WoodEMA, i.a. - International Association for Economics and Management in Wood Processing and Furniture Manufacturing

University of Ljubljana
Biotechnical faculty
Department of wood science and technology

Development trends in economic and management in wood processing and furniture manufacturing

Kozina, Slovenia, 2011

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PREFACE

The international scientific conference »Development trends in economic and management in wood processing and furniture manufacturing« was held in Kozina, Slovenia, 8-10 June 2011, and was organised under the auspices of the WoodEMA international association.

This conference brought together over 30 researchers from 10 countries and provided a relaxed forum to present and discuss new ideas, new research directions, and to review current trends in this area. It was based on short presentations that should encourage discussion by the attendees. These proceedings contain 34 contributions of more than 60 authors, which present a wide variety of research and application topics.

Wood industry has gone through radical structural changes and this has forced companies to learn to respond quickly and adapt to new conditions of severe competition. According to the interdisciplinary character of the field of wood processing and furniture manufacturing the presented papers covered numerous subjects. From this standpoint, the present publication is a diversified compilation of theoretical approaches and practical solutions to the problems of wood industry.

Organizing a conference is a lot of work, but it is also a lot of fun. I truly enjoyed and I would like to thank all the participants for their contribution and everyone who has helped make this conference a reality and a success.

For Organization Board:
Dr. Leon Oblak, Associate Professor
University of Ljubljana
Biotechnical Faculty
Department of Wood Science and Technology

Kozina, June 2011

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TIMBER PRODUCTS MARKET IN EUROPEAN COUNTRIES – CHARACTERISTICS AND TRENDS

Stanisław BORKOWSKI, Renata STASIAK-BETLEJEWSKA

ABSTRACT

The main issues affecting the timber market comprise technical innovations, changes in design and consumer requirements and environmental issues. These, combined with the availability of timber and overall economic activity, drive the performance and prices in the timber market. These factors could be translated into opportunities and threats affecting the opportunities for enterprises which would like to start timber production in the EU. However, it is important to keep in mind that the same development or trend can be an opportunity for one exporter and a threat to another. This article also provides an overview of the European market for "verified legal" and "verified legal and sustainable" solid wood products. It forms part of a regular series to track market conditions.

Key words: timber market, European market, verified legal and sustainable wood products

1. INTRODUCTION

Today, wood is perceived as: natural, renewable, economical, sound absorbing product. Timber construction is typically characterized by a multilayered combination of different materials which work together as a system to provide optimum stability, thermal, acoustic and moisture insulation, fire safety and constructional wood preservation. Timber building is perceived as a efficiency part of future energy-efficient building (passive building) because the wood is: sustainable, CO^2 neutral and a highly effective insulator, creating excellent living conditions. One of the most specific advantage of wood is its ability of energy using reduction. The timber construction has a higher heat insulation value than conventional construction methods, even with lower wall thicknesses. An external wall constructed using timber may have only half the thickness of a brick or concrete wall, yet provide double the thermal insulation value, while at the same time avoiding the thermal bridging common with other construction methods. Considering the growing importance of energy-efficient building methods, timber construction will play an increasingly important role in the future [Dipl.-Ing. Markus Julian Mayer (Architect BDA) and Dipl.-Ing. Cathrin Peters Rentschler, Munich, Germany].

The product groups regarding timber and timber products can be generally divided into two main categories, depending on their degree of processing: raw materials and by-products; and value-added, further-processed products. Raw materials and by-products consist of round wood, sawn wood, veneer and densified wood. Value-added products consist of wood-based panels, builder's joinery and carpentry of wood (mouldings, door frames, windows and window frames, stairs and staircases and a considerable amount of the parquetry, which are imported in unfinished or semi-finished stages).

2. CHARACTERISTICS OF EUROPEAN TIMBER MARKETS STRATEGIES

The European Union (EU) is the current name for the former European Community. Since January 1995 the EU has consisted of 15 member states. Ten new countries joined the EU in May 2004. In January 2007 two more countries (Bulgaria and Romania) joined the EU. Negotiations are in progress with a number of other candidate member states. In this survey, the EU is referred to as the

EU27, unless otherwise stated. Cultural awareness is a critical skill in securing success as an exporter. The enlargement of the EU has increased the size of the EU, and also significantly increased its complexity [CBI's export manual 'Exporting to the EU, 2006].

Information obtained from the wood/timber industry shows a lack of trade organizations. This is particularly obvious for the wood/timber frame industry. On the other hand, according to the majority of the country reports, the wood/timber industry has been very successful in terms of marketing the concept of wood/timber frames in building constructions. One reason for that is the strong governmental support the industry receives in some of the countries. Another reason is that several of the industries have created specific organizations mainly focusing only on marketing activities as well as developing strong collaboration partners. Examples of activities, made by the marketing organizations, are trade fairs, seminars, and different kind of prizes with focus on architects, designers, and students in order to encourage the use of wood/timber in construction works. The listed advantages for timber/wood frames are that timber/wood is perceived as a natural material and therefore environmentally correct and ecological. The weaknesses, pointed out in most of the reports, are the damp and mould issues as well as the risks of fire linked to timber/wood frames. The threats or challenges facing the timber/wood industry are raising prices of energy and raw materials but also the effects of the current economic situation which makes the growth slowdown.

Below there is a short presentation of a selection of the arguments used by the Austrian timber industry in its marketing, that point on adventages such as [Ann-Sophie Klusell, 2008]:

- wood does not produce any waste and it is totally recyclable,
- wood has just one tenth of the weight of steel,
- extraordinary structural-physical characteristics,
- wood is CO2-neutral,
- wood is light,
- wood is the material with the best rate of insulation and heat storage and saves heating costs for every housing space,
- wood burns, but the breakdown of wood in case of a fire is exactly accountable – an advantage that not all materials have,
- the insulation effect of an (a) 10 cm thin massive wood wall complies with a 160 cm thick concrete wall,
- Austrian companies and institutions are worldwide leaders in the development of wood composites as well as in modern wood manufacturing and processing technology,
- surfaces of wood strongly contribute to a comfortable room climate, since wood regulates air humidity efficiently,
- building with wood is simple but demanding at the same time – architects, designer and construction workers feel gratification, because they can treat a renewable, philanthropic resource,
- living with wood – ageless beauty.

In 2006 a campaign of Belgium woodworking industry took off to promote the timber industry and to inform the advantages of using timber frames. A selection of arguments used in promoting timber frames were pointed on adventages of timber such as: energy economics, positive influence on health, fire resistance, an eco-friendly alternative, emitting less carbon dioxide, producing oxygen. Promotion campaigns in Belgium was presented on the example of the Belgian Woodforum - a building of 1700 m^2 in the heart of Brussels (L‟ Arsenal 2, Avenue des Volontaires, 1040 Bruxelles) named "The Home of Wood".

In 2007, the Irish market share for timber frames reached an all time high of 25% to 30%. With the recent sharp decline in the market, timber frame market share may be as low as 10%. Timber frame market share grew from 5% to 30% market share in Ireland over a period of 15 years [Ann-Sophie Klusell, 2008].

Arguments used by IFTMA *Irish Timber Frame Manufacturers Association* in promoting timber frames were following:

1. Timber is environmentally friendly and will help Ireland to fulfil its Kyoto commitments.
2. Timber frame is warmer than masonry and delivers „huge" financial savings on energy.
3. Timber frames are faster to construct and saves money for the builder (Masonry is a „dinosaur" technology etcetera).
4. Technically – they say that both timber frame and masonry comply with the building regulations and therefore that timber frame is „equivalent" to masonry.

The products offered by the Swedish industry are bearing-structures in timber in multi-storey buildings, public buildings and infrastructure. Regarding the price of multi-storey buildings, the timber homes industry believes construction is cheaper using timber frames than it is using other materials. The fact that timber frame has a cost benefit is also used forcefully in timber frame marketing. Timber is also marketed by more practical means. People are invited to come and visit timber-framed multi-family buildings, to come in and "get the feel" of what it is like. The purpose of this type of marketing is to convey the feeling and atmosphere of living in a timber multi-storey building. The timber industry promotes its message through seminars, workshops, competitions and exhibitions. A selection of the arguments used by the Swedish timber industry in its marketing of multi-storey buildings with timber frames is following [Ann-Sophie Klusell, 2008]:

1. A timber frame is an eco-friendly alternative, emitting less carbon dioxide.
2. Buildings constructed on a timber frame are lightweight and well suited to poorer ground conditions.
3. It is cheaper to build using a timber frame than it is with concrete or steel.
4. Timber is a natural, Swedish material.
5. Research and the development of joists now permit timber-framed houses to have acoustic insulation to equal that of a house built of concrete. Measures have also been taken to deal with the risk of damp and mould.
6. It is quicker to build with timber since no lengthy drying periods are required, such as those linked to concrete.
7. Developments in the use of timber frames for constructing multi-storey buildings leads to regional growth and increased employment.

The British timber market use the following arguments in its the timber market strategy [Ann-Sophie Klusell, 2008]:

1. Wood is engineered to the highest level of accuracy and quality.
2. Significantly simplifies on-site construction.
3. Promotes greater efficiency and supply chain integration.
4. Brings predictability and greater control to the construction process.
5. Meets and often exceeds all current building regulations.
6. Performs well in terms of fire and flood resistance.
7. Improves construction health and safety.
8. Has fewer defects and high customer satisfaction.
9. Is by far the most environmentally friendly way to build.
10. Thermal and acoustic excellence.
11. Durability.
12. Design flexibility.

The presented information shows that the timber industry overall has a well developed timber market strategy. Important to point out, however, is well organized trade units are in general in charge for the whole wood industry and not specific for the timber frames industry. Examples of countries that do not have trade organizations especially for its timber frame industry is Belgium, Italy and Sweden. In special regard to Italy no studies have been carried out analyzing the timber industry due to the fact that the Italian timber frame industry has never been seen as a competitor to concrete.

According to the majority of the country reports the timber industry has been very successful in terms of marketing. Both in Belgium and Sweden the industries use multiple marketing channels and the timber industry marketing success is also pointed out in the Austrian and Irish reports. The reason for that may be a result from the governmental support the industry receives in some of the countries but also that several of the industries mentioned have specific organizations/sections focusing only on marketing activities as well as developing strong collaboration partners. A summary of activities made by the marketing sections of the industry are trade fairs, seminars, different kind of prizes with focus on architects, designers, and students, in order to encourage the use of timber in constructions.

The listed advantages, strengths and opportunities for timber frames are that wood/timber is perceived as a natural material and therefore environmentally correct and ecological. The Irish report indicates as well that due to excellent use of advertising media including radio, television, and printed media the Irish timber industry has been very strong in getting their „environmental" and „thermal insulation" messages across.

Further, the UK report also include that a great majority of wood-based products in the UK are now also Certified - as coming from legal and responsible sources. This presents specifiers, buyers and users with the confidence that they are dealing with an ethical industry intent on protecting its precious natural resource. The report indicates however that the greatest challenge for the UK timber industry is to maintain its rare ability of offering an unparalleled combination of commercial, social and environmental benefits. This is closely linked to CSR (corporate social responsibility), where a company seeks legitimacy and approval from the population in a country through CSR and where the legitimacy from the public is obtained where there are some responsibilities that the company must consider such as social and environmental. The UK wood industry has been undertaking some research into CRS in the timber trade with the funding from the UK Department for International Development. The aim is to develop guidelines on best practise and policy advice to government. Through the CRS the industry is creating a positive public image. The weaknesses pointed out in most of the reports are the damp and mould issues as well as the fire risks linked to timber frames. The fire risk is especially pointed out in the UK report, where the timber frame industry is seriously threatened by a series of ongoing high profile fires on multi-storey buildings. The Swedish report mentions this problem as well; it indicates however that time will show the negative but also dangerous effects of the use of the timber frame from a fire safety perspective. Another weakness is that even if the wood industry and its marketing is well developed many of the included countries in this paper is lacking a trade organization focusing on constructions in wood, as mentioned earlier. The more acute of the threats or challenges facing the timber industry are rising prices of energy and raw materials but also the effects of the current economic situation which makes the growth slowdown [Ann-Sophie Klusell, 2008].

More threats facing the wood industry may however arise, since the wood industry as well as many other industries are facing difficult times due to the global credit crunch.

3. "VERIFIED LEGAL" AND "VERIFIED LEGAL AND SUSTAINABLE" SOLID WOOD PRODUCTS

One short-coming of environmental timber procurement policies and practices within the EU is that the EU member states have not agreed a definition of "verified legal" or "verified legal and sustainable" wood products. And within EU member states, understanding of what constitutes verified legal and sustainable varies between different actors in the public and private sector. Therefore this report does not establish rigid definitions of "verified legal" and "verified legal and sustainable" timber products. Instead, a comprehensive range of forest certification frameworks, stepwise certification systems, and legality verification programs particularly relevant to the EU market have been identified. These various programs are referred to by name (or abbreviation) where relevant throughout this report.

Nevertheless various terms are used for convenience sake throughout this report to refer collectively to timber products available through a particular subset of these programs.

The term "verified timber" is used when referring to products supplied through any of the programs such as: Forest Stewardship Council (FSC), Programme for Endorsement of Forest Certification (PEFC), Programme for Endorsement of Forest Certification (PEFC). Forest certification programs combined several elements typically taken to involve:

- establishment of forestry and chain of custody standards through a balanced consensus-building multi-stakeholder process;
- alignment of forestry standards with international principles of sustainable forestry management;
- independent third party assessment of on-ground forestry performance and chain of custody management systems against these standards;
- conformance of accreditation and certification bodies with, at minimum, appropriate ISO standards.

The term "certified timber" is used when referring to products which are verified under the terms of one or other of the international, national or regional forest certification frameworks identified in. The term "verified legal timber" is used when referring either to products verified under the terms of one or other of the private sector legality verification or phased certification programs or to products covered by a FLEGT VPA license. It is not an aim of this study to assess the relative merits or credibility of individual certification or legality verification systems. These collective terms do not imply any judgement with respect to the quality of assurance provided by the programs.

Overall, 25% of the timber products imported into the EU-25 during 2007 are likely to have derived from independently certified or legally verified forests. Much of the imported verified volume was sourced from Russia and other non-EU European countries (mainly Belarus, Switzerland, Norway and Croatia) and was dominated by softwood sawn lumber and softwood logs. If intra-EU trade is taken into account, the proportion of timber products imported by individual member states likely to derive from a verified source is considerably higher, exceeding 50% in 10 EU Member States. At the end of 2008, 326 million hectares of forest were independently certified worldwide to either FSC or PEFC standards, around 11% of the global commercial forest area. Much of this area is concentrated in the temperate zone. Only around 2% of commercial forest area in the tropics is certified. The rate of increase in global certified forest area has declined in recent years from around 50 million hectares per year between 2001 and 2005 to between 15 and 25 million hectares per year since 2006.

Supply of verified hardwoods is however severely restricted by the high proportion of hardwood forests which are under the control of small land owners.

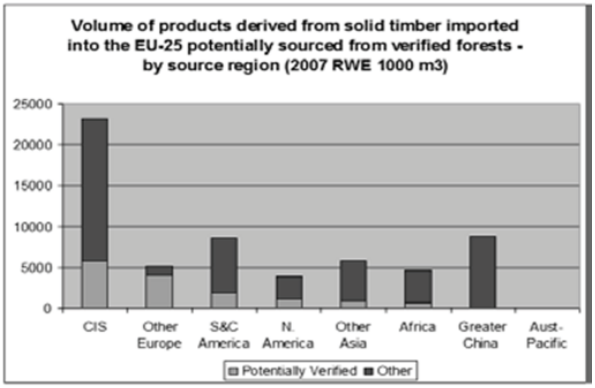
The EU's wood based panel sector has expanded considerably in recent years, to such an extent that the region is now the largest producer in the world accounting for around 25% of total world production (2009). The vast majority of EU panel production is consumed by the domestic market and only a small volume is exported. EU wood based panels production is dominated by OSB and other particle boards together with MDF. Production of plywood forms a relatively small component of the sector due to relative scarcity of larger higher quality logs suitable for plywood manufacture.

Table 1. The EU-27's 10 leading wood product manufacturers

	Softwood sawn	Hardwood sawn	Plywood	Veneer	MDF	Particle board
Germany	24028	1142	229	392	4380	10928
Sweden	18490	110	92	55	85	627
France	8300	1890	378	80	1180	4841
Austria	11027	235	258	23	650	2670
Finland	12400	77	1410	59	0	400
Poland	2844	461	440	89	1726	5330
Spain	2180	1152	450	60	1160	3295
Italy	900	800	420	470	1155	3600
Czech R.	5187	267	175	19	94	1428
UK	3100	45	0	0	865	2684
EU-27	**102330**	**11734**	**4497**	**1546**	**13098**	**44690**

Source: Eurostat

Data in the Fig.1 highlights that much of the verified volume imported from outside the EU-25 derived either from the CIS (mainly Russia) and other non-EU European countries (mainly from Belarus, Switzerland, Norway and Croatia).



Source: FII Ltd analysis of Eurostat and certification system data.

Fig. 1. the verified volume imported from outside the EU-25

The are some mplications for the timber trade result from analysis presented above:

- **Certification and verification reduces importers' risk:** Sourcing products, which are independently verified as legally or sustainably produced continues to be the only credible protection against reputational risk for imports from many tropical countries;
- **More marketing efforts downstream needed**: There is a continuing need for concerted marketing activities to raise awareness of the role of different verification systems and to ensure appropriate recognition amongst manufacturers, specifiers, retailers and end-users;
- **Other benefits need promotion**: While European demand remains uninformed and generally low, a number of other business benefits for certified operators can be identified including: maintenance of market share; protection of corporate reputation; improved business-to-busi-

ness communication; and as a foundation for pro-active marketing of wood's positive environmental credentials in relation to non-wood products. These need to be better promoted;

- **Due diligence – a way to reduce risk**: New models for green timber procurement are being developed by companies in northwestern Europe responding to the challenges of verified wood supply and demand which may offer lessons for other traders. These procurement policies combine due diligence systems to minimise the risk of illegal wood entering supply chains with progressive increases in purchases of certified wood products when available.
- **Trade associations have a key role**: Timber trade associations have a critical role to play in communicating green issues and encouraging and guiding positive action on timber procurement, particularly amongst SMEs.

4. ANALYSIS OF TRENDS ON EUROPEAN TIMBER MARKETS

The EU market is the largest consumer and importer of timber and timber products in the world. On a country level, however, a different picture exists: global imports are led by the USA; Japan is also a major importer, but its role in the global timber trade is declining; China, on the other hand, becomes an important player in the timber market. The latter mainly imports raw materials and exports finished timber products. In doing so, China takes the lead in the global furniture trade, hereby strongly affecting the market share of traditional low-cost furniture exporters, such as Malaysia and Indonesia.

The EU construction sector is the most important market sector for timber and timber products and uses up to 70% of all timber consumed in the EU, followed by the further-processing industry (most notably the furniture industry). Trends and developments affecting EU consumption and EU production are following:

1. The short-term prospects for the EU timber market, mostly concerning the professional market (i.e. professionals/ service providers working in the timber industry), are rather negative. Hardwood consumption has been especially hit by the current economic downturn, thus increasing competition among exporters to, and traders in, the EU.
2. Global competition in the timber trade increased in the past few years. Demand is growing, driven by the growth in wood-processing industries in some Asian countries (particularly China) and Eastern Europe, as well as the increased importance of wood as a sustainable energy source. European government officials and key experts foresee a shortage of sustainably managed timber in the near future.
3. Relocation of existing wood production capacities to developing countries.
4. Annual growth in production in Eastern Europe is expected to be about twice the level of growth in Western Europe across all product categories. Nevertheless, Western Europe is expected to remain the largest producer of timber.

The European timber market is fragmented. Distribution channels in South and East European countries are far less transparent and comprise many agents, while supply and distribution in North-Western Europe is characterized by a high level of integration and control. The largest importers and wholesalers are located in: Germany, France, Italy, The Netherlands and the United Kingdom.

4.1. Opportunities and threats

Exporters should analyse if the developments and trends discussed in different chapters throughout the survey provide opportunities or threats. The outcome of this analysis depends on the specific situation of an exporter.

One example is the increasing trend toward outsourcing production of timber products. On the one hand, the relocation of production facilities to low-cost countries provides opportunities to suppliers in developing countries, increasing their chances to form partnerships with EU companies and to access the EU market. On the other hand, production outsourcing has proved to be concentrated in specific

regions and it is a tough field in which to compete. For more information, please refer also to the additional CBI document From Survey to Success, Guidelines for exporting timber and timber products to the EU, which will help you to evaluate whether or not to get involved in international business, and to learn how to go about exporting to the EU.

5. CONCLUSION

Several policy measures are being developed or implemented in the EU with potential to drive demand for verified wood products. These measures are being developed in pursuit of various policy objectives, notably to meet international obligations to reduce greenhouse gas emissions under the Kyoto Protocol and to promote good forest governance and remove illegal wood from trade in accordance with the EU's FLEGT Action Plan. These policy measures include:

- Promotion of Green Building Initiatives (GBIs) such as BREEAM in the UK, HQE in France, in Austria and in Germany, Efforts to coordinate and harmonise GBIs at EU level, for example through CEN TC 350.
- Proposals for EU-wide legislation imposing requirements for "due diligence" on operators in the EU forest products sector to minimise the risk of sourcing illegal wood.
- Efforts by the European Commission to promote Green Public Procurement and develop guidance, including specific guidance on timber purchasing.
- Efforts by timber trade associations to develop procurement codes and policies for their members and to coordinate this activity at EU level

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POSSIBILITIES FOR VALUATION THE RETURN OF INVESTMENT TO HUMAN RESOURCES

Josef DRÁBEK, Martina MERKOVÁ

ABSTRACT

The valuation of return of investment to human resources is a very complicated area, especially because of the difficult quantification of the real benefits. The authors in this paper analyze the issue of investment to human resources, as well as the possibility of quantification of benefits and their importance for growth of business performance. Based on the presented methodology is possible to evaluate the efficiency of investment to human resources in enterprises.

Keywords: human resources, investment, return of investment, enterprise,

1. INTRODUCTION

Human resources are currently considered the most effective driver for development of each company. Human capital is the most important thing each of us own, from which we cannot be separated and which can help us towards achieving the set objectives. To carry out these objectives, it is necessary to constantly improving and streamlining human resources, for what is necessary the investment.

2. ISSUE OF INVESTMENT TO HUMAN CAPITAL

Streamlining and improving the human resources nowadays requires investment. Investment to human capital contributes to the improvement of personal performance (social status, income level, skills, education, general education, high IQ etc.). On the other hand, have a significant impact on business and societal results (economic growth in the country, the development of science and technology, employment, GDP). Becker described the **human capital** as a set of skills that an individual acquires by the accumulation of general and specific knowledge, skills and experience. He says its value could not be quantified, and no personality cannot be separated from its acquired knowledge, skills, health and values (Becker, 1997). Investment to human capital means all financial and non-financial expenditure, which in some way contribute to increasing the level of human capital. Typical examples include investment to education, training, science and research, health care (Dudová, 2007).

2.1. Importance of investment to human capital

Investment to human capital is nowadays considered an important leading power for economic, technological and social development. Without development of human capital the country would not be able to increase, would be difficult to adapt to new market conditions. The company needs for its existence and progress increasingly better skilled workforce that is able to transform to ever changing demands of new technologies, knowledge, skills and competencies. Experts on human capital agree

that the country's long-term growth can be sustainable if human capital can fully develop. This development is possible only on the base of necessary investment. Human capital can be considered a **full supply for economic growth**. Human productivity increases depending on the investment to human capital that is necessary for its realization (Becker, 1997). Improving the quality of human capital required to invest primarily in education and human development (Schultz, 1982).

2.2. Theory of investment to human capital

*"The object of the theory of investment to human capital is the **activities that influence future financial and psychic income** by increasing the activity of these resources, which are located in each of us. Investment to human capital is different in three aspects:*

- *The forms (may be training in the workplace, schooling, etc …)*
- *The effects on earnings and consumption*
- *The invested amount, rate of return and in particular the intensity of perceived links between investment and return" (Kameníček, 2003).*

Schultz (Schultz,1961), who examined the issue, **differentiates 5 main categories of activities** in which investment can take place:

- Formal education (primary, secondary, higher education)
- On-the-job-training (training in the workplace, courses)
- Study programs for adults outside the company
- Health services and expenditure prolonging expected life age
- Migration for employment opportunities.

Investment decision is important in getting the optimum use of resources invested in human capital, in order to ensure income. Revenue is the difference between income received from investment in human capital and expenses that were necessary to carry out investment. According to Becker, revenues from the human capital represent part of people´s income. Revenues are comparable and contribute to overall productivity. People invest to human capital in anticipation of higher future earnings, which means earnings from the investment. Revenues include an increase in salary, other earning from the profession and other non-financial income (Becker, 1997). The authors address issues of investment in human capital separate investment from different aspects. The most important one is **the aspect of the subject that means the investor**. Segmentation of investment to human factor according to the investor aspect as well as possible expected revenues is presented in figure 1.

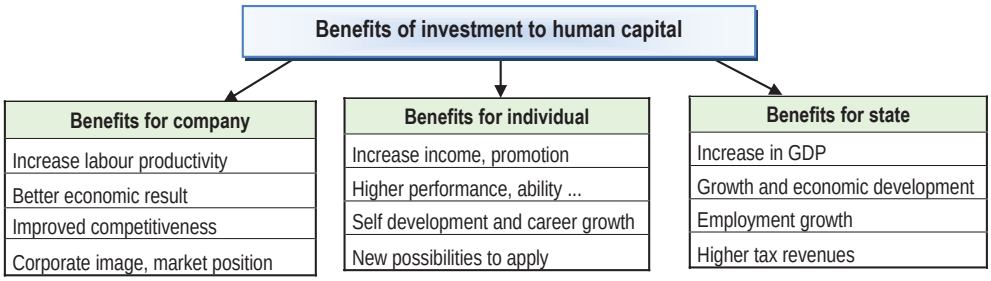

Fig.1. Benefits of investment to human capital

3. EFFECTIVENESS OF INVESTMENT TO HUMAN CAPITAL IN THE COMPANY

Most prosperous firms recognize that investing in employees education increase their productivity and performance. The main motivation medium of investing to employees is to increase corporate profits. Other investment objectives may include raising the level of employees, increased responsibilities, improved productivity, supply of new information, etc. Corporate training has many forms, the core includes (Bartoňková, 2010):

- training of employees in the company,
- compulsory training and qualification of employees,
- raising, acquiring, maintaining employee skills.

Businesses can increase productivity of their employees by investing to the providing, organization and planning:

- work-shops;
- courses and seminars;
- training and coaching;
- language and technology courses;
- planned self-education in the company;
- external seminars etc.

Among the important methods to determine the economic efficiency of invested capital to human resources is the determination of **financial indicators for return of invested capital**. To determine the recovery of invested funds, we should know the following information:

- Benefits (income respectively) from investment
- Costs arising from investing
- Period of investment
- Choosing an appropriate method

Measuring the benefits of investing to human capital is very difficult, particularly given the different views of what the benefits should include. Process for evaluation of investment in the company can be applied to human capital by using three methods for evaluating of investment to human capital, which are listed in Table 1.

Tab. 1. Methods for evaluation of investment to human capital

Possible methods for valuation of investment to human capital			
Methods		**Calculation**	**Where:**
Method 1	**Return of investment (ROI)**	HC ROI = (p - n)/n (1)	p - amount obtained n - amount invested
Method 2	**Payback period (PP)**	PP = n / CF (2)	n - amount invested CF – annual Cash Flow
Method 3	**Net present value (NPV)**	$NPV = B_{pv} - C_{pv}$ (3)	B_{pv} - present value of benefits $\sum Bt/(1+r)^n$ C_{pv} - present value of costs Bt - benefits in period t r - discount rate n - time of life cycle

Becker notes that the average rate of return on investment in human capital can be a value of about 10%. There is evidence that higher investment to human capital bring higher returns than the investment of lesser value. Several authors note that the rate of return on investment decreases with higher age. This means if the individual is older, the return on investment is lower, therefore is necessary to invest in human capital as soon as possible.

4. VERIFICATION OF INVESTMENT EFFICIENCY TO HUMAN CAPITAL IN THE COMPANY PINUS

Verification of investment efficiency to human capital has been made in the company Pinus. The wood-processing joint stock company based in Slovakia focuses on the wood production of construction and carpentry components which are offered in the Slovak and European market.

The education in the company Pinus at the present time is divided into the following **areas of investment to human capital:**

- Professional and technical education,
- Information technologies,
- Environmental education,
- Management Education,
- Language training.

} **75 % of the annual volume of investment** for education

Enterprise provides many **benefits** for staff. Employees who did not choose from fixed benefits that an enterprise offers, they have in the program of the optional benefits the opportunity to choose for what purpose they use an employment contribution. Employees selected from the optional benefits in 2010 mainly building support (allowance for mortgage loans), holiday allowance, a recovery stay, **health care**, **education**, and so on. The company in 2010 overall incurred for contributions in connection with optional benefits the amount of € 1 379 000.

Company funds invested in 2009 to human resources, specifically to the forms of training and staff development, were approximately € 205 900. These funds have been reserved from the general budget of the company and they accounted approximately **8% of operating costs**, offered for 1431 employees. Restricted funds have been allocated to invest in the following forms of education that are listed in Table 2.

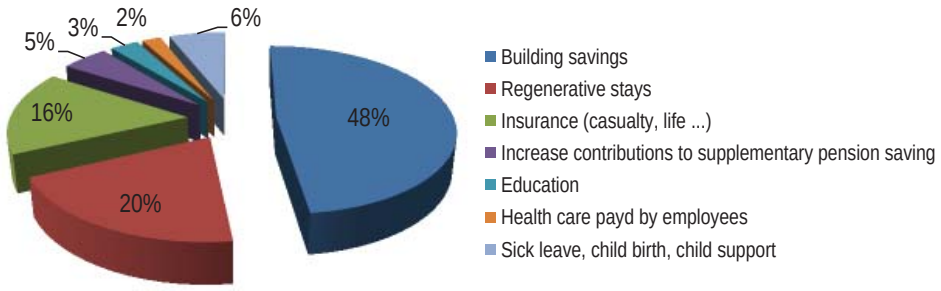

Fig.2. Interest of employees on benefits provided by the company

Tab. 2. Individual investment to education of employees in 2009

Appropriated amount	Form of investment to education	Share in % and €	
205 900 €	Education required to special profession	55%	**113 245**
	Specific skills training	16%	**32 944**
	Language learning	10%	**20 590**
	IT training	2%	**4 118**
	Management Education	9%	**18 531**
	Conferences and seminars	7%	**14 413**
	External study	1%	**2 059**

Tab. 3. Comparison of investment to human recourses in 2009 and 2010 (in €)

Investment to human recourses in 2009 and 2010		
	Year 2009	**Year 2010**
Number of employees	1 431	1 230
Number of trainings	9 854	9 820
Invested capital in staff	**205 900,00**	**204 000,00**
Average investment per 1 employee	143,89	165,85
Average investment for a training	20,90	20,77

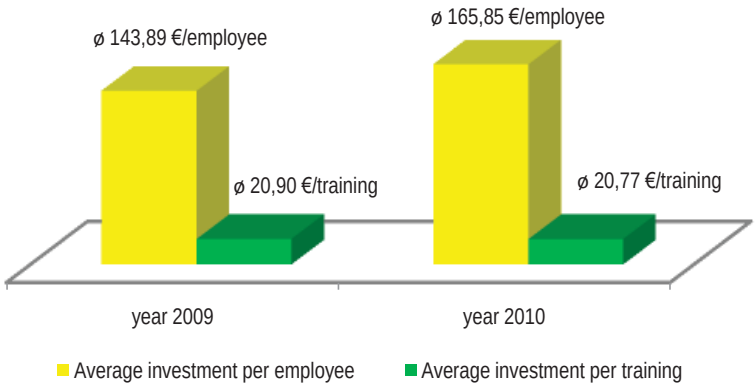

Fig.3. Average investment in education in period 2009 and 2010

Enterprise has not yet made any arrangements, scheme, or other calculations to determine the benefits of investment. Based on the enterprise data the determination of return was calculated from the recommended value of the benefit expected from internal staff of the division of human resources in the company. Calculation of the return of investment to human resources based on the method 1 from table 1: HC ROI (%) = 10,5%.

Based on calculations it was found that for each 1 euro invested to human capital, the company profits 10,5 cents in addition. What is the return of invested capital at the level 10,5%. It follows that investing to human capital represents the profitable investment for the company.

5. CONCLUSION

Generally, the highest **benefits from investment to human capital** for individuals can be considered the increasing income, higher performance, career development, enhance knowledge, skills and new possibilities to apply. As the greatest benefit for the country could consider increase in GDP, growth and economic development, employment growth and higher tax receipts. The greatest benefits of investment for companies represent the increasing labour productivity of their employees, thereby achieving better competitiveness, brand image, economic performance and market position.

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BENEFITS OF EMPLOYEES IN TIMBER INDUSTRY

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ABSTRACT

Benefits of employees have become an integral part of remuneration. They are part of many contracts, agreements and internal solutions to motivate workers. The company can be successful only if its employees are successful and happy. Benefits are important, especially in terms of motivation, build their loyalty to the organization and improving the remuneration for the results achieved.

This paper examines the benefits of small and medium-sized companies operating in timber industry.

Keywords: benefits, motivation, employees

1. HUMAN RESOURCRES MANAGEMENT

Employees are one of the most important factors of business success. The validity of this claim, however, depends on their readiness and motivation to fulfill this role. The human potential of the company is very important, which besides the actual number and structure of employees takes into account also other aspects - their level of education, culture, interpersonal relations, cooperation ability, their perceptions of environmental factors.

Systematic creation and development of human potential is a condition to generating and development of strengths of the business and its transformation into competitive advantage.

In the eighties in countries with developed economies a current concept of personal work referred to as "human resource management." has been created. This activity gave the personal work a perspective of a soft factor of management, while the overall aim stays perseved:

- to ensure the necessary staff required in the professional and qualification structure in line with strategic business objectives,
- align and motivate employees so that employees' behavior would lead to achieving strategic business objectives.

To achieve the above objectives, companies use a variety of incentives:

- Direct remuneration: fixed / variable pay,
- indirect remuneration: the provision of various employee benefits, benefits, promotion, formal recognition of job performance.

Providing direct remuneration is particularly strong motivation for employees with lower living standard. Indirect remuneration is not quantitatively nor qualitatively less valuable, many people prefer just this kind of incentive, especially if it is connected to their private lives. It is important that the staff accepts the system of remuneration. It happens so if the system will be transparent, readable, understandable and perceived as fair.[1]

[1] BORSÍKOVÁ, B.: Personnel management of a successful company: the development and use of human potential. Bratislava: RAABE, 2006.

1.1 Benefits

Providing benefits is included in corporate social policy. [2]. Care for employees (or their families) complements and broadens the social policy of the state of that kind of a value which is allowed by the corporate resources. Therefore, the value system and provided benefits for enterprises may vary. Benefits are an indirect form of remuneration, and may be cash or non cash version. They are generally not linked to employee performance[3], entitled to them arise from the employment relation. In some cases they are graded according to the hierarchical classification of the employee. Their particular structure should be in line with overall business strategy and should support achievement of its objectives. [4]

The purpose of providing employee benefits tries by satisfying the specific needs of employees to influence the acquisition of quality employees, enhance their job performance and loyalty to the company. The idea that business success is linked to employee satisfaction is not new. Already at the beginning of the 20th century T. Bata fully developed this concept in his businesses. The result of increasing use of benefits as part of compensation of employees is becoming a significant cost (in some cases, constitute 30-40% of wage costs for businesses), and therefore it is worth paying attention to them, and seek to optimize the structure of their composition.

Providing the benefits has its risks. They often have no direct incentive importance, immediate impact on the performance of employees. They understand more than their entitlement, which is a natural part of the employment relationship and not as above standard of their employer. If the grant of the benefits gives a sense of injustice it can promote dissatisfaction and conflicts between employees. The competition in the field of benefits causes to spread their growth without incentive activity. [5]

1.2 Classification of benefits

Benefits are a part of employment contracts, internal agreements, and incentive programs for employees. The company establishes itself the way the company will provide employee benefits. The company may choose to provide the employee benefits to everyone without taking into account their accomplishments, or according to so called "cafeteria" system. In the first method, all employees have the same right to every benefit. Different employees have different interests, values, family environment, so this method is less targeted and effective. In the second method an employee takes "their" benefits from the offer, according to a set financial limit.

Financial limit and offered a "menu" can be differentiated depending on e.g. the duration of employment, employee status and the achieved performance. The advantage of this system is the use of such benefits, which have significance for a particular employee.

We can divide them into several categories:

Social benefits:

- pension additional insurance;
- life and accident insurance,
- savings of employees with the participation of the employer,
- the provision of bargain loans,

[2] Social policy of company includes all business activities that the company does for its employees in order to increase their motivation and satisfaction and positively affect their life outside work. Stabilize the workforce, can promote their individual and collective development.

[3] Direct selling company (Mary Kay, Oriflame, Raypath) provide in addition to direct discount associated with the state and dealer incentive programs to increase sales volume, expanding sales base.

[4] KACHAŇÁKOVÁ, A.: *Human resources management*. Bratislava: Sprint. 2001. ISBN 80-88848-72-5

[5] http://strategie.e15.cz/special/zamestnanci-slysi-na-system-benefitu-2

- above-standard health care,
- pre-school facilities,
- not reduced wages for a specified number of days of sick leave or child care leave

Free time benefits:

- cultural, relaxation and sports activities,
- holiday over the law,
- donations on the occasion of anniversaries or work jubilees

Benefits associated with work-related activities:

- educational programs paid by the employer,
- possibility to use legal and economic consulting business for private purposes,
- increased allowances for meals, transportation to work,
- allowance for clothing.

Benefits associated with position of employee in the company:

- Staff housing, car, phone, computer,
- advantageous sale or lease of company products.

1.3 Choice of benefits

Indirect employee motivation through the provision of benefits is important for any organization whose vision is a long-term success in the marketplace. It is one of the key factors of sustainable development and prosperity of a company. Many HR specialists agree on the perception that the maturity of the organization can be judged by the size and diversity principles used for direct and indirect remuneration. Indirect remuneration also reflects the level of organizational culture and the humanity of the company. [6]

To create an optimal system of indirect remuneration should be based on several circumstances:

- industry in which business operates: to some extent predicts the requirements for employees, the method of work
- strategic business objectives: the objectives and the motivation, retention and staff development,
- organizational culture: core values, organizational culture typology,
- qualifications of staff: qualifications related to the fundamental valuation and favoring specific motivational factors,
- characteristics, family background of employees: age, sex and family background significantly affect the perception of attractive benefits,
- knowledge of employees intangible needs of attitudes, values.

To create system, which will be respected on one hand by business opportunities and on the other hand characteristics of employees is not easy.

One of the aspects which firms take into account when choosing benefits is its tax impact. Some advantages provided by the organizations may be included in their costs (lunch vouchers, pension and life insurance), or eventually their provision does not increase their income, even though it cannot be written off the taxes (contributions to culture, sports).

In selection of benefits, management must also clarify whether they serve as a motivational tool or a way of caring for employees. In some cases the businesses chooses benefits from a purely pragmatic reasons – they want to reduce the tax base. The reason to choose benefits should not be a belief that everybody does it this way.

An important element is the evaluation of the efficiency benefits. Especially when it comes to financially demanding companies the provision should be based on a payback time analysis. In the

[6] PORVAZNÍK, J.: *Holistic management*. Bratislava: Sprint 2003. ISBN 80-89085-05-9

regular evaluation of benefits obtained by employees the company obtains an overview of developments of employees' requirements, and thus this method can then update the motivation.

An integral part of providing benefits is their communication towards the current but also future employees. Sometimes it is the system of providing heavy applications so that the employee loses interest in their depletion. In this case, however, not only employee looses, but also company, which deprives the opportunity to promote the development and loyalty of their employees.

1.4 Benefits in timber industry

The aim of this paper is to present currently provided benefits for employees of small businesses in the timber industry. Even in this segment the financial crisis occurred, which reduced the income of these companies which straightaway reflected to the direct and indirect remuneration of employees.

The mentioned small businesses had created a sufficient financial reserve to maintain the same level of benefits than in times of economic growth. The data were obtained using specific job offers in woodworking published on portal Profesia.sk from 1st-8th April 2011 and from personal interviews with those who govern it (manager or owner).

An overview of those activities which the companies provide as a non-financial remuneration for their employees:

BENEFIT	company 1	company 2	company 3	company 4	company 5	company 6	company 7	company 8	company 9
advantageous sale of corporate products	▪	▪	▪	▪	▪	▪	▪	▪	▪
provision of company car	-	-	▪	-	-	▪	-	▪	-
Provision of mobile phone	-	-	-	-	-	-	-	-	-
Education program paid by employer	part	-	-	part	-	part	-	▪	-
Clothing	part	part	part	part	-	part	-	part	-
Increased contribution for meals	-	-	-	-	-	-	-	-	-
Cultural activities	-	-	-	-	-	-	-	-	-
Relaxation activities	▪	-	-	-	-	▪	-	-	-
Sport activities	▪	-	▪	-	-	-	-	▪	-
Pension additional insurance	-	-	-	-	-	-	-	-	-
Life and accident insurance	part	-	part	-	-	-	-	-	-
Above standard health care	-	-	-	-	-	-	-	-	-
Donations for anniversary	▪	▪	▪	▪	▪	▪	-	▪	-

The table referred an overview of provided benefits. All interviewed subjects provided to their employees discounts for company products, which amount varies - from 25 to 50%. In some cases, therefore the employee is able to obtain the product for his own use at the cost of materials.

Only three of these companies provide to their employees car for private purposes. In two cases it is only for rare use (visit the hospital, important family events), in one case is monthly limited number of kilometers (500 km), the petrol for private roads are always paid by employee.

Training program for employees support 4 of interviewed companies, three of them bear the cost for other education in part, one in full. These are mostly organized by professional training organizations.

Clothing for employees provides 6 of 9 interviewed organizations. This is a clothes for carpenters other workers. They are entitled for one set of working clothes. One firm stated that after two years the can ask again the clothes. The question of regularity of providing this benefit they didn´t comment. Other employees are not entitled to guessthe cost for clothing.

In the case of a higher payment for meals, no company hasn´t responded positively. Small businesses usually haven´t their own dining room. They provide meal vouchers to their employees at the minimum value determined by the law. 4 of these organizations expressed a respect for a longer lunch break. They operate in the industrial zone of the city, where possibilities to eat are limited. If three employees decide to go to lunch menu in one of the restaurants, they may use use the company car.

Negative responses recorded question about support cultural activities. None of the questioned companies has included this type of activity in her benefits. Relaxing activity in the form of massage provide two businesses. 3 times a year, employees can use massage at the particular masseuse in their free time. Sports activity supports 3 of the interviewed companies. Most of them are organized by the companies. 1 company pays to their employees entrance to the gym or swimming pool or in the value of 10 euros per year.

The option to use the phone for private purposes, supplementary pension insurance or special health care is not bearing in any of the companies surveyed. 2 compynies reported to pay accident insurance to their employees (not administrative staff). At the birthday the employees of 7 companies receive small gifts with a value from 3-15 euros. The specific amount of the gift depends on the anniversary, of number of years worked in the company and decisions of business owner.

RESUMÉ

Providing benefits is not completely new nor in the small businesses in the timber industry. Character of benefits provided by the owners reflects the dominance of men - workers in this type of business. There were small businesses whose financial capabilities are limited, however at least the owners try to reward their employees partially non-financially. Provision of referred benefits has in these businesses an incentive character, the owners understand as to promote their "party guy ".

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THE SURVEY OF PERCEPTION OF "„DESIGN FOR ALL“ PHILOSOPHY" IN THE FURNITURE INDUSTRY AMONG CONSUMERS IN SLOVAKIA

Jan DVORÁČEK, Hana MAŤOVÁ

ABSTRACT

In our paper we present the results of the survey conducted in Slovakia. The main theme of the survey was: “the influence of company’s pro-social activity on shopping behaviour of consumers”. In our paper we are focusing on the perception of „Design for all“ philosophy" on the example of furniture among consumers. We set two basic premises for this part of the survey: 1. furniture for average consumers is not suitable for the needs of wheelchair users and the second one: furniture for wheelchair users is suitable for the needs of average consumers. According to our two premises of this survey we established working hypothesis, which were verified by selected statistical methods. Based on the results of the survey we will present situation in the perception and understanding of the "Design for all" philosophy among Slovak consumers.

1. INTRODUCTION

Within the analyses of the present situation in the field of design and production of furniture for disabled persons we have to say that in Slovakia, and worldwide as well, there is not so much interest in this market segment. The producers with an experience in production of furniture for disabled perform this activity mainly as additional, the mostly as a custom-made production, to basic production activity – the production of the furniture for average consumers.

The most of this type of furniture is mainly kitchen furniture, with large and easily adjustability of height and also working and reach out areas are adjusted. Pretty good offer we can find also in seated furniture and beds, but this furniture is more characteristic as medical furniture. The big absence we can see in design and production of flexible working tables and reach out areas and in design of assistive furniture – stationary and mobile elements of specified storage furniture (Veselovský, 2005).

With consideration of demographic trend in Slovakia and also in Europe, when number of elderly people still increases and prediction of trend is pessimistic, is necessary to think about the meeting the needs of people with lower mobility. One of the solutions might be application of principles of „Design for all“ philosophy into production process of furniture.

2. PROBLEMATIC

„Design for all“ philosophy

“Design for all” or in wider perception “Accessibility for All” means designing mainstream products and services so that as many people as possible can use them easily – whatever their age and ability. This does not mean that manufacturers are expected to design every product to be usable by every consumer – there will always be a minority of disabled people with severe impairments who need adaptations or specialized products. But when „Design for all“ principles are adopted, the number of people requiring specialized and expensive alternative equipment will be fewer. „Design for all“ is not

primarily aimed at production of specialized equipment for disabled, but searches compromise solutions usable by average consumers as well as by disabled. In fact, proponents of „Design for all“ philosophy are convinced that the incorporation of „Design for all“ principles will reduce the need for adaptations and specialized products.

Mainstream products should also be adaptable to be used with technical aids - through standard interfaces, options or accessories. Besides, through the economies of scale, mainstream products and services are generally less costly than low volume specialized equipment (Anec, 2003).

Reasons for accepting of „Design for all“ philosophy

The excuse that it is people's characteristics, which exclude them from the use of mainstream goods and services, is not acceptable. Goods and services can and should be designed to meet the needs of a wide range of people including many with disabilities because you can change product designs but you cannot change people's abilities or age.

„Design for all“ is not a minority problem: Anyone can have special needs at any time in their life - using things and getting around in the dark when the lights fail, dealing with a product one handed when the other hand is holding a child or otherwise busy, being slowed down with a broken leg. Well-designed products will be easy to use in all circumstances.

„Design for all“ is of benefit to all of us. Features, which make a product accessible to older and disabled people, generally make product and services easier to use for everyone. We all get older. Our needs change with age, e.g. hearing, vision, mobility and strength impairments are common to the ageing process. Products designed for all continue to be usable and safe into our old age.

Finally, if products were designed for all, consumers would save money because mainstream goods are more competitively priced than specialized equipment and adaptation. Where aids are supplied by social services, there is a public finance benefit, too. For the individual, greater use of mainstream products also reduces the need of technical aids to live independently (Anec, 2003).

Benefits of „Design for all“ philosophy

- **Demography –** Europe has an increasing elderly population, which is leading to increasing prevalence of disability,
- **Easy use –** „Design for all“ benefits all consumers,
- **Wider choice –** Older and disabled people will have a wider choice of accessible and usable products,
- **Independence –** Inclusive design leads to increased and prolonged independence for older people if mainstream products and services continue to meet their needs,
- **Innovation –** Adherence to „Design for all“ principles does not have to be design restrictive. On the contrary, industry will need to develop innovative solutions to make their products and services accessible to and usable by more consumers.
- **Cost savings –** Inclusive design does not inevitably raise production costs if it is built in from the start of product conception **–** from the point at which manufacturers refer to the standards that they work to comply with,
- **Growing market –** At the end of the day, „Design for all“ would even be of benefit to industry because there is clearly an increasing market and demand for products designed for all (Anec, 2003).

Based on the principles of "Design for all" philosophy were within the survey about perception of company’s pro-social activities set two premises. First one was the assumption that „the furniture for average consumer doesn’t fit (is not suitable) for the needs of wheelchair users“. For verifying of

"Design for all" philosophy we have set second premise, that assumes that „the furniture for wheelchair users also fits (is suitable) for the needs of average consumers“. For both premises we set the hypotheses that are mentioned in subsection 4 of this article.

3. SURVEY METHODOLOGY

Collecting of data was realized by method of questioning by a questionnaire on the topic: the influence of company's pro-social activities on shopping behavior of consumers.

The questionnaire consisted of 11 questions, where questions 1 to 5 were aimed at obtaining of socio-demographic data of respondents (a) gender, b) age, c) education, d) work status, e) location of residence) and other questions were related to exploring problematic f) perception of CSR, g) preference of company's CSR activity, h) information about company's CSL, i) form of a contact with wheelchair user).

Questions 9 and 11 were aimed at verifying of perception of "Design for all" philosophy and the questions were set in an opposite meaning – suitability of the furniture for average (healthy) consumers for the needs of disabled consumers and on the other side, the suitability of furniture for disabled consumers for the needs of average consumers.

For our survey was determined allowable error of 5% and share of character "p" in the rate of 50%. The range of sample shouldn't be less than 384 respondents or there shouldn't be less processed and returned questionnaires. After collecting and separating of questionnaires were qualified 471 received questionnaires for final evaluation, so we meet the conditions for sample range of respondents.

For the questionnaires evaluation was used method of one-dimensional and two-dimensional descriptive statistics: frequency and contingency tables. Hypotheses were tested at significance level of $p(\alpha) = 0.05$. The test of null hypothesis was realized by the method of independence test – Pearson $\chi 2$ (chi-square) test.

Because of wide-range of results were for the needs of this article selected just results related to problematic of „Design for all“ philosophy.

4. SELECTED RESULTS OF SURVEY ABOUT THE PERCEPTION OF „DESIGN FOR ALL“ PHILOSHOPHY

Premise I: "The furniture for average consumers does not fit for the needs of wheelchair users"

Table 1. Evaluation of premise I and set hypotheses validity

Premise I	confirmed
a) will agree all respondents regardless of gender	confirmed
b) will more agree respondents in the age 61 or more,	unconfirmed
c) will agree all respondents regardless of education,	confirmed
d) will more agree respondents from the group of pensioners,	unconfirmed
e) will agree all respondents regardless of residence,	confirmed
f) will more agree respondents that perceive CSR,	confirmed
g) will more agree respondents that prefer activities of company in social field,	confirmed
h) will more agree respondents that are affected by information about the CSL of company,	confirmed
i) will more agree respondents from the family of wheelchair user	unconfirmed

Within all responses of respondents, nearly two thirds of them consider ordinary furniture as unsuitable for the needs of wheelchair users and this fact has confirmed our premise no. I. Therefore we can conclude that the respondents strongly perceive special needs of wheelchair users and they consider that the ordinary furniture (furniture for average healthy consumer) does not have universal using. This fact has been also confirmed in the possibility to express their own opinion to this question, where they most discussed about the suitability of certain types of furniture and the need of special modifications of ordinary furniture.

In the case of gender, we can conclude that the opinion about the suitability of furniture for the needs of wheelchair users is independent on gender of respondents. In a comparison of the relative frequency of respondents' answers showed that the ordinary furniture consider as unsuitable for the needs of wheelchair users more men than women. This fact we would most likely acknowledge to higher technical knowledge of male population.

Within the age of respondents, our hypothesis has not been statistically confirmed. We thus conclude that the opinion among respondents on the suitability of furniture for the needs of wheelchair users is not dependent on the age of respondents.

In the case of respondents' education we can note that the opinion on the suitability of the ordinary furniture for the needs of wheelchair users is not dependent on respondents' education.

By the work status of respondents, the results of the survey have not confirmed our hypothesis. We haven't found statistically significant difference in the perception of respondents according to their work status.

We can also say that the opinion on the suitability of ordinary furniture for the needs of wheelchair users is not dependent on location of respondents' residence.

Within the perception of CSR among respondents we assumed that more respondents from a group of sentient for CSR ("CSR positive") should consider ordinary furniture as unsuitable for the needs of wheelchair users than respondents who are not sentient for CSR ("CSR negative"). Our assumption is based on the fact that higher acceptance of the needs of disabled people should be among respondents who are "CSR positive".The survey results have shown that "CSR positive" respondents and also the "CSR negative" respondents do not consider ordinary furniture as suitable for the needs of wheelchair users. However, significantly less "CSR positive" respondents considered ordinary furniture as suitable for the needs of wheelchair users and also more respondents from a group of "CSR negative" expressed a different opinion on this question.We can conclude that "CSR positive" respondents have shown higher acceptance of the needs of disabled people or they tried to find alternative solutions for this question. However, the difference in opinions on this issue between groups "CSR positive" and "CSR negative" is not so notable.Results of the independence test have shown statistical significance of our hypotheses, so we can say that the opinion on the suitability of ordinary furniture for the needs of wheelchair users is dependent on the perception of the CSR activities by respondents.In this case we want to emphasize that the most notable difference between "CSR positive" respondents and "CSR negative" respondents were mainly in that fact that the ordinary furniture is considered as suitable for the needs of wheelchair users in group of "CSR positive" significantly less than in group "CSR negative".

In the case of preferences of individual company's CSR activities we assumed that respondents preferring the company's activities (CSR) in the social field should consider ordinary furniture as unsuitable for the needs of wheelchair users. The survey results have not indicated the notable differences in opinion on the suitability of ordinary furniture for the needs of wheelchair users according to the respondents' preferences in individual areas of CSR. Results of the independence test have confirmed statistical significance of our hypotheses, so we can say that the opinion on the suitability of ordinary furniture for wheelchair users is dependent on the preferences of the CSR activities by respondents.

In the case of Corporate Social Leadership (CSL) of company we asked respondents whether they would buy furniture from a company that also produces furniture for disabled people. This question

was indirect question aimed on CSL activities of the firm and its influence on respondents' opinion. We assumed a higher acceptance of special needs of disabled people in group of „CSL positive" respondents. The survey results and the statistical test have confirmed our hypothesis and we can thus conclude that the opinion on the suitability of ordinary furniture for the needs of wheelchair users is dependent on the influence of information about the companys' CSL on respondents.

In the case of form of a contact with wheelchair user we assumed that his family members should consider ordinary furniture unsuitable for wheelchairs users the most. We rely on the assumption that these people know the problems of wheelchair users as well as their specific needs. Based on the results of independence test we conclude that the opinion on the suitability of ordinary furniture for the needs of wheelchair users is not dependent on the form of a contact with wheelchair user.

Premise II: „Furniture for wheelchair users is also suitable for the needs of average consumers"

Table 2 Evaluation of premise II and set hypotheses validity

Premise II	confirmed
a) will agree all respondents regardless of gender	unconfirmed
b) will more agree respondents in the age 61 or more,	unconfirmed
c) will agree all respondents with higher education,	confirmed
d) will more agree respondents from the group of pensioners,	confirmed
e) will agree all respondents regardless of residence,	confirmed
f) will more agree respondents that perceive CSR,	confirmed
g) will more agree respondents that prefer activities of company in social field,	confirmed
h) will more agree respondents that are affected by information about the CSL of company,	confirmed
i) will more agree respondents from the family of wheelchair user	confirmed

Positive answers prevail in the question of the opinion of respondents on suitability of furniture for wheelchair users for the needs of average consumers (45.01 % respondents). Indecisiveness of the respondents is also confirmed by the open responses on this question. These responses were formulated in a sense that this furniture is certainly more suitable then unsuitable (the suitability of the ordinary furniture for the needs of wheelchair users), but for healthy people are not specifics of the wheelchair furniture necessary. In this case, we note that the premise has not been clearly confirmed.

In the case of gender, we can conclude that the opinion about the suitability of furniture for the wheelchair users for the needs of average consumers is dependent on gender of respondents and more women consider such furniture as suitable for average consumers.

By the age of the respondents we conclude that the opinion among respondents on the suitability of furniture for the wheelchair users for the needs of average consumers is not dependent on the age of respondents.

In the case of respondents' education, we can note that the opinion on the suitability of the furniture for the wheelchair users for the needs of average consumers is dependent on respondents' education.

By the work status of respondents, the results of the survey have confirmed our hypothesis. The respondents' opinion on suitability of the furniture for wheelchair users for the needs of average consumers is dependent on their work status, the most by the group of pensioners.

We also can state that opinion on the suitability of furniture for wheelchair users for the needs of the average consumers is not dependent on location of respondents' residence.

In the case of perception of CSR among respondents, we assumed that more respondents from a group of “CSR positive” will consider furniture for wheelchair users more suitable for the needs of the average consumers. We thought that “CSR positive” respondents should perceive more the specific needs of minority groups and will thus have a positive attitude towards the idea: „what is good for the average consumer may not be always good for the disabled consumers, but what is good for the disabled consumers should be also good for the average consumer.” Results of the independence test o have shown statistical significance of our hypotheses, so we can say that the opinion on the suitability of furniture for wheelchair users for the needs of the average consumers is dependent on the perception of the CSR activities by respondents.

We assumed that respondents preferring the company’s activities in the social field will consider the furniture for wheelchair users as more suitable for the needs of the average consumers, so our hypothesis has been confirmed.

We assumed a higher acceptance of special needs of disabled people in group „CSL positive” respondents. The survey results and the statistical test have confirmed our hypothesis and we can thus conclude that the opinion on the suitability of furniture for the wheelchair users for the average consumers is dependent on the influence of information of the companys’ CSL activities on respondents.

We assumed that family members of wheelchairs user will consider furniture for the wheelchair users more suitable for the average consumers. Our assumption was that these people know the problems of wheelchair users as well as their specific needs and they may have personal experience with specially adapted equipment. Based on the results of independence test we conclude that the opinion on the suitability of the furniture for wheelchair users for the needs of average consumers is dependent on the form of a contact with wheelchair user.

Interaction between the "Design for all" philosophy and survey results

The basis for the "Design for all" philosophy is the idea that what is suitable for average consumer may not be suitable for wheelchair user, but what is suitable for wheelchair users, should also be suitable for the average consumer.

“Design for all” philosophy is primary not aimed at production of special devices for disabled people, but tries to find compromise solutions that are usable by average consumers but also by disabled consumers. We mean that the products "designed by this philosophy” could be used indiscriminately by all consumers.

Based on the survey results we can conclude that the main idea of this philosophy is understood by approximately quarter of respondents. An important finding is that approximately one third of respondents separate "the suitability of products for the consumer" based on the "type of consumer". The reasons of these findings can be found in several aspects:

- "Design for all" is relatively new philosophy and in our region is not yet enough promoted on the public and maybe therefore people in our society are not indentified with the principles of this philosophy.
- Separation of “the suitability of products for the consumer” based on the "type of consumer" may be a consequence of the past of our country and by the communist era. There almost did not exist any integration of handicapped people into society. Mostly they were isolated and prevailed medical model of care for handicapped people. This model regards handicapped people for ill people and they were placed in hospital or houses of social care. The communist concept consider for an ideal citizen – a healthy manual worker.
- We assume that respondents who advocate "separation" have frequent contact with the wheelchair user, who is forced to use "common things" (they know problems of the wheelchair

users with using these common things) and they think that for the disabled people should be produced "special products".

- Alternatively, these respondents have experience with special devices for the disabled people and this can persuade them that for the disabled people are suitable only specially adjusted products.

5. CONCLUSION

Successful application of this philosophy in our conditions will require the increased media coverage and promotion on the public. In the case of elimination of the opinion of “separation” of certain needs of people with disabilities from the needs of healthy people will be necessary to significantly change their mind and thinking, which will require a significantly longer time period with regard to the above mentioned historical context.

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IMPLEMENTATION OF ISO 9000 INTO WOOD PROCESSING INDUSTRY IN SLOVAKIA

Pavol GEJDOŠ

ABSTRACT

The article deals about the implementation of ISO 9000 in the wood processing industry in Slovakia. Highlights at the advantages and disadvantages of implementing quality management systems, benefits and negative experiences with the implementation of this systems in wood working enterprises in Slovakia.

Keywords: quality, quality management system, ISO 9000

1. INTRODUCTION

The term quality is still more and more used in professional practice and also in usual life because it is becoming the criterion according to which is decided about surviving or extinction of companies. Area of quality is one of the substantive components in the company because without quality goods and services, which firms offer or should offer, company cannot exist. Only expressive increasing of quality can guarantee the efficiency of production and competitiveness of the company. One way to increase the quality and performance of organizations is the implementation of ISO 9000.[1]

2. QUALITY MANAGEMENT BASED ON ISO 9000

The organizations today appreciate quality management mainly like implementation and preserve of quality management system by ISO 9000. This is inadequate because the real quality management in organization must be oriented on quality products for customers. [2] Quality management system an assist organizations in enhancing customer satisfaction. Customers require products with characteristics that satisfy their needs and expectations. These needs and expectations are expressed in product specification and collectively referred to as customer requirements. The quality management system approach encourages organizations to analyse customer requirements, define the processes that contribute to the achievement of product which is acceptable to the customer, and keep these processes under control. [4]

The adoption of a quality management system should be a strategic decision of an organization. The design and implementation of an organizations quality management system influenced by:

- Its organizational environment, changes in that environment and the risks associated with that environment,
- Its varying needs,
- Its particular objectives,
- The products it provides,
- The processes it employs,
- Its size and organizational structure.

