



Deutsche Gesellschaft für
Technische Zusammenarbeit (GTZ) GmbH

Development of Studies for Sectors with Potential

Development Study for Metalworking, Mechanical Engineering, Electrical Engineering

Draft

November 2001

written by

GOPA-Consultants

Hindenburgring 18
D-61348 Bad Homburg
Telefon: +49-6172-930 502
Fax: +49-6172-930 500
E-mail: GOPA-ed@gopa.de

for

Deutschen Gesellschaft für Technische Zusammenarbeit (GTZ) GmbH

Ulrike Gantzer-Sommer
OE 8012
Postfach 51 80
65726 Eschborn
Deutschland
Telefon: +49-6196-79 2139
Fax: +49-6196-79 7297
E-mail: ulrike.gantzer-sommer@gtz.de

Wulf Hendrik Goretzky
Lejla Abdagic
Muamer Peljto
GTZ-Büro Wirtschaftsförderung
Splitska 6
71000 Sarajevo
Bosnien und Herzegowina
Telefon/Fax: +387-33-220596
E-mail: wulf.goretzky@gtz.com.ba
lejla.abdagic@gtz.com.ba
muamer.peljto@gtz.com.ba

financed by

Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung (BMZ)

Referat 204
Friedrich-Ebert-Allee 40
53113 Bonn
Deutschland

Content

1 Introduction.....	5
1.1 Definition of the sector and methodology.....	5
1.2 World-wide trends in the metal sector.....	6
1.3 Value-added chain in Bosnia and Herzegovina, and Benchmarking	8
2 Analysis of the Current Situation of the Metalworking, Mechanical Engineering and Electrical Engineering Industry in BiH	9
2.1 Importance of the sector for the economy.....	9
2.2 Geographical distribution and empirical analysis of the actual state of the metal sector.....	17
2.3 Metalworking	21
2.3.1 Products and industry sub-structure	21
2.3.2 List of companies in metalworking	21
2.3.3 Technical standard and management know-how	23
2.4 Mechanical engineering and toolmaking, supplies.....	24
2.4.1 Products and industry sub-structure	24
2.4.2 Companies in mechanical engineering	24
2.4.3 Technical standard and management know-how	26
2.5 Electrical engineering industry	28
2.5.1 Products and industry sub-structure	28
2.5.2 Selected companies in the electrical engineering industry	28
2.5.3 Technical standard, key figures and management know-how.....	30
2.6 Raw materials, services	30
2.7 Input/output matrix	30
2.8 Meso level.....	31
2.8.1 Basic and advanced training institutes.....	31
2.8.2 Chambers, associations, other institutions	32
3 Market opportunities	33
3.1 National market	33
3.2 Regional market.....	34
3.3 The EU.....	34
3.4 Competitors and benchmarking	37
3.4.1 The most important competitors	37
3.4.2 Hungary	38
3.4.3 Bulgaria.....	39
3.4.4 Romania.....	41
3.4.5 Croatia	42
3.4.6 Macedonia	42
3.4.7 FR Yugoslavia.....	43
3.4.8 Poland.....	44

3.4.9Czech Republic	44
3.5 Market opportunities and prospects: overview, specific strengths, weaknesses for BiH as a "latecomer"	45
4 Development strategy for the sector	47
4.1 Objectives of the institutions concerned and interaction between them	47
4.2 Strategic approach	49
4.2.1 Micro level.....	50
4.2.2 Meso level (structure-promoting policy)	52
4.2.3 Macro level.....	53
4.3 Measures to tap into markets.....	55
4.4 Measures for better integration within the sector	58
4.5 Qualification and training.....	59
4.6 Technology development	61
4.6.1 Policy for technology promotion.....	61
4.6.2 Quality management, measurements and standards	62
4.7 Developing a local consultancy market.....	63
5 Catalogue of measures	64
5.1 Qualification and training.....	65
5.2 Assistance in tapping into markets.....	66
5.3 Quality management	67
Annex: List of selected reference companies from the metal industry.....	69

Index of abbreviations

BiH	Bosnia and Herzegovina
CAD	Computer Aided Design
CAM	Computer Aided Management
CEE	Central and eastern European
CEFTA	Central European Free Trade Area
CNC	Computer numeric controlled
EBRD	European Bank for Reconstruction and Development
EFTA	European Free Trade Area
EU	European Union
FBiH	Federation of Bosnia and Herzegovina
FDI	Foreign Direct Investments
FIPA	Foreign Investment Promotion Agency
GDP	Gross domestic product
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Cooperation)
CIS	Community of Independent States
JIT	Just in Time
JV	Joint Venture
KM	Convertible mark
mS	majority state-owned
OECD	Organization of Economic Cooperation and Development
OHR	Office of the High Representative
PC	Personal Computer
QM	Quality Management
REFA	Reichsausschuß für Arbeitszeitermittlung (German Committee for Time Studies)*
RS	Republica Serpska
S.	state-run
SME	Small and medium-sized companies
Stat.	Statistical
TKM	Thousand convertible marks
TQM	Total Quality Management
USAID	United States Agency for International Development
USD	US Dollar
Wa.Li.	Waiting list
WTO	World Trade Organization

1 Introduction

1.1 Definition of the sector and methodology

The present sector development study covers in detail the metalworking industry (including steel construction), mechanical engineering/supplier industry, and the electrical industry. To simplify matters, the term "metal sector" was selected as an all-embracing term for the above industries. The basic approach adopted in the present study was to conduct a systematic structural analysis of the metal sector in Bosnia and Herzegovina (BiH) in order to identify ways of developing it. The study addresses decision-makers in the political and the business spheres.

An essential point is the consideration of the medium to long-term view and the interaction between the sector-relevant players (systemic or structural competitiveness). The objective of this study is to help create a vision for developing the metal sector in BiH to which all the relevant decision-makers will feel bound. This vision focuses on successful companies, i.e. companies which are competitive in the medium to long term. The study therefore places great emphasis on proposals aimed at improving the situation of these companies ("micro level"). Having taken stock of the companies in this sector, the study goes on to develop a strategy for measures at the "meso level" and proposes areas in which state institutions and players can implement targeted policies and measures to support the metal sector. Proposals for structuring measures to assure and safeguard the stability of the underlying macroeconomic conditions cutting across sector boundaries are only touched upon briefly wherever these structuring measures have a particular effect on the metal sector.

Initial work on the study involved evaluating the available sector-relevant secondary material. This included systematically analysing the available statistical data on the metal sector in BiH. We also systematically analysed empirical experiences drawn from the sectoral consultancy project currently being conducted by the Deutsche Gesellschaft für Technische Zusammenarbeit (German Technical Co-operation) under the private business promotion programme; this proved especially useful for identifying market opportunities and working out sectoral development strategies. Discussions with ministries and international donors plus national institutions at the meso level, analyses of international trends, and the results of sector-specific workshops attended by the companies in July 2001 supplemented the information basis for this study.

It should be noted at this juncture that the statistical data basis for BiH is incomplete. The utmost care was taken during the study to verify the existing statistical material and to compare the various information sources with one another. Nevertheless, the risk that some statistical information is distorted or apparently contradicted by other information sources cannot be ruled out. It must also be kept in mind that the available statistical data underestimates the economic potential of BiH - the proportion of informal (i.e. not statistically measured) economic activities in BiH is generally regarded as high. For the authors of this study however, the prime concern was to indicate development tendencies in the metal sector: accordingly, corroboration of the statements made in the study relied less on absolute values than on development tendencies and relative values. In other words, the basic statements of the study are not refuted by possible inaccuracies in the available figures.

The situation of the metal industry is subject to general economic conditions in BiH. These include the generally low performance of the country's economy, stemming both from the decades it spent dominated by socialist structures and from the war. Production is still highly material-intensive and labour-intensive. War has severed long-standing business links to foreign partners. The obsolescence of the mechanical equipment of the companies and the reluctance of western entrepreneurs to invest in BiH make it difficult to find partners in western Europe who might place orders in BiH on an outsourcing basis.

For western investors, companies in BiH will not become interesting on a large scale until the country's domestic demand is stimulated by macroeconomic policy changes. The resulting demand for products from the plant engineering and mechanical engineering industries could then be met by companies in BiH in particular. Speedy restructuring, plus downsizing of the companies, is however essential for the continued development of the metal sector. Some of the large conglomerates that still exist need to be reorganised into smaller, efficient and above all independent units. To do so, companies must have the necessary funds to obtain preliminary materials and production materials, which entails the further development of the Bosnian financial sector. The economic policy changes required include in particular more progress in the as yet sluggish privatisation process. Only a clear outlook in respect of ownership structures will permit in the long run an oriented approach to economic action and put capital investments on a sound basis. Only then can additional investments set in motion a transformation process in the direction of knowledge-based value added.

Since many companies will be unable to withstand the competitive pressure and market forces in the EU for some time to come, they must above all first reactivate their former markets in eastern Europe and the national market. To do so, it is necessary that the companies are furnished with suitable management expertise.

1.2 World-wide trends in the metal sector

The world-wide trend in metalworking, mechanical engineering and electrical engineering is towards a capital-based and knowledge-based company orientation. Companies in the above industries in western-oriented countries are highly innovative and give priority to strategies aimed at using resources sparingly and at increasing quality and customer benefits.

Main challenges for a modern company management approach in the metal industry

"Using opportunities in a changed industrial environment"

- Convergence of technologies, industries, products and markets: spotting and reacting quickly to trends and considering the fact that technology intensity is steadily growing in all sub-industries
- Shortening of product life cycles and delivery times
- Opening of sales and procurement markets leads to greater competition and hence to increased demands on companies

"Achieving clear competitive advantages"

- Developing clear-cut strategies for market positioning
- Expanding core competences
- Marketing innovative products and processes
- Investing in marketing

"Achieving more surplus value"

- Knowledge of expenditure on and earnings from products
- Increasing co-operation and network capabilities
- Optimising value-added process and reducing processing times
- Strengthening procurement management
- Using administration as a service provider
- Better performance by and training of employees

The world-wide development trends in the metal industry can be further differentiated for the two main sub-industries of general metalworking and plant engineering: mechanical engineering and electrical engineering (see following chart). The overall trends visible here are specialisation, mechanisation and the drive for ever greater added value in order to remain internationally competitive.

Chart showing industry-specific trends

General metalworking and plant engineering	Mechanical engineering / suppliers	Electrical engineering
<ul style="list-style-type: none"> • New materials • Lightweight construction • Laser cutting and welding • New connection technologies and surface technologies • CAD • Modular construction • TQM 	<ul style="list-style-type: none"> • New materials • Lightweight construction • High-speed machining, e.g. for metal cutting • Laser machining • New joining and shaping technologies • CAD, CAM • Microtechnology • Rapid prototyping 	<ul style="list-style-type: none"> • New materials • Lightweight construction • Glass-fibre transmission cables • Linear drives • Widespread use of microelectronics and microtechnology • Digital transmission technologies

- | | | |
|--|---------------------------|------------------------|
| | • TQM (excellent company) | • Increased efficiency |
|--|---------------------------|------------------------|

1.3 Value-added chain in Bosnia and Herzegovina, and Benchmarking

Metal companies in BiH as a rule have a very high production depth and tend to produce much themselves. For example, simple bought-in parts are frequently produced in-house, at high cost, since no cost reductions can be achieved by higher production runs. Production processes are labour-intensive, sub-optimal in structure and generally performed using outdated machinery. Accordingly, value-added in BiH's metal companies is usually low.

What is the typical value-added chain of a company in Bosnia and Herzegovina?

Procurement

Knowledge of international procurement markets is at best rudimentary. Alternative purchase sources are unknown. Since there is no dependable costing, acquisition costs are relatively meaningless. Cost calculation in the western sense is largely unknown, so that there is no dependable information on stock turnover frequencies and hence on the capital tied up in stock.

Production

Production is still organised according to the classic flow principle. *Just in time* concepts (JIT) are unknown. Since the entire job scheduling is still performed manually (only basic PCs are used with outdated systems), procedures cannot be made transparent and are correspondingly long. Thinking in terms of value-added processes is not widespread. Since the machinery fleet is as a rule more than 20 years old, nothing can be said about process dependability. There are practically no NC machines in operation. The organisation of production depends on existing production technologies; there is no outsourcing or concentration on production technology core competences. Since product costing analysis is not conducted in many cases, there are no indicators for realistic pricing or for profit and loss.

Quality assurance

The motto is: produce, sort, measure, inspect, rework, scrap waste, and produce new parts. Quality planning does not take place, and hence there is also no meaningful prevention. There is no overview of external and internal quality costs. Under these conditions, the location advantage of low labour costs is offset by considerable productivity disadvantages. Under these conditions, BiH companies offer little incentive to a direct investor, particularly since these companies are offered at completely unrealistic terms.

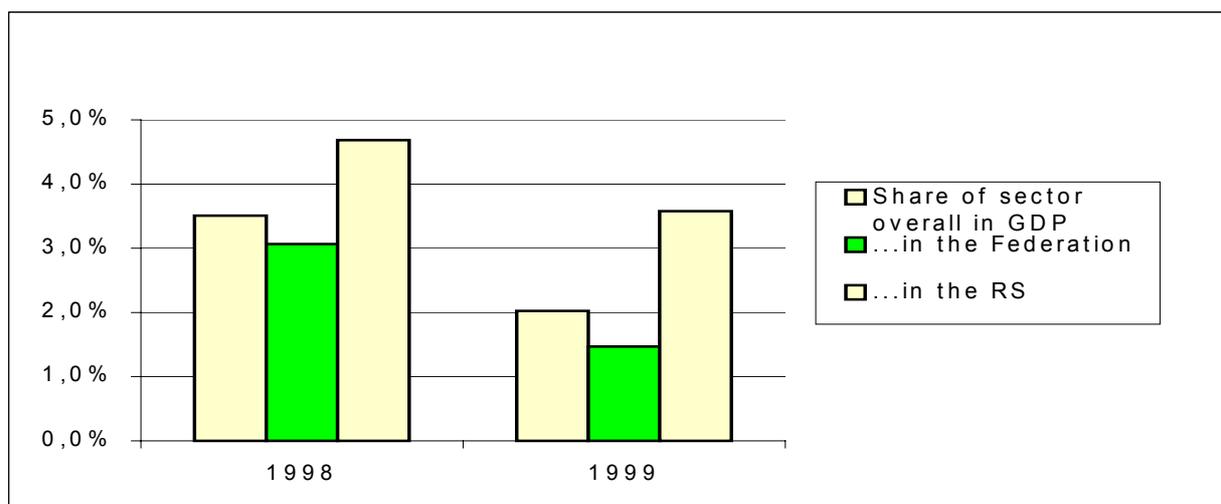
2 Analysis of the Current Situation of the Metalworking, Mechanical Engineering and Electrical Engineering Industry in BiH

2.1 Importance of the sector for the economy

The metal sector is an essential supplier of technologically developed goods and therefore plays a crucial role in every economy. As a rule, the technology intensity of this sector is an indicator of the general development situation and of the degree to which an economy has already been transformed. Bosnia and Herzegovina has in this respect a fairly long way to go, bearing in mind that productivity in this sector is still below the national average. Structural change in this sector has – as in a number of neighbouring transformation states – come late, and is also exacerbated by the high capital requirements here. Smaller, more dynamic companies tend to develop more in industries with lower investment requirements: fundamentally capital-intensive sectors are as a rule much more strongly subject to structural conservation. The high depreciation costs for machinery reduce the willingness to take risks with regard to investments, and hence the ability to use modern technologies. Without a structural change in the metal industry, however, a broad-based economic upturn in BiH will be jeopardised, since this industry is a supplier of plant and investment goods throughout the economy and as such is an important driving force for added value and hence for growth. It should be remembered that the metal sector suffered an above-average slump in the early phase of transformation in the other central and eastern European states as well. On the other hand, the industry has benefited from a general economic upturn whenever it has proven possible to use very specific competitive advantages in restricted markets.

The metal sector has in the past few years suffered a relative decline in importance in BiH: its **share of GDP** fell steeply in the past few years, and is now around some 3.5%, although higher in the RS than in the Federation. The pre-war figure was around 8%.

