



Where are we now and where should we go?

# GAP ANALYSIS OF METAL SECTOR



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## Introduction

CREDO Krajina is a project financed by the Swedish International Development Agency – SIDA and implemented by the Development Agency EDA, Banja Luka, in cooperation with the Association for Development – Nerda, Tuzla. The aim of the project is improvement of competitiveness of medium and small size companies in the area of Krajina, in order to create and maintain jobs, reduce poverty and improve the economic status of this area. The project should support creation of around 200 new jobs and maintain up to 1000 jobs in the companies/sectors encompassed by the project interventions. The CREDO Krajina Project lasts for 30 months and it consists of several phases and components. Through an initial analysis of the priority commercial sectors, a selection of industrial sectors with a significant potential for creation of new jobs was done and representatives of companies from these sectors, through sectoral boards, defined priority needs for advisory assistance and training. Additionally, a part of an advisory and financial assistance is directly aimed towards the municipalities with intention to significantly improve local business environment and establish a permanent and efficient dialogue with the private sector.

This analysis is based on the two previously performed analyses within the CREDO Krajina Project. The first one is “Baseline Study of the Industrial Sectors”, the aim of which was to explore and identify the sectors with the biggest potential for growth of competitiveness and growth of employment. On the basis of this analysis, a decision was brought that the CREDO Krajina Project will focus on the sector of metal industry, food processing industry, wood industry and leather and footwear industry. The second analysis is the value chain analysis for metal sector. The focus of this analysis was on the production, processing, distribution and sales together and this has enabled us to analyze each step in its comparison to the previous one and to compare it to the next step in the chain. The results of this analysis are being used to a great extent as a basis for the GAP analysis.

GAP analysis has offered an overview of the situation in the metal industry, from the point of view of comparing the current reality with desirable possibilities offered at the market. GAP analysis is a business analysis tool, which implies defining of differences between the current and desired state and manner of functioning of the branch.

In its basis, the GAP analysis asks two questions:

- Where are we now?
- Where do we want to be?

This document consists of the three basic parts. The first part is a description of the current situation, which starts from the situation on the market and it describes a way in which the producers and the whole value chain correspond to the demand from the market. The second part shows what a desired situation would be, that is, it responds to the question what this branch would look like, if its developmental potentials would get achieved. The third part is related to determining the gap between these two states, the so-called gaps and their description. Specific measures for overcoming the gaps are defined in the process of work with the Wood Processing Sector Board.

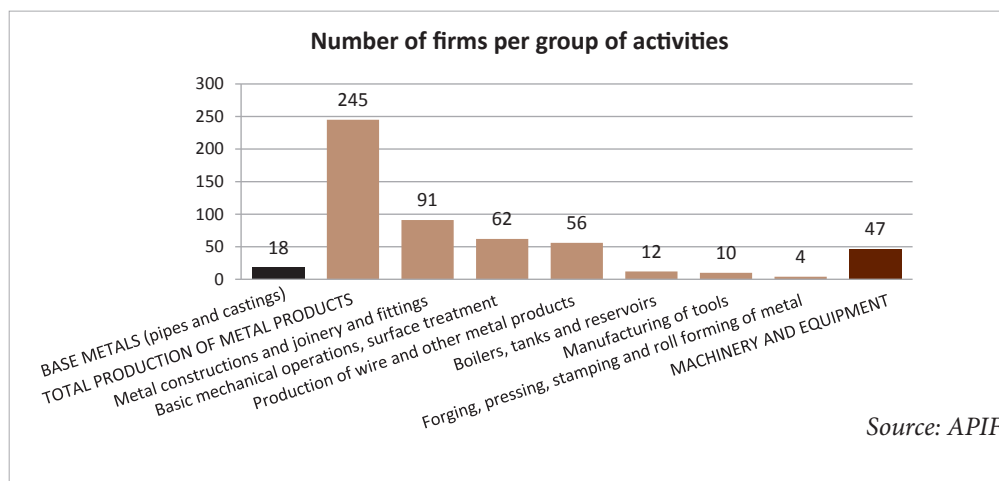
*We thank all the companies that participated in the survey, sectoral coordinator Miloš Šipragić, sectoral expert prof. dr. Vid Jovišević, and members of the Sectoral Board and workshop participants. We owe special gratitude to Shawn Cunningham and Frank Waeltring from German company Mesopartner and Zdravko Miović, the director of Eda, for the advisory support in preparation of the analysis.*

# 1. Where is the metal industry today?

Metal industry is the leading industry in the area covered by the CREDO Krajina project. This sector has great potential and has a solid human and resource base, as well as a long tradition that allows the development of different activities. On the territory of 34 selected municipalities this industry has shown vitality in post-war renewal of production and readiness for the introduction of modern technologies. Due to tradition and the existence of quality workforce and knowledge in this area, technical capacity in mold casting, precise casting, cutting, bending, pressing, forming, welding and processing have been renovated, all of which form the basis for manufacturing and assembly of metal products. This sector still has the potential to significantly increase sales, exports and employment.

The metal industry, in 308 companies registered for this activity, employs about 5,100 workers. As we can see in Chart 1, the largest activities are in the manufacturing of metal products, while there is significantly less activity in the production of base metals and the manufacturing of machinery and equipment.

