3. Analysis of Industry and Industrial Production Structure in FBiH for Metal and Electro Sector

3.0 Introduction

The basic goal of analysis of metal and electro industry is obtaining relevant data based on which it is possible to determine strategic and developmental goals in order to ensure a faster development in this sector over the coming period.

Metal industry had a key role in the industry and economy of BiH until 1990. The metal sector (metal industry, metallurgy and primary metal processing) constituted 30.1% of the social product of the overall industry in 1989. This industry had medium level technological development at that time and a certain number of products that were recognizable and competitive in the global market. The pillars of the overall technological development were then big production systems: ''Energoinvest'', ''Soko'', ''Unis'', ''RMK'', ''ZRAK'', ''Jelšingrad'', ''R. Čajavac'', ''Famos'', ''BNT'', ''IAT'' etc.

Such big systems were the pillars of their own development but also of the technological development of small companies that were their partners.

The structure of technology level in the metal and electro industry of the 1990ies was as follows:

- High technology processing branches had approximately 10% of companies,
- Medium level technology processing branches had approximately 20% of companies, and
- Lower technology processing branches had approximately 70% of companies.

At the same time the structure of technology level in European countries was as follows: high technology approximately 20%, medium level technology approximately 40% and lower technology approximately 40%.

The five-year halt in the production, caused by the war, and then slow participation in the production and market trends due to a lack of energy, supplies, market and damage of production equipment has left deep negative traces on the level of technology and processing procedures.

Today, after the disappearance of large production systems, which were pillars of development, the situation has become much worse, which may partly be seen based on the following:

- There are no significant pillars of technological development and no transfer of applied technological knowledge,
- There are no technological and development institutes, no research and development centers that were located in big production systems,
- There are no recognizable products that would mean something in the global market, except few exceptions.

The modern metal industry is facing numerous problems, demands of a dynamic market, which requires the resolution of technical and technological problems in the product development phase. The basic problems of modern production are as follows:

- Replacement of large series production with small series production,
- Development of new technologies more and more asks for high expertise and expert knowledge,
- Environmental requirements make the production face: new expenses for control, decrease in waste, waste recycling, etc.,
- Buyers increasingly demand the following from products: good design, durability, reliability and acceptable prices,
- The market is increasingly unstable and this frequently includes dumping prices.

As a result of this, the ability of the metal industry is determined by the possibility to accept, adopt and apply new technological and market challenges resulting from the new production and market philosophy.

3.0.1 Overview of Previous Research on the State of the Metal and Electro Industry

For the purpose of foreign direct investments three significant studies on the production, metal processing and electro industry in BiH were conducted so far.

The first study was conducted by GOPA – a consultant firm from Germany, and it was entitled ''Development Study for Metal Processing, Mechanical Engineering and Electrotechnics''. This study makes part of a wider development study of sectors in BiH that have a potential. The study was published in September 2001, and it was financed by GTZ (German Agency for Technical Assistance).

The second study entitled ''Initiative for Cluster Competitiveness'' was published in 2002, and it was financed by USAID (US Agency for International Development).

Since both studies were conducted immediately after the war, it was realistic to expect the poor condition of the metal sector that was observed. Both studies aimed at attracting potential foreign investors to direct investments in industry of BiH based on the newly adopted Law on Direct Foreign Investment Policy of BiH, published at the end of 1998.

The third study entitled ''Development of Export Potentials and Competitiveness of the Metal Sector of Bosnia and Herzegovina'' [9], published in 2006, was financed by US Agency for International Development (USAID) and the technical assistance of the Urban Institute from Washington, on the one hand, and the Economic Institute of Sarajevo, the implementer of the study project, on the other hand.

According to the controller, this study was conducted correctly and very professionally, and it may serve as an example for future studies that will be conducted as overviews, analyses and development concepts of any sector of economy in BiH. Particular value of this study is the overview of the achieved results in production and export of the metal sector of BiH in the period 2002-2005. The overview and analysis of successfulness of business performance were conducted based on data gathered in interviews in 23 leading companies of the metal sector of BiH, whereby 15 companies were from FBiH, and 8 companies from RS.

3.0.2 Global Development Trend of the Metal and Electro Industry

The metal industry has an important position in the structure of the industry and economy of any industrially developed country. The most developed countries have a high percentage of metal processing industry in the overall economic structure of the country, especially in the export structure, which is evident based on the data that Japan exports 60-66% of the metal processing industry as compared to the overall export, USA 40%, EEC countries around 30%. The metal industry includes: the metal processing industry, mechanical industry, car industry, production of electrical machinery and naval industry. Mechanical industry and production of cars are central branches and the most important products in the economic structure of any technologically developed country. This industry produces capital goods for the production processes in all areas of production and services. The metal industry has a very significant role in the modernization of production in other economic sectors: agriculture, construction, transport, textile industry, paper and cellulose industry, wood processing, mining, food industry, energy sector, etc. and in the improvement of export structure towards more finalized products. The most sophisticated processing forms are present in case of products from the mechanical industry, where the technical and technological level of these products (CNC processing systems), flexible production systems (FPS), tools, intelligent production systems) have a direct impact on the technological development of the whole industry. The global exchange of technological knowledge is transferred through the sale of production equipment, since every product, and in particular the today's CNC and intelligent machinery bring part of ''built in'' knowledge.

Machine industry as the most propulsive branch of metal industry includes a wide assortment of products: machinery for wood and metal processing, construction and mining machines and tools, energy sector machines and tools, agricultural machinery, processing industry machinery and devices, food and textile industry machinery,

transport mechanization machinery, pumps, compressors, special industry machinery, measurement and control instruments and devices for automatization and steering, etc.

With the spreading of science, new production technologies, new materials, IT (CAD - Computer Aided Design, CAM - Computer Aided Manufacturing, CAPP/CIM - Computer Aided Process Planning / Computer Integrated Manufacturing), automatization and intelligent processing systems in the immediate production, a new production philosophy starts, which opens up new possibilities, sets new requirements and develops new relationships in production, market and communication.

The modern production is based on:

- A dynamic global market (turbulent, wide assortment, high quality, low product prices, short delivery times),
- Flexible production, production without scrap, production without losses, continuous rationalization and revitalization,
- New production philosophy (implementation of new technologies, new materials, work productivity improvement, product quality improvement, decrease in costs, non-cost principle in product pricing according to which the price is constant, and profit is achieved by reducing production costs),
- JUST–IN–TIME production, which is achieved neither before nor after a certain time (''just in time''), both in operations between companies and internally, including minimum or no stocks.

The global distribution of jobs in the metal and electro industry is characterized by the transfer of ferrous and non-ferrous metallurgy and primary steel processing from the west to the east. The basic reason for the transfer is considerably cheaper labor force and large quantities of energy necessary for this industry.

The western countries kept: the institutes, development centers special purpose research units, quality control, development of new technologies, new products, assembly and marketing.

3.0.3 Analysis of Business Performance of Surveyed Companies in 2006 and 2007

The project design of this study for the metal and electro industry, in addition to an analysis of results achieved in production, also provides for an analysis of:

- The state of production programs,
- The state of technology and technological systems,
- Possibilities of revitalization and technology modernization,
- Internal and external constraints.

Based on the above mentioned, we should define strategic and development goals for this sector. Since there are no data on the mentioned issues at the Federal Statistics Agency, a single questionnaire for all sectors was made. This questionnaire was delivered

to 40 companies in FBiH. The questionnaires were submitted personally to the management of companies, so that the team members, in addition to interviews with the management, also controlled: the equipment, technology and production.

The questionnaire was structured in such a way to include the following in 81 questions:

- Financial indicators for 2006, 2007 and the 2008 plan,
- Data on staff,
- Production program,
- State of technology,
- State of production,
- Investments into research and development,
- Economic policy measures,
- Qualification structure of employees, and
- Foreign investments and development incentive system.

The questionnaire was fully filled by 33 companies, 4 companies gave partial answers to the questions in the questionnaire, and 3 companies did not answer. The term ''processed companies'' hereinafter refers to 33 companies, and the term ''surveyed companies'' to 37 companies.

For the purpose of easier analysis of the existing technologies and technological systems in the surveyed companies, the metal sector was divided into:

- Aluminum industry,
- Car industry,
- Metal processing industry,
- Metallurgy and
- Tool industry.