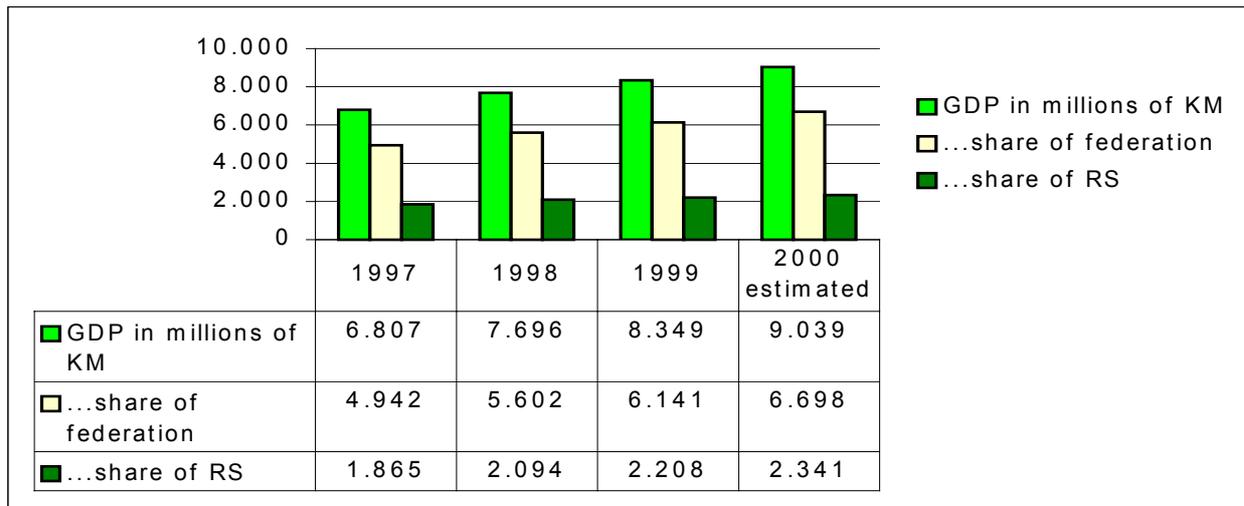
Share of metal sector in GDP



Source: Statistics office FBiH/RS

At the same time, the **gross domestic product (GDP)** in BiH has in the past few years grown steadily at around 10%, as has the potential domestic demand for goods from the metal industry – albeit with a dent in growth as a result of the Kosovo conflict. After a growth rate of nearly 10% in 2000, a GDP growth of around 14% is expected for 2001 (EBRD and others). Development in the Federation of BiH is somewhat more dynamic here than in Republika Srpska (RS), whose share of GDP is about 25%.

Development of GDP in Bosnia and Herzegovina (BiH)



Source: Statistics office FBiH/RS

Metalworking accounts for nearly **40%** of the entire metal sector, **mechanical engineering and supplying** nearly **35%**, and the **electrical industry** around **30%** (based on 1999). Metalworking in particular has suffered a relatively high decline in importance in BiH. The slump in the electrical engineering industry was, by contrast, not so serious in either entity.

Breakdown of GDP proportions within the metal sector in sub-industries

(Figures in millions of KM)	1998	1999	Shrinkage to ...% of previous year's value
Proportion of the metal sector in GDP, share of	269.8	169.1	63%
metalworking	130.0	62.6	48%
mechanical engineering, toolmaking, supplies	81.0	55.1	68%
electrical engineering industry	58.8	51.4	88%
Proportion of the metal sector in the FBiH, share of	171.7	90.2	53%
metalworking	89.3	31.8	36%
mechanical engineering, toolmaking, supplies	45.0	27.8	62%
electrical engineering industry	37.4	30.6	82%
Proportion of the metal sector in the RS, share of	98.1	78.9	81%
metalworking	40.6	30.8	76%
mechanical engineering, toolmaking, supplies	36.0	27.3	76%
electrical engineering industry	21.4	20.8	97%

Source: Statistics office FBiH/RS

While the GDP for BiH overall continued to grow despite the Kosovo conflict in the period considered above, the metal sector overall shrank substantially, particularly in the Federation, where the added value halved according to the statistical data available. These values seem however to have recovered in 2000.

Sector-based growth rates in comparison: January – September 2000 and January – September 1999

	FBiH	RS
Metalworking	+ 24.1%	+ 18.1%
Mechanical engineering/supplies	+ 30.2%	+12.6%
Electrical machinery	- 15.2%	n.a.

Source: USAID

The development trends shown for the metal industry in BiH are also reflected in the development of the employment figures: while the **numbers of employees** in BiH overall shows a slightly upward trend, the corresponding values in the metal sector are still falling.

The drop in employment does however indicate that structural change in the sector is slowly progressing. In the future, streamlining and privatisation measures will lead to a further drop in employment in some segments of the metal industry. One particular danger here is that the young and active employees (high-achievers) will turn their backs on the sector, seeing limited opportunities for development in metal industry companies. This would have a

negative effect on the future development of the sector. Reliable statistical information on the **employment of women** in the metal sector and a breakdown of the employees by age group is not available.

Development of numbers of employees

	1998	1999	2000	Change between 1999 and 2000
Employees in BiH overall	639,712	628,536	631,730	0.5%
of which in the metal sector		48,349	46,964	-2.9%
Employees in the Federation	395,445	407,754	410,808	0.7%
of which in the metal sector	29,394	28,750	28,645	-0.4%
Employees in the RS	244,267	220,782	220,922	0.1%
of which in the metal sector		19,599	18,319	-6.5%

Source: Statistics office FBiH/RS

In connection with employment in the metal sector, the feature of the "waiting list" must be mentioned: waiting lists contain employees currently not needed due to a lack of orders, and who are "parked" in these lists for a certain period. These employees are available to the company without having to / being able to do any work, and are also mostly given some pay. The RS waiting list of 31.12.2000, for example, contained a good 20% of the total employees.

The **wage and salary structure**: wages in the metal sector have dropped overall compared with wages in BiH. This applies particularly to the RS. While pay rises in the Federation are still fairly moderate, they are extremely high in the RS and must be understood as a harmonisation process within BiH, without being justified by a corresponding rise in productivity per employee.

Wages in BiH are low and competitive compared with EU countries. However, this advantage is offset by lower productivity. In comparison with the central and eastern European countries with low wage levels (such as Bulgaria and Romania), the RS is just about competitive, but the FBiH is already no longer so. In Bulgaria, for example, the gross monthly wage in production is 250 to 300 KM, and the average net wage 241 KM. The corresponding values for Romania are 250 to 350 KM and 285 KM. In the Federation and parts of the RS, these values have already been exceeded. The information on wage and salary structures is based on official information from the statistics offices in the FBiH and the RS.

Wage and salary structure in the metal industry

Average wages (net, in KM)	1999	2000 (estim.)	Change in year comparison
Overall in BiH	295	355	20.3%
in the metal sector	162	230	42.0%
in metalworking	146	212	45.2%
in mechanical engineering, toolmaking, supplies	137	191	39.4%
in the electrical engineering industry	203	288	41.9%
Overall in the Federation (FBiH)	374	412	10.2%
in the metal sector	241	280	16.2%
in metalworking	203	235	15.8%
in mechanical engineering, toolmaking, supplies	197	233	18.3%
in the electrical engineering industry	324	372	14.8%
Overall in Republika Srbska (RS)	216	299	38.4%
in the metal sector	84	181	115.5%
in metalworking	90	190	111.1%
in mechanical engineering, toolmaking, supplies	78	149	91.0%
in the electrical engineering industry	83	204	145.8%

Net values (gross values: net x approx. 1.6).

Source: Statistics office FBiH/RS

In BiH, **private companies** dominate the market, with more than three quarters of all registered business units, although these figures also contain an unknown proportion of economically inactive companies as well as many small ones. Even in the RS, only around 15 % of companies are state-run, although this figure includes almost all those of any importance or size. As a result, economic potential is practically in the hands of the state. Of the key 62 metal sector companies in the whole of BiH listed in Annex 1, more than 80% are state-run or are under state influence.

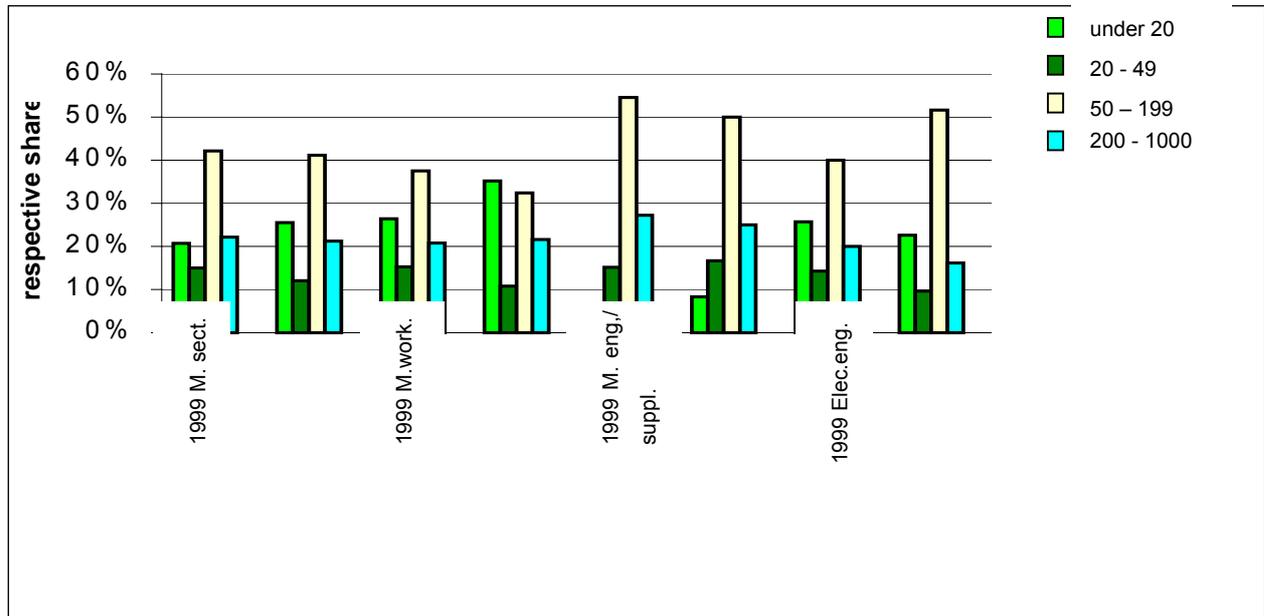
A **high proportion of state-run companies in the metal sector** automatically means that structural change in this sector will take longer. Of interest in this connection is the consideration of **profitability** (source: USAID economic updates from 31.10.2000 and 25.2.2000). In the FBiH, 51% of profits are made by private companies, which only incur 19.7% of losses (corresponding to approx. 15% of GDP in 1999). The biggest loss-maker here is the processing industry, increasing to 37.5% in the 1st half of 2000 compared to 35.6% in the 1st half of 1999. The situation in the RS is similar: mining and industry accounted for 87.5% of the losses in 1998, but only 34.9% of the profits.

Empirical surveys in the course of the study have confirmed that the productivity of private companies, measured in annual turnover per employee, is on average higher than that of state-run companies. The innovative capacity of private companies is also very often greater than that of state-run ones. This state of affairs results on one hand from the fact that private

companies include small-size start-ups that can work with comparatively modern machinery, adapt more flexibly to recent market developments, and have fewer problems with an unsuitably trained and oversized workforce. On the other hand, the higher productivity of private companies is due to the fact that these companies have already started to modernise and realign themselves. Furthermore, private companies – unlike state-run ones – can only survive on the market if they are profitable, as they do not receive any subsidies. The conclusion is clear: if the majority of the major metal companies remain in state hands, the potential for greater sectoral productivity and innovation will not be used sufficiently, and structural change in the metal sector will be further delayed. The gap between these companies and their competitors, in particular those from other transformation states, will widen still further and make it more and more difficult to catch up. Structural change needs to begin, productivity in the metal sector must be increased, and innovation potential in the form of new products needs to be utilised. The later these processes start, the more drastic the adaptation process will have to be in the future, since the proportion of basically competitive companies in BiH will increasingly fall from year to year.

Available data on **company size** in the RS based on employee numbers in the RS metal sector and its sub-industries indicate that large companies with more than 1,000 employees no longer exist. A striking feature is the relatively high proportion of small companies with less than 20 employees, especially in the electrical industry and in metalworking. These are often new companies that have started out in fields with low investment expenditure. This is corroborated by comparison of the appropriate figures for the last two years. Outside the electrical field, the proportions of small and new companies are increasing, while those of larger companies are falling.

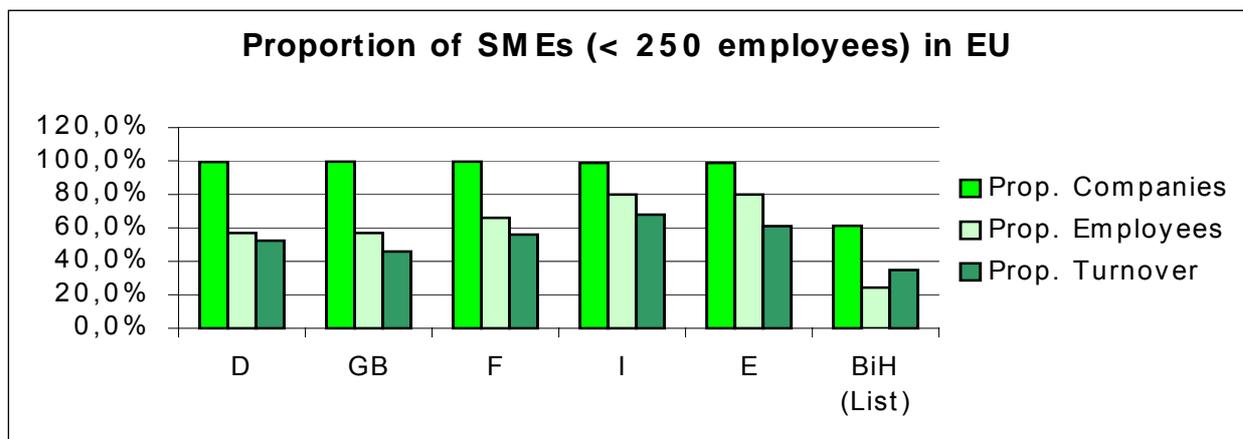
Company sizes in the RS



Source: Stat. office of RS

The proportion of companies with between 20 and 50 employees is the lowest (excepting mechanical engineering), since the large companies/company sections have not yet shrunk so far while the new companies have not yet attained that size. By comparison, in the German mechanical engineering industry the number of companies increasing in size is also continuously falling. The development in BiH is therefore moving in the right direction, i.e. towards smaller and more agile companies.

Size structures in international comparison: small and medium-sized companies in selected EU countries and in BiH



Source: Eurostat, Ind.Min. FBiH, EDA

The BiH information is based on a list of 62 important companies, see also section 2.2.2. and Annex 1.

No reliable data are available on the growth of foreign direct investment (FDI) in the sector, nor do the chambers of commerce have any realistic data on this. Whatever the case, the

level of FDI in BiH is very low both in absolute terms and in comparison to eastern European competitor countries. In the period 1994 to 1998, investments in countries competing with the BiH ranged between around 80 billion KM (Poland) and 4.5 billion KM (Croatia). In BiH, on the other hand, investment totalled around 117 million KM. This is a clear consequence of the war and political events in the post-war period. It represents a substantial competitive disadvantage which is being exacerbated, for example, by hesitant privatisation.

Foreign direct investment in BiH

	1997	1998	1999	2000
Total, mill.USD	504	100	90	117*

* Estimated

Source: EBRD

It is estimated that the proportion of investments in the metal sector in the Federation only amounted to some 2% of total investments; these figures are however questionable, since not all investments may have been recorded (source: USAID BiH economic update, dated 25.2.2000). What is noteworthy is that in steel production, for example, mainly in upstream sectors, considerable investments have been made in BiH, in particular by the Gulf states, which the metal industry has not benefited from to date.

Reliable sector-related **trade data** are not available. Nevertheless, the overall economic figures for imports and exports do however prove that there is still a lack of competitiveness in BiH's industry, including the metal sector, and that the import of end products remains highly important to the country.

Foreign trade of BiH (in millions of USD)

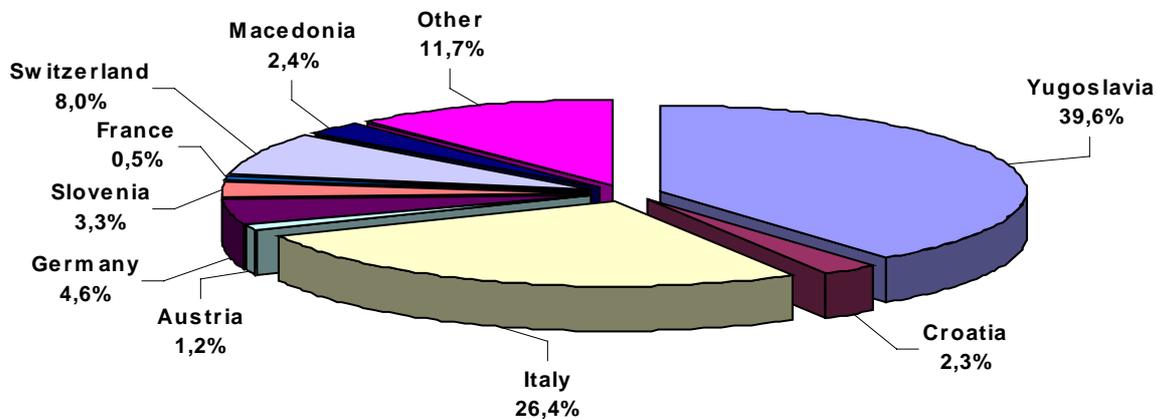
Year	Exports in millions of USD	Imports in millions of USD
	Total	Total
1997	372	2,377
1998	491	2,508
1999	537	2,547

Source: USAID

However, the total exports of BiH have risen in the past few years – from 491 million USD (1998) to 537 million USD (1999), or + 8.5%, with this development applying to both entities. Imports have however risen accordingly, and the trade deficit stood at around 2 billion USD in 1999.

