4. Analysis of Industry and Structure of Industrial Production for Wood Processing and Pulp and Paper Industry in the Federation of BiH

4.1 Wood Processing

4.1.1 Overview of the Situation in Production Programs

4.1.1.1 Situation in the Wood Industry of BiH until 1992

The wood industry in Bosnia and Herzegovina participated with 10% in the GNP (approximately 3 billion USD), and with 11% in the export of Bosnia and Herzegovina. The capacities of the wood industry include 220 of different medium-size and big companies mostly organized within ŠIPAD and KONJUH (83%), and KRIVAJA (17%). The wood industry employs approximately 61.000 of workers or 13% of the overall number of employees in industry and mining, out of which 15.000 of them are employed in primary processing and 46.000 in final processing [15]. The wood industry assortment includes various products, and according to data available for 1991, the annual production in Bosnia and Herzegovina was as shown in table 4.1.

Table 4.1 Installed capacities of wood industry in Bosnia and Herzegovina in 1991 [15]

Product	Quantity	Unit
Sawn timber from deciduous and coniferous wood	2.000.000	m^3
Veneer boards	70.000	m^3
Panel boards	37.000	m^3
Fiber boards	47.000	m^3
Chipboards	223.000	m^3
Mediapan boards	89.000	m^3
Veneer	90.000	m^3
Windows and doors	1.650.000	pcs.
Parquet floor	1.450.000	m^2
Floor boarding and panels	500.000	m^2
Prefabricated wooden houses	250.000	m^2
Wood packaging	300.000	m^3
Sets of furniture	50.000	set
Other furniture	5.700.000	pcs.
Matches	200.000	pcs.
Wicker ware	1.500.000	pcs.

Cork	350	ton
Cork products	600	m^3

The capacities of the wood industry were exceeding by far the needs of B&H, so that a large number of produced goods were sold in foreign markets, primarily the convertible market. A very strong network of proper companies and sales agencies around the world was developed for these purposes. The wood industry was an active exporter. The import for the needs of the wood industry in 1990 amounted to approximately 5% of the achieved export.

4.1.1.2 Wood Industry in FBiH Today

The wood industry is a significant sector of industrial production in the FBiH. Its development is based on the use of domestic natural resources and it is traditionally export-oriented.

4.1.1.2.1 Raw Materials

According to official data, woods and woodland in the FBiH occupy a surface of approximately 1.560.000 hectares, out of which:

- Approximately 1.283.000 hectares are state-owned,
- Approximately 277.000 hectares are privately owned

As shown in picture 4.1.

High forests with natural renewal constitute approximately 40% of wood and woodland (figure 4.2).

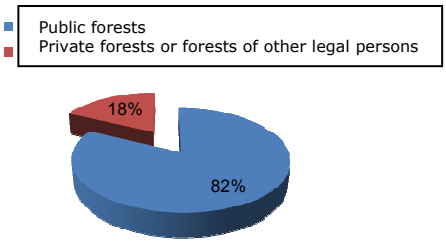


Figure 4.1 Ownership structure of woods in the FBiH

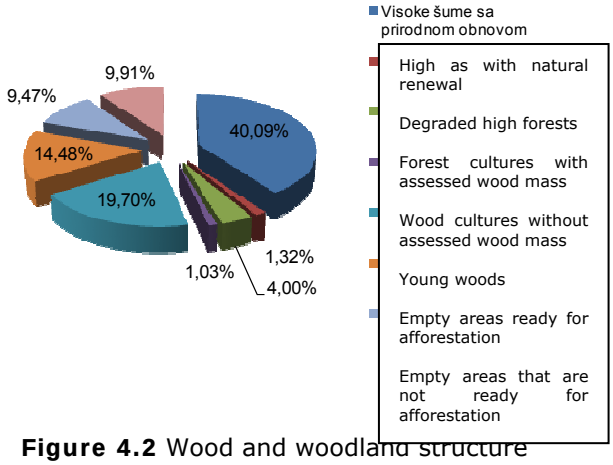


Figure 4.2 Wood and woodland structure

The situation of wood stocks is given in table 4.2 and figure 4.3 [10].

Table 4.2 Situation of wood stocks

Kind of composition	Coniferous trees	Deciduous trees	Total	%
	m^3			
High woods	68.827.644	75.348.896	144.176.541	**88,33**
Young woods	0	19.027.455	19.027.455	**11,67**
Total	**68.827.644**	**94.376.351**	**163.203.966**	**100,00**

The average annual volume increase amounts to approximately 3,7 million m^3, and the wood stock for cutting (wood stock planned to be cut according to economic plans) approximately 2,7 million m^3, as shown in figure 4.4.

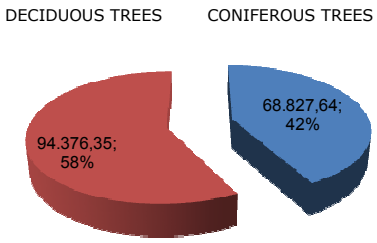


Figure 4.3 Stocks of the overall mass in the period of sorting

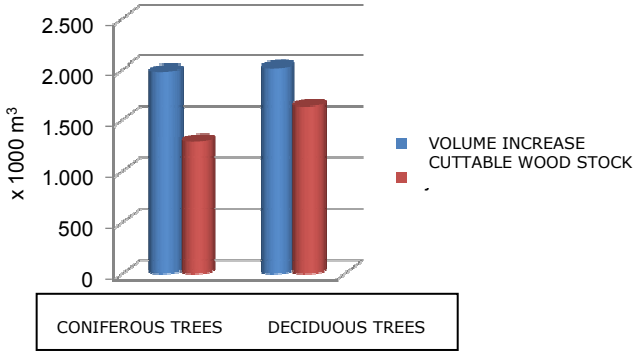


Figure 4.4 Annual volume increase and wood for cutting

The achieved cutting for the period 2002-2007 is given in figure 4.5, and the achieved production of wood assortment in 2007 and the plan for 2008 in figure 4.6. [10].

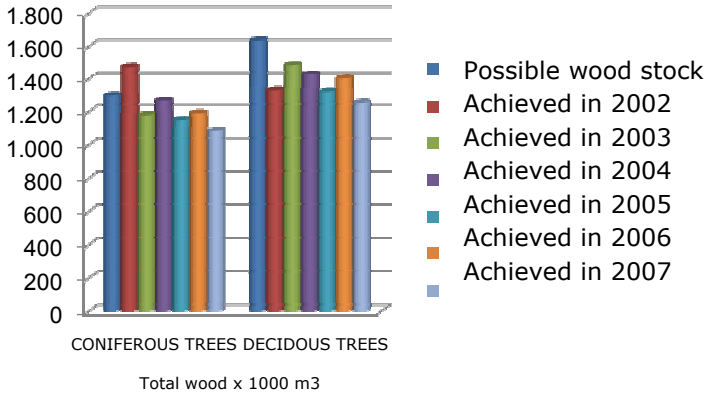


Figure 4.5 Possible wood for cutting and achieved cutting for the period 2002-2007

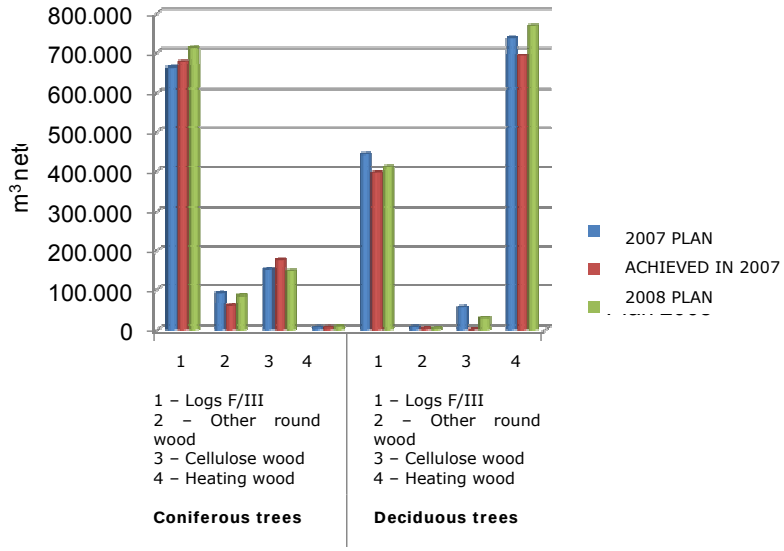


Figure 4.6 Achieved production of wood assortment in 2007 and the 2008 plan

4.1.1.2.2 Basic Statistical Indicators

According to available statistical data, the wood industry production in the FBiH in the period 2005-2007 amounted as shown in table 4.3 for production of wood and wood products (timber, veneer, boards, packaging material, windows and doors, parquet floor) and table 4.4 for furniture [8, 9].

Table 4.3 Production of wood and wood products

	Timber from coniferous trees	Oak timber	Beech timber	Other timber	Veneer	Plywood	Wood packaging	Windows, doors and element	Parquet floor, massive wood	Lamin. Parquet floor
	m³	m³	m³	m³	m³	m³	th. m²	pcs	m²	m²
2005	316.868	1.805	108,43	25.992	16.720	465	2.067	82.877	182.31	58.556
2006	302.555	10.244	176.770	10.176	15.363	3.521	26	76.268	163.33	84.661
2007	272.683	5.509	174.672	12.157	14.911	249	24	159.873	106.09	29.926
2007/06	90,0	54,0	99,0	119,5	97,0	7,1	92,0	209,6	65,0	35,0

Table 4.4 Production of furniture

Production of furniture	House furniture pcs	Kitchen furniture pcs	Chairs pcs	Armchairs, two-seater and three-seater sofas pcs
2005	185.887	183.454	647.144	50.367
2006	202.396	313.809	895.072	43.481
2007	341.692	313.876	1.134.082	48.954
2007/06 %	168,8	100,0	126,7	112,6

The participation of the sector of wood industry in the structure of industrial production of FBiH (areas: mining, processing industry and supply of electricity, gas and water) in 2007 amounted to 9,23% (wood processing and production of wood products, except furniture 3,87% and production of furniture 5,36%), as shown in picture 4.7, for

the period 2005-2007. The structure of industrial production in the FBiH in 2005 was calculated based on the participation of added value, and in 2006 and 2007 it was calculated based on annual indices of industrial production.

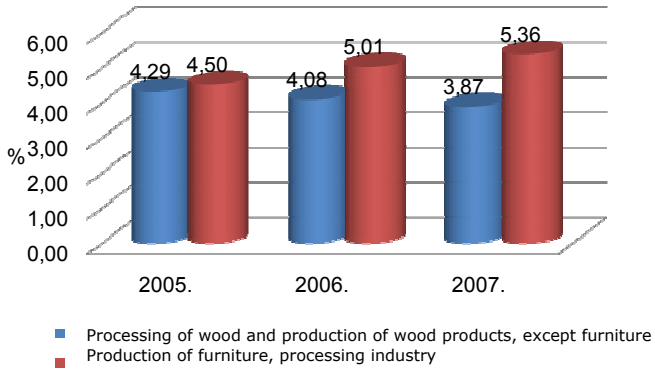


Figure 4.7 Participation of the wood industry sector in the structure of industrial production in the FBiH

The overall export of the wood sector in 2006 amounted to: 545.684.000,00 KM, and in 2007 to: 601.784.000,00 KM, which is a 9,32 % increase as compared to 2006. The export of this sector in 2006 constituted 17% of total export in the FBiH in the same year, as shown in picture 4.8, which is more than Croatia (9%) and Slovenia (8%) [4, 8, 13].

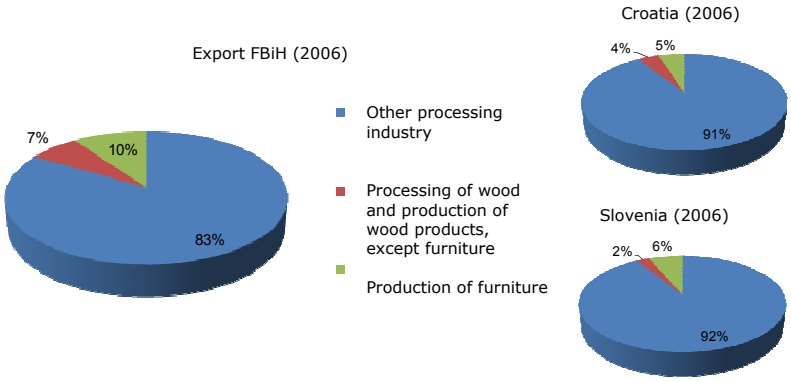


Figure 4.8 Participation of the wood sector in the export in the FBiH, Croatia and Slovenia

The total import of the wood sector in 2006 amounted to: 239.847.000,00 KM, and in 2007 to: 323.456.000,00 KM. The increase in the total import in 2007 as compared to 2006 amounted to 25,84%. The import of this sector in 2006 constituted 3% of the total import in the FBiH in the same year, as shown in figure 4.9, which is less than in Croatia (6%) and Slovenia (4%) [4, 8, 13].

