure the duration of production entities basing on that scheme. On one hand they are a form of permanent privatisation of land being a part of resources of Agricultural Property Stock of the State Treasury (APSST), while on the other hand they are a form of legal business and economical protection of the lessee which proves the importance of a discussed subject.

The aim of the paper is the assessment of legal solutions which grant the state land lessee preferential conditions of the acquisition of the leased land. Although the lessees represent the biggest part of agricultural land buyers from the Agricultural Property Agency (APA) [10], the possibilities of buying from the APSST are limited despite the existing instruments which allow them to take up the owner status. Since below presented institutions are not addressed to every entity which is conditioned even by the limits of managed land size (art. 28a of the Act on the Management of State Treasury Property) [15]). This causes a relatively unfavourable situation for those who own large-size farm land. Thereby it can be concluded that the below presented solutions represent an instrument of agricultural system creation in Poland which supports the functioning of family farms. However, in practice it turns out that also in case of those entities the preferential purchase of land leased from APA is hindered or even impossible.

PRE-EMPTION RIGHT OF STATE AGRICULTURAL LAND ACQUISITION

The first instrument worth considering which allows the lessee to purchase the leased land when meeting specific circumstances is the pre-emption right. It consists in the purchase priority of a definite thing in the situation when the owner enters into a sales contract with a third party [1]. In Poland this law results from statutory regulations as well as from the contract (art. 596 of Civil Code). According to art. 3 of the Act on the Creation of Agricultural System [16], in case of the sale of agricultural property, the lessee of the land is entitled to the pre-emption right if:

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1. the lease contract was entered in written and it includes a fixed date and if the contract was performed at least for three years from the fixed date;
2. acquired property is a part of the lessee's family farm or it is leased by a farm collective.

However, the above regulations apply only in case when the seller is a natural or legal person excluding APA. Thereby the legal position of the State agricultural land lessee is significantly weakened.

The regulations in force do not, however, exclude the possibility of contractual constitution of pre-emption rights, including the right of the APSST agricultural land lessee that they are entitled to. However, taking into consideration that when APA is entering into the contract, it uses a model contract that does not provide the pre-emption rights, so the described situation is not applicable. What's more, it must be also emphasized that legal effects of contractual pre-emption right violation come down only to compensation responsibility of the indebted party which secures the lessee's interest to a very low degree.

RIGHT OF PRECEDENCE ACQUISITION OF LAND FROM APSST

Among the solutions which enable the lessees of the state agricultural land to acquire the subject of lease the following is right of precedence acquisition which is regulated by art. 29 of the Act on the Management of State Treasury Property and other executive acts [2, 9, 15]. On that basis when APA sells the land that is leased, the lessee is enabled to purchase the land with skipping other candidates if the lease contract lasted at least for three years. In case of State Treasury land this priority will at the same time cause skipping tender sale provided by the above Act [7].

In the above way the lessee can become the owner of leased agricultural land but only when APA allocates it for sale [3]. Thereby the lessee is void of protection in a situation when APA takes a decision to develop the property in another way according to the law. It must be also stressed that allocating the land for sale which conditions the right of precedence acquisition use is in the competence of APA. Although in practice also the lessees show such initiative by proposing appropriate action, Agency is not obliged to take them into consideration. At the same time, the lessee will be entitled to the right of precedence acquisition if the previous owner or their descendents (if the agricultural land was taken over from State Treasury before 1st January 1992), or farm collective which in fact managed the property which legal usage expired according to art. 16 section 2 from 31st December 1993 (art. 38 section 1f) will not perform their rights. The Act allows such cases when right of precedence acquisition does not apply and that catalogue is additionally expanded in lease contract with APA [19].

At the same time it must be emphasized that the Act on the Management of State Treasury Property does not regulate the instances when APA violates the right of precedence acquisition. However, interpretation of law confirmed by the Supreme Court jurisdiction shows that violation of right of precedence acquisition provided by art. 29 section 1 p. 3 of the Act on the Management of State Treasury Property when entering into contract of agricultural property sale does not make the transaction invalid [8, 12, 13]. Taking the above into consideration lessees can only claim for compensation. What is more, the lessee who announced that they agree to buy the property cannot claim for entering into contract [14, 18]. In turn it proves that discussed right was regulated in such way that it does not execute the assumed aim which was to protect entities entitled including agricultural land lessees.

It is also worth stressing that the discussed institution was so far very limited in practice due to the ban on APA property sale which is in force since 1997. It concerns the properties that were put in reprivatisation claims (approximately 500 thous. ha of land) [10, 12]. However, taking into consideration that in 2010 that ban was lifted, the right of precedence acquisition regained its meaning as an instrument which allows the lessee to acquire the leased agricultural land and thereby contributing to stabilisation of running the production business.

STATE TREASURY AGRICULTURAL LAND LEASE WITH ACQUISITION RIGHT

A special kind of APSST agricultural land lease should draw one's attention which is provided by art. 38a of the Act on the Management of State Treasury Property. Under this regulation state land can be leased to natural or legal person with securing the lessee the right to acquire the leased land no later than with the contract expiration date [11]. In this case the rent equals the value of the land divided by the number of years of the contract and the interest of the amount to be due. In turn the rent determines the value of the contractual obligation of the anticipated sale contract. In this contract the price is set as a sum of the value of the leased land and due interests for the period from the contractual entering date. The rent paid till the day of signing the contract is regarded as the advance on price. The above regulations are a kind of so-called agricultural leasing [4].

From economical point of view agricultural land lease with the acquisition option is a form of property purchase on instalments with the condition that the ownership is passed from owner to the leaseholder no sooner than when at least a part of the price is paid. Since the lease rent is an advance on the price. Taking into consideration that gained fruits should allow to pay the rent, potential buyer gets an opportunity to purchase the land thanks to managing it. However, it is hard to define clearly whether the above way of purchase is more beneficial for the lessee than buying the land basing on credit or on hire purchase. For it involves higher instalments and does not guarantee the transfer of title of ownership which in case of other credit forms is performed at signing the contract. However, on the other hand, agricultural leasing does not require the first instalment on the level of 10% or 20% of the agricultural land value.

At the same time it must be stressed that the leaseholder is not protected in case of terminating the lease contract before expiration date. For in that case the rent paid is not returned. In turn, taking into consideration that the rent is higher than in case of classical lease the lessee bears severe financial effects of contract termination. However, according to the position of A. Lichorowicz the lease contract with the purchase option is a kind of pre-agreement which causes that APA has no option to withdraw from the undertaken sale commitment [4]. Entering into a sale contract in the circumstances of the Agency will lack can be replaced with the court judgement. An opposite position represents A. Oleszko, according to whom, the lessee has no guarantee that the land and they can only claim compensation which is conditioned to occurrence and proved damage [6]. Additionally, the legislation lacks regulations of the effects of premature termination of the lease contract e.g. instant notice of lease in situations defined by law.

On the other hand, it is worth emphasising that the leaseholder has no obligation to use the agricultural land right of precedence acquisition. However, in parallel with art. 709^{18} of Civil Code the lease contract with the purchase right must be classified as a direct leasing, therefore it is necessary to apply proper leasing regulations. That, in turn, causes negative effects for agricultural land leaseholder in the form of their responsibility for land usefulness to the contractual use and the effects of potential loss of the object of lease as well as the obligation to pay all the instalments in case of notice of lease on their side. Taking the above into consideration, the doctrine points out that applying regulations of direct leasing to the lease with the acquisition option is unjustified from the point of view of the lease essence and features that it should characterise [4].

In practice the lease contract with the acquisition right was a form really rarely used by APA which was influenced inter alia by the ban on selling the property that was put in reprivatisation claims [12]. Since 2010 one could expect intensification of that lease form, however, owing to intensified privatisation processes of state agricultural lands it can be expected that still the lease contract with the acquisition rights will play only supporting role. The key role will be played by the APSST land sale though the lease with the acquisition rights due to the agricultural policy should be favoured over lease in the strict sense. The above would require the legislator's intervention, which would stipulate that to the lease regulations with acquisition rights one should apply the lease and not leasing rules.

APSST AGRICULTURAL LAND PRIVATISATION IN THE VIEW OF THE ACT ON THE MANAGEMENT OF STATE TREASURY PROPERTY AMENDMENT

The opportunity of leaseholders to purchase the agricultural land leased from APA became exceptionally important along with the pursuit of public authorities to accelerate the privatisation of the State Treasury agricultural properties which is reflected in the Act of 16th September 2011 [17]. According to art. 4 section 7 of that Act the lessee who agreed to make changes in the lease contract, which consists in excluding 30% of utilised agricultural areas (UAA) from the lease contract, is entitled to buy it all or with the consent of the Agency a part of the property which was a lease contract object on the rules defined in the Act on the Management of State Treasury Property along with the right of precedence acquisition irrespective of an actual lease contract expiration date.

Through that regulation the legislator tried to expand the leaseholders rights in the field of leased agricultural land acquisition. The improvement of leaseholders situation occurred only in connection with the abolition of minimal contract time. Thereby it considers only those entities which entered into the lease contract relatively not long ago. Accusation which should be addressed against the legislator is first of all, the lack of regulations of legal effects of property sale skipping the right of precedence acquisition, which was described above.

At the same time it must be pointed out that the legislator had foreseen negative effects for the lessee of the lack of consent to exclude 30% of the leased land from the contract. In case of rejection of suggested by APA changes and in situation when the contract changes are not made on the lessee's account the leaseholder right of precedence acquisition to acquire the leased land is excluded (art. 4 section 11 of the Act of 16th September 2011). Possibility to enter into contract without putting the land out to tender is not applicable when the outgoing leaseholder will announce that they want to continue the lease on the new conditions set by APA. Although regulating the exclusion of 30% of the UAA form the lease the legislator did not envisaged compulsory regulations (there are no orders or bans) the above regulation are doubtful in terms of compatibility of the Polish constitution [5].

CONCLUSIONS

The above deliberations served the assessment of the possibility to purchase the APSST agricultural lands by the leaseholder with the transfer of ownership title of the contractual object. To do so, legal instruments were characterised. Those instruments were designed to contribute to secure (in the lessee will) the farm continuity on the leased land by the same entity despite the lease contract expiration, thereby to protect farmers' interests. The application of pre-emption right, right of precedence acquisition and the lease contract with the acquisition right and the solutions designed in the Act of 16th September of 2011, in relation to state arable land, was presented, in connection with the acceleration of the processes of agricultural state property privatisation.

Concluding, the fact that in the situation of a sale of APSST land the leaseholders position is relatively weak, is worth stressing. Basically, they have no possibility to use the pre-emption right, and the right of precedence acquisition was granted to other entities in the first place. Moreover, the lease with the acquisition right, due to the reprivatisation claims, was not applicable in practice and the purchase of land due to the state land privatisation policy is conditioned by fulfilling unfavourable conditions from the point of view of the leaseholder. Additionally, not all categories of the lessees are entitled to use all legal solutions of the leased land acquisition and owing to area limits the owners of big farms are relatively less protected. Thereby, the possibility of leaseholders to acquire the leased land must be considered only an illusory instrument of legal APSST land lessee's protection.

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THE ROLE OF CODE OF ETHICS IN CREATING ENTERPRISE'S SAFETY CULTURE

Abstract: The paper presents the role of business code of ethics in the process of building safety culture within an enterprise. The paper is based on the assumption, that an effective safety culture of an enterprise, must be founded on the values espoused by its employees. The issues of health and safety are rarely addressed in the enterprises' codes of ethics. The paper presents the essence and functions of code of ethics, process of its formation, the importance of health and safety records in these codes.

Key words: enterprise's code of ethics, safety culture, safety climate, work risk-awareness, reflexive law

INTRODUCTION

The majority of contemporary enterprises wants to act in accordance with the principles of sustainable development, writes codes of ethics containing constitutive rules for the operation of the company, often based on a particular ethical system. According to Holger Rogall 'core values, which can amount to the principles of sustainable development and for which people have an innate respect, are, inter alia: the pursuit of harmony, the desire to be loved, freedom for all people, the desire for justice and accountability' [Rogall, 2010].

Responsibility and reflectivity are inherent principles and skills in the implementation of occupational health and safety. Even during the selection process of candidates to work, the competence of responsibility and reflectivity in field of health and safety is checked by using the same methods. The issues of reflection and risk-awareness have been analyzed in this paper.

Safety culture desired in the enterprise is being created in order to induce employees to conduct operations, in a way, oriented on their health and life protection, as well as, on the well-being of their co-workers and all persons affected in any way by the operation of the company. High safety culture is associated with a sense of personal responsibility of each employee for security matters, manifested in their daily work.

The purpose of this article is to show, that the effective implementation of a safety culture, thus ensuring a safe workplace and creating the "reflective", healthy communities, is strengthened by the records of safety rules contained in enterprises' codes of ethics.

The paper presents the essence and functions of code of ethics, process of its formation, the importance of health and safety records in the codes. The work demonstrates the importance of wider phenomenon - safety culture, which constitutive document should be the code of ethics, and the impact of a safe workplace on staff morale.

WORK SAFETY IN THE ENTERPRISE'S CODE OF ETHICS

Placing safety rules in the code of ethics and thus their preservation, is essential to the proper functioning of the enterprise. The phenomenon of culture is perceived as observed behavioral regularities, group norms, espoused values, formal philosophy, rules of the game, climate, embedded skills, habits of thinking, shared meanings, root metaphors. Some of these usages focus on values. In order to establish a values based strategy for health and safety inside an enterprise, major stakeholders need to be mobilized, since a healthy workplace plan must be integrated into the enterprise's business goals and values. That is why, there is a need to gain acceptance and support

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from owners, senior managers, union leaders or informal leaders. It is critical to get that commitment before trying to proceed. Another factor is providing key evidence of this commitment by developing and adopting a comprehensive policy, that is signed by the enterprise's highest authority and communicated to all workers. Only a strategy developed that way indicates, that healthy workplace initiatives are part of the organisation's business strategy [WHO 2010].

The code of ethics should be focused on accountability. The responsibility referred to by the economists of sustainable development, is seen primarily as taking responsibility for the implementation of the principles of justice within and between generations. Responsibility is understood in this trend as a willingness to act for others, to protect the world, future generations and ourselves [Rogall, 2010].

Codes of ethics are documents referring to the phenomenon, that in the American legal literature is called *reflexive law*, unlike the substantive law, constituted by the state, which indicates the permitted and prohibited actions, responsibilities of companies in relation to the business activity (e.g. pollution standards, regulations of work health and safety, etc.). Reflexive law, begins where the substantive law ends – its task is a procedural instantiation and customization of legal norms by internal regulations [Gasparski & Lewicka-Strzałecka, 2011].

The studies have shown, that in well-established, strong ethical cultures, employees feel connected and committed to the company, and so the company is better protected against transgression of the written standards. The managers are held responsible for the creation of "ethical climate", that is designed to help members of the organisation in solving dilemmas of everyday work [Bartels, 1998].

The tool supporting the management of an enterprise and the creation of ethical climate is ethical audit, in which following issues are being analyzed:

- values guiding the employees at all levels;
- conduct consistent with identified values (concerning the management and the employees);
- obtaining the desired effect in social and natural environment of an enterprise [Gasparski, 1999].

Code of ethics is a directory of standards of conduct, defining the treatment and behaviour of employees, which purpose is not to create new standards, but to strengthen these constituting a part of values systems and are desirable from the perspective of an organisation, its strengthening; explanation of deviations from the general ethics, which are motivated by specific job or function in a particular organisation. As Ija Lazari-Pawłowska has pointed out, that: '(...) codes or their portions are usually developed with a view to correct the actual state, to pull-up to the indicated pattern, it is desired, that the formulated norms internalize in a group of recipients and, that it would be reflected in their sphere of conduct' [Lazari-Pawłowska, 1992].

THE CONTENT OF THE ENTERPRISE'S CODE OF ETHICS

Normally code of ethics contains the following content:

1. reference to settled in tradition, employees' value system;
2. target groups - stakeholders of the company - code of ethics directly affects the behaviour of employees, but also other enterprises' satellites;
3. instructions on behaviour in conflict situations;
4. framework for the use of power resulting from the post;
5. rules on the usage of company resources for personal gain;
6. definitions of behaviours and situations or proceedings affecting the code;
7. description of the possible penalties for violation of the code of ethics.

On this list, there is no reference to safety and health at work - stimulating, recording of the employees' risk awareness and written commitments of specific employer (not so much on issues,

that have already been regulated by law, as in the fields of training or improvement of labour standards). This area is usually ignored or, at best, results indirectly of other rules. The contents of the code of ethics (internal, non-official paper) are usually repeated in the work regulations, an official document, which may be relied upon external institutions. This does not happen, however, if the area of occupational health and safety - widely described principles in work regulations, has no roots in the code of ethics. Such situation has got its consequences: the standards of health and safety arising from shared values, which are not included in the code of ethic, have no chance to be "imprinted" in consciousness of workers, as it is with other rules. Saved only in work regulations, as in the overriding document, health and safety standards are seen only as enforceable rules from the employer, not as an ethical obligation to the employee.

The functioning of the code of ethics makes sense only if the document is gaining the support of all the organisation's members. It is also crucial to carry out monitoring, which would allow to assess, whether all employees comply with the principles of the code. Aside from the efforts for transparency and understanding of the document, employees should be encouraged to further meetings and consultations with members of the project team. The process of creating a code of ethics is too tedious and long, that in effect the provisions of the document were not followed. Respect for the written standards and the strength code of ethics lies in the consistent enforcement of the rules and drawing consequences from misdemeanours.

With the introduction of a code of ethics, in the organisation should appear other programs supporting the code of ethics, such as the handbook of professional standards, promotion of behaviours consistent with the code of conduct (awards, publications, seminars), continuous monitoring of compliance with the ethical and professional standards; creating ethical helpline; systematic auditing of ethics, the process of correcting the code of ethics and conducting periodic updating [Gasparski, 2011]. In code of ethics created and implemented that way, desired behaviours arising from the specific health and safety standards, would certainly be properly consolidated.

The most frequently mentioned benefits of having a code of ethics in a company, are, inter alia:

- improvement of work efficiency (the result of a coherent values' structure);
- autonomy of employees in decision-making;
- strengthening the positive image of the company;
- reducing the phenomena of corruption or embezzlement;
- conflicts' reduce;
- increase of confidence of the customers, clients and partners.