A breakdown of the total RS exports into the most important sales markets for the first three quarters of 2000 provides a general overview of the importance of the neighbouring countries for the further development of BiH's economy which applies to the metal sector as well. Even if the balance has shifted from the Federation in favour of Croatia and Slovenia, there are now once again considerable links between the BiH economy and the successor states of former Yugoslavia. This also applies in its basic structure to the metal industry (source: economic update dated 25.10.2000).

EXPORTS (KM million; January-September 2000)



A characteristic of BiH's economy is its low **utilisation of capacity**. This figure remained, for example in the case of industry and mining in the RS during 1998, at around 25 % overall. The picture in the metal sector corresponds to this: a study of 70 companies **in the metal sector** in the RS showed an **average capacity utilisation of 28%** (in 2000) with a "waiting list" of 22% of the total personnel.

Ecological considerations have hardly played any role to date in the economic life of BiH, let alone the metal industry. There seems to be little or no appreciation of this consideration.

2.2 Geographical distribution and empirical analysis of the actual state of the metal sector

Studies from widely varying regions around the world have shown time and again that dynamic industrial growth is the logical result of industry clusters. We have therefore tried in this study to illustrate at least nascent industry clusters of metal companies.

Mechanical engineering and electrical engineering are heavily concentrated in the wider Sarajevo area, and additionally around Banja Luka and other smaller economic centres. Important location factors for both sectors are centrality, closeness to the markets, and the availability of qualified employees. Metalworking is located close to its raw materials, i.e. around Tuzla, Brcko, Zenica, and also Mostar. Metal industry companies are distributed over the entire country, so any illustration of their geographical distribution can only indicate concentration tendencies and provide possible starting points for the support of "clusters" (see sector strategy, Ch. 4).

Geographical distribution of the metal industry in Bosnia and Herzegovina



-  Metalworking and plant engineering
-  Mechanical and automotive engineering
-  Electrical engineering

The explanations provided in the following chapter for the various sub-industries of the metal sector (metalworking; mechanical engineering, toolmaking, supplying; electrical engineering industry) are intended to give the reader a general overview of the situation at the company level. They are based on an analysis of 25 companies in the RS and 41 companies in the FBiH. The companies were selected on the basis of their importance (turnover and/or number of employees) or on special factors relating to production range, and are intended to show a typical cross-section of the metal industry in BiH. The selection of companies for this study is in no way intended as a ranking of these companies in respect of their competitiveness. The selection of typical companies must be seen against the background of an inadequate statistical information base. For confidentiality reasons, the numbers of employees have been summarised into five size classes, the turnover figures into four classes and the productivity key figures into three classes. The companies are listed again in alphabetical order in Annex 1.

Reliable market data at the level of the various sub-sectors is not available. In a geographical input-output matrix in section 2.6, selected companies have been used to indicate by examples where the main regional sales areas are.

Overall, the development of the metal industry in the western industrialised countries has been traditionally characterised by rapid technological progress and revolutions in company management structures. These trends have actually intensified since 1990, following the change of political system in the current transformation states. In the past ten years, new capacities, meaning additional competitors, have come into being in the central and eastern European transformation countries. The round tables with company representatives held in the course of this study make it clear that many industry representatives are aware of the fact that BiH has lost ground to its eastern European competitors because of its recent history. Its original domestic market no longer exists.

**Empirical findings on the main current challenges and opportunities for the metal industry in BiH
(results based on discussions with company representatives)**

Markets

- Lack of market information hampers economic development
- Unfair competition from goods imported without passing through customs, black market
- Customs barriers to countries of former Yugoslavia hamper economic development, but foundation of a common market in south-eastern Europe would promote this

Money/finance

- Insufficient supply of financeable operating fund and investment loans (hardly any medium and long-term financing, high interest rates which are not affordable by industrial companies)
- Bank services do not cater to the requirements of the modern economy (cashless payment, advice for clients, mobility)
- Receivables are paid too late, time limits are ignored, there are not enough liquid funds

Personnel qualification and corporate management

- Management use in many cases outdated management methods and resist changes; there is no clarity as to the direction of future company development
- Training with too much theory, too little practical orientation, backwardness in technological knowledge
- Lack of systematic further training for employees
- Specialist personnel are losing their skills and are insufficiently motivated; in some cases wage and salary payments are in arrears

Production technology and organisation

- Machinery and technology are outdated
- Absence of quality management in the modern sense
- Poor starting material quality
- High transport costs
- Inefficient organisational structures

Basic legal conditions/regulations

- Laws and regulations not adjusted to EU/WTO
- Bypassing of customs is tolerated
- Dissatisfaction with the state as owner, lack of supporting measures for the development of industry
- The legal and regulation framework is too complicated and inadequately defined
- Corruption
- Progress in privatisation is too slow, hindering industrial development

Comparative competitive potentials

- Industrial fields with experience in the production of large quantities and higher quality, e.g. in defence technology, or the vehicle and supplier industry.
- Industrial fields with experience in western Europe and suitable contacts from pre-war times

2.3 Metalworking

2.3.1 Products and industry sub-structure

The field of metalworking in BiH comprises companies from a total of seven sub-industries:

1. foundries
2. manufacture of installation products
3. tools
4. wire goods
5. anti-friction bearings
6. other metal articles and metal products
7. metal structures

Appropriate products in the metalworking field as a rule require medium difficulty technologies. The tolerance ranges are medium to coarse, and quantities range from one-off pieces to large series. Exceptions to this include tools and anti-friction bearings, which require more advanced design and production technologies, with fine to very fine tolerance ranges. There is scope here, and indeed good prospects, for supplying high-quality goods to western companies.

2.3.2 List of companies in metalworking

Company, location	Sub-industry	Owned*	Number of employees	Turnover (1,000 KM)	Turnover per employee (KM)	Products
UNIS-IGMAN, Konjic	(1)	S	200-1000	over 10,000	under 20,000	foundry
MEBO, ŠAMAC	(2)	S	50-199	1,000-5000	under 20,000	boilers
Metal-emajl, Srpski Brod	(2)	S	200-1000	1,000-5000	under 20,000	sanitary equipment
TERMAL, Lopare	(2)	S	50-199	1,000-5000	under 20,000	radiators
Industrija Alata, Trebinje	(3)	S	over 1000	over 10,000	under 20,000	machining tools
KRAJINAMETAL, Bihac	(4)	S	200-1000	5,000-10,000	20,000-50,000	wire products
UNIMET, Kopaci-Gorazde	(4)	S	50-199	1,000-5000	20,000-50,000	wire products
Feal, Siroki Brijeg	(6)	P	50-199	1,000-5000	under 20,000	sheet metal processing
Helios, Banovici	(6)	S	50-199	1,000-5000	under 20,000	boilers, heat exchangers

Company, location	Sub-industry	Owned*	Number of employees	Turnover (1,000 KM)	Turnover per employee (KM)	Products
MAXMARA, Banja Luka	(6)	P	20-49	1,000-5000	over 50,000	metal equipment for building
Mehanika, Orasje	(6)	MP	50-199	1,000-5000	under 20,000	metal construction
MIK, Kupres	(6)	P	20-49	1,000-5000	20,000-50,000	building hardware
Unis Kovina, Visoko	(6)	MS	200-1000	1,000-5000	under 20,000	metalworking
UNIS-POBJEDA, Gorazde	(6)	S	200-1000	5,000-10,000	20,000-50,000	special machines
Metalinvest, Jajce	(7)	MP	50-199	1,000-5000	20,000-50,000	metal construction
EI Dalekovodizgradnja, Sar.	(7)	S	50-199	1,000-5,000	under 20,000	structural steel engineering, assembly work
EI Comet, Sar.	(7)	MS	50-199	under 1,000	under 20,000	structural steel engineering, assembly work
Metalno, Zenica	(7)	S	200-1000	5,000-10,000	20,000-50,000	metal construction
Montmontaza TOM, Uskoplje	(7)	MS	50-199	1,000-5,000	20,000-50,000	structural steel engineering
TTU, Tuzla	(7)	MS	200-1000	1,000-5,000	under 20,000	metal construction, mechanical engineering
Tvornica dalekovodnih stubova, Doboj	(7)	S	200-1000	1,000-5000	under 20,000	metal construction
Metalinvest, Caplina	(7)	S	50-199	1,000-5000	more than 50,000	structural steel engineering

*For key to abbreviations see Annex 1

Source: Ind.Min. FBiH, EDA

Current key figures for selected metalworking RS companies

Company name	Number of employees		Sales revenue	Production	Sales		Use of capacity
	Total	Waiting list			BiH	Abroad	
"Industrija alata" Trebinje	over 1,000		over 10,000		35%	75%	over 35%
"UNIMET" Kopaci Goražde	20-50		5,000- 10,000		40 %	60%	under 20%%
"Tvorница dalekovodnih stubova" Doboj	200- 1000		1,000- 5,000 1.657		100%	-	under 20%%
"Metal – emajl" Srpski Brod	200- 1000		1,000- 5,000		80%	20%	under 20%
70 RS companies	19,38 3	4,321	330,962	285,099	38%	62%	28%

Source: Ind.Min. RS

2.3.3 Technical standard and management know-how

- In the field of structural steel engineering/metal structures, the emphasis is on metalworking. Here products range from one-offs to small quantities, the degree of mechanisation is relatively low, and the proportion of manual work (i.e. welding) relatively high. If sheet metal processing and the handling and lifting equipment needed for larger produced units are excluded, the procurement of state-of-the-art welding and extraction equipment is financeable and has in some cases already been accomplished.
- In the fields in which medium to large quantities are produced – for example connecting elements, wire goods etc. - the technology is conventional; necessary investments to adapting technology to current standards have as a rule not been made to date for financial reasons. The equipment dates back to the 1980s or even earlier. In addition to the improved technical standard of the equipment, better quality assurance and monitoring will be needed in the future.
- Due to the absence of suitable raw material production in BiH, this material is purchased from abroad depending on the required quality, from the Czech Republic, Slovenia, Germany, Austria and Italy. As a result, procurement prices have an above-average share in the cost structure of BiH companies in comparison with other countries.
- Productivity, measured by the annual turnover per employee, is between 5,000 and 60,000 KM per head, and in some cases even higher if "waiting list" employees are excluded. However, the difference between these figures and the corresponding figure of KM 240,000 (2000) for structural steel engineering in Germany, for example, is considerable. Turnover per capita is not an ideal measure of productivity, but it provides a starting point for comparing companies.

- Modern management know-how is patchy, in particular in the marketing sector, but also internally in the fields of organisation, controlling and streamlining.

2.4 Mechanical engineering and toolmaking, supplies

2.4.1 Products and industry sub-structure

The field of mechanical engineering, toolmaking and supplies comprises companies from a total of seven sub-industries :

1. construction machinery
2. machine tools
3. other machines
4. agricultural machines
5. special machines
6. vehicles
7. parts, components for vehicles

The requirements here range – particularly in the field of machine tools, special machines and vehicles – from high to very high. In similar fashion technology needs range from medium to high difficulty, tolerance ranges from coarse to very fine, and quantities small to large runs.

2.4.2 Companies in mechanical engineering

Company, location	Sub-industry (see above)	Owned*	Number of employees	Turnover (1,000 KM)	Turnover per employee (KM)	Products
MI Fering, Gracanica	(1)	mS	200-1,000	5,000-10,000	under 20,000	handling, construction equipment
JELŠINGRAD, Banja Luka	(2)	S	200-1,000	5,000-10,000	under 20,000	machine tools
BEKTO-INTERNATIONAL, Gorazde	(3)	P	50-199	over 10,000	over 50,000	tools
BNT Tv. Masina i hidr. , N. Travnik	(3)	S	200-1,000	1,000-5,000	under 20,000	mechanical engineering
Energoinvest (EI) Armature, Sar.	(3)	S	200-1,000	1,000-5,000	under 20,000	fittings
EI Etas Valves, Sar.	(3)	mS	200-1,000	1,000-5,000	under 20,000	fittings
EI Specijalne	(3)	S	50-199	1,000-5,000	20,000-50,000	fittings

Company, location	Sub-industry (see above)	Owned*	Number of employees	Turnover (1,000 KM)	Turnover per employee (KM)	Products
Armature, Sar.						
FAMOS, Sarajevo	(3)	S	200-1,000	5,000-10,000	under 20,000	engines, transmissions
JELŠINGRAD, Kotor Varoš	(3)	S	50-199	1,000-5,000	under 20,000	machinery automation equipment
LAGER, Posušje	(3)	P	under 20	1,000-5,000	over 50,000	lifting equipment
TRD, Vares	(3)	mS	200-1,000	1,000-5,000	under 20,000	mining equipment
TRUDBENIK, Doboj	(3)	S	200-1,000	5,000-10,000	under 20,000	compressors
Unis Pobjeda, Tesanj	(3)	mS	200-1,000	5,000-10,000	20,000-50,000	vehicle pumps
TMD AGS, Gradacac	(4)	mS	200-1,000	unknown	unknown	agricultural machinery
EI VMC, Sar.	(6)	S	200-1,000	1,000-5,000	under 20,000	rail cars, machinery, containers
Unis Tativ, Konjic	(7)	S	200-1,000	1,000-5,000	under 20,000	screws
Unis Unico Filter, Tesanj	(7)	mS	200-1,000	over 10,000	20,000-50,000	vehicle filters

*For key to abbreviations see Annex 1

Source: Ind.Min. FBiH, EDA

Current key figures for selected RS companies in the sub-industries of mechanical engineering, toolmaking, and supplies

Company name	Number of employees		Sales revenues	Production	Sales		Use of capacity (%)
	Total	W. list			BiH	Abroad	
Fabrika alatnih mašina "Jelšingrad" Banja Luka	200-1,000		5,000-10,000		30%	70%	under 20
"Famos" Sarajevo	200-1,000		5,000-10,000		28%	72%	between 20% and 35%
Fabrika mašina i uređaja "Jelšingrad" Kotor Varoš	50-199		1,000-5,000		75%	25%	between 20% and 35
"Trudbenik" Doboј	200-1,000		5,000-10,000		65%	35%	under 20
70 RS companies	19,383	4,321	330,962	285,099	38%	62%	28%

Source: Ind.Min. RS

2.4.3 Technical standard and management know-how

Technical standards in mechanical engineering are, all in all, satisfactory. Quality problems aside, the difficulties are less on the technical side than in the fields of marketing and company management. This applies in particular to the field of automotive suppliers, which in the early nineties were producing fairly new equipment to international standards and were in close contact with German industry. At that time, for example, between 20 and 30% of the parts for VW Golf production in Sarajevo were produced within the country; today, by contrast, there are no longer any supplier links.

Productivity in terms of turnover per employee is low, partly due to a lack of orders, and is roughly between 5,000 and 30,000 KM per capita. The front runner in the FBiH analysed in the course of this study – a private manufacturer of tools and plastic parts – achieves KM 141,000 per head; in comparison with the German average value for toolmaking of nearly KM 230,000 (1999), this is quite a good ratio. Other very high per capita values, such as those of the company Lager/Posusje, are probably attributable to a high proportion of trade.

Benchmarking

A typical benchmarking process for a flourishing mechanical engineering company in the Federation with a privately owned majority shareholding will indicate the strengths and weaknesses of new Bosnian companies and hence the development potential of those companies from BiH which are classified overall as having good prospects. At the moment, the very high value for the turnover proportion of new products (in this specific company) is supported by the products of the company and by the benefit that an untapped market offers. Generally speaking, there are serious weaknesses in BiH, for example in organisation (administrative effort, processing time for quotations) and in production control (processing and delivery time). This assessment makes it clear that new companies also need considerable support in organisation and management issues.

Benchmarking for a typical mechanical engineering company in BiH

	Unit	---	O	++	BiH	Comp any
Development						
• development time	months	24	18	12	8	++
• turnover proportion of new products	%	<20	40	>60	86	++
Production						
• processing time	days	14	5	2	90	---
• delivery time	days	26	14	7	30	---
• zero defects	%	83	96	99	n.a.	
• set-up times/machine operating hours	%	10	5	3	n.a.	
Sales						
• processing time for quotations	days	35	10	5	120	---
• number of new customers	% share	2	7	10	40	++
• tapping into markets	years	5	2	1	up to 1	++
• customer satisfaction	%	85	95	98	n.a.	
Logistics						
• procurement times	days	>30	18	5	30	---
• number of suppliers for 80% turnover	number	102	44	30	8	++
• framework agreements	% t.o.	65	78	85	89	++
• rejection (material)	%	1.5	1.1	>1	2	---
• reduction in purchase prices p.a.	%	0	4	8	10	++
Finances						
• average per capita turnover	1000 □	<110	185	250	80	---
• capital turnover	p.a.	<1.1	2	>2.4	4	++
• return on sales	%	<2	8	>12	23	++
• administrative expenditure in total costs	%	10	6	4	13	---

Benchmarking would be less favourable for most other Bosnian companies, particularly if they have not yet succeeded to date in identifying and filling market niches. In this connection, the development of new products for BiH (product development) has an outstanding role to play.

