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**CONTENTS**

<i>Ibrahim Jusufrić</i> - <b>Traffic, environmental and economic problems and prospects of solving in the countries of the Western Balkans with a focus on Bosnia and Herzegovina</b>	<b>3</b>
<i>Slobodan Nesković</i> - <b>Business Ethics in Transport, Ecology and Economy of the Countries of South-East Europe - Methods and Implementation Instruments</b>	<b>33</b>
<i>Predrag Dašić, Jovan Dašić, Bojan Crvenković</i> - <b>Application of video surveillance as a cloud service (VSaaS) in the field of traffic</b>	<b>44</b>
<i>Atanas Kozarev, Alexandra Milichinska-Gutevska</i> - <b>Expertise of bodily injuries</b>	<b>55</b>
<i>Enes Huseinagić, Dzenana Huseinagić</i> - <b>An employee of the XXI century</b>	<b>61</b>
<i>Tihomir Djurić, Sinan Alispahić</i> - <b>Impact analysis of vehicle damage on the findings and expert opinion on traffic accidents</b>	<b>67</b>
<i>Mirsad Imamović, Bruno Bojić</i> - <b>An attachment to define the concept of business logistics</b>	<b>74</b>
<i>Aleksandr I. Burya, Yekaterina A. Yeriomina, Igor I. Polovnikov, Aleksandr F. Mozorov</i> - <b>Use of polymers containing metal in the automotive industry</b>	<b>83</b>
<i>Almedina Hatarić, Jasmin Jusufrić, Mirano Jupić, Jasna Kuljanović</i> - <b>Application of RFID technology in the production of postal services</b>	<b>88</b>
<i>Nikola Kuvačić, Alisa Salikić, Lejla Skopljak</i> - <b>Mission and vision as the backbone of the development strategy of the higher education institution</b>	<b>93</b>
<i>Maida Bećirović, Azra Bećirović</i> - <b>Regional Cooperation in the Western Balkans and Inflow of Foreign Investments</b>	<b>104</b>
<i>Muhamed Bajrić, Lejla Skopljak</i> - <b>Fiscal federalism-theoretical approach</b>	<b>108</b>
<i>Pavel Kovač, Dušan Jesić, Borislav Savković, Predrag Dašić</i> - <b>Inspection of high-resistance coatings on machine parts on abrasive wear</b>	<b>116</b>
<i>Kemal Jaganjac</i> - <b>Public transport as a factor of reducing congestion in urban areas</b>	<b>120</b>
<i>Milan Stanković, Pavle Gladović, Vladimir Popović, Nada Stojanović</i> - <b>Analysis of the operation of the public city transport system in suburban settlements</b>	<b>126</b>

## TRAFFIC, ECOLOGICAL AND ECONOMY PROBLEMS AND PERSPECTIVES OF SOLVING OF MENTIONED IN THE COUNTRIES OF WESTERN BALKANS WITH AN OVERVIEW ON BOSNIA AND HERZEGOVINA

Akademik prof. dr. Ibrahim Jusufrić, email: rektor@iu-travnik.com

*Abstract: Aside of the positive effects that traffic growth has on the economic prosperity of the cities, countries, regions, continents and the world, the negative consequences of today's policies, which are more emphasized in the field of traffic, alleviate the importance of the same growth and development. Negative effects are mostly emphasized in urban environments. The constant increase of the number of inhabitants in the cities and the activity rate of motorization results in the increasing traffic congestion on the street network, as well as the consequence of increasing use of cars, and the impossibility of further satisfying of demand by building new traffic capacities of the city. The negative effects of increasing the traffic volume and the more intensive use of motorized means of transport in the cities are: emissions of harmful gases, energy consumption, communal noise, traffic accidents, occupation of space and time in already bounded urban environments, reducing the ability to perform other activities. Special negative effects of traffic are manifested on the number of people who have died in our country and in the world, and an increasing amount of material damages reaching over than 5% of GDP. The general conclusion is that transport is, actually, a victim of its own success. Traffic congestions are continuously increasing and growth is the main cause of existing environmental pollution problems. All of this has led to the application of ITS in operation and traffic management, which has a significant impact not only on the efficient functioning of the traffic as a whole but also on the appearance of road traffic fatal accidents. Increasing the number of individual passenger vehicles requires the broadening of the traffic network, which results in a reduction of green areas in urban areas, increased air pollution and environmental degradation. As a result, traffic areas have been reduced for non-motorized flows and opportunities for free movement of citizens. Increasing levels of pollution and fewer opportunities for free movement of citizens on the traffic network (hiking, bicycle use ...) lead to a decline in quality levels in urban areas.*

**Keywords:** Road traffic safety, Intelligent transport system (ITS), Sustainable development, knowledge as a resource, entrepreneurship, import and export, employment and unemployment.

### INTRODUCTION

In the modern world, the automotive industry has an extremely important role and position in the global economy.

According to IOCA (International Organization of Motor Vehicle Manufacturers), when the automotive industry was a state, it would be the sixth largest world economy. The production of cars to IOCA is close to 90 million cars a year, while the total value of the annual production of auto industry can be estimated at over \$ 2,100 billion. According to the latest data, it can be concluded that the growth trend of automobile production will continue, primarily driven by demand in the US and developing countries, such as China and Brazil.

Road traffic is one of the essential features of modern civilization. All the benefits of this phenomenon, unfortunately, are further

paid to the high cost of unnecessary human suffering. Road traffic is a part of a comprehensive traffic system, which is a significant factor of social events, because it is an inseparable companion for the development of modern society and today is the most common form of mass and individual transport thanks to the advantages it has in relation to other modes of transport. Traffic does not pose a problem for itself, but the problem arises in the phenomena, relations and activities of human society. The increase in the number of motor vehicles and the relatively small extent of the increase in the modern road network, as well as the fact that in the traffic accidents today there are far more people being killed by the world than for any other reason (fires, floods, earthquakes, etc.) traffic. According to the degree of social danger and consequences, traffic insecurity could be equated with criminality. Although crime losses are numerically higher and potentially more dangerous due



to deliberate action, uncertainties in road traffic outweigh it in irreparable and irreparable losses.

The Global Road Safety Report for 2015 of the World Health Organization, including and processing data from 180 countries, shows that the total number of deaths in traffic in the world is around 1.25 million a year, that is, each day in traffic accidents around the world are 3,500 people. Traffic accidents cost \$ 518 billion globally, and individually each country will cost about 1-2% of their annual GDP. It is predicted that in low- and middle-income countries, traffic accidents will be the cause of financial losses of about 5% of GDP. In Bosnia and Herzegovina, traffic accidents cost the state about 5.8% of GDP. According to the statistical data on road safety for 2015, published by the European Commission, it is confirmed that European roads are still the safest in the world, despite stagnation in reducing the number of deaths on roads. On the EU roads last year, 26,000 people lost their lives, 5,500 less than in 2010. However, there was no improvement at the level of the EU compared to 2014. In addition, the Commission estimates that 135,000 people have been severely injured on the EU's roads. It is estimated that social costs (rehabilitation, health care, material damage, etc.) caused by fatalities and road injuries amount to at least 100 billion euros. In Bosnia and Herzegovina roads, in the past 2016, there were a total of 39,543 traffic accidents, of which 321 persons were killed and 11,188 injured. In the course of the previous year, 884 accidents were registered in comparison to 2015, which in percentage shows the increase in the total number of traffic accidents by 2.29%. The number of accidents with dead or injured persons was also increased for 89 traffic accidents or 1.17%.

## I ROAD TRAFFIC

### 1. The place and role of road traffic in the world economy

In the modern world, the automotive industry has an extremely important role and position in the global economy. According to OICA (International Organization of Motor Vehicle Manufacturers), when the automotive industry was a state, it would be the sixth largest world economy. The production of cars to OICA is close to 90 million cars a year, while the total value of the annual production of auto industry can be estimated at over \$ 2,100 billion.

According to the latest data, it can be concluded that the growth trend of automobile production will continue, primarily driven by demand in the US and developing countries, such as China and Brazil. Auto industry is one of the leaders of the globalization process. Easy globalization is not a newer date, but goes far back into the past, only new policies and technologies in recent decades have led to the acceleration and deepening of global interdependence and integration. The world was affected by a new wave of globalization in which the markets for goods, services, labor and capital are increasingly integrated internationally. International trade, foreign direct investment, international portfolio<sup>1</sup> investment and international lending are growing faster than world production.

### 2. Road traffic problems

Road traffic is one of the essential features of modern civilization. All the benefits of this phenomenon, unfortunately, are further paid to the high cost of unnecessary human suffering. Road traffic is a part of a comprehensive traffic system, which is a significant factor of social events, because

<sup>1</sup> A portfolio is a set of financial assets that an individual or company owns, composed of different

financial instruments (securities). The business portfolio is the total business and product of a company.

it is an inseparable companion for the development of modern society and today is the most common form of mass and individual transport thanks to the advantages it has in relation to other modes of transport. Traffic does not pose a problem for itself, but the problem arises in the phenomena, relations and activities of human society. The increase in the number of motor vehicles and the relatively small extent of the increase in the modern road network, as well as the fact that in the traffic accidents today there are far more people being killed by the world than for any other reason (fires, floods, earthquakes, etc.) traffic. According to the degree of social danger and consequences, traffic insecurity could be equated with criminality. Although crime losses are numerically higher and potentially more dangerous due to deliberate action, uncertainties in road traffic outweigh it in irreparable and irreparable losses. In today's conditions of using traffic techniques, antisocial behavior, inattention, inadequacy, as well as increase in number preconditions for creating dangerous situations, and consequently for the occurrence of traffic accidents. The main indicators of the state of road traffic safety in a particular area are traffic accidents and the victims of these traffic accidents. habits, technical malfunction of motor vehicles, and increase of density of population, have led to a significant vehicles operated by persons who have not fully acquired professional management vehicles, high percentage of participation of of financial losses of about 5% of GDP. In Bosnia and Herzegovina, traffic accidents cost the state about 5.8% of GDP. Unless adequate activities are undertaken, it is predicted that traffic accidents will become the fifth leading cause of death in 2030.

as the effects of many objective factors can turn the danger into a traffic accident. High density and intensity of traffic flows, improvement of driving dynamics of motor

Modern traffic demands today require, in addition to the basic knowledge of traffic regulations and management skills, the need for better preparation of people for traffic, which means behavior in traffic and traffic education. Developing and qualifying traffic safety is a set of measures, actions and other activities that are organized as a complex system with multiple subsystems. Improving traffic safety implies compliance with various factors that can reduce the danger that is actually present in the performance of the traffic activity.

### **3. The current state of traffic safety**

#### **3.1. The current state of traffic safety in the world**

The Global Road Safety Road Safety Report for 2015 of the World Health Organization, including and processing data from 180 countries, shows that the total number of deaths in traffic in the world is around 1.25 million a year, that is, every day in traffic accidents around the world are 3,500 people. Between 20 and 50 million people suffer minor injuries, but in many cases, as a result of injuries sustained in a traffic accident, permanent disability occurs. If something does not change urgently, the UN estimates that by 2020, the number of deaths in road traffic will rise to 1.9 million a year. More than half of all deaths in road traffic occur among young people aged 15-44. Traffic accidents are the 9th leading cause of death and account for 2.2% of all deaths worldwide. Traffic accidents are the leading cause of death among young people aged 15-29, and the second leading cause of death in the world of young people aged 5-14 years. Every year, almost 400,000 people under 25 die

on world roads, on average, that's more than 1,000 a day.

More than 90% of all road deaths occur in low- and middle-income countries.

Traffic accidents cost \$ 518 billion globally, and individually each country will cost about 1-2% of their annual GDP. It is predicted that in low- and middle-income countries, traffic accidents will be the cause

### 3.2. Traffic safety in Europe

According to the statistical data on road safety for 2015, published by the European Commission, it is confirmed that European roads are still the safest in the world, despite stagnation in reducing the number of deaths on roads. On the EU's roads last year, 26,000 people lost their lives, 5,500 less than in 2010. But there was no improvement at the EU level in comparison to 2014. In addition, the Commission estimates that 135,000 people are severely injured on EU roads. It is estimated that social costs (rehabilitation, health care, material damage, etc.) caused by fatalities and road injuries amount to at least 100 billion euros.

The average mortality rate in the EU was 51.5 deaths per million people in 2015, similar to the last two years. On roads in the European Union, in 2015, 26,100 people were killed, a half less than in 1995.

Although the number of those killed on the roads of the EU 2015 has increased by 0.5% compared to 2014, this number has decreased considerably compared to 20 years ago. Looking individually according to the total number of deaths in EU countries, the highest number of road accident victims is in France (3,461), Germany (3,459) and Italy (3,428) and Poland (2,938).

The smallest traffic deaths in the country are in Malta (2.6 deaths per 100,000 inhabitants), while Croatia is at the peak of 8.2 deaths per 100,000 inhabitants, followed by Lithuania (8.3), Latvia (9.5), Romania (9.5) and Bulgaria (9.8), according to Eurostat<sup>2</sup> data.

Further efforts need to be made to achieve the EU's strategic goal, halving the number of road traffic deaths from 2010 to 2020. Technological advances in the last decade have significantly improved the safety of vehicles. Significant progress in innovation and technology has a strong potential to improve road safety in the future, especially in the area of automated and networked driving. In order to open the way to automation and better traffic management, the Commission intends to develop a master plan for the development of a cooperative intelligent transport system (ITS), two-way communications between vehicles and road infrastructure. These systems allow vehicles to send warnings (for example, in case of emergency braking) or through infrastructure (eg future road works).

	Putnička/ osobna mv	Mopedi i motocikli	Autobusi	Teretna vozila	Ostalo	Ukupan broj reg. vozilaza 2016
Federacija BiH	534.936	6.373	2.730	47.610	15.813	607.462
Republika Srpska	300.351	3.763	1.498	31.240	14.902	351.754
Distrikt Brčko	26.286	871	80	2.613	1.664	31.514
Ukupno u BiH	861.573	11.007	4.308	81.463	32.379	990.730

### 3.3. Traffic safety situation in Bosnia and Herzegovina

In Bosnia and Herzegovina roads, in the past 2016, a total of 39,543 traffic accidents occurred, of which 321 persons were killed and 11,188 injured. In the course of the past 2016, 884 accidents were registered in relation to 2015, which in percentage shows

<sup>2</sup> The Statistical Office of the European Communities (Eurostat) collects and publishes statistical data from Member States, countries

outside the European Union and from international organizations in order to inform the institutions of the European Union and enable the monitoring of the effects of Community policies.

the increase in the total number of traffic accidents by 2.29%. The number of traffic accidents with dead or injured persons was also increased for 89 traffic accidents or 1.17%. In the case of traffic accidents with pecuniary damage, over the past year, 795 accidents were registered in comparison to 2015, or 2.56% in percentage terms.