ISO 9000 specifies requirements for a quality management system where an organization:

- Needs to demonstrate its ability to consistently provide product that meets customer and applicable statutory and regulatory requirements,
- Aims to enhance customer satisfaction through the effective application of the system including processes for continual improvement of the system and assurance of conformity to customer and applicable statutory and regulatory requirement. [3]

3. BASIC ATTRIBUTES OF THE IMPLEMENTATION OF QUALITY MANAGEMENT SYSTEMS INTO WOODS ENTERPRISES IN SLOVAK REPUBLIC

In this part of this article are basic characteristics of implementations quality management systems into woods enterprises with characteristics of risk, affairs, advantages and disadvantages of successful implementation.

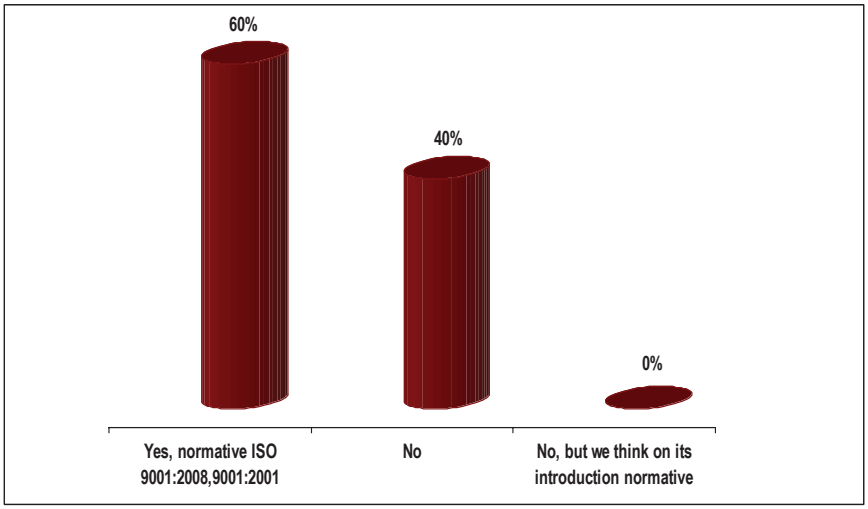

Figure 1. Enterprises certification in wood processing industry in Slovakia

As illustrated in fig.1 most organizations involved in wood industry realized that it is necessary to ensure the quality policy in this sector, and thus to distinguish themselves from others and benefit from the advantages of quality management system brings to the organization. Most companies have quality management system already built according to ISO 9001: 2008, or even by not revised prior to ISO 9001: 2001.

The second factor which was monitored was reasons of implementations quality management systems into wood processing enterprises. The most important reasons describe figure 2.

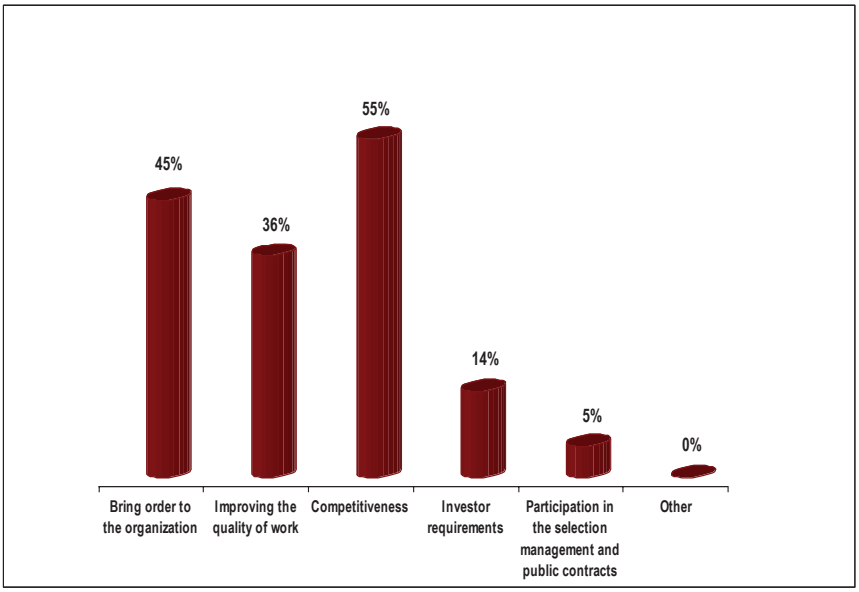

Figure 2. The most important reasons of implementation QMS into wood processing enterprises

The next factor which was monitored was barriers in building quality management systems into wood processing enterprises which illustrated figure 3.

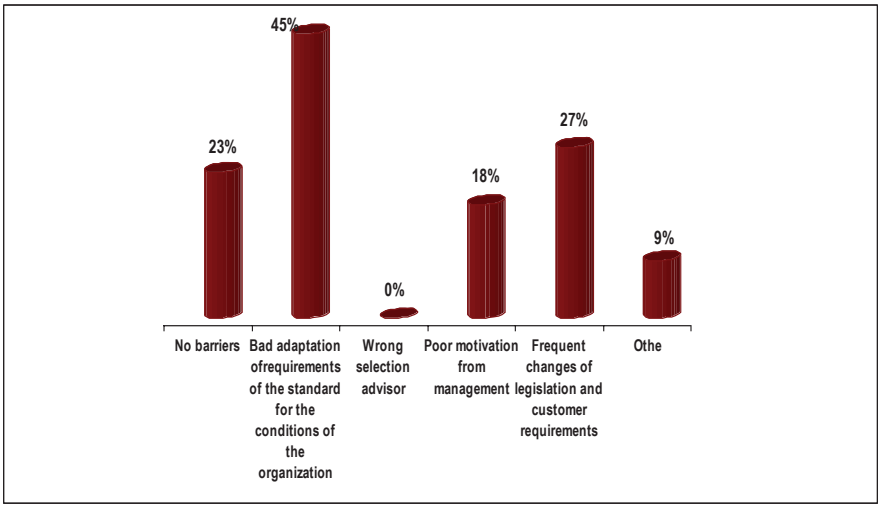

Figure 3. The barriers in building quality management systems into wood processing enterprises

The expected outcome of the barriers to building and certification of QMS is relatively well filled. Although standards of ISO 9000 intended for any organization, some of the companies still like seeing the biggest barrier to poor adaptation of the norm of the conditions of the organization as well as frequent changes in regulations and customer requirements. 9th % chose option others and here

reported particular reasons such as: administrative and financial burden, poor implementation in practice, and for small and medium-sized companies with an atypical increase in production and administrative inflexibility.

The next factor that was analyzed deal about the benefit of certification of quality management system (figure 4).

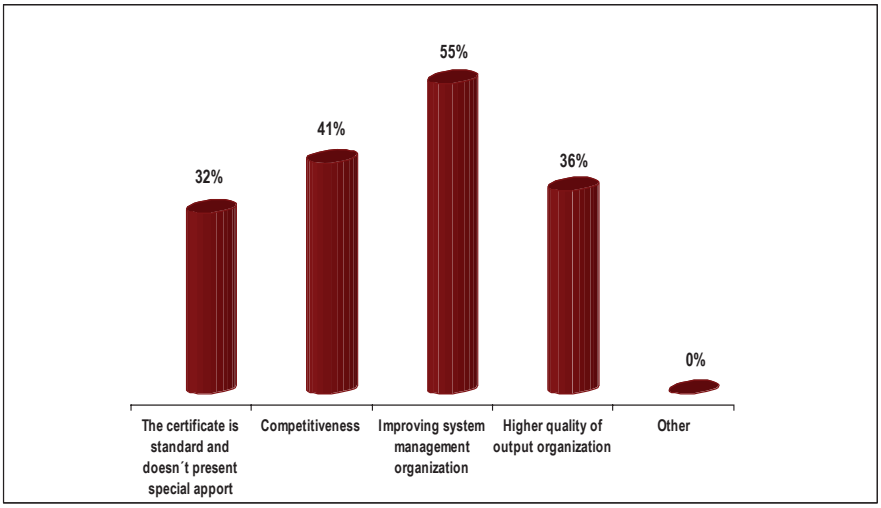

Figure 4. The benefit of certification of quality management system into wood processing enterprises

CONCLUSION

Wood processing enterprises are at present exposed of strong competitiveness but they have many new chances too. If they make stronger their productivity they can be on level of successful company. All piece of knowledge's, proposals, solutions, continual development of employees and other factor can be effectively apply in management of all types of companies but we must find appropriate strategy. About success of any company decided individual ability of company employees.

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THE SOCIO-ECONOMIC SIGNIFICANCE OF CHARCOAL PRODUCTION IN SERBIA

Branko GLAVONJIĆ, Milan NEŠIĆ, Predrag SRETENOVIĆ

ABSTRACT

In this paper are presented the main results of socio-economic importance of wood charcoal production in Serbia. The overview of that importance is realized through the analysis of the number of producers, their regional prevalence, the way of production, capacities, as also through the analysis of approporiate indicators. In the part of the research which considers the problem of wood charcoal market are given results which reffer to the cosumption, prices, foreign trade balance, ways of packing and systems of distribution of wood charcoal in Serbia.

Keywords: charcoal, production, indicators, market.

1. INTRODUCTION

Production of wood charcoal in the world becomes more and more the subject of interest and researching. This is caused by many reasons, of which three are especially highlighted: the increase of wood charcoal consumption in developing and developed countries (1), the pollution in the process of charcoal production (2) and importance of this for employing and income generating in rural areas (3) (World Bank, 2007). According to the Adam J. C., 2007, during the carbonization of 1 tone of wood, which is used for wood charcoal production, in the atmosphere is dropped huge quantity of smoke, in which prevail CO_2 and CH_4 (methane). That pollute about 700.000 m^3 of air. In traditional systems of wood charcoal production, which mainly exist in Serbia, huge quantities of smoke are dropped in the atmosphere and that is a very serious ecological problem. On the other side, wood charcoal production is the only source of income and the condition of survival for many village households in those areas.

Socio-economic benefits of charcoal production can be identified as significant driving force in the conditions of growth of wood-based energy share in the total energy consumption but at the same time as force for creation of the conditions for increase of employment on the local and regional levels (Madlener at al. 2000).

2. SCOPE AND OBJECTIVE OF THE PAPER

The subject of research in this paper is the charcoal production in Serbia. It is realized with the goal of perceiving of socio-economic importance of wood-charcoal production for rural areas development in Serbia. Rural areas are chosen due to the fact that whole production of this type of wood fuel in Serbia carries out in these areas. The overviewing of socio-economic importance is realized through the analysis of appropriate indicators: the volume of production and consumption of wood charcoal in Serbia, foreign trade balance, direct, indirect and induced employment, contribution of wood charcoal production in Public Finance of Serbia.

3. METHOD OF WORK

For the necessity of this research, field researches were carried out. They included examination of wood charcoal producers in Serbia and gathering of data about wood charcoal consumption in restaurants, meat roasters, shops of meat and retail stores for housholds' needs.This approach was stipulated by the fact that there are no official data in Serbia about the production and consumption of charcoal.

According to the subject and the goal of the research, appropriate questionnaires were created, and examinations were realized through the visit of producers and consumers. In framework of the official Serbian statistics still doesn't exist unique register of enterprises which produce wood charcoal. Because of that it was necessary to make additional effort for identifying of all relevant producers during the examinations realization.

During field researches all regions in which the wood charcoal production is carried out were visited. Producers are inventoried with following data: their number, presence of wood charcoal production systems, number of employees, the wood consumption for producing of 1 tone of charcoal, systems for selling, packing and distribution, prices and socio-economic importance which the charcoal production has for rural areas development.

The second part of the research was realized with the method of questioning of the most important charcoal producers in 21 towns/cities in Serbia. The selection of towns/cities was done according to the criteria of the biggest consumer prices. It was taken care that those towns are administrative centres of regions. The examination was realized by examinators which had visited all restaurants, meat roasters, butchers, taverns, retail stores, supermarkets, gas/oil stations and charcoal distributers in chosen towns/cities. Twenty-one enumerators were engaged, and the examinations were realized in January and February 2011.

Number of charcoal producers shown in this paper is obtained from data collected during the field researches and from municipal administrations' register of entrepreneurs, which produce some energents. Having before mentioned in mind, the list of the enterprises and number of employees shown in this paper have very special importance because that represents the first register of charcoal producers in Serbia.

Data on incomes of employees were also obtained from the companies, and their analysis showed that there are no significant differences in scope of earnings from company to company up to maximum 30%. Taxes and contributions paid to the state are defined by the Law on tax to salary of employees and Law on social contributions, and they are in the fixed amount regardless of the field of activity of the company.

4. CHARCOAL PRODUCTION IN SERBIA

Depending on the way it is performed, production of charcoal in Serbia can be generally classified in four groups: **production in earth cover kilns, production in brick kilns, production in portable steel kilns and production of charcoal in the industrial way** (figure 1).

a) Brick charcoal kiln b) Earth charcoal kiln c) Portable steel charcoal kiln d) Retorts

Figure 1. Types of charcoal kilns for the production of charcoal in Serbia

Predominant way of production of charcoal is in brick charcoal kilns, while the production of charcoal in so called portable steel charcoal kilns started in the second half of 2009 and it is not much used because produced charcoal is not of good quality. Production of charcoal in the industrial way in retorts started at the end of 2010 and at the moment is in the development phase, but still yields very good effects in terms of quality of charcoal (Cfix over 85%). This is confirmed by the fact that the complete production of industrial charcoal is exported to Germany and distributed to silicon factories and factories for gunpowder production.

The greatest number of producers is located in the eastern, south-west and western parts of Serbia (figure 2) and almost all have identical system of production. The highest concentration of brick charcoal kilns for the production of charcoal is located in the village Klokočevac near Majdanpek. In this and other villages in the area around Majdanpek there are around 200 charcoal kilns.

The biggest producer of charcoal is located in the area of Guča (south-west Serbia) and it produces around 15/t per month. Depending on the way and scope of production, all producers in Serbia can be generally grouped in two groups. First group so called includes small producers of charcoal in rural areas who produce charcoal as side activity.Their production is not permanent but based on order and is mostly executed in course of spring, summer and autumn. The usual quantity of charcoal produced in one household is around 1.5 tones a year (Glavonjić, 2007).

For purpose of this paper we conducted the survey of number of producers and scope of production of charcoal in Serbia in the regions with predominant production of charcoal. According to data obtained from conducted survey in the field each producer from this group produces a minimum of 1.5 tones of charcoal a year. Furthermore, in course of one production cycle, more than 20 stacked m^3 of wood is used on average, out of which 240 kg of fuelwood is obtained, i.e. from 1 stacked m^3 of raw material we obtain 12 kg of charcoal. Compared to the industrial way of production, the use of raw material and productivity of this way of production are a several times lower. The usual number of production cycles of these producers in course of one year is 15, and usual duration of one cycle is 16 days (1 day filing, 10 days combustion and 5 days cooling and emptying) (Glavonjić, 2009).

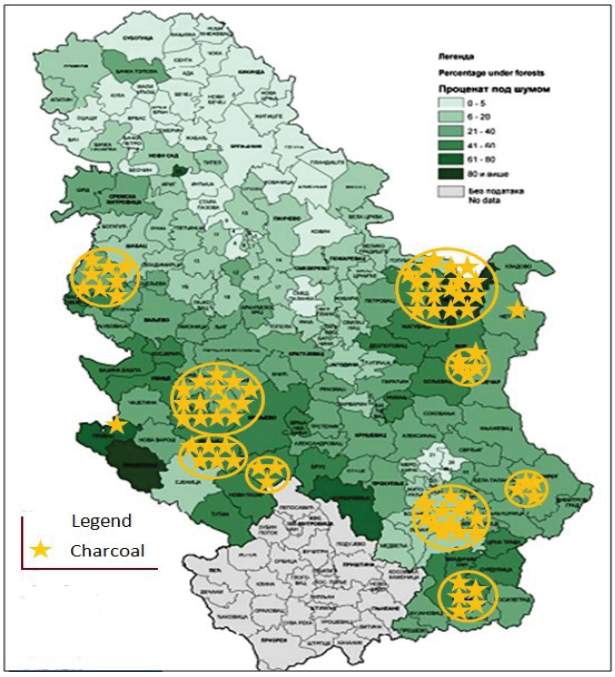

Figure 2. Map of charcoal producers in Serbia

The second category of producers consists of so called medium and big producers. Production is conducted in brick charcoal kilns which are filled with firewood or large wood residues from sawmill wood production. This group of producers also contains the producers located near forests who use split wood as raw material for production of charcoal. The highest number of medium-group producers uses the so called Swedish method in course of which the entire production process lasts for 7 days. The percentage of use of raw material is relatively low (around 25%), since from 15 m^3 of large saw mill residue it is possible to obtain 1.9 tones of charcoal, or

from 1 stacked m^3 of roundwood around 95 kg of charcoal. Wood residue is triturated into pieces of appropriate dimension for the reason of better filling of the furnace.

Important for traditional way of production of charcoal is the humidity of wood used for its production. Producers try to maintain the balanced humidity of wood, because the wood with higher percentage of humidity remain non-carbonized, which represents a big problem because they are discarded after emptying of charcoal kiln and in this way increase the pollution of environment (Kadović at al. 2009).

Currently, there is only one producer of so called black briquette in Serbia, which buys off coal dust and small residues and uses them for the production of black briquette.

Due to the economic non-viability, the buying off of coal dust and small residues is done from producers from approximately 100 km distance. A special problem In rural areas is smoke which appears in course of production process and which pollutes environment to such extent that the protests of inhabitants who are requesting the closing of charcoal kilns from that area to local authorities are increasing.

4.1. Employment in charcoal production in Serbia

From 1333 charcoal kilns in Serbia indentified in this research, in 824 charcoal kilns production is carried out seasonally (with interruptions) and in 509 the production is realized continously, during the whole year. The number of employees depends on the character of production. Results of realized examinations show that in seasonal charcoal kilns 674 workers produce wood charcoal. Those charcoal kilns were set up at the properties of their owners, videlicet on agrar households. The majority of households possess one charcoal kiln, but some households possess 2-4 charcoal kilns.

762 workers are employed in the production of charcoal in charcoal kilns in which the production is carried out during the whole year. By this, it is also comprehended one factory for industrial charcoal production, in which six workers are employed. The production in these charcoal kilns is registered through entrepreneurial firms which possess mostly 5-7 charcoal kilns.

Number of indirectly engaged workers in the wood-based energy system in Serbia depends on several factors which differ for various types of energy products.

The works of transport of wooden resource and packing of charcoal in the production of charcoal is performed by the producers due to the way the production is executed, while its delivery is executed by buyers, and in the few cases the work is performed by producers mostly on shorter transport distances (for purposes of local buyers). Due to that the number of indirectly engaged workers in the production of charcoal is relatively and is 275. It means, on 1 worker who executes direct works in the production of charcoal in Serbia, comes 0.19 of worker engaged on performance of indirect works.

In addition to of direct and indirect work present in the in the charcoal production, production of this product induced the occurrence of induced work effects. Namely, incomes realized by employees in the framework of direct and indirect work are in the certain extent spent for settlement of their requirements in the local environments and beyond, resulting in the need for certain number of work positions in other fields of economy and the increase in demand for certain goods and services (Domac at al.2005).

In regard to induced employment (work) and its relation to the charcoal production, it must be observed from two aspects (Kranjc and Domac, 2007):

- from aspect of impact on increase in purchase capacity of employees in the charcoal production on the growth of certain goods and services on the local level and beyond and
- from aspect of impact on induction of expansion of existing and opening of new positions and service for requirements of charcoal production.

Effect of multiplication is represented in both aspects, but differs in scope and impact on the local economy and number and structure of expansion of existing and opening of positions and services.

According to the Trossero 2000. part of incomes intended for consumption is spent for different requirements. One of them is settle in the restaurants (food and drink).

In regard to Serbia and effects obtained as the result of induction based on employment and incomes realized in the charcoal production, we can make a conclusion that these incomes are of great importance for local environments primarily due to the fact that the greatest number of companies for production of certain types of energy products is located in the non-developed and poorly developed regions in which the incomes from charcoal production represent the most significant incomes.

Results of the stated surveys showed that the number of induced work necessary for company requirements from the charcoal production compared to 100 directly engaged workers is 11 workers. Based on the previously stated, table 1 shows the assessment of number of workers induced by business activities of company for the charcoal production in Serbia.

Table 1. The assessment of total number of workers induced by business activities of company for the charcoal production in Serbia in 2009

Type of fuel	Direct work	Indirect work	Induced work	Total (workers)	Total produced energy (GJ)	Produced energy per worker (GJ worker)
Charcoal	1.436	275	158	1.869	401.760	**214,9**

Source Results of surveys and authors calculations

For purpose of analysis of effects realized in the production of certain types of wood biomass-energy products, the calculation of total energy which can be obtained based on produced quantity and energy value of measurement unit of certain types of energy products and total number of workers. Results from table 1 show that the realized effects in the production of charcoal is below average for the wood-based energy system (1,370.2 GJ/worker) (Micro-economic aspects of wood-based energy system in Serbia, 2009).

4.2. Contribution of charcoal production in the regional and Republic public revenues

Contribution of charcoal production in the regional and national public revenues in Serbia is realized in two ways:

1. by payment of taxes and contributions to employee salaries, and
2. by payment of value added tax for energy products in trade.

Taxes and contributions on salaries of employees represent the way in which the charcoal production in Serbia provides the biggest contribution to the regional and Republic public revenues. In 2009 the charcoal production in Serbia contributed to regional public revenues (in all parts of Serbia) with the amount of 0.507 million €, and to the budget of the Republic of Serbia with the amount of 0.933 million € (table 2).

Table 2. Contribution of charcoal production to regional and Republic public revenues through taxes and contributions on the salaries of directly engaged workers in 2009.

Type of energy product	Number of employees	Net income (€)	Contribution to regional public revenues*** (€)	Contribution to republic public revenues **** (€)	Gross income (€)**
Charcoal*	762	1.463.040	507.236	933.273	2.903.549

*Calculation of incomes in production of charcoal includes only the number of workers in the companies and entrepreneurship companies registered for execution of these activities. Other workers are not included in the calculation because they are included in the members of agricultural households to which various system of calculation of incomes and taxes is calculated.

**For calculation of incomes calculated and disbursed in RSD and EUR the average value of EUR in 2009 was used in the amount 1 EUR = 94.00 RSD

***On 1 € of income, taxes and contribution to regional revenues are 0.3467 €

**** On 1 € of income, taxes and contribution to republic revenues are 0.6379 €

In the valid legislative of the Republic of Serbia, the tax rates on added value differ for different types of wood biomass-based energy products. The tax rate for fuelwood is 8%, and for other wood biomass-based energy products 18%. Considering the quantity of produced wood biomass-based energy products, as well as the fact the greatest quantities were allocated for consumption on the local market (exception are wood pellets), the significant contribution to the wood-based energy system on the republic level was realized.

Table 3 shows the assessment of contribution of charcoal production to public finances of the Republic of Serbia based on their average unit prices in 2009 considering that they were changing in accordance with offer and demand on the market and harmonized with the growth of EUR in relation to the local currency.

In the calculation of value of VAT, the quantities of charcoal exported in 2009 are excluded, considering that VAT was not paid on them.

Table 3. Contribution of charcoal production to public revenues of the Republic of Serbia through paid VAT in 2009

Type of energy product	Quantities distributed on the local market (ton)	Price in €/measurement unit without VAT	Total value of energy without VAT (€)	Tax rate VAT (%)	VAT amount for payment into budget of the Republic of Serbia (at calculated rate) (€)
Charcoal	27,603	According to price lists of producers	5,244,570	18	944,022.6

Sources: Documentation of producers and authors calculation

Total contribution of charcoal production in Public incomes of the Republic of Serbia in 2009 through the fees on salaries and VAT was 2.38 million EUR.

5. CHARCOAL MARKET IN SERBIA

Charcoal market in Serbia is increasing. The demand and consumption of this wood fuel have been increasing due to two reasons: increased consumption on the local market and increase of export. Beside households, the biggest consumers of charcoal are butcheries and grills, which do not only sell

meat to consumers, but also offer them the "free" grilling service, which is used by a number of consumers considering that barbecue is a traditionally very popular way of preparation of food in Serbia.

Charcoal produced in the traditional way is packed in sacks of 15-16 kg and delivered to big consumers such as restaurants and butcheries. There are also producers whose main activities are production, and buying of charcoal and its packing into bags of 3-5 kg each delivered to supermarkets, which are intended for the needs of individual consumers.

Quality of charcoal produced in Serbia varies depending on the type of charcoal kiln in which the process of carbonizing wood is executed, type of wood used, duration of cycle, strength and direction of wind and quantity of water used for extinguishing at the end of the cycle. Field surveys in course of which we visited a number of charcoal kilns showed that the quality is uneven due to differences between the previously used elements in the production process, different level of expertise and skill of producer, as well as increasingly present commercial effect to produce and sell charcoal in the shortest possible time, especially in the period of seasonal increase if demand.

5.1. Systems of distribution of charcoal in Serbia, prices and foreign trade balans

Main characteristic of the system of distribution of charcoal in Serbia is that the distribution is executed in two ways: directly by the producer to end consumers and distribution over agents, supermarkets, petrol stations, etc.

The first way of distribution is used by the producers whose main and everyday activity is distribution and who have a number of charcoal kilns, their own distribution channels, as well as their own means of transport (trucks). Considering the fact that the majority of producers of charcoal have 1 to 2 charcoal kilns and that they perform the production of charcoal in the seasonal manner (occasionally), these producers give charcoal to agents (entrepreneurs) who distribute it further to end consumers. In this other case, producers of charcoal do not have the possibility of direct sales to end consumers because they do not have their own distribution channels nor the means of transport for distribution.

Surveys show that there are also examples of individual supply with charcoal by end consumers directly from producer, but these examples are scarce.

Distribution of charcoal exported from Serbia is executed through market agents in the countries of export, and packing of charcoal for them is in paper bags of 3 kg each with trademark logo and characteristics of charcoal in the language of the country it is exported to.

Charcoal prices are relatively low and range from 3,3-3,6 EUR/sack of 15 kg, i.e. 0,22-0,24 EUR/kg on parity of *fco* charcoal kilns. Prices for end producers in cities are significantly higher and range from 0,52-0,61 EUR/kg.

Taking exception to the 2006 when import of wood charcoal was slightly bigger than export, in all other years 2005-2010 the charcoal production have always had a positive foreign trade ballance (figure 3). Having in mind the actual situation on domestic market, the continuation of this tendency could be expected in following years.

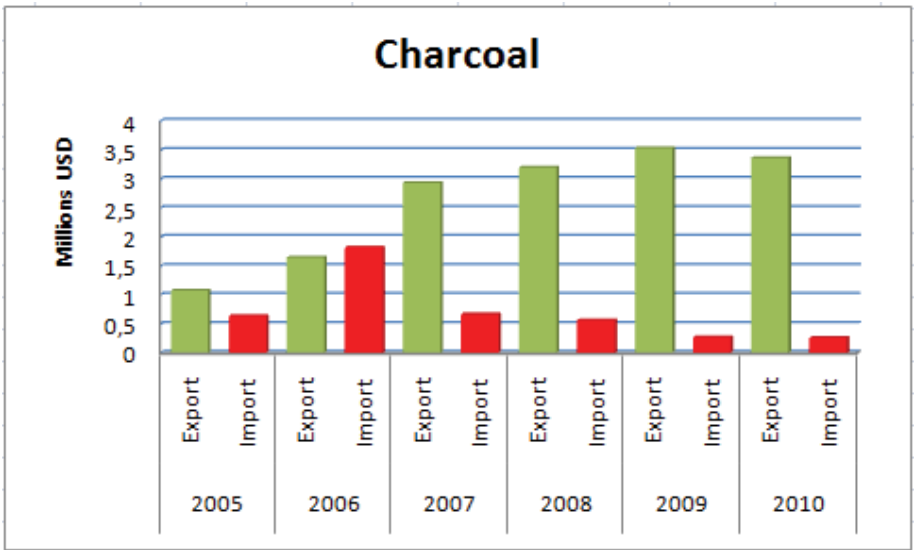

Figure 3. Export and import of charcoal of Serbia

Charcoal is mostly exported to Austria, Croatia, and Montenegro. Share of Austria in the total export of charcoal from Serbia in 2010 was 74.4%.

In the table 4 are shown assumed data about production, export, import and consumption of charcoal in Serbia. Thereat it is neccessary to note that the consumption of charcoal includes the consumption in households, grills, meat roasters and restorants.

Table 4. Overview of production, consumption, import and export of charcoal in Serbia in 2010

	Charcoal
	ton
Production	34.086
Import	486
Export	6.969
Apparent Consumption	27.603

Sources: 1.Results of surveys and authors calculations, 2. External trade of the Republic of Serbia

Reached results are mainly different from past estimations which were done for various institutions and organizations in the country and abroad. These results are also very different from the data of the official statistics. Thus, for example, the real consumption (production) of the charcoal is 3-4 times larger comparing it with the statistically recorded one.

6. CONCLUSIONS

Results of the research shew that the charcoal production in Serbia is mainly unsystematicly organized and that it is carried out traditionally, with a low percentage of starting material utilization and with noticeable pollution of natural area in the same time. One of the reasons of actual situation is nonentity of Governmental policy which would influence on improvement of situation in production of this

product. Because of that, it is necessary, as soon as possible, that the Government defines policy mesaures which would provoke more organizational access to the charcoal production and measures for reduction of natural area pollution in the process of production. By them, problems of dropping the big quantities of smoke in the atmosphere and uncontrolled deferment of huge coal dust after the carbonization should be resolved. These mesaures should be also included in the official Energy Policy of serbian Government. The charcoal production is very important source of income, as also the important element of survival for rural inhabitants in areas where it is carried out. Results which reffer on the contribution of charcoal production to official incomes of the Republic of Serbia additionally confirm creating of these mesaures.

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QUALITY MANAGEMENT IN FURNITURE MANUFACTURING

Krešimir GREGER, Kristina BIČANIĆ, Darko GLUMAC

ABSTRACT

In order to respond promptly to all contemporary market challenges company must continuously improve quality. In this study statistical process control based on data analysis from the manufacturing process was conducted, and on that basis, conclusions about the process were made. Proper application of statistical process control can reduce production costs. Research objects were two plants of one of the leading companies in furniture production of the Republic of Croatia. The study was conducted on the same production line, with identical materials and machinery manufacturing. The aim of the research is to determine whether there are variations in the production process, and try to establish whether the detected variations occurred due to systemic or specific causes. Research findings were analyzed using control charts and measuring process capability.

Keywords: furniture manufacturing, statistical quality control, control charts, process stability

1. INTODUCTION

In contemporary market conditions with fierce competition, it is necessary to ensure high quality production. In such circumstances it is necessary to conduct statistical quality control in order to expand market share and to ensure more efficient business enterprises (Figurić, 2000). Quality has become an inseparable part of everyday, but also long-term management activities, ranging from general manager down to all employees.

Quality management tools are instruments of supervising (monitoring) and diagnosing processes of designing, production, control, assembly and all different operations appearing in the cycle of the product existence (Potkány et al. 2001). They are used to ensure the quality of products and processes. Proper application of statistical process control can reduce production costs (Horvat et al., 2006).

Statistical process control and product quality control improves the process by reducing the causes of variation in them. As a tool of statistical quality control, control charts are used. They compare data on the process fulfilling the functions calculated with statistical control limits drawn as border lines on the chart. The main role of control charts is detecting and visualizing disorder of product quality.

In this study, using the performed measurements we wanted to determine whether there is any disruption in the production, which directly affects the quality of the final product. Control charts are the basic instrument for the implementation of statistical quality control by which we detect disorders of product quality. Mechanism of statistical process control of products is based on defining the limits of tolerance for the accuracy of the product or variation of a standard or prescribed measure. If product quality is within this framework, it is considered to be under control or qualitatively satisfactory.

Control chart is defined by three main lines:

- upper control limit (UPL),
- central line (CL),
- lower control limit (LCL).

The process is under statistical control if 2/3 of the values of the measured parameters are located within the central third of the control chart, in the zone of $\pm 1\sigma$ around the central line (Lazić, 2009).

In addition to control charts, in the research the assessment of process was performed using the index of potential capability index C_p and process performance index C_{pk}.

Modern industrial production in wood processing and furniture manufacturing is very complex, and a number of factors that can affect it is so big that it has become necessary to introduce systematic control that indirectly detects errors (deviations from planned quality settings) and allows timely technology intervention (Figurić, 2000). The capability to observe and the ability to remove excessive deviation from the planned quality is one of the decisive factors for the success of production. Such an immediate and permanent control of control variability is ensured by the statistical quality control methods during the manufacturing process.

2. METHODS

The study was conducted in TVIN Ltd, Virovitica timber industry. Tvin is a leading furniture manufacturer in Croatia with about 1300 employees. Ninety per cent of its production is for export. In Croatia it is well-known for its office furniture and equipment for hotels. Besides the headquarters located in Virovitica, TVIN has factories in Županja, Pitomača and Grubišno polje.

Measurements were carried out in two factories (factory I and factory II) at the same checkpoint, on a multiple-spindle drill. The depth of the drilled holes on two similar products on the same material was measured. The study was conducted under normal production conditions, which are typical for the object of the study. Only data obtained under normal conditions can be compared in the analysis and used to make conclusions (Lazić, 2009).

Multiple-spindle drills used in measurements are modern machines that have the ability to process a large number of elements in a shift. Managing is done by a computer, insertion and stacking of the elements is done by using automated "inserters and stackers" that rapidly and continuously insert and stack the elements into the machine and out of the machine. Human labour for these machines has been reduced to just controlling the machine and there is no physical labour.

After data collection the results were analysed by methods of statistical quality control, using control charts and process capability measurements. For statistical evaluation statistical software package Statisica was used, namely module Industrial Statistics & Six Sigma. For the analysis of the obtained results X bar and R control chart was used that tracks mean and ranges of samples. Sample size of 5 pieces was selected and 30 measurements were made at the research facility. To track the measured data in greater detail the individual X - bar control chart was used that shows the movement of individual values in relation to the centre line and control limits.

3. RESEARCH RESULTS

After the collection of measured data it is necessary to analyse the results to determine whether the process is statistically controlled. In the analysis of X bar and R control chart it is necessary to analyse both X and R components, and determine whether the measurements are outside of control.

Control X bar and R chart for research polygon one is shown in Figure 1. From the analysis of X-bar chart of mean can be seen that the mean values of samples follow normal distribution and do not fall outside the control limits. More than 2/3 of mean values is in the area 1 σ away from the central line on the X bar chart (70% mean values) and on the R chart of mean values (73% mean values).

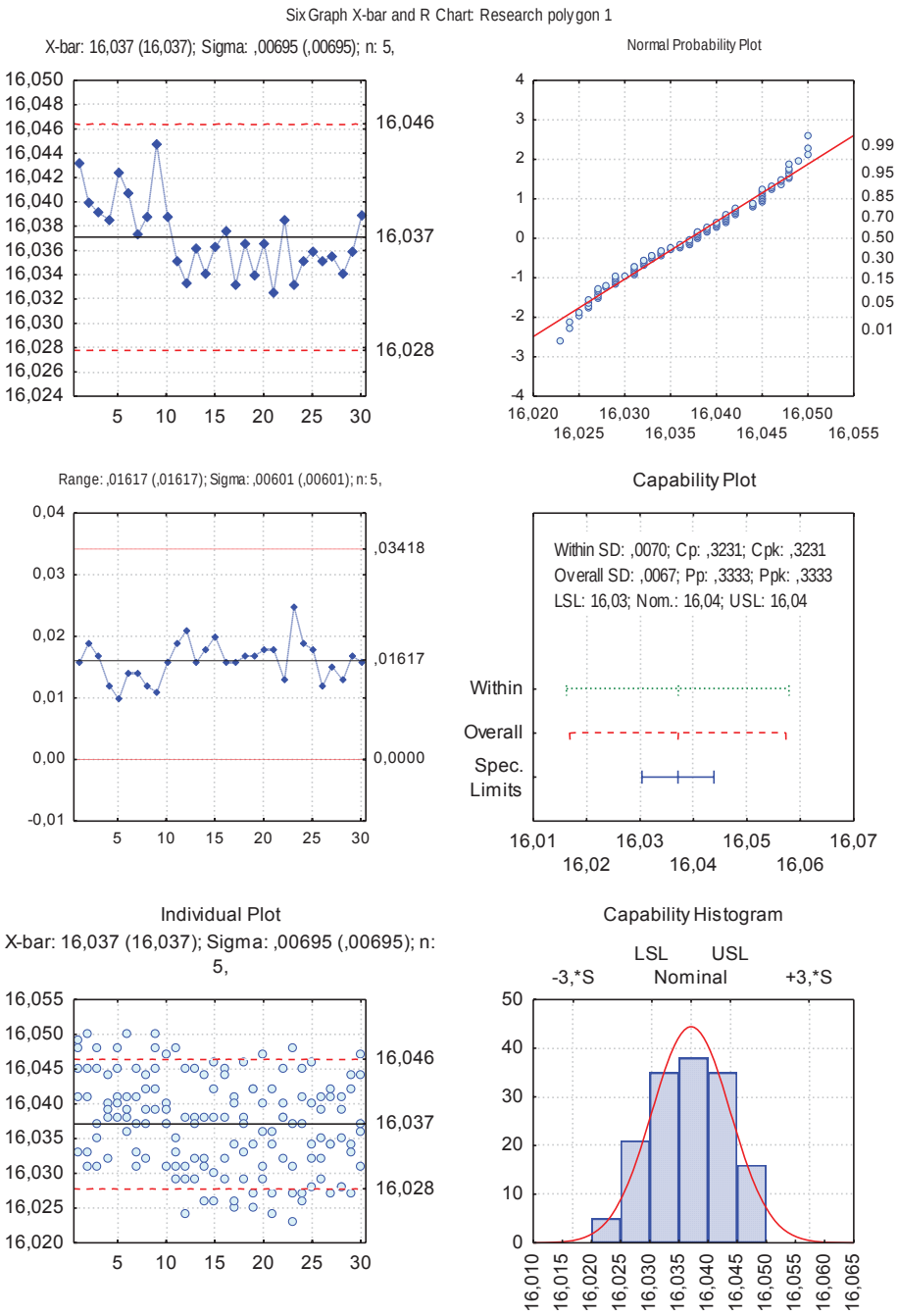

Figure 1. X bar and R control chart for research polygon 1

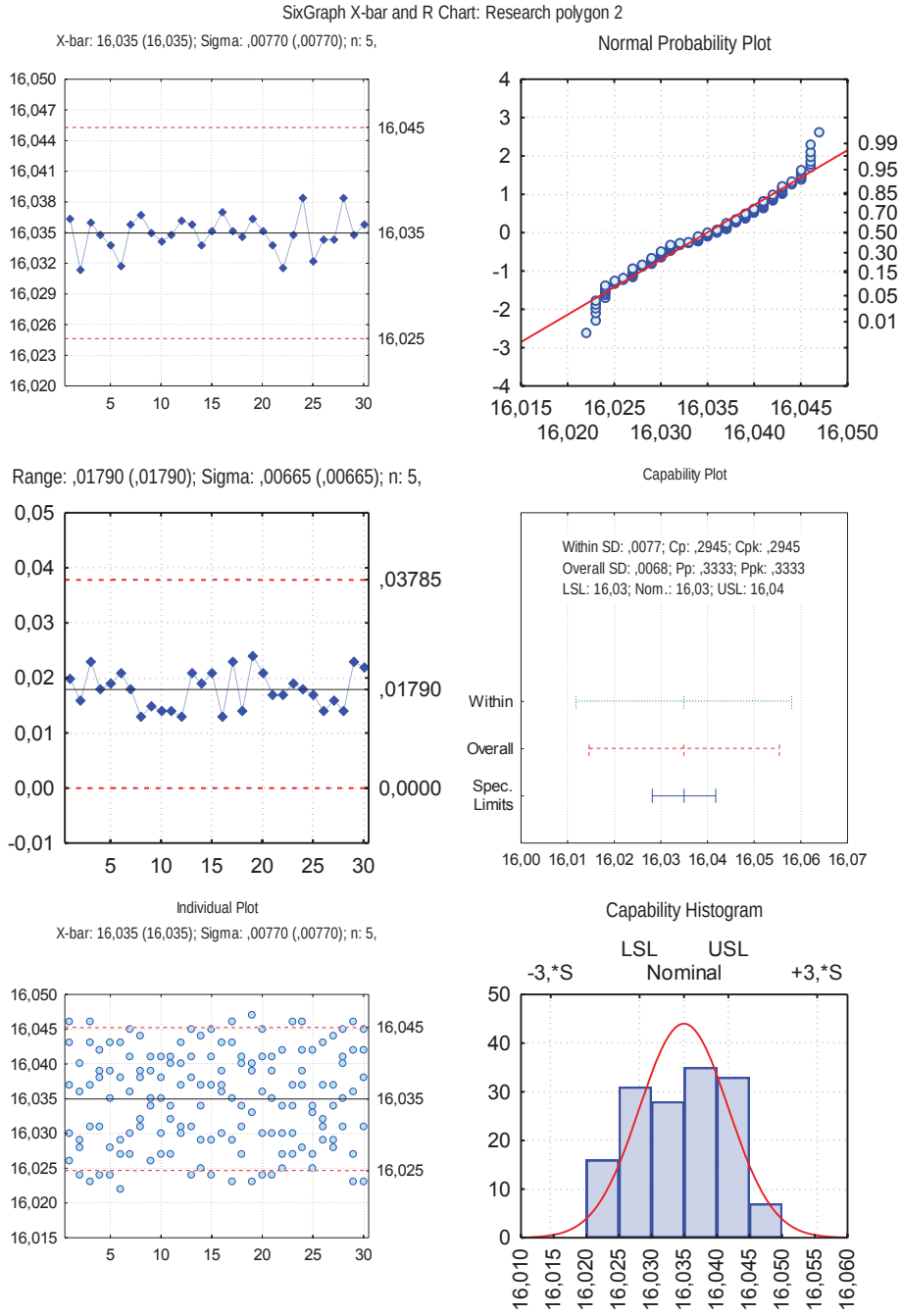

Figure 2. X – bar and R control chart for research polygon 2

In order to accurately see the deviation of measured values in relation to control limits, the control chart has been constructed for individual monitoring (Figure 1, bottom left). On the X-bar chart of individual measurements, it is evident that more measured values differ from the upper and lower control limits, indicating the need for setting the machine. Above the upper control limit there are 13 measured values, and below the lower control limit value there are 15 of them. If the space between the control limits is divided into three zones A, B and C, (A = 1 σ, B = 2 σ, and C = 3 σ) which start from the centre line of the control limits, it can be seen that 59 values (39 %, more than 1/3 of values) are located in zones B and C, i.e. in areas below the curve of normal distribution of 2 σ and 3 σ, and this can be understood as a warning that changes may occur in the process.

Index of process potential C_p=0.32 indicates an inefficient process and the performance index C_{pk}=0.32 to an unconfigured process. As a corrective measure it is proposed to stop and adjust the process.

Figure 2. shows the measured values on the research polygon two. On the X bar chart we can observe minor deviations of mean values of the centre line in relation to the results obtained in the research polygon one. Mean of the samples range at periodic intervals above and below the central line (16.037). The ranges move in cyclic intervals around the central line and do not go beyond the control limits. 1/3 or 33% of mean values is located in zones B and C, which indicates that changes in the process could happen and cause a decline in the product quality.

Individual measurements indicate to significant deviations. Above the upper control limit (16.045) there are 7 of the measured values, while below the lower control limit (16.025) there are 13 values. 41% of the values are located in zones B and C, which exceeds 2/3 of total values and signals us that we must perform process correction.

On the basis of the value of capability indicator (capability indices C_p=0.29 and C_{pk}=0.29), it is evident that the process of drilling holes on the multiple-spindle drill belongs to the group of imprecise and unconfigured processes.

4. CONCLUSION

Control charts are a basic instrument for the implementation of statistical control of a product or a production process. The main role of control charts is detecting and visualizing product quality disorder. Statistical quality control with its tools, especially control charts can greatly help improve the quality of products and processes.

As is evident from the results, using the X bar and R control chart it is possible to find out how the process behaves, to determine whether there are variations in the process and to what extent, after which with further analysis we can search for causes of errors. This control chart has been proved as a suitable tool for systematic monitoring and improvement in the process of furniture production, and in this specific case for monitoring the performance quality of multiple – spindle drills. Statistical analysis showed that on X bar and R control charts of mean there is a certain deviation from the central line, but there is no value that is outside the control limits. By measuring the process capability, values that were obtained indicate that processes are inefficient and unconfigured, and that should be approached for further analysis. Using X – bar chart for individual values we have come to the conclusion that there are multiple measurements that are outside the control limits, and that it is necessary to stop the process and remove all causes of difusion.

Using the conventional X bar and R control chart to monitor the mean and range of samples variations in the process are not always apparent. Although all mean and ranges of samples were within the control limits, process capability indices showed that the processes are unconfigured and imprecise (smaller than 1). When the process capability index is smaller than 1, it means that the process deviation exceeds the tolerance limits of the process and a significant percentage of scrap can be expected (Oslić, 2008). Only with the use of an X – bar control chart for individual values we found

greater variations in the processes and deviations outside control limits. Control charts, with special emphasis on the ones for individual values, proved to be a suitable tool for the systematic monitoring and improving the quality of furniture production processes.

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MONITORING OF WOOD SOLID PANELS QUALITY USING THE CAUSE-AND-EFFECT DIAGRAM

Sanin HASANIĆ, Safet BRDAREVIĆ, Murčo OBUČINA

ABSTRACT

The production of solid wood panels is characterized by the effect of significant number of factors which have an influence on the quality of final product. Monitoring and understanding the mechanism of influencing factors presents the crucial parameter of the successful business. In order to monitor the influencing factors, it is needed, in the beginning, to clearly define and present them in the simplest way. In this paper, the influencing factors will be shown in the cause-effect diagram used for an analysis of characteristics of processes and influencing factors which have an impact on the processes. As the outcome we will obtain the clear monitoring of the characteristics of processes and possibility for clear defining and organizing the quality control.

Keywords: solid wood panels, influencing factors, cause-effects diagram, quality control.

1. INTRODUCTION

Quality is defined as the foundation of competitive advantages by the market i.e. as „harmonization with customers' requirements regarding function, price, delivery time, security, reliability, environment protection, guarantee, advising, etc“. [5] In accordance with it, the quality control presents the control of all phases of planning, production and use of product everything for the purpose of fulfilling customers' requirements. The quality control in the wood industry is the subject of this work study [19]. Anyhow, the production of solid wood panels with its two crucial processes wood processing and gluing process [12] has the chain of its own specificities that are the subjects of this work study. The production of solid wood panels makes the circled production process from sawmill production, steaming, drying, processing technology to the process of getting solid massive panels. The wood massive panels are products that are used for stair construction, tables, kitchen elements, furniture, wooden kitchen accessories...

The basic raw material which is used by the most number of BiH manufacturers is the beech board with standard thickness 25,32,and 50 mm out of which boards with thickness 20,27,40, 43 and 45 mm are produced.

Basically, there are two types of wood massive panels:

- side laminated solid wood panels where lamellas are glued in one piece per its length and glued per its width and
- finger-joint panels where lamellas are jointed of more pieces and glued per thickness and length

Side laminated solid wood panels and joint-finger panels made of light steamed beech must comply with limit of wood moisture from 8+/- 2%.

Panels are composed of more pieces of lamellas width from 4 up to 10 mm and at finger-joint panels most often is approximately 40 mm depending on the width of panels. Lamellas are mutually jointed with anti-moisture glue which has to meet the standard DIN EN 204.

Standard types of panels are:

AB – one side of the panel is completely clear, without discolouring between lamellas, while on the other side of the panel discolouring is allowed. The panel has to be technically and properly produced (without open glue lines, cracks and other technical mistakes).

BB – both sides are with discolouring between lamellas and the panel itself has to be technically accurately produced.

AC, BC, CC – one side of these panels of the panel is the heart of log (central part of log) while the other side is clean or certain lamellas are made of the heart of log.

It is necessary to emphasize, and it is the part of this work, what is important to be distinguished:

Regarding the classes of panels' quality, as aforementioned, the visual effect is the most important and the basic factor for classification of price – characteristics of the panel.

Technical quality of panels no matter what is the class of the panel has to meet the basic parameters as follows:

- Panels have to have accurate dimensions
- Open line of joint must not be seen between lamella and open glue lines
- Anti-moister glue has to be used which meet the requirements of standard DIN EN 204, and
- the basic limiting factor for panel production is moistere contents.

Figure 1. Solid glued massive panels

The technological production process of side laminated solid wood panels itself consists of following operations:

- Planning of two wider surfaces
- Sorting per colour and quality
- Control of moisture contents and length
- Shaping of the surface at which the glue is put on
- Sorting and forming per dimensions and classes
- Gluing
- Grinding
- Formatting
- Sorting per classes and moisture contents
- Packing

Technological production process of finger-joint panels is composed of the following operations:

- Four-sided panning of elements
- Sorting per colour and quality
- Cutting and forming of lamellas
- Control of moisture contents and length

- Processing of the surface at which the glue is put on
- Forming of panel width and control
- Gluing
- Sanding
- Formatting of panels per length
- Sorting per classes and moisture contents
- Packing

2. RESEARCH METHODS

The character of influencing factors on the production of solid massive boards is various where some of them can be presented with discrete values and to be evaluated in this way, while others values can be presented with an adequate linguistic description with the certain accuracy degree. In that sense it is needed to find the way for analysis and evaluation of influence of both types of factors independently from the way of their presenting. Critical success factors have to be upgraded in order to provide success of the company business strategy. Typically, they are 20% of factors that make 80% of company performance. In order that they have an influence on quality development of production process it is needed to:

- Define the most significant influencing factors
- Find the way of their evaluation
- Define preventive actions in order to prevent non-harmonization.

The main problem that comes out in production of solid massive panels is that there are no standards for certain classes of products i.e. there is no clear defined requests for quality of solid massive panels. There are manufacturing specifications and trade norms and they are subject to different interpretation by certain customers. Therefore before the production starts, it is needed to involve and build in all customers' requirements from the very beginning of designing the product. The issue of clear definition of customers' requirements is extremely exposed in this field. The most common requests are presented in the written form and task of the manufacturer is to translate and interpret them into clear and measurable characteristic of products.

The purpose of implemented survey was to get defined most significant characteristics of the product regarding the quality by the customer including all other influencing factors which have an impact on making decision on the choice of supplier. The research that has been implemented among the biggest thirteen customers of solid massive panels produced by BiH manufacturers should give an answer on the following questions:

- Who are customers of solid massive panels produced by manufacturer from BiH?
- What are customers' requirements regarding the quality?
- What are influencing factors and the way of their evaluation what present the limiting factor while making the choice of supplier?

Comparing received results with presumed significant influencing factors through the method $\chi 2$ – test, the result was obtained with the coefficient of statistical dependence $p<0.05$ and the number of degree of freedom SS=4.

Figures for χ^2 - test are being prepared in the way that you first enter observed data from the experiment (f_t), and then expected data (fo).

Expected data are calculated in the way that for the certain cell you multiply horizontal and vertical sum and divide it with total sum.

Very often we would like to know whether the perceived frequencies are drastically different from the expected ones. This difference is calculated according to the following formula:

$$\chi^2 = \sum \frac{(f_0 - f_t)^2}{f_t}$$

3. RESULTS

Using the χ^2 – test it will be checked whether gained answers statistically and significantly derogate per all criteria i.e.per requested influencing factors from the usual values for the values of $p<0,05$ i $SS=4$.

For these values, the value is χ^2 =9,488 and all other values that are less than this one meets the required criteria of significant influencing factors for customer.

Implementing χ^2 – test we gained results for the following influencing factors:

Table 1. Influencing factors

Capacity	1,8
Finger joint and planning machine for the surface at which the glue is put on	7,5
Capacity harmonization	5,3
Managing the warehouse, relation with supplier and raw material quality	7,36
Steaming and drying treatment	5,3
Technical-technological capability of the company	5
Moisture contents	4,37
Small assortments	7,86
Delivery deadline	6,4

Therefore, CFS-Critical Success Factors of companies producing solid massive panels are:

- High level of technical-technological capability
- Organization of control of moisture of raw material and the product
- High level of quality of raw material as well as relations and classification of supplier and managing the warehouse
- Production capacity
- Harmonization of capacities between producing units
- Wide range of product assortment
- Respecting the delivery deadline

Therefore the implemented analysis has showed that there are certain number of factors to which customers are paying special attention and the monitoring and improving of determined parameters of process should bring to decreasing and elimination of non-harmonized products.

Cause-and-effect diagram is mostly used for the analysis of characteristic of processes or situations and factors which have an influence on them. In order to monitor influencing factors, at very beginning it is needed to clearly define and present them as simple as possible. As the outcome we will obtain the clear monitoring of the characteristics of processes and possibility for clear defining and organizing the quality control.

Next steps which have to be implemented by manufacturers of solid massive panels that after presenting and defining influencing factors assisted by controlling cards and Pareto analysis are to organize the functioning of control quality and define preventive actions in order to prevent appearance of non-harmonized products.

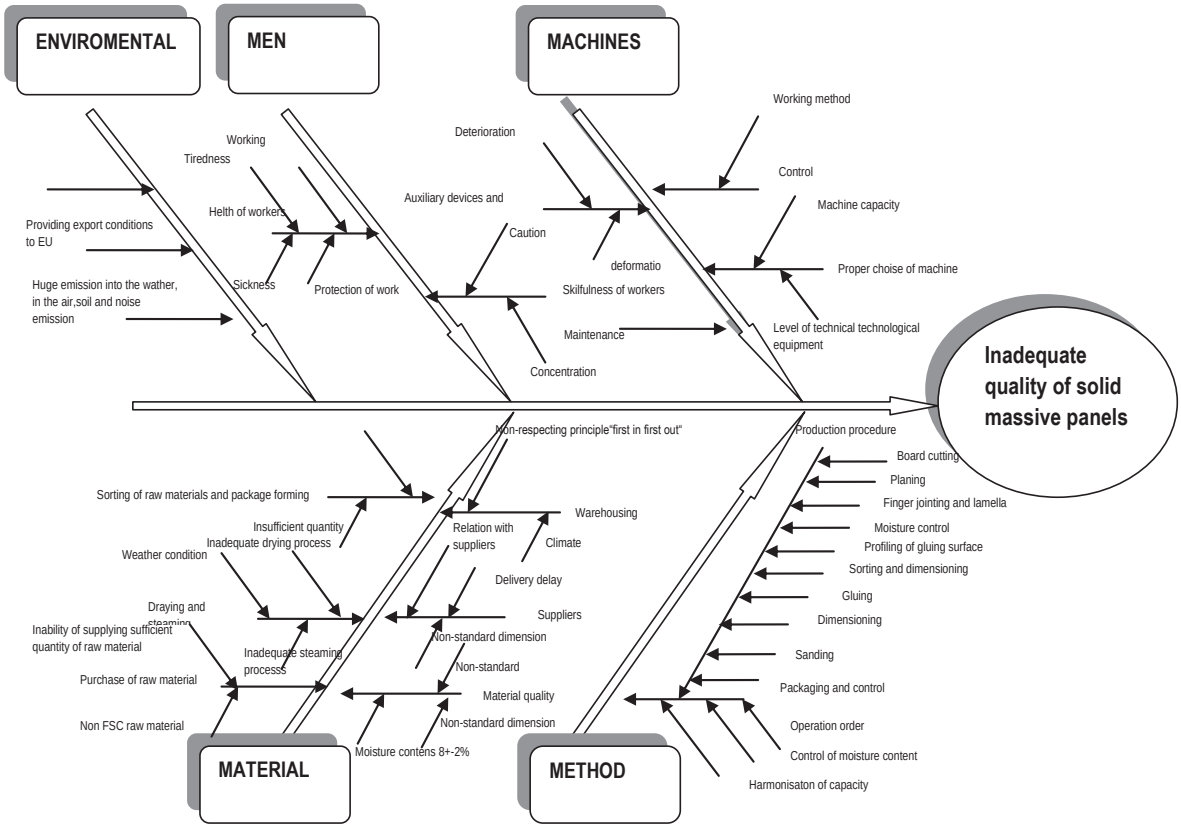

Diagram 1. Cause-and-effect diagram for solid glued massive panels

On the abovementioned diagram (Diagram 1.) influencing factors up to third level are presented using the model 4M1E. Structured overview of diagram visibly shows cause of problems or qualitative characteristics. Due to above mentioned, other advantages of this overview are:

- Encouraging group work involving proposal of all holders of business
- Introduction of all employees with all process and important influencing factors
- Simple way of presentation
- Defining directions for further research

4. CONCLUSION

Nowadays the market is characterized by bigger number of requirements for the new products. Increased use of solid massive panels is giving manufactures more and more request and requirements for quality and the way of organizing the production which can fulfil customer's requests. Further use of solid massive boards for furniture production and production of stairs largely depend on the way of production and respecting the production process what will have for an outcome the production of quality product. Due to this, defining the clear customers' requirements, their involvement in preparation of production and respecting customers' requirements by manufacturers present the most important factor of success production. Use of tool of quality presents extremely important help to manufacturers for monitoring the production and defining preventive actions which as result have prevention of appearance of non-conformances products.

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WORKERS MOTIVATION IN TRENDWOOD-TWD, LTD.

Miloš HITKA, Alexandra HAJDUKOVÁ, Mária SIROTIAKOVÁ

ABSTRACT

The most crucial premise of the efficiency of employees, their willingness and satisfaction, is related to the fact that their work itself is meaningful and fruitful for them as well as for their firm, and, moreover, adequately interesting, demanding, providing them with a possibility of personal advancement. If employees see a sort of progressive perspective as well as particular possibilities of their professional development and advancement, and are, at the same time, properly and adequately evaluated and paid according to their working efficiency from the quantitative and qualitative point of view, then, consequently, it is possible to expect their highly efficient working output. But to keep this output high, a permanent and continuous motivation is required. Taking into consideration the fact that the development of motivation itself from the time point of view is variable, it is inevitable to analyze the motivational needs of employees continuously, and if necessary, to update them in the motivational programs of the firm.

Keywords: motivation, motivational programs, human resources management.

1. INTRODUCTION

Manager´s ability to motivate his co-workers means development of their interest, willingness and mind to participate actively in performing activities corresponding to a company´s missions and goals or their part. It concerns connection of personal interest and effort of participants of labour process with the requirements of an organizational unit through meaningful and goal-seeking work of a manger. Motivation helps to create particular thinking and behaviour of managed people so that they correspond with goal oriented aims of managers. (Vodáček, Vodáčková, 2006, p.123). Motivation is probably the most important condition for increase of company employees´ work performance efficiency. To improve organization´s effectiveness it is possible to utilize opportunities offered by outsourcing, which a company may use to reach its own goals by means of outside resources. It does not have to invest to education and stabilization of specialists and experts but they are at its disposal (Potkány, 2008, p.53). Ability to motivate co-workers is by most of the authors in the area of human resources management and development considered as the most important one and at the same time the most demanding skill of a manager. In general it is known that not every expert in his area is also a good manager and team leader. To become a real effective manager he must possess proper communication skills, understand to his co-workers and know their needs. He should become a person who by means of his energy and internal enthusiasm is able to lead the others towards their requested behaviour and harmonization of individual and company goals (Blašková, 1998, p.126).

The term motivation expresses the fact that in human psychics there are specific internal motive powers and people are not always fully aware of them, i.e. incentives and motives which orientate people and their activities in a particular direction, activate them and keep developed activity to go on. Externally the influence of these powers may be perceived as motivated activity or motivated performance (Višňovský, 2003, p.116). There are actually two ways how to get to work motivation:

a) Self-motivation – people seek, find and perform jobs they are satisfied with or at least they expect will satisfy them. This type of motivation is called internal motivation. Here the motivational factors are possibilities to utilize and develop own abilities, knowledge and skills, interesting and challenging job, freedom to act, responsibility (feeling that work is important and that an employee controls his own possibilities and a chance to be functionally promoted,

b) Development of effort on the part of managers – motivation through different methods (remuneration, promotions, appreciation, etc.). This case concerns external motivation. Motivation which is encouraged from the outside through meaningful activities of managers (Vetráková-Seková-Ďurian, 2001, p.103).

Adequately motivated employees are people with clearly defined goals who take steps leading them to the goals achievement. These people may be motivated by themselves, and if it means they are on the right way and direction to achieve what they want to achieve – in such a case it is the best form of motivation. However, most of us need to be motivated more or less from the inside. The organization as a whole may offer environment where it is possible to reach the high level of motivation by means of incentives and rewards, satisfying work and opportunity for education and development. But still these are the managers who play the main role and must utilize their abilities to motivate so that they reach the fact that people do their best and who must use motivational processes provided by the organization properly. To do so they have to understand the process of motivation – how it actually works and what types of motivation exist.