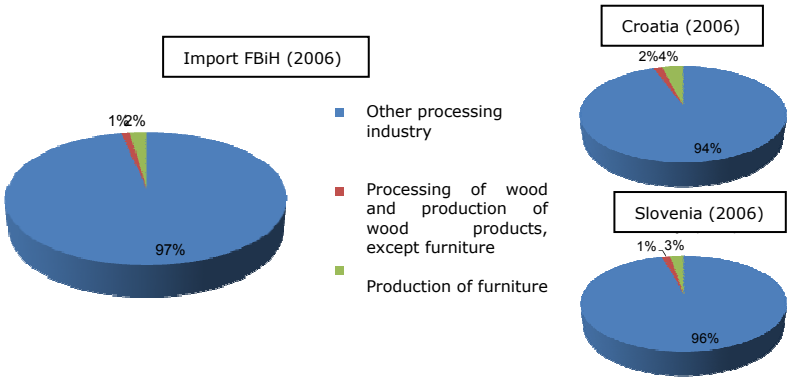
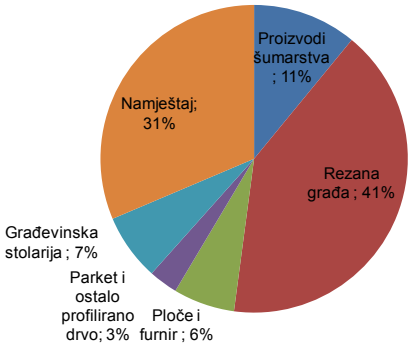


Figure 4.9 Participation of the wood sector in the import in FBiH, Croatia and Slovenia

The wood industry of the FBiH achieves a foreign trade surplus, and in 2007 the total export amounted to 601.784.000,00 KM, and import 323.456.000,00 KM [7].

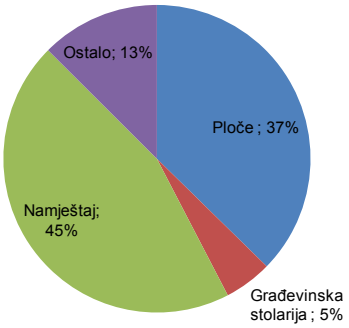
In 2006, the primary and semi-final wood processing (logs, timber, boards, windows and doors) participates with 69% in the export, and the export of final wood products (furniture) with 31%, as shown in figure 4.10 [2].

The import of furniture and windows and doors in 2006 amounted to 50% of the total import of wood industry products, figure 4.11. A significant item of the wood product imports consist of various kinds of boards (37%) used in the production of furniture [2].



Timber 41%
Forestry products 11%
Furniture 31%
Windows and doors 7%
Parquet floor and other profiled wood 3%
Boards and veneer 6%

Figure 4.10 Export structure by groups of wood industry products in FBiH for 2006



Boards 37%
Other 13%
Furniture 45%
Windows and doors 5%

Figure 4.11 Import structure by groups of wood industry products in FBiH for 2006

According to available data for 2005 and 2006 (tables 4.5 and 4.6), out of the basic raw materials and materials used in wood industry, most imports concern boards (chipboard, veneer, panel boards), approximately 90% of needs, and out of secondary materials: glue, window panes, frames [8, 9].

Table 4.5 Use of basic raw materials and materials in wood industry, wood/log processing and products made of wood/log, except furniture

	2005		2006	
	total	from import	total	from import
Logs from coniferous trees for cutting, m^3	466.346	-	516.010	2.171(0,42%)
Logs from deciduous trees for cutting, m^3	235.436	-	307.152	-
Beech logs for veneer, m^3	9.325	-	12.864	-
Timber from deciduous trees, m^3	9.337	-	15.238	413 (2,71%)
Synthetic glues, ton	448	404 (90,17%)	381	353 (92,65%)
Window panes, ton	112	112 (100%)	262	262 (100%)

Table 4.6 Use of basic raw materials and materials in wood industry, production of furniture, processing industry

	2005		2006	
	total	from import	total	from import
Materials, thous. m^2	889	764 (85,93%)	1.923	1.475 (76,70%)
Timber from coniferous trees, unprocessed, m^3	9.429	-	8.498	-
Timber from deciduous trees, unprocessed, m^3	34.357	-	32.287	2.041 (6,32%)
Plywood, panel and chipboards thous. m^2	1.094	1.017 (92,96%)	1168	1.061 (90,83%)
Chipboards, unrefined, m^3	6.618	6.565 (99,19%)	6.013	5.375 (89,38%)
Veneer sheets, thous. m^2	36	15 (41,66%)	30	22 (73,33%)
Glues, tons	430	425 (98,83%)	818	450 (55,01%)
Frame and furniture tools – metal, ton	380	275 (72,36%)	151	134 (88,74%)

The number of employees in the wood industry sector in March 2008 amounted to 14.638, which represents 17% of employees of the processing industry of the FBiH (8.794 or 10% of wood processing and production of wood products, except furniture and furniture production 5.844 or 7%), figure 4.12, which is less employees than in Croatia (10%) and Slovenia (12%) [3, 6, 13].

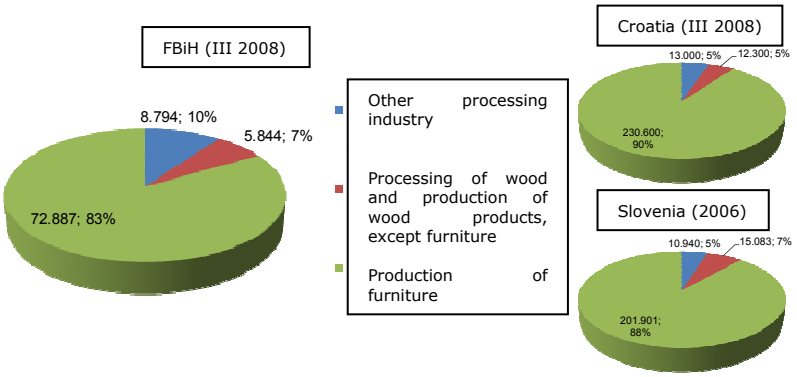


Figure 4.12 Number and percentage of employees in the wood industry in the FBiH, Croatia and Slovenia

The qualification structure of employees in the wood industry of FBiH, as compared to that of Croatia and Slovenia is shown in histograms 4.13 and 4.14. The number of persons with university education is lowest in the FBiH, approximately 2%, 3,4% in Croatia and approximately 4% in Slovenia [4, 8, 13].

Picture 4.13 Employment based on the level of professional qualifications

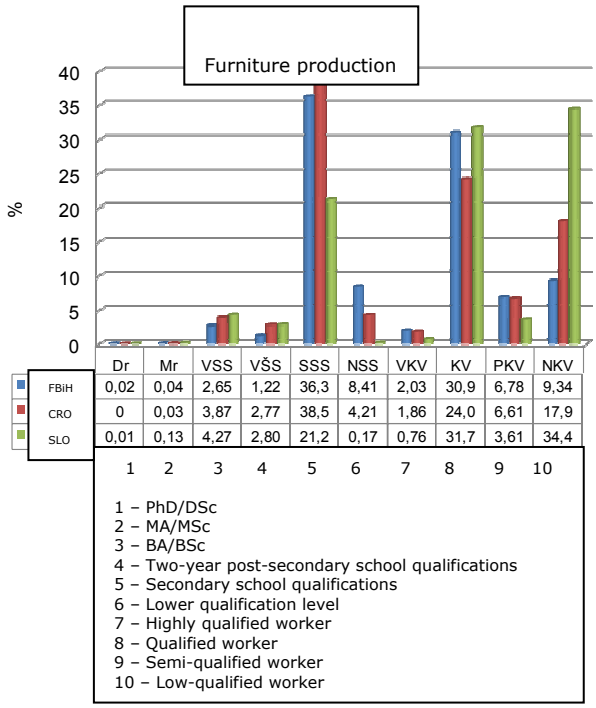


Figure 4.14 Employment based on the level of professional qualifications

4.1.1.2.3 Survey Data

A single questionnaire for all sectors with 81 questions for the purpose of obtaining survey data, which includes the following:

- Financial indicators for 2006, 2007 and the 2008 plan,
- Staff data,
- Production program,
- State of technology,
- State of production,
- Development,
- Economic policy measures and
- Foreign investments and development incentive system.

The questionnaire was submitted to 19 companies, and 17 companies returned filled questionnaires. The questionnaires were submitted in person to the management of the

companies, so that team members, in addition to interviews with the management also controlled: the equipment, technology, and production of every company.

The analysis of the questionnaire included 17 companies. For the purpose of easier analysis of the existing technologies and technological systems in the surveyed companies, the sector of the wood industry was divided into:

- Processing of wood and wood products, except furniture,
- Production of furniture,
- Trade in wood products.

The list of surveyed companies in the wood industry sector:

Processing of wood and wood products except furniture:

1. TAMEX doo - Busovača
2. PALAVRA doo – Nova Bila
3. KONTINENTAL doo – Kiseljak
4. JAFA-JASE doo – Srebrenik
5. DI JANJ Tvornica građevinske stolarije dd – Donji Vakuf
6. ANS DRIVE doo – Sarajevo
7. IMPREGNACIJA-HOLZ doo –Vitez
8. PROMO - Donji Vakuf

Production of furniture:

1. ECONOMIC doo - Vitez
2. MALAGIĆ doo –Živinice
3. JADRINA doo – Gračanica
4. DALLAS BH doo – Ilidža
5. KONJUH dd – Živinice
6. STANDARD dd – Sarajevo
7. MAOLES doo – Mostar

Trade in wood products:

1. Šipad Export-Import - Sarajevo
2. Šipad Komerc - Sarajevo

The survey sample was created based on:

- Two companies with more than 500 employees or a total of 1.730 employees,
- Two companies with 300-500 employees, or a total of 738 employees,
- Seven companies with 101-300 employees, or a total of 1.238 employees and
- Six companies with up to 100 employees or a total of 325 employees.

Based on the data from the questionnaire, and based on controls during visits and available statistical data on the situation of production programs, it can be said that the structure and assortment of wood industry products are various and based on the existing raw material base and long tradition.

The basis of the wood industry consists of the following products:

- timber,
- massive wood boards,

- furniture elements,
- all kinds of furniture (upholstered, massive, cabinets),
- windows and doors,
- parquet floors and other floors,
- prefabricated wood elements,
- pellets and briquettes.

According to the Register of the Chamber of Commerce of FBiH, 646 companies were registered for wood production and wood processing, and 97 for production of furniture [16].

In the area of wood production and processing, 356 companies engage in production of timber, wood impregnation, 17 in production of veneer, plywood, panel boards, chipboards and similar boards and plates, and 191 in production of windows, doors and elements [16].

The sector of wood production and processing, especially sawmill sector, has recovered and developed fast after the war as compared to other segments of the wood industry. There has been a great and uncontrolled increase in small sawmills that result from investments financed by private capital. The varying development of sawmill industry is a result of the great demand for wood for the construction industry, the possibility to export beech in the countries of the region, irregular distribution of raw materials and small investment costs.

This sector is dominated by small and medium-size companies today, except for big sawmills for primary processing and big companies for furniture production that possess their own big sawmill capacities. A large number of small sawmill capacities has no license issued by the FBiH, i.e. operates in grey economy area. According to the Chamber of Commerce of FBiH, in 2002 out of 846 registered plants, only 253 sawmill capacities had or submitted a request for a license [12]. It is believed that the situation has improved over the past years.

According to assessments, the installed capacities of sawmills are at least twice bigger than the allowed annual cutting [11]. Still, there is no reliable information on the true work of sawmills. Based on statistical data on production of forest assortment and use of raw materials for production of timber, it can be concluded that the available production capacities are used very little. On the other hand, due to an extensive increase in capacities, there are problems in the purchase of raw materials, their price and quality. Unbalanced offer/demand and inefficient mechanism of distribution of raw materials in the sawmill industry is one of the basic problems that the wood industry is facing.