From the above facts, it can be concluded that the trend of increasing the total number of traffic accidents commenced in 2013 will continue in 2016. According to the above data, we can conclude that on average 108 traffic accidents occurred on the territory of BiH daily during 2016, of which about 21 traffic accidents with dead and injured persons.

## 4. Motor vehicles

### 4.1. Number of registered motor vehicles

In the past 2016, 990,730 motor vehicles were registered in Bosnia and Herzegovina, which is an increase of 38,135 vehicles, or 4.00% compared to 2015.

Table: Total number of registered motor vehicles by areas and categories for 2016



Diagram 1: Percentage share of register number. vehicles of individual entities / districts in the total number of registered motor vehicles for 2016. year

### 4.2. Number of registered new motor vehicles

During 2016, 10,653 new motor vehicles were registered in Bosnia and Herzegovina, out of which 8,308 were sold new passenger cars or 78%.

Of the total number of registered motor vehicles in Bosnia and Herzegovina, 0.84% were registered new vehicles that were purchased by physical or legal entities in 2016.

### 4.3. Number of registered imported motor vehicles used

Every year, a number of used motor vehicles are imported into Bosnia and Herzegovina. During 2016, 64,003 imported motor vehicles were registered, which is a decrease of 5,973 vehicles compared to 2015. The registered vehicles used in our country during 2016 represent about 6.46% of the total number of registered motor vehicles in Bosnia and Herzegovina. When comparing 2015 and 2016 with regard to imported vehicles, we conclude that the number of imported vehicles used in 2016 declined significantly by about 8.54%.

### 4.4. Age structure of motor vehicles

Detailed analysis of the data revealed that the economic crisis, as well as the introduction of new regulations on the import of road motor vehicles (by abolishing the age limit when importing a vehicle), more precisely the introduction of the regulations<sup>3</sup> on vehicle type-approval, significantly affected the age structure of the fleet in our country. The following table shows the number of registered vehicles in Bosnia and Herzegovina according to Euro standards, based on which the age structure of the vehicle can be estimated:

Table: Number of registered vehicles in BiH

<sup>3</sup> Approval of motor vehicles, ie equipment and parts of a vehicle, represents the procedure for assessing and confirming whether a particular

vehicle as a whole, or any part thereof or equipment, complies with the requirements of the ECE Regulation or the EEC Directive.



according to Euro standards

Eurostandard*	Godištevozila	Broj vozila	Procenat
Konvencionalno vozilo	Do1991.	236.366	24,9%
Euro1	Do1992.	37.737	4,0%
Euro2	Do1996.	85.215	8,96%
Euro3	Do2000.	327.122	34,4%
Euro4	Do2005.	170.136	17,9%
Euro5	Do2009.	79.730	8,4%
Euro6	Od 2009.	13.711	1,4%
EEV	Od 2005.	357	0,04%
			100%

Looking at the table above, it can be seen that more than 72% of registered vehicles in Bosnia and Herzegovina are older than 15 years and more than 90% of the fleet is over 12 years old. More than 70% of the vehicles use diesel as a fuel, more than 28% petrol, while there is negligible number of vehicles with alternative propellant (less than 1%).

## 5. Infrastructure

### 5.1. New Infrastructure Policy of the European Union

By promoting the principles of intermodality, the EU seeks to integrate various transport sectors into effective logistics chains in order to optimally use the sectors, and to reduce transport congestion. The existing fragmented network of European roads, railways, airports and channels will be transformed into a single trans-European transport network (TEN-T) with the new EU infrastructure policy. This new EU policy sets for the first time an essential transport network based on nine major corridors: two north-south corridors, three east-west corridors, and four diagonal corridors.

This basic network will significantly alter the links between the East and the West, remove bottlenecks, improve infrastructure, and simplify cross-border traffic for travelers and businesses across the EU. Links between transport modes will be improved and contributed to the achievement of the EU's climate change goals. The basic network needs to be completed by 2030.

The new traffic network, if viewed in its entirety, will enable safer traffic with fewer stops, easier and faster travel. The goal is to

ensure that gradually, by 2050, most European citizens and businesses of this comprehensive network are not more than 30 minutes away.

### 5.2. Core corridor networks as the backbone of the new EU transport policy

The new legal basis for the development of the Trans-European Transport Network (TEN-T), which was adopted in December 2013 marks the beginning of a new era in Europe's transport infrastructure policy. In relation to the approach over the last 20 years, the main innovation of the new TEN-T policy lies in the definition of an integrated, multimodal core of the network that will be developed by the Member States and relevant stakeholders by 2030, such as infrastructure managers, regions and others, as well as EU. This basic network connects large knots (urban nodes, ports, airports and other transport terminals) through key railways, roads, inland waterways, maritime and air transport links. Such an enhanced network access across Europe-in relation to the past individual project financing programs-significantly strengthens the infrastructure base for an efficient, secure and high-quality multi-modal transport chain for freight and passengers. It provides a strong integrated policy framework, overcoming the current mosaic of infrastructure projects, which aims to smooth the functioning of the internal market and ensure economic, social and territorial cohesion and improve accessibility across the EU. Investing in many of the projects that contribute to this goal will be vital to - European Memory, inclusive and sustainable growth, and will have enormous potential for job creation-during construction and after completion-in many sectors of the economy.

The new TEN-T set guidelines will establish a clear basis for action by 2030. The core network will be completed, that is, the entire network will be in operation, the missing links between member states will be completed and bottlenecks that hinder

the free flow of traffic, which causes high costs for the economy, will be removed. Core corridor networks play a key role in coordinated implementation of the new TEN-T policy. The corridors are based on three pillars: 1. Increase of cross-border connection and removal of throats, 2. integration of means of transport (multiple variants), 3. promoting technical interoperability. The nine basic network corridors are defined, each of them comprising between four and nine different Member States, and contains a whole range of modes of transport.

In addition, the European Commission has appointed European coordinators for two horizontal priorities: European Railway Traffic Management System (ERTMS) and Highway (MoS). A special review of the new EU transport policy relates to an example of innovations that are directly related to access to the corridor, which will enable the possibility of a new priority offered by the new TEN-T Guidelines.

By designing such a European transport network, bottlenecks would be removed and the most distant regions linked to the common road system would be removed. According to the European Commission's earlier interpretations, for BiH it should be a network agreed within the P21 Trans-European Network.

The core network includes only those parts of a comprehensive network that are strategically most important, and should be established no later than December 31, 2030.

With the decision of the European Commission on October 18, 2013, nine corridors of the EU's Basic Transport Network have been defined as the backbone for connecting 94 major European ports and 38 key airports with railways and roads in the capital cities of European countries, as well as the development of 15,000 kilometers of railway infrastructure that enables its capacity achieving satisfactory speeds for passenger and freight trains, as

well as 35 border crossings.

These nine corridors are a priority for the EU's traffic policy, with an additional funding of EUR 26 billion under the name CEF (Connecting Europe Facility), from which the Member States, in addition to the existing Structural and Cohesion Funds, can also finance projects on those corridors based on the competition will be announced by the European Commission. The nine corridors are: Baltic-Adriatic, North Sea-Baltic, Mediterranean, Middle East Mediterranean, Scandinavian-Mediterranean, Rhine-Alpine, Atlantic, North Sea-Mediterranean, Rhine-Danube. Each of them must include three types of transport infrastructure, Member States and two border crossings.

### **5.3. The state of the road infrastructure in Bosnia and Herzegovina**

According to data collected from the relevant institutions, the total length of the road network in Bosnia and Herzegovina is 22,871.96 km, of which 83.50 km of the highway, 30.71 km of roads reserved for traffic of motor vehicles, 3,843,20 km of main roads, 4,714,55 km regional, and about 14,200.00 km of local roads. BiH's road network is one of the least developed in Europe. The age of asphalt roads in BiH is about 30 years, and the density of the network is 0,414 km / km<sup>2</sup>, or 4,69 km / 1,000 inhabitants, which is 2.5 to 4 times less than in the countries of Western Europe. The development of the Master Traffic Development Plan in BiH foresees activities to further study all potential directions in BiH. Planned traffic needs by 2020 indicate that on certain sections, especially in the vicinity of large cities, it will be necessary to carry out construction interventions that will enable higher level of service and traffic safety. The master plan of traffic is the concept of the basic network of development of the main corridors, and the main longitudinal and transversal directions in BiH are considered. According to the proposed, the main road network in BiH (4,073 km) is the international corridors, the primary first

routes (1,908 km) and the primary other routes (1,170 km).

### 5.3.1. Average annual daily traffic (PGDS)

The total length of the highway on the corridor Vc is 51.5 km, where the PGDS in 2013 amounted to 11.455 vehicles / day, while the Banja Luka-Mahovljani highway section, in length of 9 km PGDS<sup>4</sup>, was built at 11.822 vehicles per day. According to data obtained from JP Ceste FBiH for 2012, the highest frequency of road traffic was recorded on the main road M4, that is, on the section Sićki Brod - Tuzla where PGDS was 18,807 vehicles / day. According to the data on average annual daily traffic, we conclude that certain sections of the main roads are overburdened. In support of this conclusion, the fact is that there is a steady increase in the total number of registered vehicles in BiH, and therefore passenger cars, which are not accompanied by adequate improvement and expansion of road infrastructure, which contributes to the poor road safety in Bosnia and Herzegovina, resulting in a large number of traffic accidents, and therefore an increase in costs.

## 6. Traffic safety strategy

The starting points of the strategy should serve as the basis for the reform of the road safety sector, and can be changed and adapted to the extent of innovating and improving the security system. In Bosnia and Herzegovina, as well as in the entities and cantons, certain activities are undertaken, but they do not function as a complete system of traffic safety (program) with established contents, points to the need to coordinate and monitor all programs from the state level.

<sup>4</sup> Continuous counting (GA, GM) during 365 days of the annual average value of daily load in both directions. For the GS, counting is also sufficient for

## 6.1. Transport Security Strategy in the EU

The European Union continuously proposes new directives with measures to increase traffic safety in order to meet road safety objectives and plans in road transport through the European Commission.

The EU has brought a number of documents aimed at raising the level of traffic safety. The two basic EU documents that cover elements related to road traffic safety are:

White Paper,

Road Safety Action Program. The EU has set itself the goal of creating European road safety in the range of 2010-2020. Competence in this area is mostly national. Therefore, the EU focuses its measures on the state of the vehicle, the transport of dangerous goods and the safety of the road network.

Legal basis for such a matter as in Title VI of the Treaty of Lisbon, and in particular its member of the 91st Treaty on the Functioning of the European Union (UFEU).

In June 2003, the Commission published a program of activities of the European Road Safety Agency 2003-2010.

The Commission highlighted in its statement released on July 20, 2010, as the 2003-2010 Program. has not achieved success in reducing the number of victims, the new Road Safety Policy Roadmap Program 2011-2020 has announced. "

Year 2020 was listed as the year to halve the number of fatal traffic accidents. However, the New White Paper published on March 28, 2011, has brought about changes in the sense that, instead of the previously set goal, it will be completed by 2020, as the target year, in 2050, with a "zero percent death rate" in traffic accidents. On 11 March 2014, Parliament

at least seven consecutive days in one of the typical months. PGDS = total vehicle per year / 365 days [vehicle / day]

adopted a set of minimum common standards for periodic vehicle inspection, vehicle registration documents, and road haulage inspection of freight vehicles.

In October 2011 and in March 2015, the European Parliament and the Council adopted two Directives (2011/82 and 2015/43) on facilitating the cross-border exchange of information on road safety in relation to traffic offenses.

In order to implement the traffic safety strategy, the European Union has adopted a number of measures in the form of directives whose implementation is expected to improve the security of transport in the EU. The first EU Commission directive should increase security on major roads in the European Union, or the trans-European road network (TEN-T). The new directive defines guidelines and the most efficient ways for all phases of traffic infrastructure management. The second directive of the European Commission includes the obligation that all trucks registered in the EU have mirrors for the so-called. Dead corner. According to the Commission proposal, all vehicles weighing over 3.5 tonnes (t) will have mirrors covering the dead spot.

Measures to address the causes of traffic accidents should be directed at sources of danger and in proportion to the level of danger that certain sources emit and their correlations with other sources of traffic accidents. In order for the measures to be implemented consistently and provide appropriate effects, an operational plan should be drawn up to determine the content of the work, the time needed and the operators.

## **6.2. Security Strategy in Bosnia and Herzegovina**

The plan and objectives of the security activities require strategic, operational and additional activities that will include the following items: - clearly defined activity programs, - the scope and quality of the

precise objectives of the activity, - clearly defined bearers of the activity, - the definition of how to execute the activity, monitoring and evaluating the results of programs and activities. Bearing in mind the traffic safety situation in Bosnia and Herzegovina with all the negatives in this segment and the goal set out, real opportunities should be reflected as well as the level of security in the past period. Analyzing the state of traffic safety in the past period, its reduction, ie increase both in the total number of killed and in the total number of traffic accidents, is noticeable. Reducing the number of traffic accidents and reducing the number of deaths by about 5% annually, or 30% for a period of 6 years, would represent realistic frameworks that are feasible. The above reduction in both the total number of killed and the total number of traffic accidents can be implemented with taking clearly defined measures and activities in all fields of security as well as in all organizational forms of the state of Bosnia and Herzegovina.

### **6.2.1. Action Plan 2011-2020.**

The rising trends of traffic accidents and victims have led the BiH Council of Ministers to recognize road safety as a key problem for the nation, and the traffic safety components are included in the overall loan from the World Bank, which is intended to finance transport projects in the RS and FBiH entities. This action plan is one of the results of road safety projects.

At the state level, very significant progress was made in 2006, when a basic national traffic safety law was passed. Although the overall framework for action has been provided, the lack of support through sub-laws and regulations has reduced its potential impact and effectiveness. However, the existence of this state law has encouraged the Federal Ministry of the Interior (FMUP) to coordinate key actors and to initiate the development of a traffic safety strategy in the FBiH and the accompanying Road Safety Action Plan for the period 2008-2013. Unfortunately, this



strategy and action plan, although they solve many problems, have not been implemented due to lack of funds.

