

A Geographical Analysis of Industry in Bugojno, Bosnia and Herzegovina

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ABSTRACT

In professional and scientific researches on the location factors which influence the development of industry, there are different views. It is believed that considering only the so-called classic locational factors (raw materials, energy, labor, market, transport links, etc.) is not enough and that it is necessary to include some other factors in this analysis. In the industry of the 21st century, the following factors have a great importance: industrialisation policy of local or national authorities, connection between industry, attracting industry to the so-called industrial agglomeration, transport, customs policy, etc. Today, in the municipality of Bugojno, there are three industrial-business zones in which there is located the majority of Bugojno industry, while other industrial enterprises are deployed either throughout the town, (industries that do not require large areas for action), or are scattered across suburban area (mainly industrial wood processing factories). As a basis for monitoring changes in the distribution of industry of the municipality of Bugojno, there were used two criteria, which are commonly used in such researches. These are locational quotient and regional factor.

Keywords: Location Factors, Survey, Industrial Zone, Chain Index, Crisis

INTRODUCTION

Analysis and evaluation of geoposition represents an important factor for understanding of genesis, development, and function of any kind of area. Geographical position of the Municipality of Bugojno has the following characteristics: it is situated in the Northern Hemisphere, in the field with geographic coordinates 43°54' and 44°09' North latitude, and between 17°18' and 17°37' East longitude.

Political-geographically, the Municipality of Bugojno is situated in the state of Bosnia and Herzegovina, the entity of the Federation of Bosnia and Herzegovina, and within it, in the Middle-Bosnian Canton. Regional-geographically, it belongs to the Mountain-Valley macroregion, and the Upper Vrbas-Pliva mesoregion of Bosnia and Herzegovina. Micro-regionally, it is situated in the Uskoplje valley.

Transport-geographical position is satisfactory. By roads, Bugojno is almost equally away from the cities of Banja Luka, Sarajevo, Mostar, and Split (around 140 km). The total length of border of Bugojno municipality towards the neighbouring municipalities is 102.7 km and in those borders the Municipality of Bugojno is around 361 square kilometers in area (Gekić, 2013) (Figure 1.).

Vrišer when analyzing the importance of the individual location factors in the distribution of industry in Slovenia, singled out seven: raw materials, energy, labor, capital, market, price policy and traffic (Nurković, 2001). Industrialization is the economic and social process, the cause of radical changes of socio-economic development. It is an economic rebound, increase in production and productivity, adoption of new technologies and means of production and a

high degree of labor distribution. By direct and indirect impacts it equally affects both urban and rural areas (Vrišer, 1978).