2.5 Electrical engineering industry

2.5.1 Products and industry sub-structure

The field of the electrical engineering industry comprises companies from a total of seven sub-industries:

1. electrical machinery
2. parts for electrical appliances, radios, TVs
3. measuring equipment
4. technical equipment
5. refrigerating equipment
6. batteries
7. other electrical engineering products

Technological standard requirements are largely within conventional limits, but are higher in the measuring equipment sector and in some cases for the technical equipment used to provide the country's power supply. In the electrical engineering industry, the defence technology field is of some importance in BiH, together with companies from the electronics and optomechanical fields.

2.5.2 Selected companies in the electrical engineering industry

Company, location	Industry	Owned*	No. of staff	Turnover (1,000 KM)	Turnover/employee (KM)	Products
Energoinvest (EI), Sarajevo	(1)	MS	200-1,000	5,000-10,000	over 50,000	electric motors, generators
LOGOSOFT, Sarajevo	(2)	P	under 20	5,000-10,000	over 50,000	calculating machines
Iskraemeco, Sar.	(3)	MSJV	20-49	5,000-10,000	over 50,000	counters, measuring instruments
Mikroelektronika CAJAVEC, Banja Luka	(3)	S	50-199	over 10,000	over 50,000	measuring technology, electronics
EI Elektrooprema, Sar	(4)	S	200-1,000	5,000-10,000	under 20,000	transformers, technical equipment
EI Energocontrol, Sar.	(4)	S	50-199	under 1,000	20,000-50,000	products and development

Company, location	Industry	Owned*	No. of staff	Turnover (1,000 KM)	Turnover/employee (KM)	Products
						work for automation
EI TAT, Sar.	(4)	S	200-1,000	1,000-5,000	20,000-50,000	power station construction
EI TDS, Sar.	(4)	S	200-1,000	5,000-10,000	20,000-50,000	technical equipment
EI Sarajevo, Rasklopna oprema	(4)	S	200-1,000	over 10,000	20,000-50,000	power stations, transformer plant
ELEKTROKONTAKT, Sarajevo	(4)	P	under 20	1,000-5,000	over 50,000	power supply
ETI, Sarajevo	(4)	P	20-49	1,000-5,000	over 50,000	power supply
Soko Air, Mostar	(4)	Pr	50-199	not known	not known	airport equipment
Soko Bus, Mostar	(4)	MS	20-49	1,000-5,000	20,000-50,000	vehicle assembly
Soko, Mostar	(5)	Pr	200-1,000	5,000-10,000	20,000-50,000	refrigerating equipment

*For key to abbreviations see Annex 1

Source: Ind.Min. FBiH, EDA

Current key figures of selected RS companies in electrical engineering

Company name	Number of employees		Sales revenues	Production	Sales		Use of capacity (%)
	Total	Waiting list			BiH	Abroad	
Rasklopna oprema "Energoinvest" Sarajevo	200-1,000		over 10,000		75%	25%	under 20%
"Meboš" Šamac	50-199		1,000-5,000		98%	2%	under 20%
"USHA" Višegrad	50-199		1,000-5,000		60%	40%	under 20%
Tvornica niskonaponske opreme Doboj	200-1,000		1,000-5,000		50%	50%	over 35%
70 RS companies	19,383	4,321	330,962	285,099	38%	62%	28%

Source: Ind.Min. RS

2.5.3 Technical standard, key figures and management know-how

In BiH's electrical engineering industry, technical standards are in general conventional, excepting the defence technology fields and the measuring instruments sector. The companies there are well equipped and are trying, in some cases successfully, to forge contacts with western companies. Overall, in this sub-industry as well management know-how is not up to date. Particularly serious are marketing defects, and little or no controlling; systematic rationalisation is still a long way off. Though attention to defence technology products had a positive effect on the equipment of companies and has led to improved quality, profitability and productivity were always considered secondary – a statement that applies generally to the companies in this field.

2.6 Raw materials, services

The purchasing possibilities for raw materials (repro material) in BiH are limited. Apart from casting, no steel is produced in the country, and is instead only processed into semi-finished material (sheets/coils, pipe, section or wire). Coils, wire and sheet are, particularly when high-quality material is needed, generally obtained from abroad (the Czech Republic, Germany, Austria, Slovenia), as are special materials, e.g. for tool manufacture or special dimensions and sections for structural steel engineering. In BiH starting materials (repro materials) also include machining tools, fittings, bolts, screws etc. There are manufacturers for these materials in the country.

Transport is by truck; the railways only operate on certain stretches and are too slow. Transport is handled by state-registered companies, the same applies also for starting material deliveries.

2.7 Input/output matrix

It is impossible to conduct a consistent input/output analysis for the metal sector in BiH, as the available statistical data are incomplete (see also above, for example industry-related import/export data). It should also be pointed out that there is a high proportion of unofficial economic activity in BiH, so that the results of an input/output analysis based on official statistical data are not very meaningful. Moreover, the statistical data only show some of the economic interrelationships, as these are partly based on non-monetary bartering which is difficult to evaluate. For this reason, the present analysis was conducted on the basis of an empirical-inductive method: three companies and their regional supplying and marketing relations were considered. An attempt was made here to obtain a cross-section through the Bosnian metal industry and in so doing to draw conclusions concerning the entire sector. The analysis was conducted for one company from each of the most important sub-industries.

Links on the output side with eastern Europe hardly exist at all at present: this market is currently largely untouched by BiH's metal industry companies. As the transportability of the product increases, the trend towards the home market decreases while the trend towards

other foreign countries correspondingly increases. On the procurement side, the BiH's heavy dependence on the states of former Yugoslavia is clear. A detailed analysis of the sales markets and potentials for the metal industry of BiH is the subject of Chapter 3.

Examples from the input-output analysis also show that the integration of the metal industry within the country is at a comparatively low level – the more technology-intensive the supplier links are, the more recourse is had to external partners. The result is that the market in BiH is heavily fragmented, so that any moves towards more significant cluster formations in fields with higher added value are scarcely discernible. Furthermore, the market in BiH appears to be too small.

Input/output matrix for sample companies

↓ Input ↓ from..		→ Output → to..			
		BiH	former Yugoslavia	eastern Europe	other countries
"IAT"	Machining tools				
BiH	5%	30%	10%	0%	60%
former Yugoslavia	20%				
other foreign countries	75%				
"Jelsingrad"	Mechanical engineering				
BiH	20%	40%	40%	0%	20%
former Yugoslavia	70%				
other foreign countries	10%				
"RAOS"	Power equipment				
BiH	30%	60%	35%	0%	5%
former Yugoslavia	60%				
other foreign countries	10%				

A cluster-oriented consideration of the further development of the metal industry in BiH must – even when the traditional supplier links in the region are taken into account – therefore be tackled adopting a cross-border approach. How can earlier supplier links be restored or supplier links with states (such as Slovenia) be re-established? In the chapters on strategy development and measures (4 and 5), pragmatic solution approaches are suggested in the framework of this study.

2.8 Meso level

2.8.1 Basic and advanced training institutes

In BiH there are high schools (technical colleges), universities and faculties for training in the technical professions (mechanical engineering, metalworking, electrical engineering). At the

level of technical colleges, 14,629 students were registered in the RS, and 79,612 in the Federation. Sufficient teaching staff and premises are available, but the curricula and above all the practical training amenities (lack of technical equipment) need to be improved.

At the university and faculty level there are 6 mechanical engineering faculties, 5 electrical engineering faculties and 3 technical universities. The training system is currently undergoing reform, and some laboratories have already been re-equipped. In the RS 1,425 students have been enrolled in these training establishments, 46 of whom graduated last year.

There are no special research institutes, but the faculties do work with a number of companies in the metal sector for research and consultancy purposes. Some of the large company conglomerates, e.g. Unis, had their own research and development centres, but these have either been shut down for personnel and cost reasons or are directly performing design or job scheduling work for companies. Private training centres for the metal sector do not exist.

2.8.2 Chambers, associations, other institutions

The chamber network in BiH is sub-divided into five regional chambers in the RS, ten regional chambers in the FBiH, one chamber for each entity and one national chamber, which is to be developed into a foreign trade chamber. The chambers function as

- representatives of the interests of Bosnian companies at the political level
- providers of information about market and technology developments both nationally and internationally
- mediators and arbitrators within the economic sector
- employers' associations, with the corresponding functions regarding collective pay agreement drafting, etc.
- service providers, particularly in the fields of basic and advanced training, trade fair visits and attendances, and making business contacts.

Many chamber representatives make no distinction between the work of the chamber and the work of the association – accordingly they do not see the development of associations as a primary task in the further development of viable cross-company structures at the meso level.

The metal sector is represented in the various chambers by a functional and sectoral sub-division of the work areas and responsibilities. A special feature in BiH is the split in the chambers between the two entities, with two overall chambers – this circumstance reflects the continuing two-way split in the economic area of BiH and restricts the opportunities for successful business with international partners.

The range of services offered, customer focus, and the personnel and training situation of the various regional chambers vary widely in BiH. As a result, it is not possible to provide a consistent picture of the efficiency and quality of the chamber of commerce structure. However, the standing of the chambers of commerce with the business community is generally not high, in particular with private SMEs. These are not convinced of the efficiency

of these institutions, and in many cases take the view that the necessary structural changes in the metal industry of BiH are not sufficiently supported by the chambers. Conversely, it is unclear to many chamber representatives why companies do not make greater use of the services of the chambers and why they are only prepared in a few cases to enlist the help of the chambers of commerce to jointly tackle issues or conduct activities of common interest.

A number of initial steps have since been taken by private initiatives to establish interest representatives and consortia for specific fields as a supplement to the chamber structure, but the extent to which they are able and willing to represent state-run companies is unclear.

A state organisation for accreditation, measurement and standards/standardisation purposes has recently been established.

3 Market opportunities

3.1 National market

The market in BiH for the metal industry is very small, and the supply links within the country in the investment goods industry are limited. The investment rate is low, so that the real sales market for the metal industry of Bosnia and Herzegovina is also very limited. The economic relations between the two entities are still being built up and appear to be gradually normalising. There is an increasing tendency, for example, towards developing joint initiatives for national market development, in response to impulses that come partly from the chambers. The Republika Srpska in particular, which had formerly overly concentrated on Serbia as a sales destination, is being forced to try new avenues and is increasingly opening up to the FBiH. If trading structures can be successfully defined and organised, there will also doubtless be opportunities for local industry too.

Detailed and reliable market data from BiH is not available. It must be assumed that the national market for the metal industry will not undergo a major upturn until the restructuring (privatisation) of the economy has made more progress: when this is achieved, improved planning dependability will encourage investment in the processing industry and the demand for investment goods.

The development of the local market is inhibited by further factors: for example, differences in the laws of the two practically independent components of the Federation and the unpredictability of the taxation system must be gradually reduced. In the metal industry in particular, with its close dependence on upstream and downstream value-added processes, the fragmentation of the Bosnian and Herzegovinan market has a very negative effect on continued domestic market development, as well as on the links within the sector. A large proportion of the original market no longer exists anyway and will not be restored in its previous form (defence technology, for example, accounted for 40% of the pre-war mechanical engineering capacity of the large companies).

3.2 Regional market

In 1999 exports to regional markets accounted for around 40% of the total exports of the country. The impact of the breakdown in relations on the BiH, as a small country with previously close links to other parts of the country, was especially devastating. As a result of the Kosovo conflict, Republika Srpska in particular then also lost its sales and procurement markets in Serbia and Montenegro.

The economy in the former Yugoslavia was heavily characterised by intensive interdependency in the form of industrial associations and holding structures. Sales and production companies as well as representation networks were spread over the entire country. Incorporated into this structure were companies and foreign representatives, institutes (research and development facilities) and banks. A large proportion of the products previously made by companies in the territory of BiH were not end products, but components and parts, i.e. many companies traditionally did not make end products. Consequently, the breakdown of regional economic links particularly hit those companies which had close supplier relationships with the Yugoslavian "association system" outside BiH – particularly affecting the metal industry. An example of this is defence technology. The breakdown in business relationships and the resultant disintegration of the existing association systems also led to the loss of the markets in western European countries. For these companies, the strategic question is whether they should reorient themselves within BiH or try to win back their old markets, particularly in western Europe.

The transport system in eastern and south-eastern Europe is in a miserable state and is as a result hampering the expansion of trading relations. Poor and unreliable transport routes have – for the metal industry in particular – a negative effect on the further development of production systems (towards Just-in-Time systems): they prevent reliable planning of material use and increase procurement and warehousing costs.

Exports of the Federation and Republika Srpska in 1999 to countries in the region (in millions of KM)

	Federation	RS
FR Yugoslavia	60.7	183.7
Croatia	195.3	7.1
Slovenia	83.0	13.5

Source: Economics chamber of Republika Srpska, Banja Luka

3.3 The EU

Overall, the competitiveness of BiH companies and hence their export opportunities to the EU are low. At the present time there are only competition opportunities in niche markets, or in combination with or as a subcontractor of further developed companies in the region, since

the conventional markets have since been taken over by competitors from central and eastern European countries. Only additional outsourcing by EU companies would result in new opportunities, although these are greatly impaired by the high proportion of state-run companies in the BiH metal sector and by the current condition of these companies. There are market opportunities in the EU for BiH's metal companies, as both the western and the world market remain receptive for (special) products with a good price/performance ratio.

To date, only a few companies are well prepared for the possibility of winning market share back from competitors. While a core group of exporters from BiH has since gained sound experience abroad, other companies in BiH still suffer from an information deficit. These companies lack the know-how and also the resources for initiating business and expanding and nurturing suitable business contacts. Further obstacles are the result of inadequate marketing activities, lack of advance financing capacity, and also a lack of skilled and qualified employees for foreign sales and marketing, coupled with poor language skills. External service providers are reluctant to become involved in the handling of export deals. Many companies have difficulty in strategically incorporating their foreign commitments into their corporate development. At this juncture, it must be pointed out that in the past 2-3 years a small nucleus of exporters has stabilised in BiH. A further group of companies is occasionally active on foreign markets. Overall, however, there is too little foreign business.

Reorientation by western European partners did not only take place after the conflicts in the Balkans: as early as the early 90s a strong expansion of co-operative relations had begun with companies from eastern Germany, Poland and with the traditionally strong mechanical engineering companies from the Czech Republic and Hungary. The expansion of economic co-operation was accompanied by structural and political changes in the respective economies. One example here is the take-over of the SKODA works in the Czech Republic and its subsequent expansion by VW. In the same period, the VW plant in Bosnia-Herzegovina declined in economic importance.

Unilateral tariff advantages for imports from BiH exist in the EU, Slovenia, and in some cases in Russia, the USA and Turkey. The customs duty for the import of goods from the EU is based on the harmonised system of the European Union. The import duty rates are, depending on the respective commodity group, 0 %, 5 %, 10 % and 15 %, while the customs clearance charge is 1 % of the invoice value; duty-free import applies to selected raw materials and basic chemical substances.

Foreign trade of Bosnia and Herzegovina with Germany (in 1,000 KM)

Commodity description	Export		Import	
	1998	1999	1998	1999

Machinery and vehicles	9,500	9,469	254,218	272,586
Total	179,864	191,874	593,553	631,364

Source: Federal Statistics Office, Wiesbaden; provisional information

The commodity description "machinery and vehicles" approximately covers the production range of the industrial sector being studied. Evaluation of the foreign trade statistics shows a high negative balance overall in foreign trade with Germany and in relation to the industrial sector under review.

Foreign trade of Bosnia and Herzegovina with Germany in mechanical engineering

Commodity description	Imports from Germany		Exports to Germany	
	1999	2000	1999	2000
Total (thousand KM)	80,110	87,513	5,290	7,265
Of which:				
Food machinery and packaging machinery	14.3%	20.3%		
Construction and building materials machinery	25.2%	13.3%	6.5%	3.6%
Woodworking machinery	4.6%	6.9%		
Handling technology	6.9%	4.8%		
Precision tools			27.9%	29.7%
Drive technology			27.0%	22.7%
Machine tools			5.1%	4.0%
Other mechanical engineering products	11.0%	15.4%	13.3%	17.7%

Source: VKMA

The development of long-term co-operative relations with western European companies on the traditional markets on a JIT basis requires beforehand a comprehensive technological renewal of the industrial companies and the introduction of quality management including the necessary certifications and approvals, and would be difficult without them. The expansion of the territorial infrastructure should also be mentioned in this respect.

Relatively good development potential for co-operation by BiH companies with German mechanical engineering companies exists in medium and also heavy machinery construction: the fields of structural steel engineering, mechanical processing, casting, forgings, tool production, container construction, cable production and precision mechanics are highly suitable for the drawing up of industrial co-operation arrangements. BiH can, thanks to its relatively low labour costs and its existing skilled labour potential, be of interest to western partners seeking co-operative arrangements where the proportion of labour costs is high. Basic requirements placed on BiH companies are improved product quality, compliance with and application of international standards, and further increases in productivity. Worthy of mention in this connection are certification to ISO 9001, VDE approval for electrical engineering products, and obtaining the CE symbol. This must be done parallel

to the increased design of products for market niches, as the outlook points to an increase in labour costs.