The availability of raw materials, greater possibilities of export and the processing tradition lead to the creation of new or revitalization of the existing capacities of further processing for a high value assortment or product. This primarily relates to the production of parquet floors and furniture elements (facades, frames, glued boards,

framework elements, chair and table elements) with varying degree of finalization for processing and refining of the upper surface for individual foreign markets through foreign distribution channels. Investments in production capacities of this segment of production program, especially glued massive wood boards, is topical, because there is the interest of foreign investors, and many companies have the technical requirements for its implementation [5].

In the existing plants for production of veneer and plywood (veneer boards), the production program is based on the production of peeled veneer (beech) and production of cut veneer (beech and to a lesser extent other kinds of deciduous trees). Only few producers have integrated production capacities for finalization of veneer and production of veneer boards or production of products for furniture and construction industry. Producers of veneer and plywood cannot ensure a sufficient quantity of high-quality logs for cutting and peeling in competition with domestic sawmills.

Bosnia and Herzegovina currently does not possess the industry of chipboard and MDF boards. The production of MDF boards in the mediapan factory in Busovača stopped in 2002 [11]. The domestic furniture industry is fully dependent on the import of this kind of boards based on wood from the countries in the region.

The domestic market has registered a significant increase in the demand for windows and doors. As a result of this, new plants were established and to a lesser extent the existing production plants were revitalized, as a result of which some companies got an enviable reputation during their participation in the reconstruction and construction of numerous buildings in Bosnia and Herzegovina. The assortment of the production program and the quality of products primarily depended on the domestic market situation at the beginning (humanitarian programs and low purchasing power of consumers). In some existing, modern plants, programs were developed by applying European standards. The quality of products is generally good, although it still does not meet fully the western standards.

As part of the massive wood processing industry, the production of doors and windows still has a good inflow of raw materials from domestic sawmills. Actually, many of the producers integrate sawmills in their plants in order to ensure a constant inflow of high-quality raw materials. The production of doors and windows has a development potential in FBiH.

As regards prefabricated houses, there are several active production plants. The producers offer a flexible production program consisting of pre-fabricated and wooden functional houses that can be easily adapted to the wishes of customers, offering them the choice of the material and level of processing in agreement with the investor, up to the ''turn-key'' option. Over the past years there has been an increased export to the countries in the region and Western Europe.

As regards furniture production, 13 companies engage in the production of chairs and seats, 25 in the production of other office and store furniture, 19 in the production of kitchen furniture, 38 in the production of other furniture, and 2 in the production of

mattresses [16]. As regards the production technology, it is usually classified as production of massive, cabinet and upholstered furniture.

After the revitalization, the furniture industry has been developing based on domestic raw materials, with a dominant dependence on the import of secondary materials (frames, glue, varnishes, etc.). Since there is currently no producer of wood boards, all companies fully depend on the imported chipboard and MDF.

In general, the production includes the full furniture assortment. Due to an outdated assortment, insufficient quality and flexibility, the assessment of assortment based on market quality standards and design classifies the domestic products of the furniture industry as lower or medium-ranked price class products.

The massive furniture industry requires a steady inflow of raw material from domestic sawmills. Many producers have integrated production of furniture and sawmill in order to ensure a steady inflow of high-quality raw materials. The furniture industry in the FBiH has a great potential for this growth. Cheap labor and availability of qualified labor force support this option.

The sale of final products, based on data from 13 companies, is shown in 4.15:

- domestic market 39,80%,
- foreign non-EU market 13,62%, and
- EU market 46,58%.

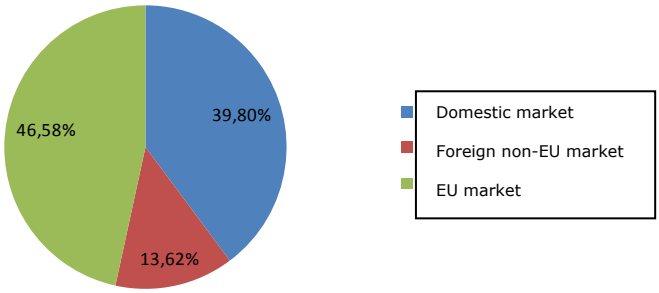


Figure 4.15 Sale of final products

Highly qualified staff in all surveyed companies amounts to approximately 6,6% of the total employee number. The total number of persons holding a master degree is 3, and there were no employees with a doctoral degree. The surveyed companies stated the need for 77 missing highly-qualified staff. More than 38% of the missing staff relates to graduate wood processing engineers. The employment plan for the coming three years for the wood sector amounts to 1.179 employees.

ISO standard has not been introduced by 68,75% companies, and no company is in the possession of the CE label, which clearly indicates the situation in relation to the organization of the companies.

4.1.2 State of Technologies and Technological Systems

4.1.2.1 State of Technology until 1992

The wood industry of the FBiH did not significantly lag behind in terms of technological equipment as compared to the technology used in the Western European area until 1992.

Most of the plants were built in the period 1970 – 1985, and some of them underwent minor or major reconstructions in the meantime. The purchased production equipment belonged to the same technology and quality as that of the wood industry in Europe.

Less productivity and poorer product quality in our country as compared to the European producers were not a result of poorer technological equipment, but other, primarily subjective weaknesses.

4.1.2.2 State of Technology Today

Based on the data from the survey, a control of the situation during visits and available data on the state of technology in the environment and world can be expressed as follows:

- 4 companies possess new equipment, which amounts to 26,66% of the sample,
- 6 companies possess modernized equipment, which amounts to 40,00% of the sample,
- 5 companies possess a combination of old and modernized equipment or 33,34% of the sample.

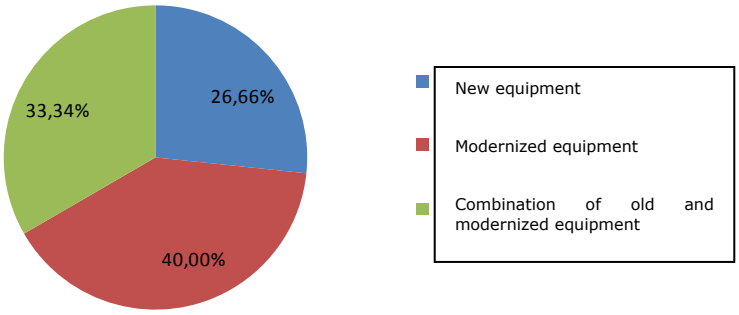


Figure 4.16 State of equipment

Since the sample includes the more important companies in the FBiH, it can be assessed that more than 60% of the overall number of companies in the wood industry have new or modernized equipment (figure 4.16), which represents a significant help to faster development of this sector over the coming period.

By inspecting the state of technology of the surveyed companies as compared to competitive companies in the surrounding area (EU countries), we can conclude the following:

- 3 companies possess outdated technology or 20,00%.
- 4 companies possess new technology or 26,66%.
- 8 companies have modernized technology or 53,34% (picture 4.17).

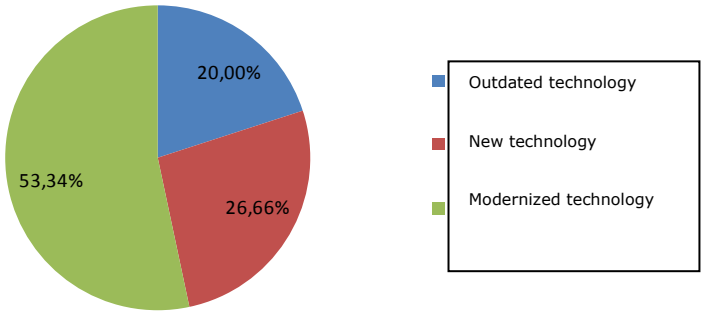


Figure 4.17 State of technology

Based on the stated facts, it can be concluded that 20% of surveyed companies in this sector have outdated technology in the FBiH, which reduces their competitive capability and requires investments in new technologies.

The use of production capacities amounts to 66,9%. Work in two shifts is organized at eight companies or 53,33%, 7 companies have one shift or 46,67%. Based on the mentioned data, it can be clearly seen that there is a small percentage of capacity use in the whole industry.

The necessary assets for equipment and technology modernization amount to 10.800.000,00 KM and relate to the 6 suveyed companies, and they plan to revitalize their technology by using these funds.

4.1.2.2.1 Financial Indicators

The total income of the surveyed companies in 2006 amounts to: 240.818.420,44 KM, and in 2007 to: 298.472.402,79 KM.

Based on the processed financial indicators a ranking list of companies for 2007 was made based on:

- The size of income per employee in KM (table 4.7),
- The net export per employee in KM (table 4.8),
- The profit per employee in KM (table 4.9),
- The value of net assets per employee (table 4.10) is related to companies that provided information.

Table 4.7 Total income per employee in KM

TOTAL INCOME PER EMPLOYEE IN KM		
Company		2007
1	Economic – Vitez	327.065,82
2	Šipad Komerc – Sarajevo	229.849,94
3	Ans Drive – Ilidža	155.783,50
4	Palavra – Nova Bila	104.408,33
5	Standard – Sarajevo	95.749,60
6	Malagić – Živinice	68.709,40
7	Jafa-Jase – Srebrenik	62.005,13
8	Tamex – Busovača	61.068,70
9	Maoles – Mostar	55.201,76
10	Dallas – Sarajevo	54.370,19
11	Šipad Export-Import – Sarajevo	47.896,87
12	Kontinental – Kiseljak	42.279,50
13	Jadrina –Gračanica	41.242,86
14	Promo – Donji Vakuf	39.634,15
15	Janj – Donji Vakuf	36.527,49
16	Impregnacija-Holz – Vitez	34.315,06
17	Konjuh – Živinice	29.154,14

Table 4.8 Net export per employee in KM

NET EXPORT PER EMPLOYEE IN KM		
Company		2007
1	Standard - Sarajevo	79.688,99
2	Tamex – Busovača	60.458,02
3	Palavra - Nova Bila	54.050,09
4	Kontinental - Kiseljak	27.253,43
5	Impregnacija-Holz - Vitez	26.918,28
6	Promo – Donji Vakuf	17.682,93
7	Janj - Donji Vakuf	15.825,17
8	Konjuh – Živinice	10.915,18
9	Malagić – Živinice	10.737,93
10	Šipad Export-Import -Sarajevo	8.111,11
11	Jadrina - Gračanica	4.500,00
12	Jafa- Jase - Srebrenik	2.881,75
13	Dallas – Sarajevo	-9.862,79
14	Maoles – Mostar	-10.957,62
15	Economic – Vitez	-148.300,47

Table 4.9 Profit per employee in KM

PROFIT PER EMPLOYEE IN KM		
Company		2007
1	Economic – Vitez	20.682,41
2	Tamex - Busovača	11.709,37
3	Impregnacija-Holz - Vitez	11.655,34
4	Ans Drive – Ilidža	4.370,42
5	Janj – Donji Vakuf	2.945,72
6	Malagić – Živinice	2.429,13
7	Standard - Sarajevo	1.273,85
8	Jafa-Jase - Srebrenik	554,85
9	Palavra - Nova Bila	409,53
10	Maoles – Mostar	368,43
11	Dallas – Sarajevo	295,01
12	Promo – Donji Vakuf	280,49
13	Kontinental – Kiseljak	187,97
14	Konjuh – Živinice	111,96
15	Šipad Komerc - Sarajevo	103,40
16	Šipad Export-Import -Sarajevo	17,64

Table 4.10 Value of net assets per employee (relates to companies that already provided information)

VALUE OF NET ASSETS PER EMPLOYEE IN KM				
Company		2006	2007	2008
1	Economic – Vitez	88.014,41	129.212,19	-
2	Palavra - Nova Bila	110.836,98	116.279,63	121.760,19
3	Ans Drive – Ilidža	97.548,55	112.582,37	140.094,59
4	Impregnacija-Holz – Vitez	77.045,27	108.801,55	-
5	Maoles – Mostar	52.833,38	85.109,10	87.142,86
6	Malagić – Živinice	62.608,96	68.965,90	-
7	Tamex – Busovača	47.918,96	62.261,96	53.435,11
8	Konjuh – Živinice	31.077,43	32.373,90	36.579,44
9	Standard – Sarajevo	26.686,62	27.246,58	27.384,62

The value of technical equipment of a position is assessed based on table 4.10.

The value of a position in 2007 varies between 129.212,19 KM (Economic–Vitez) and 27.246,58 KM (Standard – Sarajevo). The differences in the value of positions primarily result from the type of production, level of automatization and achieved restructuring level.

By dividing the indicators from tables 4.7, 4.8, 4.9 by the value of net assets per employee (table 4.10) we get three indicators for the evaluation of successfulness of business performance (table 4.11).