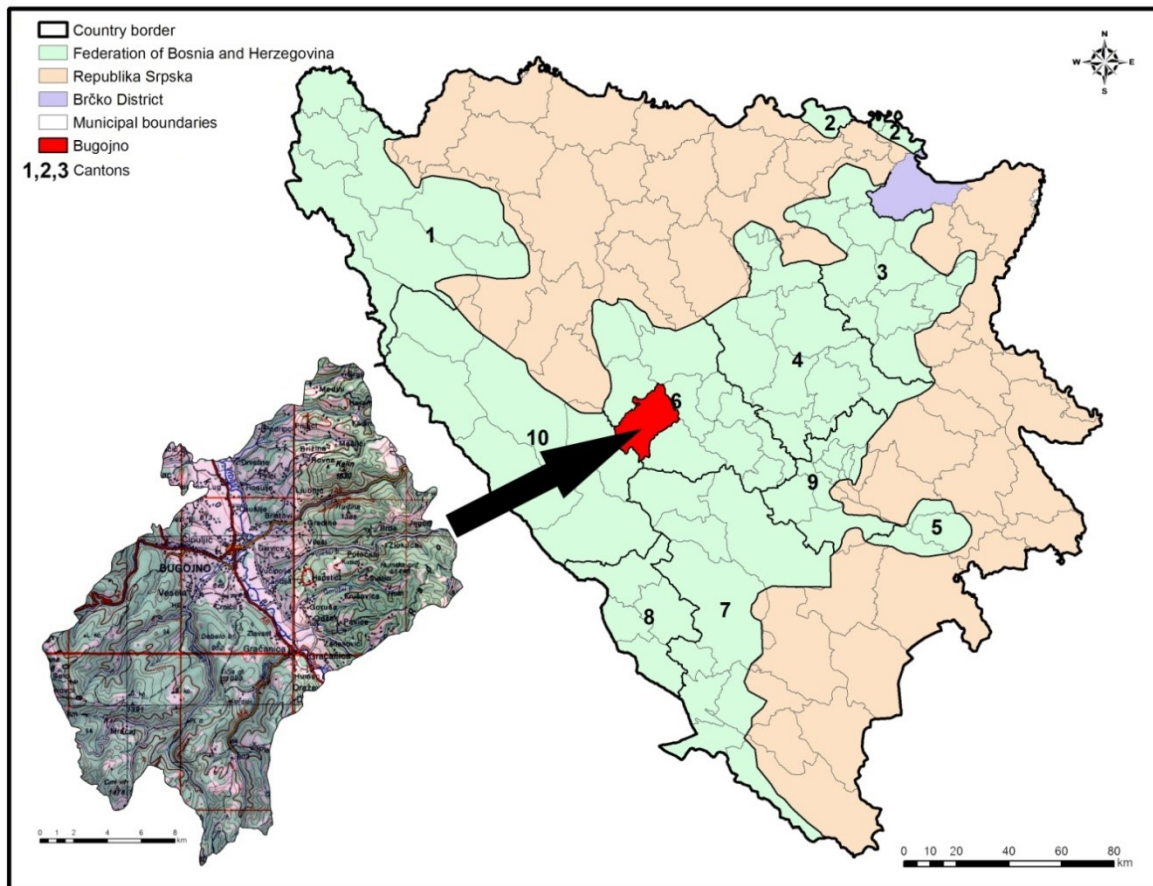


Figure 1. Geoposition of Bugojno in Bosnia and Herzegovina

Comparison of quotient size of location and regional factors within certain spatial units reveals the share and development of industrial functions in a given area. By the detailed investigations of these factors in the municipalities and individual settlements we can get to the guidelines for the selection of optimal locations and sizes of industrial buildings and thus the possibilities for accommodation in the rural areas (Pegan, 1991).

The complex transitional process of the central and eastern European countries from the centrally-planned economy towards the market economy has been characterised by numerous conflicts and dramatic changes, particularly in the production sector. Taking into consideration that industry had the dominant significance in the economic structure shortly before the collapse of communism, the primary focus of the reforms was directed towards its restructuring (Miletić et al., 2009).

Assessment of Location Factors in The Distribution of Industry in The Municipality of Bugojno

In the analysis of the industrialization of Bugojno, there were applied the following locational factors: local development policy, infrastructure, labor, market, capabilities, other wider local factors, traffic, water and mineral resources.

To avoid the analysis of industrialization of this area being too simplified and dependent only of the author's attitude, the assessment of the main location factors in the distribution of most industrial companies was carried out by conducting a special survey for senior staff in the industrial enterprises of the municipality of Bugojno. They answered a special questionnaire in which they chose five among nine key factors, which in their opinion, were the most important. These five factors were first evaluated according to the importance using the method of dotting (Vrišer, 1977), so that the most important got five dots, the second in importance four, the third three, the fourth two and the fifth a dot. In addition, respondents also marked within each factor which, in their opinion, were crucial factors in the formation of the company, or had an impact on its distribution and which will be the most important in the future for their company.

The survey covered 36 major industrial enterprises of Bugojno (58% of all industrial enterprises) and gave satisfactory results that could be useful in the further study of industrial development of the municipality of Bugojno. The survey identified the following order of location factors (Table 1).