The list of processed companies from the metal and electro industry is as follows:

Aluminum industry:

1. ALUMINIJ – Mostar
2. FEAL – Široki Brijeg
3. FE – AL - Mostar
4. ALLOY WHEELS - Jajce

Car industry:

1. PS CIMOS „TMD Ai" – Gradačac
2. MANN HUMEL BA – Tešanj
3. FAD – Tešanj, Jelah
4. ENKER – Tešanj
5. POBJEDA – Tešanj
6. STROLIT – Odžak
7. GRAEWE TADIV – Konjic
8. SOKO TVORNICA TRANSMISIJA - Mostar

Metal processing industry:

1. KOVINA – Visoko

2. RUDSTROJ – Kakanj
3. ŽICA – Sarajevo
4. UNIKLIMA – Sarajevo
5. PETROLINVEST – Sarajevo
6. REMONTMONTAŽA – Tuzla
7. TGA – Stolac
8. LIVNICA ČELIKA – Tuzla
9. TTU - Tuzla
10. METALNO - Zenica

Metallurgy:

1. ARCELOR MITTAL – Zenica
2. ŽELJEZARA - Ilijaš

Tool industry:

1. TVORNICA ALATA – Goražde
2. HELIOPLAST – Gračanica
3. UNIS PRETIS – Vogošća
4. ALAT - Konjic

Electro industry:

1. ENERGOINVEST – Sarajevo
2. ELEKTROREMONT – Banovići
3. ELIR „NIKOLA TESLA" – Tuzla
4. BIRA - Bihać
5. KAPIS - Tomislavgrad

The survey sample includes:

- Five companies with more than 500 employees, or a total of 7857 employees,
- Seven companies with 300-500 of employees, or a total of 2672 employees,
- 16 companies with the size of 101-300 employees, or a total of 2614 employees and
- Nine companies with up to 100 employees, or a total of 529 employees.

Table 3.1 Classification of companies based on employee number

Ord. No.	Name	Total number of employees			
		Up to 100	101 - 300	301 - 500	More than 501
1.	PS CIMOS „TMD Ai“ Gradačac			412	
2.	„MANN + HUMEL BA“ Tešanj			417	
3.	„FAD“ d.d. Tešanj, Jelah		109		
4.	„ENKER“ d.d. Tešanj			333	
5.	Prevent Sarajevo d.o.o. Visoko				1.738
6.	Pobjeda d.d. Tešanj		266		
7.	Kovina d.d. Visoko		130		
8.	Strolit d.o.o. Odžak		114		
9.	Alat Konjic	42			
10.	Metalno d.d. Zenica			399	
11.	„Rudstroj“ Kakanj		269		
12.	„Žica“ d.d. Sarajevo		224		
13.	Uniklima d.d. Sarajevo		107		
14.	Unis Pretis d.o.o Vogošća	67			
15.	„Tvornica alata“ Goražde		130		
16.	Helioplast d.o.o. Gračanica	70			
17.	Elektrokontakt d.o.o. Vareš	29			
18.	„Arcelor Mital“ d.o.o. Zenica				3.369
19.	„Željezara“ Ilijaš		161		
20.	UNITIC Sarajevo	74			
21.	Petrolinvest Sarajevo	80			
22.	Energoinvest – Sarajevo				883
23.	Aluminij – Mostar				922
24.	Feal – Široki Brijeg			339	
25.	FE-AL Mostar	43			
26.	Alloy Wheels Jajce		135		
27.	Elektroremont Banovići		127		
28.	Elir Tuzla	86			
29.	Bira Bihać			401	
30.	Remontmontaža Tuzla				675
31.	Livnica čelika Tuzla		189		
32.	TTU Tuzla			371	
33.	Soko Transmisije Mostar	38			
34.	Graewe Tadiv Konjic		181		
35.	Kapis Tomislavgrad		218		
36.	TRD Vareš		152		
37.	TGA- Stolac		102		

There are 13.402 employees in the mentioned 37 companies.

In order to render possible a comparison of the surveyed companies, the absolute indicators from the questionnaire were turned into relative indicators. Based on the relative indicators, it is possible to compare all sectors in this project.

The total income of the surveyed companies in 2006 amounted to: 1.752.975.686 KM, and in 2007 to: 2.097.715.499 KM, which constitutes more than 75% of the achieved income of the metal and electro sector. Based on the mentioned data it is visible that the total income of surveyed companies in 2007 is by 19,6 % higher than in 2006. The total income per employee for the first ten companies from the list is shown in table 3.2.

Table 3.2 Total income per employee for the first ten companies from the list

TOTAL INCOME PER EMPLOYEE IN KM		
Rank	**Company**	**2007**
1	Aluminij Mostar	672.156
2	TMD-Ai Gradačac	423.388
3	Energoinvest Sarajevo	370.909
4	Kapis Tomislavgrad	364.357
5	Feal Široki Brijeg	284.413
6	Alloy Wheels Jajce	193.540
7	Mittal Zenica	171.488
8	Žica Sarajevo	143.659
9	Helioplast Gračanica	110.327
10	Mann Hummel Tešanj	84.573

Picture 3.1 shows the share of the analyzed industrial branches of the metal and electro sector in the overall income for 2006 and 2007. The total income of the aluminum industry in 2007 amounted to 762.272.902 KM, metallurgy to 583.453.490 KM, car industry to 253.046.399 KM, metal processing industry to 123.138.285 KM and tool industry to 14.715.371 KM. The total income of the metal sector in 2007 amounted to 1.736.626.447 KM, and the electro sector 361.089.052 KM.

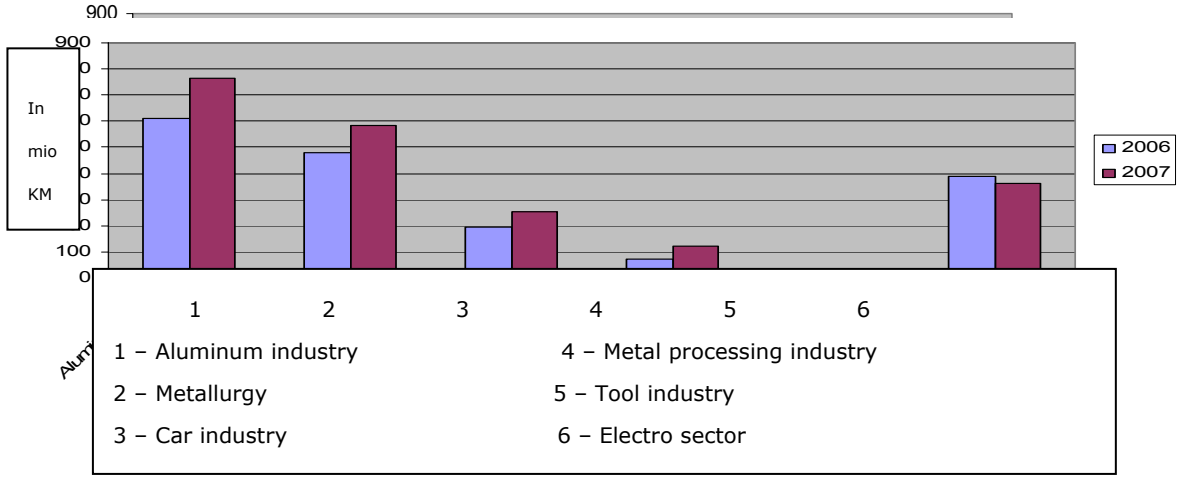


Figure 3.1 Share of industrial branches in the overall income of the metal and electro sector

Figure 3.2 shows the percentage share of individual branches of metal and electro industry in the overall income in 2007. The biggest share in the total income for both years is that of the aluminum industry with 36,3%, followed by metallurgy with 27,8%, electro industry with 17,4%, car industry with 12,1%, metal processing industry with 5,8%, and the least share is that of the tool industry, namely 0,6%.

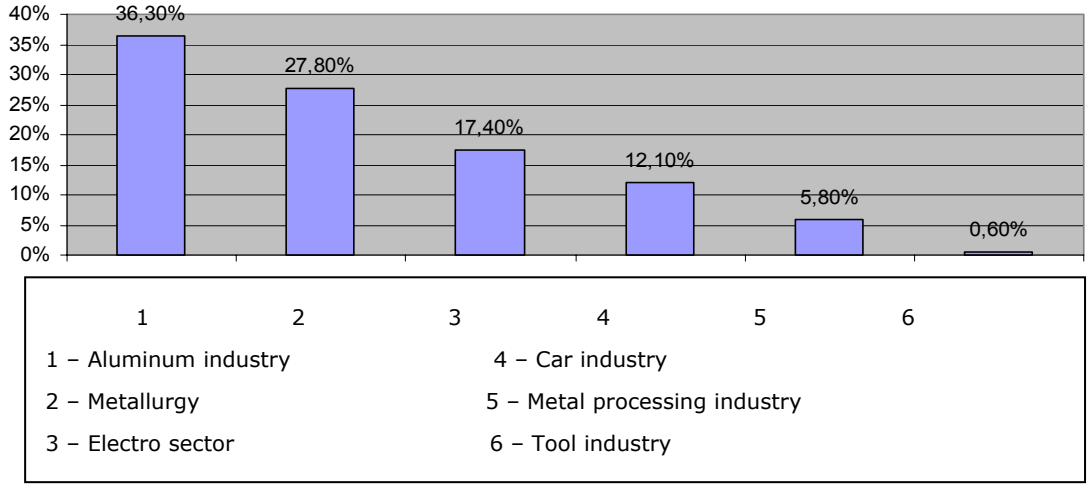


Figure 3.2 Percentage share of industrial branches in the total income of the metal and electro industry in 2007

The total export of the metal and electro sector in 2006 amounted to: 1.183.628.411 KM, and in 2007 to: 1.389.719.298 KM.