A limited database shows that common international risk factors such as inadequate use of the safety belt, speeding, driving under the influence of alcohol and inadequate protection for pedestrians are also common risk factors in BiH, which is also an excessive influence of young drivers (20-24 years aged) among the dead and injured. The Action Plan will:

1. Increase the traffic safety activities in key BiH-level agencies responsible for road safety,
2. Strengthen the capacity of these agencies to improve traffic safety by reducing the number and type of traffic accidents that most often cause deaths and injuries in BiH,
3. Focus on known major risk factors:
  - Use of the seat belt,
  - Fast speed,
  - Driving under the influence of alcohol,
  - Safety of pedestrians.

The framework of the Action Plan for the ten years from 2011 to 2020 has a goal, vision and mission. Goal: Reduce the number of people killed on the roads of Bosnia and Herzegovina by 50% by 2020  
 Vision: Safe and efficient transport, which will contribute to economic growth and development, through the establishment of a safer road network, improved behavior of road users, and coordinated government, and non-governmental organizations at entity, cantonal and municipal levels, and through targeted interventions to reduce the number of people killed and injured on the roads.

Mission: Using strong political will and dedication to encompass all road users, using a system-based approach based on the recommendations of the 5 Pillars of the UN Decade Action 7 to develop safety, security and mobility management, safer vehicles, and safer road users and reactions after the accident.

Key targets at the BiH level: 1. 7% of the annual reduction in the total number of deaths compared to the previous years

(around 50% reduction over 10 years), 2. 7% of annual reduction in accidents caused by excessive speed compared to the previous year, 3. Reduced percentage of killed pedestrians by 30% by the end of 2015, and 17% by the end of 2020, 4. The incidence of accidents caused by driving under the influence of alcohol is reduced by 7% each year compared to the previous year.

### **6.3. Measures to increase traffic safety in Bosnia and Herzegovina**

Based on the observed trends and differences between BiH and developed countries, it is necessary to define first the weak points of the domestic transport system, to define the objectives for improving the general situation and define a strategy for achieving these goals. Goals are heterogeneous and need to group them into several groups.

In order to revive transport and improve the economic situation, the following objectives can be defined:

1. The adoption of a new transport policy in line with world and European commitments, which primarily respect the basic principles of the market economy,
2. Road transport should be permanently reduced to a minimum of negative impact on the environment and consumption of propellant.

In the framework of the measures adopted with the aim of reducing traffic accidents, short-term and long-term measures that have been taken over fully in BiH are especially emphasized, which should contribute to changes in the behavior of all participants in traffic.

#### **6.3.1. Strategic road safety measures**

Road traffic safety has certainly become a part of the global policy of all countries, especially the countries of Western Europe. Without a systematic and continuous implementation of measures, there is no long-term goal. In order to gain access to the European Union, Bosnia and

Herzegovina must accept the directives and guidelines binding on member states to increase road safety. Strategic Road Traffic Safety measures should focus on the following activities:

- reduction of the most serious consequences of traffic accidents in conditions of constantly increasing traffic,
- bringing Bosnia and Herzegovina into an appropriate group of European countries according to the number of killed persons on the roads in relation to the number of inhabitants or 100,000 registered vehicles,
- Significantly increasing the modern repressive action of the police and appropriate preventive action,
- raising public awareness of the problem of traffic safety through media campaigns, adequate public (media) communication about traffic in traffic,
- Adapting legislation to the consequences and causes of traffic accidents,
- Inclusion in the implementation of programs of all state and entity institutions and professional organizations whose scope of work is related to the safety of road traffic. Strategic activities in increasing the level of traffic safety should refer to:
  - reducing vehicle speeds and adhering to the highest allowed speeds,
  - Protection of children, young people and the most vulnerable road users,
  - Adjust traffic areas to the movement of persons with physical disabilities,
  - Suppression of driving under the influence of alcohol and narcotic drugs in traffic,
  - remediation of dangerous places,
  - improvement of the activity of "Emergency medical aid",
  - increase the level of technical safety of vehicles,
  - improvement of traffic statistics and analysis,
  - the use of seat belts and daytime running lights on vehicles, respecting the traffic light.

## 7. Importance of the traffic system in contemporary society

The traditional role of the transport system can be viewed through the prism: -

Economic policies, with respect to socio-economic efficiency and rules and requirements of business economics, - Establishing regional and social equity, with special emphasis on enabling mobility for all regions and social structures, - Environment and security, which includes minimizing the harmful effects of traffic on people and on nature, adapting to the construction and preservation of the environment and natural resources. In other words, the existence of a strong connection between transport, transport and the overall economic system is argued by the fact that the participation of transport and transportation services in the sales price of products in primary products is on average 30%, in secondary 40%, in tertiary 30%, in quartile and quintile at 25 %.

It is impossible to talk about the synergistic effects of transport and transportation without emphasizing their role in protecting the environment, developing underdeveloped areas and sustainable development in the broadest sense of the word. The traffic system also gets an additional dimension in the context of the process of globalization, where accelerated economic growth and development must be accompanied by an adequate transport and transport network, especially in terms of treating three of the four freedoms of the single market. The importance of the transport sector is confirmed by the fact that its share in the total GDP of the European Union is 7%, in which 40% of the EU's investments in employment are directed to this sector, and 30% is its share in total energy consumption. Demand for transport services is constantly rising, and in the last 20 years at an average rate of 2.3% per year for goods and 3.1% for travelers.

## 8. Development of the traffic system in BiH in the following period

With regard to the assessment of the future development of BiH. of the transport system so far, and the previously presented development trends and structural changes in the production and demand of material

goods point to the conclusion that the following general development tendencies should be expected in the near future: Further increase in the total volume of transport work as the expected growth of all types of production and consumption of material goods, an increase in national income and social standards. The opening of new natural resources and the increase in tourist traffic, which will undoubtedly positively affect the future growth of these branches of transport, with the further distribution of transport substrates between certain modes of transport and in accordance with their role and function in the market of transport services as well as measures of socio-economic policy.

More efficient taking measures for the realization of the traffic policy agreement, especially in the domain of coordination of the work of transport branches between the different branches and modes of transport, as well as between the transport processors and the users of transport services, which will undoubtedly condition the future increase in efficiency and social rationality of the transport system, , techniques and transport organization, increasing the quality of transport services by organizing integrated and combined transport.

## 9. Intelligent systems in traffic and transport

The current state of traffic congestion in all modes of transport and the growth of transport needs have prompted the development of new approaches and ways to address mobility and traffic management issues at the end of the 20th century. This led to the emergence of intelligent transport systems.

Intelligent transport systems provide information transparency, better management and improved response to the traffic system by means of which it acquires intelligent attributes. The "intelligent" attribute indicates the ability of adaptive action in a changing environment, where it is necessary to collect enough data and process them in the real sector.

ITS develops intelligent vehicles, intelligent roads, wireless smart cards for toll payment, dynamic navigation systems, adaptive traffic lights, more efficient public transport, online dispatch distribution, automatic reporting and positioning of vehicles in accidents. The essence of ITS is the integration of individual solutions based on a common ITS architecture and well-integrated system specifications. The development and creation of ITS is the integration of the transport and telecommunication system, experiencing their constant changes as independent systems that directly influence the development, form and organization of intelligent transport systems.

The field of intelligent transport systems combines eight basic areas:

1. Traffic control and management systems,
2. Navigation systems,
3. control systems and non-cash collection,
4. maintenance,
5. public transport,
6. commercial transport,
7. pedestrian traffic,
8. Itineraries for emergencies.

The European Union puts ITS development elements into its common transport policy in all aspects, which implies the development of technical standardization to provide technical and technological compactness in a single market for ITS services.

Today's modern information technologies have a special importance and the role of creating conditions for safe traffic and the quality of transport services, because: 10. they reduce the number of traffic accidents and their consequences, 11. recognize dangerous situations and enable avoidance of incidents, 12. reduce traffic requirements to drivers, 13. reduces the number of decisions made by the person, the pace of decision making is more in line with the limited ability of man to handle and respond, 15. automate driver tasks, 16. provide a greater fund of reliable information, 17. prevent certain subjective failures, 18. prevent and publish vehicle

breakdowns, etc. According to the place where the information is transferred to users, we distinguish: Intelligent means of transport, Intelligent traffic routes. The functions of an intelligent vehicle for preventing traffic accidents help the driver to avoid and prevent accidents by using the vehicle's system and assessing the nature or significance before it, taking into account the driver's condition. Intelligent roads represent systems that are part of road equipment and serve to increase the level of traffic safety and improve the efficiency of the traffic system. Depending on the role in the system, we distinguish several types of ITS based on infrastructure: traffic management systems on roads, traffic control systems, passenger information systems, traffic management systems at intersections, pedestrian protection systems.

Since ITS help eliminate the negative impacts of factors on the safety of vehicles and passengers, their effect can be viewed through two main vehicle safety segments: □ Active safety, □ Passive safety, with each of these segments having sufficient influencing factors, most commonly difficult to state everything. The application of ITS in the active and passive safety of vehicles is a wide range and covers all segments. From the aspect of the vehicle, the basic elements of active safety are: - Safety of driving, - Conditional safety, - Safety management and handling, - Timing of observation. Passive vehicle safety implies: - Reducing the consequences of injuries to passengers and drivers in traffic accidents; - Reduce the consequences of injuries to other road users, including pedestrians.

## II SUSTAINABLE DEVELOPMENT

### 1. The concept of sustainable development

The concept of sustainable development is, most often, linked to environmental protection, social development planning, environmental, economic and political issues. The concept of sustainable development represents a new development paradigm, a new strategy and a philosophy of social development. Sustainable development brings together one concern for the living world on the planet Earth and for the preservation of the capacities of natural systems (natural resources) with the social and ecological challenges facing each society, state and mankind as a whole.

The relevance of the concept of sustainable development is a major contribution to the challenges that come with the environmental threat. Some of these challenges are: global warming, ozone depletion, "greenhouse effect"<sup>5</sup>, disappearance of forests, the transformation of fertile soil into the desert, the occurrence of acid rain, the extinction of animal and plant species, etc. One comprehensive definition of sustainable development is: - sustainable development is an integral economic, technological, social and cultural development, in line with the needs of environmental protection and improvement, which enables current and future generations to meet their needs and improve the quality of life.

A little over a decade ago, the World Commission on Environment and Development, also known as the Brundtland Commission, published a report titled "Our Common Future, pointing to the danger, humans and the planet, of the policy of economic growth without taking into account the possibility of regenerating the planet Earth. This commission, chaired

<sup>5</sup> The greenhouse effect is the process of warming the planet Earth, which has been caused by the

disruption of the energy balance between the amount of radiation that Earth receives from the Sun and the Earth into space



by Canadian Jim McNeill, defined sustainable development as a development that fulfills the needs of the present, without depriving the possibility of future generations to meet their needs. At the Zemun Summit in Rio de Janeiro in 1992, World leaders adopted Bruntland's recommendations, and one of the results of the summit was Agenda 21, which provides recommendations for the sustainable management of land, water and forest resources in the 21st century. One of the key documents adopted at the Rio de Janeiro summit is the Agenda 21 Declarations of Intent and Commitment to Sustainable Development in the 21st Century.

Since 1992, onwards, the UN has begun to increasingly count on the role of these groups in their programs, unlike previous practice, which excluded all actors other than national governments and several favored observation organizations. One of the chapters of Agenda 21 on important groups is the chapter on the role of local authorities. From all over the world, various bodies emphasized their key role in the concrete application of - the local level.

This resulted in the recommendation given in Chapter 28 - that local authorities should consult with the population in terms of designing a Local Agenda (LA) 21 strategy. Today, many local councils work in accordance with the Local Agenda principles. Each of the processes has its own characteristics, it is marked by local conditions, including public opinion, geographical conditions (eg urban and rural areas are different in their shortcomings), which are taken into account when making decisions, which is also true for political attitudes, as well as for the problem of resources.

### **1.1. Sustainable development as an ecological principle**

This ecological principle can be applied to a variety of natural resources and ecological systems, and to the Earth's atmosphere. It is a relationship that is oriented towards the

future.

In the field of economy, new ways of doing business must be introduced, which when taking into account the price take into account the nature factor as a factor of further production. Not only does this raise the question of how this should be done in individual cases, political or administrative management, or the economic obligations themselves, but also how much the economy can adapt to the decentralized world market, if steps can not be agreed on the road to sustainable development at the international level.

In the social field, new challenges are posed to principles and practices of just distribution - from three points of view: the basic picture of sustainable development that comes from the developmental political debate is, above all, the creation of equal opportunities for development in the North-South issue. Furthermore, it is about the sustainability of ecological modernization within a society that is not only related to new possibilities, but also with numerous burdens.

Following the Environmental and Development Conference held in Rio de Janeiro in 1992, the term -SUSTAINABLE DEVELOPMENT has become a leading concept in the field of environmental policy. This certainly constitutes an advancement for environmental policy, because in this way the relationship between environmental, economic and social problems within which environmental problems of environment must be addressed, if we want to solve them professionally and in a socially acceptable way. This means that citizens, as actors, must assume great responsibility for achieving a sustainable development policy, which in turn entails structural, institutional and financial consequences.

## **2. Sustainability of transport**

In addition to the positive effects that traffic growth has on the economic prosperity of

cities, countries, regions, continents and the world, the negative consequences of today's policies, which are increasingly evident in the field of transport, diminish the importance of the same growth and development. Negative effects are most pronounced in urban areas. The constant increase in the number of inhabitants in cities and the degree of motorization results in increasing traffic congestion in the street network, as well as the consequence of the increasing use of cars and the inability to further meet the demand by building new capacity of the city's traffic supply. The negative effects of increased traffic volume and the increasingly intense use of motorized transport vehicles in cities are: emissions of harmful gases, energy consumption, communal noise, traffic accidents, taking up space and time in anyway restricted urban areas, reducing the ability to perform other activities. The special negative effects of traffic are manifested in the number of those killed in our country and in the world, and a growing amount of material damage reaching over 5% of GDP.

The general conclusion is that transport is actually a victim of its own success. Traffic congestion is constantly increasing and growth is the main cause of existing environmental pollution problems. All this has led to the application of ITS in operation and traffic management, which significantly affects not only the efficient functioning of traffic as a whole, but also the occurrence of traffic accidents with fatal consequences.