Table 1. Assessment of location factors on development of the industry in Bugojno, 2010

<i>Location Factor</i>	<i>Impact on the current development in % of dots</i>	<i>Impact on the future development in % of dots</i>
Local development policy	2.5	13.7
Infrastructure	18.1	13.7
Labor	17.9	18.5
Market	25.9	27.4
Capacities	17.5	14.8
Other wider local factors	4.6	5.7
Transport	3.6	1.3
Water	6.2	1.8
Mineral resources	3.7	3.1

Source: Survey on locational factors, 2010.

Simply adding dots for the individual location factors for the 36 responses showed that the most dots won factor "market", 133 or 25.9%. Location factor market as one of the most outstanding economic factors in the industrial business mainly influenced the emergence and current development of the company. Production of shoemaker and leather products, mechanical and metal industry is intended for the foreign market as well as some products of wood industry (Gekić, 2011).

Location factor "infrastructure" is in the second place according to most responses. It scored 92 dots or 18.1%, and it got the highest number of dots in companies that were created before 1995, which means that the infrastructure is mostly obsolete and need to be rebuilt.

In the third place is the location factor "labor", which got 92 dots or 17.9%. Industrialisation of the municipality of Bugojno began intensively only after the Second World War and up until the mid-1960s it employed unskilled and low skilled labor force, since that period by the planned migration to this area comes the workforce with higher level qualifications that

raised the industry of Bugojno to a very high level if we observe the area of the former Yugoslavia. After 1995, the situation is quite different, and the industry of the municipality of Bugojno employs most of the labor force that is poorly qualified or unqualified.

In the framework of the questionnaire on the impact of location factors on the future development of the company, there had been offered nine same responses. According to the responses, the greatest impact on the future development of the companies from Bugojno will have factor "market" which received 27.4% of dots. It is quite a logical choice, since it is produced for the market. In the second place according to the higher number of dots there is a factor "labor" which got 18.5% of the dots. This factor in my opinion is overrated, because the municipality has a large number of unemployed population that can easily be hired and, if needed, quickly prequalified to work in certain industries.

In the third place with 18.5% of the dots is the factor "capacity" which is very important for the future operations and production. Without at least satisfactory capacities, most enterprises do not see their future existence. On the fourth and fifth place, there are factors "local development policy" and "infrastructure" that received 13.7% of dots. It is believed that, in the future, the attitudes and interests of the local community would create the need for particular companies, which is why such a large number of dots was assigned to this factor. In the future, infrastructure will remain an important factor for the development of the companies as a necessity for their further progress (Survey on locational factors, 2010).

Spatial Distribution of Industry in The Municipality of Bugojno

Today, in the municipality of Bugojno, there are three industrial-business zones in which there is located the majority of Bugojno industry, while other industrial enterprises are deployed either throughout the town, (industries that do not require large areas for action), or are scattered across rural area (mainly industrial wood processing factories) (Figure 2.).

The first industrial-business zone, "Bugojno 1", is located on the very edge of town in the western part of the municipality, 2.5 km away from the center of Bugojno municipality, on the site of the former industrial complex "Slavko Rodić". This zone is only 500 m away from the highway M - 16, whose state of road communication in the vicinity of this zone is estimated as good. Topographically, it is on flat ground which is about 670 m above sea level and where there is no risk of flooding, and it is located on soils which by characteristics are assessed as stable. The total area of this zone is 37 hectares and there are 54 buildings. The estimated value of land in the zone per m² is 7-15 euros depending on the location in the zone. There is the following infrastructure: electricity, drinking water and process water, waste water disposal, the possibility of solid waste disposal, telecommunications and transport within the zone. The legal status of industrial and business zone is: 12.5% public and 87.5% private (Archive of personnel departments of the municipality of Bugojno).