The first three aspects are directly related to the determination and respect for the principles of health and safety, however, lacks provisions explicitly dealing with this area. Undoubtedly, this is because the competence of safety awareness is not easy to train. Standards and rules for dealing with risk accepted in certain organisation, determine when the risk is significant and requires an appropriate response, and when it can be skipped or ignored. Attitudes towards safety apply to individual and group beliefs associated with the importance attached to safety. Reflectivity connected with safety is related to learning, that is, drawing conclusions from the results of undertaken actions and appropriate responses to new and unknown threats.

MINDFULLNESS AND RISK-AWARENESS IN MANAGEMENT PROCESS

In the literature, we can find the description and interpretation of the phenomenon of mindfulness and risk-awareness. One of such interpretations says, that risk-awareness is synonymous with mindfulness at the level of the individual. While this is certainly one of the aims of a mindful enterprise (or more broadly an organization), it cannot be equated with organisational mindfulness. A strategy to develop organisational mindfulness it is unlikely to succeed. As employees become more risk-aware they are more likely to report matters of concern and more likely to make suggestions for safety improvements. If the organisation discourages reporting and

fails to act on information and suggestions coming from its workforce, employees will quickly become disillusioned. The strategy will then be seen as an attempt to transfer responsibility for safety from the employer to the employee and to blame workers for being insufficiently risk-aware when things go wrong. If, on the other hand, the strategy of promoting risk-awareness among employees goes hand in hand with a commitment to mindfulness as far as the whole organisation is concerned, safe functioning becomes a real option [Hopkins, 2002].

Contemporary health-and-safety-orientated companies try to create collective mindfulness at workplace. The main assumption is, that only mindful organisations will generate mindful individuals, since the mindfulness at the individual level is actually the ultimate aim. Mindful organisations are defined as the ones, inside which people begin to expect mindfulness from one another. The concept of safety culture illuminates what it means to create a culture of mindfulness [Weick & Sutcliffe, 2001].

Safety culture of an organisation is an assembly of characteristics and attitudes in organisations and individuals which establishes that as priority [Reason, 2000]. The idea of safety culture is attractive for companies since it promises to overcome previous limitations of their safety systems. Safe behavior strategies are aimed at culture change. The main assumption is to transform the behavior of individuals by creating a culture of compliance with rules and procedures. Only when applied to the behavior of managers, is there a potential for changing organisational practices [Hopkins, 2002].

The 2008 Seoul declaration on safety and health at work, says also, that safety work environment is a fundamental human right. The United Nations Global Compact has been established, which is a voluntary international leadership platform for employers. It recognizes the existence of universal principles related to human rights, such as labour standards.

The practice of operation of the business organisations indicates, that there are three main levels of organisational culture: artefacts - visible, readily observable, values - often hidden, apparent and the "public" assumption - completely hidden. In the process of developing a safety culture, the organisation needs:

- commitment and leadership of the management (direct involvement in health and safety issues);
- safety as a core value of a company (taking into account health and safety issues in their daily work, and by planning and implementation of organisational, technological and personnel changes);
- information and communication (clear line between tolerable error and guilt).

Within the discussion of organisational safety culture, often raises the question of the importance of safety-orientated leadership. As shown by numerous studies in the field of human resource management, direct supervisors have the greatest influence on socialization to work [Makarewicz-Marcinkiewcz, 2009]. Workplaces with active, visible safety leadership have fewer injuries, are often rated as better work places and have more satisfied, more productive employees who are less likely to change jobs [OSHA, 2002].

Judith Erickson [1997] found, that in high safety enterprises, management communication is honest, open and understandable, employees are treated with respect, receive positive feedback and suggestions are encouragement. The author sustains, that if safety is integrated seamlessly into the company as a core value, the results within individual organisations are not surprising.

Great Place to Work (GPTW) Institute compiles a list of the best places to work in the United States. The institute distributes a 57-item employee survey called the Great Place to Work Trust Index to several hundred randomly selected employees at each company [Levering, 2004]. The GPTW Institute's research help companies to improve corporate performance and raise the quality of work for their employees. What is more, using stock market performance indicators, the data

illustrate that the publicly traded best companies consistently outperform other major stock indices [Lyman, 2007].

The research demonstrate, that occupational safety and health performance, as well as, safety-orientated management, is a significant component of employee morale. In fact, organisations with high levels of employee morale have fewer inspections, since they notes fewer accidents and complaints, serious, repeat violations, and lower monetary penalties. The results also demonstrate, that occupational safety and health performance should have greater importance in enhancing employee morale as companies seek to move from good to great. While safety initiatives are an important factor in helping organisations in the process of improving, it is the psychological safety initiatives that appear to be a key component in an organisation's improvement [Behm 2009].

CONCLUSIONS

One of the essential, universally accepted ethical principles is to do no harm to others. In the workplace, this means ensuring employees' health and safety. Long before national labour and health regulations came into being, business entrepreneurs learned that it was important to attach to certain social and ethical codes related to workers, as part of their role in the broader community and to ensure the success of their attempts. Creation and implementation of the enterprise's safety culture, first require clear instructions, then the effective stimulation - in these processes an important role play the relevant provisions in the code of ethics.

Duly written code of ethics is based on correctly diagnosed value system, which is shaping personality, is a component of worldview and influences the behaviour of employees. That is why, it is so important to recognize the value system of the members of the company in which the management wants to build safety culture, their level of reflectivity and risk-awareness. It would be best to build a coherent system of standards based on ambient's values and attitudes, recorded in a long process of socialization. Values and attitudes towards safety are changing, so there might be a need to modify the code of ethics in this regard. Concluding, the analysis of the role of code of ethics in creating the enterprise's safety culture it must be firmly noted, that only the codes of ethics built on existing, actual values will be respected.

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Elżbieta Mikołajczak[10]

ECONOMIC ASPECTS OF PROCESSING SAWMILL RESIDUE INTO BRIQUETTES

Abstract: Systematic increase of demand for wooden biomass and fuels generated from it is the result of the need to fulfill European Union obligations. For those sawmills which very often operate on the verge of profitability it creates a chance for improving their efficiency. Those having a sufficient amount of raw material at their disposal should consider launching production of wooden briquettes, as such initiative does not require any significant investment and may be complementary to company primary activities. Profitability of such venture depends on numerous variables. The aim of this article was to determine the value of sawmill residue when processed further into briquettes taking into account the impact of various factors. The research took account of: material intensity ratio depending on the material used, sales price per unit of final product, the entrepreneur's target margin, briquettes production cost as well as the cost of transport in case of those enterprises which do not possess their own raw material.

Key words*:* sawmill residue, wooden briquettes, profitability of processing

INTRODUCTION

Situation on the market of sawmill residue indicates that the demand for wooden residue as well as fuels based on it will be systematically growing. Such forecast is mainly the result of the need to fulfill European Union obligations for renewable energy share in the final gross energy consumption. In the Directive 2009/28/WE concerning promotion of usage of energy from renewable resources among other issues national general targets in respect to that have been laid down. (Figure 1).

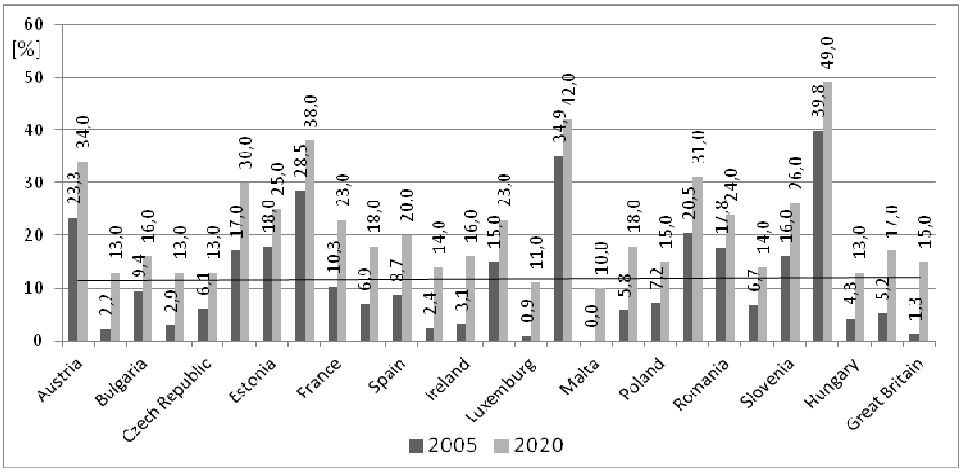

Figure 1. National overall targets concerning the share of renewable sources in the gross final consumption of energy in 2020 compared with year 2005

Source: [Energia ze źródeł odnawialnych 2012]

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The structure of obtaining renewable energy in Poland is dominated by biomass. Its most accessible and especially valuable for energy form is wood, wooden residue and based on it wooden fuels. Interest in wood as energy source is the result of its price competitiveness in comparison with many conventional fuels. The increase in demand for post-production wooden residue may also be the result of the need for diversification of energy sources, recently annoying uncertainty of supply of important for Poland energy sources such as natural gas and petroleum. Biomass is mainly used to generate heating by distributed small and medium power units (local boiler-houses and individual furnaces) and by large electrical power and heating stations which generate electricity from co burning in condensing coal boilers [Sobolewski i in. 2010].

The easiest form of wooden fuel is wood cut into pieces. Process of possessing it consists of felling a tree, separating branches from the trunk and cutting it into smaller elements. Such wood is also a by-product obtained during technological processes of mechanical wood processing. Material obtained in such way may be further ground in mechanical chipper. Chips obtained that way are more homogenous, due to which drying process aimed at increasing calorific value of that fuel is more efficient, while transport and loading becomes easier [Rybak 2006]. In the group of highly processed wooden fuels one can find wooden briquettes and wooden pellet. Production of pellet – wooden fuel of the highest level of processing consists of subjecting dried and adequately ground sawdust to high pressure and temperature. The final product due to low moisture content (about 10%) is characterized with far higher calorific value than wood in pieces and chips. At the same time its increased density makes burning process slower which further reduces the frequency of additional supply of that fuel. Processing briquettes is similar to processing pellet and only the moisture content of the final product in this case may be higher – about 12%, plus its large size is sometimes an obstacle for using it in some boilers and furnaces burning biomass. However costs related to energy consumption incurred during production process are lower due to the possibility of using less ground sawdust than in case of pellet production.

Easier technology of briquettes production means significantly lower investment level than at pellet production. As the result the barrier to enter briquettes markets is lower which makes the decision concerning launching production of that fuel much easier yet it also means significant thread from competition. New enterprises increase production capacity in this sector what can easily lead to fast decrease in prices and simultaneously decrease of profitability level of those enterprises already on the market.

METHODOLOGY

Calculation of the value of sawmill residue being processed into any wooden fuel may be carried out using the following formula [Mikołajczak 2011]:

$$W_{pub} = \frac{1}{a}\left[c_j \left(1 - \frac{m_j}{1-p} \right) - k_{jp} - k_{jt} \right] \qquad [\text{PLN/m}^3] \qquad (1)$$

where:

W_{pub} – Value of wooden residue being processed into any wooden fuel [PLN/m^3],
a – The amount of basic material (wooden residue) necessary to generate one unit of a given wooden fuel (material intensity ratio) [m^3/t, mp/t].
c_j – Sales price per unit of a given wooden fuel [PLN/t],
m_j – Target net profit margin satisfactory for an entrepreneur , m_j: {0,01; 0,05; ... 0,15},
p – Corporate Income Tax (CIT), in 2013 = 0,19,
k_{jp} – Cost per unit of processing wooden residue into a given wooden fuel including the remaining operational cost per unit [PLN/t],

k_{jt} – Cost of transporting a unit of wooden residue to the place where it will be processed in case it takes place outside the place of its origin [PLN/t],

Research carried out considered an entrepreneur who either uses his own material generated at his sawmill or the one who has to purchase that raw material on the market. Calculations were carried out taking into account three levels of margin: 5%, 10%, and 15% and production lines generating either 1 t/h or 0,250 t/h. In case of lower output it has been optionally accounted for both the possibility of using second-hand equipment or eliminating drying from technological process: (variant II) and both drying and grinding (only briquetting press – variant III). The value of various groups of post-production residue processed into briquettes has been presented in Tables 1 and 2.

RESULTS AND ANALYSIS

Obtained results show that the biggest increase in the value of sawmill residue being processed into briquettes may be expected using production line for chipwood with capacity of 1 t/h. Their value depending on the level of margin and the size of packaging used may reach from 209,92 PLN/m3 to 276,77 PLN/m3. Wet sawdust has the lowest value between 17 PLN/m3 and 118,8 PLN/m3. Just to compare prices of unprocessed chipwood in December of 2012 amounted to 105 PLN/m3, and prices of wet sawdust reached 103 PLN/m3.

In case of briquettes sold in big bag packaging the value of chipwood post-processing increases by 117%, and when sold in small bag packaging and loose by approximately 100%, even for the highest margin level of 15% (Figure 1). Purchasing raw material for processing which entails the need to incur additional cost of transport at the same margin level will result in slightly lower increase in the value of each group of wooden residue respectively for different types of packaging: by 94% and 77%. Due to that entrepreneur buying pulp chips for further processing, is unable to reach 15% net profit margin. Using new 0,250 t/h production line guarantees high 50% increase in value of wooden residue in a form of wet sawdust for the entrepreneur who has that residue at his disposal and processes it into briquettes assuming the highest margin level. Slightly lower, 40% increase in the value of that residue will be obtained by the same entrepreneur if he chooses to use dry sawdust. Using second-hand equipment will enhance the ratios by 10%. Producer processing dry wooden residue (carpentry shop) should give up on buying drying plant. The increase in value of chipwood will then amount to 88% or even 103%, while in case of dry sawdust the increase will reach 89% to 95%, depending on the condition of equipment in use (new/second-hand). When the producer will be using only dry sawdust his production line is limited only to briquetting press. Due to that the value of used raw material following processing will increase by almost a 100%. The increase in the value of wooden residue being processed into briquettes 0,250t/h production line has been presented in Figure 2.

CONCLUSION

For an entrepreneur in possession of wooden residue production of briquettes on the line of higher production capacity constitutes a more profitable alternative when compared to sales of all groups of unrefined residue enabling him to reach at least 15% margin. The need to purchase raw material, as generating costs of transport makes processing pulp chips unprofitable. Decreasing production line capacity from 1 t/h to 0,250 t/h, lowers the value of individual types of residue by several or even a dozen percent. An entrepreneur who needs to buy raw material at such low production capacity will not reach15% return on sales for the fuel produced from both types of residue. Comparing the value of all analyzed types of wooden residue allows to draw a conclusion that the most profitable is selling the final product in big bag packaging.

Table 1. Value of individual sawmill by-products converted into briquettes on the line with capacity of 1,0 t/h

Type of raw material	Moisture[%]	Type of packaging		Price of Raw material	Ratio of raw material consumption a		1/a	Price of briquettes	Conversion cost	Value of by-products processed into briquettes excluding cost of transport [PLN/m^3]			Cost of transport	Value of by-products processed into briquettes including transport [PLN/m^3]		
										level of margin				level of margin		
				[PLN/m^3]	mp/t	[m^3/t]	1/[m^3/t]	[PLN/t]	[PLN/t]	0,05	0,10	0,15	[PLN/t]	0,05	0,10	0,15
Sawdust	10	bb		120	6,8	2,24	0,45	614,00	93,86	217,01	199,95	182,90	68,00	186,41	169,35	152,30
		sb		120	6,8	2,24	0,45	648,00	130,68	214,79	196,79	178,79	68,00	184,19	166,19	148,19
		luz		120	6,8	2,24	0,45	573,00	87,36	202,62	186,70	170,79	68,00	172,02	156,10	140,19
	50	bb		103	7,2	2,37	0,42	614,00	130,12	187,31	171,39	155,47	72,00	157,07	141,15	125,23
		sb		103	7,2	2,37	0,42	648,00	166,94	185,24	168,45	151,65	72,00	155,00	138,21	121,41
		luz		103	7,2	2,37	0,42	573,00	123,62	173,88	159,03	144,17	72,00	143,64	128,79	113,93
Chips	25	bb	D	120	4,2	1,76	0,57	585,00	136,39	235,12	214,54	193,96	42,00	211,18	190,60	170,02
			P	151	4,2	1,76	0,57	614,00	136,39	250,63	229,03	207,43	42,00	226,69	205,09	183,49
		sb	D	120	4,2	1,76	0,57	599,00	173,21	221,62	200,55	179,47	42,00	197,68	176,61	155,53
			P	151	4,2	1,76	0,57	648,00	173,21	247,83	225,03	202,23	42,00	223,89	201,09	178,29
		luz	D	120	4,2	1,76	0,57	545,00	129,89	217,44	198,26	179,08	42,00	193,50	174,32	155,14
			P	151	4,2	1,76	0,57	573,00	129,89	232,41	212,25	192,09	42,00	208,47	188,31	168,15
	50	bb	D	120	5,0	2,10	0,48	585,00	142,86	194,89	177,56	160,23	50,00	170,89	153,56	136,23
			P	151	5,0	2,10	0,48	614,00	142,86	207,95	189,76	171,57	50,00	183,95	165,76	147,57
		sb	D	120	5,0	2,10	0,48	599,00	179,68	183,52	165,78	148,03	50,00	159,52	141,78	124,03
			P	151	5,0	2,10	0,48	648,00	179,68	205,59	186,39	167,19	50,00	181,59	162,39	143,19
		luz	D	120	5,0	2,10	0,48	545,00	136,36	180,00	163,85	147,70	50,00	156,00	139,85	123,70
			P	151	5,0	2,10	0,48	573,00	136,36	192,61	175,63	158,65	50,00	168,61	151,63	134,65
Wood waste	25	bb		105	3,5	1,47	0,68	585,00	141,87	276,77	252,22	227,66	35,00	252,97	228,42	203,86
		sb		105	3,5	1,47	0,68	599,00	179,19	260,33	235,18	210,04	35,00	236,53	211,38	186,24
		luz		105	3,5	1,47	0,68	545,00	135,37	255,67	232,80	209,92	35,00	231,87	209,00	186,12

bb – big bag, sb – small bag, luz – sales in bulk
D – defibered chips, P – pulp chips