The increase in the number of vehicles is conditional on the expansion of the transport network, which leads to a reduction in green areas in urban areas, to an increase in air pollution and consequently to environmental degradation. As a result, traffic areas for non-motorized flows and citizens' opportunities for free movements have been reduced. Increasing pollution levels and fewer opportunities for free movement of citizens on the transport network (hiking, using bicycles ...) lead to a decline in

quality levels in urban areas.

### 3. Knowledge as a factor of competitive advantage

Today, the highest value of property is made up of people, that is, their capital is based on knowledge, skills, skills and intellectual property. In this sense, human capital should be directed towards innovations and thus develop products and services that create a new value. There are two basic forms of knowledge: first it is explicit, objective, formal, open, and this is knowledge in the form of skills, data, scientific knowledge, manuals, etc. This knowledge can easily be transmitted, accepted and remembered, but it also changes. The other form is the so-called. implicitly, quietly, invisibly, personally, subjectively, hidden, and difficult to transmit. Implicit knowledge is key to creating new knowledge in the organization. Investing in human resources has a crucial impact on sustainability. Knowledge, skills and abilities of employees are not always given, but it is necessary to continuously train and acquire new knowledge. Knowledge-based culture is one of the most important factors for success, so the concept is "an organization that learns one of the basic characteristics of the time in which changes occur, and they are precisely the condition of survival and the main characteristic of development.

Intellectual capital consists of human capital, structural capital and external capital. Human capital is: a set of knowledge, skills, experiences, intuitions and attitudes of the workforce. Structural capital makes a wide range of patents, models, and computer and administrative systems. The company's structural capital is in fact the system, structure, strategy and culture. External capital represents the overall relationship of the organization and network of associates (suppliers, customers), their satisfaction and loyalty to the company.

Companies face a constant challenge of

change. Investing in knowledge and skills is the only way to respond to this challenge. Knowledge is the basis for innovation, and they help companies to develop in line with changes in the business environment. On the way to growth and improvement of conditions, innovation and corporate entrepreneurship play a special role. Innovation is a combination of ideas and information that bring about positive change. They include a set of scientific, technological, organizational, financial and commercial activities. To create a competitive advantage of vital importance, knowledge is the basis and innovation as a driving force.

As early as the seventies of the twentieth century, attention was paid to the contribution of classical factors to economic growth, such as labor and capital, which at that time amounted to 12%, and that knowledge as a factor of productivity contributed more than 80%. This tendency was even more pronounced in Japan, where over 95% of growth came from knowledge, and only 5% from the effects of other factors.

Traditional economic theory and practice are based on a material basis through land, equipment and money, and a directed market to an efficient distribution of labor and capital. Today, more than 50% of gross domestic product (GDP) in developed economies is based on knowledge, i.e. on the intellectual property and expertise of people. On the example of the US, one can see the role and importance of knowledge and human capital. Services in the US account for 76% of GDP. The basis of services (software, healthcare, communications, education, etc.) are intellectual and information processes that create the bulk of value for businesses. In production, the greatest contribution to the creation of values is R & D, process design, product design, logistics, marketing and technological innovation.

In the era of machines, the product and equipment were at the center of attention. Today, in the era of informatics, knowledge

is at the center of attention and value is created from knowledge, skills, intellectual property and abilities. It is all contained in people and it can be said that economy today is actually a knowledge economy, because wealth is created precisely by efficient management of knowledge. Investing in a company means gathering talents, abilities, skills and ideas what is intellectual capital and not physical and financial resources.

Significant evolutionary changes are taking place today to create a more modern enterprise in line with the changes initiated by internationalization of business, the development of information technologies and a particularly competitive economic environment. Although there are many-minded that the human factor is the most important-capital company, it can still not be shown in the accounting records as part of the company's assets (or capital).

### **3.1. Knowledge culture or "learning organization"**

A good example is the General Electric company that employs 200 lecturers, 30 officers, 30 human resource managers and many young managers who actively participate in a professional orientation training program each year. Themes are competition, winning in the global market, as well as evaluating the most important values in relation to the value of the company. Training encourages employees to confront their own values. An essential element of the development of human capital is the transfer of unique and specialized knowledge. One of the training options is that managers analyze and observe the activities of other companies and transfer the acquired knowledge to their company. Within the company, the transfer of one's own knowledge to another plays an important role, but also the adoption of the so-called " - knowledge from other workers.

Companies conduct on-the-job training, organize training at or outside the workplace (eg cooperation with

universities), monitor the individual progress of the employee and promote the exchange of explicit and nonsense knowledge. It is important that employees practically use acquired knowledge, share them with others in the company and work together to achieve the goals of the company and thus create a new value. Therefore, there are evaluation systems.

They are usually from-down to the bottom, and many organizations use the evaluation system from all angles and the feedback system. There is a need to follow subtle features such as the art of communication and social virtue, personal values, conviction and attitudes. It is important for managers to achieve top-notch results, but not for employees, but through the development of the company's core values in the long run.

The concept of "learning organization" is one of the basic characteristics of the present time, in which changes occur continuously in all areas of life, and especially in the economy. Changes are the condition of survival and the main characteristic of development. They should be permanent and numerous in all segments of the organization. In addition to the changes, another important feature of this time is that this is the time of service. Services in developed countries already account for over 60% of total revenues, and the number of employees in this sector has exceeded 70%. For the organization to enter, these trends are particularly important because the services and its attributes are reliability, kindness, communicativeness, manners, etc., largely dependent on training and training. The whole process of organizational learning is permanent, lifelong. Excellence is just the basis for new successes and the creation of a new core of competence. This creates a learning organization. -The ability to learn faster than our competitors may be our only viable competitive weapon.

A global society does not have the capacity to create employment opportunities for those seeking employment and achieving

full employment, provided that the central importance of employment is recognized as a fundamental human right. Today, the main driver of social development is the creation of new jobs, not economic policies. Namely, public stimulus programs, money supply and interest rate manipulation can certainly have a short-term effect, but the growth and development of the base companies, which serves as a basis and context for economic growth. Full employment can be achieved through a broadly based social strategy that accelerates social development, including measures that improve the quality and quantity of education and training, promotion of entrepreneurship and self-employment, increasing the speed of communication and transport, encouraging research and innovation, and more fully using the power of a social organization . Of all measures, education and training are the most important, both for generating employment and facilitating the evolution of social consciousness and culture on a more mental and ecologically conscious basis, and less of a materialist basis.

During the period from 1970 to 2008, South Korea increased its GDP by eight times and reached \$ 25,500 per capita. At the same time, employees in the service sector experienced a dramatic transformation, increasing from 31% to 69%. The number of manufacturing workers has also increased, from 19% to 37% in 1991, in 2009 this figure would be 24%. Over the past decade, South Korea has had one of the lowest unemployment rates in the world.

### **III ECONOMIC TRENDS IN BIH AND THE WESTERN BALKANS COUNTRIES**

#### **1. The Reform Agenda for Bosnia and Herzegovina and the Stabilization and Association Agreement**

The Council of Ministers of Bosnia and Herzegovina recognized the urgent need to launch a process of recovery and



modernization of the economy in order to strengthen a sustainable, efficient, socially just and stable economic growth, job creation, increase and better targeted distribution of social benefits, and the creation of a sustainable and equitable social environment.

The Reform agenda is closely linked to the objectives of the new EU approach to economic governance in the Western Balkans and is in line with the Economic Reform Program as a fundamental element that should encourage comprehensive structural reforms to maintain macroeconomic stability and enhance growth and competitiveness. The state of public finance of all levels of government in BiH is such that it is necessary to implement fiscal consolidation that will gradually lead to a reduction in the budget deficit and in the medium term lead to a reduction in the level of public debt. That is why the BiH authorities have opted for a strong three-year fiscal consolidation program. Regarding this goal, in order to avoid unfavorable external financing conditions, the authorities in BiH expect the conclusion of financial arrangements with the International Monetary Fund, the World Bank and the European Commission, which will provide financial support during the implementation of fiscal consolidation measures.

### **1.1. Business climate and competitiveness**

Further growth and prosperity in BiH are based on attracting investments. There is a need to improve competitiveness by eliminating already well-known and documented barriers to investment. In addition, there is a need to equalize and straighten the investment ground by removing hidden grants and other forms of assistance to many large companies and improving bankruptcy procedures and continuing activities to address problems with some unsustainable businesses.

### **1.2. Labor market in BiH**

In order to move steadily through sustainable growth, Bosnia and Herzegovina must accept its strategic advantages. They include significant potential in the workforce, which is currently not sufficiently exploited. The low rate of active working age and high unemployment rates, which is largely a consequence of the lack of supply and demand for qualified labor, limits development opportunities. There is also a significant number of long-term unemployed in BiH who are discouraged to seek employment. Existing labor laws to a significant extent no longer reflect social and economic relations in BiH, and are in some ways contradictory to other laws and in some terms vague and insufficiently flexible. The culture of collective bargaining and social dialogue is underdeveloped and often burdened with the unrealistic demands of social partners.

The increase in the number of employees in BiH in 2015 contributed to growth in the processing and wholesale and retail sectors.

The registered unemployment rate has been reduced, while at the same time stagnation of nominal net wages in BiH has occurred, with higher real growth due to deflation.

In addition, there has been an increase in the number of pensioners and the average pension in BiH. The labor market of the European Union in 2015 recorded a gradual recovery. Although the unemployment rate in the EU is still above the level before the economic crisis (7.2% was in 2007), it is noted that in 2015 it was lower compared to the previous year (10.2% versus 9.4 %) with an increase in the number of employees. Most EU Member States registered a lower unemployment rate compared to the previous year. Similar trends in the unemployment rate of the countries in the region were similar. On the contrary, there is a slight increase in the unemployment rate in BiH in 2015, which is in contrast to the registered unemployment rate, which declined by 0.7

pp. and amounts to 43.2%.

BiH continues to have one of the highest unemployment rates in the region. The average net wages in 2015 in most countries in the region were nominally increased with modest growth rates, while real growth was slightly higher due to deflation (the exception is Serbia and Montenegro). As in previous years, the highest average net salary is in Slovenia, while it is the lowest in Macedonia.

### **1.3. Stabilization and Association Agreement**

A key instrument of the stabilization and association process is the Stabilization and Association Agreement. By signing the Stabilization and Association Agreement, Bosnia and Herzegovina has established the first contractual relationship with the European Union, which confirms its status as a potential candidate for membership in the European Union. In this way, Bosnia and Herzegovina entered the first phase of the Stabilization and Association Process, which has a number of obligations with it. The Stabilization and Association Agreement was signed on 16 June 2008 in Luxembourg. The signing was preceded by the initialling of December 4, 2007 in Sarajevo, and negotiations on the Agreement, conducted from November 2005 to December 2006.

The agreement will enter into force after ratification or ratification in the Parliamentary Assembly of BiH, the European Parliament and the Member States of the European Union. Until the end of the process of ratification or ratification of the Agreement, which may last up to two years, the Interim Agreement on the basis of which from 1 July 2008 the provisions of the Agreement relating to trade with the European Union and certain aspects of the internal market of the European Union. The Stabilization and Association Agreement allows Bosnia and Herzegovina to use the European Union's financial assistance in the form of grants and loans, including loans from the European Investment Bank. The aid is conditioned by

the progress made in meeting the Copenhagen political criteria, and in particular the progress made in meeting the European Partnership priorities and meeting the requirements of the Stabilization and Association Process. The financial assistance granted to Bosnia and Herzegovina will be intended to meet identified needs and agreed priorities. It can cover any area of cooperation, in particular justice and home affairs, legislative alignment and economic development. In order to optimally use the available funds, the consensus parties will regularly exchange information on all sources of assistance.

## **2. Globalization and regionalization**

Globalization is a phenomenon of modern times and as such marks a modern era of civilization. Its foundation is the creation of a unique economic and political space on a global scale. Regionalization makes it an integral part and as such represents regional integration and integration of a group of geographically neighboring countries. In this way, the relations in the process of regionalization build on the principles and in the function of globalization, taking into account some specificities of countries that approach regional cooperation and cooperation. The economic content of globalization and regionalization implies the creation of a global economy in the world. Globalization is understood as - linking national economies to the world economy.

It is therefore about cooperation and economic and other connection of countries in a certain geographical area. The forms of this cooperation and networking can be different starting from liberalization of mutual trade relations, development of common economic infrastructure, industrial cooperation, joint appearance on third markets and others. In doing so, their mutual relations are built on the principles of globalization in small ones. By regional integration and cooperation, it is easier to solve economic problems in a certain area

and accelerate its economic development.

As the data shows, the Balkans represent a relatively large geographical area that must be respected by all integration processes and economic associations in Europe. It participates with about 15% in the total area of Europe and with about 19% in its population. From the point of view of economic development and economic problems, the Balkans is a very heterogeneous area. This is one of the objective reasons for its slow economic integration and slow connection with Europe, which is an additional reason to help the least developed countries of the Balkans to loosen their economic development. If this does not work, the differences in economic development between the Balkan countries will pose a serious disruption to its faster regionalization. The economic development of the Balkans over the past ten years brings with it a series of contradictions and variously directed processes.

A particular problem is the Balkan countries in transition, which are the most numerous and whose political and economic problems will significantly affect the situation in the region and beyond. The transition process takes place slowly, which is best seen by the results of economic development and the standard of the population. In addition to Slovenia, all other countries in this group are still far from the level of economic development they had a decade ago. There is a deindustrialization in the scene, which is reflected in the mass extinguishment of numerous industrial capacities as well as of all industrial branches.

Instead of restructuring production and adapting it to new conditions, it is often the closure of factories and shutdowns of production. Obviously, this has an impact on the macroeconomic movement of production, employment of the workforce and the standard of the population.

## 2.1. Balkan and European Union

An important role in the relations between the Balkans and the European Union, especially in the field of economy, has activities within the framework of the Stability Pact for South East Europe. Obviously, international actors also realized that political stability in this area is closely linked to economic development and economic stability.

As economic priorities in the following period, the Pact defined: 1) the development of trade and the increase of investments (in particular the signing and implementation of mutual free trade agreements and improvement of the investment climate); and 2) the development of infrastructure (including energy). Considering the geographical position of the region, a special activity will be focused on the development and modernization of transport corridors and energy systems. In this great help, especially in the form of long-term loans, it is expected from the European Union - its funds, banks and financial institutions.