In the zone there is a limited supply of production facilities that companies do not use for its core business. In this zone, there are located enterprises of metal industry, two companies of chemical industry and one company of timber industry. The following companies are located in the industrial-business zone "Bugojno 1": "Uni press", "Unis coming", "Unis binas", "Unis MOR", "Unis MIB", the tool factory (metal industry), "Technologic" and "Unis buplast" (chemical industry), "Unis Matić" (wood industry).

The second industrial-business zone, "Bugojno 2", is located in the north of the municipality, 3 km away from the center of the municipality, also on the very edge of town next to the main road E-661 whose state of the road communication in this area is assessed as good. It is a flat stable ground near the river Vrbas, with an altitude of 300-450 m, thus there is a risk of

flooding due to the possibility of retaining the surface water. Here, in the area of 120 ha, there are 3 buildings, transport base of the transport company "Špedicija", "D - Centar" and the former furniture factory. In this industrial-business zone, there are also free parcels for the expansion of the zone in case of need, even for 20 ha. Estimated value of the land is 7 euros / m². On the plots of this zone, or in the "D-Centar" building, there is only one company of food industry, "Dado Trade".

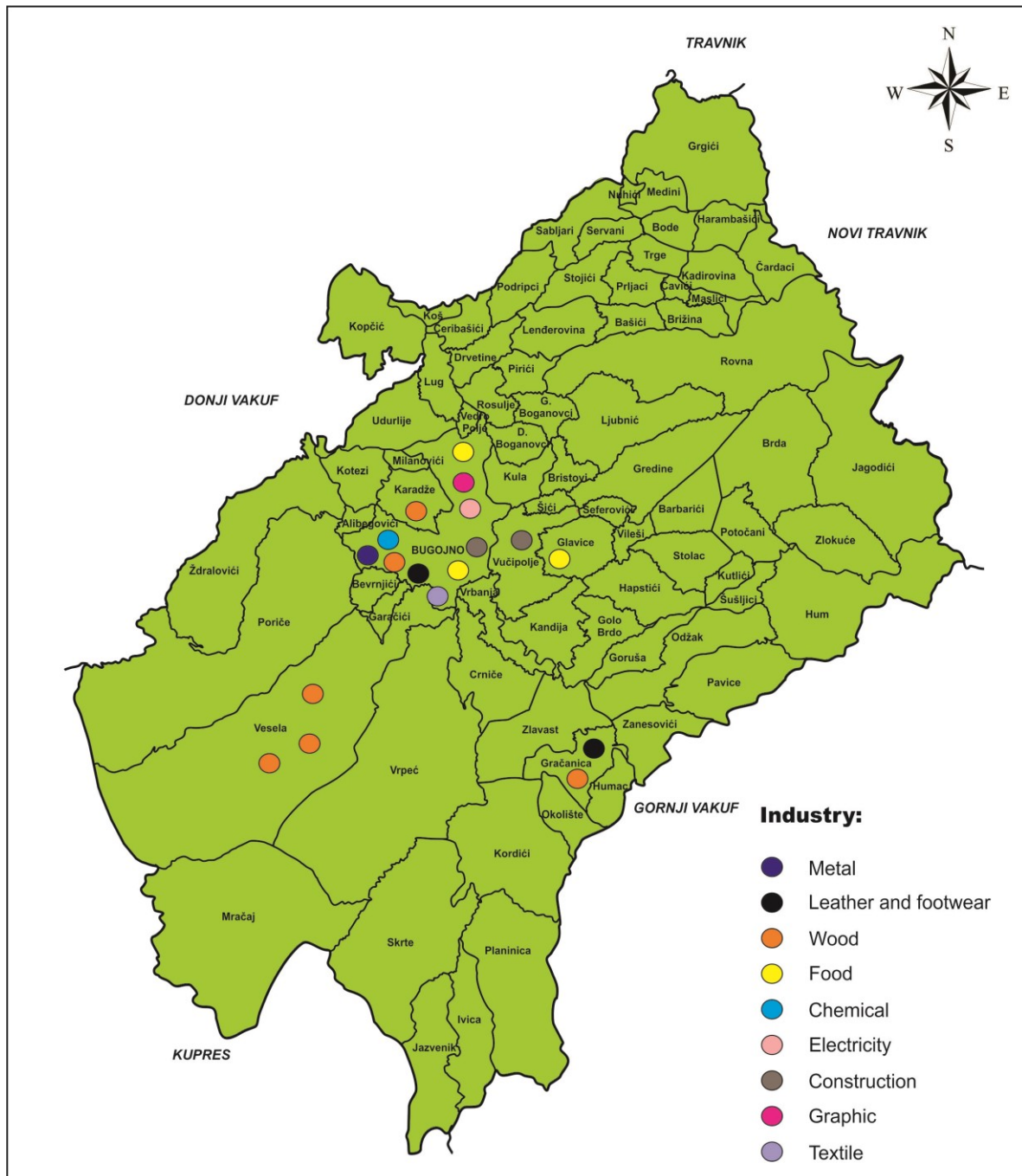


Figure 2. Distribution of main industries in the municipality of Bugojno

This zone has the following infrastructure: electricity, process water and drinking water, solid waste disposal option, while there is no waste water disposal and transportation infrastructure. The legal status of production and business zone is: public 5% and 95%

private. The zone has a good location convenience and size, and has all the prerequisites for development (Archive of personnel departments of the municipality of Bugojno).

The third industrial-business zone, "Bugojno 3", is located about 2 km away from the center of the municipality, on the edge of town, 1 km away from the main road E - 661. It is an industrial zone of former highly successful industrial enterprises "Kožara" and "Kvalitet" that no longer exist. Topographically, it is situated on a flat ground area of about 49 hectares on which there are 23 objects.