Chart 1 All firms of metal industry in 34 municipalities

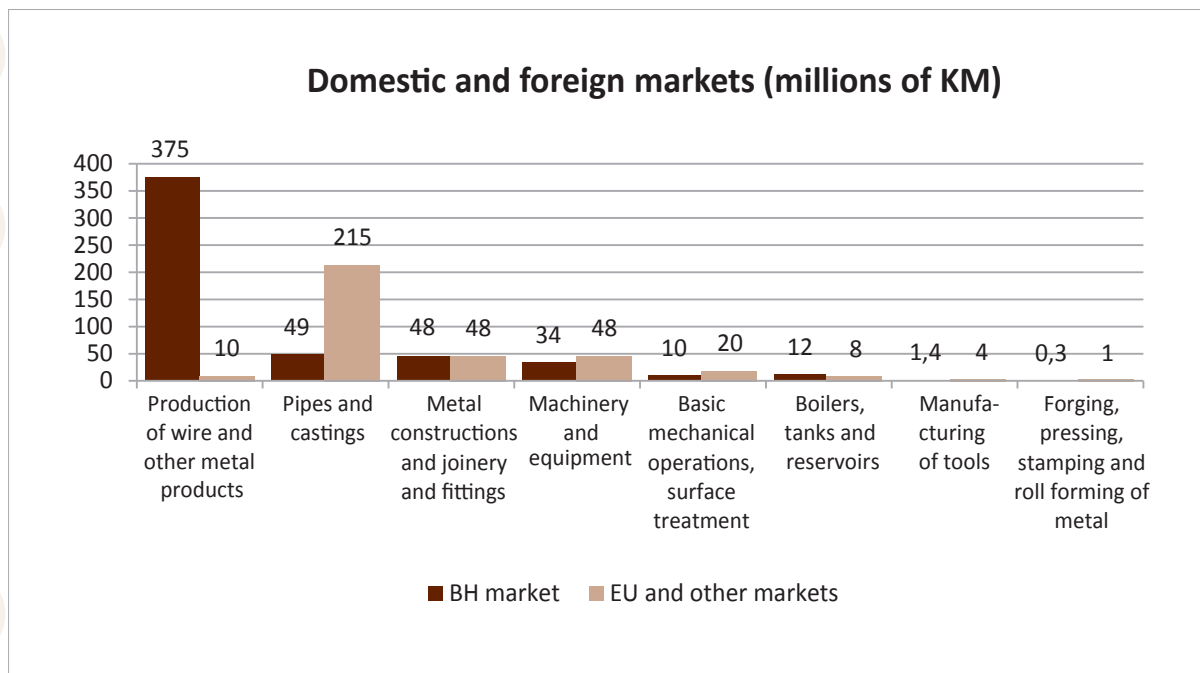




## The market position of metal industry

Total sales of the metal industry in the area of all 34 municipalities is around 900 million KM. Of these, about 43% is exported, and about 42 million KM are profits.

Chart 2 Sales on the domestic and foreign markets (in millions of KM)



Source: APIF RS i AFIP FBiH

Most dominant production is a production of welded wire mesh for the construction industry at the domestic market (about 1/3 of total sales of whole metal industry, it is mainly one company, Komerc Mali from Prnjavor). Production of pipes and castings is a basic industry that exports a lot (mostly firm “Unis” pipe factory, Derventa). These two activities are based on these two companies. Concerning the production of machinery and equipment, only 15 of 47 companies produce machines for other industries, the others are dealing with cooling and ventilation equipment, household appliances (eg “Mehanizmi B” Gradiska, “Megamont” Čelinac), etc. The most important machine manufacturer in this field is PMP Jelšingrad Gradiska (industrial gears, roll-

ers and systems for continuous casting - part of FIMSI Group, Italy). However, based on previous research, it can be concluded that the most dynamic is the production of metal products. This is confirmed by quantitative (the largest number of firms) and qualitative indicators (qualitative ratings of participants in the study).

The opinion of most of companies that participated in this research is that the domestic market is too small for the dynamic growth of this industry and is especially limited because of very strong competition from abroad (for example, manufacturers of boilers for central heating as one of the most technologically advanced have a strong competition at the domestic market, since 15 million KM of these products are imported into B&H, and they export about 10 million KM).

Companies that have experienced high growth rates in production and growth in the number of jobs are mainly oriented to the external market. Therefore, the majority of companies (58.7%) are export oriented, while those that are not exporting are mainly smaller firms, with craft products.

Most producers in the metal industry are oriented to the EU market. At the moment, the trade is limited to few countries (Germany, Austria, Slovenia, France, etc) but can potentially be a whole market of the European Union, all 28 countries. The EU market for metal products is huge. In 2012, EU has imported 1,165 trillion Euros of metal industry products<sup>1</sup>. However, EU legislation is set in the way that guarantees free access and flow of goods, only if certain standards and requirements are met. Concerning certificates, a condition that must be fulfilled is CE mark, which in essence, is a passport with a visa for export to the EU. There are also other certificates. For example, a very important are ISO standards as well as standards and certificates that are applied in individual countries, e.g. GS mark is valid only for Germany, etc. Without the fulfillment of these standards and requirements, it is impossible to export to the EU.

Those firms that have succeeded in achieving compliance with European standards have equal and fair treatment when they export to the European Union. Our companies gain a lot of with this. For example, firm Topling, as a leader in the production of boilers for central heating and as one of the technologically most advanced firms of metal industry in the project area, in 2011 exported about 35%, and in 2013 has already exported about 70% of its production to EU.

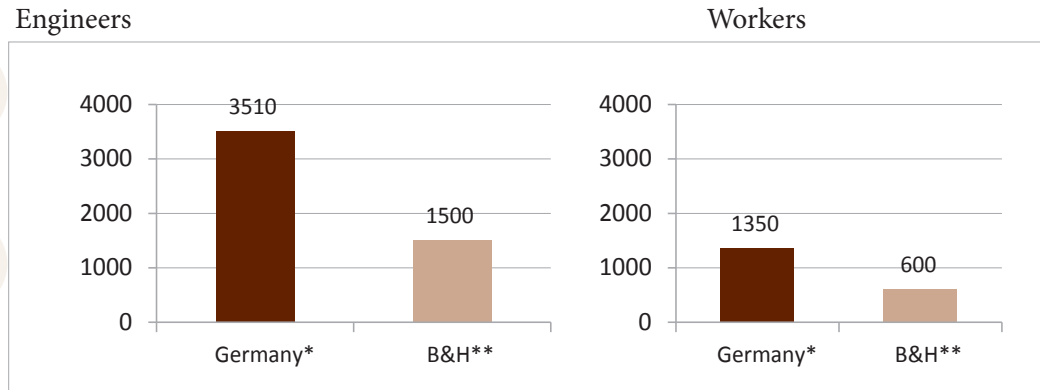
**The key reason why our firms are present and why they do business in the EU market is the fact that their products are made with standard, good quality but are sold at much lower prices than European competition.** Concerning technologically advanced companies, our products cost less mainly

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<sup>1</sup> Trademap.org

because engineering and technical personnel that designs products and leads production costs much less than the same personnel in EU. For those firms that are more labor intensive and do not have product development, key reason is good quality of product and lower labor costs.