The total export of this sector in 2006 participates in the total export of FBiH for the same year with 33,4%.

The share of some industrial branches in the total export in 2006 and 2007 is shown in figure 3.3.

In 2007, the total export of the aluminum industry amounted to 575.977.548 KM, metallurgy to 366.321.092 KM, car industry to 242.139.954 KM, metal processing

industry to 39.288.698 KM, tool industry to 861.485 KM, and electro sector to 165.130.521 KM.

The growth of the total export in 2007 as compared to 2006 amounts to 17,4%. Table 3.3 includes data on net export per employee for the first ten companies from the list in 2007.

The percentage share of industrial branches in the total export is shown in figure 3.4.

The biggest individual exporter is Aluminij Mostar, and the biggest share in the total export of the metal and electro industry is that of the aluminum industry with 41,4%, followed by metallurgy with 26,3%, car industry with 17,4%, electro sector with 11,8%, metal processing industry with 2,8% and car industry with a slight participation in the export of 0,06%.

Table 3.3 Net export per employee in KM

NET EXPORT PER EMPLOYEE IN KM	
Company	**2007**
Aluminij Mostar	347.155
Alloy Wheels Jajce	180.630
Feal Široki Brijeg	138.242
Energoinvest Sarajevo	119.632
TMD-Ai Gradačac	95.847
Mittal Zenica	39.784
Pobjeda Tešanj	24.327
Graewe Tadiv Konjic	18.785
Metalno Zenica	13.427
Bira Bihać	10.149
Kapis Tomislavgrad	-34.041

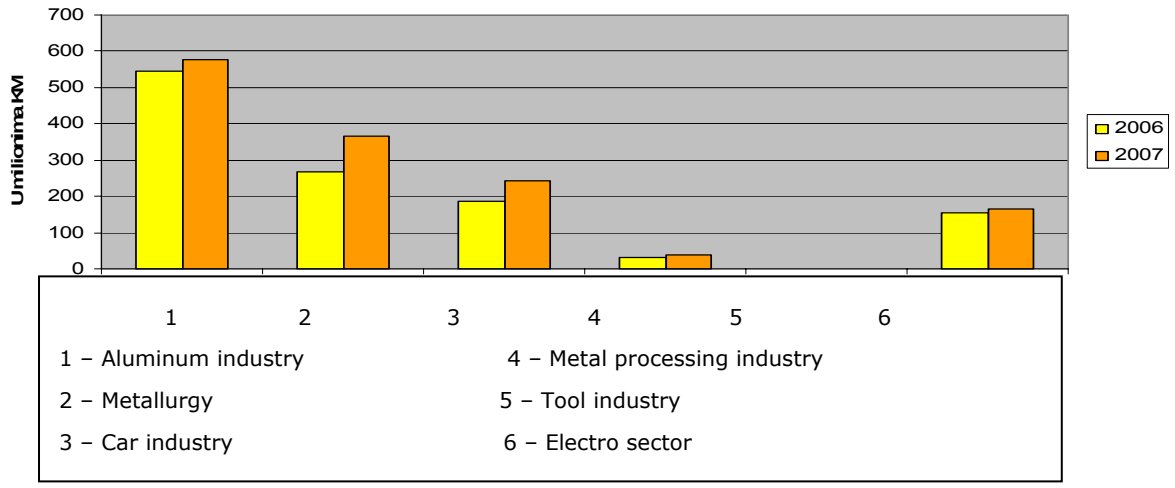
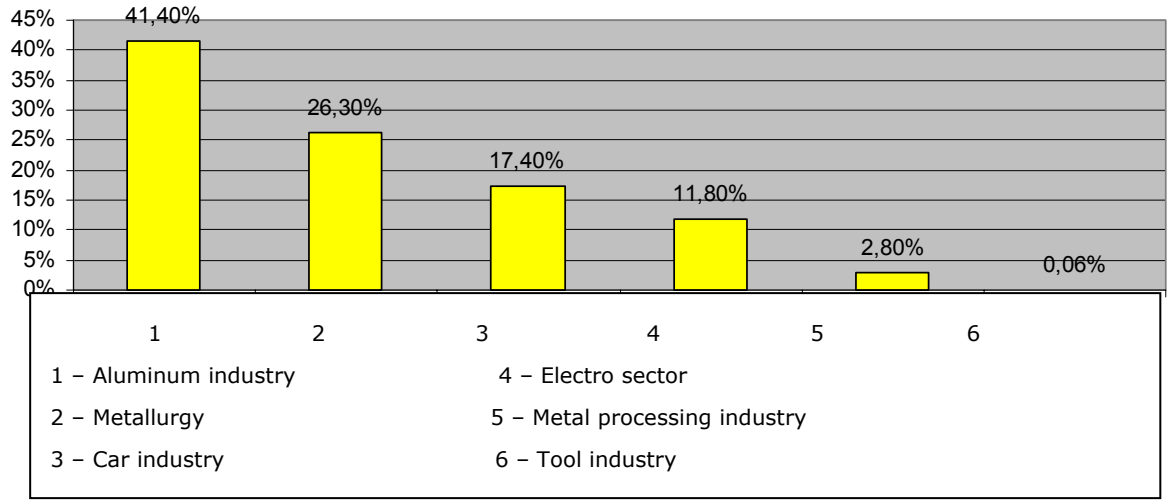


Figure 3.3 Share of industrial branches in the total export of the metal and elector sector in 2006 and 2007



Picture 3.4 Percentage share of industrial branches in the total export of the metal and electro sector in 2007

The total import for the needs of the metal and electro sector in 2006 amounted to: 695.973.639 KM, and in 2007 to 818.540.381 KM. The total import of this sector in 2006 represents 8,5% of the total import of FBiH in the same year. The increase in the total import in 2007 as compared to 2006 amounts to 17,6%. The total import of the metal and electro sector in 2006 and 2007 is graphically presented in picture 3.5. The biggest importer in 2007 was metallurgy with 230.526.999 KM, then electro industry with 186.812.064 KM, aluminum industry with 185.472.069 KM, car industry with 175.486.450 KM, metal processing industry with 35.262.282 KM and car industry with only 4.844.208 KM.

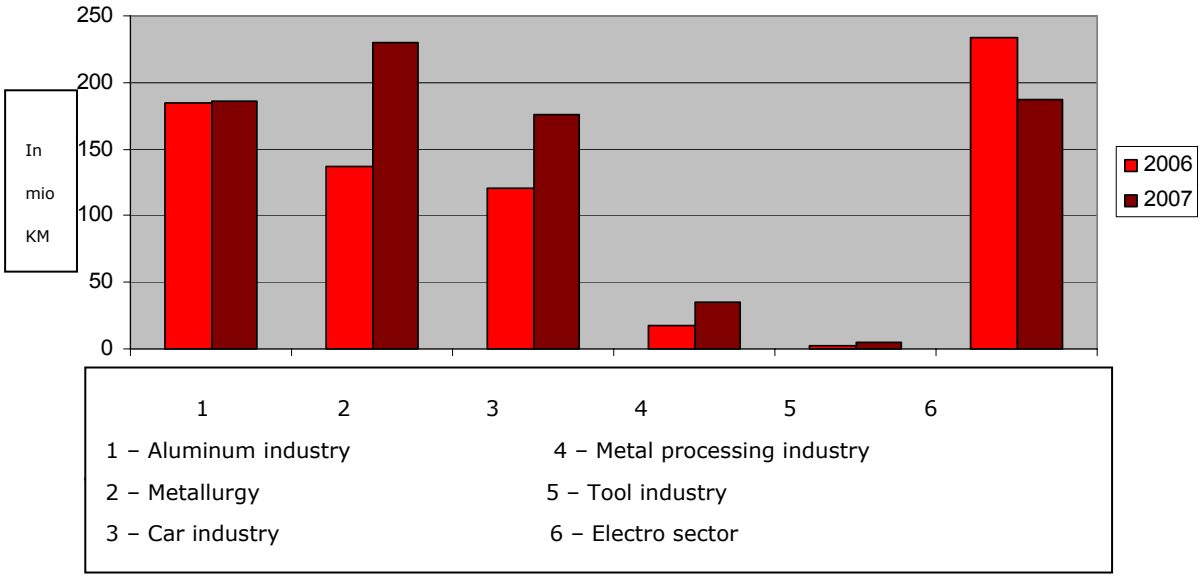


Figure 3.5 Share of industrial branches in the total export of the metal and electro sector in 2006 and 2007

Percentage share of individual industries in the total import in 2007 is shown in 3.6.

The biggest importer is the metallurgy with 28,2% of share in the total export, then electro sector with 23%, aluminum industry with 22,6%, car industry with 21,3%, metal processing industry with 4,2% and car industry with 0,5%.