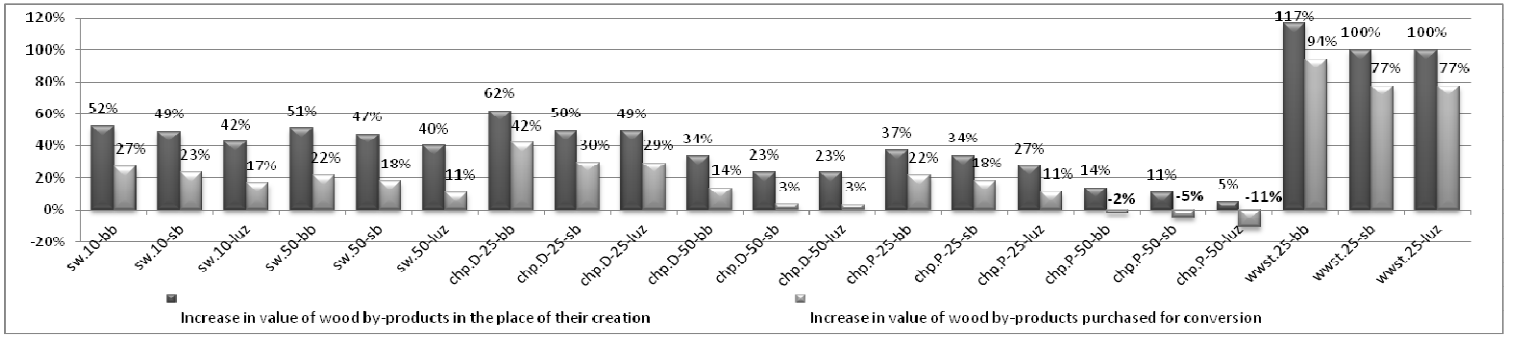
Source: own elaboration

Table 2. Value of individual types of sawmill by-products converted into briquettes on the line with capacity of 0,250 t/h

Variant	Type of Raw material	Moisture [%]		Price of raw material [PLN/m³]	Ratio of raw material consumption a		1/a 1/[m³/t]	Price of briquettes [PLN/t]	Conversion cost [PLN/t]	Value of by-products processed into briquettes excluding cost of transport [PLN/m³] poziom marży - margin level			Cost of transport [PLN/t]	Value of by-products processed into briquettes including transport [PLN/m³] poziom marży - margin level		
					mp/t	[m³/t]				0,05	0,10	0,15		0,05	0,10	0,15
New line																
I	Sawdust	10		120	6,8	2,24	0,45	648,00	148,74	206,67	188,67	170,67	68,00	176,07	158,07	140,07
		50		103	7,2	2,37	0,42	648,00	185,00	190,35	172,35	154,35	72,00	157,95	139,95	121,95
	Chips	25	D	120	4,2	1,76	0,57	599,00	191,27	166,84	150,20	133,56	42,00	147,94	131,30	114,66
			P	151	4,2	1,76	0,57	648,00	191,27	175,03	158,23	141,43	42,00	157,39	140,59	123,79
		50	D	120	5,0	2,10	0,48	599,00	197,74	153,00	137,47	121,94	50,00	132,00	116,47	100,94
			P	151	5,0	2,10	0,48	648,00	197,74	172,31	155,51	138,71	50,00	151,31	134,51	117,71
	Wood waste	25		105	3,5	1,47	0,68	599,00	197,25	248,05	222,90	197,76	35,00	224,25	199,10	173,96
II	Sawdust	10		120	6,8	2,24	0,45	648,00	129,41	272,80	250,00	227,20	68,00	215,47	211,24	188,44
	Wood waste	8-12		115	3,5	1,47	0,68	599,00	149,01	235,42	214,34	193,27	35,00	238,05	194,39	173,32
III	Sawdust	10		120	6,8	2,24	0,45	648,00	122,36	276,81	254,01	231,21	68,00	155,18	215,25	192,45
second-hand line																
I	Sawdust	10		120	6,8	2,24	0,45	648,00	125,84	216,97	198,97	180,97	68,00	186,37	168,37	150,37
		50		103	7,2	2,37	0,42	648,00	162,10	200,65	182,65	164,66	72,00	168,25	150,25	132,26
	Chips	25	D	120	4,2	1,76	0,57	599,00	168,37	177,14	160,51	143,87	42,00	158,24	141,61	124,97
			P	151	4,2	1,76	0,57	648,00	168,37	184,64	167,84	151,04	42,00	167,00	150,20	133,40
		50	D	120	5,0	2,10	0,48	599,00	174,84	162,62	147,09	131,56	50,00	141,62	126,09	110,56
			P	151	5,0	2,10	0,48	648,00	174,84	181,93	165,13	148,33	50,00	160,93	144,13	127,33
	Wood waste	25		105	3,5	1,47	0,68	599,00	174,35	263,62	238,48	213,33	35,00	239,82	214,68	189,53
II	Sawdust	10		120	6,8	2,24	0,45	648,00	116,43	280,19	257,39	234,59	68,00	241,43	218,63	195,83
	Wood waste	8-12		115	3,5	1,47	0,68	599,00	136,03	242,82	221,74	200,67	35,00	222,87	201,79	180,72
III	Sawdust	10		120	6,8	2,24	0,45	648,00	111,15	283,20	260,40	237,60	68,00	244,44	221,64	198,84

bb – big bag, sb – small bag, luz – sales in bulk
D – defibered chips, P – pulp chips

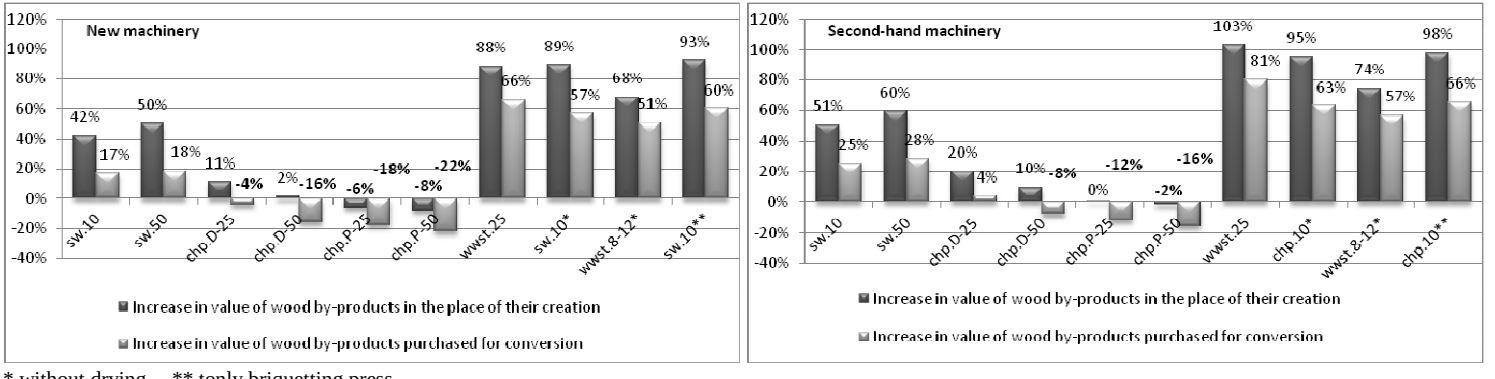
Source: own elaboration



sw – sawdust, chp. – chips, wwst – wood waste

Figure1. Increase in value of wood by-products as the result of converting them into briquettes on the line with capacity of 1,5t/h, at 15% margin

Source: own elaboration



* without drying ** tonly briquetting press

sw – sawdust, chp. – chips, wwst – wood waste

Figure 2. Increase in value of wood by-products as the result of converting them into briquettes on the line with capacity of 0,250 t/h, at 15% margin, type of packaging only small bag

Source: own elaboration

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Magdalena Olkowicz[11]

THE PORTFOLIO MANAGEMENT AS SUPPORT THE DEVELOPMENT OF NEW PRODUCTS IN THE FURNITURE INDUSTRY – PART II

Abstract: Portfolio management has received a stable and central position both in project management research, product development management research, and companies' management practices during the past decade. Moreover, it has become a central way for companies to manage their product development efficiently and effectively. Developing new products rapidly to enter new markets and capture market share may lead to designing a diverse range of products. The viewpoint presented in this article and its first part, may enable initial evaluation of product portfolios and their management over time conducted for the selected furniture factories. The research was carried on in the second half of 2011 in three large furniture (case goods) companies. The main results indicate that old products constitute on average about 30 – 55% of monthly sales. Also, there are two options for furniture manufactures: either to direct toward implementation of new furniture collections assuming their life cycles to be as long as possible, or launching new products more frequently but with the awareness of their shorter life cycles.

Key words: product development, new product, old product, product portfolio management, product mix, furniture industry.

INTRODUCTION

Offering a wide variety of products is a well-accepted strategy that companies may adopt to meet the different needs of customer groups. Nevertheless, developing new products rapidly to enter new markets and capture market share may lead to designing a diverse range of products, resulting in the formation of a heterogeneous product portfolio in terms of the components used in each product and (or) the manufacturing processes used to produce the components. A heterogeneous product portfolio is one that has no common or a minimum set of shared components and (or) manufacturing processes [Salhieh 2007]. In the large case goods companies similar problems also could be encountered. The most important in determining the final size of product range at a furniture company are: new product strategies, the types and quality of row materials, a price shelf of the product (low, middle or high), and a level of difficulty of its constructing and manufacturing. Nevertheless, in recent time little is known about product portfolio management and its effects for furniture companies. The viewpoint presented in this article and its first part, may provide some new information important for understanding the specific environment of portfolio management in furniture companies and help to indicate the problems related to achieving success in this area. Moreover, it facilitates an initial evaluation of portfolios and their management over time conducted for the chosen furniture factories.

VALUE OF PRODUCT PORTFOLIO MANAGEMENT

A product portfolio is a set of different products offered by a company, while a product family (or product line) refers to a group of individual products that share common subsystems or components and yet possess specific functional features to satisfy a variety of market niches. The design of product families has been associated with the concept of product architecture, which defines the scheme by which the function of the product is allocated to physical components [Salhieh 2007].

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The dominating view of portfolio management assumes that it as a rational decision process, which is for and between people, and for and between organizations, besides its service to strategy and products within one organization [Martinsuo 2013]. The portfolio decision process is characterized by uncertain and changing information, dynamic opportunities, multiple goals and strategic considerations, interdependence among projects, and multiple decision-makers and locations [Cooper et al. 1999]. Portfolio management has received a stable and central position in project management research, product development management research, and companies' management practices during the past decade. According to Cooper et al. [1997a, b], portfolio management has become a central means for companies to manage their product development efficiently and effectively. Firms often have very different expectations for each product in the portfolio, depending on the relative attractiveness of the market (e.g. the growth rate of the industry product category) and relative competitive position held by their products (e.g., market share). Therefore every product or even new product ideas occupy unique places within the company's portfolio of products [Wyner 1996]. Cooper et al. [1997b] claim that there are only three classes of projects: first – funded and active projects, with people assigned; second – good projects, but with no one working on them (currently unfunded) – these are the on-hold projects, and third – dead projects. Despite the variety of instructions on how projects should be selected for the portfolio, how resources should be allocated across projects, how to align the entire portfolio with strategy, and how to assess the success of the portfolio, companies still struggle with the resource sharing problem across projects as well as constant changes in their portfolios [Martinsuo 2013]. Some management has problems with portfolio management. The most important examples are presented in Table 1. The most demanding areas are: resource balancing, prioritizing projects against one another, making go or kill decisions in the absence of solid information and too many minor projects in the portfolio. These four problems are clearly interlinked. They feed one another in an endless downward spiral, what is presented in Figure 1 [Cooper et al. 2000].

Table 1. Examples of problems in portfolio management and project selection

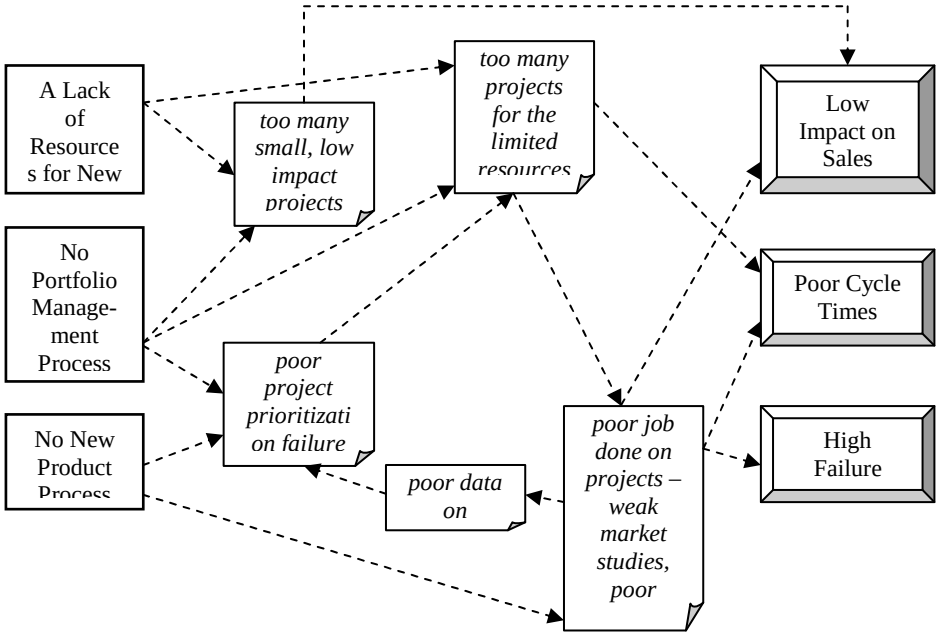
Key problems in portfolio management and project selection according to Cooper's et al. studies
▪ *the portfolio of projects does not reflect the business's strategy*; too many projects are "off strategy" and there are disconnects between spending breakdowns on project and the strategic priorities of the business
▪ *the portfolio's quality is poor*: there are too many unfit weak and mediocre projects; success rates at launch are inadequate
▪ firm's new product processes are tunnels when they should be funnels; *the go or kill decision points are weak*; projects tend to take on life of their own; poor projects are often not killed
▪ *resources are scarce and there is lack of focus*: most firms admit having far too many projects for the limited resources available; cycle times and success rates are suffering as the result
▪ some firms admitted to have *too many trivial projects in their new product pipeline* – modifications, updates and extensions – and too few of the projects needed to yield major breakthroughs and real competitive advantage; this is the result of the quest for cycle time reductions, coupled with insufficient resources

Source: Cooper et al. [1997a]

The number of new product development initiatives undertaken, the average level of technological advancement of those initiatives, and the breadth and concentration of the new product development portfolio, affect the firm's new product implementation rate. Products are more likely to launch if they are advanced and have multiple applications. Advanced products and

products having multiple applications are more likely to be developed cooperatively, and products that are developed cooperatively are more likely to launch [Green 2007].

Figure 1. Causes of problems resulting from a lack of resources, no portfolio management and no formal new product process



Source: Cooper et al. [2000]

On the other hand products of low novelty (e.g. furniture), that are close to what the firm currently understands, might be easy to develop. However, these products are likely to have limited appeal in the market. Products that serve a broad set of applications have a potentially broad market, especially if those applications represent non-overlapping customer niches. Developing one product for several uses instead of developing several products allows the firm to concentrate its resources [Green 2007].

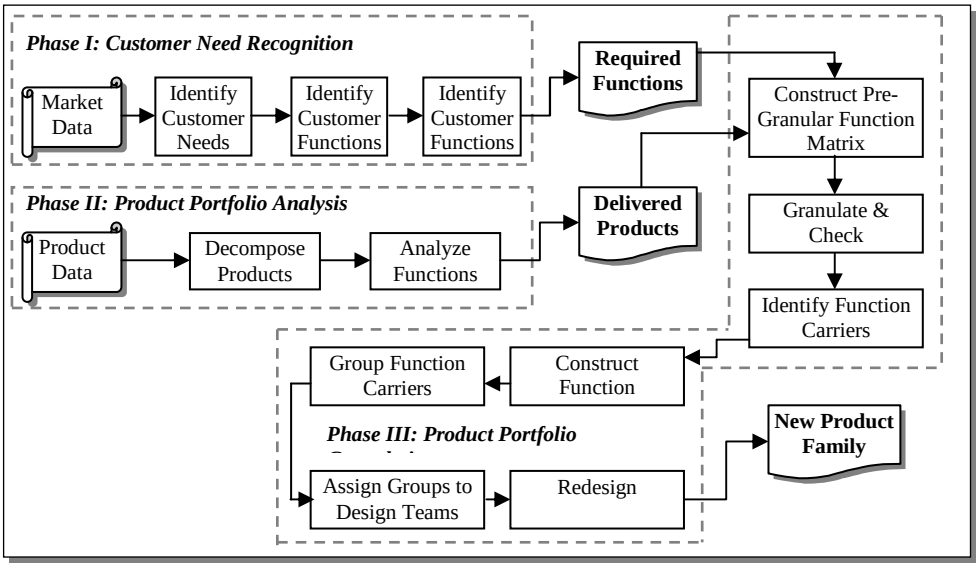
FURNITURE COMPANIES' PRODUCT PORTFOLIOS

Due to the nature of the new product in the furniture industry, a detailed definition was proposed by Olkowicz and Szymanowski [2012]. 'The new product' is called a single product (a piece of furniture) or the collection (line) of furniture (i.e. a set of products related by in style of the design and bearing the same name) which meet the criterion of novelty for 24 months, while the sale was booked by the manufacturer. It means, the being (or not) in firm's product portfolio is not equivalent to a definition of product life cycle on the market. The product life cycle theory pursues the notion that the progression of a product's market presence is similar to organic life and contains four key life stages a product passes through from the inception to its death (market introduction, growth, maturity and decline) [Nadeau and Casselman 2008]. Nevertheless, the assumed period of furniture collection novelty, i.e. 24 months, includes only those months, when sales invoices were recorded in firm's accountancy system. Because of that, some breaks in sales of the furniture

collection can appear. For example, the furniture collection was sold in January, and then in April. So the 2-months break in sales (February and March) are not included in the definition of product novelty period in the furniture industry. However, that approach lets the furniture manufacturers (especially large) effectively utilize the data, which is available at companies. 'The newness' of the furniture collection can be expressed in a modified, improved design, construction, use of a new material, a new process, a new method of customer service, satisfying new customer needs or in a better way meeting current needs. The product portfolio classification into groups new and old products can be an easy way of initial portfolio analysis.