2. AIM OF THE WORK

The aim of this work is to review motivational factors of the employees of a wood-processing company Trendwood - twd, s. r. o., by means of questionnaires and consequent division of employees through cluster analysis (Meloun, Militký, Hill, 2005) to groups based on their motivational needs and creation of similarly motivated groups of employees. Based on the above mentioned process the company may develop motivational programmes suitable for the established employees groups due to their motivational needs and in this way to achieve improvement and higher quality of their performance.

3. EXPERIMENTAL PART

Currently the company does not have a motivation programme in a written form, i.e. it does not have a clearly defined strategy in the area of its employees´ motivation. In the area of performance increase wage conditions are aimed at the share of the company economic results, what makes the only item of income, taken into consideration legally determined minimum wage. Other area which influences performance increase is a system of company employees´ education in a form of internal and external trainings carried out by the own employees as well as by external trainers.

To gather information the questionnaire was used (Hitka, 2009, p.149) and with its help we managed to find out the most important motivational factors which encourage employees towards higher work performance and which should be included in the company motivational programme.

Based on the questionnaire interpretation a conflict between subjectively preferred motivational factors and the actual situation at work place of employees who were analyzed was defined. In the questionnaire the respondents marked the importance they assign to individual motivational factors and at the same time satisfaction with the application of a particular motivational factor in the company. Employees assigned to individual motivational factors values from 1 to 5 due to the rate of importance. The difference between required state and the actual one in the company presents the basis of work satisfaction. Following interpretation was carried out through these steps:

- averaging of values of required rate of motivational factors,
- averaging of satisfaction values concerning application of motivational factors,
- interpretation of acquired data difference,
- division of the analyzed group of employees to similarly motivationally oriented groups based on the acquired results,
- defining of motivational factors into motivational programme for individual similarly motivationally oriented groups of employees.

In the group of workers the smallest conflict is between subjectively assigned importance and satisfaction with the application of the following motivational factors: work place security (5), name of the company (7), work description and work type (9), working hours (11) and work performance (13). In general the company should concentrate on elimination of mistakes in application of these motivational factors for which the employees expressed their greatest dissatisfaction and they are: further financial reward (3), communication at work place (6), fair assessment of employees (21), stress (elimination of stress at work place) (22), recognition (29) and basic salary (30).

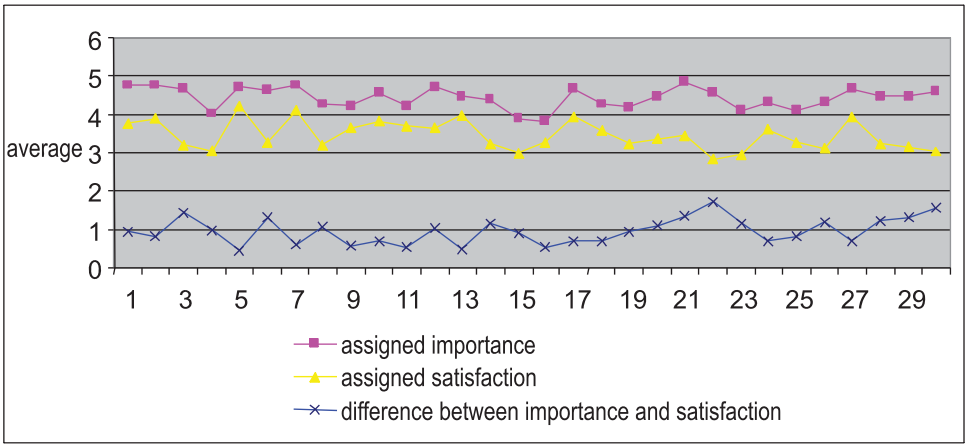

Figure 1. Conflict between subjectively preferred motivational factors and actual situation at work place

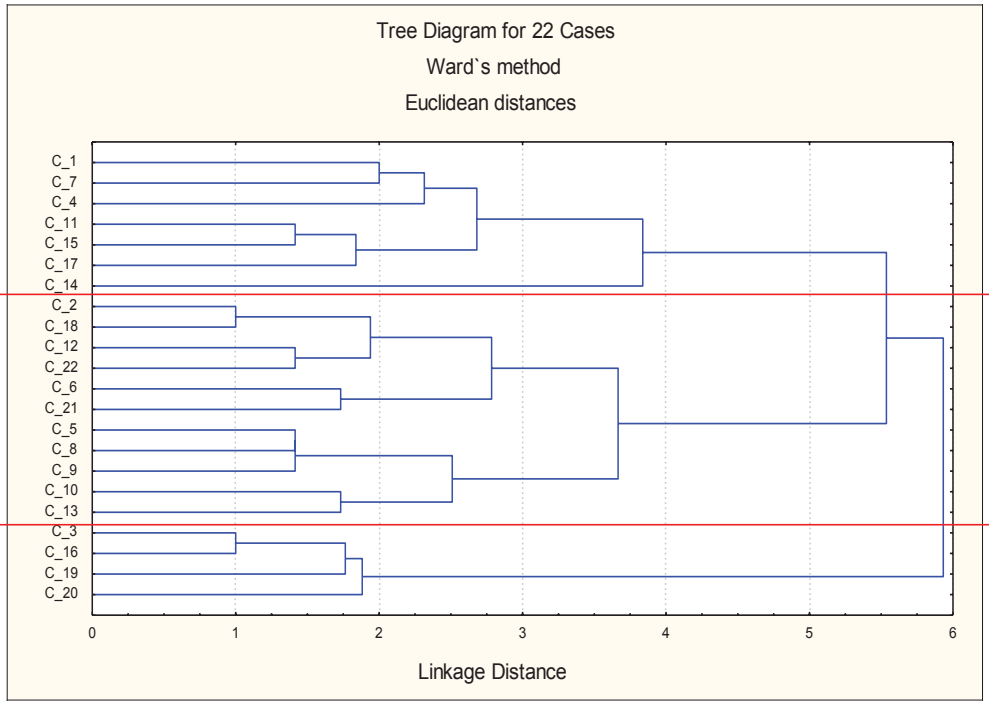

Figure 2. Employees cluster analysis

It is possible to differ three basic similarly motivationally oriented groups of workers from the graph. Te first group concerns workers number 1, 7, 4, 11, 15, 17 and 14. The second group concerns workers number 2, 18, 12, 22, 6, 21, 5, 8, 9, 10 and 13 and the third group includes workers number 3, 16, 19 and 20.

Table 1. The order of motivators for analyzed groups of workers

Group of workers 1	Group of workers 2	Group of workers 3
Social benefits	Work place security	Good working team
Stress(elimination of stress at work place)	Atmosphere at work place	Work place security
Further financial rewards	Good working team	Communication at work place
Acquaintance with achieved work result	Company name	Description an type of performed work
Company relation towards environment	Working environment	Acquaintance with achieved work result
Basic salary	Supervisor´s attitude	Working environment
Communication at work place	Stress(elimination of stress at work place)	Self-realization
Company name	Company vision	Social benefits
Working environment	Company relation towards environment	Fair employee´s assessment
Work performance	Recognition	Atmosphere at work place

Results of analysis show that the following motivational factors belong among the most important ones for the first group of workers: social benefits (20), stress (elimination at work place) (22), further financial reward (3), acquaintance with achieved work result (10), company relation towards environment (27), basic salary (30), communication at work place (6), company name (7), working environment (12) and work performance (13). The second group of workers considers as the most important motivational factors: work place security (5), atmosphere at work place (1), good working team (2), company name (7), working environment (12), supervisor´s attitude (17), stress (elimination of stress at work place (22), company vision (24), company relation to environment (27), recognition (29). The third group of workers marked as the most important motivational factors: good working team (2), work place security (5), communication at work place (6), job description and type of executed work (9), acquaintance with achieved work result (10), work environment (12), self-realization (19), social benefits (20), fair employee´s assessment (21) a atmosphere at work place (1).

Mutual motivational factor for all the groups of workers is only work environment (12). The first and second group of workers are connected by 3 motivational factors: stress (elimination of stress at work place) (22), company name (7) company relation towards environment (27) and already mentioned work environment (12). The first and third group of workers are connected by 4 motivational factors: social benefits (20), acquaintance with achieved work result (10), communication at work place (6) and work environment (12). The second and third group of workers are connected by 3 motivational factors: atmosphere at work place (1), good working team (2) and working environment (12).

4. RESULTS

After execution of detailed analysis of motivation of Trendwood – twd, s.r.o. employees the following facts may be stated:

- when conflict/difference between subjectively preferred motivational factors and actual situation at work place was analyzed it was found out that the curve of subjective satisfaction copies the curve of subjective importance what means that on average the employees are satisfied with the level of motivational factors in the company,
- the mutual motivational factor for all 3 groups of workers is only working environment.

The following recommendations and conclusions result for the company: it is problematic to determine consolidated motivational programme since all three groups are connected only by working environment. In this case it would be suitable to concentrate on each group separately and determine 3 motivational programmes according to table 1. Eventually it would be possible to merge motivational factors which connect individual groups of workers and motivational programme might contain the following motivational factors: stress (elimination of stress at work place), company name, company relation towards environment, social benefits, acquaintance with achieved work result, communication at work place, atmosphere at work place, good working team and work environment.

The results of the analysis show that not all the employees have the same needs and not for all of them the same motivational factors are important. So the company management should approach to the employees differently and determine different motivational programmes for them. It is also necessary to realize that value orientation of every man changes and that is the reason why it is critical to modify motivational programmes continuously. It is recommended to analyze and consequently based on the results of the analysis modify motivational factors in motivational programme 1x a year.

5. CONCLUSION

Motivation is willingness to act. Formerly it was claimed that motivation should come from the outside but today we know that everybody is motivated by something different. Organizations which plan to utilize the whole potential of their employees willingly leave the motivation carried out by the way “order and check” and replace this way by the other one: “advise and agree“. A company which wants to influence work approach and behaviour of its employees must determine motivational programme. Proposal and launch of effective and economically efficient motivational programme should be one of the most important challenges of each company. It is really critical to realize that introduction of effective and economically objective motivational programme should become a primary task. Of course, it is a must to adjust it to particular conditions of a company, because if motivational programmes are designed in a wrong way their results are frustration of employees and wasting company sources. Finally we want to stress the requirement to update motivational programme because values and attitudes of employees are constantly influenced by changes as well as working conditions resulting from the activity of a company and impact of external environment.

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PRODUCTION MANAGEMENT OF WOODEN PRODUCTS FOR FURNISHING PREMISES

Dragoljub IVKOVIĆ, Milan NEŠIĆ. Branko GLAVONJIĆ

ABSTRACT

The companies for the production of wooden products for furnishing premises have a characteristic production for a known customer, most usually an individual production or the production in small series. Production processes are not continuous, product flow is mixed and the variety of products great. A common technology is used for the production of different product types which may result in the drop of production efficiency. As one technological unit may efficiently support most usually one production mission, it is necessary to apply the corresponding system of production management, which means separate guided technologies, i.e. production within the production. By applying this concept, performances in wood processing production can significantly improve thus lowering capital costs.

Keywords: production management, guided production, models.

1. INTRODUCTION

Furnishing premises, as a separate segment of operations of the companies for the production of wooden products, with all its specificities, imposes certain characteristics on the production of furniture and other products for these needs. These companies mostly produce individual products or products that are produced in small series for the known customer – investor. Common technology is used for the production of products of various types, production processes are not continuous, product flow is mixed and the variety of products great.

A question arises on how to improve the production organisation in such companies and in which way the production should be managed. What imposes itself as a possible solution is the implementation of a production management system that would include separate guided technologies, i.e., production within a production.

2. MATERIAL AND METHOD OF WORK

In order to determine the characteristics of the production of furniture and other products for the needs of furnishing premises the method of direct field data gathering was implemented. Data analysis method and inductive method were applied for the conclusions regarding the current status.

Based on the considerations and analysis of the acquired data, a model was proposed for the production management in enterprises for the production of furniture and other products for the needs of furnishing premises. The proposed model is given for the enterprise that produces interior doors, built-in and freestanding furniture and other interior elements (wall panelling, pulpits, reception desks...) for the needs of furnishing premises, so that based on the above-mentioned, business operations of the enterprise are also classified into the interior doors and the interior. There are several reasons for choosing such an example.

First of all, enterprises dealing with furnishing premises with wooden products often produce interior doors and elements of the interior using a common technology.

Secondly, in the production of doors for the needs of furnishing premises the series are somewhat larger, whereas the production of interior elements is often individual, so that we can speak of the small and large scale production using common technology.

And finally, it is the production of fully differentiated products according to their constructional and functional properties.

3. RESEARCH RESULTS

The research included ten typical enterprises in Serbia in the field of production of furniture and furnishing premises. Based on the number of employees, enterprises are classified into two categories: small enterprises and medium enterprises.

Common characteristics of business operations of these enterprises can be divided into the following groups:

1. **Production program**
   Production program is extensive both in terms of width and depth. Interior and exterior doors and windows, various types of furniture, beds, wardrobes, tables, fixed interior elements, wall lining, installation casing, window sills etc. are produced applying the same production technology.
   Products of various sizes, materials, constructive solutions and finishing are produced within each mentioned group.
2. **Type of production process on the basis of the process flow**
   Production processes are not continuous, production is individual or in small series, and in accordance with a contract, type of furnishing, conceptual solutions, investor and project designer...
3. **Technology**
   Combined technology, encompassing classic joinery and contemporary, numerically operated machines, is used in production of said types of products
4. **Scope of product sales**
   Products are made for the needs of furnishing newly built residential and business premises, schools, kindergartens, hospitals, as well as for adaptation of existing premises. Contracts are concluded either directly with investors, or with a general contractor, whereby enterprises take over the role of a subcontractor.
5. **Type of production process based on the type of purchase orders**
   Production is performed exclusively on the basis of a purchase order. Contracts are signed with investor or general contractor for a precisely defined project and the production is guided towards the realization of furnishing per contracted positions.
   Storing products occurs in situations where harmonization with the dynamics of works on the premises being the subject of furnishing is required, i.e., in situations where architectural-civil works are behind the schedule envisaged by planned harmonized dynamics and the production was „faster“ than the construction/adaptation of the premises.
6. **Product type**
   It is always the production of a new product that is present in these production processes, which requires the workout of production-technical documentation for every product for which a work order is released. Repetition of production of the same product occurs in case of repetition of furnishing premises for the same investor, per internally standardized design (e.g. a range of branches of a bank or an insurance company).

Enterprises dealing with the production of wooden products for furnishing premises are in a certain way compelled to produce a large number of different products in order to satisfy various needs of each specific project. On the other hand, it is desirable to reduce fixed costs per product unit thus increasing cost-effectiveness. Nevertheless, a large number of various products decreases efficiency, and it often happens that cost-effectiveness fails. In the production process the product flow is mixed, the number of workers increases due to decreased efficiency and coordination caused by large number of products, which results in the fact that cost-effectiveness of direct work is neutralized by the lack of cost-effectiveness of indirect work due to increasing number of workers.

The intermix of the production flow (Figure 1) is shown by an example of production of interior doors and the interior (various types of furniture along with other freestanding and built-in wooden products) by use of common technology. Production is performed in seven stages (cutting timber, cutting panels, cutting veneer, lumber machining, panel machining, surface preparation and final assembly), production flows are intermixed, interweaving is extensive, there are return flows, and the production lacks necessary continuity.

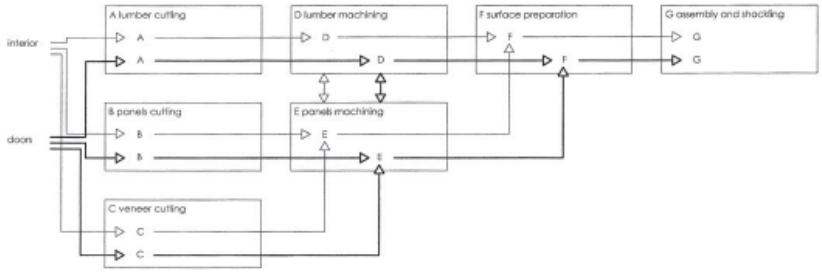

Figure 1. Intermixed production flow model
(Two groups of products are produced in seven processing stages)

The example of the production of interior doors and the interior was also used to show the production flow after guiding (Figure 2), by applying the model plant within a plant (plant within a plant – PWP). Production flows are separated, there is no interweaving, possible reverse flows can only appear within separate lines to the extent required by sequence of operations and the production is continuous.

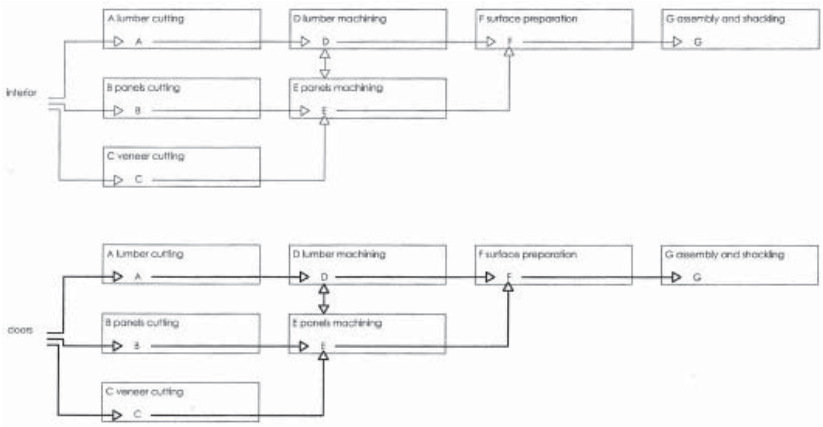

Figure 2. Guided production flow model
(Two groups of products are produced by PWP arrangement)

4. DISCUSSION

Production lines in the same plant that cannot be joined may reduce efficiency. Therefore efforts should be put towards forming a plant within a plant (PWP) and the organisation of the entire enterprise accordingly.

Organisational structure of an enterprise which simultaneously produces interior doors and interior elements for the needs of furnishing premises according to the prototype model is given in Figure 3.

The production in the enterprise is organised through production-profit centres (PPC).

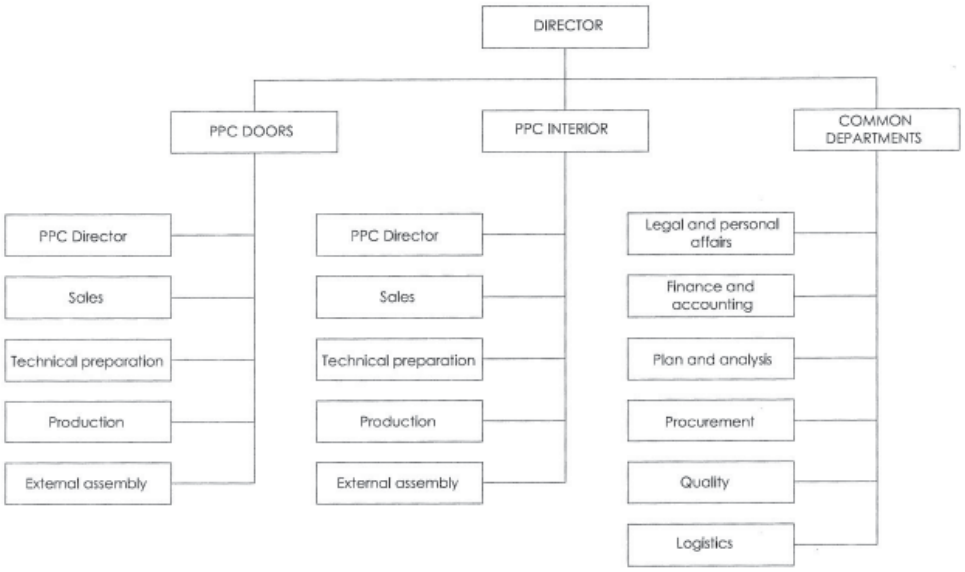

Figure 3. Organisational structure of an enterprise

Two PPCs are formed – the PPC doors and the PPC interior. Each centre has a director, sales department, technical preparation, production department and external assembly. The profit centres function as separate enterprises. Profit centres issue invoices for rendered services to one another, and the main contractor performing the works is the centre which initiated negotiations.

On the other hand, the enterprise has common departments – legal and personnel affairs, finance and accounting, plan and analysis, procurement, quality and logistics, whereby the number of employees is reduced and business operations costs rationalized.

The result of the production organisation in described manner, through PPCs, is that the enterprise strategically kept focus on the production of a large scale of products with the aim to satisfy the needs for wooden products for furnishing premises, thus improving efficiency of the production at the same time. Each PPC independently of the others can focus on and prioritize one or a combination of several production characteristics.

Thus the PPC Doors can put priority on the production per purchase order, in smaller series, until linear production of doors is organized.

On the other hand, the PPC Interior is guided to the production per purchase order, individual, with high a rate of requested quality of finishing and external assembly.

With said effects of the organisation of the production through PPCs, by forming common departments in the proposed manner the effect of reduction of common costs is achieved. The next

step, if it is assessed to contribute to the efficiency of business operations, can be the separation of both the procurement and quality departments by forming these departments in each PPC. Thereby even more specific separation of production processes which cannot be joined would be accomplished, with the aim to increase efficiency of the same.

The functional chart (Figure 4) shows the flow of information among departments in an enterprise organised through two PPCs, with common departments as explained earlier.

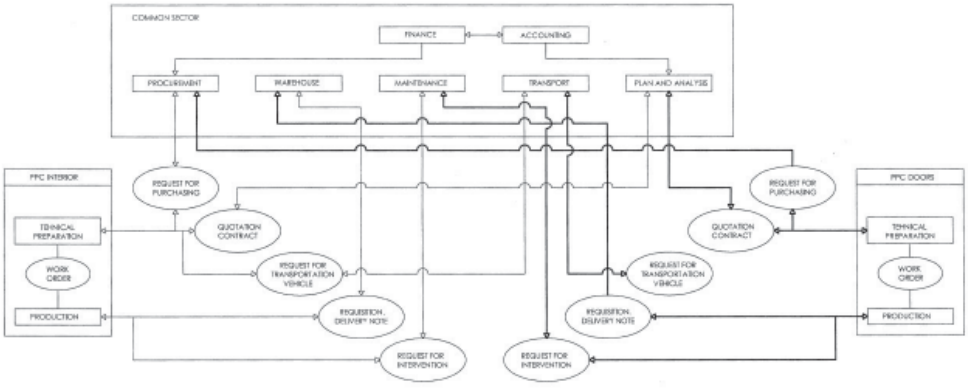

Figure 4. Functional chart

Technical preparation within the PPCs plays a central role in putting together quotations and forming work orders on the basis of concluded contracts. Technical preparation also forms requests for purchase of materials which are forwarded to procurement department, as well as requests for transport vehicles which are forwarded to transport department. There is a return flow of information.

On the basis of a formed work order and termed commencement of the same, the production department makes requisitions of intermediate goods from the intermediate goods warehouse. Upon finished production per work order, or part of it, production department delivers products to the final products warehouse. Apart from this, production department requires intervention from maintenance department if the needs arise or according to planned maintenance.

All mentioned departments, with which there is a two-way flow of information between technical preparation and production department, are a part of a common sector and are in function of both PPCs. By this, savings in business operations are achieved, parallel to guiding the PPCs to the area of business operations which they are specialized for.

5. CONCLUSION

The companies for the production of wooden products for the needs of furnishing premises are characterised by a large scale of various products. Production is done for the known customer, in small series, or individual pieces of products made of wood are produced. Production processes are not continuous; the flow of products is mixed. Common technology is used for the production of different types of products which may result in decreased efficiency of production.

As a possible solution to the increase in the production efficiency, in companies with this type of production, which stands out is forming the production within a production. Production in an enterprise is organised through production – profit centres (PPC) that function as separate enterprises. Each centre has its director, sales, technical preparation, production department and external assembly.

At the same time, with the aim of cost reduction, the enterprise has common departments – legal and personnel affairs, finance and accounting, plan and analysis, procurement, quality and logistics.

The result of production organisation through PPCs is that the enterprise strategically kept the orientation towards the production of a wide range of products with the aim of satisfying the needs for wooden products for furnishing premises, thus increasing the efficiency of production processes at the same time. Each PPC independently of the others can be focused to and can prioritize one or a combination of several production characteristics.

Thus the PPC Doors can give priority to the production per order, in smaller series, whereas the PPC Interior can be orientated towards the production per order, individual, with high rate of requested quality of finishing and external assembly.

With said effects of the production organisation through PPCs, by forming common departments in the proposed manner, the effect of decreasing common costs is achieved. The next step, should it be assessed to contribute to the efficiency of business operations, might be the separation of both the procurement and quality departments, by forming these departments in each PPC. In this way, even more specific separation of production processes which cannot be joined would be accomplished, with the aim of increasing efficiency of the same.

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MOTIVATION FACTORS IN TIMES OF NORMAL BUSINESS BEHAVIOUR AND IN TIMES OF ECONOMIC CRISIS

Denis JELAČIĆ

ABSTRACT

This paper shows the differences in opinions regarding motivation factors in wood processing and furniture manufacturing companies in times of normal business environment and in times of economic downturn. The research was conducted in two separate years. First part was conducted in the year 2006 when the economic environment was normal for all industry, including wood processing and furniture manufacturing companies. The second part of the research was conducted in the year 2010 when economic downturn in Croatian industry was at its peak. The results show that employees much more think of safety and physiological needs in a time of crisis then in a time of normal economic conditions.

Keywords: motivation factors, wood processing and furniture manufacturing, economic environment, economic crisis

INTRODUCTION

The Republic of Croatia is located in South East Europe with total area over 56 thousand km^2 and population of 4.5 mil people. In Croatia wood represents a significant raw material. The share of wood processing and furniture manufacturing in Croatian GDP was about 3 % in 2007. Domestic wood consumption in Croatia is over 3.4 mil m^3 annually and in the year 2007 the revenues were over 1 bil Euros with over 25 thousand employees.

Industrial production indexes show significant decrease since 2007 until 2010. The same goes for wood processing and furniture manufacturing, since those are the first industrial branches which respond to any crisis, especially the global one. The main reason for that is the fact that wood processing and furniture manufacturing in Croatia are highly export oriented. So, any disturbances in global or European market have a significant influence on Croatian wood processing and furniture manufacturing.

Situation in employment is almost the same. Total number of employees in wood processing and furniture manufacturing decrease from 25.000 in year 2007 (which was 9,8 % of all employees in industrial sector, and 1,67 % af all employees in Croatia) to 21.000 in year 2009 (9 % in industrial sector, i.e. 1,41 % of all employees).

Economic recession has strongly influenced the operation of companies in the last two years. We can notice its influence in all business fields, also in motivation of the employees. A lot of demotivational factors occurred, and the ones that already existed became even stronger. The employees are experiencing insecurity and some other additional fears (i.e. fear of losing a job, fear of lower wages etc.). In order for the companies to avoid all of the stated and other problems, they need to focus on seeking opportunities for sales increase and cost reduction on one hand, and on the other hand they need to establish conditions for more efficient work. The later is strongly connected with the way the employees are motivated. It is a fact that the motivational strategies that worked in the past are not so efficient in current difficult economic conditions. The management of the companies can count on

satisfactory working results and satisfied workers mostly if they insert motivational factors into the working environment. We can say that practically all motivators are in the hands of the management. The only question is if they know how to use them.

Motivation means that somebody does something because he wants to and all we need to do is to stimulate him. A motivation is a process of challenging (awakening) a person's activity, their focusing on certain items and regulation in order to reach a certain objective, overcome possible obstacles and achieve the set objective. We could say that motivation covers all factors (enthusiasm, wish, intention, persistence etc.) that either encourage or direct our behavior.

Among content theories, the most recognized are Maslow's theory of needs and Glasser's theory of choice. Both presume that all human activity is directed towards satisfying basic needs. Knowing the profile of an individual's needs is the base for selection of correct approach for efficient and successful leading of a person.

The main goal of the research was to study the situation of motivating the employees of Croatian wood-industry companies in the conditions of economic recession, which occurred in the end of 2008. It was to be established is there any difference between motivating employees in a year of normal economic behavior and a year of economic downturn.

WORK METHOD

Research method consisted of gathering the information regarding employees motivation factors through a survey with questionnaires in which total of 58 questions were asked. Its purpose was to establish the actual condition in the field of employees' motivation in Croatian wood processing and furniture manufacturing companies in the time of normal economic environment (2006) and in the time of economic crisis (2010). With the questionnaire the condition of key presumptions of different motivational theories were checked. Questions were of closed type and respondents were using five-level scale of importance for each statement. Questionnaires contained questions regarding importance of particular motivation factors on work, satisfaction of employees on a working post and relationships within the working environment.

RESULTS

The survey was conducted among 800 employees in 16 Croatian wood processing and furniture manufacturing companies. They had to answer to 58 questions regarding 22 motivation factors using five-level scale of importance for each statement in the questionnaire.

According to those marks the rating of each motivation factor was established. The ratings of five most important motivation factors given by employees in the year 2006 (the year of normal economic environment) and in the year 2010 (the year of full economic crisis for all wood processing and furniture manufacturing companies in Croatia) are given in the following figures.

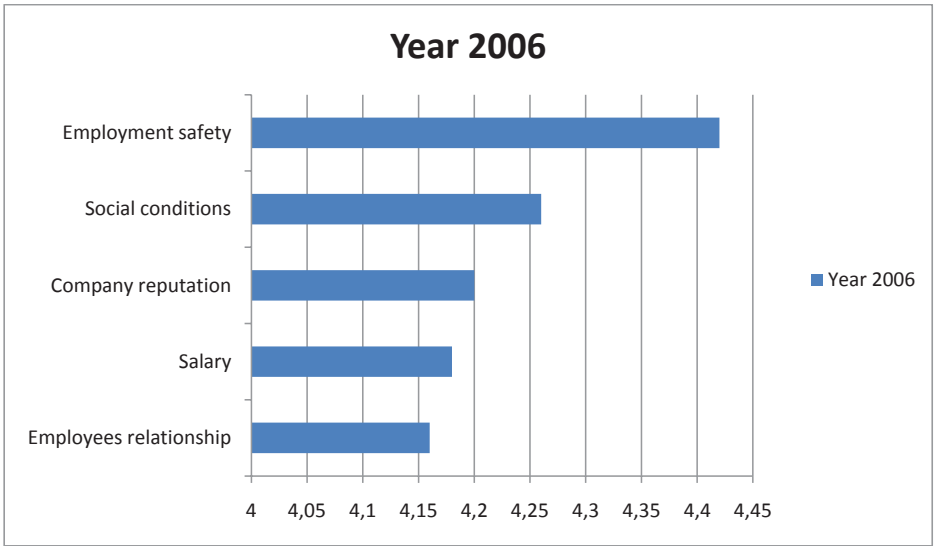

Figure 1. Top five motivators in year 2006

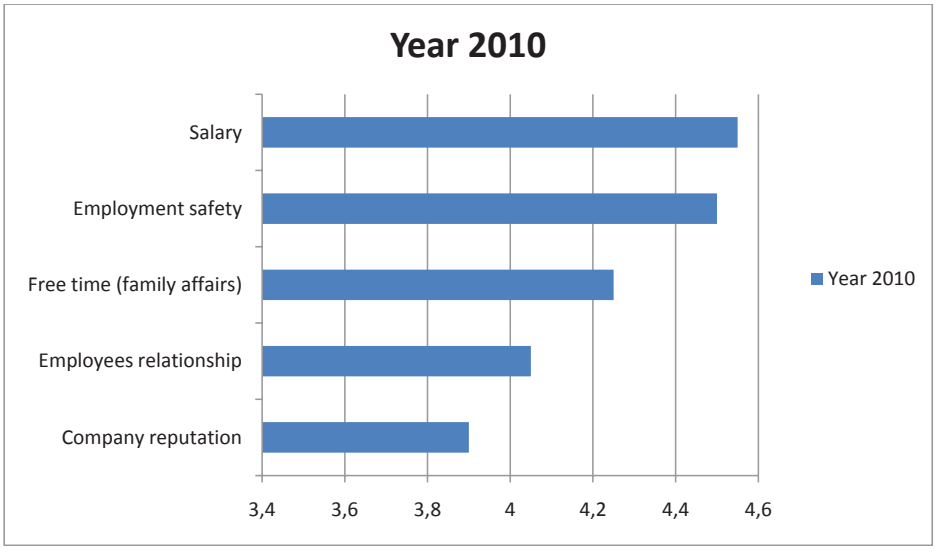

Figure 2. Top five motivators in year 2010

According to Maslow, every human has his/her own needs and they can be put in five categories: physiological needs, needs for safety, social needs, needs for reputation and needs for achievement. In the times of normal economical environment (year 2006) those needs were devided in almost even ratios. As shown in figure 1, employment safety – 4,42 (safety needs) were most important for

employees in wood processing and furniture manufacturing companies in Croatia. That motivator was followed by social conditions – 4,26 (social needs) and company reputation – 4,20 (reputation needs).

In the times of economic uncertainty and crisis, employees don't feel safe on a level they want to, so needs for safety and physiological needs come in front of any other needs. It could be seen on figure 2, where salary – 4,55 (physiological needs) and longterm employment safety – 4,50 (safety needs) are far ahead then any other motivator. Since all employees feel safe in an environment of a family, in a time of crisis family affairs are something most of people depend on. So, that motivator jumped high on a rating list of motivators in year 2010, even it was far behind in year 2006.

Company reputation (reputation needs) is one of the motivators which is in top five motivators in years 2006 and 2010 both. But, that motivator lost the importance, since the mark given to company reputation in year 2006 was 4,20 and in year 2010 it is 3,90.

Employment relationship (social needs), as another of top five motivator that could be found on both lists is equally important for employees in normal economic conditions and in conditions of crisis. In both surveyes that motivator achieved almost the same result, in year 2006 the average mark was 4,16 and in year 2010 that mark was 4,05.

Some of the motivation factors could be found on a top list of motivators in a time of normal economic environment and they don't mean much to employees in times of economic crisis. One of those motivation factors is work time organization (social needs). That motivator is very important to employees in normal conditions of manufacturing, because employees would like to work in much more friendly work conditions organized in a way that will make them less tired at the end of the working hours. During the time of crisis, that motivation factor is less important.

CONCLUSION

The results of the research in Croatian wood processing and furniture manufacturing companies show that longterm employment safety and salary, are among the most important motivation factors which respondent companies consider as factors for satisfying the need for safety of the employees, which is surely of great importance in the time of insecurity. The results of studying the presumptions from all motivational theories next to orientation towards providing safety also indicate the orientation towards building and preserving good relationship between the manager and the employees. By this it has been proven that in the time of recession, it is necessary to provide safety and establish trustworthy relations between employees to motivate them, which was also one of the objectives of this research.

Those motivation factors are among those employees marked as the most important, with which they are satisfied with, on their work posts and in their firms. In these turbulent times for our economy, when relationships within industrial branches are changing rapidly, safety of long term employment is one of the most important motivation factors and employees in wood processing and furniture manufacturing are marking it very positively.

Croatian wood processing and furniture manufacturing as one of the strategically interesting industrial branches, as well as all the other industrial branches in the Republic of Croatia, should put more effort to quality and in long term motivating their employees to stay on their working places and to contribute to development and growth of the enterprise as well as the industrial branch. One of the main roles should have internal relationships within the firm and satisfaction with co-workers on the work posts as well as quality satisfying the basic physiological needs of employees within the enterprise. Beside that, if wood processing and furniture manufacturing is among strategically important for the Republic of Croatia and if it is of the state interest, then it should be of its interest to have motivated employees which will bring wood processing and furniture manufacturing industrial branch to places it deserves.

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DEVELOPMENT OF WOODEN WINDOWS USING QUALITY FUNCTION DEPLOYMENT

Matej JOŠT, Petra GROŠELJ, Anton ZUPANČIČ, Leon OBLAK

ABSTRACT

Our objective was to define the optimal technical requirements of wooden windows that would meet the desires and needs of customers maximally. A basic chart (House of quality) was formed, documenting customers' requirements and their importance (due to the survey), technical factors of the product and their relationship to customers' requirements. According to the analytic hierarchy process the most important technical factor of wooden windows is the type of glass, followed by three factors that have similar weights: surface finishes, types of windows and wood species used. The combination of quality function deployment and analytic hierarchy process indicates surface finishes as the most important factor, which is followed by type of glass.

Keywords: wooden windows, quality function deployment, analytic hierarchy process

1. INTRODUCTION

In the paper we investigate how to develop a wooden window, which will be successful on the market. First we examine the actual state in the field of windows in Slovenia. We are interested in the type of material used for windows and the correlation between the type of material and geographical location. The second object of the research is the selection and evaluation of the technical factors, which are important at development of wooden windows.

For this purpose we implemented Quality Function Deployment (QFD), which is a support method for product development, quality management, customer needs analysis and decision-making (Chan in Wu, 2002). QFD enables the translation of customer needs and demands into the engineers' voice of technical characteristics and specifications (Akao in Mazur, 2003). We combined QFD with Analytic hierarchy process (AHP) (Saaty, 1980), which is a method from the field of multi-criteria decision making (Belton in Stewart, 2002). AHP is a framework for structuring the decision problem and representing, evaluating and ranking its elements. Due to its simplicity and flexibility it is a widely used method (Vaidya in Kumar, 2006). It enables dealing with empirical data or subjective judgments and with uncertainty and immeasurability of criteria. The integration of AHP in QFD has been used in many applications (Andronikidis in sod., 2009; Ho, 2008; Kamvysi in sod., 2010; Mayyas in sod., 2011).

2. METHODS

The QFD method can be divided in separate steps (Chan in Wu, 2005). First we have to identify customers, investigate their needs and determine the relative preferences of the selected customers' criteria. Then we have to collect technical measures of the product, state the factors that influence the design and their connections to customers' needs. To conclude we have to obtain the final weights of the technical factors. The results are presented in the House of Quality.

Initially we define the criteria, which influence the customers' decision for the windows selection. The chosen customers' criteria are: price, type of material, thermal insulation, appearance of windows, producer references, delivery time and warranty.

The voice of customers was gathered with a survey. The survey was conducted on n=183 visitors of the furniture market Ambient Ljubljana (from 9th to 14th of November 2010). The respondents evaluated the answers with a five-level Likert scale.

The aim of survey was to find out what type of windows respondents have and if the type of windows is related to the style of residence. We were also interested in the type of windows would respondent would buy today. For establishing the relationship between categorical data we used Fisher's exact test. If the calculated one-tailed p-values were smaller than 0.05, they were considered as statistically significant. The statistical analysis was implemented with the software SPSS.

In the second stage we define technical factors, which determine the wooden windows: regulations for construction (UL, 2010), used wood species, surface finishes, type of glass (insulation, security, reflexology,…), fittings, types of windows (monoplane, biplane, round,...). The selected customers' criteria and technical factors are the base of House of Quality. The ranking of the technical factors from the engineer's point of view was performed by the AHP method.

The structure of AHP consists of a hierarchy of the goal, criteria, subcriteria and alternatives. The AHP method is based on pairwise comparisons (Saaty, 2006), for which a fundamental scale of the AHP from 1 to 9 is used (Table 1).

Table 1. The fundamental scale of AHP

Intensity of importance	Definition
1	Two elements are equally important.
3	One element is slightly more important than the other.
5	One element is strongly more important than the other.
7	One element is very strongly more important than the other.
9	One element is extremely more important than the other.
2, 4, 6, 8	intermediate values

A reciprocal value is assigned to the inverse comparison. Comparisons between individual objectives are gathered in a comparison matrix *A*. The priority vector *w* is obtained from matrix *A* by the eigenvector method (Saaty, 2006) by solving the equation (1):

$$Aw = \lambda_{max} w, \tag{1}$$

where λ_{max} is the largest eigenvalue of matrix *A*.

3. RESULTS

We asked the respondents, what type of windows they have. The results are presented in Figure 1. Sixty percent of responders have wooden windows and one third has plastic windows.

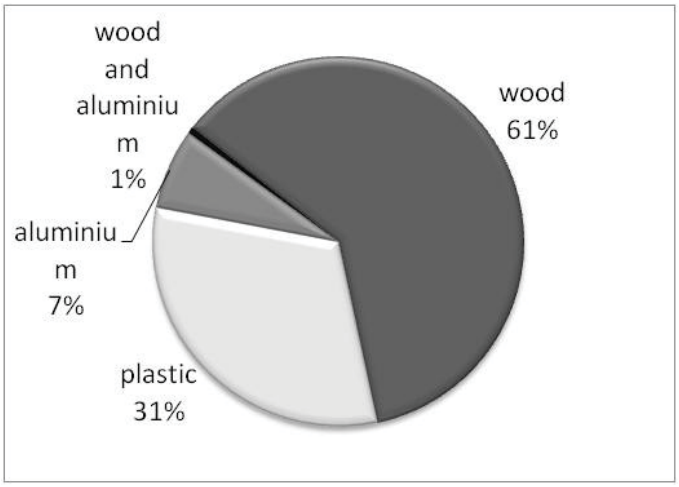


Figure 1. Type of material used for windows (present situation)

We were interested whether the type of windows depends on the place of living. We found out that the type of windows is not statistically significantly different whether people live in a town or in a village (p=0.448) or if they live in a house, an apartment or a block (p=0.225). We found the statistically significant connection between the region of living and the type of windows (p=0.036) (Figure 2). Perhaps this could be related to the fact that in some regions less new houses have been built or renovated in the past few years and so there is a higher percentage of old houses with wooden windows.

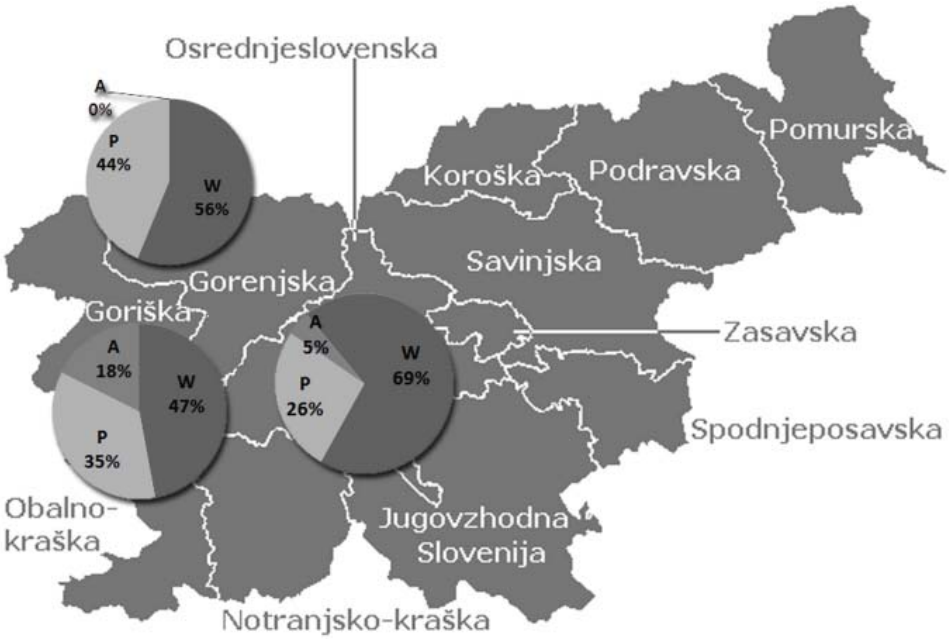


Figure 2. Material used for windows at different regions; W – wooden frame, P – plastic frame, A – aluminium frame (only for regions with sufficient data)

We asked respondents what type of windows they would buy today. Results are presented in Figure 3. People would prefer a combination of a wooden frame and aluminium, on the second place is an entirely wooden window frame, followed by a plastic frame and on the end an aluminium frame.

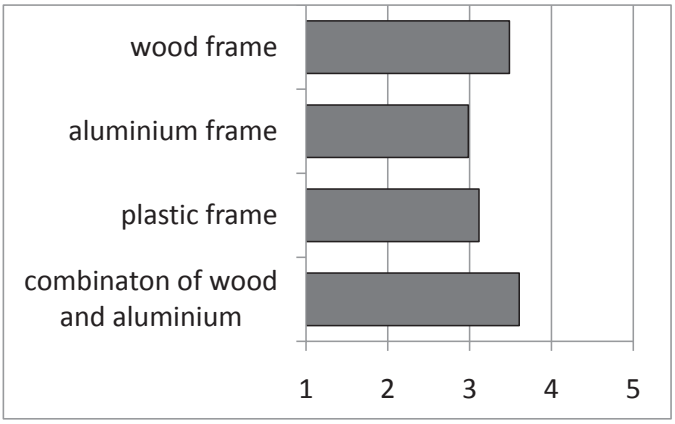


Figure 3. Answer the question: "What type of the window frame do you prefer, if you buy a new window today?"

We identified the criteria that people consider as important when purchasing new windows. We calculated the mean value of the answers from questionnaire for the customers' criteria (Figure 4). Results indicate that the most important is thermal insulation of windows, followed by warranty, which the company offers for the window. In the third place is the type of material used for producing windows followed by the appearance of windows. Price does not play the main role at the choice of windows, because it can be found only in the fifth place. Delivery time is in the sixth place. The least important criterion for customers are producer references. The results u_k^{voc}, $k=1,...,7$ are gathered in the House of Quality in the column Voice of customers (Figure 5).

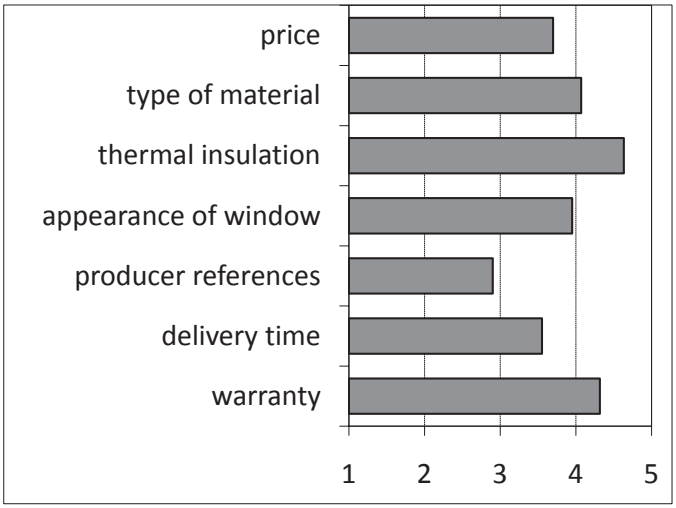
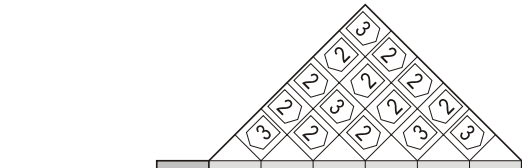


Figure 4. Mean values of customers' criteria at selecting new windows

Technical factors were pairwise compared from the wood-technology engineer's point of view according to the AHP method. The comparison matrix and its eigenvector w^{voe} are presented on equation (2):

$$\begin{array}{c} \\ r \\ w \\ s \\ g \\ f \\ t \end{array}\begin{array}{c} \begin{array}{cccccc} r & w & s & g & f & t \end{array} \\ \begin{bmatrix} 1 & 3 & \frac{1}{2} & \frac{1}{2} & 2 & \frac{1}{3} \\ \frac{1}{3} & 1 & \frac{1}{2} & \frac{1}{3} & 2 & \frac{1}{2} \\ 2 & 2 & 1 & \frac{1}{2} & 2 & \frac{1}{2} \\ 2 & 3 & 2 & 1 & 3 & 2 \\ \frac{1}{2} & \frac{1}{2} & \frac{1}{2} & \frac{1}{3} & 1 & \frac{1}{3} \\ 3 & 2 & 2 & \frac{1}{2} & 3 & 1 \end{bmatrix} \end{array}, \quad w^{voe} = (0.137, 0.092, 0.163, 0.296, 0.071, 0.241) \tag{2}$$

The pairwise comparisons and the eigenvector w^{voe} which represents the priorities of the technical factors can be found in the House of Quality in the roof and in the row Voice of engineers (Figure 5). From the technical position the most important factor at wooden windows production is type of glass, followed by types of windows. Surface finishes are set on the third place and regulations for construction on the fourth. Used wood species and fittings were ranged on the last two places.



	Voice of customers	Regulations	Wood species	Surface finishes	Type of glass	Fittings	Types of windows
Price	3.70	●	○	◉	◉	●	◉
Type of material	4.07		◉	◉	◉	◉	◉
Thermal insulation	4.63	○	●	●	◉	○	
Appearance of window	3.95		◉	◉	○		◉
Producer references	2.90		○	◉		○	
Delivery time	3.55		○	◉	○		◉
Warranty	4.32	○	●	○	○	◉	
Voice of engineers		0.137	0.092	0.163	0.296	0.071	0.241
Final weights		39.5	121.7	185.4	158.9	109.3	137.5
Final weights in %		5.3	16.2	24.6	21.1	14.5	18.3

◉ strong - 5 ○ moderate - 3 ● weak - 1

Figure 5. The House of Quality

Then the relationship between the customers' criteria and technical factors was established. The strength of relationship between the technical factor *i* and customers' criterion *k*, u_{ik} was measured on scale 5-3-1: 5 for strong, 3 for moderate and 1 for weak relationship and is written in the middle of the House of Quality.

Final weights w_i, $i=1,\ldots,6$ for technical factors are calculated as weighted sums

$$w_i = w_i^{voe} \sum_{k=1}^{7} u_{ik} u_k^{voc} . \quad (3)$$

The values and the percentages of the final weights are written in the last two rows in the House of Quality.

Final results show that the most important (dominant) technical factor is type of glass. It is followed by types of windows and surface finishes (difference in percentage is not significant). Used wood species is on the fourth place. Fittings and regulations are ranked on the last two places, although they are not irrelevant factors.

4. CONCLUSIONS

We found that at designing the wooden windows, we should consider what criteria are important to potential customers, and how those criteria are related to technical factors affecting the production of wooden windows. For classification of technical factors according their importance for customers, the QFD method was used. QFD method is typically used in planning and decision making about new products. It was combined with AHP which is a method for determining the weights and ranking of factors on various fields of research.

The results indicate that producers of wooden windows should dedicate more attention to choosing surface treatment and the type of glazing. Of course they should not ignore all other factors. Customers want the maximized possibility for individual's choice of design (appearance) and the type of windows, a large selection of wood species for windows and quality fittings. The basis of all production must be to satisfy the requirements specified in the PURES regulations (regulations on energy efficiency in buildings).

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TRANSACTION COSTS IN CONTRACTING FORESTRY OPERATIONS

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ABSTRACT

There is a lot of factors under which forestry operations are negotiated and carried out. In countries that undergone transition period of their economies the most significant factors were those connected to the structure of property rights. These changes brought new decisions on internalisation and externalisation of forestry operations. Such decisions are traditionally viewed through the production cost prism. New institutional economy claims that transaction cost must be taken under consideration too. Transaction cost could exceed saving from production cost reached via contracting in some cases. The paper presents partial results of reflections on externalisation of services within the selected interviewed forestry contractors in the Slovak Republic.

Keywords: transaction costs, property rights, contracting, forestry services

1. INTRODUCTION

Property rights, firms and open market

If a single person owns land, he will attempt to maximize its present value by taking into account alternative future time streams of benefits and costs and selecting that one which he believes will maximize the present value of his privately-owned land rights. We all know that this means that he will attempt to take into account the supply and demand conditions that he thinks will exist after his death. An owner of a private right to use land acts as a broker whose wealth depends on how well he takes into account the competing claims of the present and the future (Demsetz, 1967).

Emergence of the private property is the prerequisite for emergence and establishing of private firms. Organisations can be defined as groups of individuals mutually connected on the basis of a common objective. While institutes represent rules of the game, organisations represent the game players. Coase (1937) indicates that the operation of a market costs something and by forming an organization and allowing some authority to direct the resources, certain marketing costs are saved. Therefore, the firm or entrepreneur has to carry out his functions at less cost because it is always possible to revert to the open market if he fails to do this. The existence of many organisations at the market instead of one big company is explained by

- decreasing returns to the entrepreneur function due to increasing costs of organising additional transactions,
- failure in making the best use of the factors of production as the transactions which are organised increase, and
- increasing price of the factors of production because the other advantages of small firms are greater than those of a large firm.

Decreasing efficiency of a large firm can be also explained by the fact that increasing number of transactions tent to be either different in kind or in different places. A firm will tend to expand until the costs of organizing an extra transaction within the firm become equal to the costs of carrying out the same transaction by means of an exchange on the open market or the costs of organizing in another firm.

Meaning of property and use rights for contracts

Contracts in forestry are very flexible and they can be designed to convey a range of property and use rights and obligations. Property refers to the rights the owner of these rights has in relation to the rights of others and it is often established in laws or customs that define the conditions under which the owner has these rights (FAO, 2001). Forest contracts convey property rights to forest outputs or forest use. The nature and extent of property rights establishes the power over a resource that the owner of the rights may exercise, but also limits or constrains these rights. There are couple of dimensions relating property rights: exclusiveness, duration, comprehensiveness, rights to economic benefits and obligations, transferability and quality and security. Exclusiveness refers to the extent to which the owner may claim and secure use rights. It also defines the power to exclude others and to control access and charge for use of the resources. Duration of property rights determines the extent to which the holder will take account of the future impacts of his actions and therefore may influence investments into silviculture or forest management activities in order to yield benefits in the future. Comprehensiveness covers the range of benefits from the forest. In certain cases overlapping rights to the same interest may result in conflicts. Comprehensiveness has an impact on the way the forests are utilized and managed. When contract holders have full and comprehensive rights to the forest they will manage it to generate the most financial values to themselves. The rights to economic benefits are often constrained by forest regulations and may include restrictions on the harvesting rate, protection of environmental values, requirements of domestic wood processing industry etc. Transferability refers to the ability to transfer the rights, i.e. sell or assign these rights to someone else. However, transfers of forests contract are often restricted. If there is no transferability there is no market value of the rights. Transferability allows relocating resources to those who can make best use of them. Quality and security of property rights reflects how well these rights are protected from encroachment by others (Paluš et al., 2010).

Transaction Costs Economics

At an operational level, contractual modes have direct bearing on economic efficiency, particularly from the perspective of transaction costs. The TCE (Transaction Cost Economics) approach is characterized by a contracting orientation with transaction as the unit of analysis, and the TCE approach is concerned with the transaction cost implications of different governance structures (Williamson 1985).

Transaction costs are more recently defined as costs of capturing and protecting property rights, and transferring them from one agent to another (Barzel, 1997). These costs include the costs of discovering, exchange opportunities, negotiating contracts, monitoring and enforcing implementation, and maintaining and protecting the institutional structure (Pejovich, 1995).

Transaction costs can be distinguished from production costs, which is the cost category with which neo-classical analysis has been preoccupied. North (1990) divided the total costs of production into *transformation costs*, the costs of inputs of land, labour, and capital involved in transforming the physical attributes of a good, and *transaction costs*, the costs in defining, protecting, and enforcing the property rights to goods. TCE provides a very useful tool to understand several seemingly unrelated and non-economic issues: the law, ethics, organization, governments, family, state. The nature of silviculture causes the transaction costs of hiring, monitoring labour, getting capital and marketing the products to be relatively high. Therefore, silviculture suffers some disadvantages from market exchange. The socio-economic history before industrialization to a large extent is a history of the evolution of the relationship between land and crops, and contractual relationship between owner of labour and owner of land and capital (Zhang, 2001).

Allen (1991) introduced the concept of property-related transaction costs which comprise costs of establishing and maintaining the property, including the cost of information, negotiating, establishment, enforcement and control of a restituted property. The following three types can be recognised:

1. Transaction costs of information on how to establish the property, manage it together with more co-owners and, in the transforming states, how to restitute the property and pass the administrative procedures related to identification and registration of a property.
2. Social transaction costs or transaction costs of exclusion include the cost of mechanisms which owners need to safeguard their property under pre-defined rules (e.g. a bankruptcy law) enforced by the state (e.g. police and courts).
3. Transaction costs of uncompensated ownership restriction. They are relatively high in the transforming countries due to the tradition of state regulation and nearly absent compensation for restriction in the use of a property from public funds. They depreciate the value of a forest property.

The above suggests a hypothesis that transaction costs of property establishment (restitution) and management are of great importance for small private and common owners, while social transaction costs and costs of uncompensated ownership restriction influence motivation to economic outputs and innovation in all ownership categories (Šálka et al., 2006).

Externalisation of services and contractual relations in forestry

The transaction costs literature has identified three characteristics of transactions that have important impacts on whether transactions are conducted within a firm. *Specificity* of physical and human assets dictates governance choices in contractual relations; an activity's *frequency* of occurrence is a crucial aspect determining how transactions are arranged; and *uncertainty* underlines the different capacities of alternative governance structure in responding effectively to disturbances in the institutional and physical environment (Wang, Kooten, 2001). The TCE reasoning insists that firms behave in a transaction cost economizing manner so that the choice of governance modes regarding specific activities conforms to transaction characteristics. For instance, there is greater reliance on market contracting when investments have been made in assets of a general nature. As asset specificity increases, market contracting (with many parties) tends to give way to bilateral modes that involve two contractual parties. When assets are sufficiently specialised and activities to be performed occur at frequent intervals, reliance in contracts may give way to unified governance or in-house delivery (Williamson, 1985).

To choose between the internalisation and externalisation of services belongs to the basic decisions of the firm. According to the neoclassical theory the production costs and production effectiveness are the important parameters of the way how to provide services. The reason for contracting external contractor is the production costs saving and higher effectiveness acquirement.

The primary objective of outsourcing is to increase efficiency by introducing a competitive environment for the provision of the services. The specific "business cases" for outsourcing generally cite one or more of the following points (OECD, 2005):

- to reduce costs;
- to access expertise not available in-house to meet one-off needs;
- to access expertise on a long-term basis in order to be able to vary its quantity and mix over time.

Forest product companies tend to form lateral contractual relations in which firms choose the scale and scope of their production. Since firms gain a comparative advantage from specialisation, it is not uncommon for two firms to be located next to each other, but to specialise in the production of different products or to perform different stages in the production of a single product. However, in addition to the gains to specialisation, there are transaction costs reasons for firms to be in a certain

contractual relationship. For instance, when a re-manufacturing mill is located next to a sawmill, both mills may benefit from the proximity, but they do not necessarily have to be integrated into one firm. People with innovative ideas and specialised knowledge frequently start small secondary manufacturing businesses. Some of the lumber products coming from the sawmill can be readily used for secondary manufacturing products, such as finger-jointed products for wooden doors, while some lumber is best reserved as a commodity product with no further processing. There are clear gains from direct and stable contractual relationships (Wang, Kooten, 2001).

2. OBJECTIVE AND METHODOLOGY

The main objective of this paper is to introduce an issue of transaction costs connected to the contracting of forestry operations based on the selected results of a wider project aimed at the overall analysis of the contractors market in forestry.

The theoretical assumptions are based on the New Institutional Economy. A standardised interview has been chosen as a basic research method. The paper presents a theoretical background of contracting through the prism of transaction costs, investments protection (safeguards), asset specificity, degree of uncertainty (disturbances), frequency of occurrence, measurability of outputs and opportunism.

The project team carried out standardised interviews with seven different respondents representing contractors of forestry operations. All respondents represent private sector companies. The interview structure was the same for every contractor and part dealing with contracts and transaction costs contains 15 questions. The answers were opened and have been discussed and recorded.

3. RESULTS

Apart from one contractor, all other respondents were willing to conclude a contract requiring specific investments; however certain conditions eliminating risks were additionally required. These conditions related mostly to the assurance that a proportional part of the investment will be paid by within the contract. This, however, depends on the contract value (respondents mentioned 50-80% of the invested value) and length of period of concluded contract (e.g. for min. 5 years).

In case a contract has been cancelled by the customer, most of the contractors would be able to offer their services to other potential customers after a certain level of modification. It is a common practice that lorries and machinery are slightly modified for different customers.

Contract period is usually defined as flexible, however in many cases it is limited to a certain period with the tendency to conclude long term contracts. This flexibility results from the specifics of forestry (site conditions, weather, etc.) and from the fact that contract are concluded as performance contracts and not as time contracts. Contracts with the state forest enterprises are concluded for the period of 3-5 years, while they are amended annually. One of the contractors mentioned that he has no negotiating power in defining contract conditions and has to adapt to the requirements of the customer.

Contractors mentioned that there are generally weak possibilities to be protected against specific investments when they conclude contracts, i.e. they have limited options for risk management. Even if the contractors lay their emphasis on the quality of a contract they do not have such negotiating position that would allow effectively (fully) protect the investments. Customers are not obliged to be sanctioned in case they do not perform their obligations and they rather change the contractor. Contractors have also problem to protect themselves against price reduction or contract termination from the customer.

Practically, there is no periodicity of contracts, not in a contractual form, at least. Works are usually carried out as one-off activities. There are some exceptions, however, such as the framework

contracts concluded with the state forests (even if amended annually), long term rents or silvicultural activities financed from the EU funds (requiring 3-year contracts).

As a paradox, the most or at least 50% of turnover of certain contractors originates from long term contracts or contracts concluded with the permanent customers. Thought the contractors are contracted by single contracts the market is based on long term relations as contracts are concluded with the same customers.