Table 4.11 Indicators for the assessment of the successfulness of company's business performance

Income/assets			Export/assets		Profit/assets	
1	Standard – Sarajevo	3,51	Standard - Sarajevo	2,92	Tamex -Busovača	0,19
2	Economic – Vitez	2,53	Tamex Busovača	0,97	Economic - Vitez	0,16
3	Ans Drive – Sarajevo	1,38	Palavra - Nova Bila	0,46	Impregnacija-Holz- Vitez	0,11
4	Malagić – Živinice	1,00	Konjuh - Živinice	0,34	Standard - Sarajevo	0,05
5	Tamex – Busovača	0,98	Impregnacija-Holz- Vitez	0,25	Ans Drive - Sarajevo	0,04
6	Palavra - Nova Bila	0,90	Malagić- Živinice	0,16	Malagić - Živinice	0,04
7	Konjuh – Živinice	0,90	Maoles – Mostar	-0,13	Maoles – Mostar	0,0043
8	Maoles – Mostar	0,65	Economic - Vitez	-1,15	Palavra - Nova Bila	0,0035
9	Impregnacija-Holz – Vitez	0,32	Ans Drive - Sarajevo	-	Konjuh - Živinice	0,0035

4.1.2.2.2 Basic characteristics of the state of wood industry in the FBiH

As a result of realistic circumstances and limits, the wood industry of the FBiH has the following characteristics:

1. Basic raw materials for processing from domestic natural resources,
2. Unsatisfactory ratio of the primary and final processing,
3. Capacities of sawmill processing are bigger than the available domestic raw materials,
4. Unbalanced offer, demand and distribution of raw materials,
5. No domestic production of chipboard and MDF boards,
6. High foreign trade surplus,
7. Unsatisfactory export structure,
8. Organization of production in smaller plants near processing raw materials,
9. Relatively high employment of labor force,
10. Non-existence of a brand in the wood industry of the FBiH,
11. Unsatisfactory assortment and product quality,
12. Insufficient investments in the technological development,
13. Need for bigger use of knowledge,
14. Unsatisfactory participation of staff with university degree in the employee structure,
15. Need to open laboratories for product certification in compliance with EN standards,
16. Non-application of ISO standards and CE labels,
17. Necessary establishment of research and development centers,
18. Non-existence of a development strategy.

4.1.3 Possibilities of Revitalization and Modernization of Technology

The industrial processing of wood is a significant segment of the development of our country. Its development is based on the use of domestic natural resources and it has been traditionally export-oriented. In the definition of a strategy and revitalization of the industrial wood processing, particular importance is given to some of its characteristics:

1. a very high percentage of domestic raw materials in products of all processing phases,
2. continuous export-orientedness,
3. long-term tendency of increase in the demand for products of all wood processing phases in the world,
4. wide dispersion of companies in all municipalities of the FBiH,
5. the possibility of high employment level in small places where this is frequently the only source of income of inhabitants and where there is no infrastructure, other raw materials, expert staff, etc., in order to organize some other kind of production,
6. a relatively low value of investments in individual production buildings and employees,
7. relatively acceptable activity in terms of environment.

It is beyond doubt that the results achieved up to now in the sector of industrial wood processing are largely a result of its comparative advantages (a large share of domestic raw materials, relatively low investments in individual buildings, etc.). However, these comparative advantages are not sufficient for further survival and development. This is the reason for the need for support to its competitive and export abilities in future, which are oriented towards final production.

We should have in mind the fact that the development of modern technologies in the industrial wood processing, significant changes in the financial sector, the overall globalization, and other fundamental changes, whose dynamics will continue to speed up over the coming years, expand the framework for establishing a new development strategy.

Poor equipment quality resulted in poorer quality or damage of final products, which resulted in a decrease of sale prices.

Outdated technology and lack of capacities and non-existence of higher processing phases result in a decrease of the overall income from industrial wood processing as compared to the raw material potential. Poor use of production capacities, especially in primary wood processing (too many sawmills) has a significant impact on business results. Since the competitiveness of the sector in the market depends on the quality of products, at this moment it can be stated that the modernization of production is a pre-requisite for an increase in production, export and survival in the captured foreign markets.

An unavoidable step in the further development of this industry is certainly revitalization and modernization of technology and better linking with the supporting industries.

4.1.3.1 Analysis of Current Capacities and the Structure of Production Technology

- The wood processing industry in Bosnia and Herzegovina takes a significant place and is recognizable as a strategic sector of economic development.
- Bosnia and Herzegovina, as one of the richest countries in Europe in terms of wood, has a secured raw material base for the development of wood processing activities.
- Until 1992, Bosnia and Herzegovina has reached a high level of development of the wood processing industry. Intensive investments into this activity started in the 50ies and 60ies of the past century by investing in the production of furniture and more complex products. The previous domination of primary wood processing and production of low value products stopped and the trade balance of the wood processing industry in Bosnia and Herzegovina became positive. The export was mostly intended for the USA market, but also the market of the current EU, Eastern Europe, some African countries, Near East countries and Australia.
- The basic characteristics of companies established in the mentioned period are a large number of employees, great capacities and high-series production. The companies were organized into complex plants that also included forestry and wood processing, and they had a complete production cycle – from primary to final processing.
- The installed capacities largely exceeded the needs of the domestic market and the companies were export-oriented.
- In the 1990ies, large complex plants stopped working, the infrastructure and technological capacities of complex plants were devastated, outdated or damaged due to lack of use and maintenance, the activities of forestry and wood processing were separated, so that the production process was divided into phases, which lead to difficulties in offer and demand for raw materials. Large complex plants were defragmented and privatized in a poor way due to a lack of strategic partners, and the market was lost, which lead to a significant lagging behind the well-developed countries in terms of development and product quality monitoring. The created image of products from Bosnia and Herzegovina was significantly damaged. The sudden development of the private sector re-established the domination of primary processing over the final processing, whereby the individual installed capacities are small, the technological level of processing low, and the

product quality questionable. Grey economy in the wood processing sector is very present, which additionally aggravates a systemic solution of this sector's problem.

- Today, universal machines dominate in the companies of the wood processing sector in Bosnia and Herzegovina (64,8% of the total machinery). They are followed by special machines (13,8%), automatic machines (6,8%) and other machines (7,4%).
- The production of windows and tables requires a higher wood processing level, so that the structure of machinery is somewhat more complex as compared to primary processing.
- As regards the production of other wood products, there are also more complex machines, and very few universal machines. The peculiarity of the production process and the high level of product finalization also imply more complex machinery.
- In furniture production, there is a registered presence of all kinds of machinery with the domination of universal machines. Special machines constitute 18% of the machinery of this activity, whereas the automatic machines (8,5%) and other machines (9%) are equally present. CNC and NC machines were also registered, but there is an insufficient number of processing centers and flexible processing centers, as well as transfer of production lines (6%) that were registered only in companies dealing with furniture production.
- CNC and NC machines are present in companies with more complex production (production of furniture, production of other wood products, less frequently production of windows and doors).
- On the average, most machinery per company is present in primary wood processing and production of windows and doors where universal machines dominate, and there is a registered lack of new technologies and a significant participation of labor force in the production process. With the increase in the complexity of machines, the number of individual technological operations and the role of human factor decrease, which results in an increase in the production capacity, fastness of production, preciseness of production, possibility of quality control, etc. A particularly visible advantage of use of new technologies is in the final wood processing.
- As regards the age of machines, a span of 57 years was perceived (the oldest machine was produced in 1948), which shows the misbalance of the machinery in the wood processing industry.
- The most obvious difference in the age of the machinery is present in terms of the organizational form of the company. The average age of the machines in joint stock companies is 19,61 years, where as in case of limited liability

companies it amounts to 13,1 years. Independent crafts shops possess machines of average age of 15,45 years. The most probable reason for this situation is the stagnation of big processing complexes before the privatization process, which neglected the renewal of machinery, whereas limited liability companies (d.o.o.) are mostly smaller companies where the owners and the management with the aim of increase in profitability of companies recognized the importance of the topicality of production technologies and invested in them.

- In terms of the activity, the machinery of companies engaging in furniture production is somewhat younger than in case of other wood processing activities, primarily due to a sudden increase in the number of companies engaging in the production of cabinet furniture, which frequently invested in new technologies.
- Furniture production has the most varied structure of machinery as compared to the age of machinery, whereby the presence of both older and newer machines is significant.
- Significant investments into production machines and tools for windows and doors have been made over the past 15 years.
- Investments into machinery for timber production were most intensive in the period 1998 – 2004, i.e. the highest number of machines that were registered were produced in the mentioned period. The oldest machines in primary wood production date back to 1963.
- In furniture production it is necessary to separate furniture production subcategories – cabinet furniture, upholstered furniture and massive wood furniture.
- The most intensive investments were made in the field of cabinet furniture. Upholstered furniture mostly implies manual work, and machinery investments are rare, whereas in case of massive wood furniture there are least investments in machinery renovation.
- Italian producers dominate with 35% of produced machines present in the wood processing sector of the FBiH. They are followed by Germany with 22% of produced machines in the market of FBiH. The former Yugoslavia is significantly represented, namely by producers from Croatia (9,5%), Slovenia (8,3%), Bosnia and Herzegovina (7,8%) Serbia and Montenegro (2,2%) which makes a total of 27,8% of registered machines. In addition to the above mentioned, machinery origin countries are also: Austria (2,3%), Belgium and USA (1,5% respectively), Switzerland (1,3%), Sweden, England, the Czech Republic, China, Japan, etc.
- There is a significant variety in the producers of machinery registered in this research. The overall number amounts to 119 different machine producers. The SCM group of producers from Italy dominates with 13% of produced

machines present in the wood processing industry in FBiH. In addition to the SCM group, Bratstvo Zagreb (8,7%), Weinig Group (6,1%), and machines from proper production (5,2%) are also present. Machines from the producers Sikar (3,4%), Homag group (2,8%), Mebor (2,8%), Biesse (2,7%), Linck (2,5%), Simipianti (2,2%) are also registered.

4.1.3.2 Analysis of Current Needs for New Technologies in the Wood Processing Sector in FBiH

- Only 25,5% of companies stated the need for one or more machines. A relatively small number of stated needs is a result of numerous factors, out of which the following ones stand out: unplanned work of companies, impossibility to anticipate future needs, non-consideration of the possibility to expand or specify production, non-existence of a secure market, unfavorable financial situation, etc.
- A positive aspect of this result is the fact that 74,5% of companies from the wood processing activity has already resolved the problem of missing machines, and completed the process with investments of various origin over the past 10 years, whereas the new companies have well planned needs since the beginning, which enabled them to cause problems linked to missing machines.
- Most needs were stated in the production of other wood products (38,5% of companies engaging in this activity stated the need for one or more machines), and in furniture production (22% of companies engaging in this activity). Least needs were stated in the production of windows and doors where only 9,5% of companies stated needs for new machinery.
- As compared to the organizational form, most needs were stated in case of joint stock companies (50%), which has also been expected, because the average age of machines in joint stock companies amounts to 19,61 years. On the other hand, the organizational form of joint stock companies is mostly the form of big state companies that were privatized, in case of which significant investments into new production capacities start only after the completion of the privatization process. The difference is important as compared to independent craft workshop (SZR) and limited liability companies (d.o.o.) where every fifth company stated the need for a machine.
- Numerous missing machines as compared to the use of the machine, but also as compared to the price, point to the impossibility of grouping companies based on the needs for production technology.
- There is a significant variety in the defining of the missing production capacities.

- In the production of massive wood furniture were registered needs for the introduction of new CNC technologies for the production of spindled products, varnishing lines, scraping machinery, contact grinder machinery, oscillating grinder machinery, presses for lateral connection. The capacities for drying and presses for width connection are also limited.
- In the production of cabinet furniture, most frequently missing tools are edge bander, thread rolling machines, and CNC processing centers (multiple CNC drills).
- In case of production of windows and doors, the most pronounced problem is a lack of pneumatic presses, four-side planning machine, processing angle centers, tables for fettering and varnishing.
- In case of primary wood production, there is a pronounced lack of capacities for drying, combining, silos for storage of wood rests, various cutting machines, etc.
- Over the past years there has been an increase in the processing of wood rests into biomass. Most plants transform dry rests into briquettes. In several locations there are significant capacities for production of pellets. These capacities are based on raw rests, which is produced in wood processing plants in the proximity of up to 70 km.