The other approach of the product portfolio classification is division into heterogeneous products (i.e. group of unique products) or homogenous product families. A heterogeneous product portfolio exits when companies produce and sell products that do not share any components at all. Such cases arise when a company's product portfolio is built from several unique products as a result of recent acquisitions and (or) mergers. Also, a heterogeneous product portfolio arise when the product portfolio consists of products designed by totally independent designers who did not take into consideration the current designs of other products offered by the company, i.e. the product designers did not attempt to reuse the existing components in the new designs. On the other hand a homogenous product portfolio should contain the products that are offered to provide a set of functions used to meet similar customer needs, consist of a set of similar physical components, and are produced using similar manufacturing technologies. The methodology of transforming a heterogeneous product portfolio into a homogenous product family, that was tested on the case from the furniture industry, is presented in Figure 2 [Salhieh 2007].

Figure 2. The methodology of transformation a heterogeneous product portfolio into a homogenous product family in the furniture industry



Source: Salhieh [2007]

THE CASE STUDIES

Conducted studies of domestic and foreign literature allowed to identify the current state of knowledge on portfolio management and a new product development in the furniture industry. Noting the gap in this area, the aim of the research was to determine the level of assortment

management and its specificity. They were described on the grounds of the more in-depth analysis that was carried on in the second half of 2011 in selected, large furniture (case goods) companies. The case study was adopted for the research method. Data were collected using the following techniques: a survey, an observation, an in-depth interview and examination of documents. From the companies, which after the survey, have offered participation in the next stage of the research, were selected only three (each one employs about 500 people). The factories were chosen in that way to have their market segments differentiated with respect to price and quality. Therefore, the Plant I manufactures quite cheap furniture from chipboards or MDF-boards (the low-price market segment). The portfolio of the Plant II presents the mid-priced products, i.e. the furniture with more complicated constructions, higher quality (application of solid wood elements) which require application of more complex technologies. The last, third factory - the Plant III - delivers onto the Polish and foreign market the highest class furniture. Usually, they are completely wooden.

All of the furniture plants embraced by the study made accessible qualitative and quantitative data and information about the firms' product portfolios and procedures regarding their development process from 2003 to 2011. There was one condition – to retain their anonymity (i.e. the firms' names or the other information that would help to identify the companies, cannot be revealed). This article is the continuation of earlier one, described as part I.

RESULTS

All plants made available qualitative data from the period 2003-2011. However, quantitative data came from different time periods. The Plants I and II provided the data from the 96 consecutive months, and only the Plant III from the 48 consecutive months (with reference to data of the Plants I and II, the data of Plant III came from the period from the 49-th to the 96-th month). The reason for it lay in the difficulty to access earlier data by the Plant III. It was caused by the modernization of databases having a place exactly in the middle of the assumed studied period. The detailed scope of the obtained, quantitative data is presented in Table 2.

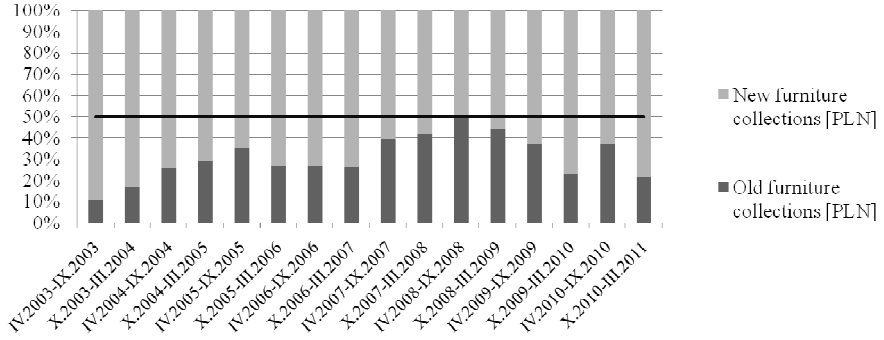
Table 2. Range of quantitative data in the studied plants

The Plant	Range of quantitative data *
I	*01.IV.2003 – 31.III.2011* (the 96 consecutive months)
II	*01.IV.2003 – 31.III.2011* (the 96 consecutive months)
III	*01.IV.2007 – 31.III.2011* (the 48 consecutive months)

** The financial year at each researched plant spans from 01.IV to 31.III of the following year*
Source: own studies

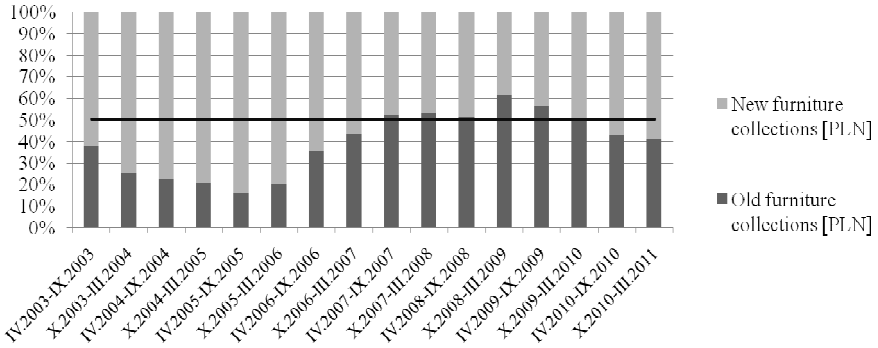
The results of the studies indicate that the sales of new furniture collections decides about a financial condition of the furniture plants, and especially the company from the low-price segment. Figures: 3, 4 and 5 present the share of new and old products in sales of plants' assortments (in per cent and in the six-month period). The sales value from new products in the plant with the simplest assortment (the Plant I) constitutes on average about 70%. In Figure 1 could be noticeable that there are some periods (e.g. 2005 – 2008), when the share of new products sales in the portfolio is higher, and inversely – lower (e.g. 2008 – 2009). It may indicate that some of new products were accepted on the market and entered to the category of old furniture collections. Nevertheless, the new furniture collections are the existence power of the Plant I on the market and firm's further development is connected with them.

Figure 3. Sales value from the Plant I



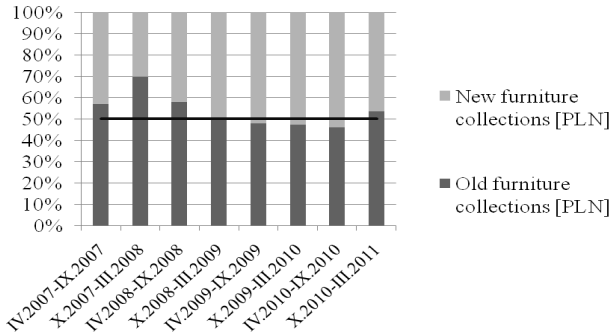
Source: own studies

Figure 4. Sales value from the Plant II



Source: own studies

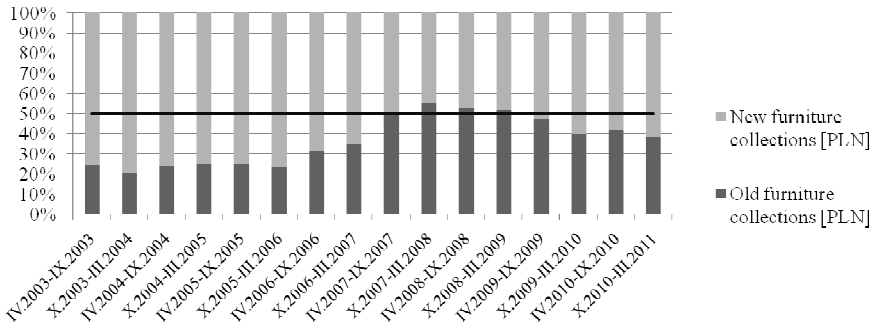
Figure 5. Sales value from the Plant III



Source: own studies

Average results of sales value from new and old products coming from furniture factories under the study are illustrated in Figure 6. The average for the period from 2003 to 2007 was calculated on the basis of the data obtained from the Plants I and II, and for the period from 2007 to 2011 – on the data from all plants. That approach reveals differences in the outcomes, caused by strong impact of the Plants I and III on the average. So sales of new products can range from 50 to even 75%, and old products – accordingly from 25 to 50%.

Figure 6. Average sales value from the Plants: I, II, III



Source: own studies

CONCLUSIONS

The analyzed product portfolios were quite versatile. The current portfolios of the Plants II and III can be characterized as being highly heterogeneous, where supposedly little common components are used. Many of the technical solutions applied in furniture collections or even inside one collection were designed separately without taking into consideration reusing existing components or technology. There are several reason for that situation.

Firstly, large companies usually are manufacturers only and introduction on the market lies within retailers (clients) competence. So manufacturers sometimes agree to design and make furniture that goes beyond their available resources and capabilities, because they don't want to lose the client. This led to an unjustified increase in the number of components used and the associated cost of producing the components needed, but also it increases the time of new product development and the level of difficulty its long-run production. The similar situation exists when the new furniture collections are designed by totally independent designers who did not take into consideration the current designs of other products offered by the company.

Secondly, furniture from the segments of a middle and high class could be more differentiated with regardless to design, quality, materials, construction and technology than cheap furniture. Therefore the product portfolios of higher class furniture were characterized through lesser about three times the furniture collection number than in the factory from the low class segment. Those facts are using by the manufacturers to differ from the competition, so it could be the advantage and the disadvantage at the same time. In that way, by adding new unique products that do not share any (or few) components with the current product, the furniture companies create their heterogeneous product portfolios. Nevertheless, that approach may contribute to launch some innovative products.

Thirdly, the furniture plants which use solid wood for production have the less implementation of new furniture collections than in the lower technology factory. So in their portfolios is more old furniture collections and probably they are traditional and classical products. On the other hand, that

fact could testify about poor effectiveness of new product implementations. Moreover, old products constitute on average about 40 – 55% of sales value in the six-month period (as in the Plants II and III), whereas in the plant with the simplest assortment (the Plant I) – only 30%.

In sum the main conclusions from conducted research indicate that the most important in determining the final size of product range at a furniture company are: new product strategies, the types and quality of row materials, a price shelf of the product (low, middle or high), and a level of difficulty of its constructing and manufacturing. Moreover, old products constitute on average about 30 – 55% of sales value in the six-month period, so there are two options for furniture manufactures: either to direct toward implementation of new furniture collections assuming their life cycles as long as possible, or launching new products very often but with the awareness of their shorter life cycles. The most important thing is consistent holding on to the assumed strategy.

RESEARCH LIMITATIONS

A few limitations of this study should be noted. First, despite taking into consideration all the data which was rendered accessible by the furniture plants, there wasn't all information about time of first furniture collection sales (especially those, that were implemented before the researched period). Therefore, that kind of information was gained owing to interview with employees, search into catalogues and the Internet. Nevertheless, the share of new products in the portfolios could be inflated. However, the disproportion between low and high class furniture segment after all is unmistakable. Second, because this study examines only the cases deriving from furniture industry, the results may not generalize to other industries.

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Damian Puślecki[12]

PREPARATION FOR WORK AND THE EMPLOYEE'S WORKING TIME

Abstract: The article addresses the issues of including preparation for work in the employee's working time. The individual elements of the statutory definition of working time are highlighted and a working definition of the term "remaining at the employer's disposal" is proposed. The article also highlights the principles of remuneration for work and subordination to the employer. The conclusions are preceded by the *pro* and *contra* arguments, which help answer the question posed in the study.

Key words:labor law, working time, preparation for work.

INTRODUCTION

Work carried out by an average employee in a timber company is a process. It consists of preparation for work, carrying out work and follow-up activities. One of the most common preparatory activities is putting on working clothing or uniforms which are provided at the workplace. On average, it takes an employee 5 minutes to put on working clothes. Working in protective clothing provided by the employer is the responsibility of the employee and the employee is not allowed to work without the necessary preparation. Both preparation for work and follow-up activities constitute a financial burden that affects the organization of the workplace and generates extra costs. So, it happens more and more frequently that the employer requests the employees to, in pursuance of the working time specified in the company's regulation, begin work already dressed in working clothing.

THE AIM AND TEN METHOD

The aim of this article is to answer the question whether, in accordance with the applicable legal regulations, preparation for work should be included in the employee's working time. The analysis of this problem has to involve the presentation of issues relating to the regulation of the employee's working time in relation to the specificity of the sources of rights and obligations of the parties of the employment relationship. This study analyzes the Act of 1974, the Labor Code, as amended.[13] The legal regulations of the Code refer to Directive 2003/88/EC of the European Parliament and the Council of 4 November 2003 concerning certain aspects of the organization of working time.[14] The descriptive method and the method of dogmatic analysis of legal acts are used in this article.

THE SPECIFITY OF THE SOURCES OF LABOUR LAW

European labor law is mostly made up of directives. The above-mentioned Directive 2003/88/EC should be implemented by Poland in a manner which fully complies with the requirements of legal security and transforms the directive's provisions into generally applicable provisions of Polish law.[15]

The Labor Code in Art. 9 § 2 establishes the supremacy of executive laws and regulations over specific acts of labor law. This means that the provisions contained in collective labor agreements, other agreements based on labor law, regulations and statutes cannot be less favorable to the employee than the regulations of labor law. Otherwise, they become legally null and void and are replaced by relevant provisions of law or executive acts. The specific hierarchical system of

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[13] *Act of 26 June 1974, the Labor Code, Journal of Laws 1974 No. 24, item 141, as amended.*
[14] *OJ L 299, 18.11.2003.*
[15] *Judgment of 15 March 1990, Commission/Netherlands, case C-339/87.*

normative acts of labor law determines the priority of application of regulations based on lower order legal acts over the norms deriving from higher order legal acts [Gersdorf, Rączka 2006].

The terms of employment are an important source of the employee's rights and duties. The employer may expand the rights and obligations of the employee within this act only in the employee's favor. Doing the opposite results in the invalidity of the terms of employment, which are in such case replaced by the relevant provisions of law or executive acts.

THE DEFINITION OF WORKING TIME

Article 2 of Directive 2003/88/EC legally defines working time. This is the period during which the worker is working, at the employer's disposal and carrying out his activity or duties, in accordance with national laws and/or practice. The Directive does not specify any intermediate forms between working time and rest period. Nor does it specify the workload and labor productivity of the employee [Florek 2012].

The definition of 'working time' was specified in the Labor Code. According to Art. 128 working time is the time during which the employee is at the disposal of the employer at the workplace or any other place designated to carry out work. This time, as a rule, should not exceed 8 hours per day and 40 hours per week.

In its definition of working time, the legislature does not limit the term to 'working.' Moreover, it extends the definition so that it includes places outside the workplace. It should be emphasized that the legal concept of working time includes not only the actual work carried out by the employee but also any period during which the employee is at the disposal of the employer, both at the workplace and any other place designated by the employer.

Thus, working time consists of not only the actual work carried out by the employee but also any period of rest during which the employee remains at the disposal of the employer. The concept of working time therefore includes both cases of working and not working. The condition for including rest period in the employee's working time is remaining at the employer's disposal [Niedbała 2012].

This is due to the construction of the employment relationship, in which the employee agrees to carry out a given work for and at the risk of the employer, and the employer employs him for remuneration in return (Article 22 § 1 of the Labor Code). The employee acting under his obligation offers the employer his ability to work which remains at the employer's disposal.

The concept of working time cannot therefore be considered in isolation from the concept of being at the disposal of the employer. However, unlike the first term, 'being at the disposal of the employer' has not been defined by the legislature.

REMAINING AT THE DISPOSAL OF THE EMPLOYER AND NOT WORKING

Defining the concept of 'being at the disposal of the employer' is not an easy task. Polish language dictionary informs one that 'a disposal' means 'an instruction given to someone' and 'to dispose' means 'to offer an instruction in order for something to be done or delivered.' The employee remaining at the employer's disposal, in accordance with the principle of subordination, is able to follow the employer's instructions and ready to perform the actions designated by the employer. For the purpose of further discussion, this concept is therefore first and foremost defined as the possibility of the employer to personally manage the employee at the workplace.

It should be emphasized that remaining at the employer's disposal does not necessarily denote constant and direct management and does not have to be limited to the workplace. Sometimes the employer has no such possibility. This concerns in particular an employee who works outside the workplace or an employee who works on a task-based system. In both cases remaining at the employer's disposal means performing or being ready to perform a designated task.

The EU legislature also broadly defines the employee's working time. In Directive 2003/88/EC, remaining at the employer's disposal does not have to be directly related to the work carried out by the employee.

The period of remaining at the employer's disposal starts with the worker's coming, at the appointed time, to the workplace or any other place where the work is to be carried out, and ends at the end of the fixed working time or later, if the employee is required to work overtime. The employee is to remain at the disposal of the employer at the workplace or any other place designated to carry out work. This place can be permanent or subject to variation. In the case of an employee whose job involves travelling from one place to another, working time does not only include the duration of work outside the workplace but also travelling from one place where work is to be carried out to another, as well as the travel time between the workplace and the place where work is to be carried out and back[16][Gersdorf, Rączka 2006].

There is no doubt that the employee remains at the disposal of the employer especially when he is working. In accordance with the current regulations, working time is also the time during which the employee is not working. For example, working time also includes the time during which the employee is ready to work but is unable to due to the obstacles caused by downtime or obstacles on behalf of the employer. The legislature includes various breaks in working time: lunch breaks, short breaks during monotonous or hazardous work, breaks during working with a display screen, breaks for exercises or holidays for people with disabilities. It is worth noting that working time also covers health and safety at work trainings and medical check-ups and periodic health screenings.[17]

The legislature classifies the above mentioned cases as working time, even though the employee is not working during this time. It should be noted that the Labor Code clearly indicates the periods in which interruptions in intermittent working time – lunch breaks, breaks due to personal reasons, periods of excused absence from work and days off work – are not included in working time.[18]

Despite providing a list of activities included and excluded from working time, the legislature did not explicitly specify the status of preparation for work within that division. This issue, therefore, has not been explicitly regulated.