In general, there is a contractors' effort to provide complex services in order to cover the widest range of works under condition they are appropriately equipped. One of the respondents noticed that this is also the interest of customers not to have too many contractors because of better coordination.

Contractors are more careful when concluding contracts with new customers. Such relations are based on available references or new customers are "checked" for a short time.

Works are usually done with the use of contractor's own technological equipment. Machinery is rented only if the amount of work is huge. The advantage of using own machinery is seen in the possibility to use it in the real time (when it is needed), while subcontracting often requires time adaptation. On the other hand, most of the contractors always calculate cost of own services in comparison to subcontracted services and the most of them prefers own services to subcontracted ones in case the costs of both equal. Such a decision is linked to above mentioned time factor as it is not possible to decide on the time of subcontractor while the contractor can conduct work when required. The reasons for subcontracting are of organizational nature (consequence of works), while the difficulty of work is also taken into consideration. Two respondents do not make any calculations as they provide their own services only.

Transaction costs related to the time spent to seek customers, meetings and negotiations are not considered by the most of the contractors. One of the contractors mentioned that he does not consider this kind of cost in case he expects future potential, i.e. long term cooperation to the future. Other contractor mentioned the effort to minimise time consumption, however his working time is not fixed as he works at the position of the director (commonly works up to 16 hours per day).

Time spent to seek customers, contract preparation and negotiation was generally characterised as short or minimal by the contractors (up to 5% of working time). The main reason for this is that several contractors have already established relations or they use the internet to look for customers' demand. In general, there is little time for negotiations, however long term contract negotiations were characterized as time consuming.

Only a limited number of the contractors lost a concluded contract before they carried out the work (usually 1 - 5%, in some cases up to 10% of all contracts), while the higher percentage is related to smaller companies. In one case a concluded contract was cancelled even after the works started.

The first proposal of a contract is usually submitted by the customer. The contract includes conditions of work acceptance, where contractors can specify provisions regarding their liabilities. An agreement describing responsibilities is the key from the viewpoint of a possible opportunistic behaviour. However, more than a half of responded contractors do not include these issues into the contracts. One of the contractors is insured against accidentally caused damages. The rest of the contractors usually include these issues into the contracts – mainly in case of higher risks (e.g. deforestation works, where contracts are very extensive).

Around a half of the contractors moves a proportional part of transaction costs (e.g. time losses) to the customers. Contractors are aware of this cost; however, including them into a contract depends on the individual case and negotiating position. If their position is significantly strong they usually include transaction cost into short term contracts. In case of long term contracts transaction cost can be compensated.

Almost all contractors have experienced additional cost, even if in a negligible number of contracts, resulting from the opportunistic behaviour of customer during the process of work acceptance. These were mainly connected either to price reductions or extra work (linked to extra cost). Exceptionally, customer did not pay for the work or it was complicated to gain the payment.

4. CONCLUSION

Regarding property rights conditions, a significant state ownership of forestlands (some 41 %) and dependence on the activities of private sector contractors are characteristics for the Slovak forestry services sector. In spite of that fact a majority of respondents is usually contracting with “non-state” forest owners.

General characteristic of this market is that the contractors have weaker negotiating position in defining contract conditions and they have to adapt to the customers’ requirements. Due to the specifics of forestry and the fact that contracts are concluded as performance (not time) contracts, most of the contracts are time flexible.

Regardless the fact that single contracts are dominant, the market is based on long term relation as contracts are concluded with the same customers. It is not common that there is a specialisation in some kind of harvesting or silviculture activities. Contractors generally try to cover the widest range of works as the primary effort is to provide complex services usually with their own technological equipment. Subcontracting third parties is not used, not even in the case that the costs of own and subcontracted work are equal. Subcontracting is more time demanding and is mostly applied as a result of consequence of works.

Most of the contractors do not take into consideration transaction costs related to the time (seeking customers, meetings and negotiations). A short or minimal time is spent for the mentioned activities (comparing to the whole working time), which is typical for this sector since the relations with the permanent customers are mainly established. Only the long term contract negotiations were characterised as time demanding. A part of contractors is aware of transaction costs and would like to include them into short term contracts especially, but it depends on negotiation and varies from case to case.

There were some cases of opportunistic behaviour noticed within our sample of respondents. The fact is that the contracts’ conditions preventing contractors from such customers’ behaviour are not sufficient in more than half of cases. However, the number and consequences of such contracts are rather negligible for the existence of firms since the basic market relations have character of long term cooperation between the contractors and the customers.

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ECONOMICS OF SLOVENIAN WOOD-INDUSTRY

Jože KROPIVŠEK, Bernard LIKAR, Petra GROŠELJ, Matej JOŠT

ABSTRACT

The paper presents some economic indicators of Slovenian wood industry, which exposes the different aspects of the economic treatment of the companies. It was found out that the situation in wood industry in general was worsened during the last years because all studied indicators showed up worse value than in previous years. Situation in wood industry was also compared with the situation of Slovenian economy in general, which was worsened in recent years due to recession as well.

Keywords: economic indicators, economic situation, wood industry, Slovenia

1. INTRODUCTION

Studying of business performance is crucial in efforts to ensure long-term success and existence of any company. With awareness of key economic indicators the company managers can actively guide companies to better performance. (Baumohl, 2008) This data is also important for the whole branch, where at the macroeconomic level appropriate measures has to be done by regulators. The analyses are focuses on the average of the branch. They can indicate key problems and indicate common trends of individual indicators.

Wood industry sector is among the other labour-intensive industries at which in recent years some negative trends have been recorded. In the foreground there is a weakening of the competitiveness of wood-industry companies and of the branch as a whole and is often measured by value-added product or service, which means the newly created (increased) value of the product or service. Poor condition of wood industry sector may also be a result of deterioration of general economic condition due to the economic recession in 2008, which was very strongly expressed in the construction industry, whose condition for the wood-industry is essential is vital for the timber industry (Bec, 2009).

The aim of the research was to calculate and display the selected aggregate economic indicators of wood industry (financial result, operating efficiency, profitability, employment, gross value added per employee and the trade of goods), and on this basis to estimate the economic situation of Slovenian wood industry.

2. METHODS

The research was based on searching and preparing data from official statistical databases and some in-depth analysis of selected key performance indicators in the Slovenian economy (Likar/Milavec, 2010; GZS, 2010; AJPES, 2010; SKEP GZS, 2010; SURS, 2011). The available data were the basis for calculations of various economic indicators of Slovenian wood-industry.

At the branch level following indicators were calculated: financial result (the difference between total revenue and expenses), operating efficiency (the ratio of all revenues and expenses), return on assets (ROA) (profitability) (the ratio between profits and assets), labor costs and gross value added (GVA) per employee (the ratio of gross value added and number of employees; the gross added value

is a the difference between the sales value of goods and services and the cost of raw materials and all other inputs that are directly attributable to that production). (Rebernik, 1999; Hornby, Gammie, Wall, 1998)

Gross added value (GVA) = Gross profit from operations - Cost of goods, materials and services - Other operating expenses

$$\text{GVA per employee} = \frac{\sum \text{Gross value added}}{\sum \text{Number of employees}}$$

In calculating the indicators, the data for sector C16 (wood processing – except furniture) and C31 (manufacture of furniture) were considered; according to the classification of economic activities (SURS, 2008).

3. RESULTS

In the year 2009, 856 wood-industry companies (excluding *solo proprietorship*) operated in Slovenia, whose total revenue was 958 million € (1191 million € in 2008), while expenses were 982 million € (1209 million € in 2008). Some companies generated 41.8 million € net loss (in total) while other companies had17.3 million € net profit. All companies in brand had negative result from operations of € 24.4 million € net loss or 3.6-times more than in 2008 (-6.8 million €). The C16 sector has ended the year 2009 with net loss of 6.1 million € (in the year before net loss was 2.7 million €). The C31 sector has ended the fiscal year 2009 with net loss of 18.3 million € (previous year was the net loss 4.1 million €) (Figure 1).

Net revenues from sales in the domestic market have decreased in wood processing sector (C16) by 8.7%, and in the furniture manufacturing sector (C31) by 19.9%, according to the previous year. Net revenues from sales in foreign markets were in C16 cut by 16.1% and in C31 by 23.6%. Overall, the net revenues from the sale of wood-processing branch have decreased by 16.3%.

Operating efficiency of the whole wood-industry branch in Slovenia amounted to 0.975 or 0.4% less than in 2008. Return on assets (ROA) was negative (due to loss) -2.26% (C16 + 31).

In general, it can be concluded that the financial results are getting worse according to the previous year, which may be a result of the economic downturn that began in 2008. In general, sector C31 suffered greater drop in profits than sector C16. In absolute terms, sector C31 contribute 75% of the total net loss of the branch.

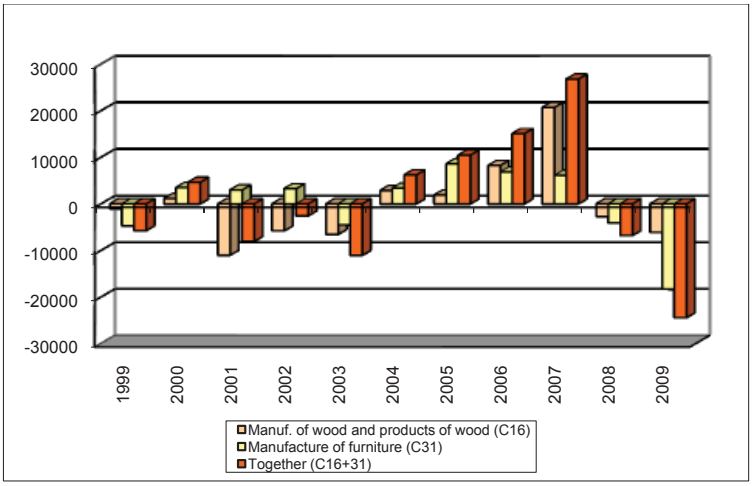

Figure 1. Evolution of net profit / loss in the wood-industry branch

Costs of goods, materials and services in 2009 decreased by 14.4% in sector C16 and in by 24.1% in C31. Costs of goods, materials and services represent 66.3% in the structure of expenses.

In the year 2009 the studied companies had 14589 employees (16997 in 2008), which means a decrease in employment by 14%. Declining trend in employment has been present in the wood-industry branch in the last few years (Figure 2). Labour costs represent 23.8% in the structure of expenses. Labour costs in sector C16 (wood processing) has decreased from year 2008 to 2009 by 15.3%, while in C31 (furniture production) by 17.9%. Labour costs in the entire wood-industry branch have been decreased by 16.6% and the number of employees decreased by 13.5%.

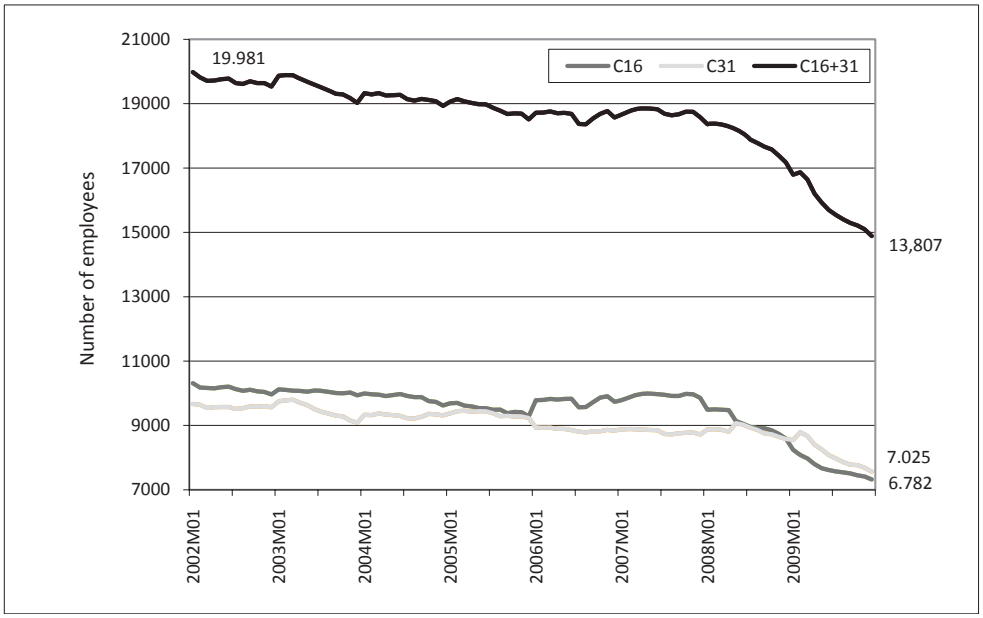

Figure 2. Evolution of employment in the wood industry companies

Gross value added per employee was in sector C16 (in 2009) on average of 22277 € (21928 € in 2008) and in C31 17285 € (20065 € in 2008). In the wood processing industry as a whole, the gross value added per employee in 2009 amounted to 19770 € (21000 € in 2008) (Figure 3). When comparing the gross value added per employee in wood branch with the data of whole processing sectors (C) in 2009 the increased gap at sector C31 has been established, while at sector C16 the trend is similar to whole processing sectors of value added. GVA per employee in companies in general was amounted to 34168 € in 2009 (35279 € in 2008:), in processing sector (C) as a whole it was 31523 € in 2009 (32003 € in 2008). Added values in EU in the field of C31 are reaching around 27140 € and in the C16 around 29290 € (EC 2006a; EC 2006b).

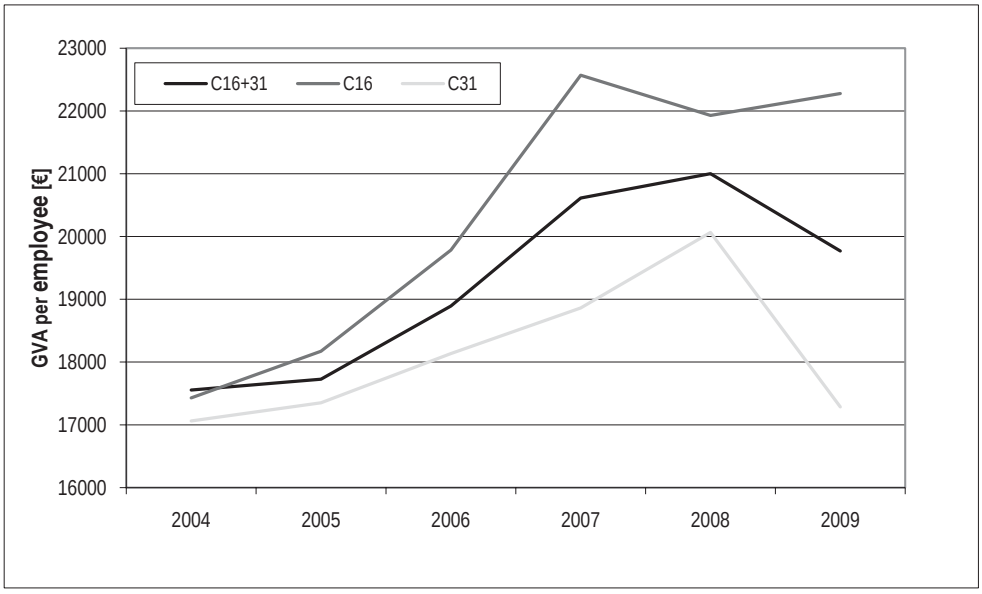

Figure 3. Growth in value added per employee

The share of sales in foreign markets is very important indicator of export orientation. The entire Slovenian economy, net revenues from sales in foreign markets in 2009 decreased by 18.6% regarding the previous year, their share in the structure was 28%. In the processing sector (C) net revenues from sales in foreign markets declined by 18.3% in the same period, but their share in the structure reached 62.2%.

In the C16 net revenues from sales in foreign markets (from 2008 to 2009) dropped by 16.1% and their share in the structure was 48.3%. In the furniture manufacturing (C31) net revenues from sales in foreign markets in 2009 decreased by 23.6% regarding the previous year and their share in the structure was 44.5%.

Comparison of geographical diversification of exports and imports by economic groups of countries shows (Figure 4) that the trading of goods of wood processing branch was in 2009 mainly in

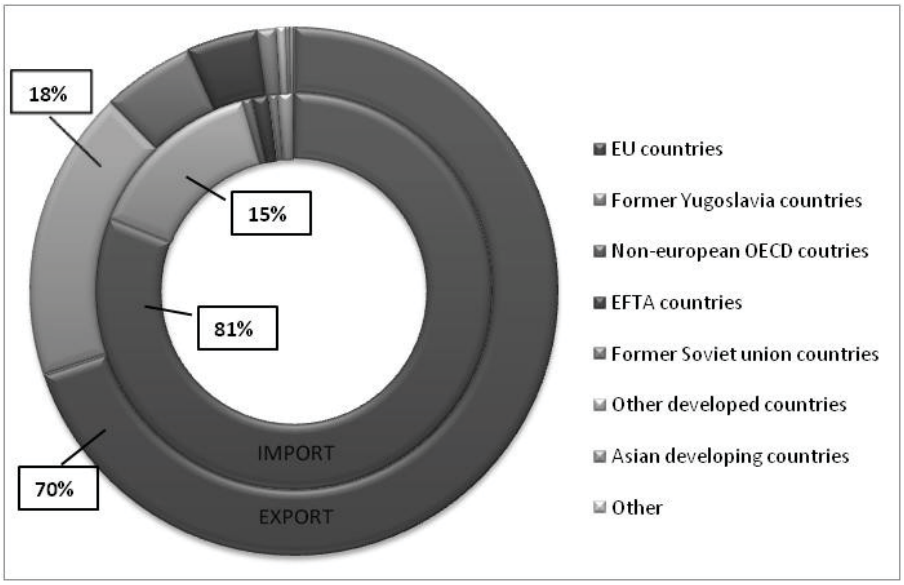

Figure 4. Share of external trade by economic groups

4. DISCUSSION AND CONCLUSIONS

In 2009 there were in Slovenia 856 wood-industry companies with 14589 employees, which number reduced in the last year for about 2000. The trend of employment in the wood-industry in recent years is markedly declining. In the year 2009 wood-industry companies generated a negative financial result from operations of 24.4 million € (in 2008, the net loss of approximately 6.8 million €). The decline in sales on both the domestic and foreign markets has been noticed. Overall, the net revenues from the sale of wood-processing branch have decreased by 16.3%.

In general, economic performance indicators worsened regarding the previous year, which is the result of economic recession, too. Indicator of operating efficiency of the whole wood-industry branch in Slovenia has fallen from 0.985 to 0.975, return on assets is negative. Also, the gross value added per employee has fallen and is on average 19770 € (21000 € in 2008), what is far below the Slovenian average.

Slovenian wood industry still remains a major net exporter. Net revenues from sales in foreign markets in 2009 declined by an average of just under 20% (depending on activity), their share in the structure of the net revenues from the sales ranged from 45 to 48%. In general, a big drop in the value of both exports (24%) than imports (32%) can be observed. In 2009, exports in absolute value declined more than imports, what means that the surplus of the branch in trade decreased regarding the previous year. The main export / import markets remain Germany, Italy, Croatia and Austria.

Based on the analysis the increased impact of the economic downturn in the performance of Slovenian wood-industry companies is determined. Lower income requires from companies to cut costs, which are in short-term reflected also as a reduction of employment. It is interesting that in spite of this the gross value added per employee have failed in the last year, from which it could be inferred mainly on the lack of development potential in the business. Only the latter can help to create higher added value and provide long-term success of companies, also in the wood-industry branch. Business opportunities can be found above all in environmental initiatives, in which wood is determined as a high quality and widely applicable material, which burden on the environment of the least possible throughout the products life cycles.

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VALUATION OF MARKETING MIX TOOLS' INFLUENCE WHEN CHOOSING FURNITURE

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ABSTRACT

New market surrounding, that is the result of the transforming society, the knowledge and information allowing understanding the purchasing decision-making and mental processes of this decision-making, are inevitable for producers and salesmen of the furniture commodities and their future development. Only the knowledge of their customers and their expectations will help the producers and sellers to react elastically on their needs and wants in constantly changing surroundings that brings plenty of opportunities. Only those entrepreneurs achieve prosperity who try to get the most complex information about the market, customers and through the own supply they help them to obtain the needful product, in right time, on right place ad for the right price. The success of the marketing program depends on the understanding and knowledge the consumer, his attitudes and values and finding the new ways of consumers' orientation.

Keywords: valuation, marketing mix, purchasing behaviour, customer, furniture

1. INTRODUCTION

In marketing one of the most discussed question is: „How consumers react on different marketing stimuli which can be used by a firm?“ Consumer decision making is conducted with the assistance of various factors that influence final decision. The company that can understand how consumers will react to different variations of product, price and advertising appeals can obtain a great competitive advantage.

Only through knowledge of their customers and their expectations producers and traders are able to react flexibly to their needs, wishes in an environment of constantly changing market, which offers many opportunities. Prosperity of the market will be reached by those businesses that try to obtain the most complex information about the market, customers and by their supply they try to help customers to obtain the required product, at the right time, in the right place and right price.

According to mentioned ideas the main purpose of the article is to identify the most important tools of marketing mix, which significantly influence the purchasing behaviour of consumers in the market with furniture. In the new market environment, which is a consequence of transforming society, the information and outputs become determinants for understanding the decision-making and mental processes that accompany this decision, as well as for manufacturers of furniture, sellers of commodities and their further development.

2. RESEARCH OF PURCHASING BEHAVIOUR

The term „purchasing behaviour“ can be defined as behaviour, that consumers present when seeking, purchasing, using, evaluating, disposing with products, services and ideas that are expected to satisfy their needs.

Consumer behaviour is necessary to examine in the individual stages of purchasing decision-making, as well as in relation to components of marketing mix. We can gain information about customers by several ways (from internal company sources, from market research, etc).

The results, which are presented in the paper, are the output from marketing research, realized in the period October 2007 - March 2009 through questioning. The questionnaire consisted of 9 questions, respondents were asked to answer in writing.

Mostly closed questions were used in the questionnaire. The sample consisted of 750 respondents. For the evaluation we received replies from 696 respondents, representing a 93% return of questionnaires. Elements of the population for research of purchasing behaviour were all inhabitants of the Slovak Republic in the age from 18 years above. Dependent variables in research were gender, age, completed education, economic activity, geographical location and whether they live in a flat or a family house.

Because of determined space we present only chosen results obtained by evaluating the data through cluster analysis, which represents a set of mathematical and statistical techniques used to identify groups of observations, so-called clusters. Cluster analysis deals with how the objects should be included in a group to keep the greatest similarity within the groups and the greatest disparity among groups. It is also used in the market segmentation while classification of consumers is based on a combination of several variables. Variables or segmentation criteria can be: sex, age, education, lifestyle, religion, experience with the product, the size of consumption, frequency of consumption and so on.

3. RESULTS OF MARKETING RESEARCH

Within the first question the respondents evaluate which factors (material, quality, design, price, availability of a shop and staff in the shop) are decisive when choosing the furniture. The data evaluated by methods of one-sized statistics show that the quality, design and price respondents rate as the most important factors, material as a very significant factor and the availability of store/shop and its staff as moderately important factor.

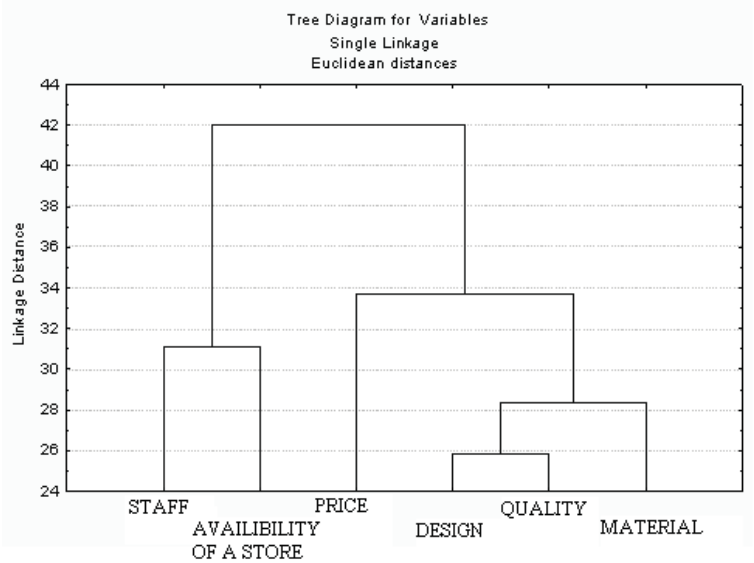

Figure 1. Evaluation of factors influencing the selection of furniture

The figure 1 shows that a separate and as well a very important attribute of the furniture is price. Furniture design, quality and material of which it is made, are a group of properties that affect the customer in accordance with the price. Availability of furniture stores and sales personnel are "outside" decisive factors influencing the customer's concrete decision, although they have their importance.

Therefore the customer decides in the first place by the character of the furniture, but in case he is determined to buy a product, he is willing to travel in order to purchase it or to overlook the inappropriate behaviour of staff shops, if such a situation occurred.

According to the figure 2 we can allege that it is important for an educated person to choose the place where he can buy the furniture as well as to get inspiration before buying it. Respondent's economic activity is reflected in choice of specific distribution channel (e.g. pensioners are more likely to buy furniture in hypermarket where they can provide the other purchases as well, businessmen ,except of traditionally furniture specialized shops or markets, like to use more time saving way of buying furniture as catalogue or internet ordering).

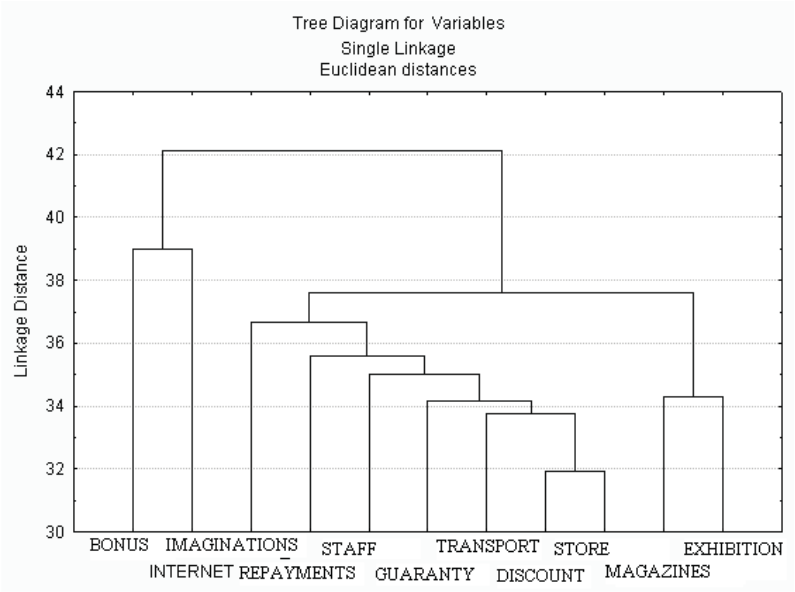

Figure 2. Cluster analysis of demographic variables in relation to the distribution and form of communication policy

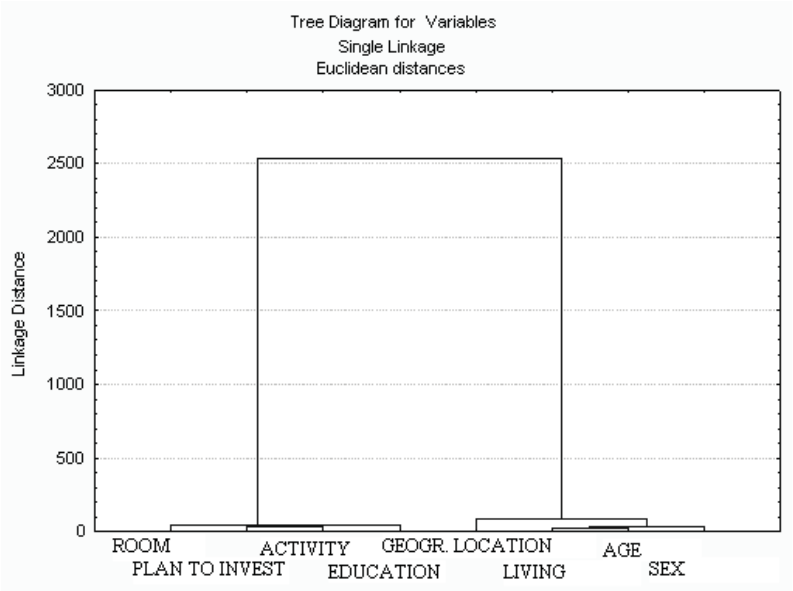

Figure 3. Cluster analysis of demographic data – intention to invest to new furniture

The influence of other independent variables (geographical location, sex, age of respondent and living standard) which create "cluster of demographic characteristics" has not markedly expressed during selection of the source of inspiration and specific distribution channel but we surely cannot consider it insignificant.

We have got two basic clusters from the comparison of chosen independent variables (age, sex, geographical location, education, living standard and economic activity of respondent) with the plan of investment to specific room furnishing during the next two years. First cluster can be considered as the cluster of respondent's demographic data (geographical location, living standard, sex and age of respondent). Second cluster is the cluster of respondent characteristics that array data including education, his/her economic activity, his/her plan to buy new furniture in the near future and to furnishing of what room is he/her able to invest the most.

According to the mentioned above we can say that the furniture producer should pay attention to who is his /her customer, his/her education, economic activity and based on these information optimize the market supply.

Based on these results as well as the investigation gained by the methods of one-size and multi-size statistics we can deduce following statements:

- Quality, design and price of product are the rated as the most important by the consumer so that it is necessary to pay more attention to the production and distribution of the furniture in the market.
- It is more convenient to publish the furniture offer in the catalogues and furniture exhibitions that was, according to the respondent's opinions, the most appreciated way of advertising eventually the powerful source of inspiration.
- Producers as well as the furniture sales person should try to get the attention of the customer by providing the "extra" services as for example furniture home delivery and its assembly, longer than 2 years (law guaranteed period) guaranty period, discounts, willingness and staff proficiency as well as the ability to pay for the furniture with instalments or take a loan.

- It is necessary to realize that possible customer usually has specific idea and requirements for the furniture before he visits the furniture shop. At the moment of his entrance, staff and the atmosphere in the shop play an important role. The facts mentioned below results to the recommendation especially for the furniture seller to make sure that his /her staff deliver the goods in proper way, it is proficient, knows the furniture that sells to the customer and satisfies the requirements which are in well-developed countries the matter of course but not in Slovak conditions.
- Customer's economic activity reflects on the choice of specific distribution channel so that the producers should consider whose their customers are and according to that place the offer. Except of usual selling way should the producers consider the possibility of catalogue or internet furniture ordering for busy customers forasmuch as it saves the precious time. The other customer group appreciates the possibility of buying the furniture at the places of wider range of goods where they can at the same time make another purchase of different goods.

4. CONCLUSION

Orientation of marketing on the consumer plays a key role. The success of the marketing program depends on the knowledge and understanding of consumer, his attitudes and values and knowledge of new consumer orientation. The path to the consumer is increasingly difficult. The market segmentation deepens, consumer preferences are changing and they become a broadly diversified when satisfying them. The value orientation of consumers is changing, too. Their application on the market requires better information about consumers, their wishes, changing lifestyles. Creating a marketing program and a combination of marketing mix for each target group presents one of the most serious decisions, in which the marketing staff must rely on knowledge of research and consumer behavior.

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PERFORMANCE EVALUATION BASED ON WOODWORKING ORGANIZATIONS CONTROLLING PROCESSES

Ondrej KUSÝ

ABSTRACT

The situation in the woodworking industry is changing and is subject to new trends. These have given the industry said foreign investors. On that basis it puts more emphasis on performance evaluation processes. One possibility for measuring and monitoring performance in pulp and paper industry is the implementation of well known or concepts that are supported by traditional forms of surveillance and evaluation of the cost-based controlling.

Keywords: controlling, quality, performance

1. INTRODUCTION

Specificity of the timber industry is dependent on the availability of natural resources on the one hand and the need for substantial funds for investment on the other side. Without large investments in wood processing industry in Slovakia is unable to maintain a competitive state. This will only emphasizes the need for effective methods to be used in corporate governance. Between one of the leading methods that can positively affect the timber industry is also controlling.

In Slovakia, the timber industry is less than 10% of the economy, but there has been considerable foreign investment, which also affects our businesses. In Slovakia there are certain features which are affecting the industry. The basic features include a high forest cover countries (41%), which provides enough raw material for processing. The disadvantage is that over 20% of the raw materials are exported abroad in the form of logs and does not process with us. In the case of processing by us could be more significant to evaluate the stock of wood, which gives us a country. Besides this, there is also a large export of processed wood from low value added.

These facts together from expanding capacity of foreign investors, such as SWEEDWOOD in Trnava, or BUKÓZA Holding Hencovce pushing more and more the economic situation in enterprises. Help domestic enterprises to maintain the pace of foreign firms could be controlling.

Assumed that the end of the 20th century witnessed significant changes, which were asked to assess performance. The very controlling, as well as the different methods of measuring performance have undergone gradual change, causing a change in the needs of tracking performance indicators. Currently, relief from the synthetic indicators, which were developed in the 90s. Begins to put increasing emphasis on creating systems that would eliminate the tracking number for businesses unnecessary data, but replaced them complex. Based on this data, the company would then be set and corporate strategy and then evaluated by its achievement.

2. CONTROLLING - CAREFUL MANAGEMENT AND COST SAVINGS

Controlling, as such, is often presented recently. Many people associated with him in different areas of management organization. The origin of the word is in English. The technical terms are often

used, but in practice there is no common understanding of controlling content. This makes him a great confused with internal audit, or directly with the financial and economic analysis, etc..

Controlling is a method of corporate governance, which is aimed at making profit, and not just monitoring plan deviations from reality, but directly contributes to the development and management measures for profitability [1].

Controlling objectives can be defined:

1. transforming visions and strategies to encourage middle managers to their implementation,
2. workers lead to continuous improvement,
3. present situation in the enterprise market,
4. draw comparisons in time and place of the cost,
5. Controlling presented as a motivating factor for workers
6. prepare an analysis of weaknesses through the cost of bad performance with suggestions for remediation,
7. to prepare data for quality reports.

Based on this we can define the goals and controlling quality:

Controlling the quality is sub-system business while controlling and quality management support tool, which seeks to promote future-oriented management and on how to minimize costs, increase quality and team processes and customer satisfaction.

When controlling itself will then be monitored for several indicators. For the baseline indicator is considered an indicator of the process, which will also lower dismantled. The basic prerequisite for performance measurement is thus the focus on processes.

Between the performance of business processes and overall business performance, there is a direct dependency. Business processes are therefore an essential source for company performance.

If we want to evaluate the company based on performance, it is necessary to define what performance means to us. In literature there is no single definition of the concept of setting out the performance. Sometimes performance is usually understood as the utilization rate of resources, but the overlap with the concept of productivity, which is understood as the ratio of output to input.

Based on the critical arguments traditional performance measurement systems since the early 90s years came to the formulation of requirements for a system of performance measurements that would satisfy the following requirements:

- companies should also develop performance measurement systems that support their strategy
- performance measurement systems should include non-financial indicators, which indeed complement the financial indicators, particularly with regard to customer perception and performance of internal processes
- general system of performance measurement should be distributed to the sub-meters to allow companies to convert goals into better manageable subsystems [3]

Definition of performance according to the EFQM model - performance is the degree of achievement by individuals, groups, and organization and processes.

Modern management emphasis on different performance measurements. In practice, these measurements do not have the necessary level of objectivity and accuracy. Performance measurement processes is yet to give owners of management processes information about the real behavior of the process. Measuring performance quality management systems then provides information to senior management of organizations on how this system performs its functions. [1]

The management organization is necessary to measure (as it is possible to control what can be measured). There are several types of measurements in the organization - the measurement of stakeholder satisfaction, measuring the effectiveness of quality management system, organization and performance measurement processes, measure performance of suppliers, but also measure the effectiveness of training, measurement of quality costs and the like. Very important measurement in the

organization are designed to measure organizational performance, respectively. performance measurement processes. These measurements determine the level of achievements. [2]

Currently implementing new approaches to monitoring the performance of firms, although the traditional system, but it added to other aspects. Modern method of performance evaluation is based on the assumption that the firm is efficient if it is able to achieve pre-defined strategic objectives. In practice, two basic approaches apply.

If we further specify the methods that are commonly used to assess the processes, we need to divide them into two groups. The first group will consist of methods that were developed in research and consultancy practice. The second group will be formed by methods which have arisen on the ground.

All these concepts are based on a common basis. In any business there are several types of processes and each process produces another performance, or other added value.

Process efficiency is therefore is expressed in response to authorized chelating value chain, which gives rise to various types of performances.

If we understand how processes strategically relevant activities and their structure makes business success, we have divided them into three basic groups:

a) increasing the value of processes
b) processes that do not increase value
c) reducing the value of processes [1]

Table 1. Overview of concepts of performance measurement [2]

development development	development duties	methods
Science and / or consulting experience	Developed based on research work in universities or institutions nearby high schools are therefore conceptually sound science. Most large-scale tested in practice or improved application in practice.	- Data Envelopment Analysis - Performance Measurement in service Businesses - Balanced Scorecard - Tableau de Bord - Productivity Measurement and Enhancement System(PROMES) - Performance Measurement Model - Performance Pyramid - Quantum performance Measurement - Concept Ernst and Young - Business Management Window
Corporate Practice	Development of performance measurement concepts well suited to their needs addressing issues of performance management and measurement specific to particular firms	- Concept J.I. Case - Concept Caterpillar - Concept Honeywell Micro Switch - Hewlett-Packard concept of the internal market

3. ADVANTAGES IN CONTROLLING THE COMPANY

The main advantages of using one company controlling the 5 basic areas:

1. basis:
   - improving the structure plans
   - increase the accuracy and quality of planning by identifying the leaders of those departments that require attention

- Improving the efficiency of management activities through the company strengths and weaknesses of the company, its bottlenecks
- motivating executives to lower level management tasks by linking incentive schemes to their evaluation

2. effectiveness:
   - Improving control activity
   - possibility of monitoring
   - higher quality analysis
3. Management
   - greater reliability of the data
   - precise formulation of the tasks
   - decentralization of decision-making
   - improving the flow of information
4. registration system
   - improve registration
   - Extension of registration
   - accelerate the flow of information
   - improving communication between business centers and economic department
5. budget costs
   - union budget costs
   - introduction of calculating contributions to cover
   - Adaptation of distinguishing economic centers. [2]

4. CONCLUSION

In this paper I have not focused strictly on the identification of individual cost items under chronically known cost models such as. PAF, COPQ and the like. An overview of key concepts of performance measurement. This may be part of the evaluation process based on controlling. It is only a question for which the concepts are the one who decides organization. Not all are in fact strictly fit into the wood processing industry, but it is possible for them, in some modifications to consider.

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CURRENT CONDITIONS AND STRATEGIES FOR EXPORT STRATEGIES OF FURNITURE IN THE REPUBLIC OF MACEDONIA

Zivka MELOSKA, Ilijana PETROVSKA, Blagojco ANAKIEV

ABSTRACT

The own development is of a main importance for each country, as one of the main factors for companies' strategic behavior in the global market. The furniture is a product of the wood modification and the furniture production, having the highest participation in the global trade.

From these reasons we are going to analyze the current situation on the furniture market in the Republic of Macedonia, its structure and future trends. Also analyzed will be the regional situation towards the furniture's import and export trends.

On the basis of these analyses we are going to propose main strategies for furniture market growth, improvement, and involvement in the global market.

Keywords: furniture market, export, import, growth strategies

1. INTRODUCTION

Republic of Macedonia is a small country, with approximately two million citizens, with economy in development, with a small buying power; in conclusion Macedonia is a small market. As a result of this, its an imperative, as for any small or developing country, to have a constant increase on international trade, especially to increase the export. The increase of the trade is a challenge, and in nowadays it is an economic precondition. It is in direct relation with the wish to increase the production, increase the sales, to increase the export and to activate all possible marketing tools that could influence on their improvements.

Because of these reasons the furniture manufacturers from the Republic of Macedonia are more actively involved in the international trade, especially for export increase, which even though has an increment tendency, still is very small comparing to the achieved import. These producers don't have already developed strategies for entering the foreign markets. Their approach is individual and not organized by any organization or an association.

2. METHODOLOGY OF THE RESEARCH

In this paper researched is the market situation towards the export and import strategies in the furniture manufacturing industry, presenting the current tendencies and regional directions.

All the analyses regarding the situation and tendencies of the furniture market in Macedonia are done based on the State Statistical Office data and also data from the Chamber of Commerce from 2010. The analyzes are done for the period from 2004 until the 2009, based on the achieved export and import presented in US dollars, and using the SITC methodology.

Regarding the data analyzes used were mathematical – statistical methods and the graphics are developed in Excel Microsoft Office.

The aim of this scientific paper is:

- To analyze the international trade with furniture
- To define the share of different specific types of furniture in the total export-import activities
- To define the import and export tendencies, as well as strategic export or import countries
- To propose recommendations for international trade development of furniture from Macedonia

3. CURRENT SITUATION WITH THE FURNITURE'S EXPORT AND IMPORT

Before we present the current situation with the furniture's export and import, we are going to provide some important data regarding the current situation with the wood manufacturing industry and furniture manufacturing industry in the Republic of Macedonia. According to the data from the Chamber of commerce (2010), this industry participates with less than 1 percentage in the gross domestic product, exactly 0,72 percentages. The number of employees, even though this number is in constant increase, is only 1,35 percentages from the total number of employees in the economy of the Republic of Macedonia.

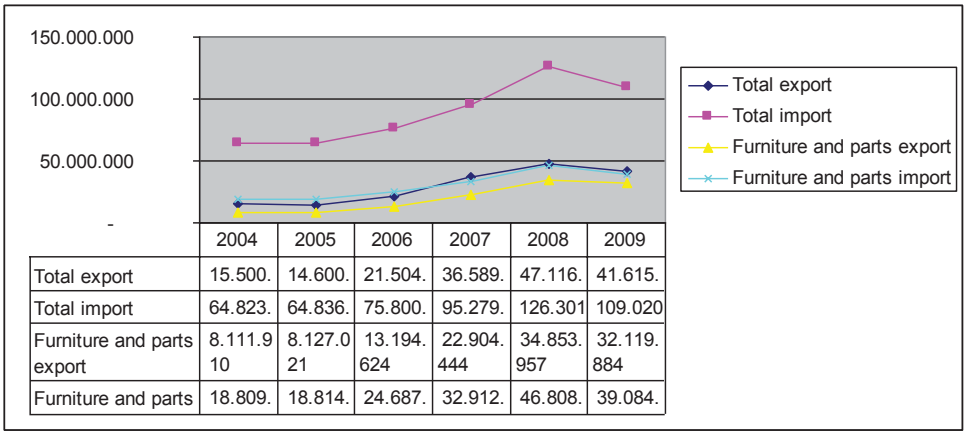
The production amount has a growing tendency almost at all different types of products, but we should take into consideration the specific ordering model for the furniture production, which is production according to orders. The industrial production, actually the serial production is not on a very satisfactory level, and therefore we have very small value of the furniture export comparing to the import.

According to the data from the Chamber of commerce (2010) in the period from 2004 – 2009, the total export of wood manufacturing and furniture's manufacturing has a trend of a continuous increase up to 2008. In the year 2009 there is a decrease for 13 percentages comparing to the previous year, presented in table 1. The same trend is present for the total accomplished import, too. There is a trend of increase up to 2008 and in the year 2009 import is decreased for the same percentage, 13 percentage as for export. However, we have to stress the situation of high trade deficit. In average, the import was three times higher than the accomplished export, as presented in the table 1.

Table 1. Export and import in wood manufacturing and furniture manufacturing, in US dollars

	Total		Wood, sawn and cork		Manufacture of wood and cork		Furniture and parts	
	export	import	export	import	export	import	export	import
2004	15.500.709	64.823.163	4.801.805	16.348.141	2.586.994	29.665.029	8.111.910	18.809.993
2005	14.600.683	64.836.394	4.806.788	16.348.141	1.666.874	29.673.693	8.127.021	18.814.565
2006	21.504.769	75.800.551	4.785.747	17.153.876	3.524.398	33.959.309	13.194.624	24.687.366
2007	36.589.433	95.279.649	7.527.236	16.958.870	6.157.753	45.407.808	22.904.444	32.912.971
2008	47.116.224	126.301.587	5.956.394	20.219.712	6.305.873	59.273.138	34.853.957	46.808.737
2009	41.615.459	109.020.694	4.173.199	24.949.663	5.322.376	44.986.736	32.119.884	39.084.295

If we are going to analyze the import and export of group of furniture and parts, as a part of the total import and export in figure 1, the same trend is obvious as in the total export and import. Noticeable is the increase as of the export, the import up to year 2008. In the year 2009 decrease is presented. The main characteristic of the trade exchange with furniture and parts is the big deficit, which is evident in all analyzed years. However, this deficit is constantly decreasing. So, if in the year 2004 the import was 2,3 times bigger than the export, already in 2009 import is only for 21 percentage bigger than the accomplished export.



	2004	2005	2006	2007	2008	2009
Total export	15.500.	14.600.	21.504.	36.589.	47.116.	41.615.
Total import	64.823.	64.836.	75.800.	95.279.	126.301	109.020
Furniture and parts export	8.111.910	8.127.021	13.194.624	22.904.444	34.853.957	32.119.884
Furniture and parts	18.809.	18.814.	24.687.	32.912.	46.808.	39.084.

Figure 1. Export and import in wood manufacturing and furniture manufacturing, in US dollars

This deficit decrease, is presenting positive movements in the international trade of furniture, which means that we could expect even to accomplish appropriate excess.

At the end of this analyzes of the situation with furniture's export and import, we should remind that in the analyzed period, the export of furniture was presented with 67 percentages, almost two thirds from the total accomplished export, and in import its participation is smaller and in average 30 percentages or only one third from the total accomplished import in the industry for wood manufacturing and furniture manufacturing.

4. THE STRUCTURE AND THE REGIONAL ORIENTATION OF FURNITURE'S IMPORT AND EXPORT

The structure of the export and import are going to be analyzed using the SITC methodology, where the wood furniture is analyzed through these two main groups:

- Wooden office furniture
- Wooden kitchen furniture
- Wooden bedroom furniture
- Other wooden furniture

According to the data from the State Statistical Office (2010), the biggest participation in the export of furniture has the group with other wooden furniture. This group has been participating in the total export in average with 65 percentages. Afterwards follows the group of wooden bedroom furniture with average 25 percentage, and in the rest of 10 percentages is the group of wooden kitchen furniture and wooden office furniture (figure 2).

Figure 2. Share in export in 2005 vs, 2009

Almost the same is the structure of the import. The biggest percentage from the import also has the group of other wooden furniture, with approximately 55 percentages, then follows the group of wooden bedroom furniture with approximately 30 percentage, and the wooden kitchen and office furniture are part from the rest of the 15 percentage (figure 3).

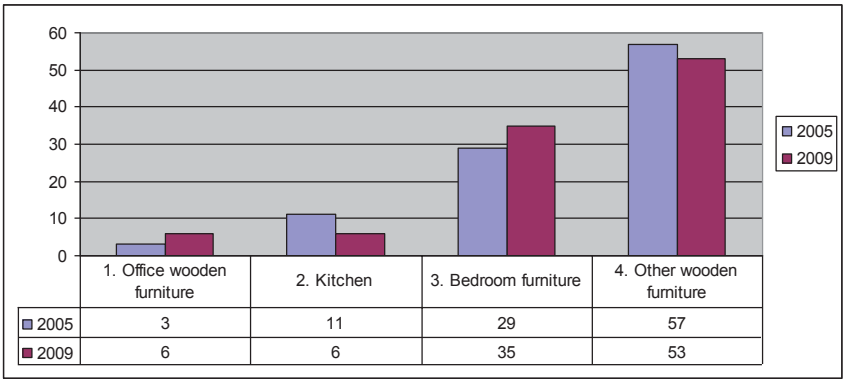


Figure 3. Share in export in 2005 vs, 2009

Therefore, we could conclude that the main product in the international trade with furniture in the Republic of Macedonia is the other wooden furniture which takes two thirds from the total accomplished export and import. This is understandable if you take into consideration the fact that here comes part of the furniture, not whole parts as in other three groups.

Taking into consideration the condition with the participation of each separate groups of furniture, the regional trend will be analyzed only for the group of other wooden furniture and wooden bedroom furniture.

According to the data from the State Statistical Office (2010) it is obvious that the strategic markets for export of wooden bedroom furniture are the countries from the neighborhood as Serbia 33 percentage, Kosovo with 31 percentage, Croatia with 9 percentage etc. It is the same situation with group of other wooden furniture where Croatia is present with 38 percentage, Greece with 21 percentage, Slovenia with 19 percentage etc. (figure 4 & 5).

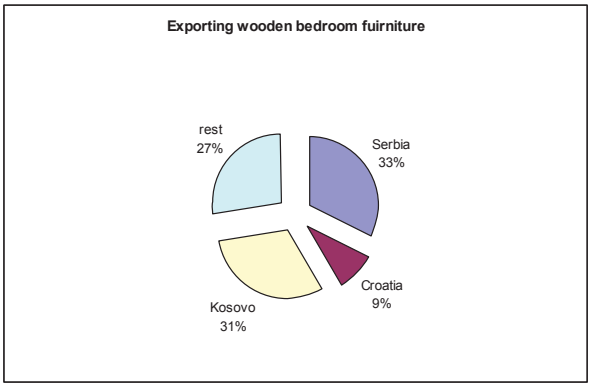


Figure 4. Export of wooden bedroom furniture

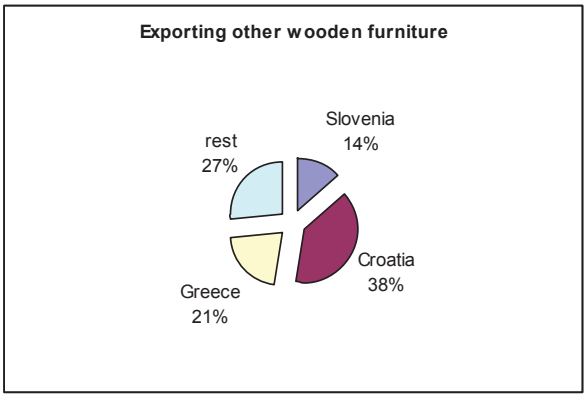


Figure 5. Export of other wooden furniture

From the other side the import for the same types of furniture is mainly from Serbia with 29 percentage and Turkey with 32 percentage, for wooden bedroom furniture, and it is the same situation with the other wooden furniture that mainly is imported from Serbia with 30 percentage, Turkey 18 percentage, Slovenia with 12 percentage etc. (figure 6 & 7)

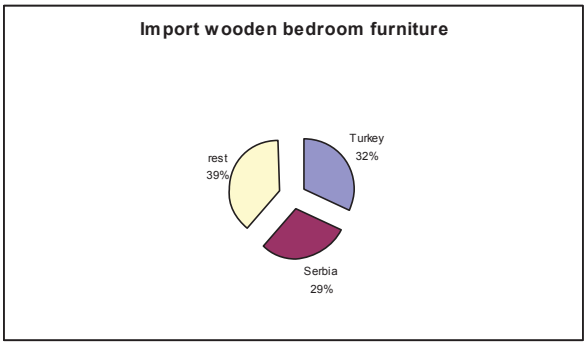


Figure 6. Import of bedrooms wooden furniture

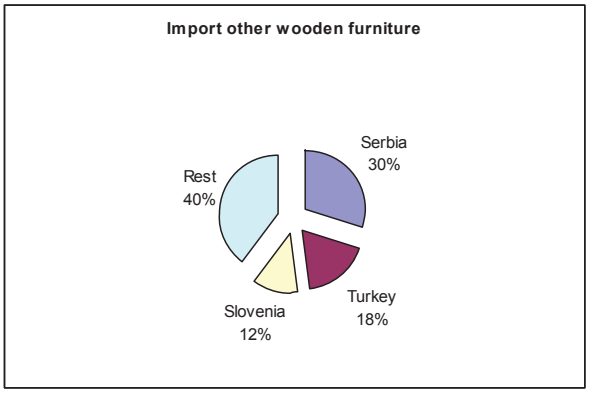


Figure 7. Import of other wooden furniture

5. CONCLUSIONS

According to the previous analyses and data, we could conclude that the industrial furniture manufacturing still doesn't have primary role. Usually for this purpose manufactured is furniture in pieces. Dominant way of satisfying these needs for furniture is by ordering furniture for personal needs and wants. This factor definitely has an impact on the furniture market situation.

According to the data, export of furniture is growing, and also there is an increase of import, too, which influence on the trade deficit. However, this deficit each year is decreased.

Main product in the international trade of furniture is the group of other wooden furniture, as a part from furniture in pieces. This is also a conclusion form the fact that the industrial furniture manufacturing is characterized with furniture in pieces, not as a whole.

At the end we could conclude that the international trade with furniture from Republic of Macedonia is not widely covered. The whole exchange is covered with the neighboring countries. The reasons are mainly because of the small transportation costs, former joint market of former Yugoslavia and also the good knowledge on those markets and already established relationships.

Concerning to the question whether China should enter this market in Republic of Macedonia, we could conclude that this is a small and not valuable market. China is concerned with metal furniture market, which is not a part of analyses in this paper.

Macedonian wooden furniture manufacturers should undertake several actions towards expanding each market for furniture. Above all it is needed to undertake serious researches on the furniture market. The market offer should not to be individually, but to perform through associations and groups, with strong promotional activities.

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POTENTIAL OF EFFECTS FROM FOREIGN DIRECT INVESTMENT

Martina MERKOVÁ, Josef DRÁBEK

ABSTRACT

Foreign direct investment has significant influence in performance of whole economy as well as individual company. It is obvious the foreign direct investment bring positive effects, but on the other hand also negatives. Based on the quantification of the effects, the authors formulate in this paper measures to increase the inflow of foreign direct investment in Slovak economy as well as in the wood processing industry in Slovak republic. Due to analysis results in the wood processing industry is possible to formulate direct and indirect effects of foreign investment in separate phases, and also can by formulated further concept of foreign direct investment inflow.

Keywords: investment, foreign direct investment (FDI), effects from FDI,

1. INTRODUCTION

The development of each sector or company requires appropriate investment, without investment cannot fully meet particularly economic objectives of the business. Foreign direct investment (FDI) n many cases support the development of the invested area, chat is specific also for wood-processing industry (WPI) in the Slovak Republic. Due to the significant factors in the context of global economic crisis, the fall in demand for timber and timber products, many small businesses were lost. In general, this branch has begun to grow mainly due to the foreign direct investment. At a time when small and middle wood companies have outdated technology, falling employment, especially in domestic enterprises is reflected a higher potential for foreign investors and related effects.

2. INVESTMENT EFFECTS IN WOOD-PROCESSING INDUSTRY IN SLOVAKIA

Each investor pursues certain effects of investment in the short or long term. In the wood-processing industry can positively assess the ***development of labour productivity*** from turnover, the most significant in the pulp and paper industry (PPI), where is recorded long-term growth above average of industrial production. Positive development was also in the furniture industry (FI) in the years 1999-2005, where the productivity growth into the level of industrial production caused by just growing volume of investment. Yet it appears positive labor productivity of added value in the CPP, especially in the years 2006-2007, when it was recorded high inflows of FDI into the sector. It appears more positive ***labor productivity of added value in the pulp and paper industry***, especially ***in the years 2006-2007***, when it was recorded high inflows of foreign direct investment into the mentioned sector.

The rate of value added in whole industrial production, as well as in the wood-processing industry observed since the beginning of the studied period of 10 years a slight decrease. Positive can be judged that the indicator in the wood and pulp and paper sector is long-term higher than industrial production. In furniture sector is trend of value added rate similar than trend of investment since 2003, just investment growth in 2003-2006 caused light increasing of value added rate indicator. Higher investment in 2007 caused the growth of value added in 2008. There was the most significant growth of added value rate ***of 15.7 % up to 28.0 % between 2007 and 2008 in the furniture sector*** and this

branch received a high level above industrial production in last mentioned year. In 2008 was rate of added value in all 3 sectors of WPI above level of industrial production. ***In whole period of 10 years (expect of year 2004) is added value rate in whole wood-processing industry above industrial production*** (Merková, Drábek 2010).

Tab. 1. Selected indicators in the wood-processing industry (WPI) and industrial production (I)

Indicator	Sector	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Labour productivity from turnover (thousand SKK)	WI	670	810	944	1 095	1 229	1 459	1 563	1 823	2 164	2 048
	FI	816	1 115	1 381	1 943	2 427	2 494	2 437	2 058	2 423	1 929
	PPI	2 145	2 855	3 351	3 665	3 656	4 288	4 375	4 976	5 995	5 704
	WPI	**1 199**	**1 591**	**1 869**	**2 169**	**2 413**	**2 668**	**2 635**	**2 666**	**3 128**	**2 869**
	I	**1 395**	**1 731**	**1 908**	**2 098**	**2 519**	**2 823**	**3 052**	**3 662**	**4 060**	**4 075**
Labour productivity from added value (thousand SKK)	WI	179	224	216	265	250	352	361	426	369	386
	FI	196	248	249	222	399	411	453	418	381	541
	PPI	668	910	1 127	1 103	902	874	957	1 137	1 252	1 141
	WPI	**344**	**463**	**522**	**503**	**501**	**521**	**550**	**589**	**568**	**642**
	I	**328**	**402**	**444**	**463**	**498**	**592**	**612**	**672**	**710**	**658**
Added value rate (%)	WI	26,8	27,7	22,9	24,2	20,3	24,1	23,1	23,4	17,1	18,8
	FI	24,0	22,2	18,0	11,4	16,4	16,5	18,6	20,3	15,7	28,0
	PPI	31,1	31,9	33,6	30,1	24,7	20,4	21,9	22,9	20,9	20,0
	WPI	**28,7**	**29,1**	**28,0**	**23,2**	**20,8**	**19,5**	**20,9**	**22,1**	**18,2**	**22,4**
	I	**23,5**	**23,2**	**23,3**	**22,1**	**19,8**	**21,0**	**20,1**	**18,3**	**17,5**	**16,2**
Investment rate (%)	WI	6,6	10,0	7,8	6,5	16,0	13,6	16,5	14,6	29,7	12,7
	FI	6,9	15,5	11,9	3,5	3,0	6,1	7,0	9,5	11,7	5,8
	PPI	21,1	5,5	6,7	9,4	21,3	15,8	14,5	8,8	6,6	7,8
	WPI	**15,1**	**8,5**	**8,1**	**7,0**	**13,4**	**11,7**	**12,1**	**10,3**	**13,1**	**8,1**
	I	**8,1**	**6,4**	**9,8**	**7,1**	**6,2**	**7,0**	**9,2**	**7,7**	**6,6**	**6,1**
Profitability of investment (%)	WI	-62,6	14,3	-2,9	33,1	-11,2	40,2	30,2	43,1	15,2	-2
	FI	-33,3	10,5	-17,5	-375,3	93,3	10,6	77,1	43,1	10,2	126,2
	PPI	28,0	136,1	189,0	149,5	41,4	22,7	36,0	90,9	87,5	103,2
	WPI	**14,1**	**60,8**	**83,6**	**49,1**	**35,7**	**23,8**	**43,3**	**60,9**	**28,6**	**-637,2**
	I	**-21,4**	**23,3**	**41,3**	**43,4**	**60,4**	**79,4**	**61,6**	**74,7**	**70,7**	**66,0**
Investment per capita (million SKK)	WI	44 342	81 188	73 278	71 109	197	198	258	265	642	261
	FI	56 070	173	163	67 356	72 100	151	171	195	282	111
	PPI	452	157	224	343	779	677	636	437	393	445
	WPI	**181**	**134**	**152**	**152**	**322**	**312**	**319**	**273**	**411**	**233**
	I	**113**	**111**	**186**	**149**	**157**	**197**	**282**	**283**	**268**	**249**

Source: own calculation of authors, data of MH SR

Correlation and regression analysis demonstrated a positive impact of investment into the growth of sales and labour productivity in the wood processing industry. ***Dependence of investment and sales in the WPI*** showed a correlation coefficient of r = 0.79. Regression coefficient b = 5.22 means that growth in investment of 1 billion SKK causing sales growth in the value of 5.22 billion SKK. ***Dependence of investment and labor productivity in the WPI*** has a similar correlation coefficient r = 0.77, the regression coefficient b = 0.162 shows that growth in investment of 1 billion SKK causing labor productivity growth of 0.162 million SKK.