Chart 3 Average gross salaries of engineers and workers in manufacturing (in EUR)



\*Source: EU Salary Calculator, Eurostat

\*\*Source: CREDO interviewed companies

It is important to emphasize that international competition is fierce and sharp and that their competitiveness is based on the knowledge and technology. For certain products that firms make for the EU market, there is a large competition by producers from Poland and Romania as well as non-EU manufacturers from China, Turkey, etc. For some products that are available in China and are acceptable by term of delivery, shape and weight for transport to the countries of Western Europe, our manufacturers generally are not competitive. One of the managers in the metal sector told us this: “In some cases we even can not get the material by the price for which producers from China delivered the finished product , which we checked , has a good quality .”

**Market access and market approach is one of the most important shortcomings of our firms.** Although our firms, when they cross the threshold of the required technical and other standards, have an equal opportunity to compete on the entire territory of the EU, they face , as we have already said , fierce and “smart” competition. The main trend in the EU and the developed world in this industry is quick response to market demands. Currently, most of our companies in the metal industry, even the most advanced, have a problem with following changes in the market and market access. Concerning the most

advanced manufacturers, they have their own product with which they compete on the European market, a product that is not much different from other standard competitive products, except by the price. However, the development of products in the EU is a continuous thing, so that existing products quickly become outdated and new ones are created, using better technologies, with an improved functionality, especially in the electronics and automation.

Although our companies develop their products from time to time, the continued development is a significant problem. First of all, this is expensive and requires high-quality market information, on the one hand, and, on the other hand, it requires well-trained engineers who follow the latest technology and development trends in the world and are able to apply these trends in their own production. The essence here are market and technology forecasts. Our firms that are continuously engaged in monitoring the markets and technologies in a systematic manner, and predict what products should be developed in the future are rare. The fact that some firms have technologically advanced products is rather the result of the extraordinary efforts of key engineers and other key personnel, then the result of a systematic approach. However, without systematic and continuous following of market and development of existing and new products, they will not be competitive at the market and will not survive.

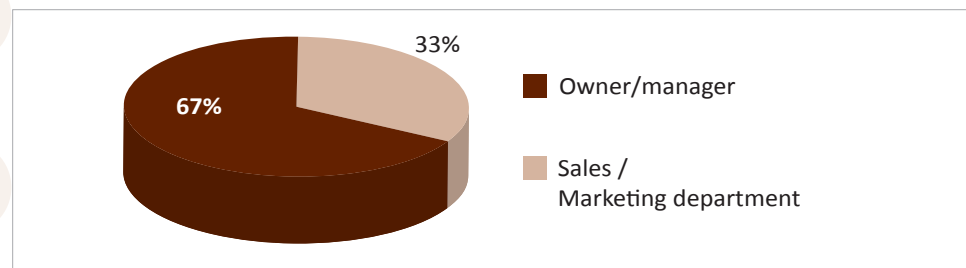
*SASP Automatic System for Bio-Mass Combustion – the product of Topling, Prnjavor*



Concerning the segment of companies engaged in the manufacture of components, they are in a position to receive the specifications from the customers, usually larger foreign companies, and produce those components on the basis of received specifications. Many of them are currently in a passive position, although there are cases that some of these companies got good reputation in the quality of manufacturing, reliability of delivery, competitive prices, etc. With this approach these firms have gained the trust of the customers and created opportunities to achieve better long-term relationships with them. Such companies are on track to gradually transform their relationship of small firm doing just one service for a large company, into relationships that could take the form of partnerships. However, if these manufacturers do not follow the market and technological changes, they can become uncompetitive and lose their position in value chains. This situation is not unusual, because some small firms are losing business because they fail to reach the criteria set by the customer. The small companies that produce components, at least once a year go through the process of evaluation by their partners from abroad. This process is exactly defined, especially through the ISO 9001 standard, and contains criteria that a small supplier must meet in order to remain a supplier. If they do not meet the criteria, they lose a job.

The most of our companies are more focused on the production process itself and do not pay sufficient attention to the market. Market relations with EU partners are often based on occasional and random contacts of managers and owners with potential buyers. Also, one of the common ways to sell their products are trade shows where they find buyers. In addition, sale is also done through personal selling, sales departments, website, etc.

*Chart 4 Sales and marketing responsibility within firms of metal sector*



*Source: CREDO Interviewed firms*

As we have already said, there are few cases of following market trends and predicting future trends in the EU market in a systematic and sustained manner and incorporating these insights into business practice.

There are even companies that do not have a people who are engaged in the marketing i.e. in positioning and progress of the company in the market. All in all, market access and market approach is one of the most important shortcomings of our companies in the metal sector.

## Production and technology

Our most advanced manufacturers today are not far from its competitors in terms of technology and machinery used in production. And even with other manufacturers, most of the things in terms of production processes, machines and basic technology is not a major concern. Machines are most often purchased in the EU, so it's the same or a few years older technology.

However, with other manufacturers, things are a bit different. In fact, about 2/3 of the manufacturers have whether a completely obsolete equipment that the needs urgent replacement or an obsolete equipment that still can be used. Such an equipment increases maintenance costs, and thus increase the cost of production. In addition, the use of obsolete equipment in the production requires a large proportion of manual work. Except in cases where the company is focused on the individual market segments (niche markets) where there is no production in large series (individual and small-scale production), this production is usually not competitive in the domestic and in particular on the European and other markets. A particular problem is that some manufacturers have no possibility of investing in advanced technologies that would enable them to be competitive.