THE PRINCIPLE OF REMUNERATION FOR WORK AND THE PRINCIPLE OF SUBORDINATION TO THE EMPLOYER

In order to answer the question posed in this study, the provisions of labor law should be analyzed. In accordance with the principle of *remuneration* for work, the employment relationship is a contractual relationship of pecuniary character. Therefore, voluntary work – the legal relationship of non-pecuniary character – cannot be classified as employment. The employee is entitled to remuneration for his work. Regulations clearly state the situations when the employee is entitled to receive guaranty benefit equal to remuneration for the period of time off. The protection of remuneration for work is crucial and characteristic of the employment relationship.

In the employment relationship, the employee works under the direction of the employer. Subordination concerns the manner, place and time of work. However, it is not absolute. According

[16] *See: Supreme Court judgment of 30 September 1976, I PR 115/76, OSPiKA 1978, No. 2, item 19, with commentary by M. Kawecka-Sobczak, NP 1978, No. 4, p. 586 and J. Tyszka, PiZS 1978, No. 7, p. 74; Supreme Court judgment of 27 May 1978, I PR 31/78, OSPiKA 1979, No. 11, item 191, with commentary by H. Kasińska; Supreme Court judgment of 4 July 1978, I PR 45/78, OSNCP 1979, No. 1, item 16, with commentary by A. Kijowski, NP 1979, No. 11, p. 162; Supreme Court judgment of 15 August 1980, IPZP 23/80, OSNCP 1981, No. 2-3, item 26.*

[17] *See: Art. 81, 124, 145, 229 § 3, 237[3] § 3 of the Labor Code and the provisions of art. 17 of Act of 27 August 1997 on vocational and social rehabilitation and the employment of people with disabilities and § 7 paragraph 2 of the Regulation of the Minister of Labor and Social Policy of 1 December 1998 on health and safety at workplaces equipped with display screens.*

[18] *See: Art. 139 § 1 of the Labor Code.*

to Art. 100 § 1 of the Labor Code, the employee is required to carry out only these commands which concern work, provided that they do not contradict the law or the terms of employment. The employee has the right to refuse to carry out the commands which do not meet legal requirements. Furthermore, in cases when the expected outcome of these commands would lead to law violation (petty offence, crime), he has a legal obligation to refuse to act.

The following can be deducted from the abovementioned regulations: the activities which are a normal working process carried out under the direction of the employer should be remunerated. It is also worth mentioning the fact that they cannot be avoided – they are the employee's obligation and the employer cannot allow anyone to work without first meeting these regulations. The subordination of the employee to the employer can already be observed in the preparatory stage – the employer may issue specific commands related primarily to the implementation of health and safety regulations.

ARGUMENTS *PRO*

The arguments in favor of including preparation for work in the employee's working time are as follows:

Firstly, work is a process, which consists of three stages: working, preparatory and follow-up activities. Without the first stage, preparatory activities, one cannot work. In many cases, preparatory activities are derived directly from the company's rules and specific regulations, such as health and safety regulations or health requirements. Carrying out preparatory activities at the workplace or other place designated by the employer (e.g. the company's locker room) is associated with meeting the employee's contractual obligation involving proper preparation for work and its completion.

Secondly, the legislature adopted a wide definition of working time. Specific provisions refer to the concept of being at the employer's disposal. Remaining at the disposal of the employer does not have to be directly related to the activities involved in the actual work. The European legislature has also broadly defined working time as not only working but also remaining at the disposal of the employer and carrying out other tasks in accordance with national practice.

The employee begins to be at the disposal of the employer when he arrives at the appointed time at the workplace or any other place where work is to be carried out. Respectively, he ends to be at the disposal of the employer in accordance with the fixed working hours. According to Art. 2379 § 3 of the Labor Code, the employer cannot allow the employee to work without protective equipment, clothing and footwear, intended for use in the workplace. Protective clothing is very often stored at the workplace and, in order to carry out his duties, the employee has to arrive at the workplace and prepare for work accordingly. In other words, the employee is in a way forced to wear protective clothing. He carries out the tasks set by the employer, his duties, and he already remains at the disposal of the employer during that time.

Thirdly, an eight-hour workday specified by the Labor Code constitutes a framework which the employer has to follow. The employer, therefore, cannot require the employee to arrive at the workplace in advance, change into protective clothing, work for 8 hours, and then find time outside the 8-hour workday to carry out the follow-up activities resulting from the normal working process. It is worth noting that the employer cannot schedule overtime in advance because it would constitute an offense against the rights of the employee - Art. 281 Section 5 of the Labor Code. Because of that, including preparation for work and the follow-up in the employee's 8-hour working day eliminates the problem of overtime - on average about 10 minutes a day per employee. 10 minutes may seem not seem long but, taking into consideration mid-sized companies and shift work, it may amount to several thousand hours of overtime per year.

Fourthly, according to Art. 94 Section 2 of the Labor Code, the employer is bound to organize work in a way that ensures full utilization of working time. While the employee, according to Art.

100 § 1 of the Labor Code, is required to work conscientiously and carefully and to follow the instructions of his superiors, provided that they concern work and do not contradict the law or the terms of employment.

Lastly, not including preparatory and follow-up activities in the employee's working time or overtime would imply that they constitute the employee's private time. However, it cannot be stated that the time needed for putting on protective clothing, resulting from the employee's contractual obligations, is his private time as he may use it in any way he wishes.

ARGUMENTS CONTRA

The arguments against including preparation for work in the employee's working time are as follows:

Firstly, including preparation for work in shift work seems problematic. The need to ensure continuous operation would require the employer to take this into account and to organize work in such a way as to avoid any superfluous breaks [Stanisławski 2011].

Secondly, the above mentioned art. 237^9 § 3 of the Labor Code, under which the employer must not allow the employee to work without protective equipment, clothing and footwear intended for use in the workplace, could imply that the employee is not ready to work, is not at the disposal of the employer, without protective clothing.

Thirdly, according to the Ministry of Labor and Social Policy (PP 053-4470/98) the current regulations do not require the employer to include the time needed for putting on working clothes or the time needed to undress and wash after work in the employee's working time. The above mentioned activities are neither included in the employee's working time nor subject to remuneration unless the employer decides otherwise. It is recommended that the employer should clearly indicate in the company's regulations or collective labor agreement that working time shall be counted from the time indicated in the regulations when the worker is dressed in working clothes.

Fourthly, the employee remains at the disposal of the employer not only when the employer directs the employee's work but also when the employee behaves in accordance with the objectives set out in the employment relationship – he is working or is ready to work. The employee is not at the disposal of the employer if he is not in the place designated by the employer to carry out work. If the employee is at the place designated by the employer to carry out work but is unable to work, he is not at the disposal of the employer [Stanisławski 2011].

Lastly, including preparatory and follow-up activities in the employee's working time touches upon the problem of determining the criteria that would protect the employer from legal abuses. At this point, it would be difficult to propose any such criteria because, for example, various preparatory activities require different amounts of time and the time needed to change into protective clothing may vary.

CONCLUSIONS

The answer to the question posed in this study – whether, in accordance with the current legal regulations, preparation for work should be included in the employee's working time – is not easy. The fact that the Supreme Court has not yet issued a decision concerning this case does not help in the interpretation of the provisions of the Labor Code. The analysis of the problem leads to the conclusion that the absence of relevant provisions in the Labor Code creates a legal loophole.

A detailed analysis of the current regulations shows that not including preparatory activities in the employee's working time or in overtime makes it necessary to determine how this time should be classified. This is definitely not private time during which the employee meets the obligations arising from the employment relationship.

It should be noted that the above arguments cannot be considered in isolation from the working process, the principles of labor law and the protective function of labor law. It cannot be denied that the process of work consists of preparatory and follow-up activities.

The need to include these activities in the employee's working time derives not only from the wide definition of working time and being at the disposal of the employer but also from the principle of remuneration for work and the fact that at the time of carrying out preparatory activities the employee is already under the direction of the employer. Arguments concerning the disorganization of the shift time can be rejected on the grounds that it is the employer who organizes work in such a way as to avoid any superfluous breaks. The employee is required to work conscientiously and carefully and to follow the instructions of his supervisors, provided that they relate to work and do not conflict with law or the terms of employment.

It should be noted that almost three years ago the Italian Supreme Court issued a similar decision. The Court ruled that workers should be compensated for the time it takes for them to change into working clothes. The Court stated that the employees should receive extra money for 10 minutes in the locker doom per day, acknowledging that putting on working clothes constitutes one of the stages of preparation for work and therefore it should be rewarded.

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ACTIVE AND INACTIVE CLUSTERS IN POLISH FURNITURE INDUSTRY. THE INDUSTRIAL NETWORK APPROACH

Abstract: The aim of the article is to identify clusters whilst at the same time determine which are inactive (i.e. in practice, not engaged in any real activities but which are treated equally as active clusters in various sources) using Polish furniture industry as an example. The analysis which has been carried out here from the perspective of the industrial network approach takes into account the structure and characteristics of the activities which clusters undertake and facilitate the identification of truly active clusters within the industry. In addition clusters are classified as formalised and informal in terms of their real activities, resources and entities. This study stresses the reasons for creating such a network structure in view of the nature of the actions during the start-up of the cluster initiative (bottom-up approach, top-down approach).

Key words: cooperation, industrial network, clusters, triple helix model, formalization, furniture industry

INTRODUCTION

Due to the growing importance of business networks and therefore the economy adopting this phenomenon as an attribute, it is impossible to limit business analysis to individual, isolated firms and to ignore the market conditions in which they operate, including their relationships with entities for the immediate and distant surrounding environment. For this reason there is an increasing level of interest in economic phenomena from the perspective of the network approach.

Due to transactions, formal and informal relationships practically every entity to a varying extent is linked with others, in this way creating a network structure. The essence of business enterprise is of course tied to constant interactions and trade exchange with other entities on the market and „firms should not be seen in isolation but as being connected in business systems" [23]. Moreover important benefits flowing from cooperation and network relationships are important from the perspective of firms (due to at least the improvement of market results achieved [3,4,20,21,23]) as well as specific industries or the economy as a whole (improvement in competitiveness). For this reason an analysis of specifics of industry sectors from network perspective is also important for supporting regulatory ties. In this article the focus of such an analysis is the furniture industry.

In the furniture industry (which is analysed in this article) one of the most popular forms of cooperation and type of network are clusters. This is also the type of network structure which is often analysed in the literature pertaining to the industry [5,6,12,15,25]. Any analysis regarding the functioning of clusters in the furniture industry usually consists of reports identifying industry clusters [5,15,16] or descriptions of the nature of clusters both in relation to firms which participate in them as well as in relation to the whole industry or economy [8,13,14]. Rarely does the analysis deal with the operations or functioning of a specific cluster without being limited to the assumptions defined in formal strategies and/or information posted on web pages, and focus on the identification of real signs of activity [7]. At the same time it is important to stress the significance of carrying out a comprehensive analysis of active clusters and signs of their activities. This is especially relevant given the fact that in business practice there are known examples of various types of cluster activity which ultimately have not aroused the interest of firms and currently are not continued. This is

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important to the extent that in practice inactive clusters are often cited in various types of reports which thereby leads to the distortion or misinterpretation of clusters and network structures within this (furniture) industry. For this reason, the analysis carried out from the perspective of the network approach, which aims to identify real activities, resources and entities, thereby indicating the extent to which clusters are formalised, provides an insight in to the factors influencing management decisions at the firm level or indeed the regulatory decisions pertaining to this field of the economy [19]. The aim of this article therefore is to identify clusters whilst at the same time determining which are inactive (i.e. in practice, not engaged in any real activities but which are treated equally as active clusters in various sources) using the Polish furniture industry as an example. The analysis which has been carried out here from the perspective of the industrial network approach takes in to account the structure and characteristics of the activities which clusters undertake and facilitates the identification of truly active clusters within the industry.

THEORETICAL BACKGROUND

According to the most common definition by M. E. Porter clusters are „(…) geographic concentrations of interconnected companies and institutions in a particular field. Clusters encompass an array of linked industries and other entities important to competition. They include, for example, suppliers of specialized inputs such as components, machinery, and services, and providers of specialized infrastructure. (…) Many clusters include governmental and other institutions – such as universities, standards-setting agencies, think tanks, vocational training providers, and trade associations – that provide specialized training, education, information, research, and technical support." [17]. Important elements of clusters are relationships and cooperation which in consequence should generate value added and lead to a competitive advantage on the market.

A cluster constitutes a type of network structure, however, the limitation of network structure analysis solely to clusters is a mistake [22]. Generally social sciences, economics, management or even mathematics (graph theory) assume that a network is a strictly or loosely defined structure of cooperating entities (nodes, actors) linked by so called network relationships (ties, arcs). A cluster, however, is a network considered from the perspective of a structure which is usually formal, where the importance of geographic proximity is stressed (participants of the cluster must be located sufficiently close to each other in order to be able to benefit from the positive effects of penetration and utilisation of shared resources [11]) and where a common industry is also important [22]. Clusters can be classified as a type of network with limited membership, where all members may be defined (…) and the full structure of this type of network is externally observable - fully observable from outside (from the perspective of an external observer) [19]. Such an understanding of a network structure is a business network which involves a formalised (also in the form of an association, company's internal structure) group of business entities with limited membership collaborating for specific purposes [9]. In line with this the most popular definition of a network, a flagship company (e.g. university in a cluster, or just a so called broker) normally acts as the task integrator. The integrator is the one main entity that is actively creating the network in a strategic manner. The flagship company/ institution only has strategic control over those aspects of its partners' business systems which are dedicated to the network [10]. These types of network structures are characterised by a varying degree of formalisation (e.g. clusters functioning in the form of an association or clusters based upon informal cooperation), although they are largely formalised [19].

In a modern economy, the term "cluster" has become a "keyword" which is supposed to ensure the growth of both firms and the economy as a whole. As a result, the support which is provided to firms in Poland is focused largely on the development of cluster initiatives. The start-up of a cluster initiative can be the result of bottom-up activities started by entities interested in cooperation (the

so-called bottom-up approach) or can result from top-down activities undertaken by public authorities (the so called top-down approach) [18] which are often associated with the search/application for funding. There is, however, a serious risk that in once funding ceases the cluster will also cease to function in a given region. The formation of a cluster in such circumstances, however, is not the result of the inherent desire to cooperate but rather a top-down initiative [24]. This constitutes an important pre-requisite for analysing clusters in terms of their actual activity which, among others, can provide a basis for the future evaluation of the effectiveness of measures aimed at the creation of cluster initiatives.

In view of the above and as well as the various motives for creating clusters, the other legal and organisational forms which they can adopt as well as their importance for the economy, it is justifiable to systemise the various issues related to these types of network structures. It is particularly important view these issues from the perspective of the network approach, especially the classification of clusters which actually function within the economy, taking in to account the entity structures and types, as well as the effectiveness of activities undertaken by the cluster.

THE FURNITURE INDUSTRY IN POLAND AND THE IDENTIFICATION OF ITS CLUSTERS

It is difficult to provide a full list of clusters functioning within the furniture industry. The data available in this regard is varied depending upon the source. According to the Polish Agency for Enterprise Development (PARP), in the first quarter of 2013, there were 198 clusters and cluster initiatives in various sectors of the economy, of which 8 were identified in Polish furniture industry [15]. In turn, the European Cluster Observatory website does not mention any furniture industry cluster in Poland [27]. This raises the question regarding the actual status of cooperation between firms in the furniture industry as part of clusters. Are these structures where interaction and cooperation actually takes place, or is this solely "on paper", "on the website" and in reality there is no interaction relating to exchanging resources and/or joint activities?

As a result of the above it is necessary to analyse the described phenomenon. For this reason, a detailed analysis of data obtained from clusters operating in Polish furniture industry was carried out between March and August 2013. Information regarding these network structures was verified using data available on the cluster websites and the strategic documents they contained, as well as based upon interviews carried out with network structure representatives. The analysis which was carried out regarding the network structures in Polish furniture industry appears to negate the figures obtained from secondary sources of information and provides a basis to presume that there are 5 active clusters in this industry (as of August 2013)[21]. Among them are clusters which are active and with a formalised structure as well as active, informal clusters. Moreover, 4 clusters were identified which were in fact inactive and which due to the lack of joint network relationships between the associated entities, do not constitute a cluster network structure focused on cooperation and the creation of value added. A geographic agglomeration of entities linked with the industry is insufficient to be able to refer to it as a cluster. It is not just a formalised structure which is required, but cooperation and joint activities undertaken by members etc. In the next section of the article, there is a review of the individual types of structures functioning in Polish furniture industry.

ACTIVE FORMAL CLUSTERS

Formal clusters constitute a network structure whereby its members are associated based upon a signed legal agreement (e.g. in the form of an association, understanding etc.). In this way, the relationships/cooperation which take place between individual members of the cluster have a formal

[21] *In reality, furniture companies can also be members of clusters where the main industry is not the furniture industry. Few such cases have been identified in the wood industry. Due to their limited importance, they are not subject to analysis in this article.*

nature. The analysis suggests that 4 out of 5 of the active clusters identified in the furniture industry can be deemed to have a formal nature. An analysis of these clusters is presented in table 1.