Tab. 2. Correlation and regression analysis of investment in the WPI

Variables	Indicator	Unit	Mean	Standard deviation	Correlation (r)	Determination (r^2)	Probability of error (p)	Constant (a)	Slope (b)
X	Investment in WPI	millions SKK	7 527	2 885					
Y	Sales in WPI	millions SKK	70	19 024	0,792267	0,627687	0,006287	30687,77	5,22494
X	Investment in WPI	millions SKK	7 527	2 885					
Y	Labour productivity of sales in WPI	thousand SKK	2 321	607	0,770233	0,593259	0,009143	1100,60	0,16209

Source: authors

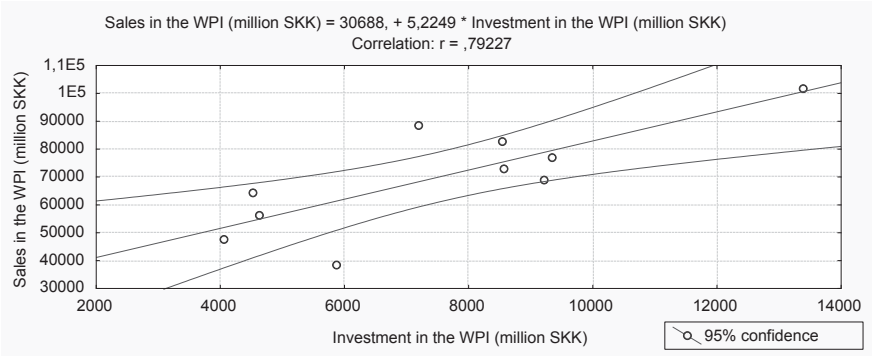

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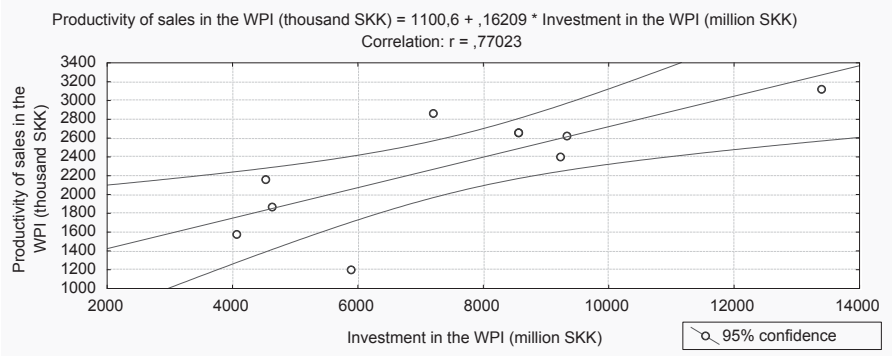
Fig. 1. Correlation in the WPI: Investment ~Sales



Source: authors

Fig. 2. Correlation in the WPI: Investment ~ Labour productivity of sales

3. POTENTIAL OF FOREIGN DIRECT INVESTMENT INFLOW INTO WPI

Based on the analysis of international institutions whose analyze conditions of business and investment can be stated that in Slovakia are good conditions for investment. A survey by the European Commission in september 2009, Slovakia was the only one EU country where only 1% of foreign investors said they planned to leave the country at the time of the adverse consequences of current global economic crisis, while in other EU member states, the average moves at the level of 5% (Report of the business environment 2009). World Investment Report 2009 (UNCTAD) assesses the change in FDI stocks in SR in 2008 with increase of +1,5%, compared with CR +1,74%, -8,2% Poland, Hungary -36,54%).

3.1. Investment possibilities in the SR and WPI

Investment opportunities for foreign investors exist also in the production – ***companies with sophisticated production*** may benefit from low labor costs more than offers the business in the EU area. Slovakia also has a well established cluster of companies in the automotive industry, the country is slowly increasing production and attracting for more manufacturers. Slovakia has recently become a leading global manufacturer of cars per capita. Latest technology and skills exist in Slovakia. Opportunities are also in the information technologies (IT) market. Slovakia provides an excellent environment for outsourcing or service centers: Dell and Swiss are an example. Both initially placed only a small part of its business activities in Slovakia. Although they reduced their organizations in the past 2 years, the crisis has spread its presence in Slovakia. Slovakia has adequate sources of wood from which a significant share is exported as a raw material. Companies should benefit from the added value of the goods at home and they should effective export finished products. Drinking water and mineral springs are also rich sources for Slovakia. Businesses in the food and beverage industry, wellness tourism sector should reap the benefits of 1200 mineral springs in the country.

3.2. Competitive advantages and disadvantages of the SR and WPI

Each country to attract foreign investors presents but also creates those conditions that are bilateral profitable for both - the investor and the state. Of course, these conditions are dependent on the status of the economy, relevant industry, as well as a number of factors that create possibilities for effective investment in the country. It is obvious that it is not possible for all sectors of the economy to create conditions that investors interested in investing with complex approach.

Among the significant ***competitive advantages*** are the ***openness of the Slovak economy to foreign investors to Slovakia, which delivers new technologies, legislation supporting FDI inflow, low duty barriers, developed markets of goods and services, a high correlation between the amount of earnings and labor productivity, low risk of terrorism, a healthy banking sector and relatively good availability of financing***. With developed countries we can compare the area of development in the markets. The macroeconomic stability was even slightly above the average of developed countries (alianciapas.sk).

Permanent competitive advantage for Slovakia is cheap labor, as evidenced by Eurostat data. Labour costs in 2008 in Slovakia had the value of 1005 EUR, which is the lowest value among the V4 countries. For comparison, the Czech Republic had a labor cost 1311 EUR, Hungary 1145 EUR and Poland 1129 EUR.

Countries that can benefit from this advantage in the future at the expense of Slovakia, are Romania (628 EUR) and Bulgaria (354 EUR). Similar are the indicators of the average gross earnings as one component of total labor costs.

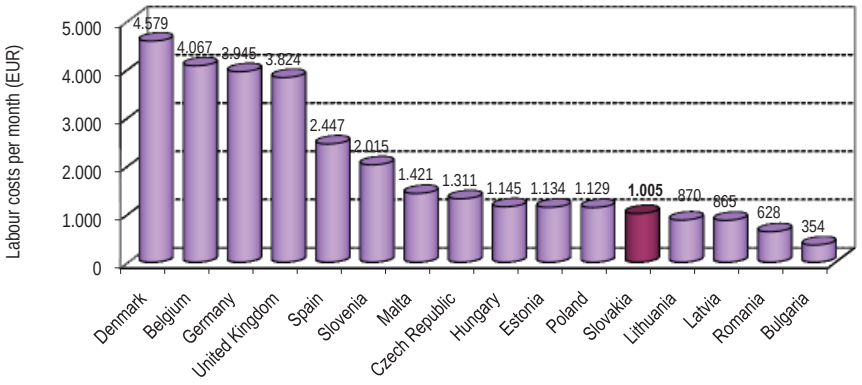


Fig. 1. Labour costs in year 2008 in selected countries (EUR) (Source: EUROSTAT)

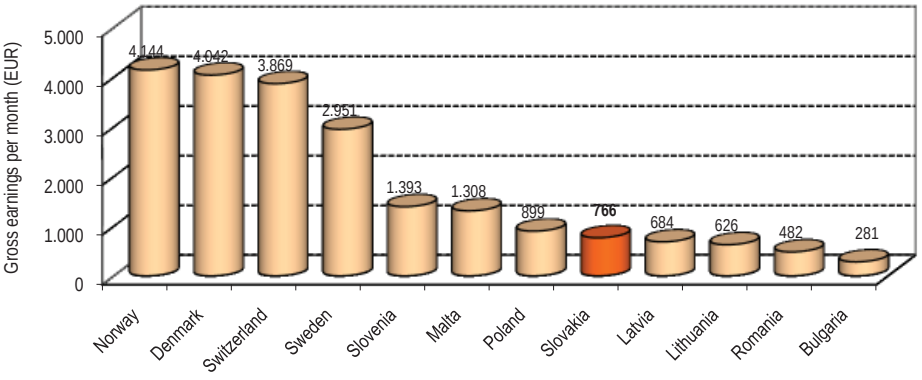
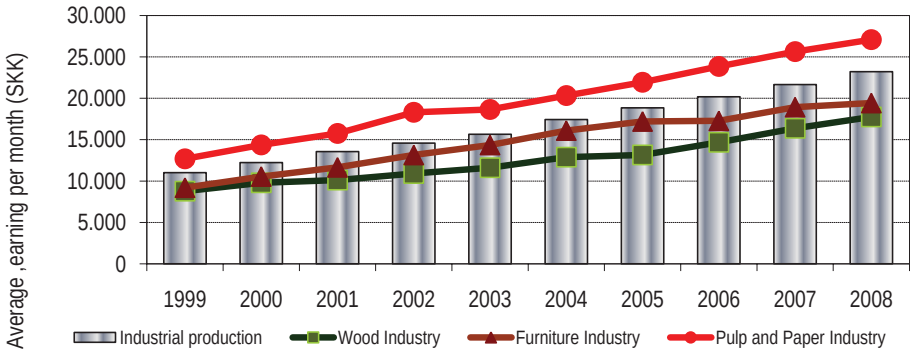


Fig. 2. Gross earnings in year 2008 in selected countries (EUR) (Source: EUROSTAT)

In terms of individual sectors in Slovakia is the highest average earning in information and communication technologies (IS/IT), in 2009 at the level of 1413 EUR. The average earning in Slovakia in 2009 was 744,50 EUR, with annual growth by 3,0%. The lowest earning is in accommodation and catering, there has been annual decrease of 7%. National reporting data from Statistical Office and data of Eurostat probably have a different procedure, where different data on the average gross earnings are for the same period.

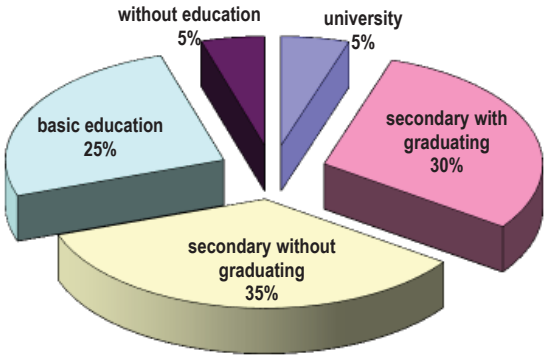
In sectors of wood and furniture industry is consistently lower average earning than in the industrial production of the SR, only sector of PPI experiencing the value. Advantage of cheap labor could therefore attract investors in the first two mentioned sectors.



Source: MH SR data

Fig. 3. Average earnings in sectors of the WPI and industrial production (SKK)

Slovakia can offer for investors a relatively educated labor force, but graduates is alleged that although they are educated, but are not adequately prepared for entry into the working sphere of life. Status of job seekers reached 381 209 persons in december 2010. Registered unemployment rate reached 12,46% in december 2010 (12,66% in december 2009), the total number of jobseekers is most from the Prešov and Košice region.



Source: UPSVaR data

Fig. 4. Unemployed persons in the Slovak Republic in the year 2009 by education

According to the statistics of the Office of Labour, Social Affairs and Family (UPSVaR) was the number of registered job seekers 7201 in the wood-processing industry (persons with education in mentioned branch) in the year 2009. Those unemployed persons would apply their knowledge in relevant fields thanks to foreign direct investment.

Tab. 3. Unemployed persons in the WPI sectors in year 2009

Region of Slovakia	WPI:	Wood industry	Furniture industry	Pulp and paper industry
Bratislava region	160	123	27	10
Trnava region	478	193	239	46
Trenčín region	591	265	304	22
Nitra region	808	399	276	133
Žilina region	1 155	679	257	219
Banská Bystrica region	1 730	1 202	431	97
Prešov region	1 586	1 248	182	156
Košice region	693	434	103	156
Slovakia	**7 201**	**4 543**	**1 819**	**839**

Source: UPSVaR data

Significant ***competitive advantages for the WPI are wood stock as renewable raw materials*** and wood harvesting forecast. The wood stock in Slovak forests has been increasing continuously and reached 234 m^3 of wood mass per hectare.

From the forecast and the vision of the development of wood stock can be seen continuing their increase until its culmination in the years 2015-2020. Then, there is expected change in the development and start reducing the stock of wood caused by gradual changes in the age composition of forests. (Moravčík, 2007).

Tab. 4. Wood stock in the Slovak Republic (millions m^3)

Wood Stock		1970	1980	1990	2000	2007	2008
Total		313	324	348	410	446	**452**
Increasing since the year 1970		*	+10,7	+35,2	+96,7	+132,6	**+138,8**
m^3/ha	**- coniferous**	225	237	235	249	209	**211**
	- deciduous	140	156	163	190	237	**241**
	Total	176	191	193	215	232	**234**
Wood stock in the forests usable for production	**Total**					413	**419**
	- coniferous					192	**194**
	- deciduous					221	**225**

Source: Green Report, 2009

Tab. 5. Wood stock forecast in the Slovak Republic (millions m^3)

Wood Stock Forecast	2010	2015	2020	2025	Vision 2050
Coniferous	213	213	209	204	182
Deciduous	238	240	241	242	233
Total	**451**	**453**	**450**	**446**	**415**
Total per hectare	**234**	**234**	**133**	**230**	**214**

Source: Moravčík, 2007

Wood harvesting is also growing. The maximum annual volume of wood harvest was reached in 2005 as the result of unusually strong wind storm in 2004. The increase of harvest increases also the economic potential of Slovak forests (SARIO).

Taking into account the current age structure of forests in Slovakia in term of next 40-50 years, harvest possibilities will be better then in present time. The planned volume of total harvesting will therefore gradually increase to expected peak in the years 2040-2050. Regulation of wood harvesting can thus be about 30% higher compared with the current time (Moravčík, 2007).

Tab. 6. Wood harvesting in the Slovak Republic (thousands m^3)

Wood harvesting		**1990**	**2000**	**2005**	**2006**	**2007**	**2008**
Coniferous	**Total**	**2777**	**3245**	**6927**	**5150**	**5344**	**6 354**
	- unplanned	1838	2012	6153	3831	4272	5559
	% of unplanned	66,2	62,0	88,8	74,4	79,9	87,5
Deciduous	**Total**	**2499**	**2973**	**3263**	**3207**	**3023**	**3 113**
	- unplanned	766	1010	380	435	429	556
	% of unplanned	30,7	34,0	11,7	13,6	14,2	17,9
Total	**Total**	**5276**	**6218**	**10190**	**8357**	**8367**	**9 467**
	- unplanned	2604	3021	6533	4266	4701	6115
	% of unplanned	49,3	48,6	64,1	51,0	56,2	64,6

Source: Green Report, 2006, 2007, 2008, 2009

Tab. 7. Wood harvesting forecast in the Slovak Republic (thousands m^3)

Wood harvesting forecast	**2010**	**2015**	**2020**	**2025**	**Vision 2050**
Coniferous	4 282	4 434	4 538	4 512	4 950
Deciduous	3 523	3 781	3 993	4 222	4 935
Total	**7 805**	**8 215**	**8 531**	**8 734**	**9 885**

Slovakia currently exports abroad 25% of raw wood (Green Report 2010), enough wood as a renewable raw material is significant comparative advantage for the WPI SR. In case of foreign capital, which will be invested in new technologies for processing of domestic raw materials, potential effects from foreign direct investment especially reflect in a higher value added in the WPI, in the growth of the WPI share in the GDP of Slovakia.

Wood industry in Slovakia has not dominant status of automobile production, does not be put to the environmental discussion as a power sector, there is missing the advertising campaign which have chemical products and according to some opinions wood sector does not require strategic solutions, such as engineering. However, ***woodworking and furniture industry in Slovakia exists and it is more than necessary***. Forests and sophistically used wood constantly produced by forests are the base for the development of WPI, which may be strategic for the Slovak economy. Increased consumption of wood in the Slovak Republic and focus on domestic production can best help companies to find solutions in a difficult situation, which now face (zsdsr.sk). Just because the WPI is currently in a difficult situation, there is increasing potential for any effects. Professionally quantified effect from the processing of the current volume of logs export outside Slovakia is calculated at about 210 millions EUR, suggesting the scope for foreign direct investment and associated effects.

4. CONCLUSION

Wood-processing industry has to face recession in the current period, the development of this sector is dependent on changes in demand for production of wood products and not just in the European area. Targeted, comprehensive measures at EU level to support the growth of domestic demands, construction as well as the downstream sectors, would certainly have a positive impact on the growth of population income growth and thus its purchasing power. If in the short term will not be stimulated demand, it is clear decreasing performance of the WPI as a whole, which of course for the future (min. 5 years) will adversely affect the WPI share in the GDP of the Slovakia, as well as balanced regional development (availability of raw materials), with negative impact on social stability of separated regions of Slovakia.

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DISTRIBUTION OF INVESTMENTS IN THE FURNITURE INDUSTRY AND WOOD PROCESSING IN THE REPUBLIC OF CROATIA FOR PERIOD 2005 - 2009

Maja MORO, Renata OJUROVIĆ, Ksenija ŠEGOTIĆ, Darko MOTIK, Andreja PIRC

ABSTRACT

The early entry into the European Union imposes the necessity of increasing the competitiveness of Croatian furniture industry and wood processing. Development of a competitive economy is of great importance of investments in education, science and technology. The aim of this study is to examine and analyze the investments of Croatian Wood Industry Companies for period 2005 - 2009 in the training of personnel, technology of wood processing and furniture manufacturing, technology of environmental protection and energy efficiency, investments in increasing capacity and investments in product innovation, service and manufacturing processes.

Keywords: wood processing, distribution of investments, competitiveness

1. INTRODUCTION

Wood processing and production of wood and cork, except for furniture, production of products made of straw and wickerwork and production of furniture in the Republic of Croatia in the late 1980s and early 1990s presented a competitive activity on the European market. As 1994 ended, their market share started decreasing and no significant positive changes regarding market competitiveness have been recorded to this day. The question is how to achieve maintain competitiveness, the prerequisite for survival, in an increasingly demanding surrounding. The general belief is that the social and economic development primarily depends on investments so one can achieve long-term development only through investments because a well-directed investment activity is the basic premise for all dimensions of competitiveness and sustainable development.

The European Union has committed to the principle of sustainable development as its policies and actions, based on balanced economic growth, price range of stability, strengthening the internal market, research and development, innovation, education, competitive social market economy and a high level of protection and improvement of environmental quality (Lučić, 2009). In order to achieve profitability and survival in the market in the EU accession process, wood processing and furniture manufacturing have to specialize and develop a modern production capacity in order with European standards and to establish an intensive, economically efficient and competitive production because of the candidate countries already from the beginning of the process of adjustment requests acceptance and implementation of recommended standards because they mean compliance with the fundamental values of the EU (Anić, 2008.). New and capital investments at present to increase the efficiency and benefits in the future are the only permanent solution for long-term development (Vedriš, 2005). Competitiveness problem basically boils down to problem size and quality of investment in physical and human capital as just enough and the quality of investment leading to increased competitiveness of productivity growth. Healthy productivity growth may not be based on passive economic restructuring by reducing employment, but must be based on the simultaneous growth of employment and production, where output growth should be faster to increased productivity and competitiveness. To accomplish the

above goals, the new technologies must be introduced, the new knowledges must be acquired, innovation and quality must be promoted which also determines the criteria for priority investments (Jurčević, 2007).

The spreading of new technologies and the globalization transform the economies of the developed industrial countries into knowledge-based economies. An important part of the competitiveness of the national economy is the level of knowledge and expertise of the personnel (Bejaković, 2006.). Embeddedness of key factors of competitiveness in business and manufacturing affect the competitive value of sustainable development and economic entity and the economy of wood processing and furniture manufacturing as a whole.

According to Ojurović (2010.) to achieve competitiveness it's important to invest in: training of personnel, marketing and promotion activities, product innovation, service and manufacturing processes, technology of wood processing and furniture manufacturing, technology of environmental protection, technology of energy efficiency and increasing capacity.

This paper presents a distribution of investments in the furniture industry and wood processing in the Republic of Croatia for period 2005 – 2009.

2. MATERIAL AND METHODS

According to the Development Strategy for Industrial Processing of Wood and Paper, enacted in 2004., Ministry of Regional Development, Forestry and Water Management, Department of Wood Industry, announced once a year a tender for assignation irrecoverable dedicated funds for stimulation and sustainability development of wood processing and furniture production in Republic of Croatia. Companies from industrial wood processing proposed a projects for financing and for this purpose they had to fill-in several forms. The seven types of investments have been chosen and they are shown in Table 1.

Table 1. Types of investments

Type	Description
t_1	training of personnel
t_2	marketing and promotion activities
t_3	product innovation, service and manufacturing processes
t_4	technology of wood processing and furniture manufacturing
t_5	technology of environmental protection
t_6	technology of energy efficiency
t_7	increasing capacity

The data on all seven types of investments had been gathered from the database of subvention donors. They include business entities, i.e. holders of capital investment, total income per years and values of investments in all seven types of investments in furniture industry and wood processing in the Republic of Croatia for 2005 - 2009 period. The data are shown in tables 2 and 3.

Table 2. Classification according to value of total income per year and investments in specific types of investments per year for all the companies in wooden sector for 2005 - 2009 period

Year	Total number of companies	Total income (mill. euro)	Types of investments (mill. euro)						
			t_1	t_2	t_3	t_4	t_5	t_6	t_7
2005	110	351,01	0,13	1,20	0,10	9,32	0,47	0,45	6,49
2006	130	395,04	0,20	1,40	0,11	12,97	0,22	1,04	7,09
2007	149	480,88	0,23	1,48	0,25	15,27	1,76	4,48	11,42
2008	156	500,24	0,36	1,65	0,73	15,27	4,63	7,73	12,76
2009	161	432,61	0,25	1,67	0,49	10,28	2,31	7,02	9,93

Table 3. Classification according to number of companies that invested in specific type of investment per year for 2005.-2009. period

Year	Total number of companies	Types of investments (number of companies)						
		t_1	t_2	t_3	t_4	t_5	t_6	t_7
2005	110	56	65	11	79	12	12	51
2006	130	60	69	15	88	11	21	64
2007	149	71	78	22	97	22	27	79
2008	156	81	82	19	105	34	42	82
2009	161	69	88	23	102	33	45	75

The assumption is that investment priorities will be the same regardless on the classification of the observed companies.

3. RESULTS AND DISCUSSION

Descriptive statistics were determined for annual income per company and annual share of investments for all of seven types of investments. Results are given in table 4.

Table 4. Descriptive statistics for annual income per company and investments in specific types of investments

Descriptive Statistics	Income per company (mill. euro)	Types of investments (euro)						
		t_1	t_2	t_3	t_4	t_5	t_6	t_7
Mean	3,07	1.641	10.504	2.231	89.732	12.357	27.054	66.721
Std.Dev.	0,23	409	377	1.636	15.995	10.998	20.476	11.813
Minimum	2,69	1.186	9.942	810	63.846	1.708	4.124	54.503
Median	3,19	1.571	10.561	1.668	97.864	11.782	30.084	61.688
Maximum	3,23	2.309	10.919	4.694	102.471	29.687	49.524	81.764
Confidence -95%	2,79	1.133	10.035	199	69.872	0	1.630	52.052
Confidence +95%	3,35	2.149	10.973	4.262	109.592	26.012	52.478	81.389

From the table 4. we can see that average annual income per company was 3,07 mill. euro with 95% confidence interval from 2,79 to 3,35 mill. euro. Also we can see that the companies in wooden sector annually invested at least in training of personnel (type t_1, from 1.133 to 2.149 euros per year) and in product innovation, service and manufacturing processes (type t_3, from 199 to 4.262 euros per year). They mostly invested in technology of wood processing and furniture manufacturing (type t_4, from

69.872 to 109.592 euros per year) and in increasing capacity (type t_7, from 52.052 to 81.389 euros per year).

In the years 2005 - 2009 average annual rate of change for total income per company was negative, $\overline{S} = -4.2\%$. Average annual rate of change for total investments (in all seven types of investments) per company in wooden sector was positive, $\overline{S} = 4.7\%$. Movement of total revenue for the company and the total investment per company in the five-year period are shown in Figure 1. and 2.

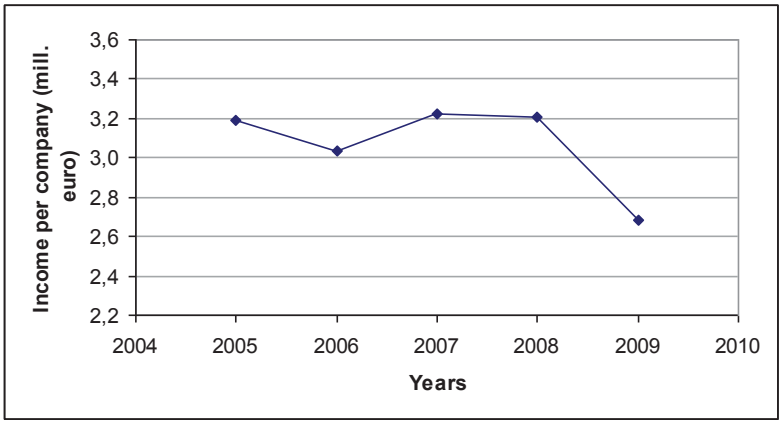

Figure 1. Total income per company for period 2005 - 2009

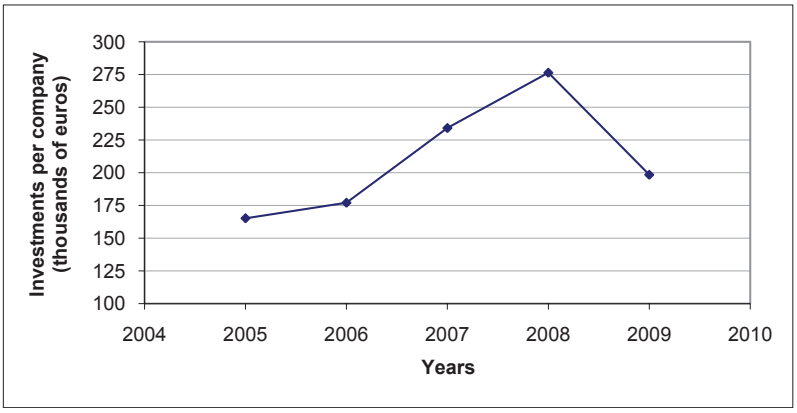

Figure 2. Total investments per company for period 2005 - 2009

Annually distribution of investments per company for all seven types of investments and distribution according to priorities for investments are shown in figures 3. and 4.

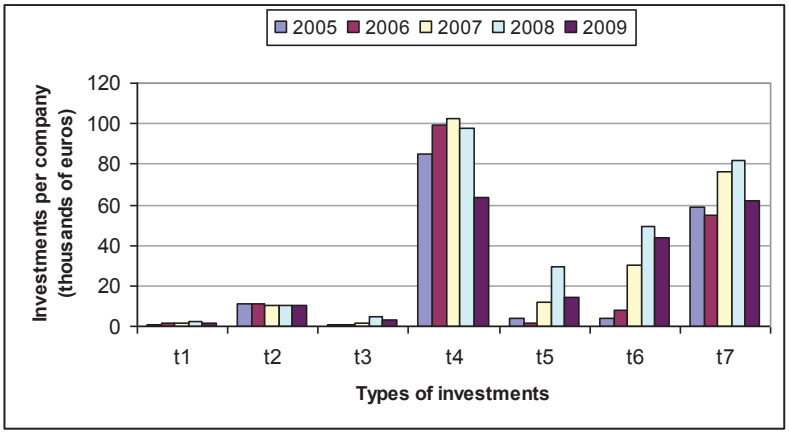

Figure 3. Investments per company and types of investments for period 2005 - 2009

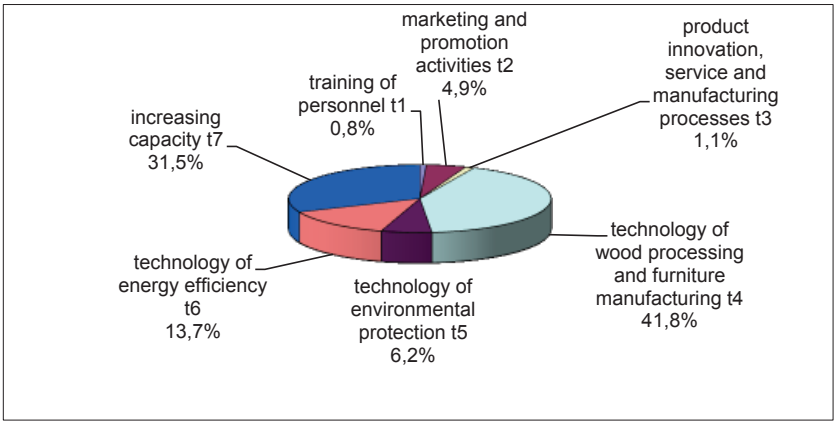

Figure 4. Ranking by type of investment with respect to the amount of invested money

Then we looked at the number of companies in the furniture industry and wood processing in the Republic of Croatia for period 2005 - 2009 that annually invested in concerned types of investments. Results are given in table 5.

Table 5. Descriptive statistics for number of companies that invested in specific types of investments

Descriptive Statistics	Types of investments (number of companies)						
	t_1	t_2	t_3	t_4	t_5	t_6	t_7
Mean	67	76	18	94	22	29	70
Std.Dev.	10	9	5	11	11	14	13
Minimum	56	65	11	79	11	12	51
Median	69	78	19	97	22	27	75
Maximum	81	88	23	105	34	45	82
Confidence -95, %	55	65	12	81	9	12	54
Confidence +95%	80	88	24	107	36	47	86

Considering the number of companies in wooden sector that annually invested in specific investment types we found that companies invested at least in product innovation, service and manufacturing processes (type t_3, from 12 to 24 companies) and tehnology of environmental protection (type t_5, from 9 to 36 companies). Companies mostly invested in technology of wood processing and furniture manufacturing (type t_4, from 81 to 107 companies per year). Distribution of investments and distribution according to priorities for investments are also shown in figures 5. and 6.

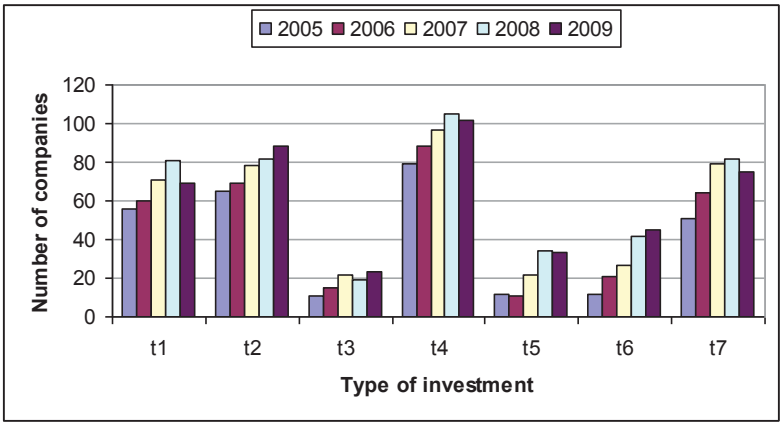

Figure 5. Investments due to number of companies

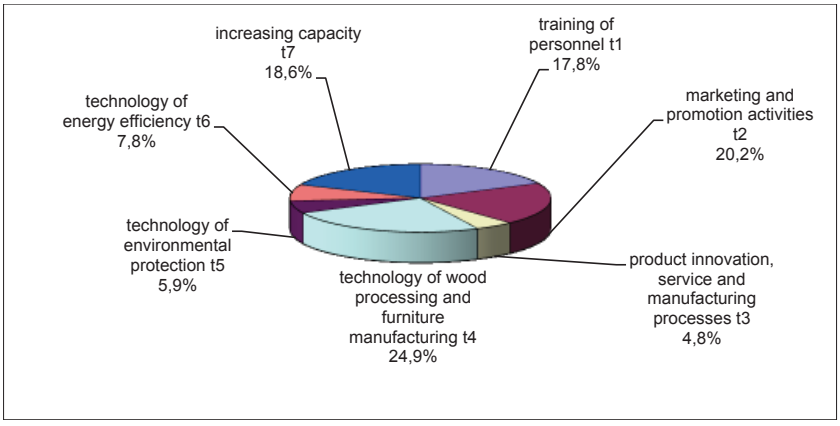

Figure 6. Ranking by type of investment with respect to the number o companies

Distribution of investments toward specific types of investments in both analyzed cases showed concordance in the ranking of only one type of investment. Analysis showed that in Croatian wooden sector the most important type for investment is type t_4, which means that as the most important investment they considered investment in technology of wood processing and furniture manufacturing. Results are presented in table 6. where *Rank 1* is distribution of investments according to amount of invested money and *Rank 2* according to number of companies.

Table 6. Comparing priorities for investments

	Types of investments	*Rank 1*	*Rank 2*
t_1	training of personnel	7	4
t_2	marketing and promotion activities	5	2
t_3	product innovation, service and manufacturing processes	6	7
t_4	technology of wood processing and furniture manufacturing	1	1
t_5	technology of environmental protection	4	6
t_6	technology of energy efficiency	3	5
t_7	increasing capacity	2	3

4. CONCLUSION

Investment in technology of wood processing and furniture manufacturing is the most important type of investment for companies in Croatian wooden sector. For the future research it would be interesting to examine distributions of investments if we divide companies in subcategories according to activities (wood processing and wood and cork product production / furniture production), sizes (small-size, middle-size and large-size), ownership (Croatian, foreign, partially Croatian, partially foreign) etc.

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THE INTERNATIONAL FINANCIAL CRISIS INFLUENCE ON THE PRODUCTION AND SALES IN SECTORS "WOOD PROCESSING WITHOUT FURNITURE" AND 'FURNITURE PRODUCTION'

Nikolay NEYKOV, Anna DOBRICHKOVA, Angel PETKOV

ABSTRACT

The economic crisis, which started at the beginning of the summer of 2007 with the so called 'accommodation or mortgage crisis' in USA, gradually grew into a world bank, financial and altogether economic crisis. Initially it leaded to destabilization of the fund market, bank losses and bankruptcies, inflation growth and raise in the capital cost, and later on (since the end of 2008) the problems of the credit institutions and the fund market transferred into the real sector. The crisis impacted on all countries, involved in the world economy, thus including Bulgaria.

The international financial crisis has influenced the Bulgarian economy too, as in almost all sectors of the national economy a production and sales drop has been registered. These processes has affected also the sectors 'Wood processing without furniture' and 'Furniture production'.

Keywords: financial crisis, wood processing, furniture

1. PROBLEM STATUS

The global finance crisis has acquired economic dimensions in the economic sectors through enterprise effectiveness drop, increase of the debts, etc. The negative influence on the economic results found expression above all things in drop down in the sales, and from there in the production. The crisis has been widely discussed and analyzed in its various consequences and characteristics. Mostly have been commented the changes, which occurred in the period 2008-2010. [1] According to the Bulgarian Chamber of Wood Processing and Furniture Industry the balance of trade has altered, as in 2009 the export exceeded the import with approximately 5%. Compared with the same figures in 2008, the correlation was to the advantage of the import with a whole 32%. It is very intriguing to investigate the crisis in depth, more precisely the prerequisites for it setting in the previous years [3]. The analysis of the time series of the sales indices, output and distribution prices serve in revealing the first symptoms of the upcoming crisis. Such symptoms are dropdowns in the production and untypical for the general trend peaks.

The purpose of this research is to determine the influence of the global finance crisis on the sales and the production in the two investigated sectors, and to build a forecast for the future development of the manufacturing for 2011.

The main tasks of this research are:

- Summary of the necessary statistical information concerning the main indices, which describe the wood processing and the furniture production.
- Calculating the influence of the foreign and internal trade factors, that leaded to reduction of the production and the sales.
- Modelling the dependency of the production on the foreign and the internal markets and extrapolating the production tendency for 2011.

To keep the submitted results correct and thorough, the research focuses on the direct influence of the crisis on sales, production and prices, without making speculations regarding the influence of other economic sectors.

2. INFORMATION SOURCES AND METHODS

In order to obtain the appropriate shape of time series in the research a 12 month moving average is used for smoothing the seasonal fluctuations. By so doing the seasonal fluctuations of sales and production are smoothed and the 'shape' of the crisis can be clearly characterized.

The following time series have been outlined: foreign and internal market sales; production in the sectors, import and foreign and internal market prices in the period 2005-2010. Indices on constant base have been obtained from the National Statistics Institute. The sales figures were transformed from revenue in current prices into revenue in base prices through the foreign and internal market indices. The influence intensity of the internal and foreign market on the production has been determined through a multiple regression model.

3. RESULTS IN SECTORS "WOOD PROCESSING WITHOUT FURNITURE"

The analysis divides into quantity comparison and efficiency comparison. Figure 1 presents the quantity data for wood processing.

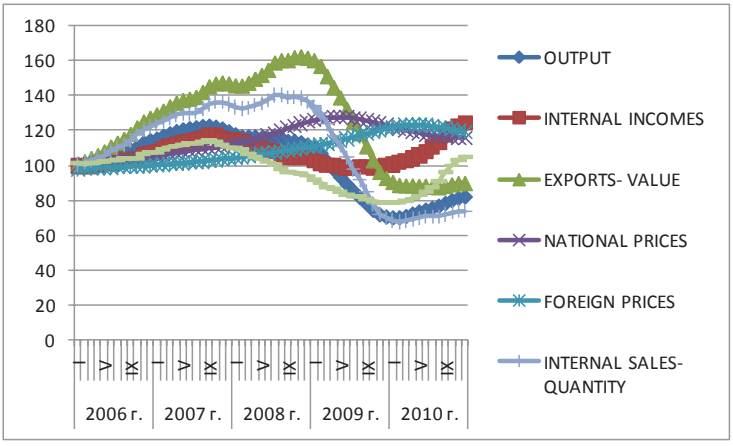

Figure 1. Smoothed indices of production and sales on internal and foreign markets

The diagram reveals that the foreign markets and the wood processing reach their absolute maximum in the second half of 2007. Regarding the internal market, this is only a local maximum, and the absolute maximum has been reached in 2008. The assumption could be made, that the national market for wood without furniture reacts at the world changes in 6-8 months. The manufacturing focuses on the internal market, due to its intensive growth in 2006-2007. During this period an increase in the wood import has been recorded. After the crisis has set in on the export markets, the production goes down, and thus reveals the export orientation of the sector. At the same time, the increased import in this period has led to solid market positions of the wood import traders, that on its turn has led to differentiation in the production and sales curves. With the crisis setting in National economy (and its

emphasized economic consequences) a dropdown of all examined figures has been registered. This process begins in the end of 2008 and continues until the end of 2009. The diagram presents, that the international processes of going out of the crisis, are recorded 6-8 months before they show up in Bulgaria. The export markets of wood products 'turn upwards' in the middle of 2009. The manufacture turns to be in better position than the wood traders. The export orientation of the manufacturers and the fast product pre-orientation of the import companies define the more intensive growth of the production compared with the trade. The so registered trend after the beginning of 2010 presumes improvement of the market positions of the Bulgarian wood products manufacturers.

The influence of the crisis over the prices is different on the national and on the foreign market. The diagram presents that the prices on the foreign market continue to increase even after the crisis once had set in. The market reacts 10-12 months after the drop in the sales. The internal market is more elastic and reacts after 3-5 months.

Summarizing the presented information above, a preliminary assessment of the crisis influence on the company's efficiency in the sector 'Wood processing' must be carried out. The assessment is presented in Table 1.

Table 1. Influence on the internal and foreign market of wood products

Factors / Index	Influence on the internal market	Influence on the foreign market
Production	-42%	-11%
Sales	-75%	-19%
Import	-25%	
Sales prices	-28%	-4%

4. RESULTS IN SECTOR 'FURNITURE PRODUCTION'

The analysis of the status of the sector 'Furniture production' passes through similar stages to the analysis of sector 'Wood processing'. The smoothed indices levels are presented in Figure 2.

The diagram distinctively reveals the status of the sector before the crisis, during the crisis and after that. By analogy with the other sector, the import increases considerably after 2006, but in contrast with it remains leading on the national market. Based on the diagram, an assumption can be made that the problems in the sector has began in the second half of 2007. The sales on the internal market drop, as does the production, while the sales on the foreign market still continue its growth. The export orientation of the sector is not as clearly outlined as it is in the wood processing sector. The production is balanced between the foreign and the internal market. The reason could be the initially negative trend in the international market prices, and in contrast with them the positive trend of the internal market prices. The setting in of the crisis is clearly revealed at the end of 2008 and its influence continues until the middle of 2010. As it is in the preceding sector, the import goes down during the crisis, but in considerably lesser degree. The prices reduce only on the internal market, after the beginning if 2010. The first signs of the crisis end are recorded about the first half of 2010 for the production and the second half for the trade. The export orientation of part of the manufacturers presumes negotiating contracts, which improve the state of the production before the rehabilitation of the internal market. The summarized results regarding the influence of the crisis on the sector are presented in table 2.

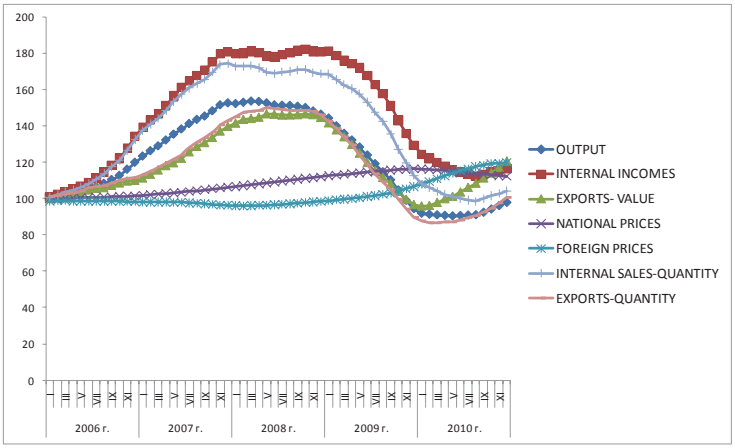

Figure 2. Diagram of the smoothed indices of sales on the internal and foreign market and the prices on the two markets for 'Furniture production'

Table 2. Influence of the foreign and the internal market on the furniture production

Factors / Index	Influence on the internal market	Influence on the foreign market
Production	-63%	-5÷10%
Sales	-76%	-64%
Import	-29%	
Sales prices	-17%	-24%

5. PERSPECTIVES FOR 2011

In the research has been made regression analysis to determine the average influence of internal and export markets on output. As it was mentioned the export-oriented companies have better opportunities for crisis exit. It is important to predict whether this exit is possible in the next year of 2011. Predicting goes through the next few stages:

- Determination of tendencies in quantities sold to the export and internal markets.
- Modelling the regression equations of output in two sectors.
- Extrapolation for 2001.

Tendencies are obtained by linear; polynomial and average rate of improvement.

Forecasts with linear trendline and average rate are very close to each other and consequently they are used methods in prediction for 2011. Result reveal that growth for 2011 should be:

- 12% increase on internal market and 8% on export markets for wood processing.
- For furniture production in 2011 is expected to be 2,11% decrease in sales on internal markets and increase in almost 0,4% on export markets.

Regression models for the two sectors are following:

For wood processing:

$$Y= 0{,}331\ x1+0{,}499x2 +5{,}951, \quad (1)$$

For furniture production:

$$Y= 0{,}554\ x1+ 0{,}359\ x2 + 1{,}722 \quad (2)$$

Where x1 is the index of internal sales;
x2 – index of export.

Equations prove that wood processing in Bulgaria is more export-oriented than furniture industry. Every percent – change in output have been caused by 0,331% increase on internal market for wood processing and 0,5% on external. For furniture industry results are consequently 0,554% for internal market and 0,359% for external-exports.

After equations have been modelled extrapolative forecast is plausible. In 2011 output in wood processing should rise in 10-12% and this in furniture industry should fall in 1-2%.

6. CONCLUSIONS

Based on the research made above the following conclusions could be drawn:

- Crisis in National Economy of Bulgaria has harder influence on output in wood processing and furniture industry, than international crisis on their export markets.
- Wood processing is more export oriented and that causes industry's hardiness during the crisis and more intensive exit after the bottom in the end of 2009.
- Traditionally high import of furniture limits the output growth. After the bottom in 2009 the industry has many difficulties for exit. Market focusing on internal trade causes bigger risk for profitableness of Bulgarian producers.
- By reason of crisis appeared import of products from both sectors decreased significantly, which can be claimed as positive consequence for producers.

International financial and economic crisis caused output and sales fall into Bulgarian economy and particularly wood processing and furniture industry. Differentiating the influences between external and internal markets (market reasons) can show up premises existed before crisis appearance. Increased import during the period between 2007 and 2008 forced the pressure over Bulgarian producers. In this period the economic "boom" motivated a great deal of traders to increase the import. But the main conclusion here appeared after the economic impacts over the both industries: It's very important, almost vital distribution market to be diversified on international and in the same time internal base. By this way each producer and industries are more independent by price balloons and speculative prices.

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GRANT PROJECTS AS COMMUNICATION CARRIERS IN POPULARIZATION OF SCIENCE AND TECHNOLOGY IN WOOD INDUSTRY

Renata NOVÁKOVÁ, Andrea TOMÁNKOVÁ

ABSTRACT

Science and technology represent key factors determining the economic and social development of country. A current major problem in this field, both in Slovakia and in other countries, is an inadequate perception of their importance by the public. Strategic goals of popularisation of science and technology are as follows:

- increasing the comprehension of science and technology by the general public,
- improving the strategies of clarification of the research and development goals and results,
- eliminating the communication barriers between:
  a) the research and development staff on the one hand, and representatives of the decision-makers on national and regional levels on the other hand,
  b) the above-mentioned parties and the general public,
  c) the research and development staff on the one hand, and representatives of business utilizing the results of research and development on the other hand.

It is a well-known fact that academic research in universities is the most common source of knowledge, innovations and activities which consequently form the basis for the development of science and technology. Not always, however, this knowledge is appropriately transferred into practice, which may be partly due to ineffective application of different forms of marketing activities. The objective of this paper is therefore to highlight the options, forms and strategies of the marketing communication mix in the context of the popularisation of science and technology in society.

Keywords: communication, science and technology, grant

1. INTRODUCTION

In order to stop the unfavourable trend in research and development initiated after 1989, The Slovak government assigned the Ministry of Education with the task to elaborate a long-term concept of the science and technology policy in the Slovak Republic, including the related legislative documents and standards of its implementation. The Slovak Republic Ministry of Education has elaborated a series of analytical and conceptual documents, including the Analysis of the State of Science and Technology in Slovakia. Simultaneously, there was an attempt to build an integrated project harmonising the research and development projects, the solutions to which should be a tangible contribution to the economic and social prosperity. The abovementioned Analysis has proved the high degree of atomisation of research projects, and the necessity to determine priorities regarding the content orientation of research and development.

A similar situation is also in the wood industry. On scientific research projects in this area is little awareness and information are not generally communicated, or only in the close community of woodcutters.

2. LEGISLATIVE SUPPORT FOR SCIENCE

Act No. 132/2002 on science and technology defined the status of science and technology and simultaneously provided better legal conditions for their financing and budgeting. The Act on science and technology assured a noticeable improvement in the objective and transparent allocation of financial support for science and technology by providing a common competitive environment for research and development. Researchers regardless the sector or section can compete for support for their projects within the governmental research and development programmes or governmental orders, under the strictly defined criteria and conditions stated in tender.

The objectives of the state policy of science and technology are being implemented via involving a wide scientific community into decision-making processes. This effort has been recently manifested in the state programmes of research and development, which were defined by the councils, consisting of the representatives of university sector, state sector of research and development, entrepreneurial sector of research and development, as well as consumer production sphere.

Important role for the wood industry may mean the creation of the wood cluster. The SR operates about 170 companies engaged in this area. The emergence of the wood cluster would be welcomed. In the region of Banská Bystrica encourage the emergence of engineering and wood processing cluster. Should be established as early as 2008. As a result of the crisis it failed to materialize. The main activities of the cluster would be aimed at promoting cooperation scientific research institutions and the wood industry national and international networking, marketing the results of research and development activities at national and European level, etc.

3. GRANT PROJECTS IN TERTIARY EDUCATION ON WOOD PROCESSING INDUSTRY

Current research in universities is rather diversified as for its contents and orientation. It reflects the current structure of faculties and their educational and research focus. Simultaneously, it absorbs new trends in the direct and related scientific disciplines (majors), which mirror the standard and historical development and mission of individual universities. New scientific trends and topics have been developed as additive and innovative ones, or as a reflexion of the scientific trends in progressive areas of the newly established faculties. The trends are also defined by the new structure of calls for EU research projects (e.g. 6th and 7th framework programmes, COST, EU structural funds etc.).

Regarding the utilisation of financial tools, grant funding is predominant. Main advantages of grant funding involve particularly the development of competitive environment in the field of projects, which creates prerequisites for the selection of better projects, thus dramatically increasing the effectiveness of financial means allocation. Within the programming period of 2007 – 2013, financial means of euro funds can also be effectively used.

Slovak Republic uses institutional financing of research and development from the state budget in terms of valid legislation. Institutional financing concerns mainly the performance of the Slovak Academy of Science and the research in universities (Fig. 1).

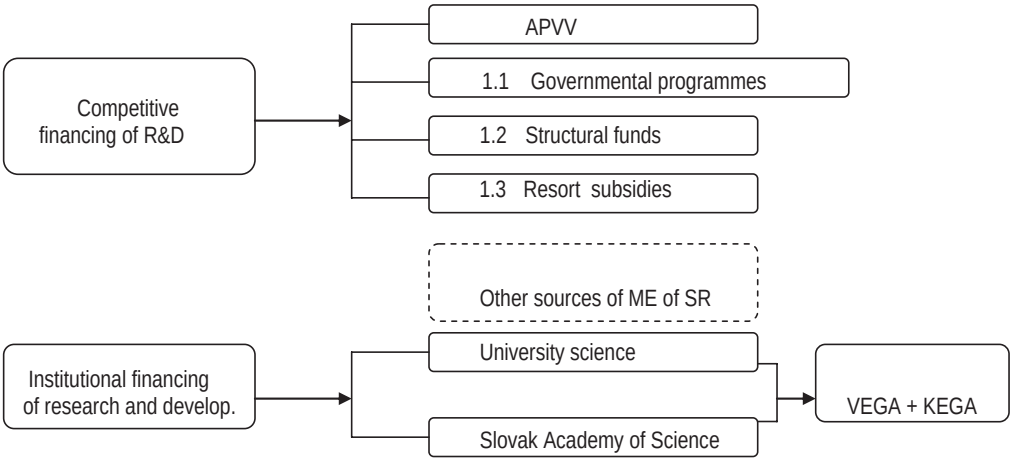

Figure 1.

4. POPULARISATION OF SCIENCE ON WOOD PROCESSING INDUSTRY IN SLOVAKIA

Popularisation, together with student education, perhaps belongs to one of the most important roles of a scientist. We are paid from the money of taxpayers, we should therefore be able to communicate the results of our research activities and science in general in a comprehensible way.

In 2007, in compliance with the abovementioned strategy, the SR Ministry of Education established the National Centre for Popularisation of Science and Technology within the Centre of Scientific and Technical Information. As a supportive tool of popularisation of science and technology in Slovakia and abroad, the National Centre has carried out the activities such as:

- providing the general popularisation of science and technology in media while communicating the topical information regarding the results and contribution in the field,
- organising the annual event "A Week of Science and Technology in Slovakia" organised by the SR Ministry of Education, Sport and Family,
- covering the all accompanying events within "A Week of Science and Technology in Slovakia" organised by the research and development organisations in Slovakia,
- awarding the personalities and organisations in the field of science and technology (e.g. A Scientist of the Year),
- summarising the research and development results and activities, interpreting them in a comprehensible way to all layers of the educated public, and presenting them via all communication channels available,
- providing a direct contact with the wide public by means of conferences, lectures, seminars, public discussions and permanent expositions focused on scientific disciplines of technology, natural science, social science and humanities, enabling the public direct response to presentations,
- issuing an electronic newspaper — The Scientific Kaleidoscope,
- administering the Central Information Portal for Research, Development and Innovations,
- supplying publications and other materials to the abovementioned Portal and keeping agenda of Science and Society.

The target groups involve:

- representatives of the decision-making sphere on the regional and state levels,
- research and development staff,
- expert public,
- entrepreneurial sector,
- university students,
- secondary school students,
- primary school pupils,
- lay public.

5. COMMUNICATION TOOLS AND THEIR ROLE IN POPULARISATION OF SCIENCE

Marketing communication represents the most important tool of marketing mix in the current dynamically developing competitive environment. Besides focusing on the desired reaction and increasing the demand for products, it also provides necessary information, distinguishes the company product from that of the competition, reminds the product to current consumers, helps face up the competition, balances the fluctuations in demand, and, what is extremely important, influences customers' behaviour and common opinions. Its role is irreplaceable also in using project management in all the stages of its process.

To popularise the research results, it is important to select an appropriate communication tools. Each communication tool is connected with certain costs, and it is therefore highly important to select the communication means assuring the most effective communication in all the related areas. Integrated marketing communication is the tool which can guarantee the effectiveness in all stages of the communication process, including the preparation, implementation and post-implementation phases of grant communication.

Mass communication is defined as a set communication. In the process, a well organised group of communicators communicates the information to the public or a set of addressees and recipients who may (but do not have to) be organised in a certain time and space distance, while bridging that distance either socially, i.e. via communication relations, or on the basis of subject, by means of mass–communication means.

The abovementioned forms of the research results popularisation enable increasing the social awareness of the key issues of the Slovak society development and alternative strategic solutions to those issues. They simultaneously provide useful feedback to the researchers, enabling them to present the results in a comprehensible and attractive ways.

6. CONCLUSION

Advanced science in Slovakia is still a bottleneck. Scientific community in Slovakia as a whole is not ready yet to name a spade a spade. This results into a low credit of both science and scientists in Slovakia, multiplied by the long-time insufficient funding of science and the absence of adequate infrastructure.

To illustrate, in 2010 was under grants VEGA registered in the group No 8 for the Agricultural, veterinary and wood science projects 113. Awareness of their scope and results of future solutions is very low.

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CONSUMER ADDED VALUE VERSUS CUSTOMER PROFITABILITY IN THE WOOD PROCESSING INDUSTRY

Renata NOVÁKOVÁ

ABSTRACT

The term value is associated with generating a value. Value is an economic term which reflects economic benefits. This concept, however, can be understood from two aspects, namely:

- from the viewpoint of a customer who examines the value and evaluates it by comparing different types of offers,
- from the viewpoint of a manufacturer who expects that demand for its products will bring the desired effect in terms of positive economic result.

Both parties anticipate that their vision of the anticipated added value will be fulfilled.

The aim of this paper is to emphasize two levels of monitoring and evaluating the effectiveness in woodworking industry.

Keywords: consumer value added, target value, overall consumer value, overall consumer price

1. INTRODUCTION

Customer can to choose from numerous products and services, most of which meet his requirements, i.e. they were produced on the required quantitative and qualitative levels. Nevertheless, market faces disproportions in successful sales of individual products, which contributes to the formation of competitive environment and thus also certain "struggle for customer". Reasons for this are customer expectations, which are projected into satisfying the customer's needs. One should realise that the importance of products dwells in the way we use them rather than in the fact that we own them. That means that each customer, either an organisation or an individual, selects from a set of potential alternative products with the aim to satisfy his or her own needs. Decision-making thus depends on satisfying the value of product. It is particularly important to consider the above-mentioned in the field of woodworking industry, as this industry is being blamed for its incapability of finalising its products in the way interesting for customers. Customers of woodworking industry therefore prefer the products of foreign provenance with more attractive price, and satisfying customer demands regarding quality. This decreasing trend can be ascribed to the world recession which has deepened the deficit from the past. Solution to this problem might be a thorough recognition of customer expectations, which is frequently reflected in **customer value added,** and in more rigorous selection of customers based on the valuation of **customer profitability.**

2. CUSTOMER VALUE ADDED

First, it is important to define what the concept of **value** involves**.** In literature, value is associated with value-generating process. For customer, it is the overall ability of a product to satisfy his or her (customer's) needs.

International Valuation Standards define value in various ways. Value is understood as an economic concept referring to price that will most presumably be negotiated between buyer and seller. Value is not an objective fact, but an estimate of presumable price, which would apply to the given product in a certain time, while the estimate corresponds with the certain definition of value.

Value as an economic concept reflects a market viewpoint of economic benefits acquired by the subject that owns the goods or utilises the services in a certain period.

Market value is another concept frequently used in practice. It reflects collective understanding and activities on market, and represents a basis for valuating the majority of resources in market economies. Definitions of market value may vary, yet their concept is always identical. Quite frequent is the notion of **objective market value**, associated with market value. International Valuation Standards define market value as "the estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion." Estimate of market value thus expresses an objective valuation of individual proprietary rights for product in particular time.

Let us look at the value from the potential customers' viewpoint. It is important to realise that each product represents certain costs to be spent by the customer in order to acquire the product. This is the reason why, before selecting a product, customer frequently considers the product's value and price. According to DeRos, value is defined as "satisfaction of customer requirements at the lowest possible acquisition, proprietary and utility costs of a product". Now, let us focus on customers' perception of a product value. Customers perceive and assess the values resented by various types of offers. When a real product value is higher than the anticipated one, customer feels satisfaction, and the probability of a repeat purchase increases. We can state that, depending on his or her expectations, customer prefers the product of the organisation offering the highest customer value regarding the total customer price, i.e. the product with the highest **anticipated value added.**

3. HOW TO DEFINE ANTICIPATED VALUE ADDED?

Customer value added can be calculated as the difference or the ratio between total customer value and total customer price, while the total customer value is determined by the set of the product's utility properties anticipated by customer. Total customer price is then given by the costs expended by the customer in connection with the evaluation, acquisition and utilisation of product.

Anticipated customer value then comprises the following components (Fig. 1):

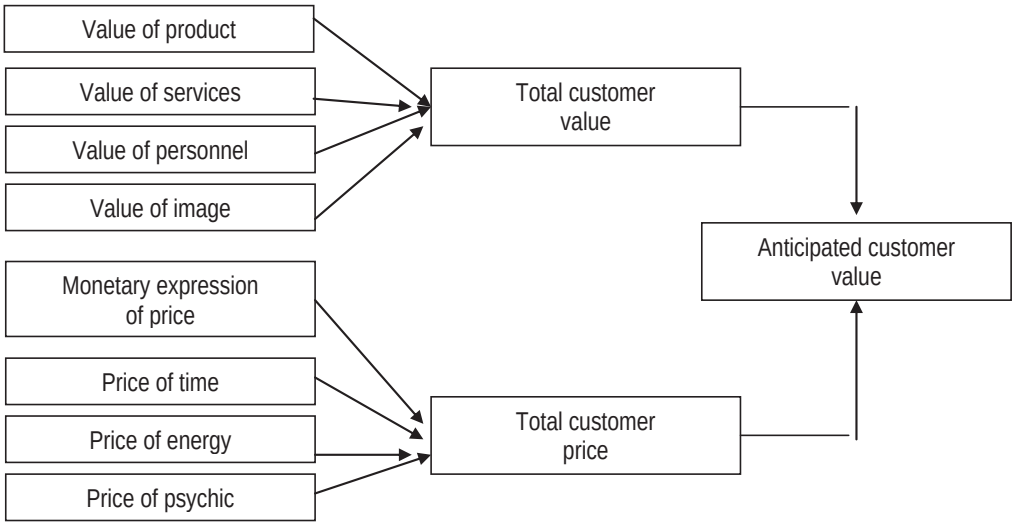

Figure 1. Components of anticipated customer value – anticipated value added

As stated above, customer anticipated value added issues form customer satisfaction. The following tools are then used to assess customer satisfaction:

a) ***System of complaints and proposals –*** a customer-oriented organisation enables its customers to point at the imperfections or to submit proposals for improvements by means of a Book of suggestions and complaints. This may provide valuable information and incentives for problem-solving and thus increasing the customer anticipated value added.
b) ***Surveys of customer satisfaction -*** surveys have proved that only 5 % of actually dissatisfied customers do complain, while the others either change the supplier or reduce buying. Using various questionnaires, organisations examine the level of customer satisfaction.
c) ***Fictitious purchasing –*** this is an extreme way, when an organisation hires so called fictitious customers who simulate various needs and situations which may arise in the field in question. Results of such surveys are assessed, and, subsequently, measures are taken with the aim to increase customer anticipated value added.

Analysis of lost customers – this analysis can be called a "swan song", as once we lost a customer, there is a very low probability that he or she will come back. The significance of the analysis dwells in the improvement of activities. It is important to monitor the ratio of the lost customers and the total number of customers, and consequently also the reasons why we lost them.

4. RETURN ON CUSTOMER (ROC) – CUSTOMER PROFITABILITY

This index emphasises rather the flow of income and costs in the course of time (within an economic lifecycle of a customer in the organisation), than a single transaction. Customer profitability is influenced by three basic factors: profit, competitive advantages and production of values within internal operations. It is important that the organisations generate both high absolute and relative values in comparison with the value of competitive products. High product quality belongs to the chief customer anticipated values. Competitive advantages, on the other hand, enable to achieve high customer

satisfaction resulting in repeat purchases and consequently to high profitability. However, many organisations have problems with assessing individual profitability of a customer.

First, it is necessary to define who is and who is not a profitable customer. Generally, a profitable customer is defined as a subject generating a flow of income exceeding the flow of costs expended in time with the aim to retain a customer or for the sales and service purposes. If we manage to identify profitable customers, we can identify or eliminate those non-profitable. Organisations carrying out such type of analysis found that up to 45 % of customers may seem to be dumping. This fact may significantly affect total effectiveness of an organisation.

Though quality management employs so-called **customer orientation,** it is necessary to analyse the effectiveness of customer-supplier relationships, as they not always tend to prosper.