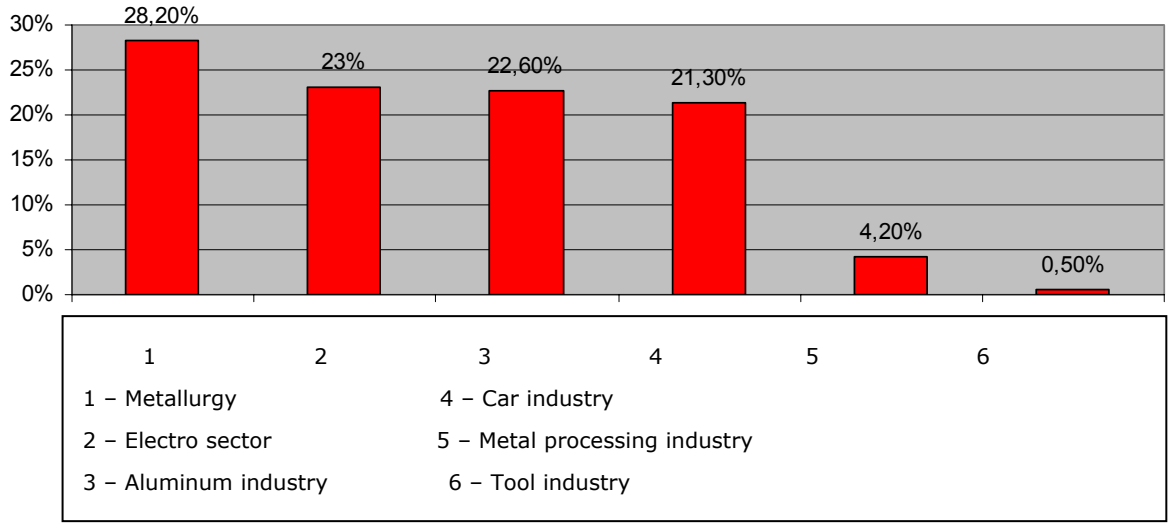


Figure 3.6 Percentage share of industrial branches in the total import of the metal and electro sector in 2007

Sale of final products of the mentioned production programs (tables 3.9-3.14) in the domestic, foreign non-EU and EU market for metal and electro industry is shown in table 3.4.

Table 3.4 Sale of final products

SECTOR	SALE OF FINAL PRODUCTS		
	Domestic market	Foreign non-EU market	EU market
METAL INDUSTRY			
Car industry	6,6 %	14%	**79,4%**
Metal processing industry	44,3%	17,6%	**38,1%**
Metallurgy	31%	22,5%	**46,5%**
Tool industry	85,2%	0	**14,8%**
Aluminum industry	38,9%	16,9%	**44,2%**
MEDIUM VALUE METAL INDUSTRY	**41,2%**	**14,2%**	**44,6%**
ELECTRO INDUSTRY	**55,6%**	**25,2%**	**19,2%**
MEDIUM VALUE (METAL+ELECTRO)	**48,4%**	**19,7%**	**31,9%**

The biggest exporter in the EU market is the car industry with 79,4% of its products, followed by metallurgy with 46,5% of its products, aluminum industry with 44,2% of its products.

The biggest sale of products in the domestic market is that of the tool industry 85,2%, electro industry with 55,6% and metal processing industry with 44,3% of its products.

Based on the processed financial indicators of the surveyed companies, table 3.5 shows data on the size of profit per employee in KM, for the ten most successful companies.

Table 3.5 Profit per employee in KM

PROFIT PER EMPLOYEE IN KM		
	Company	**2007**
1	Feal Široki Brijeg	53.804
2	Aluminij Mostar	27.880
3	Mittal Zenica	18.758
4	TMD-Ai Gradačac	17.887
5	Helioplast Gračanica	10.738
6	Kapis Tomislavgrad	8.336
7	Soko Transmisije Mostar	3.612
8	Metalno Zenica	2.476
9	Energoinvest Sarajevo	2.029
10	Pobjeda Tešanj	1.808

The calculated values of the net assets per employee in 2006 and 2007 and the 2008 plan are given in table 3.6.

Table 3.6 was the basis for an assessment of the value of technical equipment of a position.

The value of position in 2007 varies between 25.741 KM (Mann Hummel Tešanj) and 322.990 KM (Aluminij Mostar).

Differences in the value of position are primarily determined by the kind of production, level of automatization and reached level of restructuring.

By dividing the indicators from tables 3.2, 3.3 and 3.5 with the value of net assets per employee (table 3.6) three indicators for the assessment of successfulness of business performance of the company are obtained.

Table 3.6 Value of net assets per employee in KM

VALUE OF NET ASSETS PER EMPLOYEE IN KM				
	Company	**2006**	**2007**	**2008**
1	Aluminij Mostar	-	322.990	**-**
2	TMD-Ai Gradačac	64.649	72.681	**88.582**
3	Energoinvest Sarajevo	284.981	297.314	**304.747**
4	Feal Široki Brijeg	170.897	242.132	**375.939**
5	Žica Sarajevo	137.814	148.084	**174.806**
6	Mann Hummel Tešanj	21.963	25.741	**33.422**
7	Fad Jelah	105.536	107.211	**99.897**
8	Enker Tešanj	63.213	63.812	**-**
9	Pobjeda Tešanj	93.316	94.261	**97.250**
10	Uniklima Sarajevo	76.036	69.649	**43.659**
11	Petrolinvest Sarajevo	61.871	47.294	**49.375**
12	Metalno Zenica	65.635	72.688	**76.441**
13	Tvornica alata Goražde	26.694	26.323	**25.939**
14	Kapis Tomislavgrad	39.787	37.514	**41.284**

Based on these three indicators, the most successful surveyed companies in 2007 are:

1. TMD-Ai Gradačac
2. Aluminij Mostar
3. Feal Široki Brijeg
4. Kapis Tomislavgrad
5. Energoinvest Sarajevo
6. Mann Hummel Tešanj
7. Pobjeda Tešanj

TMD-Ai Gradačac achieved 5,83 KM of total income for every KM of assets value, Kapis Tomislavgrad 9,7 KM, Mann Hummel 3,29 KM, Aluminij Mostar 2,08, Energoinvest Sarajevo 1,25 KM, and Feal Široki Brijeg 1,17 KM.

In case of TMD-Ai, the achieved net export amounted to 1,32 KM for every KM of assets value, 1,07 KM Aluminij Mostar, Feal Široki Brijeg 0,57 KM, Energoinvest Sarajevo 0,40 KM, a Pobjeda Tešanj 0,26 KM.

The achieved profit on every KM of assets value amounted to 0,25 KM in case of TMD-Ai, 0,22 KM in case of Kapis Tomislavgrad, 0,22 KM in case of Feal Široki Brijeg, 8,6 in case of Aluminij Mostar and 0,67 KM in case of company Mann Hummel Tešanj.

Table 3.7 shows the average values of net and gross salaries in 2006 and 2007 by industrial branches. The average value of net salaries for the metal industry in 2007 amounted to 642,09 KM, and in electro industry 621,84 KM.

The table also includes the increase index for net and gross salaries in 2007 as compared to 2006. The average value of the index for the metal and electro sector amounts to 1,22 for net salaries and 1,18 for gross salaries.

Table 3.7 Average values of net and gross salaries

AVERAGE VALUES OF NET AND GROSS SALARIES IN KM				
SECTOR	**SALARY**	**2006**	**2007**	**2007/2006**
METAL INDUSTRY				
Aluminum industry	Net	1.152,53	1.229,9	**1,07**
	Gross	2.103,69	2.234,11	**1,06**
Metallurgy industry	Net	486,17	510,24	**1,05**
	Gross	784,05	832,46	**1,06**
Car industry	Net	420,91	505,17	**1,20**
	Gross	696,54	858,07	**1,23**
Tool industry	Net	331,87	496,81	**1,50**
	Gross	644,67	715,76	**1,11**
Metal processing industry	Net	380,68	468,22	**1,23**
	Gross	665,46	793,38	**1,19**
AVERAGE VALUE OF METAL INDUSTRY	**Net**	**554,43**	**642,09**	**1,21**
	Gross	**978,89**	**1.086,76**	**1,13**
ELEKTRO INDUSTRY	**Net**	**506,68**	**621,84**	**1,23**
	Gross	**836,07**	**1.024,30**	**1,23**
AVERAGE VALUE OF METAL+ELEKTRO	**Net**	**530,56**	**631,97**	**1,22**
	Gross	**907,48**	**1.055,53**	**1,18**

The average net salary in FBiH in 2007 amounted to 662 KM. The index of net salaries by industrial branches as compared to the average net salary in FBiH is given in table 3.8. The highest net salaries in 2007 had the employees in the aluminum industry with an index of 1,86 as compared to the average net salaries in FBiH. The lowest net salaries had the employees in the metal processing industry with an index of 0,71.