4.1.4 Internal and External Constraints (SWOT Analysis)

A pre-requisite for a correct selection of strategy is a situation analysis. This implies that a company or a sector should analyze external and internal factors in order to select the best way to achieve the desired goal. The dynamics that is present in the market forces the companies to carefully select the way in which they will compete with the competitors. The SWOT analysis is one of the instruments that can be used by the management to create business strategies. It is based on acquired and analyzed data during research on internal reserves and external circumstances. A SWOT analysis is a qualitative analytical method that shows certain phenomena or situations based on four factors. This analysis gives an objective assessment of the balance of abilities of a company or sector and external circumstances. Every company within a sector or branch has to consider the internal organization and external environment. In this context, this analysis may be understood as a picture of internal strengths and weaknesses and external opportunities and threats that the sector is facing. Based on the SWOT analysis, we are trying to identify the business strategy that will use the strengths, minimize the weaknesses, capitalize opportunities and minimize threats in the wood processing sector. In other words, the goal of the SWOT analysis to minimize weaknesses and simultaneous increase in industry strengths, and thereby use the opportunities in the best possible way

and at the same time to decrease the threats from the environment. This analysis is very useful in planning and assessment of sector development strategy. The goal of the analysis of external and internal factors is to objectively identify internal and external peculiarities of the sector. One of the useful possibilities that can improve the mentioned analyses is benchmarking. It means understanding the phenomenon that some companies perform better than others, or the search for the best people and organizations within a certain activity and using their knowledge, adjusted and improved, for the proper successful performance.

The SWOT analysis (analysis of strengths, weaknesses, opportunities and threats) as an important segment in strategy formulation means identification of internal strengths and weaknesses, external opportunities and threats in order to use and value the strengths and opportunities in the best possible way and to neutralize or remove the weaknesses and threats (figure 4.18).

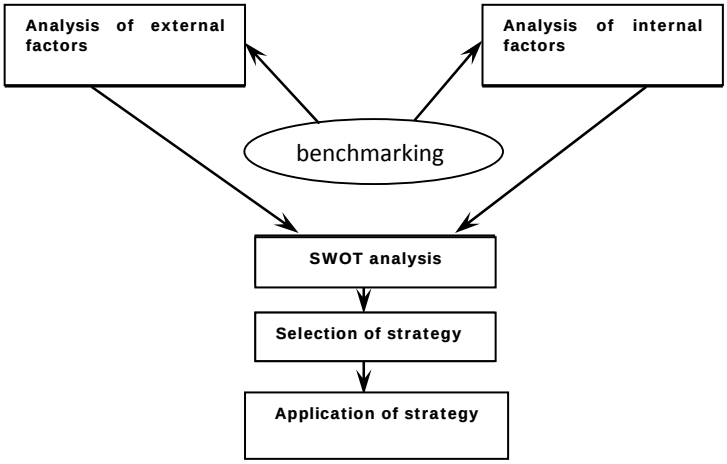


Figure 4.18 Strategy formulation process and phases

Various authors have different understanding of the role and importance of business strategy, but they also have different approaches to the process of its formulation. A generally acceptable analysis process consisting of the following steps was created:

A) Identifying factors in the external and internal analysis

Based on the external analysis of opportunities and threats it was established that they consist of macro environmental and micro environmental factors. The following areas are mostly evaluated:

- economy,
- profession,
- ecology,
- politics, legislation,
- market,
- competitiveness,
- partnership.

The internal analysis of strengths and weaknesses includes the evaluation of the following areas:

- the current situation,
- production, production assortment,
- sale and market affairs,
- marketing,
- finance,
- management,
- consolidation.

B) Creation of profiles of strengths, weaknesses, opportunities and threats. Influential factors for the analyzed areas are expressed based on four criteria. Two profiles were created: strengths and weaknesses profile, opportunities and threats profile.

C) The evaluation of important factors of every criterion.

The more important factor was assigned a number from 1 to 5 for every criterion (strength, weakness, opportunity, threat), whereby the most important factor was assigned either 1 or 5.

D) Identification of the most important criteria.

The results of this procedure in step C show the most important strengths and weaknesses in the environment and the most important opportunities and threats in the wood processing sector. These factors are considered strategy criteria in future processes of change and restriction of the wood industry in FBiH.

E) Selection of strategic alternatives

Based on the obtained results in step C, the overall value was shown for every criterion in step C. The mutual combination and comparison of the criteria in companies of the wood industry resulted in a choice of possible strategies:

- SO, offensive strategy: strengths – opportunities,
- ST, defensive strategy: strengths – threats,
- WO, alliance strategy: weaknesses – opportunities,
- WT, liberation strategy: weaknesses – threats.

The selection of the best strategy was made by comparing the differences between the overall value of strengths and weaknesses on the one hand and opportunities and threats on the other hand.

The questionnaires included the expert method of obtaining the necessary information in steps B and C. The evaluation of factors and criteria was conducted by the management of companies together with experts that did this document. The gathered data was analyzed, processed and interpreted by applying statistical methods. Based on the achieved results an alternative strategy was selected.

Based on the method of the expert questionnaires, the factors and criteria were classified into profiles relating to the external and internal analysis. This classification is shown in table 4.12. It shows the strategic profile of strengths and weaknesses of companies. Columns 1 and 5 represent extremes of the most important factors when it comes to strengths and weaknesses.

The elements of the SWOT analysis related to the strengths (S) and weaknesses (W) are as follows: (S): geographic location, size of the company, development of the infrastructure, production assortment, industrial tradition, production capacity, product quality, reliability of suppliers, energetic infrastructure, flexibility of production program; (W): liquidity, high production costs, presence of calculation methods, sales problems, outdated technologies, financial performance, equity structure, fastness of decision making, lack of market information, difficult access to new markets, reliability of suppliers, energy infrastructure.

Table 4.12 Strategic profile of strengths and weaknesses

Factors	**Strengths (S) • / Weaknesses (W) ×**				
Current situation	**1**	**2**	**3**	**4**	**5**
Geographic location				•	
Industrial tradition			•		
Infrastructure		•			
Size of company		•			
New markets			×		
Installed capacities				•	
Outdated technologies		×			
Production assortment				•	
Product quality					•
Adjustment of production program		•			
High production costs				×	
Presence of calculation methods			×		
Sale				×	
Promotion					×
Financial performance				×	
Equity structure			×		
Liquidity			×		
Company management and fastness of decision making				×	
Lack of market information				×	
Energy consolidation				•	
Reliability of suppliers		•			

The elements of the SWOT analysis related to opportunities (O) are the following ones: use of capacities, organization of companies, market segmentation, competitors'

product quality, purchase of basic raw materials, purchase of semi products and servicing, adaptable labor force market, use of foreign partnerships, market expansion.

The elements of the SWOT analysis related to threats (T) are the following ones: environmental requirements, governmental economic policy, high inflation rate, demographic development, market power of purchasers, foreign market competition, expensive borrowing, impact of trade relations, structure of clients, possibility of product substitution.

The strategic profile in table 4.13. shows opportunities and threats. Columns 1 and 5 represent extremes for individual factors in opportunities and threats. Factors in column 3 are neutral.

Table 4.13 Strategic profile of opportunities and threats

Factors	**Opportunities (O) • / Threats (T) ×**				
Current situation	**1**	**2**	**3**	**4**	**5**
Environmental requirements					×
Governmental economic policy				×	
Inflation			×		
Development in microenvironment and microenvironment		×			
Available favorable financial resources				×	
Foreign partnerships			•		
Trade alliances		×			
Use of capacities			•		
Organization of companies				•	
Market segmentation				•	
Market expansion					•
Market share			•		
Competitors' product quality		•			
Competitiveness of foreign markets					×
Purchase of basic raw materials					•
Purchase of semi-final products and servicing				•	
Market strengths of buyers			×		
Structure of buyers				×	
Possibility of product substitution				×	
Labor force market				•	

The selection of the future wood industry sector strategy depends on all previous phases for the formulation of the basic strategy and includes definition (redefinition), mission, goal specification, identification of resources and formulation of elements.

The following step classifies internal strengths and weaknesses and external opportunities and threats that were identified and evaluated. They are listed in accordance with their importance, whereby the most important factor has the value 5,

and the least important factor the value 1. The results were shown in tables 4.14 and 4.15.

The analysis of strengths shows that the most important strength is the quality of products, a wide production program and energy resource consolidation. Weaknesses include slow decision making by the management, financial performance and lack of market information.

External analysis showed that the highest value in the opportunities segment was given to the free and adaptable labor market in the region, including also adequate qualifications and continued procurement of raw materials.

Table 4.14 Internal analysis – profile of strengths (S) and weaknesses (W)

Strength (S)		Weakness (W)	
Geographic location	4	Promotion	5
Size of company	2	High production costs	4
Infrastructure	2	Calculation methods	3
Production program assortment	4	Sale problems	4
Industrial tradition in the region	3	Outdated technology	2
Production capacities	4	Profit trend	4
High quality products	5	Equity structure	3
Reliability of suppliers	2	Fastness of decision making	4
Energy resource consolidation	4	Lack of market information	4
Adequateness of production program	2	Slow opening of new markets	3
Total value	**32**	**Total value**	**36**

Table 4.15 External analysis – profile of opportunities (O) and threats (T)

Opportunity (O)		Threat (T)	
Organization of company	4	Environmental requirements	5
Use of capacities	3	Governmental economic policy	4
Segmented market	4	High inflation rate	3
Market share	3	Development in microenvironment and microenvironment	2
Competitors' product quality	2	Market strength of buyers	3
Purchase of basic raw materials	5	Foreign market competition	5
Purchase of semi-final products and servicing	4	Expensive financial resources	4
Market expansion	5	Impact of trade associations	2
Use of foreign partnerships	3	Structure of buyers	4
Labor force market	4	Possibility of product substitution	4
Total value	**37**	**Total value**	**36**

The greatest threat is a strong competition in the foreign market, unfavorable structure of buyers, expensive financial funds for future development and danger of replacement of wood products by composite materials, light metals, plastic masses, etc.

Based on an analysis of the results of mutual impact of strengths, weaknesses, opportunities and threats, a SWOT table was created, including four possible strategies as a final interpretation of the achieved results (table 4.16).

Table 4.16 SWOT table of strategic alternatives

	Strengths (S) - Geographic location – infrastructure – energy resource consolidation – product quality – production program	**Weaknesses (W)** – Slow decision making – liquidity – opening of new markets – market information – relatively old technical and technological machinery
Opportunities (O) –free and adaptable labor force market – availability of basic raw material – wood – installed capacities	**SO Strategic** – orientation towards foreign markets – development of new products	**WO Strategic** – licensed production – openness towards new partners/investors
Threats (T) – Sharper client demands – inability to borrow – replacement of wood by other materials	**ST Strategic** – use of reserves – expansion of production program	**SW Strategic** – revalorization of companies – companies in other areas

The final step of this analysis is the selection of the relevant strategy. The total values of strengths and weaknesses on the one hand and opportunities and threats on the other hand were compared and differences were calculated: strengths (S) - weaknesses (W): $35-39=-4\,(1)$, opportunities (O) - threats (T): $37-36=1$ (2). The results show that wood industry companies in FBiH have more weaknesses (W) and more opportunities (O). The most adequate strategy for wood industry companies is the WO strategy, the alliance strategy.

If the financial situation does not improve and better financing sources for the necessary changes in the wood processing sector are found, it is necessary to think about the entry of foreign investments or merger with a strong foreign partner. Unfavorable financial circumstances in the wood processing sector point to necessary changes and restructuring of the company. The results of the SWOT analysis provide necessary information for certain changes that are necessary in the process of restructuring and faster and stronger development of the wood industry in FBiH. The results of the conducted analysis point to the necessity in wood industry companies with the aim of easier adaptation and market competitiveness. This implies:

- Stabilization of the financial situation,
- Flexibility of the existing and introduction of new technologies,
- Scope of production program,
- Improvement of product design,
- Low production costs and prices of final products and serious introduction of the calculation system in the production,
- Sensibility towards changes and requests of the market and buyers.

Chances of companies in the wood processing sector of FBiH include unused opportunities, such as:

- Increase in the scope of production of basic/leading products,
- Expansion of production program,
- A higher level of finalization of sawmill products,
- Better use of capacities,
- Better product quality,
- Openness towards foreign investors/partners.

In compliance with the general, high expert knowledge in this area, and based on the SWOT analysis, the Government of the Federation has to select an adequate approach and methods and start preparatory procedures related to the process of changes and restructuring in wood processing sector.