5. CONCLUSION

The organisations that want to succeed in the current competitive environment strive for so called **total customer satisfaction.** A prerequisite for this is a symbiosis of total customer value and total customer price, resulting in the customer value added which may challenge a positive reaction form the side of potential customers and result in a purchase.

Maximisation of customer satisfaction is not the main aim of companies, though customer-oriented companies are trying to achieve high customer satisfaction. Main aim is and always will be **profit.**

Even if an organisation achieves higher customer satisfaction by means of decreasing prices, increasing quality of services etc., it may reach lower profit. In such situation, each company considers what is more effective.

An organisation may also achieve customer satisfaction without decreasing profit, e.g. by means of improving production technology or investing more into research and development of new products, which, in fact, increases the profit.

There is even the third option, when organisation acquires additional financial means by decreasing the liabilities of their debtors, in order to support the increase of customer satisfaction.

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DEVELOPMENT OF CERTAIN AREAS IN THE SLOVENIAN FURNITURE INDUSTRY

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ABSTRACT

Globalisation is increasing the number of markets facing furniture industry company, together with the fact that the number of competitive companies is increasing as well. There are changing demands of customers, who are looking for products of higher quality and lower prices together with fast and reliable delivery. The life cycle of products is getting shorter and it is necessary to constantly invest into development of new products.

Our research was about development of certain areas in the Slovenian furniture industry, which directly or indirectly adversely affect the development of innovative wood products.

Keywords: furniture industry, product development, companies, designers

1. INTRODUCTION

It is a common notion that competition in industries is becoming increasingly intense. With the trend of business globalization, companies face challenges from both national and international competitors. To counter this threat, many of them focus on searching for sustainable advantages. The survival of a company is heavily dependent on its capacity to identify new customer requirements and to develop and market improved products (goods or services). The delivery of innovative products to the marketplace is, thus, considered as a key element for a company to confront competitive challenges (Shen et al., 2000).

Satisfying customer requirements through the use of ordinary products is often not enough to capture and retain market share. Customers' needs and expectations should be met and exceeded through product innovation. However, these needs and expectations become increasingly sophisticated as customers experience new ideas in the world around them every day (Plsek, 1997). The innovative product development process requires an understanding of continuously changing customer wants and needs. Hence, there is a need to study and develop procedures that can help a company or project team gain a profound knowledge of customer requirements and satisfaction, and then develop products with innovative features.

The problem of (non)competitiveness of Slovenian furniture industry is among other things also reflected in lack of innovation and improper or lack of intensive investment in product development. The issue of innovation covers all stages of development from concept, prototyping, through laboratory studies of material and structures, market reserach as well as research of technological abilities of the company to the selection of conceptions and making products. Qualitative development of innovative products of the company is much more difficult to derive by companies themselves due to various socio technological factors (company size, level of education, the environment, the company's strategy …), so it is desirable to develop cooperation with external experts (designers, ergonomists, ecologists …). In many Slovenian furniture companies developing innovative products does not fall between the main strategies of the company's business operation. Companies too often decide to indiscriminately copy

and transfer practices from abroad, but this rarely has a long-term positive effect on company performance.

2. MATERIALS AND METHODS

We tried to learn how the leading management in the companies and designers evaluate the degree of development of certain areas in the Slovenian furniture industry, which directly or indirectly adversely affect the development of innovative products.

Our research includes 147 furniture companies classified under the following fields: manufacture of office and shop furniture, manufacture of kitchen furniture and manufacture of other furniture.

With each of the companies we conducted telephone interviews, in which we presented the problem and determined the adequacy of the company itself. In these interviews, it appeared that some companies can develop products, some companies do not cooperate with designers and even have their own development, and some companies simply did not wish to participate. So we finally received 138 responses and processed their results.

A separate questionnaire was also developed to obtain the opinions of designers involved in product development in the Slovenian furniture companies. We obtained 111 completed questionnaires of active furniture designers.

3. RESULTS

In the beginning of our research we asked the leading managers in the furniture companies and the designers whether they believe that the Slovenian furniture industry companies should invest more resources in the development of their own products in comparison to investing in other activities. The answers are shown in the Figure 1.

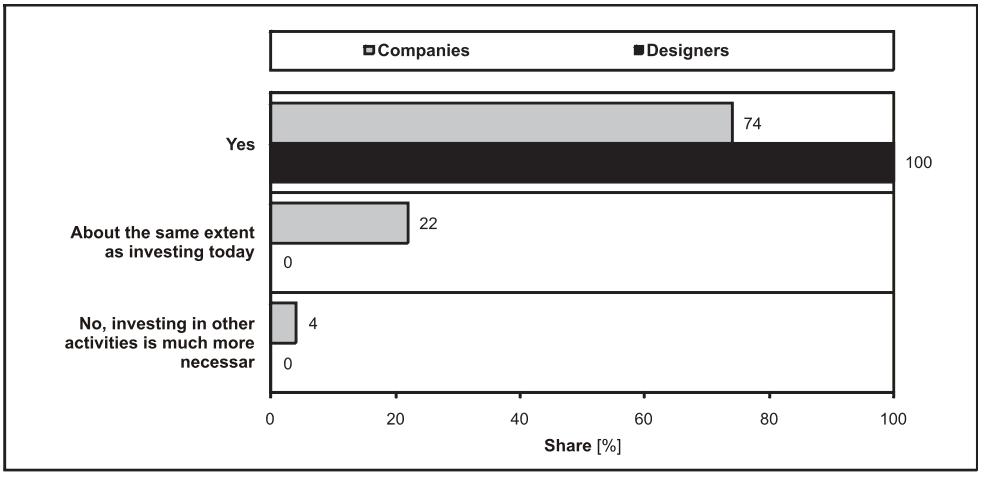

Figure 1. The need for greater investment in product development.

Figure 1 indicates the unity of views of companies and designers that they should invest more in developing their own products than in other activities within the company. Here are experts completely convinced into that, one fifth of companies would invest the same amount of resources into the product

development as it did until now, while a few companies interestingly believes that investing in other activities is much more important.

In the next question we tried to learn how the leading management in the companies and designers evaluate the degree of development of certain areas in the Slovenian furniture industry, which directly or indirectly adversely affect the development of innovative products. Figure 2 indicates their assessments, where the evaluation 5 means that the area is highly developed and there is no problem, evaluation 3, that the field is neither developed nor problematic, and finally evaluation 1 means that the area is undeveloped and highly problematic.

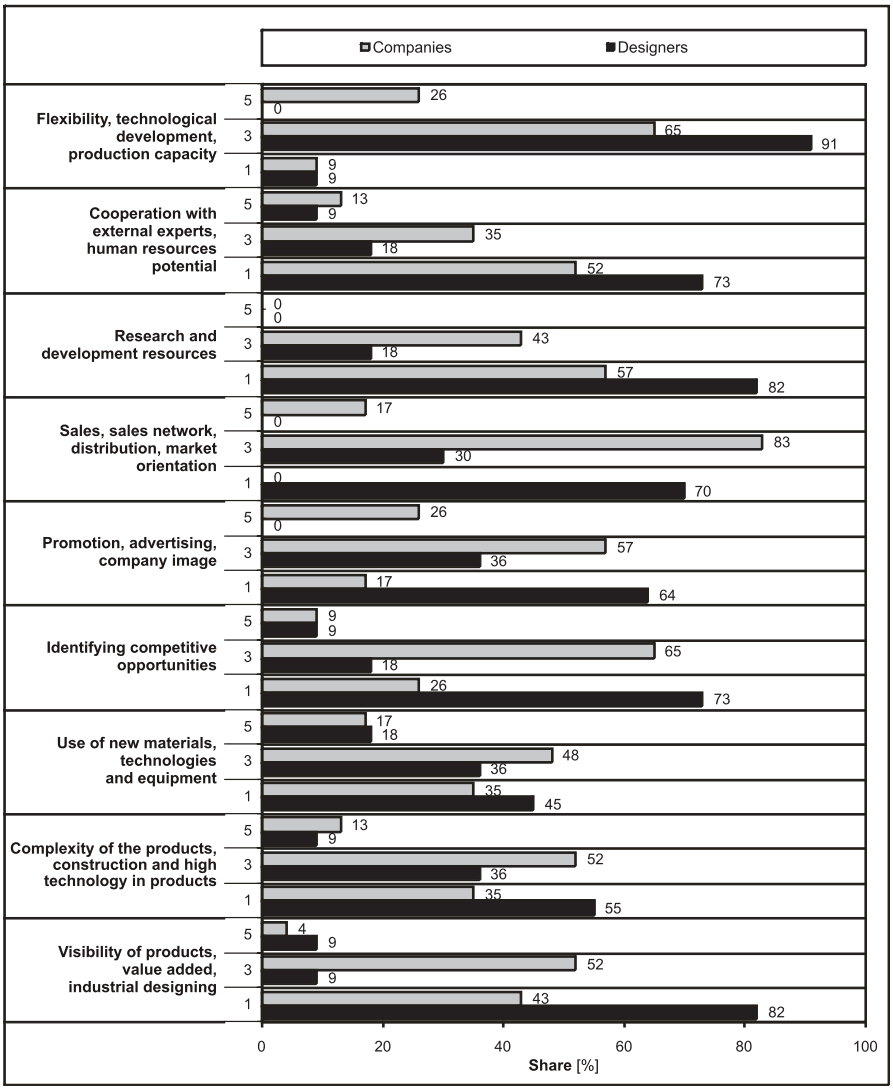

Figure 2. Development areas and negative influence on product development.

Areas, which are both according to the opinion of companies as well as of designers, undeveloped and represent problems in the development of new products, are:

– research and development resources,
– cooperation with external experts, human resources potential and
– use of new materials, technologies and equipment.

These areas represent a basis for cooperation of these two spheres. It can be concluded that there would be increased development of innovative products along ensured more resources for development, the harmonious cooperation with relevant experts and the use of modern technologies, materials and equipment.

This was followed by a question, with which we tried to establish which factors, according to the opinion of the leading management in the companies and of designers, most affected the fact, whether a company has own development of products or not. In doing so the evaluation 5 indicated that the factor has a great influence, 3, that the factor has a minor influence and 1 that the factor has no influence on it at all.

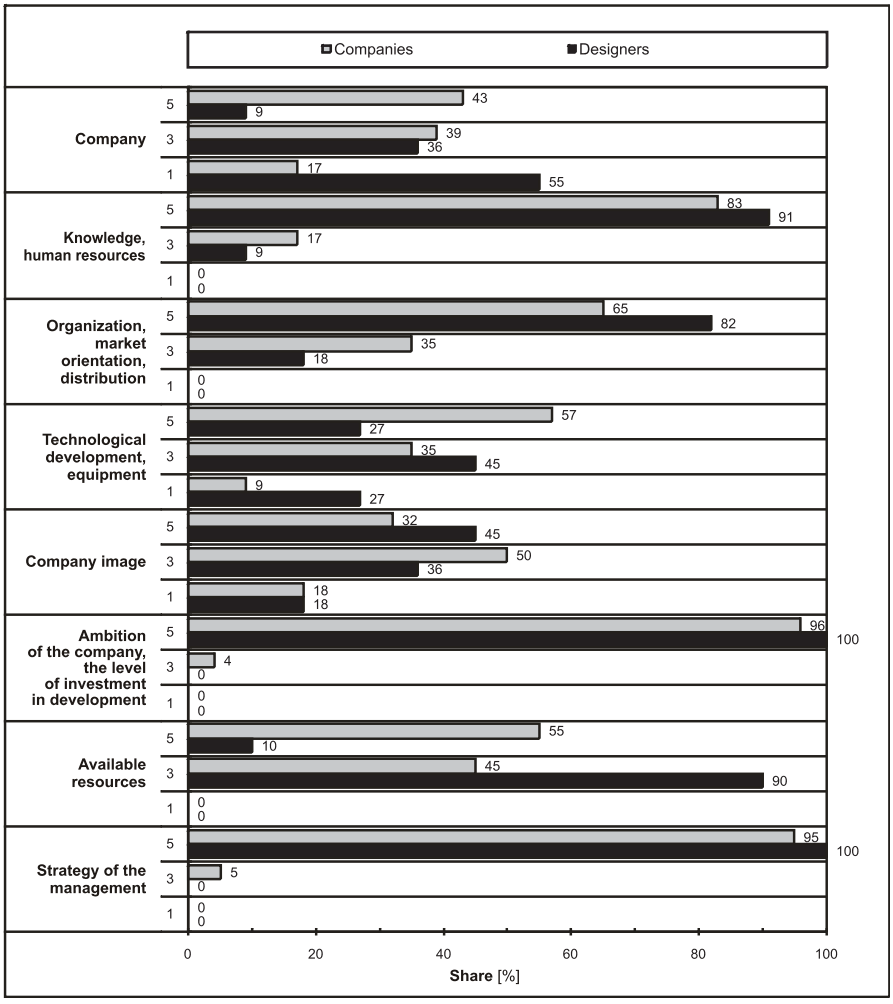

Figure 3. The influence of factors on developing own products in the company.

The Figure 3 indicates that most of companies and designers believes that the presence of developing own products in the company is most influenced by ambition of the company, level of investing in the development, strategies of the company management, knowledge, human resources and partly also the organization itself.

We also wanted to know, which information the leading in the company and designers consider as relevant and important in the product development. In the Table 1 are answers classified according to the percentages from the most important ones to least important ones.

Table 1. Key information about the company in product development

Very important information	**Companies (%)**	**Designers (%)**
Strengths and opportunities of a company	95	91
Characteristics of products, which will in the future be the most desired ones among potential buyers	91	91
Company markets (niches, competition, …), buyer, price ranger, …	90	82
Trademarks of the company, classification, objectives, vision	77	91
Characteristics of the existing products (materials, technology, …)	64	64
The existing situation (technology, marketing, advertising, competition, …)	59	64
Expected investments (technology, human resources, development, …)	50	64
Company deficiencies	50	45
Organization of a company, knowledge, human resources	41	55
Basic, additional and future activities, cooperation	36	55
Economic indicators of the company (sales, profit, resources for development, …)	32	55
Less important information		

Table 1 clearly indicates comparable evaluations made by designers and companies in all cases, with the exception of the evaluation of reasonableness of information on organization of the company, knowledge and human resources in it, on company activities (basic, additional, future ones, cooperation) and economic indicators of the company. In the above-mentioned cases more than one half of the designers identified information as necessary, and the companies identified them as partially necessary for the development of products.

4. CONCLUSION

In recent decades has the furniture industry rise to major changes. The life cycles of products are becoming increasingly shorter, which is leading to increasing need for intensified development of new products or updating the existing ones, while it is necessary to continually update the technology and equipment as well as to include developmental and research activity, education and the search for financial resources for the development and business operation of companies. Furniture industry needs to recognize that while developing and investing in the organization, computerization, automation and equipment, it must also invest in product development. This is certainly a major undertaking, but it is feasible with appropriate strategies of work, business operation and education.

Furniture products from regions with low-cost labour force are becoming along low price increasingly competitive, so the only solution is reflected in the development and raising the added value through own innovative products. The added value of the products of Slovenian furniture industry is at a very low level. Along the fact that Slovenian furniture industry is a net exporter and is thus facing high competition on markets, on which it exports its products, makes the raise the added value urgent

and necessary. Perspective is in providing such conditions that will allow targeted development of innovative, competitive products.

The survey showed the unity of designers and companies who believe that in the past there were more innovative and designed products in the furniture industry and that it will be called in the industry to improve the ratio of investment in development, compared to investing in other activities. In the development of innovative products is according to the opinion of the interviewed most difficult to provide and ensure resources for the development and low costs of the complete process (development, production, sales …) with regard to the achieved outcome.

Most of companies and designers believe that the presence of developing own products in the company is most influenced by ambition of the company and strategies of the company management and that most important information are those about strengths and opportunities of a company.

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CHANGES IN COMPETITIVENESS OF SELECTED CLUSTERS IN THE SLOVAK FOREST SECTOR

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ABSTRACT

This paper deals with the evaluation of competitiveness of the sectors of production and use of industrial roundwood and sawnwood in Slovakia. Both selected sectors, divided to coniferous and non-coniferous, are considered to be separate clusters for the purposes of this analysis. Absolute and relative competitive indicators are defined in order to evaluate competitiveness of each cluster. Additionally, changes in competitiveness are analysed in time during the period 1998 – 2008.

Key words: industrial roundwood, sawnwood, cluster, competitiveness

1. INTRODUCTION

The forest industry has experienced many important changes during last twenty years. After the year 2000 wood processing capacity in Slovakia increased significantly and improved domestic wood consumption. The highest economic growth was recorded during the years before the economic and financial crisis (driven by the global economic growth, Slovakia's accession to the EU etc.). Timber sale income represents the most important source of finances needed to ensure sustainable development of forest resources for forestry (counts for 80% of the forestry sector income). In 2008, forestry supplied approximately 8.8 million m^3 of timber to the market of which 2.2 mil. m^3 was exported [1].

Similarly, wood processing industry has undergone important structural changes. Different sectors within the industry started to develop variously, reflected to domestic and foreign conditions. The industry is able to consume approximately 8 mil. m^3 of timber. Level of sawnwood production depends on annual felling in Slovakia and on the conditions at the domestic and international wood product markets. According to FAOSTAT, coniferous sawnwood production was over 2 mi. m^3 in 2008 and is approximately two times higher compared to the production of non-coniferous sawnwood.

2. METHODOLOGY

Cluster approach is based on the idea of grouping data characterising some object into groups so that the groups or clusters include data revealing the dependencies within the object and, on the other hand, the data are distinctive between the groups. The main characteristic of clusters can be defined:

- each cluster is homogenous with respect to certain characteristic (observations within the cluster are similar to each other),
- each cluster differs from other clusters regarding the same characteristics (observations within one cluster are different from the observations in other clusters).

Based on these definitions the main groups or clusters in the forest industry can be selected. With respect to the industrial performance the forest industry will consist of roundwood, sawnwood, wood based panels, and pulp and paper production groups. For the purposes of this paper and to build on the previous research [4], we have selected the following clusters:

- coniferous industrial roundwood – IRWD (C),
- non- coniferous industrial roundwood – IRWD (NC),
- coniferous sawnwood – SNWD (C),
- non-coniferous sawnwood – SNWD (NC).

Naturally, there are material and financial interdependencies between the two clusters. Industrial roundwood is the main material input for sawnwood production and the clusters are also interlinked by the transfer of knowledge and technology. These and other relations influence the competitiveness of the industries at the domestic and international markets. Based on the Porterian approach [2], the competitiveness of one industry can enhance the competitiveness of related industries and vice versa. To measure the competitiveness of the selected clusters the following indicators were used [3]:

1. Value of total export of a product group *(expval)* – this indicator is used to measure the absolute ability to earn in international market.
2. Value of total import of a product group *(impval)* – measures the absolute value of dependency on import.
3. The share of export volume in relation to domestic production *(exp/prod)* – this relative indicator measures the degree of outward orientation.
4. The share of import volume in relation to domestic consumption *(imp/cons)* – measures the degree of import penetration.

The indicators were calculated as annual values for the period 1998-2008 to allow us to compare differences in time. Taking into consideration the main market factors – mainly the economic growth, investments and trade conditions, which were reflected in production and consumption of the analysed products the whole period can be divided into the three sub-periods lasting 3-4 years each. The first period, covered by the years 1998 - 2000 can be characterised by a low level of foreign investments to wood processing sector and unstable production capacities. The years 2001-2004 are the years of growing foreign investments, stabilisation of market supply patterns and strengthening of the national currency (EU pre accession period). The period 2005-2008 covers the years of economic growth and free trade within the EU market, still not influenced by the global economic and financial crisis.

For each period the relative indicators show the degree of comparative advantages and specialisation of the country. A high level of *exp/prod* displays high outward orientation of a cluster. If the value of *exp/prod* and *imp/cons* are closed to zero, competitiveness is inward oriented. A positive difference between *exp/prod* and *imp/cons* reveals comparative advantage for a cluster. Their equity indicates specialisation within a product group. The competitiveness of each product group is measured using the data from the FAOSTAT database [5], except consumption which is calculated.

3. RESULTS AND DISCUSSION

The individual indicators of competitiveness for industrial roundwood in the Slovak Republic during 1998-2008 are calculated in table 1.

Table 1. Calculated indicators of competitiveness for industrial roundwood clusters

Cluster	indicator	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
IRWD (C)	*expval (1000 $)*	13084	26112	24821	22875	15348	19218	21396	73693	42655	60855	107785
	impval (1000 $)	922	311	156	22876	255	679	547	1609	2175	3570	9647
	exp/prod	0,09	0,18	0,19	0,22	0,14	0,14	0,16	0,23	0,15	0,19	0,30
	imp/cons	0,00	0,00	0,00	0,22	0,00	0,01	0,01	0,01	0,01	0,02	0,05
	exp/prod-imp/cons	0,09	0,18	0,19	0,00	0,14	0,13	0,15	0,22	0,14	0,17	0,25
IRWD (NC)	*expval (1000 $)*	18291	25709	29861	34085	30377	32745	34310	22154	42990	49438	39755
	impval (1000 $)	2799	3015	3088	34287	2905	4288	7235	2166	20667	28866	32182
	exp/prod	0,20	0,26	0,34	0,34	0,29	0,21	0,17	0,11	0,19	0,18	0,16
	imp/cons	0,07	0,06	0,06	0,34	0,06	0,06	0,08	0,02	0,12	0,12	0,18
	exp/prod-imp/cons	0,13	0,20	0,28	0,00	0,23	0,15	0,09	0,09	0,07	0,06	-0,02

In general, group of coniferous and non-coniferous industrial roundwood consists of logs, pulpwood and other industrial roundwood. The average production of coniferous industrial roundwood during the years 1998-2008 was over 3.9 mil. m^3, non-coniferous about 2.8 mil. m^3. The clusters show net trade balance and create export surplus so that they are able to earn on international markets. However, they are mostly inward oriented – the main proportions of these products are consumed by domestic wood industry. In general, the degree of outward orientation (*exp/prod*) is generally low. The development trend of this indicator has been increasing for coniferous timber and decreasing for non-coniferous timber. The increasing production of coniferous timber was followed by the increasing volumes of its export. On the other hand, under the constant production of non-coniferous timber the volumes of exports were decreasing in the monitored period. From the viewpoint of the use of domestic resources, the lower the *exp/prod* index the higher the share of domestically used wood and thus higher value added by processing. Generally, there are negligible imports of roundwood to the country with the highest share recorded in non-coniferous pulpwood imports. The degree of import penetration (*imp/cons*) is thus twice and more times higher for non-coniferous industrial roundwood compared to the coniferous cluster. Based on the level of differences between *exp/prod* and *imp/cons* the country has low level of comparative advantage in producing these products and competitiveness is inward oriented. However, because of a positive difference between *exp/prod* and *imp/cons,* there are comparative advantages for both clusters.

The individual indicators of competitiveness for sawnwood roundwood in the Slovak Republic during 1998 – 2008 are calculated in table 2.

Table 2. Calculated indicators of competitiveness for sawnwood clusters

Cluster	indicator	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
SWND (C)	*expval (1000 $)*	78428	72554	71071	67351	75108	90173	71500	121812	151142	184091	192258
	impval (1000 $)	2200	2448	3738	68024	5619	7938	8199	13074	23938	59636	39906
	exp/prod	0,87	0,81	0,81	0,89	0,77	0,56	0,23	0,34	0,62	0,54	0,19
	imp/cons	0,17	0,10	0,16	0,89	0,15	0,07	0,02	0,02	0,08	0,20	0,07
	exp/prod-imp/cons	0,70	0,71	0,65	0,00	0,62	0,49	0,21	0,32	0,54	0,34	0,12
SWND (NC)	*expval (1000 $)*	43915	46551	46752	47539	50716	61255	56362	63646	69234	79565	87434
	impval (1000 $)	6550	9950	23000	282000	14000	15000	17000	15000	16000	39000	11775
	exp/prod	0,69	0,91	0,56	0,67	0,51	0,42	0,23	0,13	0,15	0,24	0,06
	imp/cons	0,05	0,20	0,11	0,67	0,06	0,05	0,04	0,03	0,03	0,05	0,02
	exp/prod-imp/cons	0,64	0,71	0,45	0,00	0,45	0,37	0,19	0,10	0,12	0,19	0,04

Coniferous and non-coniferous sawnwood are aggregate product groups characterised by a high level of heterogeneity of products included. These products represent mainly semi-finished goods. Both sawnwood clusters are export oriented and create high export income. However, the trend of *exp/prod* indicator has been significantly decreasing for both product groups. This indicates that semi-finished products are used in related industries for further processing and used domestically. This is also proved by the increasing trend of domestic sawnwood consumption. The indicators of outward orientation have decreased by half for coniferous sawnwood and approx. by 80% for non-coniferous sawnwood cluster, thus changing the level of orientation of a cluster. At the same time both clusters show low level of import penetration. Positive differences between *exp/prod* and *imp/cons* reveal comparative advantage for both clusters.

4. CONCLUSION

Analysing competitiveness of the industry has to be carried out with respect to the individual industry clusters, which are defined on the basis of similar internal characteristics. Industrial roundwood and sawnwood, both including coniferous and non-coniferous products are the main product clusters analysed in this paper. As indicated by the results, there are significant similarities in evaluation of competitiveness within industrial roundwood and sawnwood product groups; however, there are existing differences in competitive performance between the both clusters. All analysed clusters are able to earn on foreign market, have a comparative advantage and indicate openness toward export markets. However, only for the coniferous industrial roundwood cluster the indicator of outward orientation has been increasing during the analysed period. Coniferous sawnwood is the one showing the highest degree of outward competitiveness. Generally, all clusters indicated low level of import penetration.

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STANDARDS AND CERTIFICATES FOR CHARCOAL AND CHARCOAL BRIQUETTES IN THE FUNCTION OF HARMONIZATION OF THEIR QUALITY AND MARKET DEVELOPMENT

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ABSTRACT

Results presented in this paper[1] are obtained from the analysis of European standards for charcoal and charcoal briquettes quality. In accordance with this, standard EN 1860-2 of the European Committee for Standardization, Russian standard GOST 7657-84 and Serbian standard SRPS.D.B9.020 were individually analyzed, and their comparative analysis was carried out which determined similarities and differences among them. Harmonization of produced charcoal and charcoal briquettes quality with adequate standard is proven by quality certificates. Therefore, the paper analyses two most significant certificates for charcoal and charcoal briquettes quality which are used on the markets of the EU countries, namely “DIN-Geprüft” and “DINplus” certificates. Also, due to specificities, market of the Russian Federation was analyzed separately where only GOST R certificates apply.

Keywords: charcoal, charcoal briquettes, quality standards, quality certificates

1. INTRODUCTION

Quality of charcoal produced in Serbia significantly differs depending on the technology of its production. Apart in brick-built charcoal kilns, charcoal is also produced in retort systems in industrial conditions. However, applied technology is not the sole cause of different charcoal quality. If it is produced in brick-built charcoal kilns, its quality largely depends on the experience of the worker in charge of controlling the combustion process. This means that the worker determines time period of wood combustion, amount of air used for this process, as well as the moment when combustion process will stop by using water, based on his own experience.

By applying the described manner of production, it is very difficult to achieve that charcoal of equal quality is always produced in the same charcoal kiln. If the fact that significant amounts of charcoal are produced in such a manner in Serbia is added to the abovementioned, conclusion can be drawn that the product of highly different quality is present on the market.

One of possible ways to overcome the existing problem is to apply standards which define product quality as well as to obtain adequate certificates which prove harmonization of the product with the standard. Since significant amounts of produced charcoal are exported to the markets of European countries, the paper analyses existing standards and certificates for charcoal quality in the European Union and Russian Federation, as well as valid Serbian standard in order to determine present differences in the defined criteria of charcoal quality.

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2. SCOPE AND OBJECTIVE OF THE PAPER

Scope of research in the paper includes European standards for charcoal and charcoal briquettes as well as quality certificates which prove that product characteristics are in accordance with the standard requirements. Analysis partly included standards which are officially revoked because market research of certain European countries found that they are still used. Objective of the research is to observe the requirements of foreign markets through the analysis of charcoal quality standards and certificates since significant amounts of this product are exported from Serbia. Conducted comparative analysis determined similarities and differences of Serbian charcoal standard compared to the European standards.

3. METHOD OF WORK

For the purpose of research conducted in this paper, special scientific method of analysis was used which was applied to the existing European standards for charcoal and charcoal briquettes. Also, the same method was used in the research of certificates issued for the quality of the stated products. Thus, the research involved a lot of Websites of European charcoal and charcoal briquette producers, state institutes for standardization as well as institutions for quality testing of analyzed products.

Apart from analysis method, methods of synthesis and generalization as specific scientific methods were used as well. Among general scientific methods, the method of inductive-deductive conclusion was used.

4. CHARCOAL QUALITY STANDARDS

Although charcoal is a product with long tradition in production and usage, few European countries have developed their national standards for this product type. Until 2005, six charcoal standards were used in Europe, namely:

- German DIN 51749;
- French AFNOR NF B 55101;
- Belgian NBN M 11-001:
- Swedish SIS 1029;
- Russian GOST 7657-84 and
- Serbian JUS.D.B9.020.

In the period 2003-2006, the European Committee for Standardization adopted the standard EN 1860 which consists of four parts defining characteristics of barbeque appliances, fuels and firelighters for barbecuing. During 2005, the second part of the stated standard was adopted, titled: Appliances, solid fuels and firelighters for barbecuing — Part 2: Barbecue charcoal and barbecue charcoal briquettes. Requirements and test methods.

After the adoption of the EN 1860-2 standard, all member countries of the Committee for Standardization which had their own national charcoal standards were obliged to revoke and replace them with the new standard.[2] Since the Russian Federation is not a member state of the European Committee for Standardization, GOST standard, still applies.

Socialist Federative Republic of Yugoslavia was one of rare European countries which had national charcoal standard. Charcoal standard was adopted in 1958, first revised in 1977. In the

[2] The stated standard EN 1860-2 applies in all member states of the Committee, namely: Austria, Belgium, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland and United Kingdom.

Regulation of the Government of the Republic of Serbia from 2007, mark of charcoal standard JUS.D.B9.020 was replaced with the new SRPS D.B9.020, while standard contents remained the same.

All abovementioned standards set values of the most important characteristics of charcoal including fixed carbon, ash content, moisture content and volatile matter. High quality of the produced charcoal is characterized by the balance of values of the stated properties, because otherwise if the balance is disturbed, charcoal which burns either slowly or too fast is obtained. Also, if charcoal has low fixed carbon, more ash and volatile matter occur during its combustion. Besides, high ash content can also indicate increased presence of sand, minerals, lignite and similar substances which, apart from creating unpleasant smoke, also hinder charcoal firelighting and change the taste of food.

4.1. Main characteristics of charcoal and charcoal briquettes pursuant to EN 1860-2 standard

EN 1860-2 standard defines the values of charcoal and charcoal briquettes characteristics which are used only for barbecue, as well as procedures, apparatus and manner of expressing results when the characteristics are determined.[3]

Generally speaking, European standard EN 1860-2 represents the synthesis of national charcoal standards and is quite similar to the German standard DIN 51749. Since it is still used in certain European countries, although officially revoked, the paper also states the requirements from the German standard DIN 51749 along with the requirements of EN 1860-2 standard (Table 1). Comparative analysis of the two stated standards shows that the German standard has stricter requirements for fixed carbon, ash content and granulation of charcoal particles, while the set value of moisture content is the same in both standards.

Table 1. Values of certain charcoal characteristics pursuant to the European EN 1860-2 and German DIN 51749 standard

Characteristics	EN 1860-2	DIN 51749
Fixed carbon[4]	shall be minimum of 75% by mass	≥ 80 %
Ash content	shall not exceed 8% on dry basis	≤ 4 %
Moisture content[5]	shall not exceed 8%	≤ 8 %

Pursuant to the European standard EN 1860-2, all charcoal particles shall have the size between 0 and 150 mm, with the following presence of particles with certain dimensions: [6]

- no more than 10% may exceed 80 mm in size;
- at least 80% shall be greater than 20 mm;
- 0 mm – 10 mm shall not exceed 7%.

Unlike the European standard, German standard DIN 51749 sets that all charcoal particles shall not be bigger than 80 mm, with the following presence of particles with certain dimensions:

- ≤ 6% may be smaller than 10 mm;
- ≤ 30% may be smaller than 20 mm;
- ≥ 70% shall be between 20 and 80 mm.

[3] Charcoal briquettes are produced by compressing charcoal particles together with a suitable binder (EN 1860-2).
[4] Carbon remaining after the removal of volatile carbon matter and ash from dry charcoal.
[5] Water contained in the barbecue charcoal and the barbecue charcoal briquettes which are driven off at 105°C.
[6] Pursuant to the French standard, 85% of charcoal particles had to have dimensions ranging from 20 to 120 mm, while the Belgian standard allowed maximum of 10% of particles to be smaller than 20 mm, and particles with dimensions over 160 mm were not allowed by the standard.

European standard EN 1860-2 sets charcoal bulk density which must be at least 130 kg/m^3, while for the content of volatile matter[7] neither minimal nor maximum values are defined.

Values of main characteristics of charcoal briquettes pursuant to the European EN 1860-2 and German DIN 51749 standards are given in Table 2. Similar as for charcoal, requirements of the German standard for fixed carbon, ash content and moisture content of charcoal briquettes are stricter than the requirements of the European standard.

Table 2. Values of certain characteristics of charcoal briquettes pursuant to the European EN 1860-2 and German DIN 51749 standard

Characteristics	EN 1860-2	DIN 51749
Fixed carbon	shall be minimum 60% by mass	≥ 65 %
Ash content	shall be maximum 18% by mass on dry basis	≤ 15 %
Moisture content	shall not be above 8%	≤ 6 %

According to European standard EN 1860-2, the form and size of barbecue charcoal briquettes shall be suitable for use with barbecue equipment. The granules less than 20 mm shall not exceed 10%. Also, binder used for briquettes shall not have harmful effect on human health because contact with food is established during combustion.

EN 1860-2 standard also sets that microscopic analysis shall not find in more than 10 out of 1000 particles any substances which are not present in wood for charcoal production or binder which is used for briquettes production. Pursuant to the stated standard, inadmissible substances can be organic and inorganic. Organic inadmissible substances are fossil coals and derivatives thereof, such as petroleum, coke, pitch, etc. Inorganic inadmissible substances are glass, slag, rust, splinters of metal, stone powder, etc. If, however, presence of inadmissible substances (both organic and inorganic) is found, their content shall not exceed 1% of charcoal or charcoal briquettes volume.

Pursuant to EN 1860-2 standard, in test report on the quality of charcoal and charcoal briquettes for barbeque the following shall be stated:

- an identification of the product tested;
- the results and the basis of analysis;
- an unusual features noted during the determination and
- deviation from this Standard.

Also, the standard sets that the following data shall be stated on each packaging of charcoal or charcoal briquettes:

- the content indication can be made either in weight or in volume;
- "Barbecue Charcoal" or "Barbecue Charcoal Briquettes" will be the minimum marking/description of the contents;
- instructions should specify considerations of safety, health and usage for the correct and safe use of the product;
- the number of this standard (the compliance with this Standard must be proved by a certified laboratory).

4.2. Main charcoal characteristics pursuant to the Russian standard GOST 7657-84

Standard GOST 7657-84 defines the characteristics of charcoal obtained in pyrolysis and charcoal obtained in wood combustion in industrial appliances. Unlike the European standard which refers only to charcoal for barbeque, the Russian standard applies to charcoal used for various

[7] Determined as the loss in mass less that due to moisture, when charcoal or charcoal briquettes is heated out of contact with air under standardized conditions.

purposes in industry, apart from food preparation, such as the production of cristall silicon, non-ferrous metals, active coal, carbon bisulfide and ferroalloy.

Pursuant to the Russian standard GOST 7657-84, depending on physical-chemical characteristics, charcoal is classified into three quality classes, or five sub-classes (Table 3).

Table 3. Characteristics of charcoal quality classes pursuant to GOST 7657-84 standard

Characteristic	Quality classes				
	A		B		C
	Best quality	First quality	First quality	Second quality	
Apparent density, g/cm^3, not less than	0.37	0.37	Not standardized		
Mass portion of ash, %, not more than	2.5	3.0	2.5	3.0	4.0
Mass portion of fixed carbon, % not less than	90	78	88	77	67
Mass portion of water, % not more than	6	6	6	6	6
Mass portion of charcoal with grains at loading points, %, not more than:					
- size less than 25 mm	5	5	Not standardized		
- size less than 12 mm	5	5	7	7	7
Mass portion of non-charred logs, %, not more than	absence	2	absence	2	2
Mass of 1 dm^3 of charcoal, grams, not less than	210	210	Not standardized		

Notes:
1. In agreement with consumers an allowed mass portion of water in charcoal, except of charcoal of sort A of the best quality can reach 20% with converting factual mass to 6% humidity.
2. By transportation it is allowed to increase the mass portion of charcoal of the normalized fractions (of a size less than 12 or 25 mm) not more than by 0,8% per 100 km of the way.

Charcoal quality class is also set by wood species which it is produced from, apart from physical-chemical properties. Separate standard GOST 24260-80 defines three groups of wood species which can be used for charcoal production (Table 4).

Table 4. Wood species for charcoal production pursuant to GOST 24260-80

Groups	Wood species
I	birch, beech, ash, hornbeam, elm, walnut, maple
II	pine, fir, cedar, spruce, larch
III	aspen, alder, linden, poplar, willow

Notes:
1. Oak can be used for pyrolysis and charcoal production only if proven unsuitable for the production of tannin extracts.
2. Wood species from groups II and III can be used for pyrolysis and charcoal production only with previous agreement with consumer.

Charcoal of A quality class is produced in pyrolysis of wood from group I, charcoal of B class is produced in pyrolysis of wood species mix from groups 1 and 2, while charcoal of C class is produced in combustion of wood species mix from groups 1, 2 and 3.

Pursuant to the same standard, for charcoal production in pyrolysis, wood raw material 1.0 meter long and more with allowed deviation of ±3.0 cm and 3-18 cm thick is used. If charcoal is produced in wood combustion raw material of length 0.75m, 1.0m, 1.25 m and more is used. Participation of volume of roundwood 3-6 cm thick should not exceed 10% in a lot. In accordance with the agreement with consumer, raw material used for pyrolysis charcoal production can also be smaller than 1.0 meter, and for charring it can be smaller than 0.75m.

GOST 7657-84 standard sets that charcoal can be delivered packed in paper bags or mounded. If charcoal is packed in bags, they must be of HM brand, which means that they are made of impregnated layers of paper and that they are solely used for hygroscopic products.[8] Charcoal weight in one bag which has to be sewn and tied, shall not exceed 15 kg pursuant to GOST 7657-84 standard. Guaranteed warehousing period in the standard is 12 months from production date.

Pursuant to GOST 7657-84 standard, on each charcoal bag the following data shall be stated:

- designation of the producer and its brand mark;
- designation of the product, its mark, sort;
- the number of the consignment;
- net weight;
- production date;
- designation of a genuine standard;
- a precautionary sign of a shipment danger in accordance with GOST 19433-88.

4.3. Main charcoal characteristics pursuant to the standard SRPS D.B9.020

Standard SRPS D.B9.020 defines the values of the most significant characteristics of charcoal produced in retort systems in industrial conditions and forest charcoal produced in brick-built charcoal kilns, as well as methods for determining quality of the stated products. Pursuant to this standard, wood of hard and soft broad-leaved and coniferous species, without rot is used for charcoal production.

Depending on wood species used for charcoal production, the following charcoal exists:

- beech charcoal, produced from beech only or with addition of hornbeam;
- oak charcoal, produced from oak only or with addition of Turkey oak;
- hard broad-leaved species charcoal;
- coniferous species charcoal (fir, spruce, pine) and
- soft broad-leaved species charcoal (poplar, willow, alder).

Pursuant to dimensions, charcoal is classified into two quality classes. Quality class I contains charcoal which have particles diameter over 3 cm on producer's loading date and no more than 5% of particles with diameter smaller than 3 cm. Quality class II contains dust and charcoal residues, however this class is allowed to contain 5% of soil or other ingredients. Values of the most significant charcoal characteristics are given in Table 5.

[8] Characteristics of paper bags used for charcoal packing are defined in separate standard GOST 2226-88.

Table 5. Values of the most important charcoal characteristics pursuant to the Serbian standard

Characteristics	I class		II class
	Retort charcoal	Forest charcoal	Dust and charcoal residues
Moisture content, %, at most	7	10	15
Ash content, on dry basis, %, at most	3	5	18
Volatile matter, without moisture, %, at most	18	20	20
Fixed carbon on dry basis, %, at least	80	80	72
Non-charred particles, %, at most	1	1	2
Other ingredients (soil, sand, etc.), %, at most	absence	1	5

Charcoal is delivered in bulk or packed in paper or PVC bags. There are small packages 1 kg to 5 kg of weight and large packages of 10 kg and more.

Pursuant to the SRPS. D.B9.020 standard, on each charcoal package the following data shall be stated:

- type and quality (class) of charcoal;
- net weight;
- designation of the producer and
- the number of this standard.

The standard allows deviation of net weight for small packages up to 5%, while for large packages up to 3% is allowed.

4.4. Comparative analysis of European standards for charcoal and charcoal briquettes and SRPS standard

Based on the conducted analysis of the European EN 1860-2, Russian GOST 7657-84 and Serbian SRPS.D.B9.020 charcoal standard, it can be concluded that they greatly differ. European standard, which is adopted last compared to the other analyzed standards, sets the smallest number of requirements for charcoal and charcoal briquettes quality. At the same time, this is the only standard which defines the requirements of charcoal briquettes quality as separate product. European standard does not analyze the manner of charcoal production, and the stated quality requirements refer only to the products used solely for food preparation on barbeques. Unlike this, requirements of the Russian and Serbian standard refer to charcoal produced in charcoal kilns as well as to industrially produced charcoal. Unlike the European one, requirements of the Russian and Serbian standard refer to charcoal used in industry for various purposes, apart from charcoal for food preparation.

Pursuant to the European standard, charcoal quality depends solely on the values of adequate characteristics, such as fixed carbon, ash and moisture content, size of charcoal particles and proportional presence of particles with certain dimensions and bulk density. At the same time, charcoal quality does not depend on wood species, as is set in the Russian standard. Moreover, the European standard does not set wood species which can be used for charcoal and charcoal briquettes production, or quality classes of those products. Pursuant to the Russian standard, charcoal is classified into three quality classes, namely A, B and C, where A and B classes have two sub-classes each. Apart from previously stated characteristics, pursuant to which quality is set in accordance with the European standard, the Russian standard defines additional requirements such as mass portion of coals with grains at loading location, mass of 1dm^3 of charcoal in grams and mass portion of non-charred wood. Also, Russian standard does not define minimal or maximum dimensions of charcoal particles, only the percentage of small fractions presence.

Comparative analysis of values of certain charcoal characteristics indicates that the requirements of the Russian standard are stricter than the requirements of the European one, especially regarding ash and moisture content. Pursuant to the Russian standard, allowed ash content, depending on charcoal quality class, ranges between 2.5% and 4%, while pursuant to the European standard up to 8% is allowed. Also, allowed moisture content pursuant to the Russian standard is 6%, while the European one allows up to 8%. Fixed carbon set in the Russian standard ranges from 67%, for the lowest quality class, to 90% for the best A class quality, while the European standard defines the lowest value of 75%.

In its structure, Serbian standard is different compared to both previously analyzed standards. Two charcoal quality classes defined in the standard differ a lot among each other. Quality class I contains particles with dimensions over 3cm, while the second group contains residues and dust. Values of characteristics of quality class I differ depending on the manner of charcoal production. This means that charcoal produced in charcoal kilns is characterized by different quality, namely its values of characteristics differ from industrially produced charcoal. In general, forest charcoal has higher allowed ash and moisture content than the industrial one, while the set fixed carbon in the amount of 80% is the same for both product types. The standard also sets allowed values of volatile matters as well as the content of non-charred wood. Wood species which can be used for charcoal production are defined as well, however their application does not impact the quality class. Generally, charcoal is produced in Serbia mostly from beech as this wood species has the largest presence in forest fund.

Compared to the European standard, quality requirements set in the Serbian standard for class I of retort charcoal are stricter regarding ash content, moisture content and fixed carbon. This means that the values set in the Serbian standard regarding ash and moisture content are lower than the values in the European standard, while the set fixed carbon is higher. Pursuant to the standard, forest charcoal is characterized by higher fixed carbon and moisture content and lower ash content compared to the European standard. Generally, Serbian standard allows the highest moisture content if compared to the European and Russian standard. Comparison of charcoal quality defined in the Serbian standard with the quality defined in the Russian standard is not possible to be done because of large number of classes and different quality defined in the Russian standard.

It should be highlighted that calorific value of charcoal is not set in the analyzed standards.

Based on the analysis conducted in the paper, it can be concluded that the Serbian standard has certain shortages, and the following measures are proposed in order to overcome them:

- abolish second quality class of charcoal and instead define term and characteristics of charcoal briquettes, since this product has an increasing application on the markets in the EU countries;
- abolish differences in quality for industrial charcoal and charcoal produced in charcoal kilns and define single quality class regardless of the manner of its production;
- or if different quality of industrial charcoal and charcoal from charcoal kilns remains, reduce the set moisture content of forest charcoal because its high value can be a limitation for exporting the product onto foreign markets.

5. CHARCOAL AND CHARCOAL BRIQUETTES QUALITY CERTIFICATES

5.1. Quality Certificates of EU countries

Harmonization of charcoal and charcoal briquettes quality with valid standards is confirmed by testing in accredited institutions and by issuing certificates. One of the most famous institutions of this kind in Europe is DIN CERTCO founded as a part of the German Institute for Standardization.

Tests of charcoal and charcoal briquettes characteristics in this institution are conducted in accordance with the standard EN 1860-2. If it is found that a product's characteristics fulfill the

Figure 1: Mark of DIN testing

Figure 2: Mark of DINplus quality

requirements of the standard, producer obtains the right to use mark "DIN-Geprüft" (DIN tested) on the packing of his product (Figure 1).

Apart from "DIN-Geprüft" certificate, this institution issues "DINplus" ("quality plus") certificate as well, when tests show that the quality of tested product is significantly above the quality defined in the standard, namely when the product fulfills additional requirements defined in DINplus certification scheme (Figure 2). In case of charcoal and charcoal briquettes, additional requirements for obtaining DINplus certificate refer to ash content and fixed carbon.

According to DINplus scheme, ash content for charcoal can be 4% maximum, and fixed carbon is 80% minimum. Set ash content for charcoal briquettes is 15% maximum, while fixed carbon is 65% minimum.

Figure 3. "DINplus" mark on packaging of charcoal

Certificates (for DIN-Geprüft and DINplus) issued by the abovementioned institution are valid for one year, and if it is found that a product does not fulfill requirements of the standard, producer must eliminate all found shortages within 3 months at latest.

When submitting samples for testing, pursuant to the standard DIN EN 1860-2, at least 40 kg of charcoal or charcoal briquettes has to be submitted for testing purposes.

Apart from the references which have to be on each packaging of the stated products pursuant to the EN 1860-2 standard, the following shall be stated as well pursuant to DIN CERTCO rules:

- warning note: Attention! Not using highly combustible liquids e.g. spirits and petrol for lighting or relighting!
- detail of the respective production year and
- certification mark "DIN-Geprüft" or "DIN*plus*" and registration number (Figure 3).

5.2. Quality certificates of charcoal on the market of Russian Federation

Pursuant to current law, more than 70% of products sold and used on the Russian Federation market have to possess obligatory GOST-R Certificate of Conformity, which proves that product characteristics are in conformity with the requirements of GOST standard.[9] Certificates which certify the harmonization with ISO standards, since the Russian Federation is a member of this organization, are not considered sufficient evidence of product quality on this market. Possession of obligatory GOST R certificates applies to products which are imported as well as to products produced in Russia. If they are issued for imported products, they can be issued for singe delivery, for one year and for three years of validity. Apart from the Russian Federation, the same certificates apply in Belarus, Kazakhstan and Georgia. Charcoal is among products which must possess obligatory GOST-R certificate and it belongs to the group of products titled raw material and products of wood processing industry.[10] Certified product for which harmonization with the standard is found is marked with adequate mark consisting of the GOST R certification system logo and Certification Body registration number e.g. CH01 or АИ01 (Figure 4).

Figure 4: Mark of Conformity according to GOST-R certification scheme

[9] Depending on product type, obligatory or voluntary certificates are issued.
[10] List of products which must possess obligatory certificate http://gost-r-iso.com/se5.html

6. CONCLUSION

Quality of charcoal produced in Serbia significantly differs depending on the applied manner of production, namely if it is produced in charcoal kilns or in industrial conditions. Also, different charcoal quality also occurs due to specific conditions of production in charcoal kilns because wood combustion process is controlled by a worker, based on his own experience.

Therefore, it is of extreme importance for producers to be acquainted with the requirements of the national standard which define product quality and by applying it in practice to have production which results in equal quality of the product. Since significant amounts of charcoal are exported from Serbia, it is necessary to be acquainted with standards applied on foreign markets.

In accordance with the abovementioned, analysis done in the paper included standard of the European Committee for Standardization EN 1860-2 as well as the valid Russian standard GOST 7657-84, apart from the Serbian standard SRPS D.B9.020. Beside standards, the most significant certificates for charcoal quality applied in the EU countries were also analyzed as well as special certificates used on the Russian Federation market.

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INTERDEPENDENCE OF TOTAL REVENUE AND EMPLOYMENT IN THE WOOD SECTOR

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ABSTRACT

One of the important indicators of business entities is their size, which is expressed in total revenue and number of employees. For every business entity it is important to gain understanding of the general economic condition as well as conditions in the sector that can or will affect its business success. The objective of this paper was to define trends in total revenue and number of employees in the field of wood processing and furniture manufacturing. However, considering the quality of the raw material potential, wood processing tradition and strong growing trend of using wood as ecological and renewable material, it is realistic to expect further increase of production and total income and numbers of employees of the Croatian wood industry even last two years have been very hard for the sector.

Keywords: wood processing, furniture, business entity, total revenue, employment

1. INTRODUCTION

Industrial wood processing – particularly furniture manufacture as its most profitable branch – has always been a significant segment of Croatian economy. Based on domestic natural resources and a long tradition, Croatian wood processing also has human resources of high quality (Figuruć, Greger, Motik and Srdić, 2005).

One of the important indicators of business entities is their size, which is expressed in total revenue and number of employees. Revenue per employee is a key ratio for start-up companies. A low revenue per employee in comparison to similar companies is a bad sign, often boding possible failure. According to Norm (1999) companies usually fail for one of two basic reasons either, the companies fail at marketing their product or service and generating sales. Else, companies fail to keep the costs to produce and market their product sufficiently low and also there is a lack of basic revenue.

For every business entity it is important to gain understanding of the general economic condition as well as conditions in the sector that can or will affect its business success. The objective of this paper was to define trends in total revenue and number of employees in the field of wood processing and furniture manufacturing.

2. MATERIALS AND METHODS

To meet the objective of this paper, data on the revenue and employment of companies from the wood processing and furniture manufacturing sector were analyzed for the period 1996 to 2009.The analysis involved data obtained from Croatian's State Bureau of Statistics (DZS), Ministry of Finance and Financial Agency (FINA). By 2007 the Classification of Activities was carried out on the basis of NCEA 2002 and since 2007 classification is based on National Classification of Economic Activities NCEA 2007. In this paper, the classification is conducted on the basis of NCEA 2007. Based on the National Classification of Activities (Regulation on Business Subjects Classification according to the

National Classification of Economic Activities NCEA 2007, Official Gazette No. 58/07) these data were divided into two categories, C 16 – *Wood Processing and Wood and Cork Products* and C 31 – *Furniture Manufacturing.*

3. RESULTS

According to **Table 1**, in terms of revenues achieved by furniture manufacture and wood processing companies, neither constant growth nor decline was recorded in the monitored period (1996 - 2009). The highest revenues in the field of furniture manufacture in the amount of 512.2 million EUR were realized in 2008, whereas the lowest, reaching 258.9 million EUR, were achieved in 1998. Comparing the initial year 1996 and the final year 2009, revenues realized by furniture manufactures rose by 152.4 million EUR. The total average revenue in the furniture industry in the monitored 13-year period amounted to 356.1 million EUR, and average employment included 11,377 persons. A comparison of total revenues realized in the furniture industry and revenues realized in the field of primary wood processing shows that, in the monitored period, higher values were achieved by wood processing companies. The highest total revenue in the field of wood processing was realized in 2007 in the amount of 592.7 million EUR, and the lowest total revenue in this field of 301.4 million EUR was realized in 1999. The average total revenue achieved in the wood processing field for the period from 1996 to 2009 was 415.2 million EUR, which is higher by 96.1 million EUR than the average realized revenue in the field of furniture manufacture. The average number of people employed in wood processing for the same period was 11,826 persons.

Table 1. Furniture manufacturing and wood processing business indicators in Croatia from 1996 to 2009

Year	**Furniture manufacturing (C 31)**			**Wood processing (C 16)**		
	Revenue (Million EUR)	Employment (person)	Revenue per Employee (EUR)	Revenue (Million EUR)	Employment (person)	Revenue per Employee (EUR)
1996	284.2	12 641	22.486	342,3	11 223	30.498
1997	321.2	12 116	26.510	398,7	11 577	34.440
1998	258.9	10 973	23.594	345,6	11 908	29.026
1999	268.7	11 515	23.332	301,4	11 287	26.706
2000	291.4	11 611	26.669	309,2	11 495	26.896
2001	312.6	11 627	27.010	326,8	10 833	30.165
2002	306.8	11 719	26.177	376,6	11 376	33.106
2003	340.6	10 348	32.914	361,4	11 780	30.679
2004	356.6	10 563	33.760	424,2	11 584	36.619
2005	374.4	10 851	34.444	434,5	11 404	38.104
2006	442.2	11 848	37.326	500,5	12 848	38.967
2007	478.8	11 904	40.255	592,8	12 932	45.843
2008	512.2	11 386	44.985	567,7	13 466	42.157
2009	436.6	10 180	42.884	530,7	11 862	44.742
Average	**356.1**	**11 377**	**31.596**	**415.2**	**11 826**	**34.853**

According to **Figure 1** and **Table 1**, the revenue per employee in the furniture industry in the 13-year period (from 1996 to 2009) was rising, but not constantly. A drop in the revenue per person was recorded in 1998 in relation to previous years, but the year 1999 also experienced a fall in the revenue

per person. In the following years, with the exception of 2002, until 2008, the revenue per person in furniture manufacture rose, reaching 44,985 EUR per employee, which represents the highest revenue per person in the observed period. In 2009, the revenue per person dropped (42,884 EUR), and so did employment in relation to the previous year 2008 (10,180 people). The average revenue per person in the observed period in the field of furniture manufacture was 31,596 EUR. The employment trend in the observed period (from 1996 to 2009) did not show a constant drop or rise, although comparisons between the starting year 1996 and the final year 2009 reveal that employment in the furniture industry was declining. The number of people employed in the furniture industry dropped by 3,461 persons from 1996 to 2009. In the field of furniture manufacture the highest employment rate was recorded in 1996, amounting to 12,641 persons, and the lowest in 2009, reaching 10,180 people.

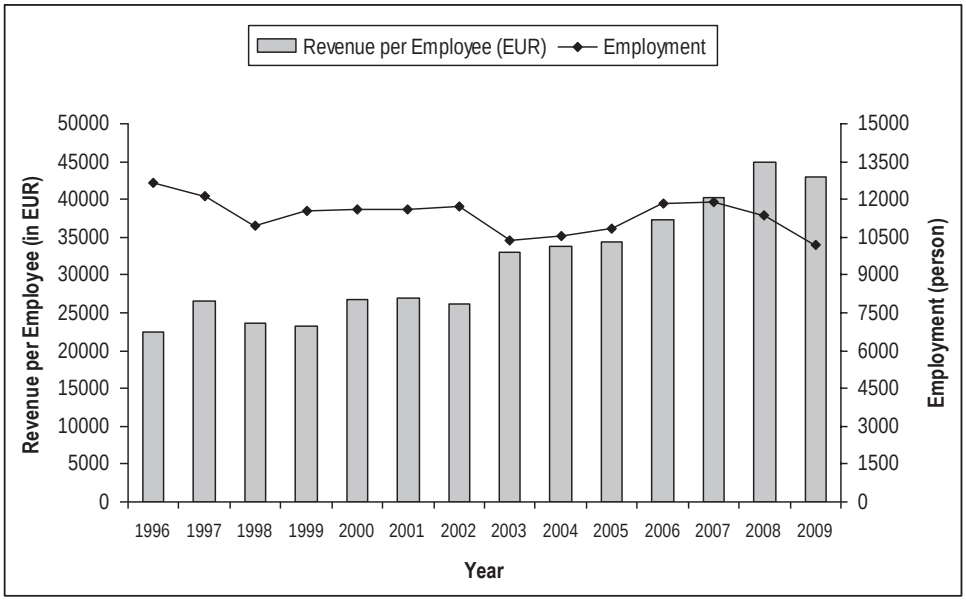

Figure 1. Employment and revenue per employee trends in furniture manufacturing in Croatia from 1996 to 2009

Revenues per employee in the field of wood processing rose in the period 1996 - 2009, albeit not constantly. A constant rising trend was not observed until 2003, but after 2003 up to 2007, the revenue per employee rose. In 2008, revenues per person employed in the wood processing companies decreased by 3,686 EUR in relation to the previous year, but the year 2009 saw renewed growth. In terms of the starting year 1996 and the final year 2009, the revenue per person in the field of wood processing increased by 14,244 EUR. In the period from 1996 to 2009, the average revenue per employee in the field of wood processing amounted to 34,853 EUR. Likewise, the employment trend in the wood processing field did not show constant rise in the observed period (1996 - 2009). The lowest employment in the stated period occurred in 2001, including 10,833 persons, and the highest seven years later (in 2008), when it involved 13,466 persons (**Table 1** and **Figure 2**).

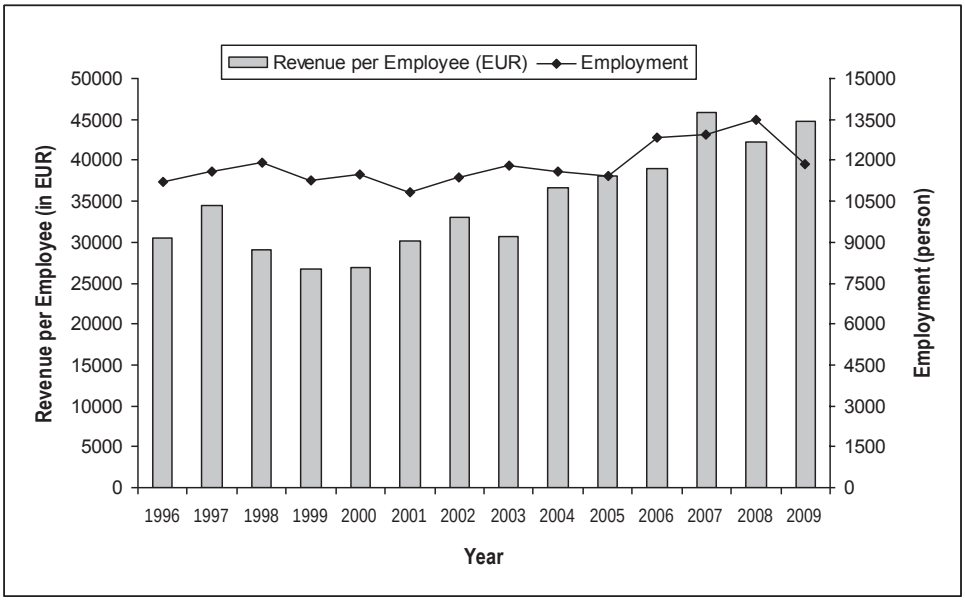

Figure 2. Employment and revenue per employee trends in wood processing in Croatia from 1996 to 2009

In terms of total revenue in the processing industry and revenue in the wood processing and furniture manufacture field for the period from 2007 to 2009, according to data from **Table 2**, total revenue in the processing industry in 2001 was 21.9 billion EUR, in 2008 it rose to 24.1 billion EUR, but in 2009 it dropped to 20.3 billion EUR. In terms of revenue share realized in the field of wood processing and furniture manufacture in the total revenue realized by the processing industry in the observed period (2007 to 2009), the share of revenue of wood processing in the total revenue realized by the processing industry amounted to 2.7% (in 2007), 2.4% (in 2008), and 2.6% (in 2009). The share of revenue realized by furniture production in the total revenue of the processing industry amounted to 2.2% in 2007, 2.1% in 2008, while in 2009 it went back to the percentage from 2007 and amounted to 2.2%. In terms of the share of both wood processing and furniture manufacture in the total revenue of the processing industry in all the observed years, the share of wood processing was higher in relation to the share of furniture production.