Table 1. Active formal clusters in furniture industry in Poland in the first half of 2013

Name	Entities	Coordinator	Main goal	Activities
Eastern Poland Furniture Industry Cluster (lubelskie voivodeship) *Klaster Przemysłu Meblarskiego Polski Wschodniej*	Firms: -micro – 6 -small – 2 -medium – 2 -large – 0 R&D institutions – 1 institutions from the surrounding environment – 1	Foundation for the Eastern Poland Furniture Industry Cluster	NA	– Member meetings – Activities linked to the promotion of products
Associated Furniture Cluster in Elblag (warmińsko-mazurskie voivodeship) *Stowarzyszenie Klaster Mebel – Elbląg*	Firms: -micro – 2 -small– 4 -medium – 8 -large –2 R&D institutions – 1 institutions from the surrounding environment – 4	Elblag Chamber of Commerce	The consolidation and bonding of competing firms from the furniture industry.	– Promotion of the furniture industry – Participation in trade fairs – Training – Conferences
Wielkopolskie Furniture Design Cluster (wielkopolskie voivodeship) *Wielkopolski Klaster Mebel Design*	Firms: -micro – 2 -small – 8 -medium – 3 -large -0 R&D institutions – 2 institutions from the surrounding environment – 1	Wielkopolskie Chamber of Commerce	The creation of an innovative and competitive product, namely the prevalence of furniture produced from light and ecological cell panels. Expanding markets and the competitiveness of member firms.	– Delivery of research products with R&D institutions – Cooperation with foreign entities – Organisation of meetings between members of the cluster – Offering free and innovative consultation services
Wood-Furniture Cluster (zachodniopomorskie voivodeship) *Klaster Drzewno-Meblarski*	Firms: -micro – 1 -small – 9 -medium – 7 -large – 1 R&D institutions – 3 institutions from the surrounding environment – 0	Zachodniopomorskie Association of Wood and Furniture	Expansion of the wood and furniture industry in the zachodniopomorskie voivodeship.	– Initiative aimed at delivering a project jointly funded by the EU. – The creation of an wood and furniture industry competence centre – Promoting the development of the industry

NA – no data

Source: Authors' own work based upon PARP data [15], cluster websites and telephone interviews with representatives of the clusters.

In most cases the business entities that are members of the aforementioned network structures are differentiated in terms of industry, size or type of entity (firms and/or institutions). Examples are the Associated Furniture Cluster in Elblag (Stowarzyszenie Klaster-Mebel Elbląg) and the

Wielkopolskie Furniture Design Cluster (Wielkopolski Klaster Mebel Design). In the former, members not directly linked to the production of furniture include an insurance company and a visual advertising firm. In the case of the latter, such members include a firm experienced in the production of paper fillings (known as "honeycombs"), a producer of steel, polyester-glass and glass components as well as a firm selling wood based panels, worktops and accessories.

In most active formal clusters the associated members include network actors which are not only local companies from the furniture industry but also representatives from institutions of higher education and those from the surrounding business environment, which corresponds to the Triple Helix model [1,2]. The only exception is the Wood-Furniture Custer (Klaster Drzewno-Meblarski) in which (as demonstrated by the available sources) there are no members from outside the business environment, however among the associated members there are the R&D institution. In turn, all of the aforementioned formal clusters are coordinated by institutions from outside the business environment. This phenomenon could be evidence of the lack of the need to initiate structures through companies. Moreover firms classified as micro, small or medium-sized dominate the active clusters. At the same time, the differentiated structure resulting from the types of entities which constitute it is typical for most of the aforementioned clusters (including the notable participation of firms from other industries) underlines the importance of cooperation between the furniture industry and entities from its surrounding environment.

The main aims of the clusters are largely focused on ensuring the development of the industry and on maintaining the competitiveness of produced goods. Attention is drawn by the fact that in the case of formal structures, one of the most often cited motivations for creating the structure is the aim of sourcing external funding (e.g. European funds). It is also important to point out that the nature of the activities carried out within the different structures is very similar. Namely, activities aimed at promoting the industry in the region are dominant (e.g. conferences, meetings etc.) as well as activities aiming to grow the industry (training, cooperation with other entities from the surrounding environment etc.).

ACTIVE INFORMAL CLUSTERS

Among the active furniture industry clusters, there is one where currently (September 2013) it is difficult to identify any real formal links between companies from the industry (see table 2). This is the newly created Szczecinek Furniture Cluster (Szczecinecki Klaster Meblowy), where the role of the initiator and currently the coordinator is filled by a firm from the environment surrounding the furniture industry (a producer of wood-based panels). This is an example of an informal network structure which is evidence of the activities interdependencies directed towards entities from the furniture industry by suppliers. It should be noted that in the nearest future this cluster can be formalised because on September 20 a letter of intent was signed between the coordinator company and the representatives of the city Szczecinek, the District Office (Starostwo Powiatowe) in Szczecinek and the institution from the surrounding environment – Pomorska Regional Developmenet Agency.

Despite the fact that this is a relatively new initiative, there is a high level of advancement in the respective activities which appear to be similar to those typical for formal clusters. Within this cluster there are also activities aimed at obtaining financing towards activities. However, in this case it should be noted that during the first months of the cluster's operations, relatively large costs were incurred in order to build new factories for producing furniture and furniture accessories. It can be assumed that in the future, the cluster will aim towards creating formal structures which will make it easier to obtain financing.

The cluster under discussion constitutes an example of rarely found bottom-up initiatives where the desire to form an association leads to the creation of network structures. It is believed that such activities have a greater chance of creating a permanent and growing network structure, whilst

the relatively short period of time during which this cluster has been operating is not conducive for assessing it in terms of its effectiveness.

Table 2. Active informal clusters in furniture industry in Poland in the first half of 2013

Name	Entities	Coordinator	Main goal	Activities
The Szczecin Furniture Cluster (zachodniopomorskie voivodeship) *Szczecinecki Klaster Meblowy*	Firms – 6 (Initiative from 2013. There are on-going discussions with institutions of higher education and institutions from the surrounding environment)	Kronospan Szczecinek	Ultimately: the achievement of a regional cluster or national key cluster (which will allow for the cluster to apply for EU funding) as well as an increase in the cluster's importance.	– Maintaining high quality of goods – The implementation of new furniture factories – Attempts at obtaining financing – Making production floors available – Cooperation with public institutions in terms of: the creation of a technological park, improvements to road infrastructure as well as the organisation of conferences.

Source: Authors' own work based upon website of the cluster's coordinator and telephone interviews with one of the cluster members.

INACTIVE CLUSTERS

The idea of clustering in recent years has become very popular which frequently leads to such activities taking place. However, the problem, as has been already underlined, is the lack of a detailed analysis regarding the level of actual cooperation, interaction in terms of resources and activities present in these clusters. Upon comparing the results of the analysis with PARP data regarding cluster activities in the furniture industry it is possible to point to examples of structures which in practice do not constitute an active cluster. In these cases it is difficult to even refer to the existence of a cluster structure. This is important to the extent that the clusters which are actually inactive are often included in various reports which in turn leads to the distortion of the picture of clusters and network structures in the furniture industry.

The analysis suggests that the Furniture Cluster in the Kujawsko-Pomorski voivodeship, the Lubawski Cluster, the Wielkopolska Furniture Cluster as well as the Zachodniopomorskie Wood & Furniture Cluster are among the inactive clusters in the furniture industry. Their primary structure and activities are presented in table 3.

In each of the clusters the level of advancement of initiatives during their activity varied. An example of a relatively high-level of activity was demonstrated by The Wielkopolska Furniture Cluster. The plans and assumptions regarding the creation of this structure were presented in the Development Strategy of The Wielkopolska Furniture Cluster in 2007 [28]. The initiatives which were carried out include the organization of conferences aimed at integrating the business environment with entities from the surrounding environment and the creation of conditions conducive for joint activities. Despite efforts, the initiative is currently not operating. It can be assumed that one of the main reasons for which the project failed to survive was the lack of funds. Early initiatives were cofinanced by UE funds. The cluster's website is still active [28], however, the last entries were made in 2007, informing of a joint activity, i.e. a conference to summarise the training project "Increasing the competitiveness of the wood industry". Due to the fact that the Wielkopolskie Furniture Design Cluster operates in the Wielkopolska voivodeship, regional firms which are interested in cooperation are able to become members, whilst the early activities of the now inactive cluster can be to a certain extent credited with spreading the idea of clustering

throughout the region. The Zachodniopomorskie Wood & Furniture Cluster as well as The Regional Development Agency in Torun were in a similar situation.

Table 3. Inactive clusters in the furniture industry in Poland in the first half of 2013

Name	Coordinator	Main goal	Activities
Furniture Cluster (kujawsko-pomorski voivodeship) *Klaster meblarski*	The Regional Development Agency in Torun *Toruńska Agencja Rozwoju Regionalnego*	Promotion of the clustering ideology in the region, in three industries referred to in the Regional Industry Innovation Strategy, including the wood and furniture industry.	– Training, workshops – Conferences – A foreign seminar and learning advanced cluster initiatives – Implementation and promotion of projects cofinanced by the EU
The Lubawski Furniture Cluster (warminsko-mazurskie voivodeship) *Lubawski Klaster Meblowy*	Guild of Craftsmen and Entrepreneurs in Lubawa *Cech Rzemieślników i Przedsiębiorców w Lubawie*	NA	– Meeting initiated by the coordinator, in order to form a cluster
The Wielkopolska Furniture Cluster (wielkopolska woivodeship) *Wielkopolski Klaster Meblarski*	The Wielkopolska Agency for Enterprise Development (currently there is a lack of an animator for the cluster) *Wielkopolska Agencja Rozwoju Przedsiębiorczości*	To identify ways to overcome barriers that do not allow the furniture industry to transform from a "hidden cluster" (i.e. actually existing but not formalised) in to a consciously created cluster by firms from the furniture industry.	– Preparation of cluster development strategy (including among others to conduct a survey among companies to better identify their needs and the environment in which they operate, the organization of conferences for participants in the cluster) – Meetings, – Implementation of a project cofinanced by the EU
The Zachodniopomorskie Wood & Furniture Cluster (zachodniopomorskie voivodeship *Zachodniopomorskie Drewno i Meble*	Association of Wood and Furniture (previously - the Koszalin University of Technology - Park of Science and Technology) in the Zachodniopomorskie Voivodeship *Stowarzyszenie Zachod-niopomorskie Drewno i Meble*	NA	– Initiatives carried out within the project – Meetings – Implementation of a project cofinanced by the EU

NA – no data

Source: Authors' own work based upon PARP data [15], cluster websites and telephone interviews with representatives of the clusters.

In the case of the former, the initiative was associated with the delivery of an EU cofunded project in the period between 2009 and 2011 and following its completion in 2011, the animator of the initiative changed. The new coordinator became the animator of the Wood & Furniture Cluster

also operating in the Zachodniopomorskie region and (according to the information obtained based upon a telephone interview) in the near future there is a plan to merge the two initiatives. In the case of the Kujawsko-Pomorskie initiative, the activities (as in many other cases) were financed using UE funds. However, firms from furniture industry did not demonstrate any real interest in this type of network structure.

Among the inactive cluster initiatives there are those which have not prompted any interest among firms to which they were directed at a very early stage. Examples are The Lubawski Furniture Cluster and the Furniture Cluster in the Kujawsko-Pomorskie voivodeship. The realisation of these initiatives was limited to one meeting after which none of the firms engaged in any further activity.

Generally speaking, the analysis shows that in practice it is impossible to identify any initiatives which would serve as evidence of activity among members of the clusters as well as their coordinators – in effect such clusters are non-existent. In the case of the discussed clusters, activities essentially consisted of meetings among members, industry representatives and entities from the surrounding business environment. Typically the cluster initiatives which were started in Poland, including those within the furniture industry were largely the effect of public support, in the form of financial instruments as well as other types of support provided by regional authorities [26]. It is significant to note that in the case of those initiatives which were started using funding from that European Union, upon the receipt of this funding there has been no commitment on behalf of members to continue the operations of these clusters.

As the research has shown, unsuccessful activities in furniture industry which aimed to create clusters were the result of a relatively limited need to form associations and the level of self-organisation. For this reason it can be deduced that the undertaken top-down initiatives were the result of a greater level of awareness among entities from the surrounding environment, i.e. public administration etc., regarding the role of such network structures within the economy. In turn firms (the main addressees of these activities) upon engaging in these activities tend to assess their tangible benefits, especially in the short term. These as well as other factors can have an impact on the relatively limited interest in the participation in clusters (with the simultaneous preference for undertaking activities linked to the potential obtainment of funds/subsidies). However, where clusters, despite their outlays, do not generate any positive effects in the form of a permanent cluster/network structure, there can be no talk of any real positive cluster effects on firms, the industry or the country in the long-term.

CONCLUSIONS AND FURTHER RESEARCH

The identification of active and inactive clusters is an important result of the study. The classification of these structures was based upon their constituent entities, goals and activities. Of particular importance was the nature of the activities carried out within clusters from the perspective of the network approach. In this way, using the furniture industry as an example, it has been shown how important it is to filter out inactive clusters in order to obtain a true image of clusters and network structures. The assumptions show that a cluster does not exist if there aren't any joint activities and actual interactions between entities and their resources within the cluster. In such situation there are no synergy or other effects of the cluster.

As can be stated based on the example of the identified active and inactive clusters, the resilience of the cluster can be assured, among others, through joint activities undertaken by associated members based upon a preconceived strategy and a willingness to cooperate among members. The stimulus for undertaking activity cannot by solely financial benefit. These clusters are evidence of the fact that such initiatives often may cease their development due to the lack of continued domestic public or EU funding.

The analysis has identified new directions of research. The study can, among others, be deemed a foundation for an analysis regarding the factors influencing the development of clusters and their operations in various stages of their development. Moreover, it seems particularly important to recognise other types of network structures whose full structure is not observable from the outside, but only from the perspective of focal company. It should be stressed that there is a need to expand analysis beyond that of clusters which are not always effective in the results which they bring. A comprehensive approach to the networks structure analysis should enable to identify the relationships between different structures. In addition, different types of relationships and network types may have different effects on various entities and result in different effects. Therefore, it is important to carry out a detailed analysis of these effects i.e., to answer the question whether or not any specific types of networks are more effective than others and generate better results. It is to be expected that network structures, including clusters, will gain in importance (especially at a government level). Hence the issues presented here require further study both in terms of quantitative and qualitative research.

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Michał Staszków[22]

USE OF CUSTOMER SATISFACTION INDEX ON THE EXAMPLE OF OFFICE RENTAL SERVICES

Abstract: Along with the development of following marketing concepts, companies operating both locally and globally, have begun to focus more on clients itself and on their needs. The use of Customer Satisfaction Index allows to specify customers needs and how satisfied they are with provided services or purchased products. Author presents in the article the concept of CSI and shows the practical application of it using an example of office space services provided by one of Polish technology parks.

Key words: satisfaction, loyalty, technology park

INTRODUCTION

Philip Kotler defines satisfaction as a pleasure or disappointment resulting from the comparison of the product (or a result of its actions) with the expectations. If the product does not meet expectations, the customer is dissatisfied. If the product meets expectations, the customer is satisfied. If the product exceeds expectations, the customer is highly satisfied or delighted [2]. Spring and MacKenzie have prepared their own model, in which they considered satisfaction as a result of the client's needs, expectations and experiences with the product after using the product [6]. Just like in previous definition we can find two crucial issues: needs and expectations. Both components have a significant impact on the level of satisfaction.

The importance of satisfaction grew with the development of various marketing concepts. The best example of growing importance of satisfaction is comparison of two concepts: sales concept and marketing concept, which emerged in the mid-50s of the twentieth century [2]. For the first time companies focused on customers and their needs while creating products and services. That was the moment when satisfaction was gaining importance. In sales concept starting point was the company, the purpose was the products, and the result was profit through sales increase. In the case of marketing concept the starting point was the market, the purpose was to meet the customers needs, and the result was profit through customer satisfaction.

Kotler brings up the arguments of marketing specialists who argue for the use of the concept of marketing. They are as follows:

- assets of company have little value without customers,
- the crucial task for companies is to attract and keep customers
- companies gain customers through a better, competitive offer
- the role of marketing is to create a better offer and deliver satisfaction to customers
- customer satisfaction affects the proceedings of various departments of the company
- marketing needs from other departments readiness to cooperate in providing customer's satisfaction.

Customer's satisfaction built through quality of products and services is also reflected in the Quality Management System named ISO 9001. Certification of office space rental service was the reason why studied technology park decided to analyse customer's satisfaction. The article discussed only the office rental service rental because it was subject of certification, but science and technology parks provide a range of services that contribute to the development of innovation [3]. ISO 9001 is a standard that specifies requirements for a quality management system. If the company wants to be certified, it must meet certain requirements defined by the standard. From the customers'

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point of view and their satisfaction, the most important point of ISO 9001 strategy is point number 8 [7]. It refers to the measurement, analysis and improvement. It doesn't impose a way of monitoring customer satisfaction, but notes that such research must be conducted. Such researches allow to control the quality of products and services, and, if needed, allow to react to the decline of quality or satisfaction.

SATISFACTION MEASUREMENT METHODS

When carrying out customer satisfaction surveys it's important to answer the question, what will be the best indicator in this particular case, for example, in the case of rental of office space. There are many methods for investigating the level of customer satisfaction. They are both quantitative and qualitative methods [8]. The most commonly used are:

- analysis of sales,
- analysis of the loss of customers,
- analysis of the complaints,
- mystery shopper test.

Very useful are also models developed by specialized organizations dealing with quality and satisfaction research. The table lists the most common indicators used to assess satisfaction.

Table 1 The main indicators of customer satisfaction evaluation

	Indicator	Indicator characteristic
1	Customer Satisfaction Index (CSI)	Allows the analysis of customer satisfaction in terms of each relevant characteristics for customer satisfaction and total product / service. Measures the expectations of our customers and their satisfaction. Uses a weighting system for the assessment of attributes (criteria).
2	American Customer Satisfaction Index (ASCI)	The American satisfaction index was first published in 1994. Is a macro-level indicator, which measures consumer satisfaction with the quality of the products and services they use, both domestic and imported.
3	Customer Relationship Management (CRM)	Strategy, whose main objective is to build long-term, positive relationships with customers. Its basis is the correct definition of customer value, customer value creation, reaching out to selected customers, shaping their expectations, providing customers with the expected value.

Source: EMAR Marketing Research [4]

In Europe, the most commonly used measure is Customer Satisfaction Index [1]. The most important feature of this indicator is that it measures both the importance of the individual components that affect satisfaction, as well as the level of satisfaction. CSI indicator was also used to test the studied technology park. CSI research consists of exploratory and diagnostic phase.

Exploratory phase was carried out to identify the attributes of customer satisfaction. Taking into account the fact that the office rental service is not too complex, it was easy to identify key factors that affect customers' satisfaction. For this purpose there were conducted interviews with people from the administration of the technology park, which are responsible for lease. In addition, the interview was conducted with the person from technology park management. On this basis were defined characteristics, to which customers pay greatest attention. They were:

- quickness of solving reported cases,
- transparency of received invoices,
- the quality of the office space leased,
- technical equipment of offices,
- cleaning service,
- the presence of the reception in the office building.