The conducted SWOT analysis provides the necessary information for new steps in the creation of a development strategy for the wood sector in FBiH. The analysis can be implemented in practice in various ways. Various methods, participants and time are used for this, depending on the peculiarities of the profession, company, organization and specific needs.

The SWOT analysis enables the wood industry to focus on the elimination of weaknesses and threats, to support strengths and use opportunities in the market. The results of the analysis have the purpose to determine the future development strategy. The achieved results and surveyed companies from the wood industry show a critical situation, require changes and restructuring. The restructuring process determines the necessary changes, development strategy, realistic goals and selection of an adequate method for changes of the implementation based on a detailed analysis of the wood industry sector and its environment. The results of the SWOT analysis in the wood industry of FBiH show that the most adequate strategy is the strategy of alliance. It is necessary to introduce licensed production and open up towards new investors. A competitiveness analysis of the wood industry was implemented in compliance with Porter's model of five competitive strengths. This analysis may point to the perspective and development directions of the wood sector.

Analysis of the existing competition. The level of competitiveness within different segments of the wood industry may vary. Generally it can be said that the level of industrial competition is high. In terms of competitive structure, the wood industry is not very focused, and there is a large number of small and medium-size companies. The producers of final products most frequently engage in primary wood processing, which has an impact on investment costs and fixed costs, and on the other hand it causes an excess of demand for raw materials and increases the competitive pressure within wood industry. The demand stagnates and decreases, which leads to a higher industrial competition. The following exit barriers are dominant: relatively high investments in the plant and equipment, high fixed costs of industry exit and social pressure.

Analysis of potential competitors. The intensity of entry barriers is moderate and a result of the strength of the supplier of raw materials, limitedness of the domestic

market, competition from the surrounding countries and unadjusted domestic quality standards. There is also unfair competition and other non-business sources of conflict.

Analysis of substitutes. There are product substitutes (use of non-wood materials) in some segments of the wood industry, which may lead to price caps. This particularly relates to windows and doors and partly to furniture due to a change in trends.

Analysis of suppliers. The negotiation strength of the supplier is very strong and has an important impact on the definition of the perspective and wood industry development directions. The relations to suppliers are limiting, and they frequently also have a negative impact on the long-term production planning. Due to monopoly, the suppliers (raw materials and electricity) frequently set discriminatory prices or requirements.

Analysis of buyers. The negotiation strength of buyers is pronounced and results in a profit decrease. The wood industry is mostly dependent on ''key buyers'', who request a higher quality of products and/or meeting of additional conditions for the same price, because they are able to find an alternative supplier from the countries from the region.

Based on all the above mentioned, it may be concluded that the development strategy of the wood industry in FBiH should be comprehensive, wide enough and include a general series of priorities, visions and goals that the government should adopt in order to use them as a basis for formulation of coordinated business efforts and activities, and to achieve its mission.

4.1.5 Possible Strategic and Developmental Goals

The wood processing industry in Europe represents one of the largest sectors with more than 200.000 small and medium-sized companies, whereas on the other hand, in the production of boards and sawmill processing we see very big companies with the structure of a corporation, which are connected both in the European area and internationally and have production in several locations.

The wood industry represents one of the more important branches of the processing industry of Bosnia and Herzegovina. It is pronouncedly export-oriented, and from year to year it has an increasing surplus. However, the general assessment is that the percentage of use of wood potential and available capacities for wood processing is not at a satisfactory level. The export of furniture has not reached the pre-war level in the overall export of the wood industry in FBiH, but also in BiH in general. The developmental role of the wood industry in the economy of FBiH is a continuous maximum increase in export and decrease in trade deficit of BiH. If relevant requirements are met, the development of this sector can be speeded up, including an increase in the production at an average annual rate of 10%.

Based on the analysis, the strategic goal of this sector is to keep the position of one of the most important branches of the processing industry in FBiH and to be economically successful through well-balanced and sustainable development and to follow global

development trends. The strategic and developmental goal of the wood industry may be also defined based on specific strategic goals:

- Change of the existing structure for the benefit of final production,
- Increase in the participation of final wood products in the domestic and foreign market,
- Increase in the competitiveness of final products in the market,
- Increase in the productivity and employment in the wood industry.

Measures that should ensure a faster and better development of the wood industry would be the following ones:

- Improvement of business relations between the forestry and wood processing companies
- Defining goal products and support to export of higher processing phases
- Promotion of companies and joint appearance in the market – export strategy
- Quality control
- Staff and education.

4.1.5.1 Improvement of Business Relations Between the Forestry and Wood Processing Companies

The previous practice showed that the relations between the forestry and wood processing companies was not sufficiently and well regulated when they were part of the same organization, and this continues to be the case even now when they are separate. As a result of this, one of more important activities will be the improvement of business relations between the forestry companies and wood processing companies in FBiH.

Every year, there are problems related to objective distribution of the available quantity of logs, having in mind the excess of capacities of the wood processing industry and the fact that certain quantities of logs are exported outside BiH. This additionally aggravates the position of wood processing companies and endangers the operations of most of them.

Considering various development strategies, especially in case of forestry, and in particular wood and paper industry in the world and in our case, there are certain assumptions that point both to common and different elements that should be considered when defining the strategies of these economic branches and their interrelations in future.

For these reasons, we list the following opinions and proposals:

- Analyze the forestry and wood industry as a linked chain in achieving the added value (Scandinavian and Baltic concepts)
- Ensure sustainability and reliability of supply of final producers through long-term export-oriented contracts
- Introduce market relations in pricing of goods and services

- It is necessary to define the requirements and manner of sale of logs (application of EU norms for wood assortments, etc.)

4.1.5.2 Defining Target Products and Support to the Export of Higher Phases of Processing

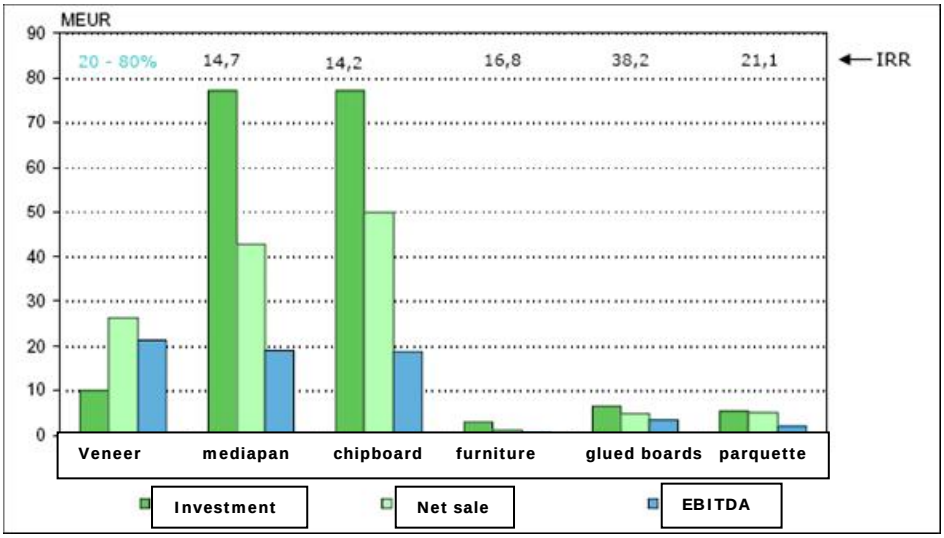
Private capital was invested in all wood industry productions of BiH, especially in sawmill processing, which has three times greater capacities than the available raw materials, which compensates for the production of the social sector. This investment of private capital did not happen in the production of boards and veneer, because it is related to big investments and processing industry, and in Europe the board production capacities vary between 1.000 m^3 and 2.000 m^3 per day. This is the reason for an enormous import of boards. Chipboard is the most flexible wooden board in terms of the materials that may be used in production both in relation to the kind of wood and its form. Juniper tree and pine tree are the most frequently used kinds in Europe, but beech, birch tree and aspen tree are also frequently used. Wood can have the form of logs, with and without bark, boards, chip with and without rind and recycled wood. Since currently there is no chipboard industry in FBiH, this might be an interesting investment alternative.

MDF fibrous board with medium density is produced from all kinds of fresh wood as raw materials. Raw materials may be chip, sawdust, rests of veneer or round wood. In furniture production, the raw material is usually chip without rind. Juniper tree is the most frequent raw material because of the light color of wood and long fibers. Other possible kinds are pine tree, aspen, birch and beech. Since MDF is currently not produced in FBiH, there is a factory in Busovača; this is an interesting investment opportunity for the revitalization and modernization of the existing factory.

Definition of target products should strengthen the competitive ability of companies and improve the quality of certain products, and initiate certain cooperation among companies, and thereby contribute to a decrease of the export of timber and improve the production of more finalized products. Most wood processors from BiH, who are development-oriented, at this moment is in a stage halfway between production of timber and furniture production. This wood processing phase has been proven to be implementable and interesting in terms of development, size of investment, cooperation of several producers in obtaining a semi-product, and finally, the final product. At this moment significant semi-products are: processing of short timber into lamelled boards, production of veneer, especially refined veneer and veneer products (plywood, furniture pressings) that are exported to the EU market.

There is a general lack of raw wood and the current use of rests is not cost-efficient and is partly spendthrifty. The use of rests for the production of biomass (briquettes, pellets) and energy is an interesting option both for wood processors and energy users near big wood industry plants. In terms of direct foreign investments, this segment seems to be interesting.

The increase in export of other final products, and primarily windows and doors, floors and interior design, and construction works abroad (Russia, Arabian countries). Export of massive wood furniture, primarily chairs and tables with a significant improvement of quality and orientation towards markets in the region, EU and Russia. The export of upholstered furniture cannot be considered profitable, since its production requires significant labor force, which will continue to be cheaper in FBiH as compared to EU for a longer period. The following chart (picture 4.19) shows an analysis of key products through key financial indicators, and it was made by the FIPA.



Picture 4.19 Key financial indicators for profitable investments (FIPA, 2006)

4.1.5.3 Promotion of Companies and Joint Appearance in the Market – Export Strategy

The developmental role of the wood industry is a continuous increase in wood product export, especially in case of more finalized products for the purpose of decreasing the foreign trade deficit. The key to success of the furniture industry in future is the export, and in order to achieve this, we have to know the foreign market, improve the production process in order to respond to demands of the foreign market through a good design, surface processing, flexible production, mutual cooperation with the aim of improving competitiveness and creation of an adequate marketing mix.

The marketing mix is not possible if there is no transition from an extensive way of operating (there is a product, a buyer is sought after and the product is sold at a low price) to intensive production based on the aspiration to meet the wishes of (buyers) foreign consumers to the highest possible degree. It is known that the furniture demand depends on: the size of the gross domestic product, housing construction, demographic growth, crediting of furniture sale under favorable conditions, etc. These are mostly general factors, and particular importance is given to internal: design, surface processing and quality of production, which leads to a significantly higher price of the product and improves the sale.

In order to improve the competitiveness of wood products, it is necessary to introduce research and marketing, and also product quality, design and production process development. Based on the mentioned data on foreign trade in case of wood industry, it may be concluded that positive results were achieved, and that the final processing has been resulting in export increase over the last five-six years.

In addition to this positive indicator, we still have to devote particular attention to the export of final products, especially export of chairs, tables, massive wood furniture for children, individual pieces of furniture, wood products and equipping of buildings in cooperation with construction industry companies that perform works abroad. We need to ensure that there is maximum cooperation in the wood industry, which would contribute to a significant increase in competitiveness, decrease in investments, improved use of capacities, increase in productivity and better quality through production specialization, decrease in costs, and through creation of individual clusters, we would ensure mutual support in the foreign market, and not competition.

In order to develop competitiveness, companies' production needs to be increased, with a particular focus on improvement of quality and unique abilities, instead of competition based on low prices (no competition to prices of Near East countries). In order to become competitive, we need to become equal to the competition fast in terms of technology. Particular attention should be devoted to profession, knowledge and practical application of knowledge and skills acquired during education.

Information and communication technology is the most important infrastructure of the 21 century and together with education it is becoming the biggest growth and prosperity factor. Faster development is hindered by insufficiently developed entrepreneurial environment and incomplete transformation of the state into a service for entrepreneurs and citizens. Joint progress requires: macroeconomic stability, openness, efficient financial market, long-term growth sustainability, education, innovations, flexibility, infrastructure and information sharing. Education has a strong impact on business growth, and the wood industry in FBiH has less than 2% of employees with university degree, which is the reason of its significant lagging behind the developed countries. If we speak about the technical equipment in the wood industry, we can say that it is not at a satisfactory level.