Table 2. Wood processing and furniture manufacturing revenue shares in manufacturing industry from 2007 to 2009

REVENUE	2007		2008		2009	
	Value	Percentage	Value	Percentage	Value	Percentage
	Million EUR	%	Million EUR	%	Million EUR	%
Manufacturing industry(C)	21,911	100,0	24,144	100,0	20,251	100,0
Wood processing (C16)	593	2,7	568	2,4	531	2,6
Furniture manufacturing (C 31)	479	2,2	512	2,1	437	2,2

According to the data by the Ministry of Finance (2007, 2008 and 2009), there were 1,515,647 employed persons in the Republic of Croatia in 2007. Due to the effects of world economic crisis on Croatia, employment in 2009 dropped to 1,457,207 persons.

Data shown in **Table 3** also indicate similar relations; in other words, in 2007, overall, 258,314 persons were employed in the processing industry. In comparison with 2007, employment in 2008 rose to include 266,661 persons, but in 2009 employment in the processing industry decreased to 242,057 persons. As for the share of people employed in the wood processing and furniture manufacture fields, employment in wood processing rose in 2008 in relation to 2007, but decreased in 2009 in relation to 2008 which was not the case with the furniture manufacture field. During the three observed years, the highest number of employed persons in the subject industry was recorded in 2008, slightly less in 2007, whereas the lowest employment rate was recorded in 2009. The percentage of people employed in the field of wood processing in overall employment in the processing industry in 2007 amounted to 5%, in 2008 to 5.2%, and in 2009 to 4.9%. The share of employment in furniture manufacture in overall employment in the processing industry was slightly lower in relation to the share of wood processing, and came to 4.6% in 2007, 4.4% in 2008, and 4.2% in 2009.

Table 3. Wood processing and furniture manufacturing employment shares in manufacturing industry from 2007 to 2009

EMPLOYMENT	2007		2008		2009	
	People	Percentage	People	Percentage	People	Percentage
Manufacturing industry (C)	257314	100,0	260661	100,0	242057	100,0
Wood processing (C16)	12932	5,0	13466	5,2	11862	4,9
Furniture manufacturing (C 31)	11904	4,6	11386	4,4	10180	4,2

4. SUMMARY

The highest revenue in the field of furniture manufacture was realized in 2008 and amounted to 12.2 million EUR, while the lowest occurred in 1998, when it reached 258.9 million EUR. The average total realized revenue in the furniture industry in the 13-year period was 356.1 million EUR.

The highest employment rate in the field of furniture manufacture was recorded in 1996, including 12,641 persons, and the lowest in 2009, when 10,180 people were employed in the said industry. The employment trend in the observed period (from 1996 to 2009) did not manifest constant growth or decline. Average employment in wood processing was 11,377 people.

However, considering the quality of the raw material potential, wood processing tradition and strong growing trend of using wood as ecological and renewable material, it is realistic to expect further increase of production and total income and numbers of employees of the Croatian wood industry even last two years have been very hard for the sector.

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INTERNET POTENTIAL IN THE WOOD PROCESSING ENTERPRISES

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ABSTRACT

The article addresses the possibilities that the Internet provides to companies operating in the wood processing industry. Internet can be used in all parts of the marketing information system, in the processes of customer relationship management and also in various parts of the marketing mix, especially in marketing communications.

The paper focuses on the use of Internet in marketing communications in selected wood processing enterprises in Slovakia. We are comparing websites of these enterprises in terms of their options they present and we evaluate the level of use of Internet tools in the communication mix in terms of quantity and quality.

Keywords: internet, web site, online marketing

1. INTERNET IMPORTANCE FOR COMPANIES

99 % of Slovak companies have Internet access and using Internet is matter of course in almost all enterprises in Slovakia. But the less is the company oriented to B2C and more industrial and to B2B, the less is using different Internet marketing tools. Very often is Internet usage limited to sending emails, creating a basic website of the company and the acquisition of secondary data for marketing information system.

There is a great potential and importance in Internet also for wood processing companies. B2B wood processing companies need to be seen on Internet, because is becoming more and more the first searching place for potential customer. It is also a reference place, where potential customer looks for contact, information about company and product. B2C wood processing companies need Internet even more, because 50 % of Slovaks are online and 90 % of them have at least once shopped online. If the company is not online or it doesn't have good Internet marketing communication, its position is becoming more vulnerable. Following Internet tools can company use as a part of it marketing communication.

1.1. Web site

Web site is basic Internet tool, without which company almost doesn't exist. Web site should contain following sections: about company, about products (possibly a catalog with a price list), contact section, news section and for wood processing companies we recommend also suppliers and distributers sections. Additional tools on website can be RSS, job offers, section with promotions and products on sale, plug-ins for social media or small web applications helping visitors to orient on the site or work with it. Site should also option for search.

It is important that the web site goes with actual design trends and follows the basic rules of visitor navigation and stays. With the development of mobile technologies is better to don't use Flash technology, because it is not supported on devices such a iPhone or iPad. Web site should be optimized for different Internet browsers and operational systems. Management can decide to optimize the site for

mobile devices based on the percentage of mobile visitors. Keeping track on web analytics also helps to see what sections or promotion works best, what are the problematic parts of web site.

If the company needs to find new customers, the best is to start with the search engines and optimize the web site for them. Search engine optimization brings good results, but needs to be built for longer time and management can't expect immediate results. If company has a web site admin, he can manage such a task. Otherwise is recommended to hire a specilized company.

1.2. Social media

Social Media such as Facebook, Twitter, LinkedIn, YouTube, Flickr or Foursquare are not anymore just a trendy additions to marketing communication but helpful tools to spread the communication message to wider audience and a potential place to build brand identity, positive image and customer trust and faithfulness.

Company doesn't have to necessary use all of them. For B2C companies is preferably use Facebook, Twitter, Foursquare and YouTube, for B2B companies are better Twitter, LinkedIn and Flickr. YouTube can be used for promotional videos, videos showing the industrial process and technologies of companies (also photos on Flickr can be used such a way). Twitter and LinkedIn are good for gaining professional contacts.

Communication through social media might seem easy, but can be difficult and small mistakes can hurt the image of company. In this case is also recommended to hire professional company, that will start the process and train at least one marketer from company, or at least send the marketer to specilized workshop.

1.3. Internet advertising

Internet advertising has many different tools. Most popular is banner advertising. For wood processing companies might be useful use it only in case, if it has wide distribution coverage or big sales. For other companies is this type of advertising not recommended, because it is expensive.

More reasonable tool is paid search when company can buy top places in the search result. This might be good option for B2B companies, because not many have done it, the competition is low and the prices for top results low then. In search engines and also on sites can be used contextual advertising that is displayed with search words or articles that the company decides to buy.

Few years ago were popular catalog listings, but with the search engines and social networks is better to focus on them and do not spend resources on online catalogs with exception of Zlate stranky (Golden Pages) that offers new tools such as webcam view, virtual reality or mobile application.

Very good tool for wood processing companies might be email marketing. With right and careful use can bring positive feedback and loyalty of customers. As part of it company can send newsletters depending on the character of business.

Other Internet advertising tools are slotting fees, lead generation, sponsorship or rich media. It is up to company to decide, if to use some of them, but without knowing it is better to consult it with experienced online marketer, that can say if it can bring positive results that company wishes for.

1.4. Other tools

B2C enterprise can decide to sell through internet shop. Online shop is not expensive to make, question is if the delivery of product is gonna be profitable. Slovak costumers often prefer to pick up the

product in the shop after offering it online. Usually they go after lower price. If the online shop can offer it, company could try it.

Popular phenomena in the last year are online coupon discounts based on mass shopping. This tool is good to get new customers, but is not recommended to use it more often, because it devaluate the products.

Other tools are more about making some buzz around company and getting attention of marketers and professionals: QR marketing, app marketing or buzz marketing.

2. WEB SITES OF SLOVAK FURNITURE COMPANIES

2.1. Methodology of the survey

Companies producing furnitures are from all wood processing companies closest to the final customers because they directly uses their products. That is why we decided to rate their web sites as a basic contact point with online user.

We chose 25 biggest companies manufacturing furniture in Slovak republic that also have web site in Slovak language. We had to exclude Swedwood Slovakia, producer for Ikea, because his website contains only contact information. Rating was based on scale from 1 to 5 for performance of the factor or use of the tool. 5 was the best value, 1 was the worst, 0 if the company didn't have the section or tool. We were rating 20 factors divided to three groups by importance; first group had coefficient 3, second 2, third 1. Final rating of each factor was multiplied by the coefficient of relevant group.

1. group: sections about company, about products, catalog, contact, distributors, design of website, orientation on website,
2. group: eshop, language mutations, press center, promotions or sales, search, suppliers.
3. group: fotogallery, job offers, news, newsletter, RSS, web application, social media.

2.2. Results of the survey

In the table 1 are the final results for each company in each group of factors and also in total. The companies are ranked from the company with highest to lowest total score. Maximum possible score for first group factors was 105 points, for second 60 and for third 35, maximum total was 200 points.

Average reached points was 89 points, but only eleven companies reached above average. The lowest score had companies in factors within third group, where the average reached score was only 3.84 points from 30 total. Only three companies reached 10 point or more.

3. CONCLUSION

Many companies' web sites we surveyed are missing catalogues, just few of them have eshops, they do not use social media or web applications. Design of half of them is very old and doesn't follow new trends in web design. On the other hand most of the web sites have good navigation and orientation on them was very easy.

Furniture manufacturing companies do not have to rely only on their distributors and stores, they should also start to acquire new customers online, because this customers are usually more sophisticated and are willing to spend more money. By not using the options Internet offers they are loosing valuable time. The companies that are using Internet options and tools already now are gaining great share and loyalty of customer.

Table 1. Final results

COMPANY	1st GROUP FACTORS	2nd GROUP FACTORS	3rd GROUP FACTORS	TOTAL
Makrowin	99	28	20	147
Decodom	96	42	8	146
Drevona	102	26	6	134
Lind Mobler Slovakia	96	12	9	117
Galan	63	38	10	111
Fines	90	16	3	109
Koryna	87	18	4	109
Meuble	87	16	0	103
GKT	87	10	0	97
Kanapa	75	20	0	95
FIT möbel SK	90	0	0	90
Furni Finish	69	16	0	85
Alnea	75	6	4	85
Trendwood-twd	66	6	11	83
Idona	69	12	2	83
Ekoltech	57	16	6	79
Lencos	66	10	3	79
Elpo	63	12	3	78
Tribyt	72	2	0	74
NDH market	63	4	2	69
Vital	54	10	0	64
We-tec	63	0	0	63
Masterwood	33	10	1	44
Antares Eurotrade	36	6	0	42
Stemann	30	6	4	40
AVERAGE REACHED SCORE	71.5	14	3.84	89.04

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METHODOLOGICAL SCHEME FOR EVALUATION OF ECONOMICAL EFFICIENCY OF OUTSOURCING USE IN WOOD PROCESSING INDUSTRY

Marek POTKÁNY

ABSTRACT

Outsourcing is relatively well established in the wood industry in Slovakia. It is commonly used in following areas: logistic, maintenance of information systems and technologies, administration and accounting, law and economical consulting, education and facility management. The main reasons why outsourcing is employed are: cost cutting in selected activities, focusing on the core business, efforts to improve quality of outsourcing processes. Slovak wood working companies spend no time calculating cost savings when deciding whether to use outsourcing. This publication specifically presents an evaluation of economical efficiency of outsourcing use and its influence on a financial performance for business practice.

Keywords: outsourcing, processes, cost, economic efficiency, woodworking industry

1. INTRODUCTION

Woodworking industry in Slovakia is influenced by the economic crisis, causing stagnation at the construction industry and decreasing the customer demand for construction and woodwork and furniture products. Many companies are looking any ways of cost savings, and recently more and more companies increasingly use the possibilities of outsourcing.

As follows from results of the project VEGA 1/0360/08 "Functional and design parameters for the evaluation of economic effectiveness of outsourcing in wood working companies" (Potkány, 2011), with offering the use of outsourcing services in its business practices met most of the wood processing industry in Slovakia, while in the regions are not noticeable any significant differences (figure 1).

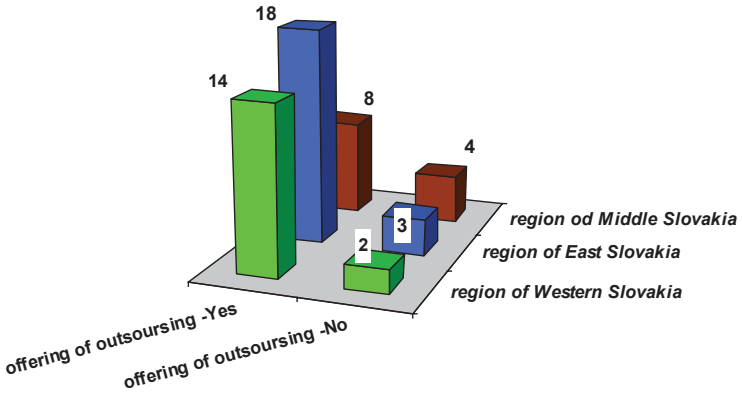


Figure 1. Offers the use of outsourcing services in the wood processing industry in Slovakia
(Source: Potkány 2011)

No using of outsourcing in the past has affected mainly micro and small companies. The main reason of inefficient using of outsourcing in the small companies is regarding to the lack of companies offering outsourcing and little time that companies spend on research in this issue.

Interest in the use of outsourcing services for wood working enterprises, as present the results of the survey is evident (figure 2).

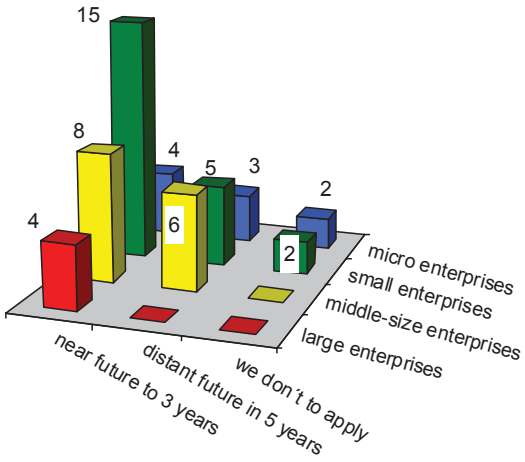


Figure 2. The possibilities of outsourcing application in the wood processing industry in Slovakia *(Source: Potkány 2011)*

Priority task of outsourcing use in company praxis is becoming increasing quality level of outsourcing activities performed with the aim of cost saving. However, experience has confirmed that they are often ideas on cost savings higher than it actually is possible. The problem is quite difficult to determine the level and know their own costs for the implementation of the outsourced processes. For many companies is extremely difficult able to track costs on their own processes and then to determine the level of potential cost savings from using of outsourcing services.

2. THE PROJECT OF EVALUATION FOR ECONOMIC EFFICIENCY OF OUTSOURCING USE

General model of outsourcing application consists from of several individual action: Strategic analysis of functional sphere of company, Analysis of the company sphere identified for outsourcing, Definition of requirements for suppliers of outsourcing services, Selection of appropriate supplier outsourcing services, Establish the conditions of the outsourcing relationship, Managing the transition phase of outsourcing relationship *(Rydvalová, Rydval, 2008 and Potkány, 2011)* is possible to apply also for the needs of the wood processing industry. The practice of outsourcing in other industries but confirmed that they are often ideas on cost savings is higher than it actually is. The problem is to identify and know the level of its costs to perform the outsourced processes and also the often forgotten on the level of additional costs to manage an outsourcing relationship. These data is a very important in determining the potential cost savings that outsourcing can bring at the company.

This paper demonstrates such a method and its effects on financial aspects in a company. This method may be applied without any substantial expenses. The suggested method is based on known activity-based costing calculation that contains following steps:

- Identification of processes, activities and procedures in an enterprise
- Cost analysis of an enterprise
- Determination of parametric costs on outsourcing with specification of partial criteria:
  - *Identification of cost allocation base for identified groups of overhead cost*
  - *Determination of rates for identified groups of overheads cost*
  - *Establishment of overhead costs in single processes*
- Quantification of potential cost savings when using outsourcing
- Expressing an influence on a financial performance of an enterprise

2.1 Identification of processes, activities and procedures in an enterprise

Orientation on business processes becomes a key matter in most companies. The main element of the new concepts of corporate governance is to change their focus from managing functional areas of management value chain, which consists of processes, operations and activities *(Šoljaková, 2003).*

The **process** is an organized group of interrelated activities that together create customer value results *(Hammer, 2002).* **Activity** is a comprehensive summary of the work is composed of several activities (going in a row or similar nature), which connection is important for the creation of ABC costing model. **Procedure** is understood as the least descriptive performance of a particular type of work (administrative, managerial, service or production / technology) in an enterprise (obtained from storage, accounting, typing invoices, carry out manufacturing operations, etc.).

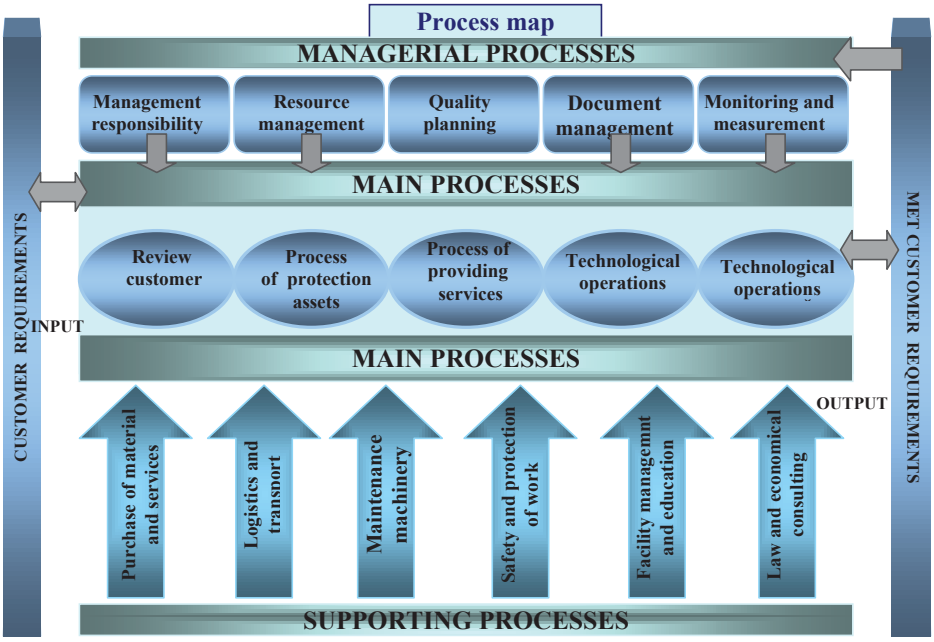


Figure 3. The process map *(Source: Teplická, 2004)*

All organisations need to identify and describe their processes and design a processes classification list (Šatanová, Krajčírová, 2010). For this classification it is very important to create some criteria. The main processes that make a value for a customer can be called a „core business". For the complete classification of the **companies´ processes** it is needed to develop a map of processes as

shown in figure 3. **Process map** is an instrument through the organization describes its business processes in a hierarchy: managerial processes, main processes, supporting processes (Šatanová, Gejdoš, 2010). Managerial processes are elements of corporate management or a management decision. The main (core) processes are activities serving to create added value. Supporting processes support a core processes, but do not add value for customer.

Into the supporting processes is possible to include the processes that are often to the potential of outsourcing use *(*logistic, maintenance of information systems and technologies, administration and accounting, law and economical consulting, education and facility management). For each supporting process, we propose to develop a detailed identification of the all activities and operations. For identify the processes, activities and actions is possible based on organizational structure of company and processes utilized analyzes job descriptions of each employee, ensuring the processes. The proposal for a general identification of business process, activities and operations with the specification of possible relational variable overhead allocations base presented Table 1.

2.2 Cost analysis of an enterprise

Cost analysis of an enterprise is one of the first criteria for assessing the economic efficiency of the company, but also it is important information in the proposal of outsourcing use for any activities of the company and their transfer to an external supplier. Today, most of companies monitoring the minimum level of direct and overheads cost.

Direct costs are the cost items that can be directly allocated to cost objects (product, service, organizational unit) without any conversion or using by allocation base. Typical examples are the cost items identified by the standards of material consumption or time (materials, labor), or costs directly monitored at the organizational unit of company (depreciation, energy, overhead labor and materials cost, maintenance, services ...). **Overhead costs** are the cost items that are priority monitoring at the organizational unit of companies, or like a special group at the all of company. For its allocation at the cost abject are needs to use any types of allocation base. Typical examples are the cost items are overhead material and labour cost, energy, financial cost, travel cost, interest, administration cost. For company is necessary to monitoring these costs at least heading the chart of financial accounts, respectively in which the most detailed items of cost types. The fields of outsourcing are the most important information on the level of overheads cost. A separate category of cost is **irrelevant cost**, which are trying to characterize the group considered the estimated costs of future options for their development. The relevant costs in each variant of decision (to outsource or not outsource) will to change. Irrelevant costs are the special group of cost that the values of the costs remain the same alternatives considered in decision-making does not reflect any change. **Irrelevant costs should be eliminating from any** type **of decision-making** task about outsourcing.

2.3 Determination of parametric costs of outsourcing use

The problem of determination parametric cost of outsourcing is dependent on whether the company wants to apply selective or comprehensive form of outsourcing. Another important factor is how internal accounting system is able to the register the levels of cost to potential areas for outsourcing use. The most important information for complex form of outsourcing (use of external service organizations for replacement all activities) is to determine the parametric level of cost:

Parametric cost for complex outsourcing at the account period (PC_{CO})

$$PC_{CO} = \textit{the cost of organisation unit – transaction cost} \qquad (1)$$

Table 1. The proposal of general identification of business processes, activities and operations with allocation base

PROCESSES	ACTIVITIES	OPERATIONS	ALLOCATION BASE
RESEARCH AND DEVELOPMENT OF OUTPUTS	**Planning and creating of new proposals**	- market analysis and information processing, - creating of construction documentation.	the number of requirements of proposals, special request of customer
	Evaluation and selection of best proposal	- evaluation of proposal option from the view of design, price and time requirement ,... - changes at the design prototypes.	the number of proposal options, the number of changes proposed, special request of customer,
	Optimization of the final proposal the final form	bill of materials processing and working procedures of the final proposal, - verification the cost of the final product,	standardized components, the number of standard hours,
MANAGING AND ADMINISTRATION	**Planning and budgeting**	- creation of basic types of planning and budgeting - evaluations of deviations,	the number of employees, share from total cost, perceptual share from time employed found
	Personal agenda	- personnel selection, - schooling and education, - personnel administration,	the number of education activities and courses
	Accounting	- payroll agenda, - accounting agenda, - accounting administration,	the number of documents
PRODUCTION	**Processing of materials**	- materials A, - materials B, materials C,	perceptual share from time employed found,
	Technological operation 1	- setting machine, - turning, - ……..	the number of preparation of productions, the number of technological operations,
	Technological operation 2	- drilling, - pooling, - ……..	perceptual share from time employed found, the number of drilling operations,
	…….		
DISTRIBUTION	**Storage entrance**	- evidence - control,	the number of products, m^3, m^2, kg
	Contract elaboration	-contact with customer, - processing of orders	the number of order, contact,
	Sale	- invoicing, - evidence of payment invoices	the number of invoice,
	Transport of product	-loading of products, - transport to customer	the number of products, materials items, km, tonne/kilometres.

Source: Own elaborations

Parametric cost can be expressed at the total cost of the accounting period or as the level of costs based on the specific unit. Specific unit is possible established on the basis, depending on what area of outsourcing will be one (facility management, administration, logistics, accounting, human resources ...), but also on the level of price offer outsourcing services of an external organization (based eg. per employee, project, document management, kilometer ...). In case if we use a complex form of outsourcing, which is often covered as a process of organizational unit, is sufficient to establish their own costs at the organizational unit. More often in practice applied to a form of **selective outsourcing**, namely an external assignment only selected processes, activities, which are the responsibility of the organizational unit. If we use a form of selective outsourcing, it is necessary to determine the amount of its **own costs** for the selected process, activity or operations. If the organisational unit provides a number of activities and we wants to outsource only selected activities, we must to determine the partial costs of activities through the ABC costing methodology.

From the proposal of estimation parametric cost is need to identify a number of other specific steps. Sell them methodically grouped in the following areas:

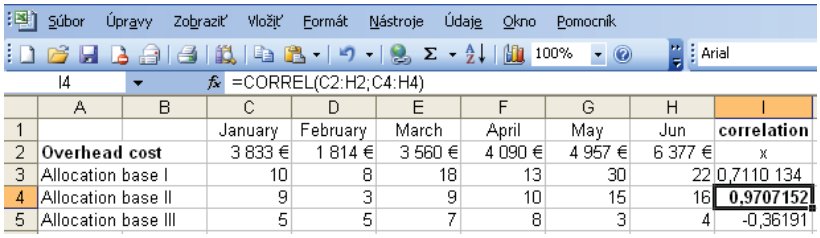
- *Identification of cost allocation base for identified groups of overhead cost*
- *Determination of rates for identified groups of overheads cost*
- *Establishment of overhead costs in single processes*

In the case of determining parametric costs is very important area of determining the level of co-operation costs, sometimes also referred to as transaction cost. Managers in decision-making are often based on a comparison of border values and looking for situations in which marginal revenues exceed marginal costs. The answer is impossible to determine the incorporation of transaction costs in decision making *(Paluš, H., Kaputa, V., Šupín, M., Fodrek, L., Parobek, J., Šálka, J., Halaj, D., Šulek, R., 2010).*

2.3.1 Identification of cost allocation base for identified groups of overhead cost

After the identification of processes, activities and procedures in an enterprise is needs for any process (activity, procedures) allocate the overhead costs for which it is necessary to determine the most ideal type of the allocation base. Allocation base is an indication, by which is possible to allocate the overheads cost to cost object (processes or activities). Allocation base should have a direct relationship to the calculated output and in general it can be any value expressed in monetary terms or in kind. Allocation base should meet the following requirements *(Foltínová et al., 2007):* the causal relationship between the allocation base and the overhead costs, the height of allocation base should be easily identifiable and controllable and constant for provide a comparability of different periods, should be large enough that a small error in the quantification not cause large errors in the allocation. For our proposal, we will for the selection of allocation base overhead costs based on the ABC costing methodology that can quantify the level of costs of the outsourced processes or activities. Drury referred that generally are three types of allocation base *(Drury, C. 2000):*

- **Transaction drivers** are usually defined in the measurable items (number of orders, number of invoices, number of proposals, ...). These values are often incorrect because they assume that every performance of activities is consumed the same amount of resources.
- **Duration drivers** represent the time needed to perform activities (standard hours, worked time fund, ...). These values are precise type of allocation base, because trying to accept differences between the performance of one activity.
- **Intensity drivers** allocated the overheads cost directly to the activity. This is the most accurate way of the cost allocation to the activities. Very often it is not possible to use this type of allocation base from the reason of information deficit about the cost consumption and activity outputs.



	A	B	C	D	E	F	G	H	I
1			January	February	March	April	May	Jun	correlation
2	**Overhead cost**		3 833 €	1 814 €	3 560 €	4 090 €	4 957 €	6 377 €	x
3	Allocation base I		10	8	18	13	30	22	0,7110 134
4	Allocation base II		9	3	9	10	15	16	**0,9707152**
5	Allocation base III		5	5	7	8	3	4	-0,36191

Figure 4. Generic analysis of the allocation base for a selected group of overheads cost

For the determination of ideal type of allocation base of the each level of overhead cost is possible to use the function of correlation analyze by the program Microsoft Office Excel (figure 4).

From the analyzed types of allocation base has the highest value of correlation coefficient allocation base II. This alternative of allocation base may be considered for that type of overheads cost as a determinant for the following decision making tasks (for the task of estimation own level of overhead cost for process, activity or procedures). In a similar way is possible to do the same for other groups of overheads cost, while we propose also compared data on the level of costs and allocation bases at least quarterly data records. Important is the fact that the analyzed allocation base must have direct connection with the process, activity or procedure.

2.3.2 Determination of rates for identified groups of overheads cost

In determining the own cost is necessary to proceed methodically through determining the rate of cost. The rate is a classic indicator, by which it is possible to determine the level of the allocation of the cost. Rate can be determined as a share of overhead costs and allocation base. This step is again to be done separately for each group of overheads cost and the defined base type of allocation base.

Rate *= the level of overhead cost / allocation base* *(2)*

2.3.3 Establishment of overhead costs in single processes

Application of overhed cost rates and the level of allocaton base for any processes, activities or procedures is then possible to determine the level of own cost (OC_P) for process activity or procedure. The procedure is following:

$$OC_P = \sum_{n}^{i=1} (rate_1 \times volume\ of\ al.\ base\ for\ process_1) + ... (rate_n \times volume\ of\ al.\ base\ for\ process_n) \quad (3)$$

n: The number of analyzed groups of overheads cost and allocation base

Then is possible to determine the level of parametric cost **for selective form of outsourcing at the account period** (PC_{SO}).

$$PC_{SO} = own\ cost\ of\ outsourcing\ process - transaction\ cost \quad (4)$$

This cost is basically marginal cost of adoption, respectively rejection of outsourcing services through their comparison with the cost of external services of specialized organizations. In the case where outsourcing price is under the parametric cost, it would mean for the company potential cost savings and the possibility of increasing of its orientation for core business (production, sales). The problem is to assess the quality of service increases, the potential risk of transmission to the supplier or obtaining of know-how from the field. These factors are the following criteria at the selection.

2.4 Quantification of potential cost savings

One of the best reasons for application of outsourcing in company practise is cost savings. This is the most important indicator for evaluation of the economic efficiency of outsourcing. This indicator is possible to determine like a different between parametric cost for selective outsourcing at the account period and price of external services for outsourcing use.

Saving of the cost *= PC_{SO} – price of external services* *(5)*

Cost savings is possible to determine give priority at the total cost of the accounting period or as a secondary level of costs based on the specific unit (employee, project, document, desktop, kilometer,...).

3. CONCLUSION

The world financial crisis has influenced the whole entrepreneur's society in a negative way. As a result of the crisis, many enterprises are forced to undertake many costly actions, which sometimes are not even linked to their company's main focus of activity. Specialists suggest to focus on the main activity in which a certain company operates (e.g. production, trade or services) and let go of watching the operational details and aside procedures. Therefore, outsourcing represents a new way towards rationalization of enterprise's activities, which means to submit internal side- activities, which are generally not linked to the main company's focus of activity, to external subjects. This is more cost

effective. Correctly use of methodological scheme presented for evaluation of economical efficiency of outsourcing use in wood processing industry can show one of the companies' effective ways to reduce costs and increase business performance. It is important to determine functional and design parameters for the evaluation of economic effectiveness of outsourcing in wood working companies.

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WOOD SUPPLY – SIMULATION OF THE RAW MATERIAL ALLOCATION UNDER VARYING ECONOMIC CONDITIONS FOR THE AUSTRIAN FOREST-BASED SECTOR

Peter SCHWARZBAUER, Stefan WEINFURTER, Tobias STERN, Wolfgang HUBER, Sebastian KOCH, Caroline LEDL, Leyla JAZAYERI-THOMAS

ABSTRACT

In the light of the recent economic crisis, economic scenarios and their possible impacts on the supply and allocation of wood raw material are simulated for Austria. The main underlying methodology is a forest-sector simulation model, which utilizes the System-Dynamics (SD) language and addresses the interactions between macroeconomics, the forest sector and within the forest sector, including energy. Preliminary results highlight the crucial role of sawmills regarding the supply of wood raw material, because a reduction of sawnwood production due to a general economic downturn also reduces the supply of sawmill residues, which negatively affects the production of pulp and panels but also counteracts policies to increase the share of biomass in energy production.

Keywords: wood supply, economic crisis, simulation, scenarios, wood for energy vs. material

1. BACKGROUND

The recent economic crisis was taken as a starting point for the project “ECri-Wood - Wood Supply and Economic Crisis: Impacts on the Forest-based Sector and Bio-Energy Production" which is funded by the “Jubiläumsfonds” of the Austrian Federal Reserve (Austrian National Bank). In course of this project various economic scenarios and their impacts on the supply and allocation of the raw material wood were simulated for Austria.

2. MODEL

The main modelling system of this project is a quantitative forest-sector specific simulation model, called “FOHOW” (Forst- und Holzwirtschaft). It addresses the interactions between macroeconomics, the forest sector and within the forest sector. In the simulation model of the Austrian forest sector (FOHOW) the forest sector is modelled as a whole (system), from forest growth to the use of paper (Figure 1). It does not intend to deliver exact forecasts but tries to analyse longer-term effects of events (“what-if” questions). In this project the “what-if” questions are related to the (potential) reduction of wood products production by the forest-based industry due to long-term effects of economic crises, in particular how that reduction would affect the markets of wood for energy. FOHOW is a simulation model using the System-Dynamics (SD) language. The current version of FOHOW consists of approx. 1500 equations, of which about 250 are levels, 250 rates, 400 auxiliaries and the rest table functions and constants (Schwarzbauer, 1993).

FOHOW consists of four types of modules:

(1) General economy: includes only exogenous variables (GDP, population).
(2) Forest industry and forest product markets: includes supply, demand, prices and trade for each (semi-finished) product.
(3) Forestry: includes timber supply from three ownership categories: small private forest owners (< 200 ha), larger private forest owners (>= 200 ha) and Austrian Federal Forests. Timber markets are at the border between (2) and (3).
(4) Forest resources: includes forest area, growing stock and increment each broken into coniferous and non-coniferous forests, ownership categories and two age-classes.

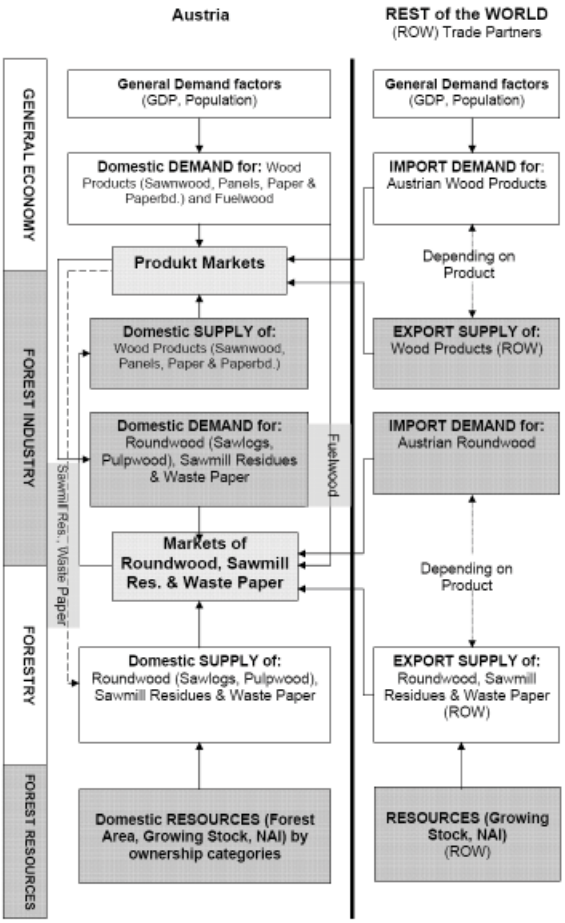

Figure 1. Structure of the FOHOW model

FOHOW covers only one region with trade relations to the rest of the world: Austria is the centre of interest, a fictive "rest-of-the-world" represents the aggregation of Austrian trade partners (imports and exports) in forest products.

The following product groups are included in the model:

Forestry
- Coniferous logs
- Non-coniferous logs
- Coniferous pulpwood
- Non-coniferous pulpwood
- Coniferous fuelwood
- Non-coniferous fuelwood

Sawmiling industry
- Coniferous Sawnwood
- Non-coniferous Sawnwood
- Sawmill residues

Board and panel industry
- Particle- and fiberboards

Pulp and paper industry (semi-finished products and finished products)
- Pulp
- Waste paper
- Paper and paperboard

3. SCENARIOS

3.1. Base scenario – business as usual

General impact factors for the baseline scenario are given in Table 1. Besides the assumptions in Table 1, no political interventions of any kind are assumed. Only the free market and the general economic conditions are decisive.

Table 1. General impact factors

				Year		
Impact factor	**2008**	**2009**	**2010**	**2011**	**2012-2015**	**2016-2020**
GDP Austria*	2.2	-3.9	2.0	1.9	2.5	2.1
GDP OECD*	0.4	-3.4	2.2	2.2	2.5	2.0
	2008	**2009**	**2010**	**2011**	**2015**	**2020**
Crude oil price $/barrel **	99.57	60.12	72.42	76.25	105.33	132.33

*Annual real growth rates
Sources: *2008-2011 WIFO (2010); since 2012 OECD Baseline Scenario
**EIA (2010)

3.1.1. Base scenario variation – reduction of coniferous industrial roundwood imports

Assumptions are kept equal to the baseline scenario (Table 1) with one exception: Austria's coniferous sawlog imports are not left to the market's free forces, but decrease due to the establishment of new capacities in the neighbouring countries (Table 2). Further impacts such as changes in imports of other roundwood assortments are not assumed.

Table 2. Additional assumptions for the reduction of coniferous sawlog imports (million m³)

	Year			
Impact factor	2006	2015	2020	2025
Coniferous sawlog imports	5.8	4.0	2.5	1.0

3.1.2. Base scenario variation – energy efficiency scenario

The energy efficiency scenario presumably takes into account that the Austrian National Action Plan for Renewable Energy 2010 (BMWFJ, 2010) is executed. Assumptions correspond to those of the baseline scenario with the following exception: The goals of the National Renewable Energy Action Plan 2010 are set as preconditions. These are: reduction of overall energy consumption -10%; share of renewable energy 34%, thereof 45% woody biomass. These goals are met by 2020. After 2020 political intervention is omitted and only the free market forces "rule."

3.2. Scenario – local economic crisis

All assumptions coincide with those of the baseline scenario except that Austria's annual economic growth rate is reduced starting with the year 2012. Simulated reduction of economic growth is similar in extent and length to former economic downturns in the US (1928-1934), Finland and Latvia (Table 3).

Table 3. Assumptions for economic development in the local economic crisis scenario

	Year								
Impact factor	2012	2013	2014	2015	2016	2017	2018	2019-2020	2021-2025
GDP Austria*	-7.0	-9.7	-12.5	-15.0	-11.0	0.02	0.2	2.1	1.9
GDP OECD*	2.5	2.5	2.5	2.5	2.0	2.0	2.0	2.0	2.0

*Annual real growth rates

3.3. Scenario – global economic crisis

Underlying assumptions are equal to those of the baseline scenario except that the economic annual growth rate of Austria AND the rest of the world is reduced beginning with the year 2012 (Table 4). Extent and duration of the economic growth decline is similar to past economic crises.

Table 4. Assumptions for economic development in the global economic crisis scenario

	Year								
Impact factor	2012	2013	2014	2015	2016	2017	2018	2019-2020	2021-2025
GDP Austria*	-7.0	-9.7	-12.5	-15.0	-11.0	0.02	0.2	2.1	1.9
GDP OECD*	-7.0	-9.7	-12.5	-15.0	-11.0	0.02	0.2	2.0	2.0

*Annual real growth rates

4. RESULTS

Results must not be considered as “forecasts” but rather as “projections” based on scenario assumptions, because the probability of occurrence cannot be calculated.

4.1. Results of baseline scenario

As one might expect, the baseline scenario does not show spectacular changes, though it reveals some interesting developments (Figures 2 and 3). Prices of sawmill residues increase most notably of all the forest products displayed in the model, because of increasing demand in the energy sector. While prices of sawmill residues will go up, prices of fuelwood directly from forests will stagnate or slightly decline.

Already in the baseline scenario the growth rate of overall woody biomass consumption for energy purposes exceeds the growth rates of all forest products. These effects can be primarily ascribed to increasing oil prices.

The increase in consumption of sawmill residues for energy purposes will not (yet) lead to fundamental procurement problems of panel and paper industries. Increased supply from domestic forests (due to higher prices) and to a lesser extend increased imports of roundwood, sawmill residues and pulp compensate for increased consumption of sawmill residues for energy purposes.

The increase in consumption of sawmill residues will indirectly result in ascending prices of industrial roundwood, because sawmills will decrease recovery in order to rise sawmill residue production. That way demand in industrial roundwood shall be strengthened. Thus escalating raw material prices shall be compensated by increased sawmill residue prices.

Forestry’s production values/sales rise over time due to increased industrial roundwood prices and intensified removals. Production values/sales of sawmilling industry rise due to increased sawmill residue prices. Production values/sales of both forestry and sawmilling industry grow at a considerably higher rate than that of panel and paper industries.

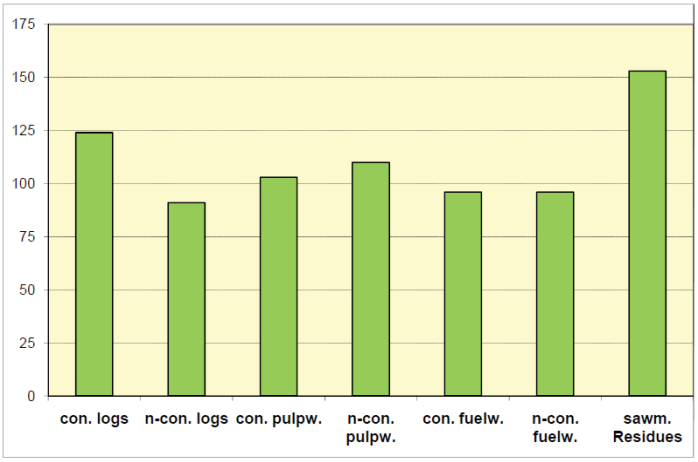

Figure 2. Real price indexes 2025 (2006 = 100) of the baseline scenario, roundwood

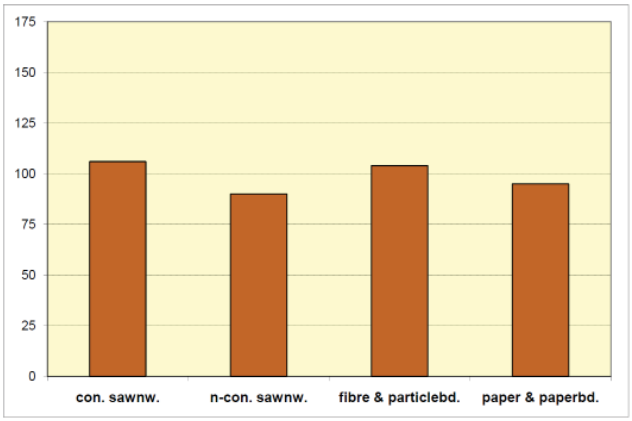

Figure 3. Real price indexes 2025 (2006 = 100) of the baseline scenario, wood products

4.2. Results of baseline scenario variations

The following paragraphs depict the effects of the two baseline scenario variations, namely the energy efficiency scenario and the reduction of coniferous sawlog imports scenario.

On one hand, energy savings measures and efficient energy use reduce overall energy consumption. On the other hand, the share of renewable energy grows. Both account for the similarities of the energy efficiency scenario and the baseline scenario.

Shortage of sawmill residues caused by reduction of coniferous sawlog imports and increased use of sawmill residues for energy purposes respectively, will be partly compensated by intensified removals from domestic forests, to a slight increase by pulpwood imports and increased processing of waste paper.

Reduced coniferous sawlog imports have a severe negative impact on the sawmilling industry. In contrast, sawmilling industry can somewhat profit from increased demand for sawmill residues for energy purposes.

4.3. Results of economic crises scenarios

Both economic crises scenarios, the global and the local, result in declined production and dwindling prices, though at different magnitudes. It is self-evident that the impact of the global crisis scenario is larger in comparison to the local economic crisis scenario.

Within the local scenario forest-based industries can compensate for the domestic demand decline by increasing exports (sawmill industry, paper industry) or maintaining exports (panel industry). Supply and consumption of woody biomass for energy purposes will be affected less than material use of wood, comparably.

The utilization of sawmill residues for energy purposes reaches a higher level in the global crisis scenario than in the local crisis scenario, because in the local scenario competition for the raw material is considerably stronger between material use (panels, paper) and use for energy purposes. Thus, local economic crises can already exhibit a problem for woody biomass use for energy purposes.

The sawmill industry plays a key role regarding the allocation of woody biomass in all of the scenarios: On one hand, the sawmill industry is the largest customer of the forest sector. On the other hand, the sawmill industry is the supplier of sawmill residues for both, material use of sawmill residues and the sawmill residue utilization for energy purposes. That also counts for the crises scenarios.

The panel industry is scarcely affected by a local economic crisis, paper industry suffers most in both scenarios. A severe reduction of coniferous sawlog imports would be worse for the sawmill industry than a local crisis. In this regard, panel and paper industries are scarcely affected, although availability of sawmill residues would definitely decline. Although forestry always exhibits the most positive development, already a local economic crisis would mean significant losses for forestry. Execution of the National Renewable Energy Action Plan 2010 surprisingly indicates only minor impacts on turnover of each sector (Figure 4 and 5).

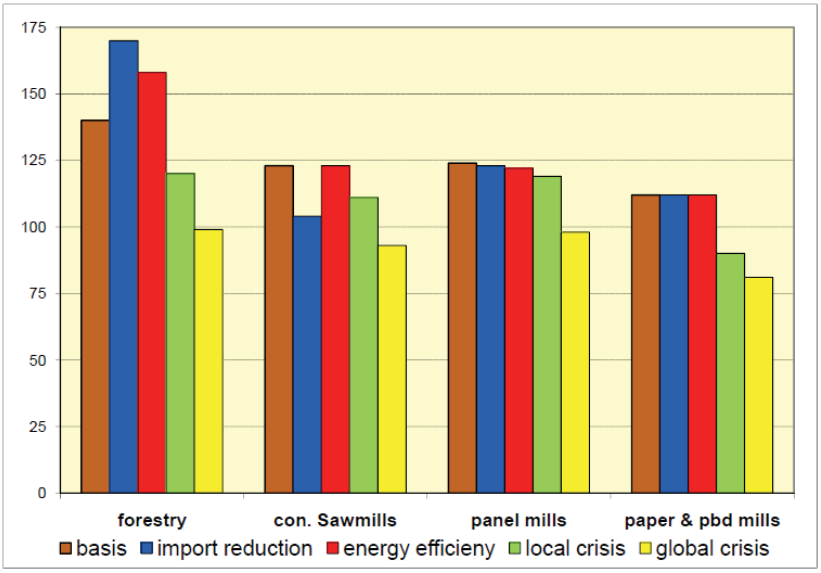

Figure 4. Real turnover indexes, forestry and forest-based industries 2025 (2006 = 100)

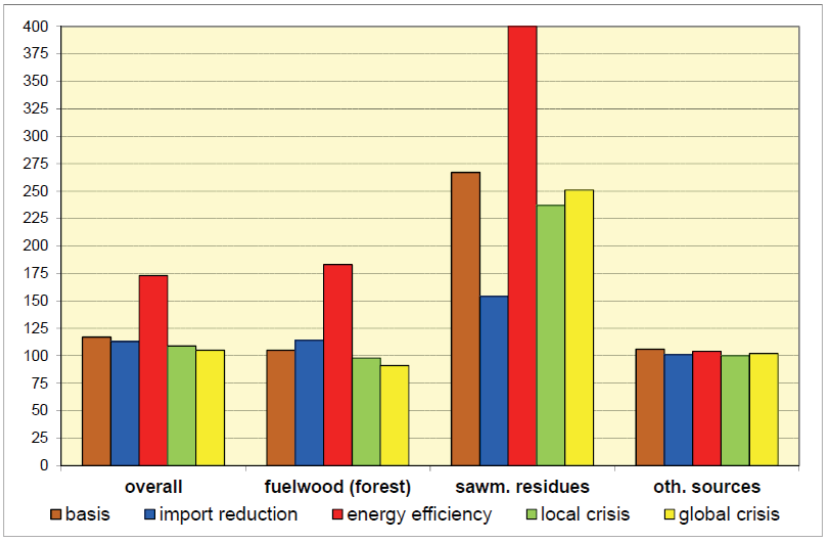

Figure 5. Indexes, woody biomass consumption for energy purposes 2025 (2006 = 100)

5. DISCUSSION

When there is scarcity of wood rawmaterial (in case of increased demand for wood energy and/or a reduced raw material base due to reduced log imports) forestry is the winner, because harvests and prices for roundwood increase. While sawmills are severely affected in a negative way by reduced log imports, they are also winners in the efficient energy scenario, due to rising prices of sawmill residues. In case of decreasing demand – due to a downturn in the general economy – the paper industry is suffering most within the branches of the forest sector in Austria. Although the general impact of a local crisis on the overall forest sector is less than the impact of a global downturn, the results show that even a local crisis can reduce the availability of wood for energy: in a local crisis panel and paper mills are much better off than in the global crisis, because they still can rely on exports; thus, they are in a better position to compete for wood biomass with the energy sector.

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APPROACH TO MANAGEMENT OF RESTRUCTURALIZATION IN SLOVAK WOOD PROCESSING ENTERPRISES

Andrea SUJOVÁ

ABSTRACT

Restructuralization in many enterprises contemporary seems to be only one way to reach new competitive advantages according to requirements of globalized market. The restructuralization has become a tool enabling revaluation of present enterprising activities and to relocate sources towards increasing the enterprise performance. The paper is focused on approach to management of restructuralization as one of key success factors by restructuralization process. In paper the attention is paid to identification of approach applied in Slovak wood processing enterprises and to process approach recommended for successful restructuralization.

Keywords: restructuralization, process management, wood processing enterprise

1. INTRODUCTION

Among basic strategic goals of each enterprise the ability to be competitive on the market belongs. Enterprises have been permanently searching methods and ways for securing the sustainable development. One way is the restructuralization that enables to optimalize the business structure and to increase its competitiveness.[8] Restructuralization presents a complex system of changes in all company departments and processes requiring change including not only cost reducing but optimalization of all elements and processes allied to change of thinking, work procedures, company culture.

Business restructuralization is a process of changes in particular company departments directing to securing the next successful development and long-term prosperity. Restructuralization content are complex changes including relatively independent but inseparable and interlocking components: technical, organizational, methodical and social changes.

Success of business restructuralization depends on several factors. The prerequisite of successful restructuralization is to determine a reason for change need on the base of detailed elaborated analyses of enterprise and its environment, to determine real goals and choice of convenient method for change realization. Choice of suitable approach and methods of restructuralization management belong among key factors of successful restructuralization process. Opinions of experts as also experiences of enterprises with realization of changes supported process approach as a basic condition for successful restructuralization.

2. APPROACHES TO MANAGEMENT OF RESTRUCTURALIZATION

The present theory and practice provide for enterprise´s restructuralization two different approaches: traditional functional and process approach. *(Truneček 1997)*

In the long term used management system in most of enterprises the **functional management** has been. Enterprises consist of functional structures that perform partial elements of total processes. Functional management is based on division of labour and specialization and there are created specialized organs providing particular management functions. [2] Traditional, functional approach comes out the principles of function management therefore it is based on clear procedures and instructions from up to down. It is focused on measurable and quantificational results. Functional approach is focused on measurable and quantificational results. It comes out analysis of company economy and its aim is to slim of enterprise towards better prosperity. Arrangements are directed to improvement of economic indicators like cost reduction, profit and labour productivity increase. This approach is solving only consequences of crisis rise and it is not able to be flexible in fast changing environment. The result is loss of dynamics, contact with customers and orientation on internal problem of enterprise. Continual sliming of enterprise can result in such company weakening that disables to come at growth phase.

Process approach to restructuralization goes out principles of process management focused on horizontal management of an enterprise through processes. Process system is operating on following principles:

» Principle of alternative procedures – choice from more possible procedures.
» Team cooperation – involvement and motivation off all workers on results.
» Lean management structure – competences and responsibility for result in each process.
» Jointly perceived success or failure – better employee morale, cooperation and communication.
» Orientation to customer – creation of added value for customer.

Within process approach *two conceptions* exist:

Continual improvement – never ending process whereat repeating small improvements in production and trade processes are achieving and company is becoming more competitive. This conception can be applied in functional enterprises without permanent problems. Among methods of continual improvement belong:

- ***KAIZEN*** *(kai = change, zen = better)*, that means a change to better; i tis going on team improvement focused on serial and sustainable improvement of work and working procedures in all areas and all levels.
- ***TFM*** *(total flow management)* is considered for new KAIZEN model including not only production but also complete supply chain and its aim is to shortening a total running time in complete supply chain.
- ***TQM*** *(total quality management)* is characterized as a conception of quality management oriented in all phases of product life-cycle on customer satisfaction, respecting its diferent requirments by insisitng on permanent increasing the quality of products and services.
- ***JIT*** *(just in time)* is synchronisation of production operations, purchasing needed raw-materials and delivery of products according to real needs and their time flow.
- ***Lean production***: maximal simplification of all production procedures, elimination of all activities with possibility of chepar purchase.
- ***Patching*** is a method of proactive, periodic restructuralization with aim to optimalise using the enterprise sources by appearing the market opportunity.

Reengineering – radical change of company processes in purpose to dramatic efficiency improvement. The main principle of reengineering is identification of outdated rules, methods and processes and their radical change to new, more effective. After I. Mašín (1994) a need to perform reengineering has rised if diference between planned, target value and achieved one is more than 10 %.

Reengineering process includes 3 levels:

- ***Work process reengineering - WPR***: change of proceses in production and data processing,

- ***Business process reengineering - BPR:*** change of enterprising processe in relation to environment (adapting to economic environment),
- ***Business reengineering - BRE:*** radical redefinition of goals and functions of whole enterprise, strategic change of enterprising direction

Table 1. Basic characteristics of approaches to restructuralization

Parameter	FUNCTION APPROACH	PROCESS APPROACH	
	The slim of enterprise	Continual improvement	Reengineering
premise	**negative economic results**	**healthy process**	**defecting process**
outlet	**economic analysis**	**detailed process analyses**	**Iterative proposal**
width	**all functional levels**	**existing small process**	**whole company process**
method	**cost reduction**	**TQM, KAIZEN, JIT**	**innovations - change management**
technique	**implication identification**	**identification of reasons**	**rules refracting**
aim	**better prosperity**	**upgrade of process output**	**process redesign**

3. APPROACH TO RESTRUCTURALIZATION APPLIED IN SLOVAK WOOD PROCESSING ENTERPRISES

Present situation of solving the management of restructuralization issue ***in Slovak wood processing enterprises*** has been analyzed through questionnaire research in 56 small and medium enterprises from production branches of wood processing and furniture. Research came to result that approach to restructuralization applied in most of enterprises is functional and the changes are performed only in case of critical financial situation. It is proved by next facts:

» 72 % enterprises come out the financial situation detected by financial analysis and changes are performed only by critical financial situation.
» Enterprises don ´t regard the competition, none enterprise analyses competition by decisions about changes realization.
» The main grounds for changes were: low production efficiency (100%), negative economic result in 72 % and low labour productivity in 60 %. Insufficient competitiveness, innovation need were grounds of middle importance.
» Solution of named problems consisted of employees reducing (in 88 %), assortment structure optimalization (in 80 %) and production increase (in 48 %).
» To solve the problems in enterprise by change realization – to achieve a positive result was succeed only in some enterprises: to upturn the economic result in 55 %, to reach higher satisfaction of customers in 33 % and to increase production quality in 43 % enterprises.
» Long-term positive effects have been achieved in enterprises (72 %) focused on small number of areas (2 – 3) where more changes have been performed.

4. ARGUMENTS FOR APPLICATION OF PROCESS APPROACH TO RESTRUCTURALIZATION MANAGEMENT

Application of functional management instruments in present time in fast changing environment has not been effective what is reflected by the characteristics and features of functional management which are considered as its disadvantages in comparison with other management systems and also by research results in enterprises focused on grounds for implementation of process management that are realization of total strategic change in effort to achieve flexibility in reaction to changes in external

a internal environment, implementation of quality management system ISO, keeping the quality according to ISO standards, simplification of management system.

Restructuralization is a process and that is main reason why a process approach to restructuralization of enterprise is a necessary prerequisite for its realization. Also enterprises successfully passed a restructuralization process confirmed that the basic prerequisite of successful restructuralization the process approach is. It means focus on changes in processes and eliminating the reasons of negative results.

Restructuralization based on processes brings to enterprise several measurable and negligible effects. Among main contributions of process restructuralization belongs:

- detecting reasons of negative results: assign effective and ineffective processes and get rid of unnecessary activities and development of effective activities,
- adducing evidence about objective exploitation of enterprise sources: it helps to detect reserves and to increase business performance by optimal costs,
- insuring the measurement and evaluation of customer, products and market segments profitability, help to recognize enterprise from customer view,
- measurement of results in relation to business strategy,
- effective cost reduce (on right places, in right scale),
- gaining the flexibility in adapting to changes on market that means to gain a main competitive advantage on globalized market.

5. CONCLUSION

The permanent development is conditional to successful restructuralization of business processes. Except emphasis on production quality the enterprises have to insist on quality and effectiveness of processes. Needed changes should be performed in way to achieve desired effects in the long term.

The large number of Slovak enterprises understands the restructuralization as the process connected with change of owners or as a process focused on cost reducing in effort to improve financial indicators and that is why the most frequent ground for restructuralization is the crisis situation in the enterprise. Experiences of foreign enterprises confirm that restructuralization can be a way to reaching competitive advantages on market and to increasing the competitiveness and performance. The main ground for restructuralization has been becoming utilization of market opportunities or changes in customer requests.

Success of business restructuralization depends on choice of suitable approach and methods of restructuralization management. Slovak enterprises by deciding for change realization apply the functional approach – they have gone out financial situation and by restructuralization they have been trying reduce the costs and improve economic results. Functional approach doesn´t enable find and eliminate the reasons of negative results that is why the effects of restructuring changes were not sufficient and restructuralization was failed.

Experiences of Slovak enterprises performing functional approach to restructuralization proved that required effects were not achieved or were only short-timed. Solution for successful restructuralization is process approach to management of restructuralization.

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SUPPLIERS EVALUATION METHODS

Anna ŠATANOVÁ, Lucia KRAJČÍROVÁ

ABSTRACT

Quality supplier is a prerequisite for the successful establishment of all areas of business activity. Monitoring and evaluation of suppliers is very important for actual business practice. It provides the information that is necessary for selection of those suppliers that best suit for business needs. The aim of our article is to bring the method of suppliers evaluation in the wood processing industry using the method of twin criteria comparison, the method of scoring, the graphic method and the decision matrix method.

Keywords: criteria, methods of evaluation, selection of supplier, suppliers

1. INTRODUCTION

If company wants to be successful, it has to be presented on market by the highest quality of its products and it has to offer them to customers in such form, which they expect from it. All market participants, which come into contact with company, influence it in many ways. Especially suppliers and inputs have large influence on the quality of its production, because the most quality errors are created currently in preproduction phase. For this reason the company has to pay a lot of attention to the issue of selection and evaluation of its suppliers.

Nowadays the most of companies has their own worked-out system of selection and evaluation of suppliers. Norms ISO 9000 pay high attention to this issue, while ISO 9001:2009 defines the requirements for this area and ISO 9004:2009 refers to possible recommendations in the process of purchasing and supplier management [4].

So that the company can make the right decision and choose such a partner, who does not endanger its existence, it must have the sufficiency of information about supplier at disposal. It is important to evaluate its business partners on the basis of such criteria, which will be essential for the company and provide necessary information for the company management of its supplier-customer relations. Assurance of trouble free process of production requires the purchase of quality inputs, which in company do not cause unacceptable situation. Objective determination about purchase is asking for careful selection of supplier.

In our paper we propose method of suppliers' evaluation for company in the wood processing industry, engaged in production of wood windows and doors (construction and joinery production). The company has suppliers of input materials, such as blocks of spruce and pine wood, various types of ironworks (massive adjustable hinges, handles positioning, peripheral ironwork...), material for surface treatment, weather-strip, drip, isolating glass...

2. EVALUATION OF SUPPLIERS

In the initial phase of choice of suppliers we propose the company to use the method of brainstorming and brainwriting. The proposed procedure gets the company a lot of solutions to the possible situations. Creative sessions in the company should be involved staff of commercial, economic, production and supply unit. Therefore we collect so many ideas from different angles. The company

thereby guarantees some degree of objectivity by purchasing decision. Besides the resolution of suppliers question this way will also bring great positive in terms of promoting creative thinking of its employees. We propose to realise this method in company in the following steps:

- proposal of suppliers evaluation parameters,
- continuous selection of ideas,
- exclusion of unsuitable and unusable ideas,
- determination of evaluation criteria, such as time, price, contractual terms, market behaviour, image of potential business partner, the conditions for long-term partnership and evaluation of total costs.

Those evaluation criteria to be cy-pres, we use questionnaire method of collecting information. Those will company send to its suppliers and the questions will be developed so they can be incorporated into own evaluation criteria.

3. MULTICRITERIA METHODS

The actual period is characterized by permanently more complicated market conditions. Therefore the method of evaluation and selection of suppliers has to take in account various criteria [2]. These are possible to monitor and, of course, to evaluate by means of so called multicriteria methods, which would be used for evaluation of suppliers also in our company.

Evaluation of required criteria in the company would be possible only with the participation of various members of the evaluation, because it is not possible that one employee comes into contact with all business activities and the conditions under review. We propose using of **paired comparisons method** to the company. Its result is a severity determination of criteria. After determining the individual evaluation criteria we can begin to evaluate the suppliers, which we can thereafter divide to groups by kind of individual inputs (e. g. suppliers of inputs, service providers, carriers...).