Grafikon 5. Nivo tehnologije preduzeća metalske industrije

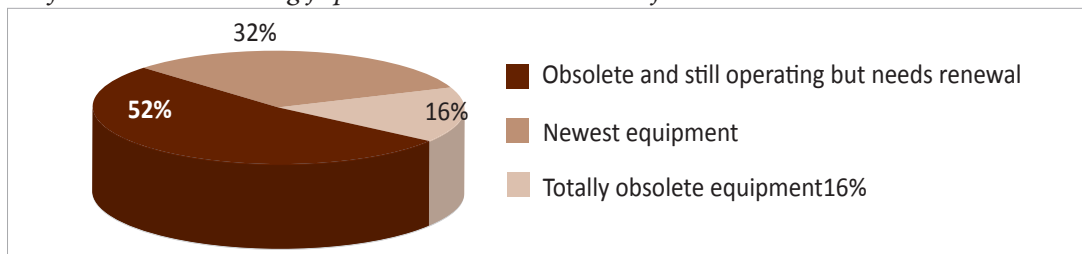


Chart 5 Metal industry firms level of technology

Also, most companies in the metal industry, including the most advanced ones, have a problem with designing that lags behind European competition. In accordance with the practice of rapid response to

market changes, the EU and the developed world have created significant changes and improvements in the field of technology, with the basic trend of production flexibility in order to quickly react to changes . The most of our firms do not apply modern techniques of design and communication with the market , where products are changed very rapidly and quickly adapted to requests of European buyers. Our companies, as a rule , spend a lot of time in design because they use outdated techniques . Most often they use AutoCAD and print technical drawings, but it is not uncommon for the technical drawings and technical documents to be drawn by hand . This often results in poor solutions and slow response to the demands of the customers. Some domestic companies , leaders in technological development, apply new techniques in design (Solid Works and 3D parametric design) and achieve outstanding results . For example, with the application of these techniques, the company “Spektra” has managed to substantially increase productivity and shorten the process of making parts 13 times.

*Firm Spektra DMG Banja Luka – from design to production*



The problem here is the engineering and technical personnel, who should be educated so that they can be technologically equal to the competition. This is particularly true for companies that export certain components because they can not adequately communicate with EU companies that ordered these components without well-trained engineers. Without them it is hard to make harmonization of the products with the requirements of the directives and standards of the EU, which means that it is not possible to remove technical barriers to the export of products. Also, only a well-trained engineers can quickly and efficiently respond to the demands of European customers. That's the only way to retain customers, to expand cooperation with them and to get new customers.

## People and knowledge

In terms of people and knowledge, there is one, at first glance, contradictory situation, which, when we get a little deeper into the analysis, really reflects the current situation. The most advanced firms point out that their main competitive advantage is «low cost knowledge», so that the key engineers who carry out the development and production cost much less than those in the EU. On the other hand, in most other firms there is a lack of quality engineers. This shortage is evident, and there are companies that do not have a single engineer. The key contradiction, therefore, is that engineers are also key advantage of the best ones, but also that there is a significant shortage of engineers in most other companies. In this field, the shift can not be made quickly, because it takes time to improve such a structure.

Concerning existing engineering staff, knowledge and skills they possess in some areas are at the level of knowledge of international competition, because it is based on the knowledge of experienced engineers, many of whom followed the development of technology from years ago and transferred their knowledge to the younger engineers. However, it is only a basis for building new solutions. The main flow of knowledge in terms of new things today comes from developed countries, mainly from Germany but also from other countries. Ways of transfer of new knowledge are different, through direct cooperation with individuals or companies from the West, participation in trade fairs, through the Internet, etc. The main disadvantage is that these flows are sporadic and often depend on the case. Also important issue is the aforementioned level of knowledge regarding new technologies for the design. As we have already said, it is not possible to adequately communicate to companies from the EU without well-trained engineers. The point is that European competitors use these new technologies, and often base their competitiveness on it. The rapid improvement in this area cannot be achieved very easy. There are companies that are focused on this, but, since quality engineering and technical personnel is lacking, this can not be quickly corrected.





*The Faculty of Mechanical Engineering in Banja Luka*

Experienced engineers are trained in these new things and new engineers are already educated to use modern technology, but there is too few of them. Faculty of Mechanical Engineering in Banja Luka has licensed software, same as universities in the EU and the developed world and is able to produce good staff. However, there is too few of those who study this area, and most of those who graduate from Faculty find a job abroad and leave. Annually, out of 10 graduated engineers 6 goes abroad and 4 are employed in the domestic industry.

Concerning the workers, the situation is somewhat better. Since the metal industry was relatively developed in this area before the war, there is a significant number of skilled workers of older generation. Many firms based their production on such workers. A good example of this is the manufacturer of elevators "Tri Best". In addition to the significant engineering capacity, they employ skilled craftsmen whose knowledge often replaces the use of latest technologies, because they manage to achieve equally good results with older technology. However, all the other workers, who do not have the necessary knowledge are trained by firms themselves, which takes time and money.

The situation with workers is better in relation to the situation with engineers. The training is much shorter and it is easier to get workers ready for production. This is especially true for companies that

possess modern technology because it requires fewer workers with high specific skills. With modern technology a good part of the functions that were once performed by qualified masters, are transformed into automated processes, where the key role is of the person who programmes the machine, and the role of workers is based on simple operations. In this way, it is easier to transform workers who have little or no knowledge needed for the production process to a “usable” production workers.

One of the most important things in human resources in these companies is the lack of people and capacity for quality market performance. European competition pays a lot of attention to this area and invests a lot in monitoring changes at the existing market, in finding new markets, in competition monitoring, prediction of future market trends, etc. With most of our companies, this function is ignored, and there are few men who are engaged in this kind of activities. These people must be educated having in mind both technological and market aspects. Some of our firms have such a people (e.g. Topling), but in the vast majority of other firms, market presence and market research is created randomly.

### Cooperation between enterprises

Cooperation between firms of metal sector is at a low level, as opposed to the EU and the developed world, where firms often cooperate. Manufacturers often buy components at the same place, but each on its own, although with joint purchasing they may have lower prices and more favorable conditions. Also, this applies to small firms that manufacture components, which are in most cases “freelancing”.

The exception and the positive example in the metal industry is the production of wire products. The producers of steel wire mesh within our project area (Komerco Mali, Armaco, etc.) have come together and jointly purchase raw materials for many years. They additionally cooperate in terms of production and division of work.

## Institutions for support and development

Public policies for the development of this and other industrial sectors are mostly based on empty phrases and those documents are mainly a “dead letter”. Those policies are also brought without significant consultations with business companies, they are often not developed into specific activities and project tasks, no financial constructions for realization of priority projects are done and no reports on realization of these projects are done at all, either in public or in professional circles.