Table 3.8 Index of net salaries/average net salaries in FBiH

INDEX OF NET SALARIES / AVERAGE NET SALARIES IN FBIH FOR 2007	
INDUSTRY	**2007**
ALUMINIUM INDUSTRY	1,86
METALURGY	0,77
CAR INDUSTRY	0,76
TOOL INDUSTRY	0,75
METAL PROCESSING INDUSTRY	0,71
ELEKTRO	0,94

3.1 Overview of the State of Production Programs

The production program of the metal and electro sector in FBiH is classified based on the kinds of industries and presented in tables 3.9 - 3.14.

Table 3.9 Production program of the aluminum industry

A L U M I N I UM INDUSTRY				
Ord. No.	**Name of company**	**Production program**	**Projected capacity**	**Usage %**
1.	Aluminij d.d. Mostar	Baked anodes Primary aluminum in electrolysis Wire Ø9,5 mm Billets 15 kg Blocks	55.000 t 120.000 t 22.000 t 36.000 t 75.000 t	105% 102% 23% 35% 82%
2.	FEAL d.o.o Široki Brijeg	Aluminum profiles Surface protection - anodization Electrostatic coloring	12.000 t 8.000 t 10.000 t	70% 65% 70%
3.	FE-AL d.o.o Mostar	Aluminum profiles	12.000 t	70%
4.	Jajce Alloy Wheels	Aluminum tracks 13" - 22" of various design	600.000 pcs	85%

The production program of the aluminum industry consists of: the production of primary aluminum, its processing into profiles and aluminum tracks. The percentage of usage of projected capacities of electrolysis amounts to 102%, based on which it can be concluded that it is related to the top production.

The production program of the car industry is very specialized, which is visible based on the data provided in table 3.10.

The highest level of usage of the projected capacities is present in case of the company CIMOS ''TMD Ai'' Gradačac.

Table 3.10 Production program of the car industry

CAR INDUSTRY				
Ord. No.	**Name of company**	**Production program**	**Projected company**	**Usage %**
1.	PS CIMOS „TMD Ai" – Gradačac	Production of spare parts for motor vehicles and motors	46000 pcs/day	90%-98%
2.	MAN+HUMMEL BA d.d Tešanj	Production of vehicle filters	10.000.000 pcs	72%
3.	FAD d.d. Jelah - Tešanj	Brake disc Brake drum Hub Steering transmission parts	1.500.000 150.000 150.000 80.000	51,4% 14,3% 14,3% 20,0%
4.	ENKER d.d. Tešanj	Production of electrical equipment for motors and vehicles (sparkplugs)		
5.	Pobjeda d.d. Tešanj	Production of pumps and compressors	66.000 pcs/mth and 100 t/mth	70%-100%
6.	Strolit d.o.o. Odžak	Production of metal constructions and parts of constructions	300 t/mth	93%-95%
7.	Soko Tvornica transmisija Mostar	Universal joints Joint half-shafts	-	60% 50%
8.	Graewe Tadiv Konjic	Screws for the car industry M4-M24 mm	6.000 t	60%
9.	Krupa kabine Bosanska Krupa	Working machines booths, Agricultural machinery booths	-	100%

The metal processing industry has a various production program. Individual companies, such as Foundry Tuzla represent the only producer of steel castings in FBiH. Due to the unresolved privatization process and outdated equipment, the level of use of

projected capacities is only 17%. The production program of the metal processing industry is shown in table 3.11.

Table 3.11 Production program of the metal processing industry

METAL PROCESSING INDUSTRY				
Ord. No.	**Name of company**	**Production program**	**Projected capacity**	**Usage %**
1.	UNIS KOVINA d.d. Visoko	- Car superstructures, - Portable steel constructions, - Containers of various size	- 60 pcs/g - 4.200 ton/g - 1.200 pcs/g	- 15% - 15% 25%
2.	RUDSTROJ d.d. Kakanj	Production of machinery for mines, quarries and construction industry		80%
3.	„ŽICA“ D.D. Sarajevo	Production of drawn wire	160 ton	10%-75%
4.	UNIKLIMA d.d. Sarajevo	Production of air conditioning and ventilation devices, except for households	38.000 pcs	20%-70%
5.	PETROLINVEST d.d. Sarajevo	Design and construction of buildings		90%
6.	„Metalno“ d.d. Zenica	Production of metal constructions		Up to 80%
7.	DD „Tvornica rezervnih dijelova“ Vareš	Production of metal constructions and their parts	4.200 t/y	60%-70%
8.	Remontmontaža d.d. Tuzla	Steel constructions Heat exchanger Friction catches Containers under pressure Reservoirs Boilers with solid and fluid fuel Repair of hydraulic installations Design, production, construction, maintenance and repair of thermo-energy and other industrial plants	-	80%
9.	TGA d.d. Stolac	Steel fabric Braced girder Classic steel fabric	60t per 1 shift 10t per 1 shift 10t per 1 shift	70% 50% 80%
10.	TTU Tuzla	BTO system plants in mines Rubber belt conveyors Screw and chain conveyors Reductors Reloading devices in shipbuilding Turning and inclination devices for wagons Crushers and crushing plants Elevating devices Sorting and separation devices Vibration devices Presses (sugar factory) Funiculars for transport of persons and materials Metal cisterns and tanks Spare parts for its products Steel constructions Services (sand blasting, cutting and thermal processing)		
11.	Foundry Tuzla	Steel casts from: -carbon steel, -brass steel -steel for improvements, -abrasion-proof steel, -high-brass, non-corrosive and chemical-proof steel, -fire-proof steel, -manganese steel, -cast steel based on client specification.	7.000 t/y	17%

The production program of tool industry consists of specialization for production of tools for plastic products in case of Helioplast d.o.o. Gračanica up to production of tools for metal processing in other companies mentioned in table 3.12. The production program for metallurgy is given in table 3.13, and the production program of electro industry in table 3.14.

Table 3.12 Production program of tool industry

TOOL INDUSTRY				
Ord. No.	**Name of the company**	**Production program**	**Projected capacity**	**Usage %**
1.	HELIOPLAST d.o.o. Gračanica	Production of tools and products		
2.	TVORNICA ALATA d.d. Goražde	Production of tools		
3.	UNIS–PRETIS d.o.o. Sarajevo Vogošća	Production and processing of metal products	Individual production	
4.	ALAT d.o.o. Konjic	Tool design and production		75%

Table 3.13 Production program of metallurgy

METALLURGY				
Ord. No.	**Name of the company**	**Production program**	**Projected capacity**	**Usage %**
1.	„Arcelor Mittal“ d.o.o. Zenica	Production of coke, raw iron, steel, rolled and wrought products	926.000 tons	70% - 95%
2.	Željezara „Ilijaš“ d.d. Ilijaš	Iron casting	5.000 t	50 %

Table 3.14 Production program of the electro industry

ELECTRO INDUSTRY				
Ord. No.	**Name of the company**	**Production program**	**Projected capacity**	**Usage %**
1.	ENERGOINVEST d.d. Sarajevo	Design, research and engineering activities		
2.	ELEKTRO-KONTAKT d.o.o.	Production of electrical and installation material (switches, sockets, plugs, phone sockets, etc.)	cca 7.200.000 pcs	80%
3.	BIRA d.d. Bihać	Refrigerators and freezers	300.000 pcs	75%
4.	ELIR Nikola Tesla d.d. Tuzla	Installation transformers Siluminum cable attachment cabinets Tin built-in cabinets: - type RO-T - type RO-VIKEND - type RO-T15 - type RO-T2+1 Graffiti brushes Siluminum propellers	700 pcs 800 pcs 700 pcs 1.000 pcs 800 pcs 800 pcs 10.000 pcs 500 pcs	45% 30% 50% 25% 30% 30% 20% 20%
5.	Elektroremont d.d. Banovići	Repair electrical rotation machines Repair of transformers Repair of pump aggregates Repair of devices protected from explosion		80% 85% 90% 94%
6.	KAPIS d.o.o. Tvornica kabela Tomislavgrad	Conductors Heat supply – Cu Heat supply – Al Self-portable cables Ropes	320.000 kg 600.000 kg 400.000 kg 150.000 kg 70.000 kg	80% 80% 75% 73% 65%
7.	Energo-Electric d.o.o. Bihać	High-voltage isolators Medium-voltage isolators Auto-pneumatic wickets Construction of motors	350 t 100 t 50 t 100 t	15%

The production program of electro industry includes the production of: cables (Kapis Tomislavgrad), high-voltage isolators, electro-installation material, installation transformers, refrigerators and freezers, and repair of electro machinery and transformers.

The average usage of production capacities amounts to: 74,7% in case of car industry, 51,9% in case of metal processing industry, 80% in case of metallurgy, 71,2% in case of tool industry, 61% in case of electro industry and 80,5% in case of aluminum industry.

The work in three shifts was organized by 25% of companies, and in one or two shifts by 37,5% of companies. Based on the mentioned data it is evident that there is a small percentage of use of production capacities in the metal and electro industry.

3.2. State of Technologies and Technological Systems

By controlling the state of technologies of the surveyed companies as compared to the competitive companies in the region (EU countries), we may conclude the following:

- 43,8% of companies have outdated technology,
- 9,3% of companies have new technology,
- 34,4% of companies have modernized technology,
- 12,5% of companies have a combination of new and modernized technology (figure 3.7).