In phase of suppliers' evaluation we propose the company to use a **method of scoring**, which is the scoring system for individual criteria within the scale (1 – 5 points). Its essence inheres in the fact that it assigns all suppliers by synthetic value. It is based on an evaluation of the main parameters = criteria. The resulting value is not their arithmetic average value. It is obtained on the basis that each criterion is assigned by a coefficient = relative weight, which was determined by method of paired comparisons.

For the company are the most important criteria for evaluation its current and potential suppliers of inputs:

- terms and conditions,
- quality management system,
- price and payment terms,
- delivery and storage,
- communication with supplier,
- production, purchase,
- control and testing.

The company would evaluate completed questionnaires and the results of the analysis would be incorporated into the evaluation criteria. Only for information we present the evaluation of selected criteria Quality management system (see Table 1).

Table 1. Quality management system

Quality management system	yes	partly	no	weight
Is the supplier ISO certified?	5	3	0	4
Does supplier implement, maintain and improve QMS?	5	3	0	4
Does the supplier have self quality management organization?	5	3	0	2
Does the supplier have a quality manual?	5	3	0	1

The criterion is then evaluated on the basis of the answers, where answer yes is attaching 5 points, answer partly 3 points and answer no 0 points. By means of such procedure we evaluate also the other selected criteria.

For the company we propose max. possible number of points that suppliers can get for each criterion. Of these points the company develops scale for separation suppliers into the following categories:

500 – 426 (100% – 85,2%) – category A
425 – 326 (85% – 65,2%) – category B
325 – 256 (65% – 51,2%) – category C
less than 255 points (51%) – category D

- **category A** – the supplier in this group is for the company the best for long-term cooperation. He best meets the specified requirements and for the company is a little risk by cooperation. All suppliers, which are included in this group, are subject for continuous evaluation during the year.
- **category B** – suppliers in this group have some limitations, but in terms of assurance of quality they are not a significant risk for the company. However, they are suitable for short-term cooperation, eventually as alternative suppliers.
- **category C** – cooperation with this group the company realises only in special cases. For deliveries from this category of suppliers it focuses only when there is no disposition of suppliers from group A and B. However the quality is not endangered, the potential supplier of this group must fulfil the required criterion for the quality and the product (min. score).
- **category D** – purchase from suppliers in this category is company rejecting, because working with them could seriously jeopardize the quality of final production and the reputation too.

Table 2. Final classification

	Supplier		
	A	B	C
Terms	40	10	20
Quality management system	50	50	10
Price and payment terms	60	60	70
Terms of delivery and storage	65	40	48
Communication with supplier	30	64	65
Production	66	70	46
Purchase	60	30	26
Control and testing	66	40	40
Total	**437**	**364**	**325**
Assigned category	**A**	**B**	**C**

We propose for the company that this method of evaluation would be extended by **the graphic method**, which will give the graphic image of the performance of its current and potential suppliers [3].

For the evaluation it can use the scale - from 1 to 5 (1 = lowest, 5 = highest rating). Every quadrant of the resulting graph here is one of the selected parameters. Each of them can still improve next fractional criteria illustrated in the quadrant corresponding to the basic criteria for one of the five circles.

By representation of all criteria the company obtains the geometric Picture (see Fig. 1), whose area is proportional to the global performance of the supplier. For better comparison it is also possible to construct a graph representing the minimum required performance. On this basis is then possible to choose such supplier, who provides the best conditions of supplies for the company.

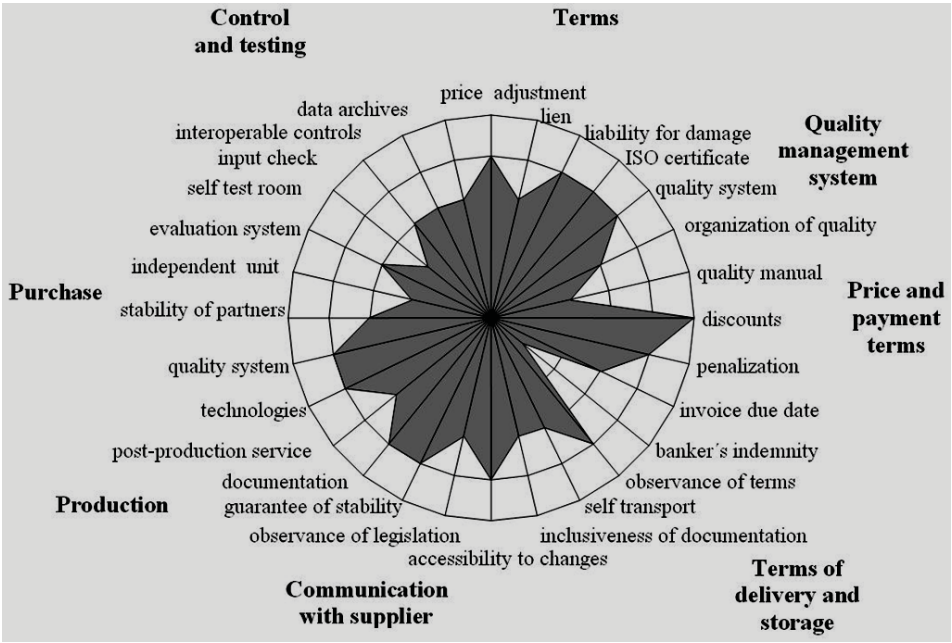

Figure 1. Graph of supplier's total production rate

The graphic method can also be used by comparing the performance of suppliers with each other, where we choose the supplier with the largest displayed chart area.

This method can be used also by the selection of supplier on the basis of one variable (criterion), for example Price and payment terms.

For the performance evaluation of suppliers we propose as a next alternative to apply the **decision matrix method** (see Table 3), which is also regarded as the basic method. It represents the simplest multicriteria method. Importance weights of criteria are here evaluated by the scale from 1 to 10, where 1 is assigned as the lowest weight and value 10 as the highest weight. By the same scale is here evaluated the fact, as individual variations of solutions meet selected criteria (1 = unsatisfactory, 10 = perfect suits). The resulting criterion then represents the largest weighted sum.

The advantage of this method is its simplicity and relatively low time-consumption. Contrariwise the disadvantage is possibility to identify a high proportion of subjectivity in evaluation of the individual criteria weights and the actual evaluation of how various options meet the selected criteria.

Table 3. Suppliers evaluation by decision matrix method

		Supplier		
Criterion	**Weight**	**A**	**B**	**C**
Terms	9	7	2	3
Quality management system	8	8	8	2
Price and payment terms	10	8	8	9
Terms of delivery and storage	6	8	6	7
Communication with supplier	7	4	8	8
Production	4	8	9	7
Purchase	3	8	4	3
Control and testing	5	8	4	4
Weighted sum		**379**	**322**	**288**
Priority		**1**	**2**	**3**

Modified decision matrix method partly eliminates the shortcomings of this method.

Here are the weights of criteria and evaluation of variants, how they meet criteria, determined by paired comparison. This means that if we compare two criteria, so the more important, is rated number 1 and minor 0. If such situation arises, that the criteria achieve the same level of importance, then the value is ½. The resulting weights or evaluations of alternatives we get so, that the totals from their evaluation we demand the equal to one.

Table 4. Twin criteria comparison

	C1	C2	C3	C4	C5	C6	C7	C8	Total	Weight
Terms (C1)	-	1	0	1	1	1	1	1	6	**6/28=0,21**
Quality management system (C2)	0	-	0	1	1	1	1	1	5	**5/28=0,18**
Price and payment terms (C3)	1	1	-	1	1	1	1	1	7	**7/28=0,25**
Terms of delivery and storage (C4)	0	0	0	-	0	1	1	1	3	**3/28=0,11**
Communication with supplier (C5)	0	0	0	1	-	1	1	1	4	**4/28=0,14**
Production (C6)	0	0	0	0	0	-	1	0	1	**1/28=0,04**
Purchase (C7)	0	0	0	0	0	0	-	0	0	**0/28=0**
Control and testing (C8)	0	0	0	0	0	1	1	-	2	**2/28=0,07**
Total									**28**	

Paired comparison of variants

a) by criterion 1 (Terms)

	A	B	C	∑	evaluation
A	-	1	1	2	0,67
B	0	-	0	0	0
C	0	1	-	1	0,33

b) by criterion 2 (QMS)

	A	B	C	∑	evaluation
A	-	0,5	1	1,5	0,5
B	0,5	-	1	1,5	0,5
C	0	0	-	0	0

c) by criterion 3 (Price and payment terms)

	A	B	C	∑	evaluation
A	-	0,5	0	0,5	0,17
B	0,5	-	0	0,5	0,17
C	1	1	-	2	0,67

d) by criterion 4 (Terms of delivery and storage)

	A	B	C	∑	evaluation
A	-	1	1	2	0,67
B	0	-	0	0	0
C	0	1	-	1	0,33

e) by criterion 5 (Communication with supplier)

	A	B	C	∑	evaluation
A	-	0	0	0	0
B	1	-	0,5	1,5	0,5
C	1	0,5	-	1,5	0,5

f) by criterion 6 (Production)

	A	B	C	∑	evaluation
A	-	0	1	1	0,33
B	1	-	1	2	0,67
C	0	0	-	0	0

g) by criterion 7 (Purchase)

	A	B	C	∑	evaluation
A	-	1	1	2	0,67
B	0	-	1	1	0,33
C	0	0	-	0	0

h) by criterion 8 (Control and testing)

	A	B	C	∑	evaluation
A	-	1	1	2	0,67
B	0	-	0,5	0,5	0,17
C	0	0,5	-	0,5	0,17

Table 5. Final classification

		Supplier		
Criterion	**Weight**	**A**	**B**	**C**
Terms	0,21	0,67	0	0,33
Quality management system	0,18	0,5	0,5	0
Price and payment terms	0,25	0,17	0,17	0,67
Terms of delivery and storage	0,11	0,67	0	0,33
Communication with supplier	0,14	0	0,5	0,5
Production	0,04	0,33	0,67	0
Purchase	0	0,67	0,33	0
Control and testing	0,07	0,67	0,17	0,17
Weighted sum		**0,407**	**0,2412**	**0,355**
Priority		**1**	**3**	**2**

It is very important that the company does not rely on quality of supply only by entry evaluation of suppliers; therefore we propose the continuous compounding during the year. At the end of the year we propose to develop a year-long evaluation of its suppliers, which results would be given to suppliers, and this would contribute to effective implementation of supply chain relationships.

4. CONCLUSION

Monitoring and evaluation of suppliers is one of means to assure on time delivery of inputs in the required quality. Likewise the endangering of company business itself is reduced. The company creates the conditions for its own improvement and improvement of its activities quality.

In the article we focused on the form, how can the company evaluate its suppliers. We proposed company methods, that can be used in the evaluation to extend not only explanatory value of whole process of new suppliers selection, but to enable the company to get and deepen information for already existing cooperation, so that it is able to improve constantly.

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A COMPARISON OF FURNITURE MANUFACTURER DEMOGRAPHICS AND PRODUCTION PROFILES: THE UNITED STATES AND CROATIA

Richard P. VLOSKY, Andreja PIRC

ABSTRACT

The United States and Croatia are very different countries, and as such, one might expect their furniture manufacturing sectors to also be very different. In fall 2009 and spring 2010 mail-based surveys of randomly selected members from furniture manufacturing sectors in both countries were conducted. The objective of this paper is to compare company demographics and manufacturing characteristics in a large developed country (US) and a smaller less developed country (Croatia). Characteristics included number, age and educational level of employees; age, number and commonality of machines used in production processes and; expectations on number of manufacturing processes and number of employees respondents expected over the next three years.

Keywords: furniture, wood processing, company characteristics, USA, Croatia

1. INTRODUCTION

The United States and Croatia are very different countries, and as such, one might expect their furniture manufacturing sectors to also be very different. Corporate life expectancy and vitality of firms are indicators of the overall health of the enterprise (de Geus, 2002). Often, the general corporate climate of many organizations is not comensurate with success, because business thinking and decision making is based on experience and not on strategic plans developed based on actual market conditions. The ability of an organization to use knowledge predetermines success or failure of its actions. Knowledge is a changing system with interactions among experience, skills, facts, relations, values, thinking processes and meaning (Mládková, 2008). Corporate growth and health are strongly associated with employee education, age and creativity in both in large and small enterprises. In addition, manufacturing processes, equipment used, and strategic process outsourcing are also linked to competitive advantage. The potential for outsourcing has moved from peripheral activities to activities such as design and component manufacturing. Outsourcing decisions that are not made with a strategic perspective may be motivated by the need for short-term cost reductions. Furniture manufacturers are constantly seeking lower-cost techniques of production processes which are typically tied to investments in new manufacturing equipment.

2. MATERIALS AND METHODS

Sample frames of 430 U.S. and 409 Croatian wood and furniture manufacturers were randomly selected from each country's furniture sector population. Mail surveys were conducted. Based on research objectives, a questionnaire instrument was developed, pre-tested, and finalized based on pre-tested inputs. The questionnaire consisted of three sections; the first section on general company information demographics and manufacturing profile is the focus of this paper. Data collection in the U.S. started in September, 2009 and ended in November, 2009 while data collection in Croatia started in March, 2010 and ended in June, 2010. In the U.S., of the 430 surveys mailed, 115 surveys were either undeliverable or unusable. In Croatia, of the 409 surveys mailed, 91 were either undeliverable or

unusable. The unusable surveys were those from firms that were no longer in the furniture business or that were not interested in survey participation. The total number of usable surveys received from U.S. companies was 74 with an adjusted response rate of *23.5%*, while in Croatia there were 77 useable surveys with an adjusted response rate of *24.2%*. The adjusted response rate was calculated using the following expression: Adjusted Response Rate = [Usable Surveys /Total sample – (Undeliverable + Unusable)]*100%. Data were analyzed in MS Excel.

3. RESULTS

Respondents in both U.S. and Croatia were asked to indicate the number of years their company had been in business. In U.S., the oldest respondent company was established in 1910, while the youngest was established in 2009. In Croatia, the oldest respondent company was established in 1927, while the youngest was established in 2008. Overall the 74 U.S. respondents, mean of years in business was 35.1. On the other hand, over all 77 Croatian respondents, mean of the years in business was only 14.1.

As seen in **Figure 1**, more then half of U.S. respondents, 62%, noted that their companies employ no more then 10 people, while this was found to be case in 57% Croatian furniture manufacturing companies. In the U.S., 17% of respondents employ between 26 and 50 people, while the balance employ between 11 and 25 people (7%), between 51 and 100 people (7%), and between 101 and 500 people (7%). No U.S. respondents employ more than 500 people. **Figure 1** also shows that 16% of Croatian respondents indicated that their companies have between 11 and 25 people. Eleven percent of respondents employ between 26 and 100 employees, while 10% of them employ 101 to 250 people. Employment of more then 250 people was found to be case in 6% of Croatian respondent companies.

U.S. and Croatian respondents further were asked to indicate their employee's age and education levels. Both age and education were classified into six categories. As shown in **Figure 2**, results indicate on average, in U.S. companies almost half (49%) of total employee's number are people over 50 years old, while in Croatian companies only 13% of total employee's number are people older than 50. Nineteen percent of total employees and 22% of total employees are between 41 and 50 for U.S. and Croatian respondents, respectively. Twenty percent of U.S. respondent company employees are people between 31 and 40, while in Croatian companies 38% of employees fell within this range. Finally, on average, only 12% of U.S respondent company employees are between 20 and 30 years old, while the figure for Croatian companies is 27%.

Further, based on the 70 U.S. and the 75 Croatian respondents, employee educational structures were obtained. In U.S. companies, almost half (42%) of total employee's are high school graduates, followed 20% who have some college that have a college degree (B.A. /B.S.) Five percent of employee's have completed a Master's or Ph.D. For Croatian respondents, on average, 71% of employee are high school graduates, 12% have a B.A./B.S. degree, and 1% have a M.S. or Ph.D. level of education (**Figure 3**).

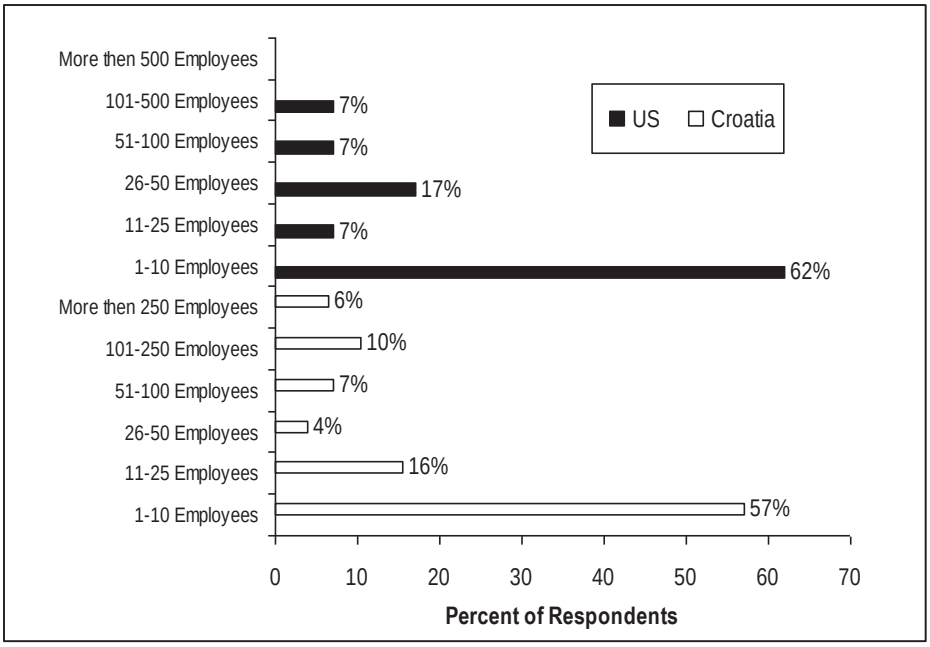

Figure 1. Employment levels in U.S. (n = 70) and Croatia (n = 77)

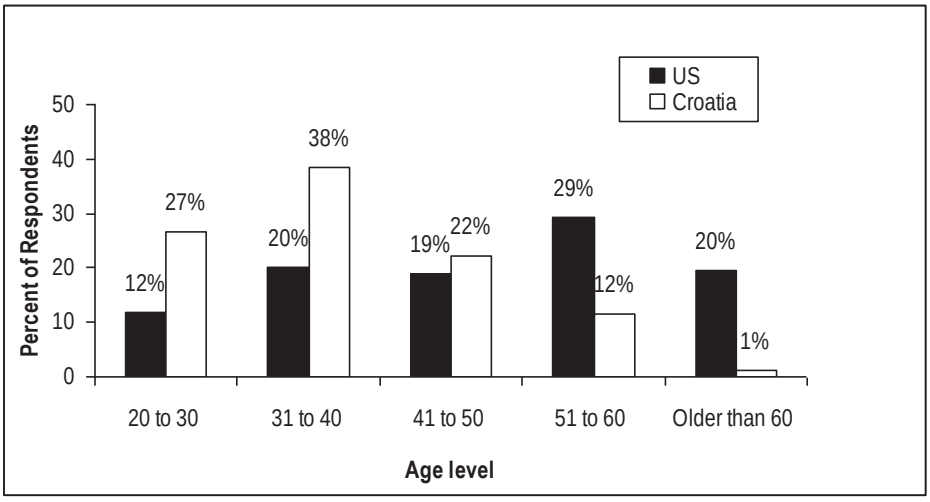

Figure 2. Age level of employees in U.S. (n = 70) and Croatia (n = 75)

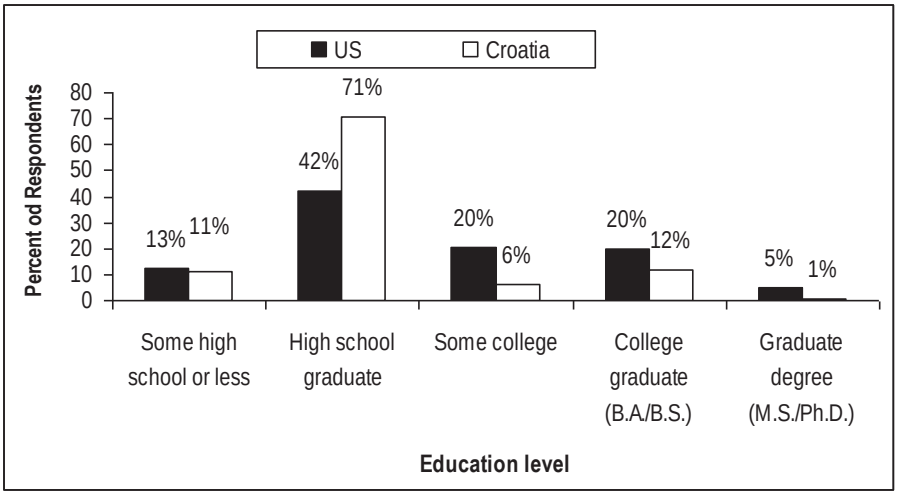

Figure 3. Education level of employees in U.S. (n = 70) and Croatia (n = 76)

Respondents were asked to indicate which operations and processing technology they use in their furniture and wood processing manufacturing. First, respondents were asked to indicate the number and age of their large capital manufacturing machines. As seen in **Figure 4**, 74% of U.S. respondents noted that they have between 1 and 11 large capital manufacturing machines, while this was found to be case in 61% of Croatian companies. Eleven percent of U.S. respondents and 12% of Croatian noted that they have between 11 and 15 large capital manufacturing machines; 15% of U.S. respondents have 15 or more large capital manufacturing machines relative to 27% of Croatian respondents.

Further, as shown in **Figure 5**, 62% of U.S. respondents indicated that their large capital item machines were 11 and more years old; while 7% of the respondents indicated that their large capital item manufacturing machines are less then 5 years old. Thirty-one percent of U.S. respondents stated that their large capital item manufacturing machines are between 6 and 10 years old. When comparing results to Croatian respondents, 39% of them noted that that they have large capital item machines older then 11 years, but 30% of Croatian companies had large capital item machines younger then 5 years. Twenty-one percent of Croatian companies indicated that they have between 6 and 11 large capital item manufacturing machines.

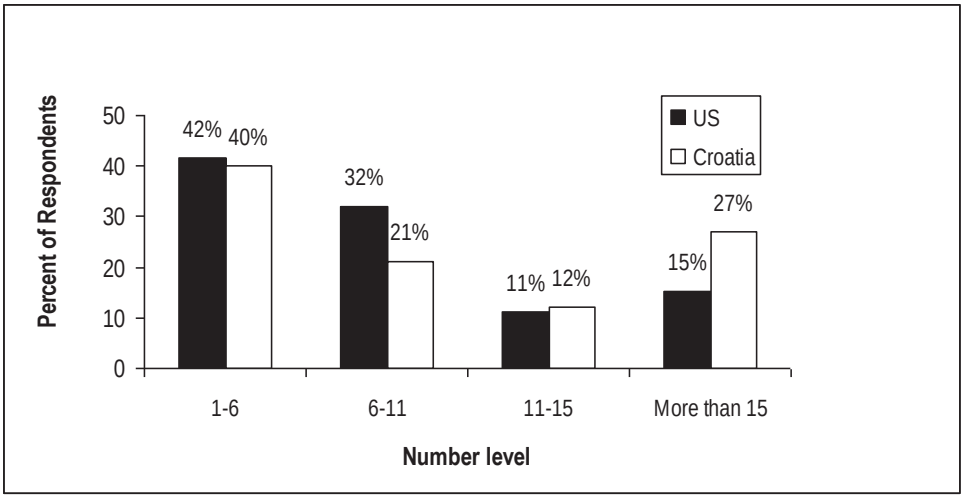

Figure 4. Number of large capital item manufacturing machines in U.S. (n = 72) and Croatia (n = 77)

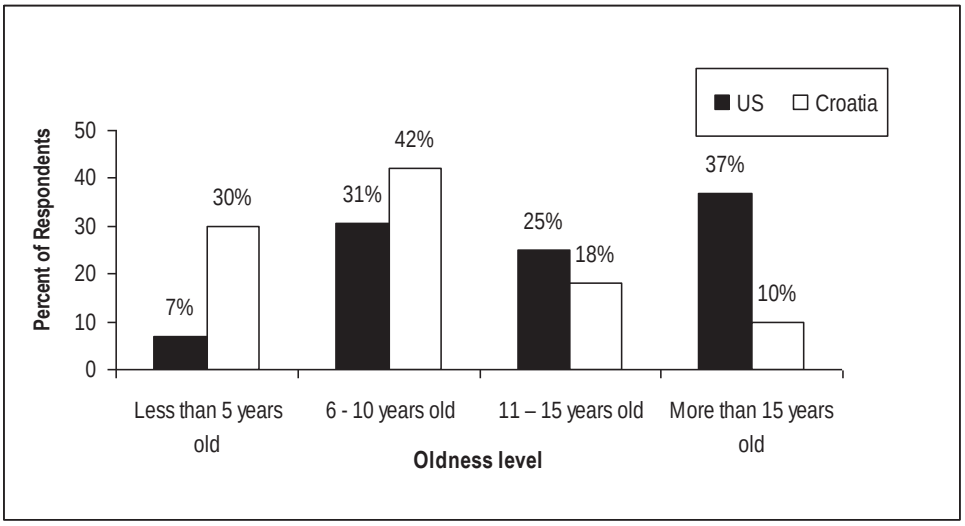

Figure 5. Age of large capital item manufacturing machines in U.S. (n = 72) and Croatia (n = 77)

Respondents in U.S. and Croatia were asked to list the equipment that they use in their manufacturing processes. As shown in **Figure 6**, for U.S. respondents, 99% use table saws in their manufacturing processes. Almost all (between 90% and 95%) of the respondents use drill presses, band saws and routers while planers and shapers were use between 70% and 80% of respondents. Between 30% and 70% of respondents use crosscut saws, jointers, lathes, panel saws, CNC routers, straight-line rip saws, edge banders and scroll saws. Other manufacturing equipment was used by less then 30% of U.S. respondent companies.

As also seen in **Figure 6**, for Croatian respondent, 70% identifed the panel saw as the most used equipment in manufacturing processes. More than half of respondents (51%-58%), noted that other

high-use machines were: router (58%), jointer (56%), drill press (55%), moulder (55%), sander (55%), planer (53%), band saw (51%), and edge bander (51%). Almost half of the respondents, 49%, noted the usage of shapers while 43% indicated that they use a scroll saw in their manufacturing processes, 39% indicated that they use laquer machines while 36% noted that they use crosscut (radial arm) saws in their manufacturing processes. Between 20% to 30% of respondents noted that they use the following equipment: double end tenoner (26%), lathe (22%), straight line rip saw (22%), dry kiln (22%), and gang rip saw (21%). Other manufacturing equipment was used by less then 20% of Croatian respondent companies.

Respondents in both the U.S. and Croatia indicated their involvedness in stages of manufacturing. Of all U.S. respondents, 79% indicated that they are involved in all stages of manufacturing. Those respondents who were not involved in all stages of manufacturing their products sub-contract some stages out to other companies. On the other hand, 70% of Croatian manufacturers responded affirmatively, while 30% outsourced at least one stage of their production process.

Seventy-one percent of U.S. respondents indicated that the number of manufacturing processes or operations in their company would remain the same over the next three years while 15% indicated that number of manufacturing processes would increase, and 14% of respondents indicated that this would decrease over the next three years. Fifty-two percent of U.S. respondents said that the number of manufacturing employees would remain the same over this time period, 36% said this would increase, and 12% indicated that this would decrease over the next three years.

For Croatian respondents, 44% indicated that the number of manufacturing processes/operation in their company and the number of manufacturing employees would remain the same in next three years. Only 4% noted that the number of manufacturing employees would increase over the next three years, while 53% percent of respondents said that the number of manufacturing employees would decrease over the same period. Sixteen percent of Croatian respondents indicated that number of manufacturing processes would decrease, while 40% of respondents indicated that number of manufacturing processes would increase over the next three years.

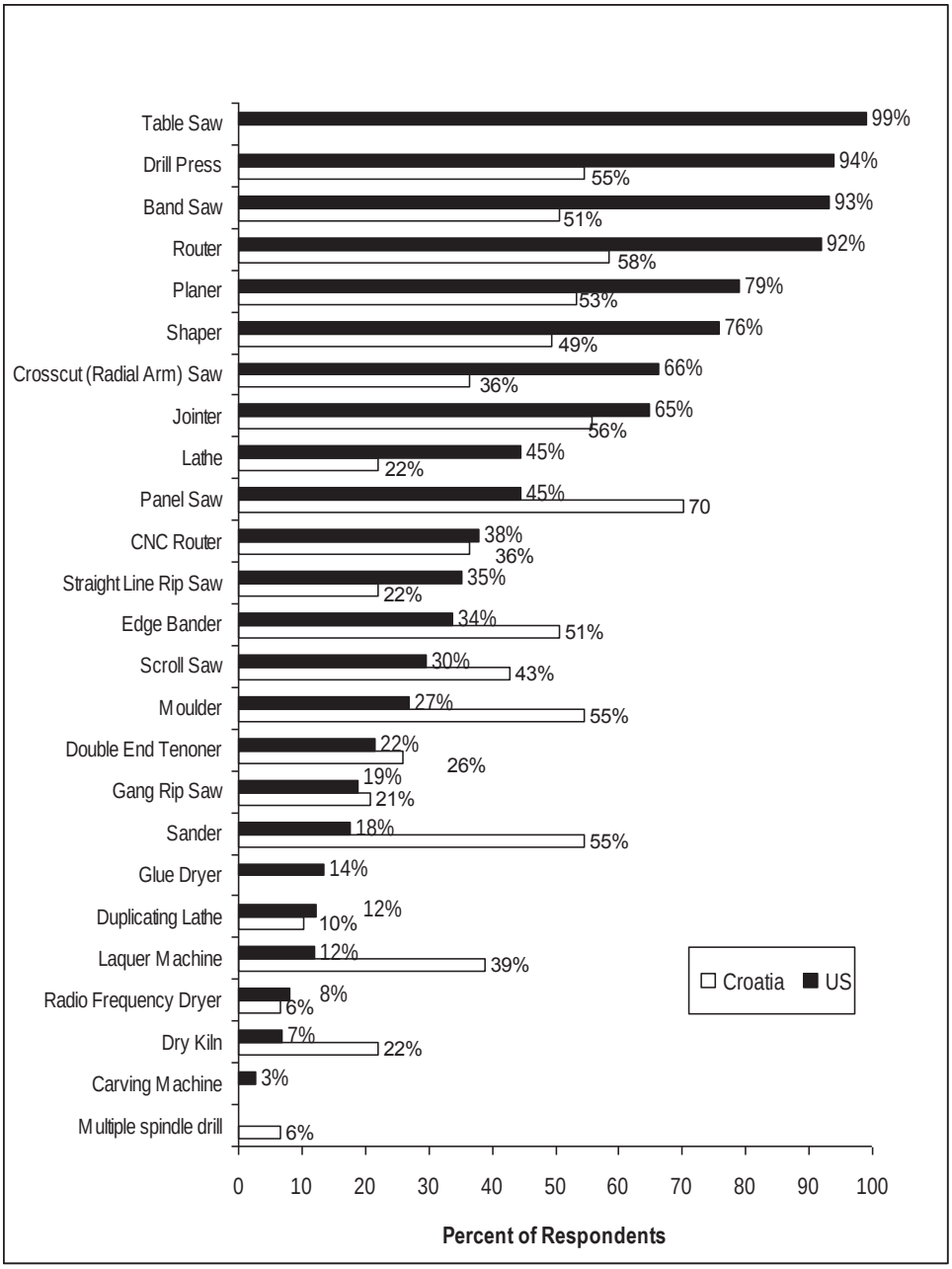

Figure 6. Equipment used in manufacturing processes in U.S. (n = 74) and Croatia (n = 77)

4. SUMMARY

Overall, results indicate that on average, U.S. respondent firms are over twice as old as Croatian firms. The majority of respondents in both countries have 1 to 10 employees, but Croatian employees are younger than U.S. respondent company employees. U.S. employees are more educated with 45 % having some college, a college degree, or an advanced degree. When examining company manufacturing characteristics, results showed that 21% of U.S. respondent companies outsource one or more of their production processes while 30% of Croatian companies do so. We examined commonality of machines used in the production process. Table saw, drill press and band saw are the top ranked equipment in U.S., while in Croatia top machines are: panel saw, router and jointer. Almost half of respondents (42% in U.S.; 40% in Croatia) said that they have from 1 to 6 large capital manufacturing machines in their companies. Large capital manufacturing machines are older in U.S. respondent companies with 37% indicating that they have manufacturing machines older then 15 years, while 42% of Croatian indicated that they have machines between 6 and 10 years old. Given the current severe recession impacting furniture manufacturers in the U.S., the sector has faced a significant loss in domestic market share to China, 52% of U.S. respondents said they expect the number of manufacturing employees to remain static over the next 3 years compared to 44% of Croatian respondents. In addition, 72% of U.S. respondents expect that the number of their companies' manufacturing processes to increase compared to 44% of respondents in Croatia suggesting an attempt at improving efficiency while reducing labor costs.

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THE EFFECT OF FOREST CONTEXT ON AUSTRIAN CONSUMER PREFERENCES FOR WOODEN FURNITURE

Stefan WEINFURTER, Peter SCHWARZBAUER

ABSTRACT

Two conjoint analyses were performed amongst Austrian consumers in order to find out their preferences for wooden furniture considering forest context. In one survey the forest context was separated into natural forests and plantations as well as domestic and imported wood. In the second survey the forest context was limited to domestic sources and differentiated into natural/ semi-natural, moderately altered, and strongly altered/artificial forests. Results indicate, that Austrian consumers would assign highest priority to the wood origin, preferring domestic and natural or semi-natural as opposed to imported wood and wood grown in plantations when purchasing wooden furniture (i.e. a solid wooden dining table). Results of the two surveys that made up a pilot study are compared to a similar New Zealand study.

Keywords: forest context, certified wood products, furniture, consumer preference, conjoint analysis

1. INTRODUCTION AND BACKGROUND

A large number of studies analyzed the issue of forest certification and consumer preferences for wood products (e.g., Anderson and Hansen, 2004; Anderson et al.., 2005; Bigsby and Ozanne, 2002; Gronroos and Bowyer, 1999; Ozanne and Vlosky, 1997; Roos and Nyrud, 2008; Roos and Hugosson, 2008; Veisten and Solberg, 2004). In contrast, the influence of forest context on consumer preferences for wood products has barely been investigated (Bigsby and Ozanne, 2007).

Forest context is determined by the social and economic environment shaping a country's forestry, i.e. how forests are managed and used. In New Zealand, for example, all harvest from native forests on public land has been abandoned. Subsequently, nearly all of New Zealand's wood products originate from plantations (Bigsby and Ozanne, 2007), i.e. 1.8 million hectares (7 percent of New Zealand's land cover), thereof 1.6 million hectares of *Pinus radiata* plantations. Nevertheless, New Zealand still holds 6.5 million hectares of natural forests. That is 24 percent of New Zealand's land cover. Altogether New Zealand holds 8.3 million hectares forest, i.e. 31 percent of New Zealands total area (New Zealand Forest Owners Association, 2011).

Austria's land area totals 8.39 million hectares of which 3.96 million hectares are covered by forests. That is a forest share of 47 percent. Of that ca. 85 percent are forests available for wood supply. The majority of the remaining 15 percent is made up by *protection forests* without removals (BFW, 2011), which shall protect forests, surrounding land and objects from avalanches and mud slides. On one hand, hardly any of Austria's forests are old-growth forests. On the other hand, Austria's forests hardly contain forest plantations in the sense of New Zealands (*Pinus radiata)* forest plantations. Thus Austria's "forest context" differs from that of New Zealand.

A majority of Austria's forests are "moderately altered" in their "naturalness" (Figure 1). The "naturalness" of Austria's forests was extensively investigated by the research project "Hemeroby of the Austrian Forest Ecosystem" that was a contribution to the UNESCO-sponsored international research initiative within the framework of the "Man and the Biosphere" program. The term *hemeroby* is complementary to naturalness (Grabherr et al., 1998).

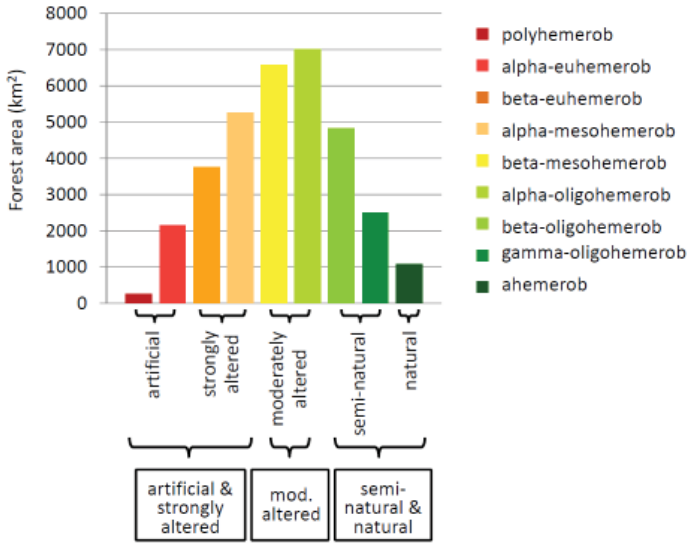

Figure 1. Distribution of hemeroby levels across Austria's forest land (Grabherr et al., 1998)

As depicted in Figure 1, more than 20 percent of Austria's 4 million hectares of forests are classified as semi-natural and natural. *Natural* means no human impact. *Semi-natural* forests show a natural composition of tree species and human impact on the forest structure and its ground vegetation is minimal. *Moderately altered* forests account for 41 percent of Austria's forests. They are all commercially utilized, but the potential natural vegetation is at least partly present. *Strongly altered* and *artificial* forests make up 30 percent of Austria's forests. They are characterized by extensive exploitation and tree species composition does not resemble the original natural one. The condensed three levels of hemeroby for Austria's forests were included in one of the two surveys presented here.

In the study of Bigsby and Ozanne (2007) New Zealand respondents preferred furniture (wooden outdoor table sets) made of domestic (New Zealand) wood originating from plantations that are certified rather than imported wood originating from natural/native forests that are not certified. Due to the different Austrian forest context, the authors of this paper hypothesize, that Austrian respondents would prefer furniture (solid wooden dining tables) made of domestic (Austrian) wood originating from natural forests that are certified rather than imported wood originating from plantations/artificial forests/strongly altered forests that are not certified. A dining table as an example of a wooden product was selected for the present two surveys, because it is a simple product, it is present in many households, and it is used daily. There is no need for explaining this product to consumers and consumers likely do not have difficulties evaluating a solid wooden dining table.

2. METHODS

2.1. Sample and sampling procedure

Two surveys were carried as integral part of an undergraduate course for students enrolled in the Environmental and Bio-resources Management program at University of Natural Resources and Life Sciences Vienna (BOKU). First, students were provided with background information regarding the content of the surveys and detailed instructions to carry out face-to-face interviews with respondents recruited in their personal surroundings. Subjects affiliated with forestry (e.g. foresters) were excluded from the survey. Sampling procedure was that of a so-called judgment (convenient/purposive) sample. Respondents are handpicked and are deemed to be able to serve the research purpose. It is also assumed that respondents are somewhat representative of the population of interest. They are supposed to offer the contributions sought for. When searching for ideas and insights the researcher goal does not lie in sampling a cross section of opinion but rather in sampling the elements deemed being able to offer some perspective of the research question (Churchill, 1995).

2.2. Questionnaire design

The core of each of the two surveys was a conjoint task. Conjoint analysis is very well suited for understanding consumers' evaluations of and reactions to predetermined attribute combinations that depict potential services or products. The researcher gains insight into the composition of consumers' preferences. Conjoint analysis is based on the assumption that consumers evaluate the utility or value of a product by combining the utilities contributed by each attribute. The products are presented to the respondents thus simulating a more realistic purchase situation where consumer have to choose among a set of products but not rate single product attributes e.g. on importance. In conjoint analysis importance of each product attribute and utility of each attribute's variation (i.e. level) are calculated from respondents' overall product ratings according to their preference. A respondent's overall preference for a product can be called the "total worth" of the product. It can be understood as the sum of the part-worths of each level. Possible values for each attribute are called attribute levels. Each product presented to the respondents is called treatment or stimulus. It is made up by combinations of attribute levels (Backhaus et al., 2000; Hair et al., 1995).

Based on the attributes of interests, combinations of levels of these attributes would result in too many stimuli and overburden respondents. Thus, two conjoint surveys were designed. In the first survey, international aspects were omitted. Conjoint attributes included *price*, *certification* and *type of forest* (Table 1). Type of forest was broken down into *strongly altered/artificial forest*, *moderately altered forest*, and semi-natural/*natural forest*. The questionnaire included explanations of the three types of forests and certification for respondents.

Table 1. Conjoint analysis - Product attributes and levels for a solid wooden dining table (survey 1)

Attributes survey 1	Level 1	Level 2	Level 3
Type of forest	strongly altered / artificial forest	moderately altered forest	semi-natural / natural forest
Forest/wood certification	certified	not certified	
Price	799 €	999 €	

In the second survey, an international component was introduced with the attribute *origin of wood*. It comprised two attribute levels, namely *Austrian* and *imported wood.* The attribute *type of forest* (levels *strongly altered/artificial forest*, *moderately altered forest*, and *semi-natural/natural forest*) from survey 1 was transformed into *kind of forest* with the levels *natural forest* and *plantation* (Table 2) The attributes *certification* and *price* remained the same as in survey one. Again, the questionnaire included an explanation for *certification* but also explanations for the terms *natural forest* and *plantation* for respondents.

Table 2. Conjoint analysis - product attributes and levels for a solid wooden dining table (survey 2)

Attributes survey 2	Level 1	Level 2
Origin of wood	Austria	Imported wood
Kind of forest	Natural forest	Plantation
Forest/wood certification	certified	not certified
Price	799 €	999 €

By designing two surveys instead of one, the number of stimuli (combinations of attribute levels) presented to respondents in one conjoint task was already reduced. Nevertheless, the authors strived to reduce the number of stimuli to a necessary minimum. Therefore, fractional factorial designs were utilized resulting in ten stimuli for each of the two surveys. The ten stimuli representing solid wooden dining tables for each of the two surveys are listed in Table 3 and 4.

Table 3. Conjoint stimuli (combinations of attribute levels) presented to respondents in survey 1

A	799 €	Strongly altered / artificial forest	certified
B	999 €	Strongly altered / artificial forest	not certified
C	799 €	Moderately altered forest	certified
D	799 €	Strongly altered / artificial forest	not certified
E	799 €	Natural / semi-natural forest	not certified
F	999 €	Strongly altered / artificial forest	certified
G	999 €	Natural / semi-natural forest	certified
H	999 €	Moderately altered forest	not certified
I	999 €	Moderately altered forest	certified
J	799 €	Moderately altered forest	not certified

Table 4. Conjoint stimuli (combinations of attribute levels) presented to respondents in survey 2

A	999 €	Imported Wood	Natural forest	not certified
B	799 €	Wood from Austria	Natural forest	certified
C	999 €	Wood from Austria	Plantation	not certified
D	799 €	Imported Wood	Plantation	not certified
E	999 €	Imported Wood	Natural forest	certified
F	999 €	Wood from Austria	Plantation	certified
G	799 €	Wood from Austria	Natural forest	not certified
H	799 €	Imported Wood	Plantation	certified
I	999 €	Wood from Austria	Natural forest	certified
J	799 €	Wood from Austria	Plantation	certified

In both surveys, respondents were asked to rank the ten stimuli provided for dining tables made of solid wood according to their purchasing preference. Thus respondents ranked the ten stimuli from "would purchase most likely" to "would purchase least likely."

3. RESULTS

Altogether, 172 respondents were acquired by students for survey 1 and 184 for survey 2. With 100-200 respondents the two surveys rather had the character of pilot studies according to Dillman (2000). Respondents did not have any difficulties in performing the (conjoint) tasks requested from them. Substantial revisions would not be necessary, if an execution of a large scale study was contemplated. Because sampling procedure was that of a judgment (convenient/purposive) sample, the sample is not representative for the Austrian population. Nevertheless, concluding from the few sociodemographic questions, the sample offers a quite well cross-section. Furthermore, survey 1 and 2 did not differ in sociodemographics.

Conjoint results provide relative importance values of attributes. In the case of survey 1, these were type of forest, certification and price. If respondents were to consider the type of forest when purchasing a solid wooden dining table, results from survey 1 (precluding international issues) show, that type of forest was considered most important. As mentioned above, Type of forest was itemized into *strongly altered/artificial forest*, *moderately altered forest*, and semi-natural/*natural forest*. Certification was deemed second most important and price least important (Figure 2).

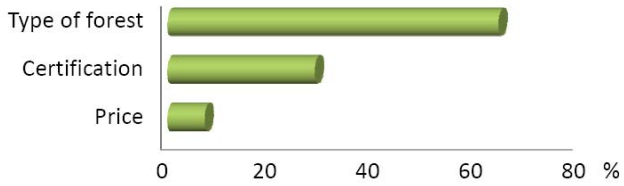

Figure 2. Conjoint analysis - attribute importance survey 1

The attributes certification and price were kept equal for survey 2. The attribute *type of forest* (*strongly altered/artificial forest*, *moderately altered forest*, or semi-natural/*natural forest*) was renamed into *kind of forest* and attribute levels were changed into *natural forest* and *plantation*. An international aspect was introduced by adding a fourth attribute named *origin of wood*. This attribute was itemized into *imported wood* and domestic wood (*Austria*).

Conjoint results of survey 2 indicate that if respondents were to consider *origin of wood* and *kind of forest* when purchasing a solid wooden dining table, *origin of wood* would be considered most important and *kind of forest* least important (Figure 3). *Certification* was deemed second most important succeeded by *price* as in survey one.

Results of survey 1 and 2 are inconsistent regarding *type of forest* (survey 1) and *kind of forest* (survey 1): Type of forest was most important in survey 1, while *kind of forest* was least important in survey 2. Though levels of these two attributes were not congruent, they were similar in range (survey 1: natural forest – artificial forest; survey 2: natural forest – plantation).

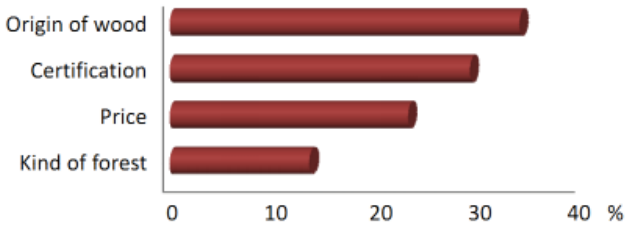

Figure 3. Conjoint analysis - attribute importance survey 2

Conjoint analysis results do not only provide relative importance values for the covered attributes, but also utility estimates for each attribute level. That means, the greater the utility value of an attribute level the greater the preference for that level. Not surprisingly and coinciding respondents assigned greater utility to the lower price level and wood from certified forests in both surveys (Figure 4 and 5).

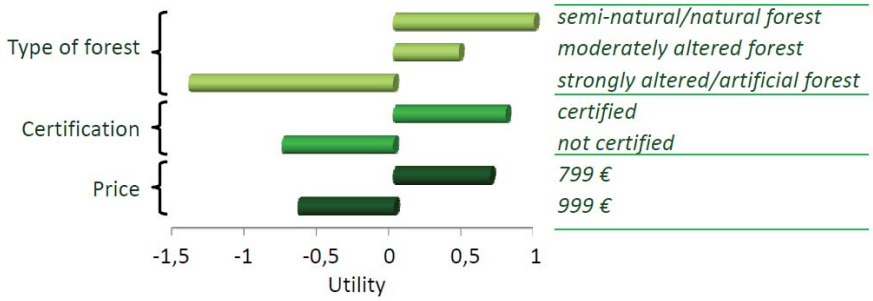

Figure 4. Conjoint analysis- utilities of survey 1

In survey 1, respondents clearly preferred wood from *semi-natural/natural* forests and *moderately altered forests* as opposed to wood from *strongly altered/artificial forests* (Figure 4). In survey 2, respondents explicitly preferred Austrian (domestic) wood as opposed to imported wood. Furthermore respondents of survey 2 favor wood from natural forests over wood from plantations, though only a little (Figure 5).

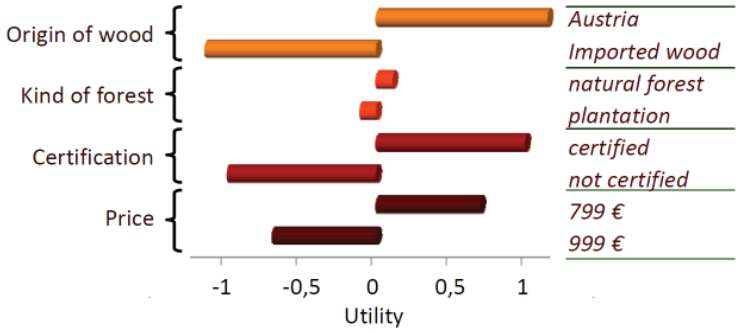

Figure 5. Conjoint analysis - utilities of survey 2

5. SUMMARY AND DISCUSSION

The two present surveys rather had the character of a pilot study. Substantial revisions would not be required if an execution of a large scale study was contemplated. Tasks requested from respondents were performed by them without difficulties. This specifically counts for the conjoint part of the questionnaire.

If the two surveys were to be carried out on a larger scale, the authors would merge the two conjoint tasks. This consolidation would result in four attributes, namely *origin of wood*, *type of forest*, *certification*, and *price*. The attribute *kind of forest* (levels: *natural forest* vs. *plantation*) would be omitted, because survey 2 showed that respondents hardly discriminate between the two levels of this attribute. The authors suspect that the reason for the lack of discrimination between *natural forest* versus *plantation* by Austrian respondents is the almost absence of plantations in the sense of New Zealands (*Pinus radiata)* forest plantations, for example.

Respondents of the present two Austrian surveys assign greater importance to the wood origin, preferring domestic and natural or semi-natural as opposed to imported wood and wood grown in plantations when purchasing wooden furniture (i.e. a solid wooden dining table). In contrast to that New Zealand consumers prefer wood originating from (domestic = New Zealand) plantations. The reason of this discrepancy obviously is the varying "forest contexts" of the two countries. On one hand, hardly any of Austria's forests are old-growth forests. On the other hand, Austria's forests hardly contain forest plantations in the sense of New Zealands (*Pinus radiata)* forest plantations. In New Zealand all harvest from native/natural forests (6.5 million hectares) has been abandoned. Nearly all of New Zealand's wood products originate from 1.8 million (thereof 1.6 million hectares of *Pinus radiata* plantations).

If a furniture producer were to market for example wooden tables in Austria and in New Zealand, the authors recommend promotion of certified domestic wood from natural/semi-natural forests in Austria and certified wood from domestic forest plantations in New Zealand. The authors further recommend that the wooden tables for the Austrian and the New Zealand market are in fact made of certified domestic wood from natural/semi-natural forests for the Austrian market and of certified wood from domestic forest plantations for the New Zealand market.

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AUDIT OF INNOVATION PROCESS IN SELECTED SMALL AND MIDDLE ENTERPRISES IN THE WOODWORKING INDUSTRY

Anna ZAUŠKOVÁ, Alena KUSÁ, Veronika PIZANO

ABSTRACT

Innovation process creates new possibilities based on the combination of various groups of knowledge. Innovation process may be fully realized only in healthy and functional economic. Even though, the economical crisis and its negative impacts on the companies should start their innovation activities. One of the actual problems of small and medium enterprises is the measuring of effectiveness of the innovation process. In this article we deal with the establishment of appropriate tool for innovation process evaluation proceeded in small and medium enterprises by audits.

Keywords: innovation, efficiency, measurement, audit, enterprises.

1. INTRODUCTION

Innovation process generally gains more global character and its importance raise on all governance levels – national, regional, intra-plant. Politics of each country start to consider the position of business innovation activities support and creating the innovation environment keeping the sustainable grow of its competitiveness as the key position within plans and actions of the country. Innovation activities are successful especially in countries that are able to manage them effectively.

Innovation processes are generally considered as the key of economic and social development. Innovations are the important factor of business units grow, they are source of extra value for the customer and extra profit for the businessman. Innovations as the competitiveness pillar on one hand and as the result of creative intellectual processing of information, knowledge and skills on the other hand become the instrument of further society development which further influences the elements of innovation process and innovation management processes.

2. PROPOSAL OF INNOVATION PROCESS AUDIT IN SMALL MEDIUM ENTERPRISES

In order to define defects and to specify right tools to improve the company innovation process is necessary at first to realize innovation process audit. Goal of the first phase of project VEGA 1/0496/09: "Integrated model of innovation management audit aimed on evaluation and measurement if innovation and marketing processes of Slovak small and medium businesses efficiency" that has been solved on Department of Marketing, Trade and World Forestry, Faculty of Wood Science and Technology, Technical University in Zvolen, is to define and develop the proposal of innovation process audit for small and medium enterprises. Audit proposal fully respects the universality of its use for the business of each industry and their focus of activity, is aimed on the processes and business sources which are related with the innovations in business. The proposal is based on the method of selected measurable criteria but in order to keep the complexity of the evaluation even immeasurable criteria.

We can agree on the allegation that the innovation process exist in each organization, company or enterprise. If we want to develop and manage this process, we need to find the answer to the following question: *"How large it is and by what is his dimension conditioned?"* We can expect that the results of measuring can help us not only to reveal the weaknesses of existing innovation process but also to predict the innovation activity of employees. Let's try to define the basic. Four basic innovation fields which include the innovation process in company can be generally characterized for the reason of definition of measurement efficiency of innovation process methods. We are talking about product innovation, process innovation, organization and marketing innovation.

The measuring methods by itself define the fields or indicators that can be divided in measurable and immeasurable where both are important by the state of business innovation process evaluation.

2.1. Proposal of audit criteria according the innovation process phase

By the proposal of innovation process audit we can start from particular phases of innovation process where audit will be aimed on each phase separately with defined measurable and immeasurable criteria. Phases of the innovation process are following:

- Phase of invention creation,
- Phase of innovation creation,
- Phase of innovation diffusion (penetration) – see Figure 1.

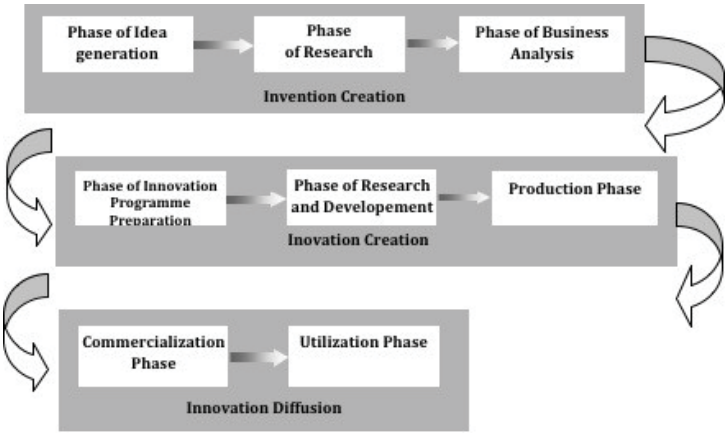

Figure 1. Innovation process
Source: Zaušková, A., Loučanová, E., Inovačný manažment (2008)

Phase of invention creation represents the criteria which are connected with ideas sources, internal or external sources. The criteria in this phase are aimed on employees potential evaluation whose are mostly the source of invention (ideas) and improvements. So that this source would be able to generate valuable ideas, education and qualification is its condition. By creation of appropriate conditions will raise the motivation of this source to generate inventions. If there is not any human potential in the company that would be able to do this activity, company rely on the external sources – as scientific, professional and teaching institutions, cooperation with suppliers and partners, competition analysis and analysis of customer demands. In order to reach synergy effect it is optimal to combine all of the mentioned sources, where support of all participants is expected.

Phase of innovation creation represents mostly the expenses related with the tool investment which are the final tool to reach the innovation activity or the source of innovation by itself. We are

talking about the research and development expenses in particular. If the company does not realize it, it is usually provided from the external sources as the machines and appliances, external know-how, software and so on. It is necessary to understand this phase of innovation process from the wider point of view and that is the reason why the proposal of audit criteria contains the measurement criteria from each field and activity that the company or business realizes. That is the only reason how can the innovation process be evaluated as the complete process without the result deformation that could happen if we chose and aimed on several fields only. This phase includes the criteria from technologies field, organization, planning, products, marketing, investments and research.

Phase of innovation of diffusion presents the final phase of the innovation process in a company. Through applying of the innovation activities in all areas of the company we can expect medium to long-term effect which is characterized by measurable criteria, such as sales from new products, geographic markets, market segments, new sales created by innovation activity, increase of new customers and so on. By evaluation of these sales we get a real feedback, which will give us information about the efficiency of individual actions and innovation activities. Other indirect indicators of successful implementation of innovation activities may be, for example not measurable indicators of the type of shortening the reaction time to customer requirements, reduction of the number of complaints, the overall increase of the product level, increase of market share and so on. We can assume that the mentioned effects of innovation activities realization will not be recorded in the same accounting period as costs invested for their implementation.

In connection with the identified phases of the innovation process, it is possible to characterize basic indicators which directly or indirectly point at the performance of innovation process in the company in determined phases.

Table 1 presents division of innovation process phases and indicators belonging to them. Measurable indicators are there identified as M and not measurable criteria as N.

Table 1. The phases of the innovation process and performance measurement indicators

Phase of innovation process	Indicator	Measurability of innovation process
Invention creation A	A1 Employees with university degree education / employees (%)	M
	A2 Costs of qualification increase / sales (%)	M
	A3 Total number of training days / employees	M
	A4 Direct / indirect employees (%)	M
	A5 Acquisition of external know-how / sales (%)	M
	A6 Workforce quality	N
	A7 Employees motivation and satisfaction supporting invention creation	N
	A8 Evaluation of status and quality of partnerships	N
	A9 Realization of competition analysis	N
	A10Level of cooperation with the surroundings - suppliers, partners, customers	N
	A11 Level of cooperation with scientific research organizations	N
	A12 Cooperation agreements in the area of innovation (institutions, state, schools)	N
	A13 New technologies monitoring, analysis of their using in a company	N
	A14 Existence of a innovation projects portfolio	N
	A15 Planning of invention and innovation resources	N

Innovation creation B	B1 Costs of research and development / sales (%)	M
	B2 Machinery and equipment provison / sales (%)	M
	B3 Investments / sales (%)	M
	B4 Expenses on preparatory phase of production and launching on the market / sales (%)	M
	B5 Realization of research and development results in the practice	N
	B6 New product technological degree	N
	B7 Competitiveness of a new product (price- costs- quality)	N
	B8 Introduction of innovation for the field of business	N
	B9 Reducing of the product development cycle	N
	B10 Period of launching a new product on the market	N
	B11 Level of information technology utilization in all processes	N
	B12 Change of organization and principles of corporate governance	N
	B13 Production flexibility (adaption of production to market requirements)	N
	B14 Planning changes of used technologies	N
Innovation diffusion C	C1 Sales from new products / sales (%)	M
	C2 Sales from patented products / sales (%)	M
	C3 Return on capital used in production (%)	M
	C4 Value of refused supplies / production consumption (%)	M
	C5 Marketing costs / sales (%)	M
	C6 Sales of new geographical markets / sales (%)	M
	C7 New market segments sales / sales (%)	M
	C8 Total new sales / sales (%)	M
	C9 Value of the claimed products / sales (%)	M
	C10 New customers / total number of customers (%)	M
	C11 Increasing of product quality levels (ISO certificates)	N
	C12 Customer requirements reaction time	N
	C13 Market share	N

3. CONCLUSION

The actual audit of the innovation process will be implemented through an evaluation questionnaire, which will include individual evaluation criteria grouped according to stages of the innovation process. Therefore it is divided into three main parts where each part will include questions related to the measurable and not measurable criteria.

Regarding the defined indicators a questionnaire will be drawn up for the company which will aim to determine the status of its innovation process. To obtain relevant and comprehensive results, both the general issues associated with the company and its characteristic and measurable and not measurable indicators will be included in the questionnaire. General information and measurable indicators will be completed by selecting one of the options offered for their self-evaluation

Not measurable indicators will be questioned by statements, which are assigned a number according to significance (1 to 5) that best describes the situation in the company.

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Association's goal is to promote science and results of scientific and professional work of its members, mutual scientific co-operation, as well as to support the science and professional development in the Association's field of work.

To achieve these goals the Association is working on following:

- Exchange of knowledge and researh results among members by organizing conferences and publishing articles in journals and proceedings
- Support mutual scientific cooperation among Association's members through elaboration of scientific projects
- Support the development of scientific and professional organizations in Association's fields of expertise
- Scientific and professional education by organizing scientific and professional symposiums
- Collecting and exchange of market, technological and technical data

Every physical and legal person who accepts the Statute and the Acting Code of the Association can become a member.

The Statute and all additional information may be found on the web site: www.woodema.org. Your questions and suggestions you may send to e-mail address of the Association secretary, Assoc. prof. Denis Jelačić, PhD.: jelacic@sumfak.hr