The interests of economic cooperation and integration with the European Union are expressed individually by all Balkan countries. This is reflected in the way and the way of accelerating their economic development and raising the general level of their economic development. She is already their biggest foreign trade partner.

This high share of foreign trade from the EU to each Balkan country individually is the result of the fact that it is a geographically close market with large production and a high demand for products and services. Prospectively, the scope and importance of EU exports and imports to the Balkan countries could be even greater. The condition for this is the faster economic development of the Balkans, especially of its part in transition. Such development would enable greater quantities and value of goods from this area intended for the EU market, as well as greater opportunities for acceptance (in the form of imports) of

goods and services produced in the EU.

### 3. Economics of knowledge and justice for all

The emergence of the knowledge economy, historically, was preceded by two periods of economic life development in society. The first period refers to agriculture as the dominant form of production, while the second period relates to the transition from agricultural to industrial production. This second development period encompassed both technological aspects of changes in production itself and changes in the demographic structure of society. The third developmental period is characteristic, among other things, that knowledge becomes the main factor of production with a creative, informed, innovative and entrepreneurial individual as its bearer. The economy that we know today is constantly changing and adapting to the needs of society. At the same time, there are two different types of economy at the same time. These are the so-called. mass economics (ie the economy of the industrial age that still exists due to the mass consumption of material goods, the accumulation of material wealth and economies of scale and the massive exploitation of material raw materials and energy in the production process), and the so-called. The information economy, which, in contrast to the mass economy, uses a lot less energy, raw materials and labor, and achieves better effects due to knowledge, ie information embedded in the product, gives these products a new, additional value in terms of improved quality, design, functionality and multiple utility. Claims that education becomes decisive for the functioning of modern information-based societies based on knowledge, that is, that the knowledge economy uses knowledge as the best quality goods, as a means of production and guarantees of competitive advantages on the market.

The knowledge economy now stands at its lowest developmental form called corporate capitalism, characterized by labor

exploitation, unlimited consumption of natural resources, changing fundamental values, social, economic and political structures, deliberately provoking economic and social crises in the world, and working the self-interest of multinational corporations based on doctrines of neoliberalism and supported by globalization processes.

In order for the knowledge economy to evolve to a higher level of development, a higher level and quality of democracy in all countries of the world is needed, ie it is necessary to create conditions for a compromise, equal and united membership of countries in the globalized world.

We live in a time and world full of constant, rapid and unpredictable changes. These same changes relate to every aspect of life, either private or business. The fact that today only the uncertainty is certain is valid both for the individual, for the wider social community, for companies, for national economies, for regional associations. In a word, for the whole world. The causes are attributed to globalization trends and the growing information, economic, technical, technological, sabotage, media ... networking of the world. In such a globalized economy, traditional factors of production and belief in the importance of owning physical property and manual labor give way to the intangible property that manifests in the form of knowledge and information ie, intellectual capital.

### 4. BiH and the European Union

The EU and Bosnia and Herzegovina have established diplomatic relations. In Thessaloniki in 2003, the Council of the European Union declared on the Western Balkans: "The region is rich in the European Union, so Bosnia and Herzegovina has a prospect of EU membership, and the relations between the Union and this country are developing in that context.



#### 4.1. Current status of relationship

The first visible effect of the European integration process for BiH citizens was the introduction of a visa-free regime for those with biometric passports on December 15, 2010. The Stabilization and Association Agreement (SAA) on 16 June 2008 in Luxembourg established a framework for the implementation of legal, administrative, economic reforms that will bring the country closer to the EU. An Interim Agreement on Trade and Issues (as of July 1, 2008) was put into effect, thus establishing a free trade area between the EU and BiH, and the EU is the main trading partner of the country. In addition, BiH also benefits from the unilateral autonomous trade preferences of the EU for countries and territories that are participating or in connection with the stabilization and association process.

This has significantly increased BiH's obligations as the scope of reforms has been expanded from trade issues to EU regulations as a whole.

On this basis, on February 15, 2016, a request for membership in the European Union was submitted to the Presidency of the EU Council. The following steps in the process of EU accession are: 1. The European Commission sends a detailed BiH Questionnaire, 2. The Commission evaluates the responses submitted by BiH and makes recommendations to the Council of the EU (28 Member States), 3. After the conclusion of the negotiations, a Treaty of Accession ratified by the Member States, and the European Parliament gives its consent, 4. The country joins the EU on a specific date.

#### 4.2. Financial assistance and trade relations between 2007 and 2013

Bosnia and Herzegovina received € 615 million from the Instrument for Pre-Accession Assistance (IPA) that provides targeted financial assistance to candidate and potential candidate countries. The

second phase of the IPA is currently underway, from 2014 to 2020 with at least € 165 million allocated to Bosnia and Herzegovina in the first stage. IPA particularly helps strengthen democratic institutions and the rule of law, reform public administration, conduct economic reforms, promote respect for human and minority rights and gender equality, support civil society development and promote regional cooperation, and contribute to sustainable development and poverty reduction. The EU is BiH's main trading partner. BiH has benefited from access to the EU market through the introduction of the so-called autonomous trade measures since 2000. Following the entry into force of the Interim Agreement, EU access to the market for products from Bosnia and Herzegovina has increased further, and trade preferences have been granted for imports from the EU to the country.

According to the findings of the Progress Report for 2014, BiH has achieved a high level of trade integration with the EU. The EU remains the main trading partner of Bosnia and Herzegovina, additionally strengthened by the accession of Croatia to the EU as of July 1, 2013. Accordingly, the share of exports to the EU has increased to 73.5%, while EU imports have slightly decreased to 60% of total imports. The most important trade partners from the EU are Germany and Croatia. CEFTA countries remain the second most important trading partner and account for some 16% of exports of goods and 11% of imports.

### 5. The economic situation in BiH

In April 2017, the representative office of the German economy in BiH presented the results of the economic research conducted annually among members of the Wirtschaftsverein BiH association. The goal is to detect the satisfaction of German and other investors in BiH, and companies engaged in bilateral economic relations with Germany.

For the first time since this survey, none of the respondents expects a deterioration in

their own business development. Even 72% of the total number expects better business development. None of the companies involved in the survey expects a decrease in turnover, while 71% of respondents consider increasing traffic. An important benchmark for better quality business is new investments. Thus, 90% of the surveyed estimate that investments will remain equal or higher in the year before. Unfortunately, such a result has interrupted the trend of expectations for growth in investments.

All companies expressed dissatisfaction with the fight against corruption and crime, political and social security, public administration, legal security, the tax system and tax administrations. All have been highlighted as one of the biggest problems of political instability. Research has shown two results. On the one hand, bh. companies are developing positively, and at fairs outside BiH they have noticed notable results.

On the other hand, we do not have political stability in BiH, which is a prerequisite for a stable business climate. On that occasion, it was pointed out that there was an effort to bring new investors to BiH, but that the political situation boycotted these efforts because information abroad about BiH as an unstable country was transmitted abroad. It will be emphasized that the geographical position of BiH is excellent, because all the companies that work here are fictitious in the center of Europe, but also that such a position must be better used. Despite all the challenges of the BH market, 73% of respondents would choose BiH as a business location again. Companies were mostly established by domestic investors, 1,233 of them, while the number of newly founded companies was 468 foreign investors.

Maybe we do not see it, but in Bosnia and Herzegovina, new firms are still open. Thus, according to the Statistical Office, a total of 1,780 new market-oriented companies were opened in the past year, excluding craftsmen / individuals. Of this,

1,716 enterprises with fewer than 10 employees, 58 from 10 to 50 and six enterprises with 50 to 250 employees.

By areas, the most newly established companies in 2016 are in wholesale and retail trade, repair of motor vehicles and motorcycles (486), then in the field of professional, scientific and technical activities (221), manufacturing industry (200 companies), real estate (198), administrative and auxiliary service activities (140), and construction (109 enterprises). All other areas (catering, transport, agriculture, education and other activities) have less than 100 newly established companies, according to the Statistics Bureau of FBiH. When it comes to the number of newly founded companies per canton, the most were established in Canton Sarajevo - 807 enterprises, 233 were founded in the Tuzla Canton, 216 in Zenica, the 155 in Herzegovina-Neretva and 150 companies in the Una-Sana Canton. According to the data available to us, the companies were mostly established by domestic investors, of which 1,233, while the number of newly established companies is foreign investors 468, and the number of mixed companies where foreign and domestic investors are 79. Most foreign investors are from the United Arab Emirates - 83 companies, from Turkey 62, Kuwait 45 and from Croatia 31 company.

In the past year, a total of 595 market-oriented companies were shut down, 583 enterprises under 10 employees and 12 companies with 10 to 50 employees. By areas, the most extinguished companies were in wholesale and retail trade, repair of motor vehicles and motorcycles - 241 enterprises, 72 in the processing industry, 52 in the field of professional, scientific and technical activities 52 and 51 in the construction industry.

The most extinguished companies are in Sarajevo Canton, 148 in TK 121, in the ZDK 92 enterprises were closed, 81 in the HNK 81 and in the USK 73 enterprises. Domestic investors in this period

extinguished 501 company, page 68, and the number of blown companies was 26. Most of the foreign investors with extinguished companies are from Croatia, followed by Slovenia, Serbia, Germany and Italy.

### 5.1. Import and export

The most important partner of BiH in the exchange is the EU, in which we participate with 72.2% of exports and 68.7% of imports. In the first quarter of this year, Bosnia and Herzegovina realized exports worth more than 2.5 billion KM, and the export increase was higher by 14% compared to the same period of the previous year. Imports in the first quarter amounted to almost KM 4.1 billion, which is 17% more than in the same period last year. Such changes resulted in coverage of import by export of 63.10%, and the total volume of foreign trade increased and its value amounts to about 6.61 billion KM.

### 5.2. Export of goods in 2015

The higher level of economic activity in the Eurozone and the countries of the region, which manifested itself through the increase in economic growth, has positively influenced the production processes in Bosnia and Herzegovina and, ultimately, in BiH. export. Thus, according to preliminary data of BHAS10, BHAS10 achieved total export of goods of KM 8.9 billion for 2015, representing a nominal increase of 3.5% compared to the previous year, while real growth due to the decrease in export prices was something higher and amounted to about 3.8%.

If BH. exports of goods in the mentioned period are observed by the main industrial groups of products, except for the categories of energy and unallocated, where there was a decrease in exports to about 25% and 10% respectively, in all other categories growth of exports was recorded, with growth rates being non-durable consumer goods 11.2%, capital goods 10.6%, intermediary products 6.1% and durable consumer goods 2.3%.

### 5.3. Foreign direct investment

Foreign direct investment in the world in 2015 increased by 36.5% y / y. According to data in the Balance of Payments in BiH, SDUs in 2015 were reduced by 34.8% y / y. In BiH, it is mostly invested in telecommunications, financial activities and insurance.

### 5.4. Investments in the world and the region

According to the latest estimates of UNCTAD 11, foreign direct investments in the world in 2015 amount to about 1.699 billion. USD with an increase of 36.5% g / g. Of this amount, 55.1% refers to developed countries, 43.6% to developing countries, while only 1.3% apply to transition countries and achieve the largest decline in investment (54.3% g / g).

### 5.5. Markets

The increase in exports from Bosnia and Herzegovina, compared to the same period last year, was achieved with almost all countries, except Italy, where a slight decline in exports was recorded at 1.4%. The highest export growth was recorded in Croatia, Serbia, Montenegro and Turkey, and the highest increase in imports was recorded in imports from Switzerland, Hungary and Croatia.

From these indicators it can be concluded that BiH is increasingly turning to regional partners, and for example Serbia can be used, which this year is second only in terms of the volume of foreign trade, immediately after Croatia.

The most important partner of Bosnia and Herzegovina in foreign trade by volume of trade, whose share is 70.7% in the total volume of trade, is the EU (71 exports and 70.5% of imports). Exports from BiH in 2016, compared to the previous year, increased by 6% and amounted to KM 9.7 billion, while imports in the same period also increased by 5.58% and amounted to

KM 16.2 billion. Such changes resulted in 60.1% export coverage coverage, which is by 0.40% more than the coverage in the previous 2015. The total volume of foreign trade increased by 5.74% and its value was 26 billion KM, while the deficit in 2016 was almost 6.5 million KM.

The most important partner in terms of exchange from the European Union is Croatia. In 2016, compared to the previous year, total exports of products to Croatia increased by 7.59%, while imports increased by 5.03%. Total exports from BiH to Croatia amounted to about KM 1 billion, while goods imported from Croatia to BiH market amounted to KM 2.55 billion.

After the EU, CEFTA 12 participates in trade with BiH with 15.5% of exports and 15.6% of imports. In the CEFTA market in 2016, goods worth KM 1.5 billion were exported from BiH, and exports increased by 5.79% compared to the previous year. From the territory of CEFTA we imported goods worth KM 2.5 billion, which is 6.92% more than in the previous year. This relationship between the value of exports and imports resulted in an export coverage coverage of 59.6%. The most important foreign trade partner from the CEFTA region is Serbia with which we have the least coverage of export imports. We exported goods to the Serbian market in 2016, amounting to 882,044,000 KM, which is 8.08% more than in the previous year. From the territory of Serbia, we imported goods worth 2.3 billion KM and thus increased the import by 7.3% in relation to 2015.

13.9% of imports and 13.5% of exports belong to the participation of EFTA 13 and other countries. EFTA's most important partner is Switzerland, with which almost all the foreign trade with BiH is done. In 2016, imports from Switzerland decreased by 39.89% while exports increased by 13.80%.

Among the so-called "other markets", BiH's most important foreign trade partner is

Turkey, followed by China.

In 2016, the volume of trade with Turkey amounted to 998 million KM. Export to Turkey amounted to KM 401.32 million and was 13.16% higher than in the previous year. Imports from Turkey increased by 9.83% and amounted to about 597 million KM. Import coverage by export was 67.2%. With the NR China, there was also a decline in both exports and imports, where exchange was mainly done in the textile industry.

## **5.6. Industrial production growth in 2016**

Last year, Bosnia and Herzegovina achieved an industrial production growth of about 4.3% compared to 2015, according to the Directorate for Economic Planning of BiH in the information on the movement of macroeconomic indicators. This growth was accompanied by an increase in the number of employees.