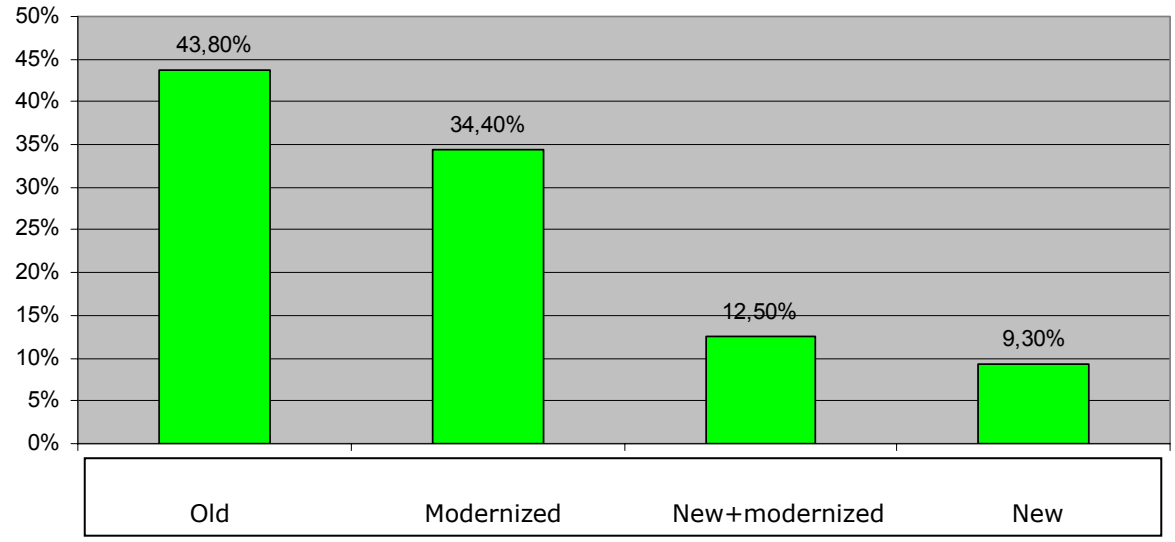


Figure 3.7 State of technology for the metal and electro sector

Based on visits and data from the questionnaires, the state of equipment of the surveyed companies as compared to the equipment of the competitive companies in the region is as follows:

- 46,8% of companies from the sample have old equipment,
- 15,6% of companies from the sample have new equipment,
- 21,8% of companies from the sample have modernized equipment,
- 6,2% of companies from the sample have a combination of old and modernized, and
- 9,3% of companies from the sample have a combination of new and modernized equipment (picture 3.8).

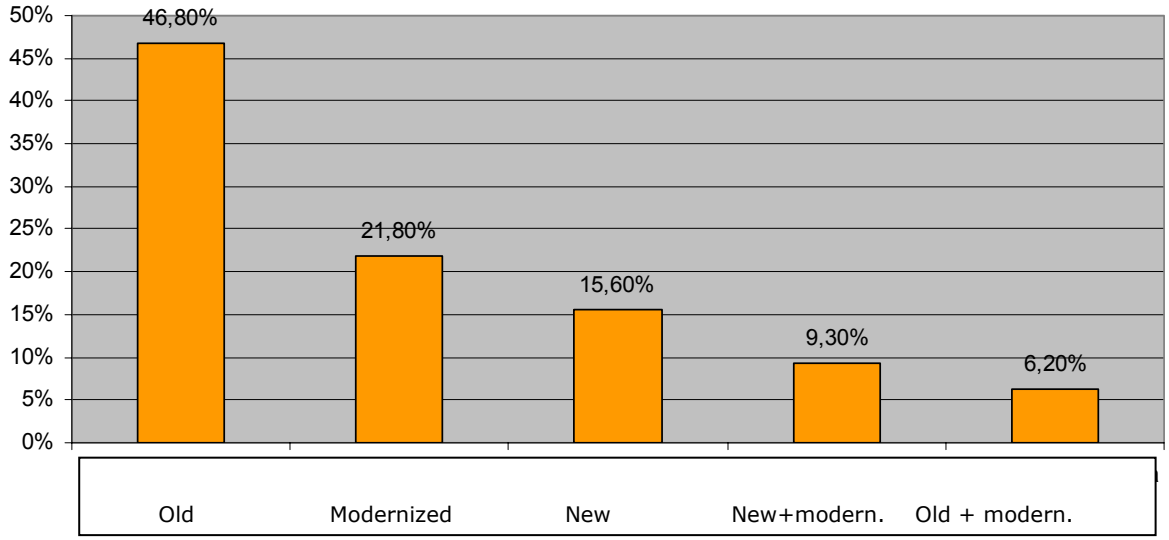


Figure 3.8 State of equipment of the metal and electro sector

Since the sample includes all more important companies in FBiH, we can assess that more than 50% of the total number of companies have old equipment and outdated technology in the metal and electro industry, which considerably reduces their competitive ability, requires enormous investments in new technologies and represents a significant obstacle for a faster development of this sector over the coming period.

The stated necessary funds for equipment modernization amount to a total of 184 170 000 KM, as follows:

- 24.600.000 KM for the car industry,
- 28.970.000 KM metal processing industry,
- 5.000.000 KM metallurgy,
- 2.600.000 KM tool industry,
- 100.000.000 KM aluminum industry and
- 23.000.000 KM and electro industry.

The stated funds needed for equipment modernization as opposed to the total income of the metal and electro sector in 2007 amount to 8,8%.

Based on the stated, we can conclude that these are big funds that cannot be secured without the help of the state.

It is necessary to select a strategic partner, and intervene through government policy – borrowing in order to modernize equipment, especially in companies in case of which FBiH has an ownership stake.

ISO (International Organization for Standardization) standard has not been introduced by 34,4% of companies, which clearly points to the state in the segment of company organization.

The CE label, which confirms the compliance of a product with the basic requirements of the new approach directives that guarantee: safety of employees, users and environment in production and use of a given product, and only the company Kapis Tomislavgrad out of 37 companies possesses it to 100% for all its products. The company Bira Bihać has the CE label for approximately 85% of its products, and the company Arcelor Mittal Zenica has the CE label for several of its products from the production programs of warm-rolled wire.

This situation in relation to the CE label in the overall metal and partly also in electro industry points to problems that may occur in case of export to a foreign market.

3.3 Possibilities of Revitalization and Modernization of Technology

In modern business environment, the issue of revitalization and modernization of the applied technologies, development and implementation of new technologies belongs to the key issues of an organization and very often it represents the key component of competitive business strategies of modern organizations. An effective modernization and adoption of new technologies means the introduction of dramatic changes in the functioning of the organization that result in improved efficiency, productivity, quality, safety, and the achievement of the final goal related to the improvement of competitiveness and profitability of the organization, are something that is crucial for survival and successful positioning of companies today in the global market and strong competition. On the other hand, the time and money spent on unsuccessful and inadequate implementation of modern technologies have a counterproductive impact on the competitiveness and profitability or maintenance, growth and development of the organization. This issue and possibility of an effective application of modern technologies therefore deserves serious analyses and decision making based on analysis and evaluations related to all factors that are crucial for the success of this process. Some of the mentioned factors are: the characteristics of new technologies, organizational scheme and structure, human factors, characteristics and business environment conditions, etc.

The possibility of revitalization and modernization of technologies, which is applied in specific business systems in FBiH represents an extremely complex issue related to social, political, economic and organizational elements. The answer to this question requires a holistic approach to its review, or previous detailed analysis of the business environment of domestic companies from the perspective of ''big picture'', which would show the state of numerous factors that are crucial for its successful resolution. The most important issues that require answers and represent a basis for the assessment of possibilities of effective modernization of technologies applicable in companies in FBiH include issues related to the uncompleted privatization process, availability of investment capital and circumstances under which these funds are disbursed by commercial banks, interests of domestic and foreign investors, management abilities of the company, labor force motivation, necessary knowledge and level of expertise of domestic staff for its application, the existence of comprehensive development goals, strategies and plans at various levels of our society, and the existence of a relevant legislative framework. These are only some of the more important assumptions that need to be resolved for the purpose of this goal, and all of them require a detailed assessment, attention and adequate solutions. In this study, the issue of the possibility of revitalization and modernization of technologies in the metal and electro sector in FBiH was analyzed based on a certain number of indicators that were obtained by companies from the survey, and analysis of other relevant factors that constitute the basis for the resolution of this problem.

The answers to the following questions from the questionnaire were separated as indicators of the analyzed state:

- The existence of company development strategy,
- The assessment of the necessary funds for equipment modernization,
- The existence of the development function in the organizational structure of the company,
- The share of high-profile staff in the employee structure.

Based on the data obtained from the surveyed companies, the current situation in the metal and electro sector is as follows:

Out of a total of 33 processed companies, 9 companies or 27,3% of processed companies have no short-term and long-term development strategy (7 companies from metal industry and 2 companies from electro industry).