The potential of the already active exporters from BiH has not yet been fully tapped. According to estimates, around half the companies in the metal industry are only sporadically active in foreign business. Foreign sales frequently account for only a small proportion of overall turnover. The causes of this are a failure to nurture customer contacts and the considerable logistic problems for after-sales service. If BiH's companies can succeed in overcoming these difficulties during the development of foreign business contacts, and hence remain regularly and more extensively in business after that, the export development of BiH's metal industry could see a marked upturn.

Export opportunities exist for those suppliers who have so far oriented themselves primarily to the regional market. In addition, with the aid of direct investments, local medium-sized companies – for example suppliers – can be integrated by cooperative arrangements into the networks of internationally active companies (e.g. suppliers for VW). In addition, further export potentials must be tapped – this applies in particular to services (e.g. licenses, services in the handling of foreign business, etc.).

3.4 Competitors and benchmarking

3.4.1 The most important competitors

Poland, the Czech Republic, Hungary and Slovenia have been able over the past ten years to secure a considerable proportion of the German and western European markets. Their share of turnover on the German market in 1999 and 2000 corroborates this statement. Companies in these countries have succeeded in integrating themselves into international co-operation arrangements and in steadily developing them. The advantages of these countries were greater proximity to the German market (logistics), rapid implementation of the reform processes (including adaptation to international standards), and above all low labour costs. These states have already pushed strongly for structural changes in the industry and are many years ahead of the metal industry in BiH. The major competitors all have location advantages because they operate on large home markets (in terms of population and/or purchasing power). As a result, investments pay off more easily in their easy-to-serve national markets than in the small and administratively split BiH. The latter will only become more attractive in terms of its accessible market when it succeeds in deepening its regional links with the other states of former Yugoslavia.

BiH has, all in all, labour cost advantages over its competitors. Nevertheless, it remains doubtful whether this will, given BiH's low productivity levels, also be reflected in its unit labour costs and hence whether there is really a labour cost advantage when the comparatively low productivity in BiH's metal industry is taken into account.

Benchmarking: labour costs, work productivity and unit labour costs in an international comparison

	Labour costs (USD/hour)	Work productivity (USD)	Unit labour costs (USD)
Germany	30.33	39.44	0.77
Switzerland	27.98	41.60	0.67
Great Britain	13.63	22.65	0.60
USA	17.20	31.64	0.54
Italy	17.40	33.18	0.52
Japan	20.44	39.42	0.52
Spain	12.49	26.35	0.47
France	18.85	40.38	0.47
Poland	2.09	5.03	0.42
Taiwan	5.62	13.55	0.41
Portugal	5.20	13.29	0.39
Czech Republic	1.64	5.01	0.33
Singapore	7.32	24.85	0.29
Malaysia	1.53	5.67	0.27
Hong Kong	4.82	20.63	0.23
BiH (Federation)	1.21	Approx. 1.60**	Approx. 0.76**

Source: The World Competitiveness Yearbook 99

- Labour costs: expense per hour incl. incidental costs
 - Work productivity: value added per employee and per hour of work
 - Unit labour costs: labour costs/work productivity
- ** Rough own estimates, since the necessary reliable basic data are not available

The international comparison of unit labour costs also makes it clear that the available information on BiH is patchy: this makes it difficult for foreign investors to decide whether to commit themselves in BiH. In comparison with the other central and eastern European countries, it is in any event clear that the situation in the Bosnian-Herzegovinan economy is unfavourable. The following sets out the development trends in the eastern European transformation states. This is intended to illustrate what course these economies have taken and what stage of development BiH has reached in comparison.

3.4.2 Hungary

Hungary has been able in the past few years to develop its exports to Germany and in so doing achieve considerable growth rates. These figures reflect in exemplary form the strengthening of the competitiveness of Hungarian industry on the international market. In particular, the mechanical engineering industry and electrical engineering products make up a major proportion of total exports (with 15% and 21% export shares respectively). Hungary was especially able to increase its competitiveness in the sub-sectors of electrical, optical and transport equipment.

Exports to Germany

Commodity group	1999	2000
-----------------	------	------

	Millions of KM	Millions of KM
Mechanical engineering	2,923.6	3,169.2
Electrical engineering products	3,119.7	4,372.8
Total exports	17,528.4	20,704.0

Source: Federal Statistics Office

In line with its liberalisation policy, preferential agreements have been concluded with the EU and with EFTA. Hungary is an associate member of the EU. As far as is known, it has customs exemption in dealings with the EU for industrial products; for other relevant EU requirements, see the Commission report dated 11/2000 on the single market: standards, ecological certification, etc.

3.4.3 Bulgaria

Trade between Bulgaria and BiH has intensified in recent years, in particular thanks to increasing imports from Bulgaria. Bulgaria has been able in the past few years to increase its exports to western markets too, and is devoting intensive effort to using its comparative advantages on these markets. However, Bulgaria's foreign trade has been heavily affected by the Kosovo conflict. In addition to the loss of the Yugoslavian sales market, its transport routes through that country were also severed.

The foreign trade sales of Bulgaria rose by 7.3% in the first quarter of 2001. Exports to Romania more than doubled, and exports to Yugoslavia and Greece rose by more than 22 %. The most important trading partners in the EU area are Germany, Italy, and Greece.

Regional export structure 1999 (shares in %)

Central and eastern Europe (without CIS) including: CEFTA	12.3 4.3
CIS	9.0
OECD including: EU	66.4 52.6

Source: National statistical institute

Regional import structure 1999 (shares in %)

Central and eastern Europe (without CIS) including: CEFTA	7.2 6.4
CIS	23.6
OECD including: EU	57.9 48.7

Source: National statistical institute

Exports from Bulgaria to Germany

Commodity group	1999 (V) Millions of KM	1998 Millions of KM
Metal semi-finished goods	30.1	96.3
Machinery	98.2	82.7
Electrical engineering products	58.8	53.0
Total export	964.4	1,042.9

(V): Provisional data

Source: Federal Statistics Office, calculations of the F.A.Z. Institute

Goods exchange between Bosnia & Herzegovina and Bulgaria (in millions of USD)

	1996	1997	1998	1999	2000
Import	2.726	3.899	10.694	8.592	9.035
Export	0.033	0.220	0.153	0.040	0.257
Total trade	2.759	4.110	10.847	8.632	9.292
Trade balance	-2.693	-3.679	-10.541	-8.551	-8.778

Exchange of selected commodity groups between BiH and Bulgaria (year 2000)

Imports from BG	%	Exports from BiH	%
Rolled steel products	13.5	Lead ores	30.5
Transformers	12.4	Machinery	6.4
Steel structures	8.6	Centrifuges	5.5
Wedges, nails	3.4	Rolled billets and sections	2.4
Iron wire	2.0		

Export opportunities for Bosnia and Herzegovina exist in light and heavy engineering. The national electricity company of Bulgaria (NEK) was privatised last year. In the coming years there will be further heavy investments in Bulgaria in heating power stations, coal mining and in the field of natural gas supply.

In line with its liberalisation policy, preferential agreements have been concluded with the EU, EFTA, CEFTA, Turkey and Macedonia. For industrial commodities, the average customs duties for the EU and EFTA are 2 %. Goods from the Czech Republic, Slovakia and Slovenia are practically duty-exempt for this commodity group. The duty on commodities from a country of origin enjoying most-favoured nation status is on average 11.0 %.

3.4.4 Romania

For the year 2000, the exports of Romania are estimated at 9.6 billion US \$. Romania's main trading partners are the EU and the CEFTA countries. According to forecasts, a further increase in exports can be expected in 2001. Metals and metal products as well as machinery and vehicle construction play an important part here.

In Romania a slight economic upturn can be noted, the cause of which lies in the prospect of accession to the EU and in the economic reforms which have since been introduced. Investment activity has become brisk. Analysis of trading relations with Germany shows that Romania is one of BiH's major competitors on the German and western European markets: for example, during the fourth meeting of the German-Romanian Economic Council, contracts and agreements were signed that involve 500 million USD of investments in Romania in the next few years. These relate mainly to the sectors of transport and power. Consequently, we envisage an expanding potential for business by BiH companies in Romania, particularly for mechanical engineering and electrical engineering.

Export structure by commodity groups (share of total exports in %)

Commodity group	1999
Metals and metal products	15.4
Machinery and vehicle construction	17.9
Other semi-finished and processed goods	25.5

Source: Romanian Committee for Statistics (CNS)

Exports to Germany

Commodity group	1999 Millions of KM	1998 Millions of KM
Iron goods	96.1	117.5
Machinery	211.0	126.6
Electr.eng. products	262.9	208.3
Total exports	3,483.0	3,193.4

Source: Federal Statistics Office, calculations of the F.A.Z. Institute

Romania is a member of GATT, and there is an association agreement with the EU. For originating products a reduction in duties by 2002 is planned.

3.4.5 Croatia

Due to the effects of the Kosovo conflict and economic developments in western Europe, Croatia's exports fell markedly and for the year 2000 stood at about 4.7 billion US\$. Strong growth in production for export requires structural reforms in the Croatian economy. However, export statistics also demonstrate that machinery, equipment and vehicles represent an important export sector for Croatia.

Export structure by commodity groups (share of total exports in %)

Commodity group	1999
Machinery, equipment and vehicles	30.3
Raw materials	5.1

Source: CROSTAT

Exports to Germany

Commodity group	1999 (V) Millions of KM	1998 Millions of KM
Iron goods	30,9	36.7
Machinery	98,0	88.7
Electr.eng. products	99,0	110.6
Total exports	1,257.8	1,335.9

Source: Federal Statistics Office, calculations of the F.A.Z. Institute (V): Provisional data

3.4.6 Macedonia

Macedonia's foreign trade slumped in the 2nd quarter of 1999 as the Kosovo crisis began. Total exports fell in 1999 to a value of 1.2 billion US \$, sales markets were lost, and export routes destroyed. In the coming years, increasing economic growth and foreign trade development are expected, assuming political stabilisation. In view of the uncertain situation in the country at the time of reporting, forecasts about the further development and the position of the country as a possible competitor cannot be made. Any further heightening of the ethnic disturbances will doubtless have a generally negative effect on the assessment of the region as a business partner in the view of western entrepreneurs.

Exports to Germany

Commodity group	1999 (V) Millions of KM	1998 Millions of KM
Electrical engineering products	21.5	16.7
Total exports	476.3	515.0

(V): Provisional data

Source: Federal Statistics Office, calculations of the F.A.Z. Institute

3.4.7 FR Yugoslavia

The exports of the FR Yugoslavia halved in 1999 to reach a volume of 1.5 billion US \$. The main causes of this were the effect of international sanctions, combined with the poor export quality of Serbian products.

It can however be predicted that BiH will in the near future be facing steadily strengthening competition from Yugoslavia, since the latter will represent, after its rejoining of the community of states, a considerable attraction to western and regional business partners compared with the rest of the region. BiH will also be compelled by intensive interdependencies and co-operation arrangements to work towards a regional division of labour that exploits in full the comparative advantages both of BiH as a location and of the existing industrial structures.

Exports of FR Yugoslavia to Germany

Commodity group	1999 (V) Millions of KM	1998 Millions of KM
Machinery	19.0	23.6
Semi-finished iron products	4.7	36.9
Iron goods	16.3	28.8
Electrical engineering products	21.5	16.7
Total imports	352.5	661.0

(V): Provisional data

Source: Federal Statistics Office, calculations of the F.A.Z. Institute

The duties for the import of goods into the FR Yugoslavia are between 0 and 25 %. For raw materials and semi-finished products, a duty of 8 % is imposed, with 17 % for consumer goods, and 13 % for investment goods.

As part of the reconstruction of the country, major donor-financed infrastructure projects, including follow-up orders, will be implemented. Bosnia and Herzegovina is one of Yugoslavia's most important trading partners. With an intensification of marketing on the part of BiH companies, BiH's traditional partnership with its neighbour can lead to the building up of a significant sales market for mechanical engineering and electrical engineering products.

Most important trading partners of the former Yugoslavia (in millions of USD in 2000)

	Imports	Exports
Germany	478	177
Italy	389	222
BiH (only Republika Srpska)	174	254
Russia	319	85
France	89	42

3.4.8 Poland

Poland is, on account of its size and its comparatively advanced development, one of BiH's major competitors, particularly in the metal sector. Furthermore, Germany is one of Poland's most important foreign trade partners, which shows the well-established and expandable business contacts and links between these two countries. The export share to Germany is developing dynamically and steadily. Mechanical engineering and electrical engineering products are important export industries for Poland, and in this connection it should be noted that the export of machinery alone from Poland to Germany approximately equals the total export volume of BiH to all countries.

Exports to Germany

Commodity group	1999 Millions of KM	2000 Millions of KM
Machinery	874.3	1,111.6
Electr. engineering products	1,543.0	1,809.9
Total exports	18,029.9	23,303.2

Source: Statistics Office

In line with its liberalisation policy, preferential agreements have been concluded with the EU and EFTA. Poland is an associate member of the EU.

3.4.9 Czech Republic

The exchange of goods between the Czech Republic and other countries, including Germany, is growing dynamically. Industrial co-operation with German companies has reached a level that indicates an already close interdependence. In this connection the Czech Republic's advantage of regional proximity to Germany must (as with Poland) be taken into account. Trade links and foreign investments very often cross borders, but remain in close regional association with the respective partner country. In this respect in particular, BiH is greatly disadvantaged, because it is not near the EU markets.

Exports to Germany

Commodity group	1999 Millions of KM	2000 Millions of KM
Machinery	2,705.3	3,154.5
Electr. engineering products	3,037.7	4,197.1
Total exports	19,888.6	25,167.6

Source: Statistics Office

3.5 Market opportunities and prospects: overview, specific strengths, weaknesses for BiH as a "latecomer"

Market opportunities for the various sub-sectors vary from target market to target market, and have already been illustrated in the presentation of market opportunities and competitors. The following illustration summarises the strengths and weaknesses and the development potentials and risks of BiH's metal industry, to provide an overview of the specific situation of the industry in the country. It is important in this connection to point out that these are statements about tendencies, which can be considerably more positive or more negative from one company to another. The development opportunities for the metal industry are illustrated within the framework of the strategy development for the sector.

Overall, it can be stated that the productivity of the metal industry has – with some exceptions – not yet increased sufficiently in recent years. While work productivity in competing countries like Hungary, Poland and the Czech Republic developed after the start of their transformation in the form of a J curve, BiH's productivity curve is at best shallow. Studies indicate that work productivity in the central European states in 1999 increased to around 1.5 times the value for 1989, whereas in south-eastern European countries this value is still below the work productivity figure for 1989. Even if no exact figures for BiH are available on this, it must be assumed on the strength of the structural data obtained for the metal sector that productivity in the country remains below that of the more developed eastern European transformation states.

The main obstacle to the dynamic development of the metal sector is still weaknesses in company management. Due to unclear (future) ownership situations and weaknesses in company management, important restructuring requirements are either not being identified, are put off or wrongly handled. The relative success of small private companies has shown that the lack of financial strength of many companies is indeed hampering their development, but cannot be considered as the sole and most important inhibiting factor for the metal sector.

In addition, the institutional infrastructure for the support of metal companies, i.e. cross-company institutions supplying metal companies with sector-relevant information, basic and advanced training institutions and technology-promoting bodies (for example certification institutes, standards offices etc.) and consulting facilities either does not exist or is ineffective.

Strengths/weaknesses profile of the metal sector in BiH in respect of market entry into western Europe / eastern Europe

Assessment criteria	stren- gths	weaknesse s	importance for market entry
Economic			
Capital raising and financial strength		x	high
Growth potential (rapid increase in production possible) / capacity (production, logistics)	x		medium
Benefit from a stable economic policy environment (currency stability etc.)	x		medium
Customer-type dependence	x		medium
Sales-related:			
Sales experience and channels national/international		x	high
Distribution experience/international		x	high
Existence of consolidated international business links		x	high
Experience with trade representations		x	high
Knowledge about competitors	x		medium
Range width		x	medium
Range depth		x	medium
Technical:			
Production facility (technical standard)		x	medium
Production processes (flexibility)		x	medium
Product range (wide)		x	medium
Product quality (international standards)		x	medium
Design quality (design criteria)		x	high
EU conformity		x	high
Development of new products		x	high
Use of information technology		x	medium
Personnel:			
Flexibility of employment contracts (long term, amicable)		x	medium
Language skills of specialist personnel	x		medium
Training standard in respect of modern technologies		x	medium
Training standard in respect of basic technologies / adaptability of technicians	x		medium
Training standards (commercial personnel)		x	medium
Experience abroad		x	medium
Ecological:			
Environmental protection conformity		x	medium
Recycling (packaging)		x	medium
Disposal concepts		x	medium
Organisation:			
Delivery capacity/flexibility (short term)	x		medium
Order handling		x	high
Procedure organisation		x	high
Structural organisation		x	medium
Employee management		x	high
Quality management		x	high
IT equipment level		x	high

4 Development strategy for the sector

4.1 Objectives of the institutions concerned and interaction between them

The development strategy for the metal sector fits into the objectives of the Stability Pact drafted by the international community under the auspices of the World Bank and the EU. It is geared to the fundamental objectives of the Stability Pact, namely:

- to introduce economic reforms aimed at modernising and restructuring industry and at raising the competitiveness of businesses in BiH
- to create greater regional integration among the south-eastern European states in order to better exploit the region's potential for development
- to identify and implement ways of gradually strengthening the integration of BiH's economy into that of the EU states. To do so, the EU has created the Stabilisation and Association Process, which provides a contractual basis for the accession of the south-eastern European states to the EU. No Stabilisation and Association Agreement as yet exists with Bosnia and Herzegovina.