Companies generally consider to have almost no support from the institutions. They say that, when they need such a help, organizations and individuals who can help them are very rare. Generally, our institutions are not included in economic life and are not interested in economic development.

In addition to the chambers of commerce, companies of metal industry are rarely members of some other business associations. Of the total number of surveyed companies in the metal industry, only about 20% are satisfied with the support provided by the chambers of commerce. This support is mainly reflected in specific training, support in the preparation of standards, etc.

As far as educational institutions, there are two secondary schools in the project area (Technical School in Banja Luka and Technical - Transport mixed secondary school in Bihac ), but the quality of the knowledge and practical skills of students in particular are very limited . Companies are willing to work closely with these schools , so that students would be allowed for practice to get right skills from which students and companies can benefit . However , such cooperation does not exist. In addition, motivation and work habits of those who complete these schools are often a problem, because today in BiH there is a different value system relative to that which would be desirable from the standpoint of the industry .

A very similar situation is with the Faculty of Mechanical Engineering in Banja Luka and Faculty of Engineering ( Mechanical Engineering Department ) in Bihac . The number of students is not enough compared to the demand in the economy, although, in recent years, the number of students enrolled at the Faculty of Mechanical Engineering in Banja Luka is increasing. As we have already said , after they graduate, a significant portion of engineers leave the country and find a job in the EU. There is also insufficient cooperation between universities and industry, although it must be emphasized that some individuals from the Mechanical Engineering Faculty in Banja Luka play big role for firms, and some firms see them as the only support that exists in this region .

## Financing of investments

One of the big problems that companies are currently facing are unfavorable lending conditions. Banks are “very expensive”. Commercial lending rates are much higher in comparison to the EU. Thus, for example, for loan in Slovenia and the same amount and the same purpose, the interest rate is 3.9 % and 6.62 % of BiH.

The positive thing mentioned by businessmen themselves in financing investments are subsidies given by certain ministries. As for the metal industry, the most common form of subsidy is the one for increasing competitiveness. The aim of subsidy is supporting the implementation of development projects of economic entities, in order to improve their development, improving competitiveness, establishing quality systems as well as increasing employment. The maximum amount is 200.000 KM.

In addition to the grants that are awarded, it is certainly important to mention the assistance to the sector through credit lines of Investment-Development Bank of the Republic of Serbia. The amounts range from KM 30.000 to KM 5,000,000, depending on the purpose and form of organization of users, the payback period is 1-15 years, grace period ranges from 12 to 24 months, with interest rates ranging from 4 % to 4.9 %. However, some business respondents complain that these loans can be obtained only by political affiliation and that they are not equally available to all.

## Business environment

Companies from metal industry are in a disadvantage in terms of the environment in which they operate, in relation to European competition. Unlike us, cities, regions and countries in EU are fighting to attract firms, in order to employ people and pay taxes on their territories. Therefore, the conditions in which firms operate in the EU are much more favorable.

We have a completely opposite situation. Existing tax legislation indicates that the real economy is burdened with many tangible and intangible liabilities. For example, in the RS tax rates are formally low (profit tax 10% and VAT 17%), but the legislative is very complicated, so the company is obliged to adhere to over 20 laws related to fiscal and parafiscal charges, and about 30 laws that talk about the penalty provisions. The firms submit more than 100 different applications and forms in the course of the year. In the Federation, the situation similar for many things, except for one, significant, positive exception.

Export-oriented firms in Federation are supported by fiscal stimulus measures. Namely, all companies that export more than 30% of total sales, do not pay profit tax. This is a significant incentive and positive move of decision-makers in the area of fiscal policy.

This is an exception, but generally most of procedures are harder and more complicated for firms, because these procedures are a source of “institutional rent.” For example, process of issuing building permits and other permits is very complicated and laborious task, and requires a significant financial effort and a large number of administrative procedures. There are also some incongruities that make life difficult for firms. State or entity may be delayed in payment to firms (public procurement, VAT, etc.), but the reverse is not possible. It often happens that the state has debt to particular company, but the company still has to pay its debts to state. Also, BiH as a state has not adopted the regulations and directives of the EU in terms of technical requirements and characteristics that products must meet, so it is necessary to meet the criteria and procedures specifically designed in Bosnia and Herzegovina.

These are just examples, there are more of them and we are not going to state all of them here but it can be concluded that the legal and institutional framework in which the economy operates is very complicated, there are intricate and lengthy procedures that require a lot of costs, formal and informal, and that those who make decision on this framework often do not understand the conditions under which the economy functions.

### **Culture and values**

Modern approach to economic growth and development means that the productivity and competitiveness of a country are not conditioned by its material assets - natural resources , physical and financial capital, but by “intangible” characteristics of the population - the quality and quantity of knowledge, entrepreneurship, creativity, innovation, work ethic. Only societies that value highest civilizational characteristics such as creativity , knowledge and work can, in modern conditions, count on greater prosperity . In such societies , these values play a major role not only in the economy but also in the building of social structures , in general change in education, culture, mentality and quality of life.

However, characteristics valued in BiH, unfortunately, are not these. Neither RS , nor FBiH are a society that creates fertile ground for highest civilizational characteristics such as creativity , knowledge and work. In our society , instead of knowledge and ideas there is more focus on party and family ties, instead

of hard work, ability to accomplish things without work is valued more. In our system of values least valued are those that create most of new, added value, which is not possible without creativity, knowledge and work. It is well known that the business people from the real sector are often on the margins of society by reputation. Even the common name for the business people - "privatnik" has negative connotations and bad reputation.

This is supported by scientific research in this field. Lack of confidence among the people of Bosnia and Herzegovina recorded in these studies, is a direct result of poor system of values. According to these studies (eg, Salaj 2008, the European Values Studies), measured general level of confidence shows that only 16% of inhabitants believe that most people can be trusted. Let us remind that in countries where the creativity, knowledge and work are highly valued, such as the Scandinavian countries, according to the same research, 60-65% of people trust other people.

Having this in mind, it becomes clear why are institutions uninterested in economic development, why "privatniks" have a bad reputation, why business associations are weak, why there is no real dialogue between business and government, and why, at the end, there is no compelling vision and development strategy. Because of this value system we have fallen into the trap from which it is difficult to get out. Our society does not value creativity, knowledge and work sufficiently, and the result is current situation - low creation of new, added value, low productivity and slow development. It is therefore important to support the producers in the metal sector, because they are the exception to the rule and a positive example of how creativity, knowledge and work can create good results.