The second step was conducting a survey, which in accordance with the concept of Customer Satisfaction Index allowed to assess the validity of individual items for customers.

In the diagnostic phase there was carried out measurement of customer satisfaction with abovementioned services. For this purpose there was used questionnaire, which combined with the results of the exploratory phase allowed to identified a customer satisfaction index.

A survey of the validity of the individual elements consisted of two parts. The first concerned determining how important for respondents are the elements associated with running a business in the park, and the other concerned issues of renting space. In the first part tenants were asked to answer 5 closed questions, in the second part were 6 closed questions. In the construction of the questionnaire was used 7-step Likert scale [5]. Number 1 was assigned to the statement "in general invalid" while 7 meant "very important".

The second survey was divided into three sections:

- lease
- technical equipment and service
- administration

The survey consisted of 16 questions, of which 14 were closed questions, 2 were open-ended questions. Again, most of the questions in the Likert scale was used. This time, however, the value of 1 was assigned to the statement "strongly dissatisfied" and the number 7 "definitely satisfied". Open-ended questions related to the functioning of the suggestions related to the administration department.

Based on surveys CSI index was calculated and was created diagram showing which parts need improvement and which meet customer expectations.

RESEARCH RESULTS - EXAMPLE OF TECHNOLOGY PARK

In order to fully assess the level of satisfaction the average rate of validity must be compared with average rate of satisfaction.

Table 2 Average validity and customer satisfaction

Attribute	Average importance	Weight	Average satisfaction	Weighted score
Quickness of solving reported cases	**6,83**	**17,92%**	5,61	1,01
Quality of the office space	**6,67**	**17,50%**	5,88	1,03
Technical equipment of offices	**6,61**	**17,34%**	6,12	1,06
Transparency of received invoices	**6,5**	**17,06%**	5,83	0,99
Cleaning services	**6,06**	**15,90%**	6,06	0,96
Presence of the reception in the office building	**5,44**	**14,27%**	6,21	0,89
Weighted average				**5,94**
Customer Satisfaction Index				**84,85%**

Source: Own research

The analysis has been conducted with six pre-defined attributes, which are presented in the table below. There was also satisfaction index calculated for the studied attributes, which is exactly Customer Satisfaction Index.

As can be seen from the summary the overall satisfaction rate is 84.85% which is a very high score. It can therefore be concluded that these six attributes that have the greatest importance for customers, satisfy them in 85%.

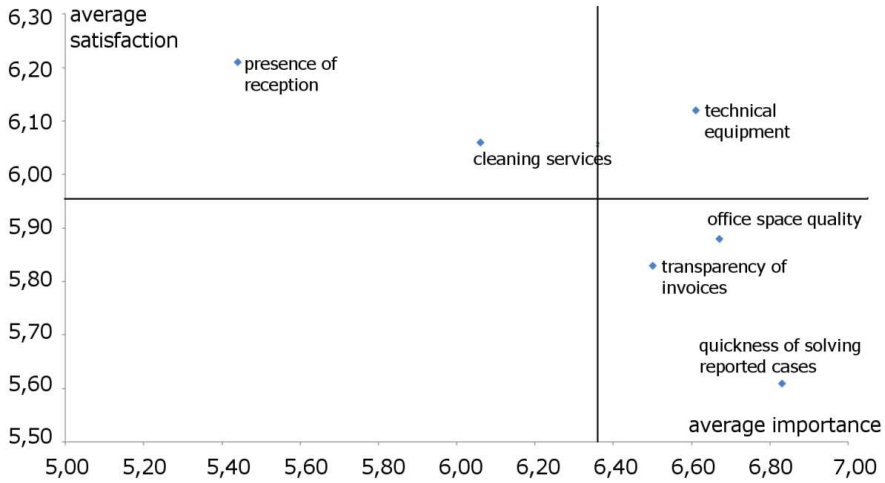

Figure 1. Diagram importance-satisfaction

Source: own research

The above diagram is very useful because it allows to specify a group of factors that need to be improved, as well as those that bring us significant benefits. As shown, it takes into account the evaluation of the validity on the horizontal axis, and the assessment of satisfaction on the vertical axis. Lines which divide scheme are average rating of importance and satisfaction of all appropriate factors.

According to the methodology of CSI, in the first place, the managers should focus on the elements that are located in the right lower quarter. In this case those are: quickness of reported problems solving, transparency of invoices received and the quality of rented office space. These are elements in which level of importance significantly exceed the level of satisfaction.

Subsequently, it is recommended to consider elements in the lower left quarter, they are in fact below average satisfaction, but at the same time have less validity than the average.

The top half concerns aspects that exceed the average level of satisfaction. Left upper quarter relates to items that are not so important for customers, but they are fully satisfied by the company's offer. In this case, these services are cleaning service presence of the reception in an office building.

Right upper quarter are the attributes, where the rate should be maintained at the current level, these are the elements of high importance for the customer, which are also highly rated in terms of satisfaction. There is a single element, namely, the technical office equipment.

CONCLUSIONS

An increasing awareness of customers, both in the B2B and B2C market require from companies greater commitment and attitude to the needs of customers. It is cheaper to keep a

customer than to acquire a new one. Monitoring customer satisfaction allows to keep customers and get new, and it is advisable for any business and any industry. Regular satisfaction survey is also required by the ISO 9001Quality Management System. Article helped to show that Customer Satisfaction Index is a tool that easily allows to identify the most important characteristics of a product or service, as well as evaluating satisfaction survey characteristics. Graphical presentation of the results clearly shows which elements should be improved, and which should be maintain on the current level. CSI is a versatile tool that can be use in both the B2B and B2C market, which best example is office rental service provided by studied technology park. Regardless of whether managers use the Customer Satisfaction Index method, or any other measure, research should be carried out regularly to see if offer weaknesses could be improved.

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Wacław Szymanowski[23]

PRODUCTION ENGINEERING – A NEW APPROACH TO MANAGEMENT OR A NEW DISCIPLINE?

Abstract: Production Engineering – a new approach to management or a new discipline? The paper discusses the origins and the evolution of production engineering, which, in 2010, became a separate discipline of technological sciences. It outlines the definition of production engineering as formulated by the American Institute of Industrial Engineers, in 1989. Based on that definition, the body of knowledge referring to the product lifecycle is described and, next, 10 areas – the building blocks of the production engineering discipline are delineated. All of them are based on IT technological developments.

Key words: production engineering, new discipline.

INTRODUCTION –COMPETITIVENESS OF COMPANIES – ORIGINS AND FUTURE

The industrial civilization, which Toffler (2006) called the second wave, took its shape at the end of the 18th century in England and in the second half of the 19th century in the United States. It was embodied by the massive production of material goods, which led to the separation of manufacturing and consumption stages. The production was based on non-renewable energy sources (fossil fuels such as coal, gas and petrol), and used steam and electrical energy. The mass production process followed 6 rules of bureaucracy: standardization and specialization, synchronization (of human and machine work rhythms), concentration of people in urban centers, of the production and of capital, and power centralization (decision making based on the superior-executor-direct reportpattern), maximization of productions and profits.

In the second half of the 20th century, and namely in 1980s, the environment of companies underwent a substantial number of changes: it became more and more turbulent, marked with an increasing complexity and speed, the intensity of change and technological innovation. Companies thus faced the challenge of responding to such changes (Drucker 1995).

That evolution brought about ensuing developments in the corporate management process: companies needed to take into account the necessary conditions of the protection of the quality and safety of natural and social environment. This was achieved, among all, through the decentralization of decision-making processes in large companies, from both manufacturing and service sectors, at the end of 1980s. In 1990s, the pursuit of an increased effectiveness fostered the emergence of re-engineering and outsourcing of manufacturing and auxiliary processes, which, in turn, stimulated the introduction of lean management, and the rise on an unprecedented scale of innovation in small and medium enterprises, e.g. in the Silicon Valley. The commercialization of Internet (1994) paved the way for the one-to-onere-orientation, i.e. the focus on specific clients, which, in turn, led to the emergence of new individualized modalities of product and service provision: a standard and tailor-made approach called customization (mass customization). As in the first decade of the 21st century, businesses have become more and more flexible, in the nearest future we should witness the increase in networking, with the even more cohesive nodes, among large and small companies as well. (see Fig. 1).

NOTION OF PRODUCTION ENGINEERING AND AREAS OF ITS APPLICATION

The emergence of mass production based on steam, and next on electric energy, which, thanks to Ford, in 1909 took the orderly shape of the production line, required specific organization rules

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which would foster its effectiveness. Since the end of the 19th century, those rules had been presented at technological universities established in the most industrialized economies. In the USA, the first department which hosted lectures on those principles was Harold & Inge Arcus Department of Industrial & Manufacturing Engineering at the Pennsylvania State University, founded in 1908. In Poland, such research center was set up in 1919, at the Technological University of Warsaw, by Professor K. Adamiecki.

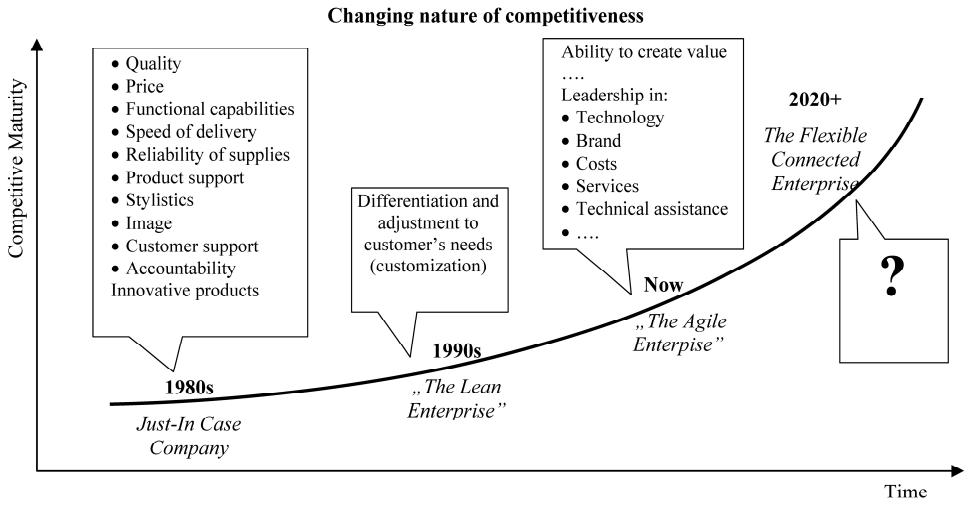

Figure 1. Specificity of competitiveness in the changing world, from 1980s to the first decade of the 21st century and on.

Source: Santarek K., Stan i kierunki rozwoju inżynierii produkcji w USA i krajach Europy Zachodniej, lecture for the meeting of the Production Engineering Committee of the Polish Academy of Science, Zakopane, 2010.

Production engineering combines several technological scientific disciplines which describe manufacturing and management processes, and integrates a wide range of research areas on technologies and organizations. In consequence, it requires a different approach to any problem-solving. In 1989, the American Institute of Industrial Engineers (IIE) established the definition of production engineering, which is still of value today.

Production engineering covers planning, design and management of production systems and logistics systems, and the assurance of their functioning. Such systems are understood as socio-technical systems integrating workers, information, energy, materials and work tools during the whole product lifecycle. In order to achieve a more effective operation of such system, production engineering focuses on technological, economic, human and social sciences, and uses telecommunication and information knowledge, knowledge on management, social communication and stimulation of worker's creativity. Human orientation is the key factor which differentiates production engineering from other technological sciences. The most performing systems are those which continuously strive to upgrade the working environment, and in which human efforts bring the most vital contribution to efficiency, costs and work quality (Istota inżynierii produkcji, 2012)

Understandably, each company would make all endeavors in order to increase its productivity, defined as the relation between the results and the expenditure made to achieve them. In practice, this means that research efforts should basically focus on three main areas:

- Analysis of the lifecycle of products and services;

- Study of manufacturing processes;
- Analysis of developments in the organization of the manufacturing system.

Considering the anticipated developments inthe business environment and the evolution of manufacturing tendencies, as discussed above, product and service manufacturing processes and their delivery "just in time" should be analyzed in their specific variants. In fact, such transformations lead to increased spending on design and preparation, on the organization and on the management of manufacturing processes. These stages make all part of the product lifecycle, as detailed in Figure 2 below.

PRODUCTION EINGEENIRING RESEARCH AREAS

The relations between the stages of the new product development and scientific disciplines which cover technological and social aspects of manufacturing activities, as outlined on Figure 2 .

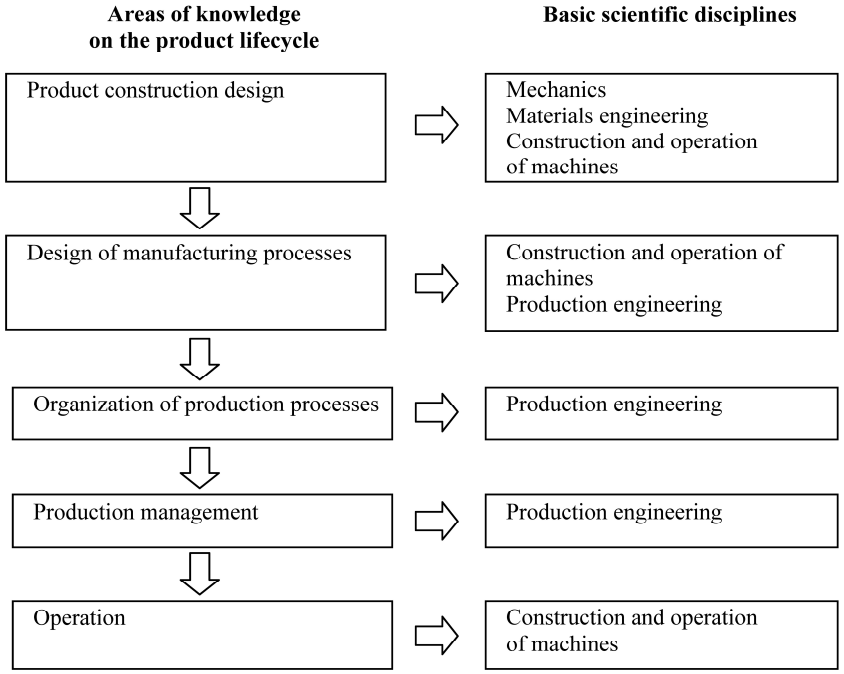

Figure 2. Areas of knowledge on the product lifecycle versus basic scientific disciplines

Source: Istota inżynierii produkcji, Production Engineering Committee of the Polish Academy of Science, June 2012, p.5.

1. Organization and management of products and services

The area covers such issues as the design and the organization of manufacturing processes, working time management, product cost streamlining, scheduling of production orders and the use of IT systems in corporate management.

2. Selected issues of production processes engineering

The area covers the issues of management of resources processing into functional goods, namely the manufacturing of machine components, changes of their dimensions, modification of their surface structure, bonding of powders and molds, plastic working and plastics processing,

coating, abrasive and erosive processing. Research should focus on problem-solving in the management of working time (workers and capital goods), as well as of materials and information flows.

3. Innovation management

The area covers such topics as the creation and measurement of innovation processes and their management, and in particular methods and tools used for the development of innovative solutions, designing and development of innovations and transfer of technologies fostering the competitiveness of companies.

4. Production and service project management

The area describes changing production conditions, technological progress as driven by the application of project management tools, reduced product market windows, the launch of new technologies and their timely implementations thanks to new methods applicable for scheduling, control and assessing the risk related to project execution deadlines.

5. Optimization of the supply chain and logistics

The area covers such topics as the optimization of materials, information and financial flows across the organizational network oriented towards the production and delivery of products and services, while ensuring deadlines, quality, delivery costs and continuity.

6. Quality management

Quality management allows for the improvement of company operations thanks to the application of standardized management support systems, and in particular the elimination of obstacles and difficulties in the implementation process. This may be achieved thanks to better management methods and techniques, as well as to better product safety standards and assurance of product liability.

7. Decision-making support systems. Production knowledge management.

The area covers mathematical models, including decision-making models, and artificial intelligence instruments used to achieve financial and operational goals in production management.

8. Corporate forecasting. Modeling and computer simulation

The area refers to forecasting of technological and economic processes and demand-side projections. Moreover, it includes the modeling and simulation of product design, the design of processes and tasks of production logistics and project management. The results of such modeling and simulation may be of use in designing new production systems or in reconstructing the existing ones.

9. Shaping the working environment. Work safety

The area covers the bulk of analyses on factors which shape the safety in the working environment. Such analyses are performed with modeling and computer simulation methods used in production engineering, and thus pertain to such issues as early identification and prediction of technological risks and threats to health in the working environment, work ergonomics, work valuation in production systems, application of RFID technology in the dissemination of best practices in occupational safety and health and reconstruction of incidents at work.

10. Effectiveness, productivity and company organization

The area focuses on actions and decision taken by the management to apply new business models and new organizational solutions which will drive the effectiveness of the organization and lead to changes in its environment.

CONCLUSIONS

In the context of a more and more globalized corporate environment and of rapid changes in manufacturing processes, the body of knowledge needed for each engineer-manager should include both the current technological knowledge, and the business management know-how. This will necessarily entail the realization of 2 principles: [1 p.9-10]

PRINCIPLE 1: there is no manufacturing without management, and no management wihtout any specific application;

PRINCIPLE 2: there is no management without computer-aided methods.

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MATERIAL AND STRUCTURAL COMPONENTS OF COMPLEX PRODUCTS - ANALYSIS OF SELECTED TERMS

Abstract: Basic terms related to components of complex products were categorised and a classification of these components was proposed. Analysed terms were illustrated with examples of structural components of furniture as representatives of complex products. The classification of terms referring to components of complex products was presented in the form applying the principles of propositional calculus and the set theory. These specific definitions may ensure greater clarity of descriptions in investigations concerning organisation and management of production. They may also be applied when constructing IT data bases, which facilitate the creation of lists of components as explosions and implosions of bills of materials and engineering bills of materials for complex products.