While macroeconomic analyses are available as decision-making aids for political decision-makers in BiH, there is no sector-specific analysis and above all no strategy for the development of the metal sector which takes into account suitable sector-specific basic conditions and institutions. The present study is intended to fill this gap and to create the necessary preconditions permitting sector-related reforms to be implemented in BiH: on the basis of the sector-related analyses of the previous chapters, proposals are submitted in the following section on how the productive potential of the metal sector in BiH can be better used in the future.

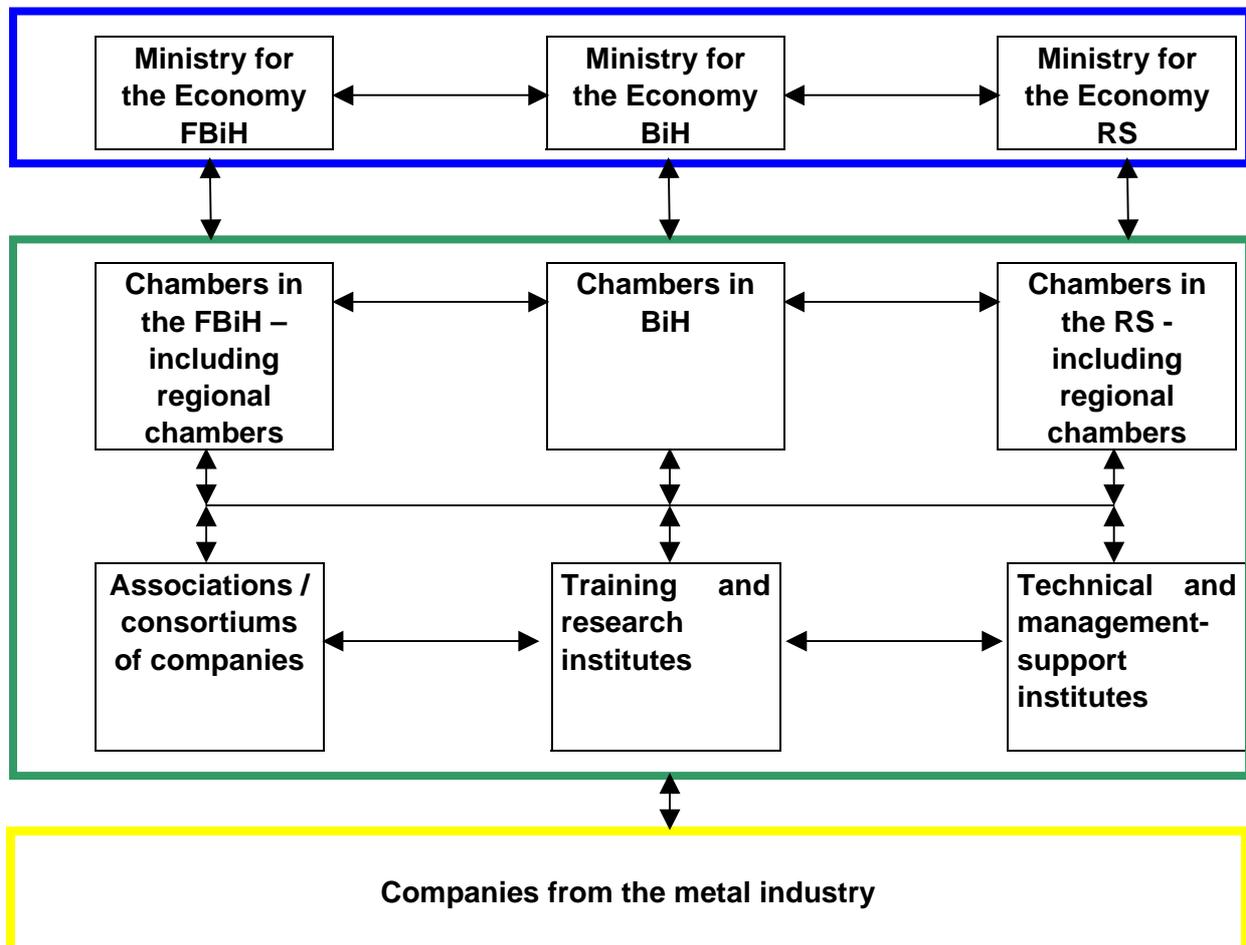
Under the Stability Pact for Southeast Europe, three specialised, cross-state "Working Tables" were set up. These include Working Table 2 on economic reconstruction, development and co-operation, which covers the field investigated in the present sectoral development study. Under the Dayton Peace Accords, the Office of the High Representative (OHR) monitors the country's political and economic development on behalf of the international community. The OHR and other umbrella institutions (such as FIPA and the Office for Statistics) thus monitor and support promotion measures designed to aid this sector.

In order for the metal sector to continue to develop, the various state and private-sector institutions have to work together at the macro and meso levels. At the meso level, the chambers of commerce, cross-company representative bodies and other organisations have the responsibility of initiating and implementing individual measures. As partners of policymakers on one hand and of the companies on the other, these institutions must act as catalysts and sponsors in order to strengthen the competitiveness of the metal sector. The responsibility for creating suitable background economic conditions for industry as a whole and for the metal industry in particular lies at the political level.

Measures aimed at promoting the development of the sector have to be based on the principle of subsidiarity, meaning that they have to be initiated and implemented as far as

possible by the companies themselves, or by the institutions at the meso level. The role of the ministries should be restricted to the level an industrial policy (creating the framework for industrial modernisation).

Cooperation between institutions on the macro and meso level



The **OHR**, as the supreme monitoring body of the international community, should, in the interests of the country's rapid development, in particular aim to

- support ministries in the development of realistic visions and the enforcement of a co-ordinated economic policy
- organise an independent and professional statistical structure / culture for BiH
- strengthen the budget of FIPA (Foreign Investment Promotion Agency) for the short-term improvement of the promotion of BiH abroad
- intensify discussions in the donor community relating to the establishment of funding arrangements in BiH that offer a real source of funds for commercial industrial companies as well.

4.2 Strategic approach

The fundamental approach behind the development strategy which we propose for the metal sector starts from the micro level: the first step is to pave the way at the company level for increasing the value-added in the companies and to open up additional sales markets in BiH and abroad. Policymakers have to continue improving the existing information base about the actual situation of the different companies, and therefore of the sector, in order to provide a realistic estimate of the sector's future potential. It is important that the political authorities draw up a joint programme to develop the sector by means of a close dialogue with stakeholders, rather than by imposing measures "from on high".

In consequence, the present study focuses strongly on improvement measures that have to be initiated at the micro level – that is, by the companies, to provide a basis for sectoral development. On the basis of this, conclusions on which measures need to be taken at the meso level are drawn. The proposed measures at this level form the starting point for a further, detailed dialogue between policy-makers and industry in BiH. The proposals should be regarded as a springboard for further, more detailed discussions: they are complementary, but can also be implemented as separate packages.

It is crucial to implement improvement measures rapidly. In current market conditions, it is difficult to catch up lost time in connection with competitors. Western European companies have long been staking out desired spheres of influence in central and eastern European countries, while Serbia can be expected to be a future competitor. Efforts must be made to ensure that all levels, i.e. companies, institutions at the meso level and also the political decision-makers, work constructively in sector development – any obstructiveness resulting from the continued pursuance of personal interests must be dealt with using every means possible.

The basic condition necessary for the implementation of a sectoral development strategy is that the responsible institutions at the political level and institutions at the meso level (associations, chambers of commerce etc.) should:

- clearly define, delimit and agree with other institutions the responsibilities within the relevant institutions, but also between themselves
- devise political measures that are transparent and based on an intensive dialogue with the affected companies from the metal sector
- be open for dialogue and for external proposals as to how to improve the industry's situation
- work constructively on the implementation of measures to enforce the Stability Pact.

4.2.1 Micro level

From the analyses and conclusions of the present study, it is possible to derive three **fundamental directions for a strategy to promote the metal sector** at the company level:

1. **Strategy of international market differentiation and integration into the international intra-sectoral division of labour:** companies from the fields of automotive supply, defence technology and part/component production predominantly supply in the long term the world market with high-quality parts and components.
2. **Strategy of streamlining and product specification:** companies from conventional metal construction, structural steel engineering and simpler production predominantly supply in the medium term the domestic/regional markets as well as the Middle East.
3. **Strategy of regional market differentiation and greater integration into the national and regional division of labour:** the supplier grouping with already known or new partner companies from the region will be rebuilt step-by-step, resulting in the creation of regional networks.

These fundamental strategic directions reflect the recommendation that metal companies from BiH should pursue a niche and differentiation strategy in order to position themselves in the medium and long term on the regional and international markets. World-wide, the industry is subject to strong and predatory competition, and BiH as a "latecomer" will only stand a chance if it penetrates market areas and niches where there is less competition or where the country has specific competitive advantages thanks to its geographical location.

This strategy is recommended particularly in view of the fact that BiH is unattractive as an investment location in comparison with other transformation states. Broadly based modernisation of the sector is not possible because of the current lack of capital, which is expected to persist in the future: this means that an "investment strategy", i.e. a sector-wide and comprehensive strengthening of the capital stock, that is of the fixed assets, can be ruled out.

Support measures at the company level should be implemented against the background of one of the above strategies; further individual measures in the various subject fields must then be derived from the general strategic direction. To achieve the set objectives, it is possible at the company level to distinguish between a number of strategic approaches. These measures are – subdivided by area – illustrated below in the form of an overview. This list is intended to provide political decision-makers with a survey of the main areas of improvement potential at the company level. As part of sector promotion, the above subject fields must be addressed and subdivided into further details during individual company consultations.

Approaches for support measures at the company level

Topic	Objective	Strategy / activity
Product range	Concentrating product range on core competencies	<ul style="list-style-type: none"> • Review of the available product range in respect of current and future competitiveness • Development of a range of highly competitive products • Concentration on core competencies and products with specific competitive advantages
Production to order (of the customer)	Enabling profitable production to order	<ul style="list-style-type: none"> • Increase/improvement of supply of high-quality parts, components • Enabling order quantity "one" to be a profitable target size • Alignment of new designs to potential for production-to-order
Development	Recognising development potentials and speeding up development processes	<ul style="list-style-type: none"> • Improvement of know-how concerning modern technologies and broaching their application potential in BiH • Preparation and enabling of systematic use of modern technologies • Introduction and use of "Simultaneous Engineering", i.e. integration of product concept/design, quality, costs and time during product development
Production processes and procurement	Modernising production processes, reducing procurement costs and optimising logistics	<ul style="list-style-type: none"> • Preparation, financing and implementation of investment decisions • Systematic optimisation of procedure organisation and provision of new machinery • Joint buying and transportation • Joint inspection/certification • Conclusion of framework delivery agreements / closer co-operation with suppliers including set up of supplier networks
Management, personnel leadership and organisation	Introducing modern leadership methods, project management and teamwork	<ul style="list-style-type: none"> • Introduction of necessary changes in the management and leadership culture • Employee motivation by positive performance incentives (e.g. success-related payment) • Simplification of structure and procedure organisation and more efficient and market-oriented design of these • Decentralisation of decision-making powers • Creation of flat hierarchies and small units (clear-cut allocation of responsibilities)

Topic	Objective	Strategy / activity
Controlling	Simplification and modernisation of the company management	<ul style="list-style-type: none"> • Building up of company planning • Setting up effective controlling and product-related costing
Quality	Understanding quality as the result of all the company processes	<ul style="list-style-type: none"> • Introduction of quality management • Preparation and implementation of certification programmes

The illustrated subject fields indicate starting points for sector development that must be taken up in a cross-company way at the meso level.

4.2.2 Meso level (structure-promoting policy)

To increase the structural (systemic) competitiveness of the metal sector, a large number of cross-company measures ("structure-promoting policy") must be taken; their objective is to support the metal companies outside their environment in the medium and long-term strengthening of their competitiveness (meso level). Strategic approaches to the implementation of measures at the meso level are the subject of this chapter, and further details can be found in the sections on how to tap into markets, on qualification and training, and on quality management.

A restructuring policy should be seen as the common task of both public and private players whose objective is to continuously raise the efficiency and competitiveness of the metal sector. There is thus a need to moderate and steer complex opinion-shaping and agreement processes in this field. Given the prevailing political situation in BiH, this could paralyse the implementation of actual aid measures for the sector if this were to take place at the national level. It is therefore recommended that policy should be implemented through regional initiatives. The seeds of sectoral development need to be sown, according to the players' interests, strengths and will to implement measures in the respective regions, in the hope that they will have a knock-on effect on other regions.

This regional restructuring policy reflects the overall economic interest in fostering the development of clusters of industry rather than an even distribution across the country. This would also increase inter-regional competition, encouraging regions to seek to emulate each other.

The analysis of regional clustering in the BiH metal industry has attempted to develop approaches for these clusters. The responsible ministries and local governments should consolidate these analyses on a case-by-case basis and pinpoint the specific regional features of the links between the industries. Experience has shown that selective aid measures obtain the best results, all the more so since public budget resources are scarce. A "strengthening the strong" approach, focusing on dynamic, timely development measures, is preferable to a blanket approach. In concrete terms this means, for example, that timely regional development measures conducted primarily by the metal industry should be given priority over blanket subsidising of interest payments on investment. For example, it would be

better to promote the setting up of an institute for VDE certification if the lack of such an institute is inhibiting development in the sector, rather than to subsidise debt-ridden businesses with public funds.

The most important partners for implementing a restructuring policy are institutions at the meso level, such as technology promotion centres, standardisation bodies etc, and in particular the chambers of commerce at all levels (national chambers, entity chambers, regional chambers and the bodies representing the companies, i.e. the industry associations or working groups). In BiH, these structures have plenty of scope for development compared with other countries, as the earlier analysis showed. In other words, the basis for implementing a restructuring policy is still very weak in BiH.

The conclusions for policy are as follows: much more has to be done to promote and develop chambers of commerce and industry associations as well as cross-company, private-sector initiatives. Another aspect of this is the need to foster networking between companies (see also Chapter 4.4).

One first step towards achieving this would be to continue and intensify efforts to build a transparent chamber of commerce structure (including foreign trade). The ideal structure would be a two-level hierarchy consisting of regional chambers and one umbrella chamber. Existing modernisation initiatives in the various chambers have to be fostered and supported (e.g. aid for planning and undertaking foreign business trips, co-operation on fair projects etc.). Conversely, consistent steps need to be taken to eliminate chamber structures which are hampering structural change in the metal sector because of backward thinking and obstructiveness. Here again, a focus on regional initiatives is recommended, in order to involve the chambers in questions of motivation and development potential. To strengthen the chambers, a demand-focused range of services has to be developed that the companies will regard as genuinely beneficial, while the chambers have to put an end to their practice of exerting politically motivated pressure on companies.

In order to accelerate structural change in the chambers, private enterprise – in working groups dealing with specific issues, for example – needs to be encouraged. The state could accelerate this process by organising technology forums and similar opportunities for discussion. The working groups could then develop into private-sector industry associations independent of state bodies. State influence on companies should not be exercised through cross-company associations, but only through legislation; otherwise, these associations will lose all credibility in the eyes of business people and will ultimately fail to be an effective tool for implementing policy.

4.2.3 Macro level

The task of the macro level is to implement free-market reforms with sufficient critical mass to drive structural change in BiH's metal industry. The role of the industry ministries of the FBiH and the RS should by no means be limited to that of more or less passive supporters of privatisation and liberalisation measures. Rather, the ministries' room for manoeuvre in matters of sectoral development will increase with each success that is achieved thanks to the development of cross-company industry associations and services at the meso level. The

core challenge facing the ministries is to act as catalysts contributing to this technical-industrial structural change in the metal sector: first and foremost, this involves throwing the old ways of thinking in terms of production figures and volumes overboard, and giving priority to the market and to raising value added instead.

The state therefore has the task of supporting systematic streamlining in the metal industry and stimulating a dynamic learning and changing process at the various action and intervention levels. In specific terms, this means that the state must promote or develop existing specialisation fields in BiH's metal industry that have competitive potential in the medium and long term.