## 2. Where do we want to go?

FINAL RESULT	Metal industry firms improved position in existing and new markets, with improvements to existing and with created new products and components
MARKET	A proactive approach to the market based on systematic and continuous monitoring of markets and technologies, and forecasting of what products and components should be developed in the future.

PRODUCTION	Increased production of finished products, with continuous development of existing products and creation of new ones, in accordance with the needs and changes in the market and technology	The production based on flexibility in response to changing market conditions	Increased production of components which progresses from simple product, to the integration of multiple components into assemblies and finished products
RESOURCES	Significantly increased number of qualified personnel important for market and competent engineering technical personnel	Most companies achieve compliance of products with European standards	Firms financed investments under favorable financing conditions
INSTITUTIONS	Educational and training institutions provide more educated and trained people for the economy	Technology institutions provide support to firms in the use of new technologies and in meeting standards	Financial and development institutions provide funding on favorable terms, equal for all

### 3. Which are the most significant gaps to be overcome?

The above analysis of the current situation and the projection of a desirable future state, it follows that the most important gaps that need to be bridged between these two positions are following:

- the market - the lack of people and the capacity for successful expansion in existing markets and for entering new markets;
- human resources - lack of engineers, technicians and skilled labor force;
- key processes - lack in development, design and implementation of modern production and business processes and models, and the lag in technical and technological level;
- cooperation between companies.

This does not mean that there are no more gaps that affect competitiveness. In the area of infrastructure there are significant problems (eg. Electricity), fiscal and para-fiscal charges are high, cooperation between enterprises is low and so on. However, we are here focused on those who are most important and bear “the greatest specific weight”. All those firms that have successfully responded to the challenges in terms of markets, people and technology, managed somehow to deal with other issues. However, for those that did not overcome those obstacles, it is not likely that better infrastructure, lower taxes, etc. would much help. These conclusions stem from a thorough analysis of our businesses, with particular emphasis on companies that are successfully coping with the majority of challenges and which represent an example in which direction others should go.

What is particularly good is the fact that the project “CREDO Krajina”, institutions, organizations and industrial enterprises participating in the project have the means to influence the improvement of the situation in these areas. Thus, these areas are “manageable”, as opposed to infrastructure, tax system, customs regimes and so on, where it is very difficult to change things and where changes are going very slowly.

#### **The market**

One of the most important things in human resources in metalworking firms is the lack of people and capacity for quality market performance. The competition focuses significantly on this area and investing in monitoring changes in the existing market, finding new markets, competition monitoring, forecasting future market trends, etc. With most of our companies, this function is ignored and there are few of



them who deal with the market in this way. This profile of people should be educated having in mind both technological and market-economic aspect. As we concluded in the analysis of the current position, in the vast majority of enterprises of metal industry connection with the market and market research occurs sporadically and randomly. This is one of their weakest links in the process and in this segment they are significantly weaker than their competitors. In their current sales orientation, starting point is the factory and production, or things that company produces. However, the key thing for a good orientation of the company to the market is to follow the needs of customers.

As for the performance in foreign markets, in our area there are a large number of small companies that have a chance to export, have products that have a future, but they should work on their products, harmonize them with the standards and requirements of European and other markets, to overcome the so-called technical barriers that are the first step on this path. These barriers can be overcome only by themselves and they must try to overcome them just to be able to even think about exporting.

The aspect	Why is it important?	Found weaknesses	Main actors	Area of activity and potential interventions
<b>THE GAP- MARKET</b>				
<ul style="list-style-type: none"> <li>• Access to and participation in the market (bigger and better export arrangements)</li> </ul>	<ul style="list-style-type: none"> <li>• the key to further improvement of competitiveness, and increase of sales volumes</li> </ul>	<ul style="list-style-type: none"> <li>• In most businesses owners / directors perform the bulk of the work in sales (not using sales people who know the requirements and conditions of the market)</li> <li>• There is not enough knowledge about markets and sources of information</li> <li>• Required combination of engineering and marketing knowledge is rare</li> <li>• External knowledge (agents) are effective, but expensive (up to 20%) and do not lead to capacity building of companies</li> </ul>	<ul style="list-style-type: none"> <li>• German Chamber of Commerce (AHK) and similar associations</li> <li>• Economic missions abroad</li> <li>• Firms with positive experiences</li> <li>• Foreign trade and chambers of commerce</li> <li>• GIZ (CIM experts)</li> </ul>	<ul style="list-style-type: none"> <li>• Training: “How to export to Germany and the EU”</li> <li>• Organizing events that would be encountered by local companies and potential foreign partners</li> <li>• Fairs visits</li> <li>• Support to a creation of direct connections of companies with foreign customers / partners</li> </ul>

The aspect	Why is it important?	Found weaknesses	Main actors	Area of activity and potential interventions
<b>THE GAP- MARKET</b>				
<ul style="list-style-type: none"> <li>• The introduction of standards and certification of products</li> </ul>	<ul style="list-style-type: none"> <li>• CE marking is a prerequisite for export</li> <li>• ISO standards are a prerequisite for cooperation with foreign partners</li> <li>• Without foreign markets there is no growth and development</li> </ul>	<ul style="list-style-type: none"> <li>• A large number of small companies have the ability to export, but standards (CE, ISO) are barriers for them</li> </ul>	<ul style="list-style-type: none"> <li>• Companies and experts from the region with good experience in this field</li> <li>• Faculty of Mechanical Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Support to companies in the introduction of standards and certification of products</li> </ul>

## Human resources

There is a lack of quality engineers in most companies in this sector. This lack is evident and there are companies that do not have any engineers. In this area, the shift cannot be done easily, because the improvement of this structure takes time. Universities do not produce enough of engineers for the industry, and of those who graduate, about half of them immediately goes abroad. The main reason is that earnings of engineers are much higher abroad. It must be stressed that work of engineers has not been adequately valued in many of our businesses. An important issue is also the level of practical knowledge about new technologies. The point is that European competitors use new technologies and often base their advantage on it. There are some domestic companies that are focused on this, but so far quality engineering and technical personnel is lacking, especially those who can work on the development of existing and creation of new products.