Certain forms of development functions are present in case of 10 companies or 31,2%. 22 companies or 68,8% of processed companies have no development function.

The annual investments in research and development in 2007 amount to:

- Car industry 1.220.000 KM,
- Metal processing industry 90.000 KM, and
- Aluminum industry 1.700.000 KM.

The total investments in research and development in the mentioned three branches amount to 3 010 000 KM, whereas at the same time there were no investments in research and development in 2007 in these three industrial branches (metallurgy, tool industry and electro industry).

The total number of staff with university education in all companies amounts to 1162 or 9% of the total number of employees. The total number of persons with a master degree amounts to 30 and with a doctoral degree to 7.

Four big companies employ 65% of staff with bachelor degree, 73% of staff with a master degree and 71% of staff with a doctoral degree.

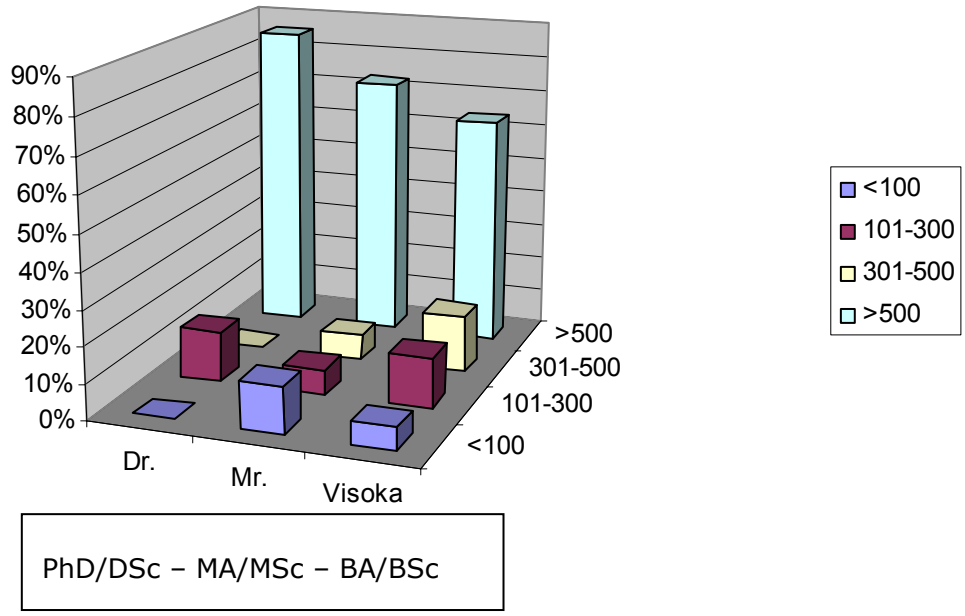


Figure 3.9 Share of the total number of high-profile staff by the size of company

The share of the total number of high-profile staff by company shown in 3.9 clearly shows that most of the high-profile staff is in big companies (more than 500 employees). If we consider that big companies have development functions, we see that the key to development organization is present in case of big companies.

The surveyed companies expressed the need for the missing high-profile staff, in the metal industry 204, in electro industry 26. More than 50% of the missing staff relates to graduate mechanical engineers. By analyzing the total number of students in the fourth year of all mechanical engineering faculties in FBiH, we conclude that there is a large gap between the high-profile staff and the needs of the economy. The employment plan over the coming three years for the metal and electro sector amounts to 1.760 employees.

The given overview of the situation in the metal and electro sector points to insufficient development, and in some companies also to full absence of the strategic management function, lack of strategic planning, significant and unavailable funds

needed for investments for equipment modernization, and insufficient development or complete lack of the development function in the organizational structure of the company.

The possibility of meeting the stated needs and efforts of the domestic companies related to the modernization of business performance through adoption and application of modern technologies should be sought in adequate solutions and measures that will contribute to the improvement and strengthening of the capacities of companies for the entry in demanding and complex projects, and the project of revitalization and modernization certainly belongs to them. The possibilities should primarily be searched for and recognized in the following:

- Awareness raising and adequate educational programs on the importance of management and marketing functions for the success of business operations,
- Building and strengthening of the strategic management function at domestic companies,
- Permanent investment in staff development,
- Adequate completion of the initiated privatization process of domestic companies,
- Offer of attractive programs and conditions for attracting domestic and foreign investors,
- Diplomacy (economic) should ensure easier sale of products in the global and EU market,
- Economic diplomacy should contribute to the recognition of certificates issued by domestic institutions (BATA institute and verified laboratories),
- Ensuring that companies (subjects in charge of development) adopted the quality system; standards ISO 9000, ISO 14000, HACCP (Hazard Analysis Critical Control Point), CE etc.,
- The establishment of the institutional infrastructure represents a priority goal (institutions that ensure the transfer of knowledge and technologies; access to quality (favorable) financial funds, evidence on quality in compliance with EU norms),
- The establishment of financial support system for economic development through domestic development banks and favorable borrowing conditions,
- Investment in university education and provision of various kinds of support to universities for the ''production'' of intellectual capital through education of persons capable for development and application of new technologies, and able to offer answers to dynamic changes of the global economy,
- State policy measures for strong links between the government, universities and industry, whereby the universities should take the role of key research and development centers, whereas the industry would primarily implement marketing, production and sale functions,

- Strong development of modern institutes, research centers and laboratories at universities/faculties, which would render possible the achievement of the necessary link between the science and practice, and take over the development functions of companies that do not have their own capacities,
- Innovation and modernization of curricula and programs in compliance with the global technological progress and needs of the metal and electro sector of FBiH.

At a time when the application of new technologies has a significant impact on the competitive ability of the country in all social spheres, it is not realistic to expect improvements and an integral solution to this problem without the institutionalized approach at various levels. The issue of implementation of new technologies should be treated at the strategic level of the society and business systems as a multidisciplinary task that also includes the privatization process and reorganization of companies, system development and financing sources, university education system, and especially strengthening of research activities at universities.

3.4 SWOT Analysis

We wish to see the Federation of BiH as a progressive society – a society of knowledge serving the purpose of creation of new values. The most adequate model for transition countries / and therefore also for FBiH and BiH / is the eco-social market model[1] that is based on the key dimensions: ecology, society and market economy, which are intrinsically interrelated for the purpose of achieving competitive abilities, social fairness and partnership, and careful use of natural resources.

For the purpose of achieving the goal, a decision needs to be made on what to do and how, taking into consideration the advantages – strengths, disadvantages – weaknesses, chances – opportunities, and dangers – threats.

Basic characteristics of the economy of FBiH

By analyzing the metal and electro sector in FBiH and the processed data from the previous text, we can provide a summary of the basic characteristics of the economy:

- The competitiveness of the economy of FBiH is considerably under the EU economy average or some countries from the region,
- The unemployment rate in FBiH amounts to approximately 40%,
- The education level of the employees is low,
- The productivity of companies in the industry, and SMEs in FBiH lags behind the productivity of competitive companies in the market,
- The motivation of employees is poor,
- Insufficient institutional support to industrial companies that are stable and need support for further development,

[1] For details on the economic and social market model for building a progressive society, please see ''Poduzetnik 1000 zašto, 1001 zato'', of the author A. Mišković, J. Bejić and A. Cigić, issued by the Institute for Mechanical Engineering Mostar, 2005.

- Small number of industrial companies that can attract the interest of SMEs,
- Low total income per employee,
- Low net export per employee,
- High total import for the needs of the industry,
- Small profit per employee,
- Outdated technology and equipment.

In general, the SWOT analysis of revitalization and development of industrial companies in FBiH is shown in the following table:

S – STRENGTHS	O – OPPORTUNITIES
- Industrial tradition and experience - Natural resources - Developed primary production of basic metals (steel and aluminum) - Trained and cost-effective industrial labor force - Creative, adaptable and language-skilled labor force - Large number of younger educated population - Possibility of ICT application (development of a society of knowledge) - Good progress of local self-government - Increasing partnership of the public and private sector - Motivation for the improvement of the local community	- Good geographic and geopolitical location - Relatively good communication connection to Europe and the world - Proximity and knowledge about the markets of Croatia, Serbia, Montenegro, Slovenia and Albania - Access to trade and other integrations (CEFTA, EU-zone, WTO) - Market expansion - Access to IPA funds of the EU - Integration processes / EU and NATO - Establishment of a single economic space in BiH - Political stability of the Western Balkans - Stable currency KM - Application of new ICT technologies - Starting of production with the goal of replacing import products by domestic ones - Privatization and restructuring - Investments (attracting foreign investors) - Interest of foreign investors in infrastructure projects - Granting of concessions - Proximity of the big EU market
W – WEAKNESSES	**T – THREATS**
- Old technology and equipment - Incomplete privatization - Organizational lack of organization after the disintegration of big systems - Old knowledge and skills - Educational system is not market-oriented - Lack of continuous education and trainings - Passivity of actors in the labor market - Bad industrial and entrepreneurial infrastructure (physical, financial, educational and advisory, institutional) - Small number of industrial companies that can significantly attract SMEs - Low level of awareness of the importance of environment preservation - Poor waste management - Business environment without incentives - Very small investments in research and development - Small number of companies based on knowledge - Poor access to quality financial assets - Lack of competition of domestic production - Lost opportunities for attracting serious foreign investments	- Political instability in BiH and Western Balkans - Legal instability and complexity of FBiH - Inefficient judiciary - Existence of several legal systems - Legal uncertainty for potential investors - Lack of single economic space in BiH - No regionalization of BiH and FBiH in economic terms - The reform process in all segments is slow - Slow introduction of ICT (information and communication technologies) - Institutions that need to ensure transfer of knowledge and technologies are insufficiently market oriented - The institutional infrastructure for the SME sector basically does not exist - Slow SME networking for interests - Global financial crisis and recession - Lack of more significant investments - Decrease in production - Halts in privatization - Increase of the "grey economy" share - Corruption

Based on the conducted SWOT analysis, we identified the main goals:

- Modernization of the existing and introduction of new equipment and new technologies,
- Promotion of the system of permanent training of employees,
- Making FBiH, and therefore also BiH attractive for foreign direct investments,
- Simplification of procedures related to export, import and compensation affairs,
- Significant increase in investments in research and development.