Key words: management of production, categorization, classification, complex product, structural

INTRODUCTION

In literature on the subject, terms referring to components (material or structural) of complex products are frequently ambiguous. For example a product is treated as a component with no explanation of the scope of the meaning or with an imprecise description, which sometimes leads to incorrect application of these terms. In other cases such terms as a detail or element are used as equivalents (synonyms). While an element is an indivisible component of an entity, a detail is a small part - indivisible or complex. Economic sciences, including also organisation and management of production, are currently sufficiently developed to attempt at the clarification and unification of applied concepts and terms at least in some areas of the accumulated knowledge.

The aim of the paper is to categorise and present a proposal for a classification of terms connected with components of complex products. The embedded network of terms aims at ordering of concepts and terms used in sciences connected with organisation and management of production.

TERMS REFERRING TO PRODUCT AND COMPLEX PRODUCT

According to Chlewiński (1999) categorisation is "a process of establishment of categories (Latin categoria, from Greek katēgoria = judgement, statement, type, a concept distinguished in a classification) [25], i.e. a search for a general rule, thanks to which we similarly perceive and react to different elements" [26]. In turn, classification (Latin classis = section + facio = I make) is defined by the Dictionary of foreign words by PWN (2013) as "a logical division of the scope of a given concept (name), consisting in the listing of subordinate concepts so that a sum of their scopes is equivalent to the scope they share and so that these scopes are mutually exclusive". Categorisation and classification of selected terms is presented based on furniture items as representatives of complex products. Furniture includes multi-element products produced from different wood species, wood-based materials and non-woody raw materials.

Analysis of definitions connected with material structure and structural design of complex products requires first of all an explanation for the scope of meaning for the term "product". A

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[26] *Chlewiński Z. (1999): Umysł - dynamiczna organizacja pojęć: analiza psychologiczna. Wydawnictwo Naukowe PWN, Warszawa, p. 48.*

product (Latin productus = produced) is a purposeful result (effect) of manufacturing processes with the direct or indirect participation of humans. Products are made from different types of materials of varying degrees of processing. The material in the original or slightly transformed form is referred to as raw material.

The term „product" as a concept[27] may be used in a narrower or broader sense. In the former case this term is applied in relation to an object, which production process in a specific economic entity has been completed. As a result this product has all the characteristics required by the consumer (user). In a broader sense a product is any object of work, including that in the course of processing and irrespective of the realised stage of the production process. In this paper the term "product" in the narrower sense was replaced by the term "final product", while to denote a product in the broader sense such terms were used as e.g. "component" and "part" or two- or three-element phrases were used such as e.g. a solid-form product, a direct master component, etc.

A complex product is a product, which was manufactured from at least two parts. Then the product receives a structure (Latin structura – a system and interrelations of elements (parts) constituting an entity[28]). Components of complex products during manufacture and as final parts of final products are found in forms (states) of varied properties. In relation to the distinguished forms of components, in order to stress their properties uninomial (single word) terms are used such as element, detail, or binomial[29] (two-word) terms such as an amorphous component (product), a uniform component (product), a unit component (product), a slave component (product), etc., which appropriately characterise their state.

CHARACTERISTICS OF BASIC TERMS FOR COMPONENTS OF COMPLEX PRODUCTS

Complex products are manufactured from components, which may be classified to basic categories defined as amorphous, solid-form, uniform and unit products[30]. Amorphous products are shapeless and are non-structural components of furniture. They include e.g. adhesives, lacquers and stains. Solid-form products have a shape. The class of solid-form products comprises uniform and unit products.

Uniform products are solid-form products, from which structural components of final products are made. From the point of view of their applicability they are characterised by uniform (homogeneous) physico-chemical properties along at least one measurable dimension. Uniform products include e.g. board materials (e.g. particleboards, fibreboards, plywood), which have two such directions, and strips or bands (e.g. edge bands), which have one direction with uniform properties. The number of uniform products is measured using quantitative units of measure, e.g. volume, area, length, weight, etc. During the manufacturing process uniform products are divided perpendicular to the directions with uniform properties into the number of fragments as demanded. As a result of these divisions unit products are obtained. For example commercial particleboard (a uniform product) is cut, sometimes repeatedly, in two directions into panels, to dimensions consistent with their intended use. As a final result of such operations panels become unit products. During successive technological operations unit products are no longer divided into parts, they may only be formed.

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[27] *According to ibid., p. 47: „concept" refers to "a basic cognitive structure, representing a generalised, abstract class of objects (objects, events, actions, characteristics, relations) interconnected by a principle". According to http://pl.wikipedia.org/wiki/pojęcie (accessed 24.11.2013) a term is "an abstract, mental equivalent of an object. Upon being defined a concept becomes a term".*

[28] *Wielki słownik wyrazów obcych PWN (2013): Praca zbiorowa pod redakcją naukową M. Bońko, Państwowe Wydawnictwo Naukowe, Warszawa. ISBN: 978-83-01-14455-5.*

[29] *Cf.: Binominalne nazewnictwo gatunków. W: Encyklopedia Biologia. Greg, 2008. ISBN 978-83-7327-756-4.*

[30] *Names "amorphous, solid-form, uniform and unit products" were proposed and defined by the authors of the paper.*

Unit products (structural components[31]) are found every time as separate items (e.g. shelves, doors, drawers). They are structural components of solid-form products and as a result of cutting they have already been given basic dimensions (full measure), adequately to their intended use. The number of unit products is expressed in the units of quantity, i.e. pieces, pairs, sets, etc. Generally they are characterised by varied properties (first of all dimensions and shapes) in all the three dimensional directions. If unit products are semi-finished products cut to full measure (e.g. panels, scantlings), they are not cut into parts in the course of further operations of the technological process. They are only subjected to forming and next they are assembled into subassemblies or assemblies and final products. Manufacturing processes of unit products are performed in a discrete (non-continuous) manner. Unit products include furniture, as final products and their structural components (elements, subassemblies, assemblies).

CLASSIFICATION OF STRUCTURAL COMPONENTS OF COMPLEX PRODUCTS

The following relations are observed between structural components of furniture and the final furniture product and between its components: inclusion, order and affiliation[32]. The above mentioned relations were assumed as criteria constituting the basis for the classification of structural components of furniture. The division of components based on the served structural or utility functions and divisions into types of joints of structural components in the final product remain outside the scope of this analysis.

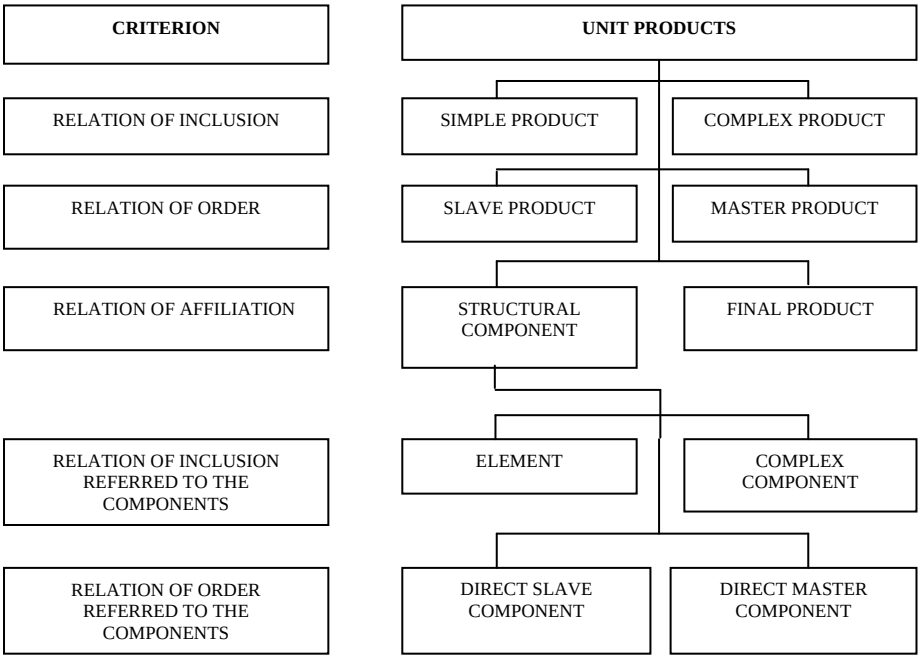

Figure 1. Classification criteria and terms characterising unit products in terms of their relations

Source: own study.

[31] *Construction (Latin construction) - means "arrangement components of some whole." Wielki słownik wyrazów obcych PWN (2013): Praca zbiorowa pod redakcją naukową M. Bońko, Państwowe Wydawnictwo Naukowe, Warszawa. ISBN: 978-83-01-14455-5.*

[32] *Murawski R., Świdyrowicz K. (2006): Podstawy logiki i teorii mnogości. Wydawnictwo Naukowe UAM, Poznań.*

Figure 1 presents a classification of basic terms, which refer to the relations, which may occur between the final furniture product and its structural components, as well as interrelations between components. Specified names refer only to those forms of components, which are classified as unit products.

The first relation (inclusion) presented in Fig. 1 refers both to components (a simple component, a complex component) as well as final products (a simple final product, a complex final product). The second relation (order) may refer to the system between several components (slave components, a master component) or between components and the final product (slave components, a master final product). The relation of affiliation refers to components and final products. The two former relations (inclusion and order) refer only to systems between components.

The classification presented in Fig. 1 takes the form of a dichotomy division. This means that the analysed set of unit products, comprising final furniture products and their structural components is always divided based on a specific relation into two opposite subsets, described by their binomial or trinomial (three-member) names.

MATHEMATICAL APPROACH TO THE CLASSIFICATION OF UNIT PRODUCTS

When describing the classification presented in Fig. 1 principles of propositional calculus and the set theory may be used. In such a case a formalised form of the dependence between final products and their structural components is obtained. In this form of the classification the following symbols are applied[33]: $\neg$ - conjunction "no"; $\vee$ - specific quantifier; $x \in X$ – x is an element of X; $\subset$ - is included[34]; $\cup$ - a union of sets; $\cap$ - a product of sets; $\varnothing$ - an empty set.

For the purpose of the formalised description it is assumed that there is a set **W** of the following form:

$$W = \{w_1, w_2, ..., w_i, ..., w_n\}, \tag{1}$$

where:

W - a set of all unit products (final products or structural components), which are taken into consideration during analysis,

$\mathbf{w_i}$ - a unit product (a final product or a structural component), i = 1, ..., n.

It is also assumed that between certain elements of a set **W** there may be relations[35] of inclusion, order and affiliation[36].

For the inclusion relation this means that between two unit products, e.g. $\mathbf{w_i}$ and $\mathbf{w_k}$ there is a relation, in which product $\mathbf{w_i}$ is a component of the product (it is contained in the product) $\mathbf{w_k}$ ($i \neq k$). Such a dependence is observed e.g. for a shelf of a cabinet ($\mathbf{w_i}$) and the body of the cabinet ($\mathbf{w_k}$) - the shelf is a component of the body. The inclusion relation is written as: $\mathbf{w_i \subset w_k}$.

Among elements of set **W** we may distinguish unit products, which have no structural design. They comprise a class of simple products **P** (e.g. a table leg, a shelf, a wooden dowel). A unit

[33] *Ibid.*

[34] *A distinction between the affiliation and inclusion relations was explained by Kubiński G. (2010): „If we say that element a is an element, i.e. it belongs to set A, $a \in A$, this means that it is an element of this set similarly as a single man is an element of humankind. In turn, if we speak of set A being contained in set B, $A \subset B$, we speak of the existence of a set of men in the set of the entire humankind". Na podstawie: http://www.academia.edu/3594746/Alain_Badiou (accessed 22.11.2013).*

[35] *Relation – in the set theory it refers to a any subset of the Cartesian product of a finite number of sets.*

[36] *Guzicki W., Zakrzewski P. (2007): Wykłady ze wstępu do matematyki. Wprowadzenie do teorii mnogości. PWN, Warszawa. ISBN 978-83-01-14415-9.*

product $\mathbf{w_i}$ is contained in the class of simple products P (i.e. wi ∈ P), if in set W there are at least two unit products wk, wp contained in wi, which is presented by the formula:

$$\neg[\overset{\vee}{k, p}(w_k, w_p)] \subset w_i, \quad dla\ i \neq k\ oraz\ i \neq p. \tag{2}$$

particular wk = wp.

$$\overset{\vee}{k, p}(w_k, w_p) \subset w_i, \quad dla\ i \neq k\ oraz\ i \neq p. \tag{3}$$

These unit products, which have a structural design, belong to the class of complex products Z (e.g. the body of a cabinet, a drawer, a chair). A unit product wi is contained in the class of complex products Z (i.e. wi ∈ Z), if in a set W there exist at least two unit products wk, wp contained in wi, which may be written as:

In particular wk = wp. In such a case the structure of product wi is formed by two unit products, identical in terms of their type. Both classes of products P and Z are disjoint, i.e. $P \cap Z = \varnothing$ and they form a set $W = P \cup Z$. A complex product may be formed in the course of a manufacturing process or outside a manufacturing process - as a result of assembly performed by the user. The latter situation refers e.g. to furniture produced and sold for self-assembly (e.g. a kitchen cabinet).

In view of the order relation[37], which occurs between a pair of unit products (wi, wk) comprising the structural design of a product wk, we distinguish slave products (e.g. the back wall in relation to the cabinet body) and master products (the cabinet body in relation to the back wall, being a component of this body). A unit product wi belongs to the class of slave products D (i.e. wi ∈ D) if in a set W there is at least one unit product wk containing wi. This dependence is given in the formula:

$$\overset{\vee}{i}(w_k) \supset w_i, \quad dla\ i \neq k. \tag{4}$$

A unit product wk belongs to a class of master products N (i.e. wk ∈ N), if in a set W there is at least one product wi contained in wk. The described dependence is presented by the formula:

$$\overset{\vee}{k}(w_k) \subset w_i, \quad dla\ i \neq k. \tag{5}$$

A master slave product $\mathbf{w_k}$ in relation to another unit product may be a slave product depending on the levels of structural design, at which these products are found. Thus the indicated classes of products **D** and **N** are inseparable, i.e. $\mathbf{D \cap N \neq \varnothing}$ and $\mathbf{W = D \cup N}$.

Due to the affiliation relation of a unit product to the structural design of another product we may distinguish structural components and final products (e.g. a table, a desk). A unit product $\mathbf{w_i}$ belongs to a class of structural components **S** (i.e. $\mathbf{w_i \in S}$) if in a set **W** there is at least one complex product $\mathbf{w_k}$ (belonging to the class of complex products **Z**) containing $\mathbf{w_i}$. Such a situation is described by a formula:

[37] *A binary relation in a set X is called a relation of partial order or shortly an order relation only when it is reflexive, asymmetrical and transitive. . http://cynarski.pl/pjwstk/MAD/index44.html (accessed 24.11.2013).*

$$\overset{\vee}{k}(w_k) \supset w_i, \quad dla\ i \neq k \text{ oraz } w_k \in Z. \qquad (6)$$

A unit product $\mathbf{w_i}$ belongs to a class of final products **F** (i.e. $\mathbf{w_i \in F}$) if in a set **W** there is no complex product $\mathbf{w_k}$ containing $\mathbf{w_i}$. Such a dependence is presented by formula:

$$\neg\,[\overset{\vee}{k}(w_k)] \supset w_i, \quad \text{for } i \neq k \text{ and } w_k \in Z. \qquad (7)$$

Classes of unit products **S** and **F** are disjoint, i.e. $\mathbf{S \cap F = \varnothing}$ and a set $\mathbf{W = S \cup F}$.

Within structural components (a class of unit products **S**), due to their structural design described by the inclusion relation, we may distinguish elements, i.e. simple structural components and assemblies (subassemblies), i.e. complex structural components. A component, which is a complex product, depending on the degree of complexity, is called a subassembly (e.g. an underframe) or n assembly (e.g. a cabinet body). Otherwise it is an element (e.g. a tabletop board). A unit product $\mathbf{w_i}$ belongs to a subclass of elements **E** (i.e. $\mathbf{w_i \in E \subset S}$), if a set **W** does not contain at least two unit products $\mathbf{w_k}$, $\mathbf{w_p}$ contained in $\mathbf{w_i}$, which may be presented by a formula:

$$\neg\,[\overset{\vee}{k,p}(w_k, w_p)] \subset w_i,\ w_i \in S,\ \text{for } i \neq k \text{ and } i \neq p. \qquad (8)$$

In particular $\mathbf{w_k = w_p}$.

A unit product $\mathbf{w_i}$ belongs to a subclass of complex components (subassemblies, assemblies) **G** (i.e. $\mathbf{w_i \in G \subset S}$), if in a set **W** there are at least two unit products $\mathbf{w_k}$, $\mathbf{w_p}$ contained in $\mathbf{w_i}$, which may be written in the form:

$$\overset{\vee}{k,p}(w_k, w_p) \subset w_i,\ w_i \in S,\ \text{for } i \neq k \text{ and } i \neq p. \qquad (9)$$

Classes of unit products **E** and **G** are disjoint, i.e. $\mathbf{E \cap G = \varnothing}$ and $\mathbf{S = E \cup G}$.

Moreover, due to the order relation within components (a class of unit products **S**) we may distinguish direct slave components and direct master components. A component $\mathbf{w_i \in S}$ is called a direct slave component of a master product $\mathbf{w_k \in N}$, if for a component $\mathbf{w_k}$ there exist no other master product $\mathbf{w_p \in N}$, which is a slave product in relation to $\mathbf{w_p}$. A subassembly refers to a direct complex structural component of an assembly. A component $\mathbf{w_i \in S}$ is called a direct master component in relation to a slave component $\mathbf{w_k \in D}$, if in relation to a component $\mathbf{w_i}$ a product $\mathbf{w_k}$ is a direct component.

CONCLUSIONS

The conducted categorisation of basic terms concerning components of complex products and a classification of these components are proposed, being an attempt at ordering, within the analysed scope, the terminology concerning organisation and management of production. These findings may be applied when constructing IT data bases for complex final products and their material structures.

They constitute a network of concepts for the creation of bills of components, particularly explosions and implosions of the material structure and structural design of complex products.

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