Also, skilled workers are missing, especially if we take into account the potential development of the metal industry. Secondary vocational education does not produce enough workers, especially when it comes to qualifications that are highly demanded in the labor market (welders, CNC programmers and operators, etc.). Also the quality of those who complete this type of education is questionable. They are mainly workers without sufficient practical skills.

The aspect	Why is it important?	Found weaknesses	Main actors	Area of activity and potential interventions
<b>GAP – HUMAN RESOURCES</b>				
<ul style="list-style-type: none"> <li>• Key skills - engineers (more good engineers would improve the competitiveness of companies and the sector as a whole)</li> </ul>	<ul style="list-style-type: none"> <li>• Represents a competitive advantage - cheaper engineers (knowledge workers) - An important factor for decisions of potential investors</li> </ul>	<ul style="list-style-type: none"> <li>• Faculties do not produce enough of engineers for the industry</li> <li>• About half of graduate engineers immediately goes abroad</li> <li>• SMEs do not hire enough of engineers</li> <li>• The work of engineers has not been adequately paid</li> </ul>	<ul style="list-style-type: none"> <li>• Mechanical Engineering Faculty Banja Luka and Bihac</li> <li>• Owners / managers of SMEs</li> </ul>	<ul style="list-style-type: none"> <li>• Building partnerships between the mechanical engineering faculties (Banja Luka and Bihac) and enterprises</li> <li>• Initiating changes in the program, practices in companies, support of product development, problem solving by the faculty on behalf of the companies</li> </ul>
<ul style="list-style-type: none"> <li>• Key skills - welders and other key professions that are missing (more certified welders would improve the competitiveness and attractiveness of the sector for investments)</li> </ul>	<ul style="list-style-type: none"> <li>• Represents a competitive advantage - cheaper key craftsmen</li> <li>• An important factor for decisions of potential investors</li> </ul>	<ul style="list-style-type: none"> <li>• secondary vocational education does not produce welders and other workers with practical skills</li> <li>• There is no well-organized and continuous (practical) training</li> <li>• Expensive certification of welders, no institutions in the country</li> <li>• When they learn to work and receive a certificate, a junior welders usually go abroad</li> <li>• Welders work is not adequately paid</li> </ul>	<ul style="list-style-type: none"> <li>• Secondary Technical School Banja Luka</li> <li>• Faculty of Mechanical Engineering Banja Luka - Department (and laboratories) for welding and material testing</li> <li>• Companies interested in training</li> <li>• Welding Institute in Tuzla (partnership with TUV)</li> </ul>	<ul style="list-style-type: none"> <li>• Support to the transformation of welding laboratory of Mechanical Engineering Faculty, Banja Luka into the Institute for Welding</li> <li>• Support to the certification of welders</li> <li>• Support to the building of partnerships between centers for retraining adults (WMTA Academy Srbac, etc.) and enterprises</li> <li>• Support for building partnerships between secondary vocational schools and enterprises</li> </ul>
<ul style="list-style-type: none"> <li>• Human resource management</li> </ul>	<ul style="list-style-type: none"> <li>• A significant portion of competitiveness is based on key experts (engineers and craftsmen)</li> </ul>	<ul style="list-style-type: none"> <li>• Key experts are treated as all other workers</li> <li>• Key experts go to other companies, or go abroad, or go to the public sector</li> </ul>	<ul style="list-style-type: none"> <li>• Consultants in this field</li> <li>• Businesses (which could not keep key people, and those that keep them satisfied)</li> </ul>	<ul style="list-style-type: none"> <li>• Organize events to exchange experiences and knowledge for executives</li> <li>• Opening the possibility of consulting in human resources management</li> </ul>

## The key process and technology

If they want to survive, our companies must continuously work on the development of existing, creation and development of new products. First of all, the market and technology are changing rapidly. Product development in the EU is a continuous thing so that existing products quickly become obsolete and new appear, using better technology, with improved functionality, particularly in terms of electronics and automation. Although some of our companies develop its products, the continuous development is a significant problem. It is, above all, expensive and requires high-quality market information, on the one hand, and, on the other hand, well-trained engineers who follow the latest technology and development trends in the world and are able to apply these trends in its own production. According to the current situation, most companies in the metal industry, including the most advanced, have a problem with the development of products, design and industrial design. In this area are lagging behind the competition.

The conquest of new products and markets do not go without advancing technology. Technology is a part of every activity in which our companies create new value. Modern production technology is one of the main generators of competitiveness. Nowadays we have the increasing use of computers and robots in the production process, CAD / CAM systems (computer aided production), CAE (Computer Aided Engineering), 3D technology, CIM (computer integrated manufacturing), CAR (computer aided repairs), computer aided maintenance, CAT (computer aided testing) and many others. The application of these technologies in modern production is widespread in companies that are our direct competitors in the market of the European Union and other markets. Thus, the issue of equipment is very important for our companies, because it is usually a big investment, and very often it completely changes the technology.

Also, most of the engineering, professional and technical staff do not apply modern techniques of design and communication with the market, for example, software “SolidWorks”, which quickly changes the product and allows companies to quickly adapt to customer requirements. Similar thing goes for industrial design that is often below the level of competitors.

In addition, changes are needed in key business processes. The strong growth of some of our companies is not accompanied by appropriate management and organizational transformation. Many owners or managers have limited (professional) knowledge, and because they are often of technical education, they lack the market and management skills in particular. Some of them are aware that they have become a bottleneck for the development of the company and their firms need a transformation in management. Also, some intend to engage seriously their family members as heirs in the management of the company, but in some cases there is no heirs or, sometimes, they are not interested.