The industry ministries have to recognise and promote any potential for networking with other sectors and clusters, e.g. strengthening the delivery links between the electricity industry and the metal industry. Cross-ministry working groups should be set up to draw up specific plans for measures to expand the domestic market potential of the metal industry.

The fundamental prerequisites for improving the background conditions for industry as a whole are detailed in the FIAS study entitled "Commercial Legal Framework and Administrative Barriers to Investment", dated March 2001. Since the metal sector in BiH – as already explained - requires considerable investment, the factors mentioned in the FIAS study play a particular role for this sector.

The following cross-sector political requirements are particularly relevant to the development of the metal industry, and can be defined at the macro level:

- SMEs will play a key role in BiH's economic development because, compared with large-scale companies, they have good potential for innovation and productivity growth. This equally applies to the metal sector. In consequence, any measures aimed at promoting the sector have to be closely co-ordinated with general measures aimed at promoting SMEs. We view the adoption of economic policies aimed at facilitating access for SMEs to finances, the simplification of administrative procedures and tax systems, greater legal security and the abolition of corruption, as well as greater efficiency on the part of the institutions at the meso level, as the key elements for supporting SMEs. Any aid measures for SMEs have to be based on exclusively economic and competition-focused criteria. Politically motivated criteria are not an effective basis for bringing about structural change in the metal sector.
- Transparent and consistent legal and regulatory frameworks geared to long-term planning are needed.
- The average customs rates in BiH are some 7-8 per cent below those of the other states in south-eastern Europe. However, the customs provisions include numerous special regulations which leave scope for protectionist measures. There are major differences in the customs policies of the two entities, which result in undeclared goods entering BiH. BiH's accession to the WTO is still a long way off, which does not improve the country's competitive position in relation to the more highly developed transformation states. In all these fields, policy-makers have to strive to gradually dismantle BiH's "special status" in this respect and to establish it as a fully-fledged, industrialised nation within the international community.

- BiH's statistical database must be improved: foreign investors have access to data on market developments and industry structures from neighbouring countries in south-eastern Europe and from BiH's competitors, indicating their attractiveness for investment. The available statistical data on BiH are extremely sparse; moreover, they generally apply to the two entities separately. This could result in potential investors' simply ignoring BiH, since there is no sound information basis for taking such a crucial decision.
- Structure-preserving labour legislation should be dismantled. Maintaining "waiting lists" at the company level shifts social costs from the state to companies. This acts as a brake on structural change, making metal companies unattractive to potential investors.

The sector-related analyses indicate that the privatisation of state-owned companies needs to be accelerated urgently in the interests of development of the metal sector. The frequently inflated evaluations, based on fixed assets, in the run-up to privatisation are illusory: both domestic and foreign investors evaluate businesses by weighing the anticipated profits against the liabilities they are assuming. Logically, the privatisation of the metal companies should be viewed primarily as a political measure to trigger and accelerate structural change in the metal industry, and less as a source of income for the state. In addition, many of the metal companies in BiH are not, due to their present structure and size, interesting to foreign investors. Very often parts of a company with good market potential are attractive to investors. Companies in the metal industry must be prepared organisationally and structurally so that they can in the medium and longer term also operate on the market as smaller and specialised units. These company parts would then also be of interest to potential investors. In the course of sector promotion measures, therefore, due attention must also be paid to ensuring that the consultancy work for individual companies selectively supports this focusing process and thus makes companies more attractive for (external) investors.

4.3 Measures to tap into markets

Measures to tap into markets must be incorporated into co-ordinated and strategic lines of action on the micro, meso and political levels. The basic approach should be to promote the continuity and intensity of foreign trade commitments of exporters which are already active, and at the same time to gradually open up new export potentials. This is particularly possible in the supplier industry, in the economic field of direct investments (e.g. the modernisation and expansion of the aluminium plant in Mostar, the steel works in Zenica, cement works, VW etc.) as well as outside the processing industry. Measures to tap into markets must be target group-oriented.

Individual approaches designed to tap into markets

Target group • Activities	Activity / support by		
	Company	meso level	macro level
<p><i>Export beginners</i></p> <ul style="list-style-type: none"> • Reduction of information deficits by providing know-how and advice • Attending and visiting trade fairs: international specialist fairs, international multi-industry fairs on the target markets • Co-operation exchanges and market-opening trips, making initial contacts, transactions and co-operative arrangements 	X	XX	
<p><i>Companies with little export experience</i></p> <ul style="list-style-type: none"> • Advanced training measures and information provision in the companies: foreign marketing, intercultural communication, international standards, market analyses and research • Drafting of marketing and sales concepts • Strategy concepts: which markets, with which objectives • Creation of structural preconditions within the company (setting up sales and marketing organisations) • Increased use of existing networks of EU projects (Euro Info Centre etc.) • Otherwise: see under "Export beginners" 	XX	XX	
	XX	X	
	XX	X	
	XX	X	
	X		X
<p><i>Export companies</i></p> <ul style="list-style-type: none"> • Improvement of innovation management (see previous chapter) • Build-up and expansion of export consortia/export-related company networks • Build-up and expansion of foreign representations: co-operation with service providers or with exporters established on the target market 	XX	XX	X
	XX	X	X
	XX	X	X

XX: Main responsibility

X: Active co-operation/support

It is important in the course of the promotion work designed to tap into markets to concentrate on selected target regions (the target regions relevant for BiH have already been analysed in Chapter 3 of this study). The selection criteria for this should be existing

intensive contacts in certain regions and developable market positions. Policy-makers should support the economy by specific assistance, e.g. via their respective embassies.

Even if the initiatives for these market-opening measures have to come from the companies, the meso level nevertheless has a crucial supporting role to play. It is proposed that a virtual linkup of information and service sources important for foreign trade be established.

Approaches to tap into markets to be conducted by metal industry companies

Topic	Activity / support by		
	company	meso level	macro level
• Expansion of a joint foreign trade gateway via the Internet		XX	X
• Making knowledge of partners centrally accessible for partners and companies – also using the Internet, i.e. compilation of a "Who's who" in the European metal industry, performance profiles		XX	
• Making sector-related information about selected target markets available		XX	
• Regular publishing of foreign trade news, trade fairs, market exploration trips, seminars, co-operation exchanges, experience reports		XX	
• Creating a database on exporters from the BiH metal industry		XX	X
• Providing information on basic questions of export business (e.g. customs and foreign trade law, financing possibilities etc.)		X	XX
• Providing background information on purchasing stakes in companies, setting up trade representations, joint ventures and other forms of co-operation		XX	X
• Establishing links to information on EU programs, trans-national projects, co-operation arrangements with EU partners etc.		XX	X

XX: Responsible activity/initiators

X: support

In BiH a foreign trade congress for the metal industry could be prepared and organised jointly with partners as a central political event. The initiators of this event should be the BiH chambers, so that they can position themselves as competent service providers for foreign trade issues in BiH. This presentation could be used to set out the current foreign trade

situation of the country and to present the range of achievements of the foreign trade partners and their products. Partner regions, partner organisations and strategic investors can also be integrated into this forum.

4.4 Measures for better integration within the sector

Network formation is crucially important as far as the further development of the metal sector is concerned. Companies must co-operate in technological networks and be integrated into production and innovation systems, as these favour an intensive information exchange and technological learning. Studies from a wide variety of regions world-wide have repeatedly confirmed that the expansion of company networks, supplemented by institutions on the meso level (the so-called clusters) have a very strong positive effect on the competitiveness of regions and/or nations.

The benefit of company and intra-sector networks is often underestimated in transformation states, and this is also true in BiH. Company managers do not recognise the value of co-operation with other companies and sector-relevant institutions. This narrow-minded way of thinking, often difficult to understand rationally, hampers the use of synergies and has an overall negative effect on the development of a sector. Company representatives and policy-makers are called upon to promote network formation by suitable measures. Here a step-by-step intensification of co-operation is recommended, the objective being to slowly build up confidence. At the same time, company representatives must realise that short-term advantages can be counter-productive in business in the long term, and that company networks must in the long term be geared to a "win-win situation" if they are to remain stable. In other words, all network partners must benefit in the long term from co-operation.

Approaches for improved integration within the metal sector

Topic	Activity / support by		
	Company	meso level	macro level
• Forging personal contacts by joint events and enabling knowledge transfers, for example by...	XX	XX	XX
• ...the establishment of regular round tables on important topics	X	XX	XX
• .. promoting exchanges of experiences between companies	X	XX	
• ...more visits to companies and trade fairs, particularly in foreign countries relevant to the market	X	XX	
• ...visiting international specialist conferences and events	XX	XX	XX
• Promoting "verticalisation" (see below for	X	X	XX

Topic	Activity / support by		
	Company	meso level	macro level
explanation)			
• Promoting "horizontalisation" (see below for explanation)	X	XX	X

XX: Responsible activity/initiators

X: support

The objective of political supporting measures must be to promote national and regional "verticalisation", containing upstream and downstream areas. For example, considerable investments have been made in steel production in the country; at this point there is networking potential for the metal industry on the basis of raw materials. The objective must be to keep the value-added process as far as possible inside the country and to persuade investors (mainly from steel production) to commit themselves in the downstream metal industry too.

At the same time, efforts towards a regional "horizontalisation" must be consolidated: long-term supply links on the basis of previously made investments in Slovenia and Croatia in particular could be built up and expanded. Policy-makers must ensure that the formation of regional networks and the resultant commitments of regional business partners are not understood as a "sell-out of the country", but more as an opportunity to secure market potential in the long term on the basis of regional company groupings. This network formation can be supported in very specific ways by the promotion of mutual visits of managers, cooperation exchanges, etc.

4.5 Qualification and training

The initial focus should be to intensify basic and advanced training in companies, in order to eliminate as quickly as possible the knowledge deficits hampering the further development of the metal sector. Given the widespread under-employment in BiH, it should for example be possible to provide incentives for further training parallel to current employment. There is a considerable need for training at the higher and middle management levels in metal companies, specifically in the fields of:

- strategic corporate planning
- innovation management
- accounting and controlling, costing and product costing analysis
- personnel management
- marketing and sales organisation
- quality management and development of "Total Quality Management" as a principle of company management
- materials management
- production control and production scheduling (REFA).

Here it is not only the imparting of technical knowledge that is important: what is crucial is the gradual adoption of western corporate thinking and action, e.g. delegation of responsibility, teamwork and project management.

In view of the ever-increasing need for qualifications, the training of apprentices must be expanded in the more technologically oriented sub-industries of the metal industry (such as electrical engineering). On the basis of a systematic survey of the existing apprenticeships and their strengths and weaknesses, apprenticeships in other occupations should be gradually introduced. As a model, the dual apprenticeship system of Germany is recommended, entailing a combination of theoretical and practical training. Positive examples for the introduction of these apprenticeship programs can already be found in Romania and Bulgaria, for example. These apprenticeships must – in compliance with modern requirements – be supplemented by basic training in management and cross-occupational issues. The latter include, for example, using IT, techniques for group work, etc.

In the metal industry there is a particular requirement for sector specialists or mid-level specialist and management personnel for the companies, as well as for industry-related services, institutions on the meso level (such as quality inspection etc.), and qualified, practically oriented consultancy services. Very often external consultancy support of a specialised/technical nature is provided either by university professors or their students, or by former company employees at the management level. Innovative solutions to problems geared to modern-day company practices are therefore rarely suggested.

A further step to improve qualification standards at the management level of the metal industry entails initially comparing in a systematic way the current curricula and equipment features of existing university institutions with those in western industrialised countries. In this way a strengths/weaknesses profile can be prepared, allowing specific improvement measures to be implemented. In accordance with the Declaration of Bologna, which aims at a harmonisation of European training, the training system at the universities in BiH is currently being reformed. In keeping with the premises of this declaration, the following plans for improvement relevant to the development of the metal industry are taking shape:

- Strengthening the practical orientation, i.e. orientation of training programmes to company needs, lowering basic research in favour of application development
- Improving both the staff and equipment in training establishments
- Strengthening the mobility of specialists between training and research establishments on one hand, and business on the other. This also entails more student exchanges with business (initiation of company internships).

A start on quality improvement has already been made. Training laboratory facilities are being modernised – for example it is now possible at the University of Banja Luka to train engineers in the design field using computers. What is important now is to transfer these successes to the rest of the country and to promote both the exchange of students and teaching personnel and know-how transfer within the country. With regard to the sectoral development of the metal industry, networking potentials between universities must be identified in particular, and co-operation between university teaching and companies must be specified in individual steps. These can be, for example, company-specific student and dissertation work, industry and industry-related detailed analyses, internships in the

company, and support for the companies in introducing modern computer and internet-based technologies.

The further training of specially-qualified scientists abroad in the scope of exchange programs promotes know-how transfer and the forging of contacts with international business partners. A first step here is, following a systematic survey of existing exchange possibilities, the forging of contacts with international training institutions. Contacts with the already further developed transformation states, for example Poland, Hungary and the Czech Republic, are particularly recommended in this context, as knowledge on how to cope with the structural changes stemming from transformation can also be tapped here. Exchange students must be persuaded by means of special incentives (e.g. connected to the financing of their training) to come back and use their know-how in the long term for the benefit of BiH's economy.

Returnee and invitation programs for well-trained and skilled employees working abroad (particularly in Germany) help to ensure that the existing expertise of Bosnian and Herzegovinan citizens abroad will benefit their country. Specifically, these returnee programs can be introduced in specialised and technology centres where the returnees can, after suitable methodical training, themselves train specialists resident in BiH.

4.6 Technology development

4.6.1 Policy for technology promotion

A technology policy should primarily aim to widely diffuse new technological processes and organisation concepts and hence to ensure a continual industrial modernisation process. Technology development and promotion must be oriented to the following basic principles:

- Promotion of application-oriented research and development in the universities (see above), but also in state-run and private technology institutions – for example setting up and strengthening (existing) test laboratories for industrial standards, consultancy centres for the introduction of quality management systems, etc.
- Stimulation of technology dissemination – via information and consultancy centres, Internet gateways, industry-specific demonstration centres (for example introduction of Computer Aided Design (CAD) or Computer Aided Management (CAM), training workshops, technology start-up centres, and the institutionalisation of national technology dialogues.
- Promotion of research and development and arousing creativity potential at company level, for example by technology competitions, tax breaks for promotion of company research expenditures, systematic information on BiH companies and support for these in public tendering procedures, etc.

Experience from other transformation states shows that the success of research and development institutes tends to exponentially match their degree of specialisation. Bodies with a clear strategy or alignment geared to specific fields are better placed to disseminate practical know-how. The conclusion that can be drawn for promotional policy is that, when in doubt, it is preferable to promote specific, application-focused institutes which are in direct

contact with companies, rather than general research projects, for example by universities. The more directly a research institute is able to contribute to solving acute problems experienced by companies, the more willing companies are to help finance the research institutes.

A concept aimed at promoting technology in the sector needs to be drafted. It would exceed the scope of this study to detail the individual aspects of such a concept, especially as the aim of promoting technology is to create, for all sectors of industry, the overall conditions conducive to research and development in companies, universities and private research institutes. In the light of the three principal objectives named above, the following points need to be defined in order to implement promotional measures for technology:

- The financial scope and means for providing financial incentives/supporting measures
- The institutional framework and distribution of roles between the micro, meso and macro levels
- Networking of sector-specific supporting measures with general R&D promotion in BiH
- Emphasis on regions (clusters) and/or sub-industries.

4.6.2 Quality management, measurements and standards

Quality management and certification to ISO 9000 (2000 version) is of crucial importance, particularly in respect of the strategic approach for the entire sector – the supply of high-quality parts and components. Quality management harmonises the measures needed to achieve quality throughout the company and hence has a direct effect on product quality. The certification of the company proves the correctness and the completeness of the company's quality system. In addition, there are approval systems for certain products that may only be sold under closely determined conditions. For example, electrical engineering articles in Germany generally require the VDE symbol, confirming their compliance with the specialised standards and safety standards necessary for the product. Supplies to the automobile industry are based on the VDA guideline number 6, listing the conditions necessary for co-operation with and deliveries to the automotive industry. The dissemination of the above processes in BiH promotes sectoral development; the dissemination of quality management including ISO certification is, for example, an essential condition for improving the market opportunities of the industry in the medium and long term. The objectives and the substance of quality management must be made known to a wider circle of entrepreneurs; particularly relevant is the standard DIN EN ISO 9000:2000, valid since 15.12.2000.

The strategic objective of supporting policy must be to build up in no more than two or three years a network of quality management consultants. The individual steps, each based on the previous ones and leading to a wider application of the principles of quality management in BiH, are illustrated in Chapter 5 of this study. The institutions sponsoring this strategy can be the chambers, private technology institutes, management consultants or company working groups. In any event, it is an advantage to support several – competing – institutions in order to ensure high performance thanks to competition. All these institutions could combine their

joint interests in a single working group or association; activities in this respect do not have to be limited to the metal sector.

Measurements and standards in BiH can be expanded in a similar form; here the more stringent sector-specific requirements (for example with the VDE symbol) would suggest an even stronger linkage to industry-oriented research and technology-promoting institutions.