As regards sawmills, we can say that their capacities are much bigger than the available raw materials, but they are also fragmented and have outdated equipment, and in our country there are no sawmills for processing of thin round wood and technical parts. As regards massive wood furniture production, the equipment is a limiting factor of the development, which is particularly pronounced in the equipment for surface processing of wood. We can therefore only be partly satisfied with the technological equipment and technology in the production of cabinet furniture. The wood industry has big potentials and with a good development strategy based on knowledge, research, innovation and design, we will ensure a place in the development strategy of BiH and Europe.

4.1.5.4 Quality of Product and Production Process

With the aim of improving the quality of wood industry products of FBiH and control of raw materials that are imported, it is necessary to monitor product quality control and work on the development of a center for wood industry product control and development. As regards this, the following is necessary:

- Establish European norms for the purpose of export and protection of domestic products,
- Establish control of quality of import products as a protection of domestic producers by introducing EU norms (this measure primarily relates to import final products),
- Obligation of certificates and attests (ISO) for products and processes in the wood industry,
- Establishment of adequate institutions for product quality control performance, which are connected to similar European partners.

4.1.5.5 Staff and Education

The existing educational system in FBiH, from primary, secondary, tertiary and life-long education and learning should be reformed and adapted to the needs of the labor market. In order to reach a stronger development of the wood industry sector, in addition to significant investments into new technologies and market promotion, it is also necessary to invest in staff that may accept and maintain new technologies and work on the improvement of product quality and development of new products.

This requires improving the existing situation at all levels in FBiH, including secondary schools, universities and continuous seminars at companies.

Faculties have to be subject to continuous internal and external evaluation. Environmental and human resources have to be created and developed, and investments in new laboratory equipment need to be secured. Study programs have to be in compliance with the interest of a changing market. Also, in the implementation of the Bologna Declaration, the structure of study programs needs to be adapted.

As regards the needs for qualified labor force, the biggest problem is a lack of labor force with university education: wood processing engineers, managers with knowledge and skills that might face the challenge of company revitalization, staff for successful marketing and product promotion, especially in the foreign market. More attention should be devoted to the education of designers.

Secondary school education curricula for the wood processing industry should be adapted to market needs, expressed through: good knowledge of the practical part of work, expressed responsibility towards working tasks, computer skills, willingness to work in a team, knowledge of technologies and materials. This requires better equipment of school workshops for practical lessons for students and practical lessons at companies. Practical lessons would have to be transferred to a greater degree from school workshop

to company plants where students would acquire specific knowledge and skills in a more efficient way.

It is necessary to introduce a permanent and organized system of continuous (specialist) education through technology centers, clusters or faculties. Additional training of workers who already work and perform responsible duties at their companies, but do not possess an adequate qualification or knowledge related to new technologies, product development, labor protection, quality management, is very important. Re-training relates to a decrease in professional and qualification misbalance of offer and demand in the labor market.

4.2 Pulp and Paper Industry

4.2.1 Overview of the Situation in Pulp and Paper Industry

4.2.1.1 Situation in Pulp and Paper Industry in BiH until 1992

Thanks to the considerable presence of forest areas, BiH had a well-developed pulp and paper industry. Bosnia and Herzegovina participated with 10.2% in total exports in the sector of production and processing of paper in SFR Yugoslavia and with 4.1% in imports. Production of pulp, paper and paper products was concentrated in four large industrial capacities: NATRON Maglaj, PAPIR Drvar, INCEL Banja Luka and CELPAK Prijedor. The installed capacities of pulp industry in BiH until 1992 are shown in Table 4.17.

Table 4.17 Installed capacities of pulp industry in BiH until 1992

Product	Quantity	Unit
Pulp factories, conifers	914,000	m^3
Pulp factories, hardwoods	615,000	m^3

In the 1980s Natron Maglaj became the largest producer of unbleached coniferous sulphate pulp, packaging paper, natron paper, paper bags and corrugated packaging in Yugoslavia. Pulp production capacity amounted to 120,000 t/yr. and paper production capacity to 155,000 t/yr. The production was stopped in 1992.

In the 1980s pulp factory in Drvar stopped its production. After the change of ownership and production purpose, the factory started to produce high-quality paper and it employed 600 workers. Its production was stopped in the first half of the nineties.

4.2.1.2 Pulp and Paper Industry in the FBiH Today

During the first postwar years, the recovery of pulp and paper industry was slow due to the loss of market and ownership transformation. Nevertheless, the manufacturing processes in individual factories were restored. Today, the backbone of development in this sector consists of the joint-venture company Natron-Hayat d.o.o. in Maglaj and the company Violeta d.o.o. in Tomislavgrad that emerged as a greenfield investment of private capital. The development of Natron-Hayat is based on the use of local natural

resources, whereas the strategic goal of Violeta Company is to process the imported pulp in its own paper factory. Both companies are export oriented.

4.2.1.2.1 Raw Materials

Table 4.18 presents the achieved assortment of wood products in the period from 2002 to 2007.

Table 4.18 Presentation of achieved assortment of wood products in the period from 2002 to 2007

						m^3 net
Type of assortment	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Čonifers						
Logs F/III	1,000,052	905,484	832,721	733,166	743,361	675,524
Other roundwood and pulpwood	201,738	214,684	229,012	210,104	253,503	238,912
Firewood	26,429	9,241	9,210	5,238	3,969	5,532
TOTAL	1,230,674	1,129,409	1,070,943	948,508	1,000,833	919,968
Hardwoods						
Logs F/III	475,133	483,065	466,035	376,602	381,329	395,642
Other roundwood and pulpwood	32,508	13,251	23,336	9,609	27,381	4,527
Firewood	607,144	684,812	722,457	771,128	807,790	691,864
TOTAL	1,112,330	1,181,128	1,211,828	1,157,339	1,216,500	1,092,034
GRAND TOTAL	2,343,004	2,310,537	2,287,895	2,105,847	2,217,333	2,012,002

The realized production of pulpwood in 2007 and the plan for 2008 are presented in Table 4.19.

Table 4.19 Realized production of pulpwood in 2007 and plan for 2008

Type of assortment		**Plan for 2007 m^3 net**	**Realized in 2007 m^3 net**	**Plan for 2008 m^3 net**
Pulpwood	**Conifers**	151,505	176,101	147,368
	Hardwoods	58,203	471	30,918

Conifer pulpwood accounts for 19.14% of total realized production of net pulpwood conifers in 2007. The realized production of hardwood assortment of pulpwood in 2007 was negligible. In fact, as there are no local industrial capacities that use hardwood assortment of pulpwood as raw material, a larger part of this assortment is sold as firewood.

4.2.1.2.2 Basic Statistical Indicators

Production sector of pulp, paper and paper products includes the production of pulpwood and pulp, graphic paper and cardboard, other uncoated paper and cardboards, corrugated paper and cardboard, boxes and similar corrugated cardboard packaging, paper sacks and bags, folding paper and cardboard packaging, other paper and

cardboard packaging, paper for household, hygiene and toiletry needs, envelopes, cigarette filters, and printed, convex or perforated paper, labels and other paper products.

According to the available statistics, the production of pulp, paper and paper products in the FBiH in the period from 2005 to 2007 corresponded with the figures presented in Table 4.20.

Table 4.20 Production of pulp, paper and paper products

	Unit of measure	2005	2006	2007	2007/06 %
Paper and cardboard	t	38,390	57,164	68,686	120.15
Corrugated cardboard and paper packaging	t	9,467	11,987	7,804	65.10

Proportion of the sector of production of pulp, paper and paper products in the structure of industrial production of the FBiH in 2007 amounted to 1.83%, as shown in Figure 4.20 for the period 2005-2007. The structure of industrial production of the FBiH in 2005 was calculated using the share of added value and in 2006 and 2007 it was calculated using annual indexes of industrial production.

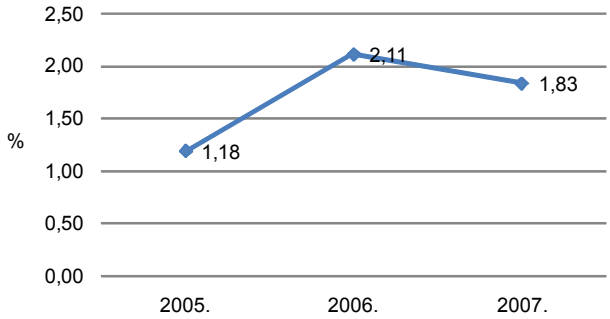


Figure 4.20 Proportion of the sector of production of pulp, paper and paper products in the structure of industrial production of the FBiH

Total exports of this sector in 2006 amounts to: 29,547,000.00 KM, and in 2007 35,688,000.00 KM which makes an increase of 20.78% in relation to 2006. Exports of this sector in 2007 makes 0.86% of total exports in the FBiH in the same year.

Total imports of this sector in 2006 amounts to: 154,302,000.00 KM, and in 2007 182,818,000.00 KM. Growth of imports in 2007 compared with 2006 amounts to 18.48%. Imports of this sector in 2007 make 1.85% of total imports of the FBiH in the same year.

Sector of production of pulp, paper and paper products in the FBiH makes trade deficit with foreign countries, as can be concluded from Figure 4.21.

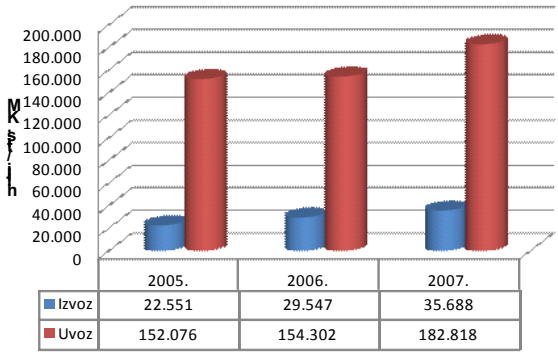


Figure 4.21 Exports and imports of the sector of production of pulp, paper and paper products in the FBiH

According to available data for 2005, 2006 and 2007 (Table 4.21), out of basic raw materials and materials that are used in pulp and paper industry, the largest imports are made for kraft paper (about 94% of requirements in 2007) and paper and cardboard (about 57% of requirements in 2007). Significant share of imported waste paper and cardboard makes about 19% of requirements.

Table 4.21 Consumption of basic raw materials and materials in the production sector of pulp, paper and paper products

	2005		2006		2007	
	total	from import	total	from import	total	from import
Kraft paper, t	1,160	1,160	3,504	3,504	2,345	2,207
Paper and cardboard, t	1,501	941	3,361	2,284	2,993	1,728
Scrap, waste paper and cardboard, t	50,799	35,038	86,200	24,772	121,376	22,902

Number of employees in the sector of production of pulp, paper and paper products in 2007 was 1256, which makes 1.48% of employees in processing industry of the FBiH.

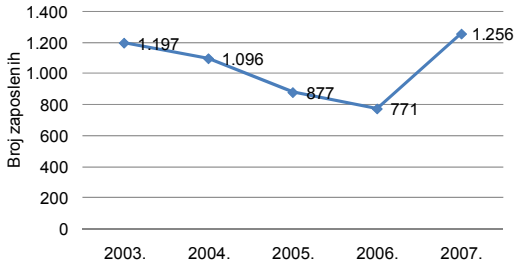


Figure 4.22 Number of employees in the sector of production of pulp, paper and paper products in the FBiH

Qualification structure of employees in the sector of production of pulp, paper and paper products in the FBiH is shown in histogram in Figure 4.23.

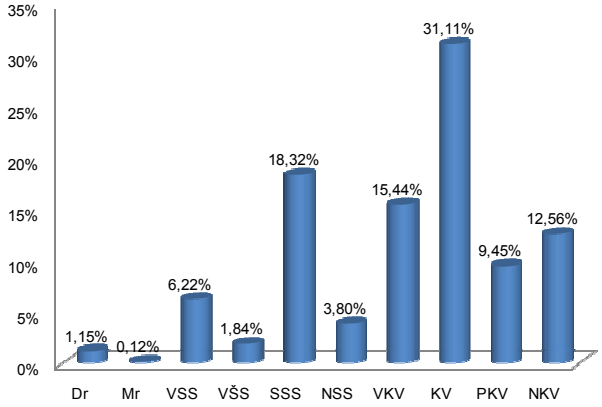


Figure 4.23 Employment by degree of professional education

4.2.1.2.3 Survey Data

In order to obtain answers to the raised questions a unique questionnaire was created for all sectors. The questionnaire was disseminated to 5 companies, and the completed questionnaires were returned by four companies.