### **5.6.1. Export markets**

Observed by sectors, based on data, it can be noted that all sectors contributed positively to the increased production volume. Growth in the first half was caused by increased production in the manufacturing industry, while in the second part of the year, when there was a weakening in that branch, the energy sector compensated for the losses incurred. The most significant contribution to the growth of total industrial production in BH was achieved within the manufacturing industry, which, due to positive economic trends in the export markets, increased by 3.1%.

Within the processing industry, the highest growth rates were achieved in the production of chemical products, 14.2%, finished metal products, 12.5%, and in the manufacture of furniture, food products, where the increase was 8.8% and 7.3% respectively.



### 5.6.2. Price reduction

The most significant reductions were recorded in the production of basic metals 4.7%, and of coke and refined petroleum products by 5.7%. The decline in production is mainly the result of prices on the world market where there has been a reduction in prices and weakening demand for these products. In the mining sector, production increased by 3.4%, which is, to a large extent, a consequence of the increase in coal and lignite production.

## 6. Employment and unemployment

### 6.1. Economic Policy on Unemployment

Unemployment in BiH is not only the unemployment of young people; it is not just the unemployment of those who have lost their jobs after the privatization, nor is the unemployment of only NKV and KV workers and those who have lost their jobs after the plundering privatization. Today, in the structure of the unemployed, there is a whole series of subcategories. There are also young people, but also middle-aged people, as well as those who are missing a few years to retirement, and uneducated, but also masters and doctors of science, there are graduates of social and humanistic sciences, as well as mathematicians, physicists and chemists, doctors etc.

The unemployment rate is an extremely important indicator of the situation in which the society is located. It is possible to talk about a whole series of causes that generate high unemployment, that is, a structural disorder in the labor market between labor supply and labor demand. Also, unemployment produces a whole range of negative, not only economic, but also social, socio-psychological, demographic consequences. A high unemployment rate is the generator of social dissatisfaction. The higher the unemployment rate, the greater the likelihood of social unrest and protests (which in modern societies are mainly intelligently controlled and politically exploited), the rise in all forms of violence, as well as the criminalization of society, then suicide, the intensification

of emigration waves ... However much this problem was trying to ignore, and redirect attention to the surrogate of the topic, high unemployment indicates a deep disorder in society and remains a threat to society.

A tolerable unemployment rate is the one that moves between the hypothetical zero percent and 5%. This means that the majority of the working-age population has a job that provides at least minimum conditions for their existence, if it remains without work, it easily finds a new job, there is no danger of unrest and protest in the society, and the economic system is efficient in exploiting the workforce itself to include the majority of the working age population regardless of the qualifications they possess.

The unemployment rate at the level between 5% and 10% is alarming. Such a high unemployment rate indicates a disparity in the supply of labor and labor demand in the labor market, the decline in economic activity, the slowdown in the creation of new jobs, the lack of competitiveness of the economy ...

A society with an unemployment rate of over 15% and above 20% is already a seriously socially divided, antagonistic and socially divided, in which feelings of social injustice prevail, and a large number of people already have almost no chance of exercising their right to work, in other words to provide conditions of one's own survival. Such a high rate of unemployment can easily be caused by a wave of social unrest and protests, emigration waves, the rise of crime, suicide, and even the problem of physical and mental health of socially vulnerable categories of the population.

In early 2014, the International Labor Organization published a publication - Global Trends in Employment 2014. The figures published in this publication show that the global unemployment rate in 2013 was 6% of the total global workforce. The number of unemployed in the world reached the number of 201.8 million people, which is 4.9 million more than in

2012, when the total number of unemployed in the world was 196.9 million people. In 2013, 31.8 million people were out of work more than in 2007 by the end of 2014, the ILO foresees an increase in the global unemployment rate from 6% to 6.1%, as well as the long-term inability to solve this problem on a global scale.

According to MoR14 data, in developed economies of the EU countries, 8.6% of the unemployed are from the total labor force. This is about 3% more than the level at which the unemployment rate in the EU was in 2007. According to unemployment data that can be found on Eurostat's website, the unemployment rate in the euro area for April 2014 amounts to 11.6%, while in the EU itself (28 members - 10.46%) it is known that Greece, Cyprus has the highest unemployment, Portugal, Spain, Ireland.

According to the International Labor Organization's report, the youth unemployment rate in EU countries is 18.3%, and a particularly dramatic situation is in Serbia, Macedonia, and finally in Bosnia and Herzegovina, where youth unemployment is 63.1% for 2013. year. As a special category within the category of youth who are unemployed the so-called NEET15 group is distinguished, and these are young people who are not even involved in the work process, nor are they involved in the education and acquisition system. In most countries for which there are data on so-called NEET group, the level on which it is located is about 20%. In Ireland and Spain, where the percentage of those in the NEET group in 2007 was 9.4%, in 2013 it was above 20%.

According to the Statistical Office, in the first quarter of 2016, the unemployment rate in BiH was 27.5%.

In the structure of the unemployed in countries with a drastically high unemployment rate, over 20% are dominated by middle-aged unemployed. Everything is more noticeable unemployment of highly educated people

in EU member states that are affected by this problem (Spain, Greece, Portugal, Cyprus, Ireland, Italy) when it comes to BiH, the coalition governments that so far have marginalized the unemployment problem by replacing it with a surrogate topic. According to the data from 2016, the registered unemployment rate in the region is 7.3%, while according to the latest data, the worst is Bosnia and Herzegovina with 27.5% of the registered unemployment. In addition to Slovenia, all other countries in the region have an unemployment rate of more than 10%. The only one with registered unemployment is more than 20%, Apart from Bosnia and Herzegovina, is Macedonia. Thus, the unemployment rate in the third quarter of last year in Croatia was 12%, although data for November last year showed that this figure increased to 14.4% at the monthly level. The unemployment rate in the third quarter last year in Serbia was 13.8%, Montenegro was 16.9%, while in Macedonia it was 23.4%.

## 6.2. Employment

The average number of employed persons in BiH in 2015 continued to increase at a slightly faster rate of growth (1.8%) compared to the previous year and amounted to 713.6 thousand. Although in most areas of activity the number of employed persons is increased (comparison  $g / g$ ), the most significant contribution to the growth of the number of employees is in the activities employed by the largest number of persons in BiH - industry and trade. With the increase in the volume of industrial production in BiH, the average number of persons in paid employment in the manufacturing sector increased by 2%  $g / g$ .

In both bh. Entities in 2015 registered the growth of the number of employed persons. The average number of employees in FBiH was 450.1 thousand, with a growth rate of 1.5%  $g / g$ . At the same time, the average number of employees in the RS increased by 1.8%  $y / y$  to 246 thousand. The most significant contribution to the growth in the number of employees in both entities is in

manufacturing and wholesale and retail trade, indicating that both entities contributed to the growth of the number of employees in BiH. In addition to the above mentioned activities in FBiH, the number of employees is significantly increased in administrative and auxiliary service activities and activities of health and social care. On the other hand, the activities of hotel and catering, education and professional, scientific and technical activities in the Republic of Srpska had a significant contribution to the growth of the total number of employees (in addition to industry and trade).

### 6.3. Unemployment

With an increase in the number of employed persons in 2015, the average number of unemployed persons in BiH continued to decrease (-1.4% g / g) and amount to 541.8 thousand. The intensity of the reduction in the number of unemployed was particularly pronounced in the second half of the year. The number of unemployed persons is lower in both entities (comparison g / g), with a slightly higher rate of decrease in the RS. In FBiH, the average number of unemployed persons was reduced by 0.3% y / y and amounted to 390.2 thousand, and out of the total number of persons removed from the register, 67% was due to employment. In the RS, the average number of unemployed persons is 4.4% y / y and it amounts to 139.5 thousand. Of the total number of deleted from the records in 2015, about 51% is due to employment and private activities. According to the qualification structure, the greatest contribution to reducing the number of unemployed (g / g) in both entities is in the categories of NKV and KV persons.

### 6.4. A drastic fall in the number of workers

The key problem in BiH is that today's BH. companies do not have their own product, but they are condemned to do so. lohn jobs. Out of the pre-war over 100,000 workers in the textile and footwear sector in Bosnia

and Croatia, around a quarter have remained. The drastic fall in the number of workers is the consequence of the destruction of the economy in this activity with the beginning of transition and privatization.

In a large number of cases, in the privatization process, many companies end up stealing and liquidating firms, which has led to the extinguishing of factories or companies. According to the FBiH Institute of Statistics, in October 2016, 21,415 workers were employed in that sector, and the average salary was 403 KM.

The key problem is that of today's BH. companies in the field of textiles, leather, footwear and tires do not have their own product but have been sentenced to do so. lohn jobs or product finishing jobs for major foreign companies that deliver all the materials, and our workers only sell their workforce. Formerly recognizable bh. companies, such as Borac Travnik, Aida, KTK or Vitex, no longer exist, and the newcomers have a completely different attitude.

### 6.5. Output for unemployment in BiH

Social entrepreneurship is a very topical issue and should be turned around because it is an outlet for the unemployment and poverty of particularly vulnerable and vulnerable categories. An example that 14 million people in European countries are employed through social entrepreneurship tells us that in some ways the future is in this. The Social Entrepreneurship Fair is one of the activities of the advocacy campaign - The adoption of new policies and measures in the field of social entrepreneurship<sup>l</sup>, which the Foundation for Social Inclusion in BiH, the Initiative for Better and Humanitarian Inclusion and the Coalition of marginalized groups in BiH-KOMA are implementing with the support of the United States Agency for International Development (USAID).

The aim of this activity is to merge commercial and social enterprises, ie socially responsible companies that have

responded and ten companies that work in practical terms with marginalized groups.

## 7. Entrepreneurship

Entrepreneurs and small and medium-sized enterprises in their possession have always been seen as the main drivers of the economy, employment and the economy as a whole. Their basic characteristics were proactivity, flexibility and reactivity that differentiated them from large companies. However, with the development of small and medium-sized enterprises, entrepreneurs have encountered the challenges of survival and / or further growth of companies that are no longer just enthusiastic, willing to take risks and flexibility. More and more attention is devoted to the development of fundamental managerial skills, skills and programs that will enable the entrepreneur to manage quality and growth of his own company. The necessary knowledge and skills of entrepreneurs vary depending on the stage of development of the company. It is therefore interesting to observe that the needs for specific knowledge and skills are changing with the stage of enterprise development and the position of entrepreneurs within the company itself. In the European Union, out of three private sector employees, small and medium-sized enterprises employ two people and create more than half the total value added in the EU. Small-sized companies are the core of the European economy, because with their growth and development, and innovation, they drive the economy, employment and growth of the economy as a whole. It is interesting that 99% of companies in the EU are small and medium enterprises and that nine out of ten small and medium enterprises are micro enterprises with fewer than 10 employees. Their basic characteristics are proactivity, flexibility and reactivity, which differentiates them from large, multinational companies.

Every business today, and therefore small and medium enterprises, is confronted with global competition and the frequent and complex changes in the environment. We

are witnessing all the shorter product life cycles and different customers' wishes, which represents a continuous opportunity, primarily for new companies and startups 16, to take their place in the market, even in industries dominated by well organized and resource-intensive competition. At the same time, the short-term possibility is shown to small enterprises that, on the basis of their basic characteristics, they gain their share in the market. By doing so, entrepreneurs at the company's headquarters must build an organization that will be able to operate efficiently in this dynamic environment. However, with the development of the organization, entrepreneurs face the challenges of survival and / or further growth of companies that are no longer just enthusiastic, willing to take risks and flexibility. If we know that nine out of ten small and medium-sized companies are those with fewer than ten employees, with the dominance of those with less than four people, it is understandable that these companies do not have the necessary skills and corporate knowledge to adequately design new business models of enterprise development and the position of entrepreneurs within the company itself. The role of small and medium-sized enterprises is very important for every economy, but they are not enough for the economy to develop, yet the role of big companies is important for the development of each economy. Unfortunately, we have a rather unfavorable structure of the economy dominated by small and medium-sized enterprises with 99.5% of the total structure, of which 95% of small enterprises. This is rather bad and is the result of unsuccessful reforms and transformation of ownership that failed to bring the domestic economy into a liberalized approach to the economy and market, which is far removed from abroad in the processes of euro integration. This is contributed by the entrepreneurial spirit in BiH, which is at a very low level in relation to the EU countries.

These are the facts on the basis of which



appropriate policies should be created which should change our perceptions in the future in this regard. Young people who complete their education, either medium or high, are dreaming of getting employed in the public sector, in almost a hundred percent amount. In the West, the situation is different. About 65% of young people have the ambition to start their own business, about 20% of their imagination about employment that would allow them the knowledge and experience to start their own business in due course, while only 15% have a plan to get employed in the public sector. In the business of small and medium enterprises, strategic planning is very important. At the stage of introduction, strategic planning in the company is informal and guided by entrepreneurs - everyone knows why the company is founded and what its purpose is. Although the strategy of the company is not clearly articulated, it can be read from decision making. The initial strategy of the company is reduced to justifying, elaborating and communicating the strategy of the strategy based on the entrepreneurial vision. In the growth phase, it comes to the point when strategic planning needs to take on a formal form. The company must think of itself as a business, not a product / service. The truth is quite different, and many companies approach the growth stage with the same strategy they had when they started their life cycle. However, the environment is constantly changing; customer demands become more complex; competition is stronger and introduces new products and services. A growing company has to constantly develop its strategy and thus ways to compete in a dynamic environment. The consequence of the lack of strategic planning is slowing down the growth of the company.

Incorrectly managed, the growth of the company can lead to its decay. Many small businesses fail to realize their own growth potential because owners are busy with daily, routine and operational tasks in the company and fail to separate the time needed to work on planning the future of the company, its growth and development.

It is crucial for an entrepreneur to prepare his company for the upcoming growth phase through a business development plan, a plan for employment and training, both for himself and for people within the company. For the needs and development of small and medium-sized enterprises in BiH, it is very important that the Federal Government adopted a report of the Federal Ministry of Development, Entrepreneurship and Crafts on the implementation of the Action Plan for the implementation of the project "Development of Small and Medium Enterprises in FBiH" for 2016.