There is no risk of flooding the field, while the soil is very stable. There are no available parcels for the expansion of the zone, thus the value of the soil in the zone is 9 euros / m². Infrastructurally, this zone ranks fairly well, because it has: electricity, possibility of solid waste disposal, telecommunications and transport infrastructure within the zone.

When speaking about property, 25% of the zone is still publicly owned, 75% is private. This zone includes industrial capacities of the former large enterprises of leather, footwear and textile industries "Kožara" and "Kvalitet" which at the beginning of the 21st century have been closed. Industrial / commercial zone has all the necessary infrastructure. About 75% of the zone has been privatized, while the rest is in the process of privatization (Archive of personnel departments of the municipality of Bugojno).

Currently, 12 companies operate in the zone. A certain number of the companies bought, or privatized parts of the zone, and a number of them is leasing an office space. In the zone there is a limited supply of production facilities that the companies do not use for its core business. In this zone, there are located companies: Europak, Istra (chemical industry), JSC (Joint Stock Company) for shoe manufacturing, Z&V Una & Donna, Serena (footwear industry), Donnia Trade (fur industry), JSC for the production of leather (leather goods industry), Knitwear GGE, Clothing (textile industry).

In the town of Bugojno, which is also the largest town in the municipality, there are 26 industrial enterprises, namely: companies involved in the production of pastries (Euro slad, Kačako, Start), the enterprises of chemical industry (total 6), Samadex, Stahl, Šarmak, Sirovinametal (metal industry), Štampa, Brdo-Montage and Grafika (graphics industry), seven companies of baking industry, Farmex, Mlinpek (food industry), Gorica (construction industry) (Gekić, 2011).

In the village of Vučipolje, there are enterprises of the construction industry: TGM and UM Beton. In the village of Karadže, there are companies of wood industry "Drvopromex" and "Drvorez" and the enterprise of chemical industry "Europlast". In the village of Gračanica, in the south of the municipality, there are companies "Bunta" (wood industry), "Zika" (production of footwear), while in the village of Glavice, there is the company of food industry "Bajrić". In the village of Vesela, there are companies of wood industries, such as: "Vesna S", Production, transport and service company "Duboka", "Karašin komerc", et al. (Archive of personnel offices of the municipality of Bugojno; Survey on locational factors, 2010).