4.7 Developing a local consultancy market

Basic and advanced training programs contributing to the further development of the metal sector should focus on the establishment and strengthening of consulting services. The consultancy services offered by domestic consultants are not highly regarded by companies in BiH, who often hire the services of university professors and former senior managers as external consultants. This fails to take into account the fact that external consultants who have an in-depth understanding of the free-market approach – not only in business management, but also in production technology – can make a genuine contribution to a company's business, even without long years of experience in a business. Given the enormous task facing them, companies in BiH urgently need support which, for reasons of cost and volume, ought to be transferred from international consultants to local ones.

For this reason, a census has to be made of the qualified consultants who specialise in the metal industry, and company managers then have to be convinced of the benefits of their services. They also need to be coached as to how to successfully work with consultants. The chambers of commerce in BiH could very well fulfil this task: they should stop viewing consultants as competitors, but rather as vehicles for providing businesses with essential information on general issues regardless of sector. The consultants could also be used to further improve the standing of the chambers of commerce with companies in BiH. Drafting concepts for building consultancy businesses and centres lies outside the scope of this study. Various donor bodies, including USAID and the Soros Foundation, have developed methodologies and sample projects for this purpose.

Whereas – as illustrated above – the technology development institutions need to be geared more specifically to one industry or to specialised fields if they are going to be of use to that industry, the scope of consultancy skills should instead cover all industry sectors of. The reason for this is that the medium to long-term objective in building a consultancy market must be to create consultancy companies that will be capable of establishing themselves on the market in the long term. Restricting consultants to one or a small number of sectors severely limits their potential customer base. Experience in other transformation states has shown that the consultancy firms which are best able to assert themselves on the market are national market leaders in terms of professionalism, rather than due to specialisation in any particular industry. Examples are IT training and consultancy centres, auditors with a strong emphasis on management consultancy, secretarial training institutes (basic and advanced training), consultants in modern accountancy and cost accounting techniques, etc.

The strong presence of donors in BiH has led to a relatively broad spectrum of consultancy services in the country. In promoting the metal sector, policy-makers and institutions at the meso level need to approach international donor organisations concerning the issue of qualified consultants. Policy-makers have to urge international donors to concentrate more on *training* local consultants in order to make them available for the local market as swiftly as possible. A situation in which BiH consultants are paid solely by international donors for a lengthy period must be avoided – this will raise consultants’ expectations and lead them to demand fees which the private-sector industry in BiH is unable to pay.

5 Catalogue of measures

In the previous chapter, strategies for sector development on the micro, meso and macro levels were formulated and from these the basic features of specific measures for sector development. In the closing section of this study, it is now important to weight the various activities based on their importance and timescale.

The box below is subdivided according to the time horizon (short, medium and long term nature) of the various measures and their importance to the sector. It reflects an initial assessment and should be understood as a starting point for appropriate working groups with the relevant stakeholders.

↑ Importance for sector development			
High	Build-up of networks	Associations	Basic and advanced training (company-related and cross-company) and
	Co-ordinated and coherent policy of technology promotion	R&D promotion (including expansion of institutions)	Expansion of management capacities in the companies
		Strategic focus of companies	Market opening
		Expansion / focusing of product range	Quality management
Medium	Protective rights	Harmonisation with international standards	Company controlling
	Optimisation of production methods	Product development	Financing possibilities
			Further development of chambers

↑ Importance for sector development			
		Company organisation	Improvement of the economic policy environment (privatisation etc.)
Low		Procurement	Assuring fair competition in BiH
	Long-term	Medium-term	Short-term
	Time horizon		

To make the individual measures coherent and co-ordinated, the responsible ministries should appoint a steering body to co-ordinate the supporting measures with the stakeholders and supporting institutions involved and to perform continuous monitoring. This steering body should supervise the individual working groups formed for a specific topic. The heads of the working groups should be members of the steering body.

Working groups should be formed that jointly set about detailing the measures for sector development proposed in the preceding section and specifying these in the form of individual activities. At this juncture, the areas with the greatest importance for the sector that must be tackled in the short term are be illustrated below (chapters 5.1. – 5.3.). These include basic and further training, quality management and tapping into markets.

Effective measures for sector development result from the interaction of all players relevant to the metal sector at the political, meso and company levels. All these levels must be taken into account when co-ordinating and designing the measures.

5.1 Qualification and training

As a general principle, the underlying purpose of qualification and training regarding the further development of the metal sector is familiarisation with modern management methods and improvement of technical know-how.

Activities	Activity / support by		
	Company	meso level	macro level
• QM training (see also below)	X	XX	
• General qualification of management	XX		
• Management training with coaching	XX	X	
• Promotion of "visual instruction" in the West	X	XX	
• Basic/advanced training in the commercial sector		X	XX

Activities	Activity / support by		
	Company	meso level	macro level
<ul style="list-style-type: none"> Basic/advanced specialist training in the engineering field 		X	XX
<ul style="list-style-type: none"> Modernisation of BiH study courses and labs 		X	XX
<ul style="list-style-type: none"> Setting up of postgraduate study courses at relevant BiH training establishments providing advanced training 	X	X	XX
<ul style="list-style-type: none"> Training of industrial engineers 			XX
<ul style="list-style-type: none"> Setting up of establishments for technology promotion at the universities/technical institutes 		X	XX
<ul style="list-style-type: none"> Setting up/continuation of partnerships between western European and BiH training institutions 	X	X	XX

XX: Initiators – main players in implementing the respective measure

X: Support and active co-operation

5.2 Assistance in tapping into markets

Measures to assist tapping into markets concentrate primarily on the company sector and must be supported by the chambers (foreign trade chambers). Supplementing the target group-oriented supporting strategies for tapping into markets as defined in Chapter 4.3 are the following groups of measures:

Target group Activities	Activity / support by		
	Company	meso level	macro level
<ul style="list-style-type: none"> Further progress in transforming the chambers into foreign trade chambers, and providing a modern and demand-oriented range of services for these foreign trade chambers 	X	XX	X
<ul style="list-style-type: none"> Fine-tuning of detailed suggestions for target group-oriented export promotion strategies and of the main target regions for export (no interventionism, instead targeted information and marketing support for companies. This can also include the setting up and support of an association of export/trade promoting institutions and/or the networking of existing information sources in connection with this). 	X	XX	X

<ul style="list-style-type: none"> • General promotion of BiH as partner for trade relations and as an investment location 		X	XX
-------------------------------------------------------------------------------------------------------------------------------------------	--	---	----

5.3 Quality management

Based on the strategic objectives for a wider application of quality management in BiH companies, a sequence of combined measures can be identified. These measures must be further subdivided and provided with a detailed schedule.

Activities Target group	Activity / support by		
	Company	meso level	macro level
<ul style="list-style-type: none"> • Systematic survey of the existing supporting initiatives and institutions in the field of quality management (involved institutions, consultants, inspected companies, supporting programmes by foreign donors etc.) 		X	XX
<ul style="list-style-type: none"> • Promotion of quality circles and information centres for quality management (including PR for quality management – combination of QM know-how by specialist associations and other technology-promoting institutions) 	X	XX	X
<ul style="list-style-type: none"> • Systematic analysis of good practices and existing QM systems in the region (in particular in Croatia, Slovenia, Romania, Slovakia and Hungary) 		X	XX
<ul style="list-style-type: none"> • Performance of cross-company training courses for BiH companies about quality management ("awareness raising") and performance of individual company consultations with the purpose of initiating the introduction of QM systems. 	X	XX	
<ul style="list-style-type: none"> • Selection of institutions in BiH acting as "resource centres" for QM – drafting of development plans for these institutions (performance profile, financing, personnel levels etc.). 		XX	X
<ul style="list-style-type: none"> • Definition and initiation of co-operative arrangements between "QM institutions" from BiH and western and/or regional certification institutions (western partner institutions as sponsors, thereby ensuring the know-how transfer between western 		XX	

Activities Target group	Activity / support by		
	Company	meso level	macro level
Europe and BiH)			

<ul style="list-style-type: none"> Pilot training scheme for future auditors in quality management – abroad or in BiH by western trainers (multi-tage process up to the level of a QM trainer). These trainers must directly co-operate with institutions from BiH 	X	XX	
<ul style="list-style-type: none"> Initiation and performance of a pilot consultancy programme in selected metal industry companies by auditors from BiH – if necessary with additional support by foreign consultants 	X	XX	

Annex: List of selected reference companies from the metal industry

BiH-Enterprises (Min. of Industry FBiH/RS)							
	Enterprise, city	Subsectors	Ownership	No. of employees	Turnover (1000 KM)	Turnover per employee (KM)	Products
1	BEKTO-INTERNATIONAL, Gorazde	.2.3	P	50-199	over 10.000	over 50.000	Tools
2	BIRA, Bihac	.3.7	S	200-1.000	over 10.000	20.000-50.000	Refrigerators
3	BNT Tv. Masina i hidr., N. Travnik	.2.3	S	200-1.000	1.000-5.000	under 20.000	Mechanical Engineering
4	Energoinvest (EI), Sarajevo	3.4	mS	200-1.000	5.000-10.000	under 50.000	Electric Motors, Generators
4a	Energoinvest (EI) Armature, Sar.	.2.3	S	200-1.000	1.000-5.000	under 20.000	dashboards
5	EI Comet, Sar.	.1.7	mS	50-199	under 1.000	under 20.000	Steel-girder construction, Installations
6	EI Dalekovodizgradnja, Sar.	.1.7	S	50-199	1.000-5.000	under 20.000	Steel-girder construction, Installations
7	EI Elektrooprema, Sar	.3.4	S	200-1.000	5.000-10.000	under 20.000	Transformators, Technical Equipment
8	EI Energocontrol, Sar.	.3.4	S	50-199	under 1000	20.000-50.000	P+E for Automation
9	EI Enker, Tesanj	.3.7	mS	200-1.000	5.000-10.000	under 20.000	E-Technology, ceramics
10	EI Etas Valves, Sar.	.2.3	mS	200-1.000	1.000-5.000	under 20.000	Dashboards
11	EI, Sarajevo	.3.1	mS	990	61.884	62.509	Electric Motors, Generators
12	EI Specijalne Armature, Sar.	.2.3	S	50-199	1.000-5.000	20.000-50.000	dashboards
13	EI TAT, Sar.	.3.4	S	200-	1.000-	under	Power

BiH-Enterprises (Min. of Industry FBiH/RS)							
	Enterprise, city	Subsectors	Ownership	No. of employees	Turnover (1000 KM)	Turnover per employee (KM)	Products
				1.000	5.000	20.000	Station Construction
14	EI TDS, Sar.	.3.4	S	200-1.000	5.000-10.000	20.000-50.000	Technical Equipment
15	EI VMC, Sar.	.2.6	S	200-1.000	1.000-5.000	under 20.000	Waggon, Machinery, Container
16	EI Sarajevo, Rasclupna oprema	3.4	S	200-1.000	over 10.000	20.000-50.000	Power Station, Transformational Systems
17	ELEKTROKONTAKT, Sarajevo	.3.4	P	under 20	1.000-5.000	over 50.000	Supply of Energy
18	ETI, Sarajevo	.3.4	P	20-49	1.000-5.000	over 50.000	Supply of Energy
19	FAMOS, Sarajevo	.3.3	S	200-1000	5.000-10.000	under 20.000	Motors, Gear Boxes
20	Feal, Siroki Brijeg	.1.6	P	50-199	1.000-5.000	under 20.000	Metal Usage
21	Helios, Banovici	.1.6	S	50-199	1.000-5.000	under 20.000	Tanks, Heat Exchange
22	Industrija alata, Trebinje	.1.3	S	over 1.000	over 10.000	under 20.000	Processing Tools
23	IPV, Citluk		S	50-199	?		
24	Iskraemeco, Sar.	.3.3	mSJV	20-49	5.000-10.000	over 50.000	Numerators, Meters
25	JELŠINGRAD, Banja Luka	.2.2	S	200-1.000	5.000-10.000	under 20.000	Tools Machinery
26	JELŠINGRAD, Kotor Varoš	.2.3	S	50-199	1.000-5.000	under 20.000	Machines, Automatical Systems
27	KRAJINAMETAL, Bihac	.1.4	S	200-1000	5.000-10.000	20.000-50.000	Wire Products
28	LAGER, Posušje	.2.3	P	under 20	1.000-5.000	over 50.000	Hydraulic Ramps
29	LOGOSOFT, Sarajevo	.3.2	P	under 20	1.000-5.000	over 50.000	Adding Machines

BiH-Enterprises (Min. of Industry FBiH/RS)							
	Enterprise, city	Subsectors	Ownership	No. of employees	Turnover (1000 KM)	Turnover per employee (KM)	Products
30	MAXMARA, Banja Luka	.1.6	P	20-49	1.000-5.000	over 50.000	Metal Equipment for Construction
31	MEBO, ŠAMAC	.1.2	S	50-199	1.000-5.000	under 20.000	Tanks
32	Mehanika, Orasje	.1.6	mP	50-199	1.000-5.000	under 20.000	Metal Sector
33	Metal-emajl, Srpski Brod	.1.2	S	200-1.000	1.000-5.000	under 20.000	Sanitation Facilities
34	Metalinvest, Caplina	.1.7.	S	50-199	1.000-5.000	über 50.000	Steel-girder construction
35	Metalinvest, Jajce	.1.7	mP	50-199	1.000-5.000	20.000-50.000	Metal Sector
36	Metalno, Zenica	.1.7	S	200-1.000	5.000-10.000	20.000-50.000	Metal Sector
37	MI Fering, Gracanica	.2.1	mS	200-1.000	1.000-5000	under 20.000	Technical Support, Construction Equipment
38	MIK, Kupres	.1.6	P	20-49	1.000-5.000	20.000-50.000	Construction Tarnishes
39	Mikroelektronika CAJAVEC, Banja Luka	.3.3	S	50-199	over 10.000	over 50.000	Measurable Technology, Electronics
40	Montmontaza TOM, Uskoplje	.1.7	mS	50-199	1.000-5.000	20.000-50.000	Steel-girder construction
41	Soko Air, Mostar	.3.4	pr	50-199	n.b.	n.b.	Airport Equipment
42	Soko Bus, Mostar	.3.4	mS	20-49	1.000-5.0000	20.000-50.000	Vehicle Installation
43	Soko, Mostar	.3.5	pr	200-1.000	5.000-10.000	under 20.000	Cold Storage Plant
44	Soko RKT, Mostar	.3.5	pr	50-199	1.000-5.000	over 50.000	Cold Storage Plant
45	TERMAL, Lopare	.1.2	S	50-199	1.000-5.000	under 20.000	Heating

BiH-Enterprises (Min. of Industry FBiH/RS)							
	Enterprise, city	Subsec tors	Owner ship	No. of employe es	Turnover (1000 KM)	Turnover per employee (KM)	Products
46	TMD AGS, Gradacac	.2.4	mS	200- 1.000	n.b.	n.b.	Agricultural Machinery Construction
47	TRD, Vares	.2.3	mS	200- 1000	1.000- 5.000	under 20.000	Mining Institutions
48	TRUDBENIK, Doboj	.2.3	S	200- 1.000	5.000- 10.000	under 20.000	Compres- sors
49	TTU, Tuzla	.1.7	mS	200- 1.000	1.000- 5.000	under 20.000	Metal Sector Machinery Sector
50	Tvornica dalekovodnih stubova, Doboj	.1.7	S	200- 1.000	1.000- 5.000	under 20.000	Metal Sector
51	Uniklima, Sar.	.3.5	mS	50-199	1.000- 5.000	under 20.000	Air Conditioning
52	UNIMET, Kopaci- Gorazde	.1.4	S	50-199	1.000- 5.000	20.000- 50.000	Wire Products
53	Unis Holding, Sar.	2.3	mS	50-199	1.000- 5.000	20.000- 50.000	Vehicle Installation
54	UNIS-IGMAN, Konjic	.1.1	S	200- 1000	over 10.000	under 20.000	Casting
55	Unis Kovina, Visoko	.1.6	mS	200- 1.000	1.000- 5.000	under 20.000	Metal Processing
56	UNIS-POBJEDA, Gorazde	.1.6	S	200- 1.000	5.000- 10.000	20.000- 50.000	Special Machinery
57	Unis Pobjeda, Tesanj	.2.3	mS	200- 1.000	5.000- 10.000	20.000- 50.000	Vehicle Pumps
58	Unis Preduzece, Valjcici Konjic	.1.5	S	50-199	1.000- 5.000	20.000- 50.000	Rolling Storage
59	Unis Tativ, Konjic	.2.7	S	200- 1.000	1.000- 5.000	under 20.000	Bolts
60	Unis Unico Filter, Tesanj	.2.7	mS	200- 1.000	over 10.000	20.000- 50.00	Vehicle Filter
61	USHA, Višegrad	.3.7	S	50-199	1.000- 5.000	20.000- 50.000	Electronic Cable
62	Volkswagen, Sar.	.2.6	mP	50-199	n.b.	n.b.	Vehicle Installation