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### **BUSINESS ETHICS IN TRANSPORT, ECOLOGY AND ECONOMY OF SOUTH EASTERN EUROPE - METHODS AND INSTRUMENTS OF IMPLEMENTATION**

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*Abstract: Business ethics is a modern scientific discipline and adequate vocational guidance. This is an area of particular importance for the engagement of employees, work performance and the wider community. The concept of ethical behavior in traffic, ecology and economy provides a positive attitude towards social subjects of modern challenges. Implementation of the code of ethics in all spheres of public life positively affects the development of one country as well as South-Eastern Europe. Formulation and implementation of this concept represents an obligation of relevant factors of the country at all levels.*

**Keywords: Business ethics, traffic, economy, environmental ethics, government, company, Southeast Europe.**

## INTRODUCTION

The moral crisis in our society has existed for a longer period, measured in time, for some 20 years. During this period there was a complete disappearance of morale (war, immediately pre-war time and a few years after the war), that is, practice of immorality, in society, social groups and individuals. More precisely, today we do not have the basic elements of developed and safe morality as an important cohesive social force. We do not have moral norms, because everything that is in the earlier period can be done, as in today's developed, democratic and civilized society, is unacceptable and subject to a civil conviction and dismissal, such as: organized crime, open violence, theft, immorality, war profiteering, corruption, fraud, manipulation, shooting and street killings, nepotism, abuse of position, trade people, illicit funds, narcotics, various blackberries, gray areas, political trade, the appearance of fake heroes and self-styled leaders, experts, guards, surfers, buying diplomas and the like.

For modern companies, maintaining a constant focus on business ethics is the key to success. A number of decisions are made by doing business activities. Therefore, ethics is increasingly gaining importance as one aspect of management discipline. It affects not only the employees of the company, but also the wider social community. That is why it is necessary in every company, regardless of size and activity, to adopt an ethical business ethics policy that will regulate ethical principles of behavior. Part of the responsibility of modern management is to create an organization in which the shared value is created in accordance with the defined mission and company vision. Therefore, it is extremely important to provide a positive attitude to premapromens, openness in communication, transparency, acceptance of risks and responsibilities as well as the development of all those who are seized.

Managers transfer employees' beliefs and values in order to better adapt to the company's market changes and demands. It

is necessary that the company's management provides a positive example of ethical behavior, and rewards ethical and punishable unethical behavior.

The introduction of ethical codes into all professions, and especially those in which the absence of such codes can endanger general safety and health, is an imperative of contemporary society. Otherwise, social progress in other fields will be shown to be a negative trend if it is not accompanied by adequate control measures and the suppression of unethical behavior, which remain purely negative in the short term and in the long run. Informatization of the society led to a critical review of ethical norms and the concept of social tolerance. Miljevic states that "unethical practices like violation of privacy, theft of intellectual property and lying by digitizing issues of concern to ethics in the process of organization convergence and sophisticated technologies." For this reason, the strength of the adopted ethics must be increased along with the growth of the power of the elementary elements of modern society, that is, technological achievements and the new conditions of organization of work.

## 1. BUSINESS ETHICS - METHODS AND INSTRUMENTS

Ethical dilemmas and dilemmas with which managers meet in their career form the core of every managerial job. Deviations from ethical norms are more pronounced, and moral dilemmas are becoming increasingly common. Characteristic areas in which the most frequent deviations from ethical norms occur are: corruption, industrial thefts and espionage, conflicts of interest, media abuse, secret deals, frauds and other phenomena related to the contemporary development of society such as discrimination and cultural diversity. Corruption is a major problem of the modern world. In political and legal theory, corruption is generally assumed to be the abuse of entrusted public authority, in order to gain personal advantage over conflicts of interest and nepotism as an incidental phenomenon. According to numerous

occurrences of this phenomenon in the world, the activities that are most prone to corruption are highlighted: public procurement, public revenue collection, government appointments, donations for political campaigns, etc. Politicians, political parties and public officials are labeled as the most responsible for this evidenced evil of contemporary society. Corruption can be suppressed in various ways. One way is to raise the level of ethical awareness, to define new moral standards of behavior and to conduct practical checks on the integrity of public services. Of course, it is easy to avoid, but it is difficult to carry out and regardless of what is immoral and illegitimate. Conflicts of interest are very common in business practice. They are raised because of the opposition of personal and organizational interests. In order to avoid conflicts of interest, employees should be able to divide their private interests from the business contracts they make, and organizations must avoid conflicts of interest in the provision of goods and services.

The conflict of interest, again, is particularly characteristic of public services. The primary task of the Government of public institutions is to serve the public interest. In this respect, citizens have the right to expect that each official performs his functions fairly and impartially. Therefore, officials performing public functions who overstretch their private interests may constitute a threat to this fundamental right, may destroy the reputation of the public service body, which affects the public's trust. Avoidance of double standards and the elimination of hypocrisy, as a moral principle, is especially evident in times of crisis, when elitism and special privileges should be avoided. First, it is hypocritical to say that the crisis equally affects all workers of one business entity, especially if it is widely known that some workers have high daily allowances, free transport, meals and other benefits, and others do not. To highlight the concern over the decline in business and the lack of financial resources, while equipping

the office with the most expensive furniture and organizing expensive cocktails and socializing, it is the true form of hypocrisy, which always justifies a revolt.

"If you establish a competitive and fighting spirit towards the outside, towards the market and the competition, if everyone knows that they are objectively assessed for business effects, and if good relations, openness and cooperation are, it is certain that the company will progress. A game requires a top team, not a set of beleaguered individuals.<sup>6</sup> At the present time, the opposing attitudes about the relationship between business and ethics are getting more and more important. Today, the issue of ethics in business is re-actualized and becomes unavoidable in the conditions of the new world crisis, both in developed countries, in transition countries, and in underdeveloped economies. Business ethics, after a series of financial scandals occurring in individual companies around the world, is becoming increasingly important, both for companies and their businesses, as well as for academic institutions that educate business people for a modern business environment. More recent research in this field shows that the absence of ethical standards in business causes great damage to individual companies and to the overall world economy. Therefore, this topic continues to focus on research and education.

Unethical behavior may arise as a result of many factors. Some of these factors relate to individual ones, while others may represent the policy of the company itself. Examples of desirable behavior offer helpful guidance to employees, but often they can not be enough to prevent unethical behavior or to promote ethical behavior. If the culture of a company encourages, or simply passes over suspicious behavior by putting business interests first, ethical behavior will primarily be based on the personal honesty of employees. Individual fairness can be sufficient for the majority, but not for all employees. Personal weaknesses and temptations are sources of

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<sup>6</sup> Babid, J., *Introduction to Business Ethics*, Prague: Virtus, 2000, p. 5.



unethical behavior both in business and in other areas of life. There are business situations in which an individual knows what is right, but does not have perseverance and personal integrity to draw the right move, perhaps because it involves a certain amount of personal risk. In this case, the company policy should reduce the personal risk associated with proper business. Employees can not be in a position where their work would be negatively assessed, if it is based on ethical behavior. For example, this could be a case of lost sales if it could be achieved by some unethical actions. The problem of tempting employees to take unethical moves can be the result of several factors.

The first factor is if there is a belief that other employees do not behave according to the rules of ethics, or that they have fallen prey to temptation. In such circumstances, an individual has more difficulty in resisting temptation. Second, falling into temptation is more likely if companies conduct superficial ethical analyzes, or use arbitrary standards. Unethical behavior can also result from too narrow focus on duties imposed by law. The law recognizes actions that an individual, or an enterprise, can not enforce. However, the law provides for minimum prohibitions relating to unethical behavior.

Ethical codes define values and behavior based on them, establish a higher moral level in enterprises and work organizations, such behaviors that are expected of employees or those who are not tolerated. This establishes the norms and beliefs of the organization, and through this, the intention is to encourage a desirable model of thinking. However, ethical codes differ from ethical rules. Ethical rules include requirements to behave in a certain way and not only refer to proposals, expectations, requests, or requests that individuals or work collectives behave in a certain way, but rather concretize that kind of thing. In such a case, ethical rules have a coercive system through which they define what must be done by methods of legislation. On the other hand, ethical codes aim to raise the moral level of employees. A large number

of companies and organizations have developed ethical codes, they are working on it and undertaking actions to precisely define their code of ethics. In that sense, we can say that ethics becomes institutionalized.

The advantage of defining codes of ethics in working organizations is to specify the behavior of executives about what is unethical behavior for them, and the employees to think about ethical issues and possible coping with them in practice. Ethical dilemmas and dilemmas with which managers meet in their career form the core of every managerial job. Deviations from ethical norms are more pronounced, and moral dilemmas are becoming increasingly common. Characteristic areas in which the most common deviations from ethical norms occur are: corruption, industrial theft and espionage, conflicts of interest, media abuse, secret agreements, fraud and other phenomena related to contemporary development of society such as discrimination and cultural diversity.

Although in the process of career management, emphasis is put on the organizational aspect of managing the career of an employee, modern business is increasingly indicating the importance of individual career management. The role of an individual in career management and development is very great in contemporary society. The individual is to meet the needs and ambitions of the organization and seek the space for their satisfaction, as long as career development is no longer linked to one enterprise only. The time has passed since the individual was treated as an instrument for achieving organizational goals. Instead, now the concept is increasingly understood as an instrument for meeting individual goals and developing professional careers. Every employee has to play an active role in his career and to think responsibly about its development, permanently getting ready for further progress towards more responsible and demanding jobs. The individual is the ultimate responsibility, since it depends mostly on the extent to

which he will align his knowledge, skills and abilities with professional goals and career development plans and how well he will adapt to changes in the environment, and in particular to changes in the internal and external labor market. In other words, the employee must actively and responsibly manage his / her career, maintain constant competitiveness and be ready to take on more complex and responsible jobs. It also has to accept full responsibility for progress and success. Career planning and development, from an individual point of view, is becoming more and more important.

Ethical codes define values and behavior based on them, establish a higher moral level in enterprises and work organizations, such behaviors that are expected of employees or those who are not tolerated. This establishes the norms and beliefs of the organization, and through this the intention is to encourage a desirable model of thinking. However, ethical codes differ from ethical rules; Ethical rules include requirements to behave in a certain way and not only apply to templates, expectations, requests, or requests that individuals or workers collectively behave in a certain way, but rather concretize that kind of thing. In such a case, ethical rules have a coercive system through which they define what must be done by methods of legislation. On the other hand, ethical codes aim to raise the moral level of employees. A large number of companies and organizations have developed ethical codes, they are working on it and undertaking actions to precisely define their code of ethics. In that sense, we can say that ethics becomes institutionalized.

The advantage of defining codes of ethics in working organizations is to specify the behavior of executives about what is unethical behavior for them, and the employees to think ethically and possibly face them in practice - they may refuse to carry out some unethical procedure they can find, an action that is directly in line with the organization's ethical code of conduct, to clearly set boundaries between

desirable and undesirable behavior, and to identify mechanisms through which to react in similar situations. The question arises as to whether the code of ethics is completely sustainable in practice, and there are a number of concerns about the advantages of having a code of ethics in a work organization. It is reluctant to establish a strict list of guidelines that will include all potentially possible forms and types of unethical practices, adding that ethical codes as such are too general to get to values, that they are foggy ethical priorities, and that, when the individual as an individual phenomenon is concerned, the code of ethics does not have much of an impact and can only be effective if it is part of personal behavior and that it deeply believes in it.

## **2. BUSINESS ETHICS IN TRAFFIC OF SOUTH EASTERN EUROPE**

Traffic refers to the overall relations of interpersonal communication, the transfer of information and data, and the transport of people and material goods. With the help of technical and technological means, the transfer of information and data, as well as the transport of people and material goods from the shortest to the most desirable places. It can be said that traffic is as old as human society. Along with the development of the society, the science of traffic, traffic communications and vehicles developed, which encouraged and directed the development of transport. So today we can talk about five built types of traffic: gleson, road, water, air and telecommunication. Traffic is an essential factor, not just the development of a society, but also the survival of a particular community. Simply put, traffic is social-blood "and where they do not reach traffic arteries, this area demographically dies. This activity has both a sociological, economic and developmental role in society. Privately observed, traffic is a very propulsive and profitable activity, and when this activity is perceived in a wider sense, it is plausible to say that traffic is the basis of social development and its main

integrative factor.

The level of development of a society is measured by the degree of traffic development, and the level of cultural development with the culture in traffic. Traffic culture represents patterns of attitudes and behavior of participants in traffic and it is a part of socialization, value orientations of people, social relations, especially the relationship of power, the degree of development (self) awareness of citizens about safety risks in traffic, development of social empathy, etc. In traffic crime, the part that is called reckless or violent is an indication of self-will, non-recognition of moral norms and disrespect of the freedoms of other participants in traffic. Characteristics and ways of manifesting violent behavior in traffic vary from country to country, suggesting that socio-cultural factors affect ruthless behavior in traffic. Low social control and high social tolerance contribute to the development of violent behavioral patterns. And in the case of traffic, a more general conclusion can be drawn that uncontrolled power-raises "violence" at all levels of social relations.

Most drivers in our cities, especially in Belgrade, have experience with violent behavior in traffic on a daily basis. Everyday occurrence is the exceeding of allowed speed, unauthorized approach and overtaking, inappropriate use of siren and verbal aggression. The manifestation of traffic aggression is more often occurring on city streets, mostly in the afternoon, when people return from work and when they are - big on the streets. Also, younger men often violate traffic rules and behave violently while driving. Violent rioting is everywhere, but it manifests in different ways. Thus, for example, in Japan, the unauthorized approach to the vehicle in front is most often used, while in Argentina, aggression appears at the verbal level.

A man (the so-called human factor) is a key factor in traffic accidents, and this means a man in the sum of his physiological, psychological, cultural and social

characteristics. A person may have a developed sense of responsibility and not drive in a risk condition for himself and for others. Traffic culture is only part of a wider culture of society and an individual, which means that "man drives as he lives". This is best seen by official records of the causes of traffic accidents: most are caused by high speed, driving under the influence of alcohol, abusive driving and disrespect of the rights of pedestrians. Research on the psycho-social characteristics of traffic delinquents suggests that those at high risk in relation to those at lower risk exhibit two key traits: aggressiveness and inability to tolerate. When consciousness about the value of human life is not sufficiently developed, then this value is not respected in the behavior of traffic. Alcohol-ridden drivers cause between 30-60 percent of all traffic accidents. They and five to seven times more often make serious accidents on the road. A significant part of traffic accidents should be called the right name - they are part of social violence.