Changes in The Distribution and Structure of Industry in The Municipality of Bugojno

The location quotient determined the distribution of industries in settlements compared to the distribution of the population. Thus, the number of employees in the industry of settlements of Bugojno municipality was compared with the number of inhabitants in these settlements and the municipality of Bugojno. Regional factor was used to determine how much the index of employees has changed in individual settlements and in the whole municipality of

Bugojno. This methodology was applied by Vrišer (1977) for the study of industrialisation of Slovenia and Nurković (2001) in his doctoral dissertation in the study of industrialisation of Tuzla basin.

Bugojno had a location quotient of 1.1 and it had a lower value than in some other settlements primarily due to the high concentration of the population that has increased since 1981, while the number of industrial workers decreased. The following settlements had the location quotient greater than one: Alibegovići, Bevrnjići, Ceribašići, Garačići, Hapstići, Koš, Kotezi, Kutlići, Okolište, Poriče, Potočani, Udurlije, Vesela, Vučipolje and Ždralovići.

The location quotient in the settlements of Bugojno municipality in 1991 ranged from 0 in even 51 settlements to 2.3 in Bugojno. The town recorded the largest location quotient due to by far the most industrial workers, and because less than half of the population of the municipality lived in it. During the 1980s there was a turn because a large number of people left the primary activities and started working in industrial activities. Only two villages had no industrial workers, in other settlements the location quotient in 1991 ranged from 0.1 in the settlement Maslići to 1.8 in Nuhći which had such a value primarily due to the small population (Population by settlements, 1991).

Data from 2010 show large changes. The number of industrial workers was enormously reduced. A large number of settlements had no industrial workers, so the value of location quotient for them was 0. The town of Bugojno had a value of location quotient of 0.9. The following settlements had the greatest value of location quotient: Drvetine 3.4, Golo Brdo 3.2, Glavice 2.7, Pavice 2.5, Servani 2.9 and Zlokuće 2.5 (Survey on the location factors, 2010).

Branch structure of industry in the municipality of Bugojno, after the Second World War, was relatively stable and it did not change much until 1992. Among the branches there were differences in the number of employees, then the growth rates of production and productivity. Within the branch structure, very significant changes were happening that are closely associated with the introduction of technical and technological innovations and the emergence of new products. Branch structure of industry is also largely dependent of the industrial classification. With the development of industry in the municipality of Bugojno, the number of industrial branches was increasing. This section will also refer to the branch structure of the industry of Bugojno municipality in three periods (1961, 1987 and 2010) and the number of employees per branch of industry (Table 2).

In 1961 the number of industrial workers of the municipality was 2 250. They worked in six branches of industry. Most employees were in metal industry 1 654, or 73.5%, then in leather and footwear industry 240 or 10.7%. It included also: electricity generation, building materials industry, wood and food industries. In 1987, the number of industrial workers increased to 8,891, which is an increase when compared to the year 1961, of 395%. Most employees were in metal industry 5 078, or 57.1% of the total number of employees, which is an increase of 307%, then leather and footwear industry 1 453 (an increase of 605%) or 16.3%, in chemical industry 870 or 9.8%, in textile industry 6.5%, wood 4.9%, food 3.8%.

Today's indicators (survey and data from AFIP-*The Agency for Financial, IT and Mediation Services Inc.*, 2010) in the branches of industry of Bugojno municipality point to a deep crisis of the industry. The war of 1992-1995 tore up business contacts and abolished the market for the products of the industrial branches from the area, and led to the cessation of production in many companies. The data from surveys, municipality administration, questionnaires show that on the territory of Bugojno municipality existed 63 industrial enterprises.