3.5 Possible Strategic and Development Goals

The conducted survey shows that 27,3% of surveyed companies in FBiH do not have a short-term and/or long-term development strategy, and 68,8% of surveyed companies have no development function. Some of the surveyed companies state the problem of non-existence of a long-term strategy, which allows some decisions to be made ad hoc. Industrial development strategies contribute to the forming of the mind, 'vision' of development and 'image' of the company in its business environment. These strategies should create the basis for sustainable industrial development, and would be based on general principles:

- Economically justified production with growth tendency,
- Consideration of social aspects: social security based on safe job, health protection, etc.
- Consideration of environmental principles: decrease in pollution, adequate waste management, etc.

Designed capacities of the metal and electro sector and sale of final products (table 3.4) are more than 50% export-oriented towards EU and non-EU markets, so that the following main strategic goals are proposed:

1. Increase in export, with a particular focus on market expansion,
2. Modernization of the existing and introduction of new equipment and technology.

For the implementation of main strategic goals it is necessary to take the following measures within the industrial policy:

1. Speeding up privatization of state-owned companies

   In case of companies that have not been privatized, the first strategic goal would be definition of property relations. (One of the problems defined in the survey that the factories taken by the privatization funds that sell them as real estate at absurdly high prices to those that lack premises, but have a program.)

2. Creating conditions for modernization of existing and introduction of new equipment and technology

   The metal and electro sector in FBiH does not have an enviable position in terms of the state of its equipment and technology due to the war destruction, but also due to year long lack of investments in technology, production processes and new production programs. Having in mind the fact that 47,6 % of surveyed companies use old equipment, whereas 57,1% or 12 surveyed companies base their production on outdated technology, one of priority goals is modernization of the existing technologies and equipment, as well as introduction of new modern technologies and equipment, such as for example FAD d.d. Jelah Tešanj, where it is necessary to implement the new technology for surface protection.

   Global trends are based on the introduction of new technologies:
   - Highly automatized and robotized processes,
   - IT and digital communication,
   - New technological processes: high-speed processing, laser processing, etc.
   - New materials,
   - New energy sources.

   Companies in FBiH have to enter the world of high technology and services and modern management methods by emphasizing the product quality if they wish to be competitive in the domestic and foreign market. At the same time, the interests of workers and the whole society may not be neglected.

   Since the introduction of modern technologies requires significant financial investments, one of the ways for modernization of the existing and/or introduction of new equipment and technology are foreign direct investments. It is therefore recommended that the relevant institutions should secure research and finding of new possibilities, and adopt adequate measures that will support the introduction of modern technologies. At the same time, there should be measures for the necessary re-training of workers that will lose their jobs due to the automatization of plants.

3. Make BiH, and thereby also FBiH, attractive for foreign direct investments, which is a duty and obligation of the state (at all levels) and it should be implemented through a series of integral measures, that should result in the stability of laws and regulations, simplicity of procedures for the establishment and maintenance of business, stability of political and social circumstances, moderate taxes and contributions, removal of influence of politics from companies, etc. The reason for this is the fact that chances and opportunities for the development of individual subjects, and therefore of branches of the metal sector of BiH primarily depend on the interest of private domestic investors, since the domestic capital is very small for more significant investments and creation of jobs, which are very expensive in this sector.

4. Take measures for better activation of domestic resources in the development of export programs of more successful companies through the development of a system of

decrease in interest rates on loans from commercial banks, which actually replaces the role of the development and export bank, whose establishment the IMF and WB do not allow, which would be an instrument for incentives as it was the case with JUMBES, and which exists in all developed countries.

5. Create simpler procedures related to export, import and compensation affairs.

6. Insist on final adoption of the suggested changes in customs tariffs, which would abolish customs on the import of raw materials and equipment that are not produced in BiH and imported from outside the CEFTA free trade zone and EU customs union and thereby improve the competitive ability of the metal processing industry in BiH.

7. The tariff systems in electric energy and gas sector should be compliant with the principles and price ratios in EU countries, since the industry cannot pay too high prices for gas and electricity, bear the costs of social prices for households in case of both mentioned energy sources or too low prices of electricity that is imported.

8. Initiate the promotion of the continuous training system for employees at all levels at companies in the way it is done by OECD countries, where normal training is considered up to 10% of the paid weekly working hours (4 hours).

9. Disseminate knowledge on clusters and positive impact of clusters on the competitive ability of the company through chambers of commerce. Create a positive relationship of governments towards state incentives for introduction of companies into clusters. Design campaigns of business networking with the most attractive companies, support establishment of clusters, industrial and business entrepreneurial zones, technological parks, etc.

10. Support to the research and development activities with faculties as centers of these activities, i.e. more intensive cooperation with university institutions.

In this sense it is necessary to establish and improve communication with university institutions, which will contribute to higher participation of domestic staff in the development processes of new products and technologies.
Since the introduction of new, modern technologies requires a higher level of knowledge, the responsibilities and awareness of workers, they first need re-training / additional training, and then continuous trainings with the goal of mastering the novelties in the technical and technological aspects. University institutions, as centers of research and development activity, may play a significant role through implementation of development and additional training programs.

11. Export structure should be changed by increasing the level of product finalization.

Domestic resources: aluminum and steel should be kept for domestic needs, because together with the energy, they constitute the ''golden triangle'' for the development of industry. Further finalization of aluminum may result in new products for the car and

electro industry, which provides the possibility of better pricing of electricity for special consumers.

The conducted research of production programs of the metal and electro sector points to a lack of foundries and existence of only one foundry for steel casting (Foundry in Tuzla). Modernization of foundries would decrease the import of casts, and the expansion of assortment would enable Foundry Tuzla to meet the needs of the energy sector of FBiH.

Considering the experience up to now, unused potentials of the metal sector are design and production of tools. Creation of clusters of tool producers would contribute to a faster development of this branch of metal industry.

12. The application of international, and primarily EU regulations in the field of improvement of product and service quality improvement:

-With the aim of improving the competitiveness of companies, it is necessary to create requirements for obtaining CE labels for products and introduction of ISO 9001:2000, ISO 14001, TS 16949:2002, as well as meeting of requirements defined by these standards.

- Continuous monitoring of measures applied by the EU on products that are imported or exported to/from BiH is necessary.

Support companies in obtaining international certificate based on reimbursement of the paid tax with 30-50% of certifying costs.

13 .Develop a system of continuous market research (e.g. through chambers of commerce).

14. Introduction of IT and digital communications (adoption of measures that would reduce the prices of providers, and would at the same time improve the communication performance – fastness, etc.).

15. Interest networking of industrial companies and SMEs.

16. Institutions that need to ensure transfer of knowledge and technologies need to be market oriented.

17. The metal sector in BiH should be institutionally organized at the level of Ministry of Industry or Ministry of Economy of BiH.

The achievement of strategic and development goals would to a large extent eliminate weaknesses and threats in the development of industrial companies, and would considerably improve their strength and possibilities. The characteristics of the economy of FBiH would be completely different and better, and the Federation would be a step forward towards becoming a society of knowledge.

The only changeable resources are knowledge and skills, lifelong learning, research, new technologies and institutional infrastructure, which provide an opportunity for

market competition. The new technologies imposed a new way of life, which requires permanent acquisition of new knowledge and daily consumption of a variety of new information.

Modern technology has to run faster and faster in order to stay in place (Peter F. Drucker).

In addition to the mentioned directions and possible strategic goals, there are following indirect goals of priority and urgent actions:

1. Road and railway traffic are a key segment of the development of the country, and also of the industrial development. It is therefore necessary to devote attention to the improvement of road and railway communication.
2. Together with the development of the industry, it is necessary to develop the energy sector.

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