The aspect	Why is it important?	Found weaknesses	Main actors	Area of activity and potential interventions
<b>THE GAP – KEY PROCESSES AND TECHNOLOGY</b>				
<ul style="list-style-type: none"> <li>• Key processes - product development</li> </ul>	<p>In the context of having its own finished product:</p> <ul style="list-style-type: none"> <li>• Greater stability of business</li> <li>• Greater bargaining power towards buyers</li> </ul> <p>In the context of the development process and technical preparations:</p> <ul style="list-style-type: none"> <li>• Reducing the time required for the preparation and execution of production</li> <li>• Simulation and correction of any problems / errors</li> <li>• Flexibility in changing demands of customers (different product characteristics)</li> <li>• Creating a knowledge base / “solved” products</li> </ul>	<ul style="list-style-type: none"> <li>• Few companies have their own product (part of the strategy of firms: own product versus „lohn“ production)</li> <li>• Outdated methods of design and production preparation dominate</li> <li>• Companies are aware of the need for support in this area (as professional-engineering, and financial)</li> </ul>	<ul style="list-style-type: none"> <li>• Successful companies (eg. Spektra DMG)</li> <li>• Faculty of Mechanical Engineering</li> <li>• Individuals / companies that offer these services</li> </ul>	<ul style="list-style-type: none"> <li>• Support to companies in product development (rapid prototyping, equipment, etc.).</li> <li>• Supporting the training of engineers and students (CAD / CAPP / CM Solid-Works)</li> </ul>
<ul style="list-style-type: none"> <li>• Key processes - organization of production</li> </ul>	<ul style="list-style-type: none"> <li>• There are opportunities to increase efficiency and reduce production costs (lower cost and / or higher profits)</li> <li>• Important primarily for the (few) company engaged in the manufacture in large series (eg. „Metalac MBM“)</li> </ul>	<ul style="list-style-type: none"> <li>• There is an interest of companies for this area (lean production)</li> <li>• Few experts in our proximity, in this field</li> </ul>	<ul style="list-style-type: none"> <li>• Companies and experts from the region with good experience in this field</li> <li>• Faculty of Mechanical Engineering</li> </ul>	<ul style="list-style-type: none"> <li>• Improvement of production processes (5S, Lean, Kaizen - initial training and consulting)</li> <li>• Support and improvement of equipment maintenance</li> </ul>

The aspect	Why is it important?	Found weaknesses	Main actors	Area of activity and potential interventions
<b>THE GAP – KEY PROCESSES AND TECHNOLOGY</b>				
<ul style="list-style-type: none"> <li>• Key processes - management and organization</li> </ul>	<ul style="list-style-type: none"> <li>• Directors are decision makers, all operational activities, as well as organizational culture depend on them, especially given the fact that they do not delegate enough</li> <li>• Entrepreneurial way of running the company by founders, becomes a constraint for growth of companies</li> </ul>	<ul style="list-style-type: none"> <li>• Owners / managers are often technical profile and lack market and management knowledge</li> <li>• Directors are looking for practical solutions, experiences and their exchange</li> <li>• Some owners are aware that they have become a bottleneck for the development of the company and the need for transformation</li> <li>• Some are not</li> <li>• Some intended to be to seriously engage their heirs in the management of the company</li> </ul>	<ul style="list-style-type: none"> <li>• Companies that have successfully solved some problems</li> <li>• Organizations that have experience with training of directors (eg. Adizes)</li> <li>• Organizations that have experience in the transfer of “tacit” knowledge (Eda)</li> <li>• Sectoral experts</li> </ul>	<ul style="list-style-type: none"> <li>• Events for the exchange of experience and knowledge for managers / owners</li> <li>• Improvement and professionalization of management (Adizes, etc. - Initial training and consulting)</li> </ul>
<ul style="list-style-type: none"> <li>• Investment capital for the purchase of new equipment and introduction of new products and innovations</li> </ul>	<ul style="list-style-type: none"> <li>• about 2/3 of the companies needs to invest in better equipment and technology</li> <li>• The introduction of new products and innovation funding</li> </ul>	<ul style="list-style-type: none"> <li>• Expensive financing</li> <li>• Access to resources of IRB difficult and conditioned</li> <li>• No more subsidies for increasing competitiveness (for export)</li> <li>• The unwillingness of owners to use new ways of raising capital (equity ...)</li> <li>• No venture capital funds</li> </ul>	<ul style="list-style-type: none"> <li>• Banks,</li> <li>• IRB</li> <li>• Credit guarantee fund</li> <li>• Western Balkans Innovation Fund</li> <li>• Companies with a positive experience</li> <li>• Stock market</li> </ul>	<ul style="list-style-type: none"> <li>• Support to procurement of key equipment</li> <li>• Provision of investment capital (initial training and consulting)</li> </ul>

## Cooperation between companies

Cooperation between companies of the metal sector is relatively low. As we said in the analytical part, a positive example in the metal industry in the project area is the production of wire products. The producers of welded meshes in our area (“Komerac Mali”, “Armaco” and other companies) teamed up and jointly purchase raw materials for many years. In addition, they co-operate also in terms of production and division of work. However, in other enterprises cooperation is mostly when they borrow equipment from each other, but this is sporadic and rare.

There are many benefits that could be achieved through greater cooperation. First of all, it is important to increase the capacity of the sector to cooperate with foreign manufacturers and markets, of which, in fact, further progress in this sector depends. In common procurement their position could be better because the joint purchasing may accomplish a lower prices and more favorable conditions. In addition, it would make sense to exchange innovative practices, and even to have joint activities in developing new and improving existing products.

The aspect	Why is it important?	Found weaknesses	Main actors	Area of activity and potential interventions
<b>THE GAP – COOPERATION BETWEEN COMPANIES</b>				
<ul style="list-style-type: none"> <li>Establishment of better cooperation between local companies</li> </ul>	<ul style="list-style-type: none"> <li>Important for improvement of the capacity of the sector for the cooperation with foreign manufacturers</li> <li>It is important to increase the capacity of the sector</li> <li>to produce their own products</li> </ul>	<ul style="list-style-type: none"> <li>There are positive examples of cooperation, but it is still at a low level</li> <li>The key problem is lack of trust between firms</li> </ul>	<ul style="list-style-type: none"> <li>Domestic companies, especially those with a positive experience in cooperation</li> </ul>	<ul style="list-style-type: none"> <li>Exchange of experience and managerial practices (“Wine for executives”)</li> <li>Promotion of innovative practices</li> <li>Supporting companies in the areas of common interest</li> <li>Support the systematic measurement and comparison of the performance of firms and rewarding best practice</li> </ul>



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