Table 2. Branch structure of industry in the municipality of Bugojno, 1961-2010

Industry	Number of workers			% from total industrial workers		
	1961	1987	2010	1961	1987	2010
Electricity	66	101	27	2.9	1.1	32.9
Metal	1 654	5 078	416	73.5	57.1	17.0
Chemical	0	870	188	0	9.8	23.2
Wood	48	436	121	2.1	4.9	10.5
Construction	171	0	61	7.6	0	6.8
Leather and Footwear	240	1 453	589	10.7	16.3	3.7
Food	71	333	305	3.2	3.8	3.5
Graphic (and other)	0	43	17	0	0.5	1.5
Textile	0	577	66	0	6.5	0.9
<i>Total</i>	<i>2 250</i>	<i>8 891</i>	<i>1 790</i>	<i>100.00</i>	<i>100.00</i>	<i>100.00</i>

Source: adapted from Census 1961-1991; Archives of industrial enterprises, 2010.

In the municipality of Bugojno there are: metal, wood, chemical, construction, electrical, food, textile, leather and footwear and printing industry. In the first half of 2010, in the industry of Bugojno municipality, there were employed 1 790 workers. Of these, most employees were in leather and footwear industries 589 or 32.9%, in metal industry, 416 or 23.2%, in food industry, 305 or 17%, chemical industry 188 or 10.5% in timber industry 121 or 6, 8%. In the municipality of Bugojno there are also textile, construction, electrical and printing industry.

Further analysis of these branches of industry with regard to what they produce lead us to the fact that the industry of Bugojno municipality is very complex. If we compare the number of employees in the industry of Bugojno municipality in 2010 with the number of employees in 1987, we can conclude the following: the number of industrial workers declined from 8 891 to 1 790, i.e. for 7 101, or 79.9%; the number of employees in the industry was drastically reduced in all branches of industry except in food industry for which it can be said that the number of employees remained approximately the same; the largest decline in employment was experienced by metal industry for 91.8% or a total of 4 662 workers; textile industry for 88.6%, leather and footwear industry for 59.5%, and so on (Gekić, 2011).

Changes in the branch structure of the industry of Bugojno municipality, for the period 1961-2010, was followed on the basis of the number of employees in individual branches of industry comparing them with the data on the level of Bosnia and Herzegovina. In 1961, in the industry of Bugojno municipality, there were employed 2 250 workers, which is 1.3% of all industrial workers in Bosnia and Herzegovina (Table 3).

Table 3. Chain index of dynamics of industrial development in Bugojno and Bosnia and Herzegovina, 1961-2010

<i>Year</i>	<i>Municipality of Bugojno (workers)</i>	<i>Chain Index</i>	<i>Bosnia and Herzegovina (workers)</i>	<i>Chain Index</i>
1961	2 250	-	166 395	-
1987	8 891	395	421 320	253
2010	1 790	20	144 861	34

Source: Adapted from Census 1961-1991; AFIP, 2010.; Survey, 2010.

Chain index of dynamics of industrial development shows that in the period of 1961-1987, the number of employees in the industry of Bugojno municipality grew faster than in Bosnia and Herzegovina. In 1987, there were 8 891 workers in the industry of Bugojno municipality, which is 2.1% of all industrial workers of Bosnia and Herzegovina.

After 1991, the number of industrial workers has declined sharply in both coverage areas. The number of employees in the industry is reduced significantly faster in the municipality of Bugojno in relation to Bosnia and Herzegovina, because now only 1.2% of industrial workers of Bosnia and Herzegovina are employed in the municipality of Bugojno (Marić, 1991).

After 1991, in almost every branch of industry, the number of employees was reduced. In the period of 1987-2010, the number of employees decreased the most in electricity generation ($I = 4$).