List of surveyed companies:

1. NATRON-HAYAT doo - Maglaj
2. VIOLETA doo – Tomislavgrad
3. GRAFOPAK doo – Gračanica
4. POLET dd – Sarajevo

Sample questionnaire was completed by:

- a company with over 500 employees (Natron-Hayat - 888 employees),
- a company with 301-500 employees (Violeta – 347 employees),
- a company with 101-300 employees (Polet -101 employees),
- a company with up to 100 employees (Grafopak – 70 employees).

- **Business activity analysis of surveyed companies**

The analysis of the four companies includes 1406 employees. The total income of the surveyed companies in 2006 amounted to 195,912,606.30 KM, and in 2007 199,976,468.70 KM. Total exports of the surveyed companies in 2006 amounted to 37,165,939.52 KM, and in 2007 38,916,691.71 KM. Total import relates to three companies and in 2006 it amounts to 12,807,723.22 KM, and in 2007 16.629.838.17 KM.

It should be noted that some of the data obtained by the survey, which was presented previously, collide with the statistics given in Section 4.2.1.2.2. The reason for this lies in the fact that the surveyed companies are classified according to their business activity in various fields of classification of business activity in BiH.

Absolute indicators from the questionnaire were converted to relative indicators that allow comparison with other sectors.

Total income, exports and profit per employee for the surveyed companies is illustrated in Table 4.22.

Table 4.22 Total income, export and profit per employee

2007				
Company		Total revenue per employee in KM	Net exports per employee in KM	Profit per employee in KM
1	Natron-Hayat – Maglaj	40,478.70	5,795.68	-3,196.72
2	Violeta - Tomislavgrad	435,952.42	-	-
3	Grafopak – Gračanica	32,612.66	3,712.14	-4,251.28
4	Polet - Sarajevo	104,277.00	-19,507.29	682.88

Calculated values of net assets per employee in 2006 and 2007 and the plan for 2008 are illustrated in Table 4.23.

Table 4.23 Value of net assets per employee

VALUE OF NET ASSETS PER EMPLOYEE IN KM				
Company		2006	2007	2008
1	Natron-Hayat – Maglaj	58,448.67	143,617.24	155,978.01
2	Violeta - Tomislavgrad	-	-	-
3	Grafopak – Gračanica	42,045.21	39,379.83	41,914.16
4	Polet - Sarajevo	-	-	-

Based on Table 4.23 it is possible to give estimates of the value of technical equipment of the job. Value of the job in 2007 ranged from 143,617.24 KM (Natron-Hayat) to 39,379.83 KM (Grafopak). Differences in value of the job primarily depend on a particular type of production, degree of automation and the achieved degree of restructuring.

When the indicators in table 4.22 are divided with the value of net assets per employee (Table 4.23), the obtained result are three indicators used for assessment of business performance of the company (Table 4.24).

Table 4.24 Indicators for assessment of business performance of the company

income/assets			exports/assets		profit/assets	
1	Natron-Hayat – Maglaj	0.28	Natron-Hayat – Maglaj	0.04	Natron-Hayat – Maglaj	-0.02
2	Violeta - Tomislavgrad	-	Violeta - Tomislavgrad	-	Violeta - Tomislavgrad	-
3	Grafopak – Gračanica	0.82	Grafopak – Gračanica	0.09	Grafopak – Gračanica	-0.10
4	Polet - Sarajevo	-	Polet - Sarajevo	-	Polet - Sarajevo	-

- **Cross section of production programs**

Based on data from questionnaires, overview of the situation during the visits and the available statistical data on the state of production programs, it can be concluded

that the structure and range of products of pulp and paper industry are diverse and partly based on the existing raw material, Table 4.25.

The backbone of this industry consists of the following products:

- pulp,
- paper (packaging, MG, clupak, kraft, kraftliner, processed),
- corrugated cardboard;
- sacks, bags, shopping and filter bags,
- packaging (cardboard, trade and the one made of complex materials);
- paper for household, hygiene and toilet needs;

Table 4.25 Production program

Company		Production program	Projected capacity	Utilization %
1	Natron-Hayat – Maglaj (activated capacity)	pulp	28,800 t	34.2
		packaging paper	40,000 t	95.8
		MG paper	9,000 t	8.9
		clupak, kraft, kraftliner paper	26,490 t	34.5
		sacks	6,320 t	26.3
		bags	2,500 t	0.49
		shopping bags	400 t	18.3
		corrugated cardboard	30,000 t	60.6
		cardboard packaging	15,000 t	21.3
		processed paper	4,000 t	58.3
2	Violeta -Tomislavgrad	toilet paper	75 palettes/24 h	80
		wipers	70 palettes/24 h	80
		moist napkins	20 palettes/24 h	80
		dry napkins	5 palettes/24 h	80
		napkins	5 palettes/24 h	80
		plain towels	5 palettes/24 h	80
		daily towels	3 palettes/24 h	80
		diapers	25 palettes/24 h	80
3	Grafopak –Gračanica	bags with square bottom for processing industry	11,000,000 pieces	70
		filter bags for vacuum cleaners	360,000 pieces	80
		shopping bags with square bottom and outer machine handle (export)	48,000,000 pieces	62
4	Polet - Sarajevo	-	-	-

Utilization of production capacities and organization of work for the surveyed companies are illustrated in Table 4.26.

Table 4.26 Utilization of production capacities and organization of work

Company		Utilization of production capacities %	Organization of work (shift)
1	Natron-Hayat – Maglaj	44.9	3
2	Violeta - Tomislavgrad	80.0	2 (3)
3	Grafopak – Gračanica	70,.0	3
4	Polet - Sarajevo	60-80%	2

Placement of final products is shown in Table 4.27.

Table 4.27 Placement of final products

Company		Placement of final products		
		Domestic market	Foreign market outside of the EU	EU market
1	Natron-Hayat – Maglaj	36.87%	47.23%	15.90%
2	Violeta - Tomislavgrad	-	-	-
3	Grafopak – Gračanica	44%	-	56%
4	Polet - Sarajevo	95%	5%	-

Information on procurement of raw materials and intermediate goods is illustrated in Table 4.28.

Table 4.28 Supply of raw materials and intermediate goods

Company		Supply of raw materials and intermediate goods	
		Domestic market	Import
1	Natron-Hayat – Maglaj	- pulpwood - coal - waste paper	- waste paper - glue and paint
2	Violeta - Tomislavgrad	5%	95%
3	Grafopak – Gračanica	- brown kraft paper - glue and paint - boxes and foil	- white kraft paper - recycled brown paper
4	Polet - Sarajevo	1.5 million KM	100,000 KM

- **State of technology and technological systems**

Technology assessment in relation to competing firms in the region (EU countries) and the status of equipment of surveyed companies are illustrated in Table 4.29.

Table 4.29 Assessment of technology and equipment

Company		State of technology	State of equipment
1	Natron-Hayat – Maglaj	modernized	-
2	Violeta - Tomislavgrad	new	modernized
3	Grafopak – Gračanica	obsolete	old
4	Polet - Sarajevo	new; obsolete	old; new

ISO standard was introduced by one company and none of the companies possessed the CE sign of the product.

- **Possibility of modernization and revitalization of Technology**

Indicators to consider the possibility of revitalization and modernization of technology in the pulp and paper industry were obtained from responses to questions in the questionnaire.

Investment in revitalization and modernization of technology is shown in Table 4.30.

Table 4.30 Investment in revitalization and modernization of technology

Company		Investment in new technologies	Investment in environment protection	Technology development plan	Necessary funds for modernization of equipment
1	Natron-Hayat – Maglaj	130,000,000.00 KM	17,000,000.00 KM	- independently - in cooperation with higher education institutions	20,000,000 Euros
2	Violeta - Tomislavgrad	50,000,000.00 KM	200,000.00 KM	- independently	-
3	Grafopak – Gračanica	-	-	- independently	120,000.00 KM
4	Polet - Sarajevo	-	-	- independently - in cooperation with higher education institutions	-

Responses to the question whether there is a company's strategy and development function in the organizational structure of the company, as illustrated in Table 4.31.

Table 4.31 Company strategy and research and development sector

Company		Is there a short-term or long-term strategy	Does a research and development sector exist
1	Natron-Hayat – Maglaj	YES	NO
2	Violeta - Tomislavgrad	YES	YES
3	Grafopak – Gračanica	YES	NO
4	Polet - Sarajevo	-	-

Data on participation of highly professional personnel and the need for highly qualified personnel that is lacking is illustrated in Table 4.32.

Table 4.32 Participation of highly professional personnel and the need for highly qualified personnel that is lacking

Company		Participation of highly qualified personnel (PhD, MA, graduated, two year of higher education) u %	Qualified personnel needed for a faster company development	
			Qualification	number
1	Natron-Hayat – Maglaj	8.67	- electrical engineers - electro-energetic engineers - mechanical engineers	-
2	Violeta - Tomislavgrad	5.76	-	-
3	Grafopak – Gračanica	2.86	-	-
4	Polet - Sarajevo	9.99	- BSc. Mech. Eng. - BSc. Econ.	2 1

4.2.1.2.4 Basic Characteristics of the Situation of Pulp and Paper Industry in the FBiH

As a result of real circumstances and limitations, basic characteristics of the state of pulp and paper industry in the FBiH are as follows:

1. high proportion of raw material for processing from local natural resources;

2. hampered delivery of pulpwood by forest industrial companies;
3. insufficient use of resources in the form of waste paper and sawmill waste and pulp chopped straw from the plant for primary wood processing;
4. permanent export orientation of pulp and paper industry due to the limited domestic market;
5. trade deficit with foreign countries;
6. establishment of brands in pulp and paper industry of the FBiH (Violeta, Natron-Hayat);
7. tendency to broaden the assortment of products;
8. high value of individual investments in production facilities and per employee;
9. significant investments in technological development (launching of integrated production in the company Natron-Hayat);
10. significant investments in order to adjust with obligatory standards for the protection of environment (ecological risk activity);
11. need to establish a laboratory for certifying products according to EN standards;
12. non-application of ISO standards and CE marking;
13. need to create research and development centers;
14. there is no development strategy.

4.2.2 Internal and External Constraints (SWOT Analysis)

The achieved results in the sector of pulp and paper industry are reflected through its comparative advantages (large proportion of domestic raw materials, existing capacities etc.) but also through the realization of domestic and foreign investment in new and existing capacities. It is obvious that comparative advantages are not sufficient for further survival and development. Hence the need to boost it's competitive and export possibilities. On the other hand, globalization, technological development, changes in the financial sector, and other fundamental changes impose a need to define development strategies for this sector as well.

SWOT analysis is an analytical method for obtaining an objective assessment of one's own possibility on the level of a company and/or a sector, and of one's own restrictions that a company or sector is facing. This analysis, as one of the most important segments of each strategy, means to determine internal strengths and weaknesses and external opportunities and threats for a company or a sector in order to position itself in the global market (Table 4.33 and 4.34).

Table 4.33 Internal analysis –Strengths and Weaknesses (W) Profile

Strengths (S)	Weaknesses(W)
Geographical position	Capital structure
Infrastructure	Problems with sales
Industrial tradition in the region	Production costs
Installed capacities	Lack of market information
Assortment of production program	Financial performance

Table 4.34 External analysis – Opportunities (O) and Threats (T) Profile

Opportunities (O)	Threats (T)
Organization of the company	Supply of basic raw materials
Use of capacities	Ecological requirements
Product quality of the competition	Foreign market competition
Labor market	Expensive financial means
Market expansion	Influence of trade associations

4.2.3 Possible Strategic and Development Goals

Based on the implemented analysis, the strategic objective of this sector is to maintain the trend of recovery and to position itself as an important branch of manufacturing industries in the FBiH through a balanced and sustainable development. The strategic and development goal of pulp and paper industry can also be defined on the basis of specific strategic objectives:

- directing the development towards reconstruction and modernization of existing capacities for processing of pulp and production of paper packaging and kraft paper,
- specialization of production in order to reduce costs,
- technological processes in pulp and paper factories have to serve the environment according to the EU norms,
- increasing the participation of products in domestic and foreign markets,
- increasing competitiveness in the market,
- increasing productivity and employment in pulp and paper industry.

Measures needed to provide conditions for faster and better quality development of pulp and paper industry would be the following:

- improving business relations between the forestry and companies engaged in pulp production,
- improving business relations between wood industry companies and pulp industry companies,
- developing the system for collecting and recycling waste paper and packaging,
- exports and employment incentives,

- definition of incentives for large companies,
- systemic resolving of internal debt in BiH,
- company promotion,
- quality control,
- personnel and education.

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