Besides those, a great reduction experienced the following industries: metal industry ($I = 8$), textile industry ($I = 11$), chemical industry ($I = 22$), wood industry ($I = 28$), leather and footwear industry ($I = 40$) and food industry ($I = 91$). The existing branch structure is the result of different development dynamics of certain branches of industry at different times. Today, the primacy of the industry has leather and footwear industry and metal industry (Nurković, 2001).

CONCLUSION

According to Rowthorne and Wells, there are two types of industry crisis: positive and negative. Positive industry crisis occurs when the dynamic and successful industry is laying off workers to increase productivity. In such an example for the overall industry, distinctive is low employment and growth of social product. Negative industry crisis occurs, when industrial social product grows slowly, or even decline, and thereby adversely affecting the growth of the overall social product. Laid-off workers cannot find employment in the service sector, so that the number of unemployed workers is growing rapidly (Slavec, 1997).

In the municipality of Bugojno, until 1992, there were some significant industrialisation processes characteristic of the socialist way of doing business, so industrial crisis in that period can be evaluated neither as positive nor as negative, as defined by the aforementioned authors. It should be noted that the number of industrial workers was constantly increasing since the end of World War II until 1992, and with it grew and productivity of industry.

In the period of 1992-1995 (time of war in Bosnia and Herzegovina), industrial production stopped in almost all industrial enterprises. Important markets were lost, a large number of capable and educated labor force left the municipality of Bugojno, the production technology was destroyed, devastated or stolen, etc. The largest Bugojno work team was the company

"Slavko Rodić" which in 1991 employed over 4000 workers. In early 1991, the company found itself in a deep crisis. It was operating in the field of military industry and it was not ready for the market economy, primarily due to the lack of high-quality production programs. As a result, the dismissal of workers and sending workers to the so-called waiting for a job, and finally a complete breakdown of the enterprise in the period of 1992-1995.

The main cause of the collapse of once great companies of Bugojno industry, were primarily developments in the period of 1992-1995, but also the transition to market economy, outdated technology, and, consequently, the already mentioned lack of quality production programs in most companies. The crisis was particularly felt in large industrial companies that had employed a large number of workers, such as: "Slavko Rodić", "Kožara", "Gorica" and "Mlinpek" and which were industrial giants in the former Yugoslavia, and it was followed by partial or complete release of workers.

The large industrial company "Slavko Rodić" completely fell apart like so many others. The only way to prevent a complete collapse of Bugojno industry, was the privatization of companies that was successful in a very small number of companies. Most of the privatized companies were soon after this process experienced a total breakdown. Thus, once a great company of the textile industry "Kvalitet" ceased operating in 2005, and the construction company "Gorica" which had about 1.900 workers, now has only 22 employees. The industrial complex "Slavko Rodić" was dissected by the privatization to the several companies with a small number of workers, and there is only one company "UNIS Binas" which has almost two hundred workers.

The current problems of the industry in the municipality of Bugojno:

The first problem occurs in the footwear industry, because companies are working on a "business loan" (imported semi-finished products that are subsequently processed into the final product, supplying of semi-finished products directly related to the export of the final product to the same foreign company). They receive materials for making shoes from Italian partners and make finished product.

Each employee works according to the standard of 6 pairs of shoes a day using classical technology. As the price of these shoes ranges from 6-18 euros, the price of labor is also low, thus the monthly average wage in these enterprises is about 150 euros. However, this branch of industry has good prospects, primarily because of the way of business. Metal industry also faces the problem of outdated technology and low labor cost due to low productivity.

Another problem is the lack of skilled labor, because, though the municipality of Bugojno has around 650 of thier own students at universities across Bosnia and Herzegovina annually, they do not return to thier local municipality after graduation due to the lack of employment opportunities. Based on this, the largest number of active industrial workers are those with secondary education, mostly three-year secondary education.

The third problem is the lack of quality production programs which is why the price of the product of Bugojno industry is very low compared to products from other areas, the price of labor is, of course, related to it (Gekić, 2011).

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