Violent behavior patterns are transmitted to all spheres of life, even in traffic. Official terms such as accidents or traffic accidents indicate "accident", "non-adverse", "non-adapted driving conditions". In a large number of traffic accidents it is a clear violation with (for) a steering wheel. The will for power, such an obvious social phenomenon, is clearly recognized in the behavior of some people who run their vehicles. For them on the road it is known-how big and who is small, they do not apply to yellow strips or the right of priority passage. It is apparent that such people appreciate the expensive car and driving mode as symbols of power and success. To them, for that reason, "no one stands in the way" in the limitation of the sense of power. -The culture of tolerance towards violent behavior in traffic, combined with the poor response of the system to violations of traffic regulations, strongly contributes to the manifestation of violent behavior in traffic. And in the case of traffic, a more general conclusion can be drawn that uncontrolled power-raises "violence" at all levels of social relations.

All countries in the world suffer from big traffic accidents. Traffic accidents represent general human, social and economic problems, which are to a large extent determined by the further development of society. Particularly the problem of people suffering in traffic is caused by the population of young people, who mostly suffer from traffic injuries due to their inexperience and unwantedness. Special development of traffic and its infrastructure should be considered in the development of urban (urban) environments, which can not accept the increasing use of means of transport. In urban areas, it can be said that the whole population represents traffic participants. Our society is not sufficiently compact due to the large differences in the level of economic, cultural and social development. By all criteria, there are significant differences between the north and the south, as well as between the west and the east of the country. This is due to poorly developed traffic that prevents the rapid flow of people, goods, information and knowledge. This is why frequent conflicts and tensions are frequent in all segments of society. Modern roads are a real integrative factor in the social community. Nowadays, without them, evolutionary, let alone rapid development processes, can not happen. This is a basic prerequisite for achieving national cohesion. When this is understood and accepted, half of the problem will be solved.<sup>7</sup>

### **3. ECOLOGICAL ETHICS COUNTRIES OF SOUTHEAST EUROPE**

From the present point of view, the region of Southeast Europe is one of the parts of Europe that is in the most intensive processes of transition. While Hungary has already almost joined the European Union, Bulgaria and Romania are preparing for

their economy, politics, culture and society as a whole. Serbia and Montenegro, along with the rest of the Western Balkans, still have a lot to do in order to be officially taken into the process of consideration for joining the EU. In the first place, it is necessary to solve legal and practical (organizational) problems related to quality and improvement of the environment. These issues are now almost impossible to solve without the introduction of sustainable development as a leading idea in reform processes. In the process of transition, it is very important to inform and educate the population about the changes that are inevitable in all social, scientific and economic activities, as well as in the area of protection and improvement of the environment. Education and information should take place at all, from pre-school children, through different levels of school children and young people to adults. It should take into account and include all educational profiles of citizens. Education must become reformed according to needs and should be managed, among other things, by environmental protection and sustainable development.<sup>8</sup>

The first founder of ecological ethics, or ethical relation to nature, are stoic philosophers, and above all, the founder of the Zenon Stoic Philosophical School. Stoicism is created almost at the same time as epicureanism, but it develops in controversy with it. The initial setting of stoicism is in linking virtue with the notion of necessity, which governs in nature. The Stoic Philosophical School formulates the problem in a way that is fundamentally different from the most modern biocentric theories, which at the center of everything put life as the most remarkable and most valuable gift of nature. Under nature, among the stooges, Zenon's disciples, are two things: According to the first positions that Chrysopus has, the notion of nature refers to both the universe and the nature of man. Kleant, who considers that the only

<sup>7</sup> Nešković, S., Ecological Ethics, in: Ecological Management, Belgrade: PEP High School, 2010, p. 33.

<sup>8</sup> Nešković, S., Ethics of Responsibility as a Basis of Environmental Ethics, in: Ecology and Environmental Management, Belgrade: VPŠ Čačak, 2011.

nature of the cosmos is what we must obey, and not the particular nature of man, is the second position. What bridges these two positions and connects man's nature with nature is in general the idea of the mind, even the kindness and mercy of the cosmos, and the unique, common law for everything in nature. The general position of stoic philosophy is that nature is mastered by one mind that permeates all things.<sup>9</sup>

The application of new theoretical frameworks has enabled the emergence of a new discipline, environmental economics, whose first contributions are related to the analysis of economic aspects of pollution. Nevertheless, the most significant step in the development of the economic theory of the twentieth century was the appearance of the book "The Growth Boundaries" (Meadows, 1972), devoted to resource exhaustion and possible growth limits, drawing the attention of a wider circle of the world, scientific and political public. Thus, the concept of sustainable development, which slowly but surely enters the list of priorities of international political action, springs up and becomes the topic of a series of global political meetings. In Stockholm, in 1972, at the UN Environment Conference, the establishment of the United Nations Environment Program, UNEP, was initiated. (Later, the establishment of national environmental agencies in a number of countries was followed.) A coordinated action by national and international bodies, in 1980, proclaimed a global action program to promote sustainability, the so-called "The World Conservation Strategy, by the International Union for the Conservation of Nature. The UN was established in 1983 by the World Commission for Environment and Development. Seeing the danger of potential climate change, the World Meteorological Organization and the UN Environment Program in 1988 established the International Climate Change Panel, which aims to collect all relevant climate change information.

At the UN Conference on Environment and Development, UNCED in Rio de Janeiro, in 1992, important documents were adopted:

- UN Framework Convention on Climate Change and
- Convention on Biological Diversity.

In 1993, the UN Commission for Sustainable Development was established with the primary goal of overseeing the implementation of the above-mentioned documents and other acts. In August 2002, the World Summit on Sustainable Development in Johannesburg was held. At this summit, the participating states agreed to start developing and adopting national sustainable development strategies in the shortest possible time. Sustainable development is the development that ensures meeting current needs without compromising the ability of future generations to meet their needs. Sustainable development can not be achieved by short-term economic growth. Long-term economic outcomes such as intensive use of natural resources due to economic growth and increased degradation and environmental pollution have to be taken into account.

The basic intention of the Environmental Management System or ISO 14001 is to improve the impact of organizations and individuals on the environment globally. - Ecological management enables the organization to regulate the environmental impact by storing and removing waste, reducing excessive energy consumption and aligning with environmental laws. With the efficient implementation of the system, tasks and responsibilities related to the protection and prevention of environmental pollution according to socio - economic needs have been defined. ISO 14001 represents the balance between ecology and economics. It can be integrated with other management systems in order to achieve the desired goals of the organization. The challenge is not only providing quality products and services, but also practical

<sup>9</sup> Nešković, S., Ecological Ethics, in: Ecological Management, Belgrade: PEP School, 2010, p. 35.



application of ecological approach and ecological awareness. The obtaining of the certificate confirms that the organization operates in an environmentally responsible manner, in accordance with the relevant laws and that the results of operation correspond to domestic and international expectations.

The ISO 14001: 2004 standard is written so that it can be applied by organizations of all sorts and sizes and can be adapted for different geographical, cultural and social conditions. Environmental Management Systems ISO 14001 is a management tool that allows organizations of any size to:

- identify and control the impact of its activities, products and services on the environment, - improve the attitude towards the environment, - implement a systematic approach that will achieve goals related to environmental protection and provide evidence that it has achieved the set goals. Implementation of the Environmental Management System can refer to the whole company, one branch or one work process, and the choice depends largely on the company's needs. The basic reasons that lead to the expressed need for introduction of the environmental protection system ISO 14001 are:

- Continuous pollution of the environment,
- fear of total exhaustion of natural resources,
- lack of organized and systematic monitoring of the consequences of pollution,
- Increased interest in public opinion for environmental protection,
- legal solutions,
- special working conditions in vulnerable areas.

The ISO 14001 standard has conceptual similarities with the ISO 9001 standard, while on the other hand, with the cooperation of the author (TC 176 / TC 207), clear compatibility of the verification process has been achieved. In principle, we can speak of two sets of requirements of these two standards for similarity: identical or very similar and related, and specific to a particular standard. Almost identical or

similar to ISO 9001 and ISO 14001:

- documentation,
- records,
- internal check,
- representative of the management,
- review management.

ISO 14001: 2015 represents the latest version of the standard that defines the requirements for environmental management and protection. The new version will enable you to reduce costs, rational energy consumption, reduce negative environmental impacts, reduce the risk of environmental incidents, respect the environmental laws, improve your reputation and your customers' reputation, position on the domestic and European markets. The ISO 14001: 2015 standard provides an answer to the latest trends and ensures compatibility with other standards of management systems such as ISO 9001. The new version of the standard (ISO 14001: 2015) contains a requirement to understand the context of an organization (both organizations themselves and environments) it would be better to manage the risks, with more emphasis on the leaders in the organization that should promote environmental management in the organization. In addition to the above, a new version of the standard has made a move towards improving the environmental performance, instead of improving the management system. Certified organizations have been left for three years from the moment of publishing a new version of standards to harmonize the existing environmental management system with the requirements of ISO 14001: 2015 standards.

#### **4. BUSINESS ETHICS IN THE ECONOMY OF COUNTRIES OF SOUTHEASTERN EUROPE**

Not long ago, the business world realized that doing business was not just providing goods and services in exchange for a certain amount of money, but rather a much wider concept. As early as the 18th century, companies had to be concerned about

social, not just economic aspects of business. In the nineteenth century, there is division and division into large, or powerful enterprises that have great power and influence development, and fewer regional companies fall into their shadow. In the twenties of the twentieth century, the transparent business and lack of interest of companies for the benefit of the community with the principle of laissez - faire, where the state has no role in the economic flows, partly influenced the creation of the Great Crisis of the thirties. Only during this period are there questions about transparency of business, how much the company takes care of the living standard of their employees, and so on. Then it abandons the principle that characterizes the natural flow of economic events and the state gets an active and significant role, which in essence forces companies to be socially responsible and take care of their employees, to improve both working and living conditions of workers. This, we can say, is the first attempt to create philanthropic business models that still have not found their true meaning, since companies have only occasionally been involved in certain social events. Business people from the countries of Eastern Europe and Russia are still adapting to the usual business manners of the West. They were used to very rigid bureaucratic structures, with an individual not previously expected to expose it to the contrary from the accepted line. Therefore, they may sometimes be uncertain about behavior when they are abroad, or it will not be easy for them to adapt to some customary customs. It is the duty of the host to make their visit successful, and this may also involve a somewhat late night out. Smoking is a very common practice in these countries, and if you are a non-smoker, you must have an understanding of it. The entire region of South East Europe is in transition towards a market economy and towards new democratic institutions. A permanent process of privatization of social ownership and a continuing lack of integrity again creates a new fertile soil for corruption. Corruption today is poisoning many areas of public, private, commercial

and political life and thus greatly threatens equality, solidarity, and security of citizens. With the help of corruption, one can easily access everything, especially what they do not have right, while others are deprived of much, even their most basic rights. Corruption thus destroys the trust of both public authorities and politicians, as well as the possibility of honest civic and business relations and entrepreneurial activities and jobs. Corruption simply breaks down the basic principles of democracy and a democratic society. Corruption is one of the basic leverage of organized crime, i.e. various mafia couples, were local, family, cow, tribal and country-based, or transnational, involving actors from several countries. In this regard, the European Union today, from all the countries of the future member states, all the countries of the region of Southeast Europe, demand that they be effectively combating corruption and organized crime. The world's public knows that through the countries of the former Yugoslavia, many roads of drugs, dirty money, and smuggling of everything and everything, from drugs and weapons, to humans are still leading.

## CONCLUSION

From the present point of view, the region of Southeast Europe is one of the parts of Europe that is in the most intensive processes of transition. In the process of transition, it is very important to inform and educate the population about the changes that are inevitable in all social, scientific and economic activities, as well as in the area of protection and improvement of the environment. Education and information should take place at all levels, ranging from pre-school children, through different levels of school children and young people to adults. It should take into account and include all educational profiles of citizens. Education must become reformed according to needs and should be managed, among other things, by environmental protection and sustainable development. Consciousness about environmental protection slowly wakes up and it seems that we are finally starting to take measures

to get rid of further destruction of our planet. The biggest burden will be the realization of the most important logistical processes (transport, manipulation, storage) due to the fact that these processes are in essence in great contradiction with the basic environmental codes.

In addition to the benefits of traffic and transport infrastructure, the same is also the result of many unwanted effects. All countries in the world suffer from big traffic accidents. Traffic accidents represent general human, social and economic problems, which are to a large extent determined by the further development of society. Particularly the problem of people suffering in traffic is caused by the population of young people, who mostly suffer from traffic injuries due to their inexperience and unwantedness. Special development of traffic and its infrastructure should be considered in the development of urban (urban) environments, which can not accept the increasing use of means of transport. In urban areas, it can be said that the whole population represents traffic participants. Traffic culture consists of the mutual relations of all participants in traffic, their communications, message traffic, services, attention, protection and communication. Traffic culture is a part of the general culture of the mentality and civilization level of the social community of a site, region or region. It is highly correlated with the culture and style of life that is significantly determined by the processes of experiencing, reacting, and scripting (patterns, patterns, etc.) of behavior.

Corruption is equally harmful to societies at all levels of development. In societies on the path of democratic transformation, the problem is greater and more difficult because the new needs dictate numerous tasks, and the means and ways for their implementation are still unfinished or insufficient. Corruption destroys the substance of every state, so its suppression to the extent of acceptability according to the standards of the world in which we live, a condition without which the state can not be legitimized as a state of the rule of law.

The fight against corruption must be organized and a long-lasting process of application of well-defined measures for the prevention and suppression of corruption. Despite the adoption of some important anti-corruption laws, the fight against corruption has not yielded enough results.

The processed number of corruption cases is disproportionate to the number of phenomena that have been publicly suspected. General financial crime is a financial crime that results in the illegal acquisition or use of someone else's property for their own use and benefit. Financial crimes affect all areas, people, the economy, the state. Financial crimes can be carried out by individuals, corporations or organized criminal groups. Victims can be individuals, corporations, governments, as well as entire economies. The most common form of financial crime is money laundering. Our society is not sufficiently compact due to the large differences in the level of economic, cultural and social development.

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## APPLICATION OF VIDEO SURVEILLANCE AS A SERVICE (VSaaS) IN THE AREA OF TRANSPORTATION

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**Abstract:** *Implementing a system for video surveillance allows monitoring and management of traffic in order to increase the security and safety of all road users. This system provides real-time information on traffic flow, congestion and if there are any potential security risks in different parts of the road. Modern systems have the ability to control traffic lights and to redirect the driver to alternative routes to optimize the flow of traffic. Taking into account the difficulty of such operations large computer resources are necessary for processing data in real time what today can be achieved only through the use of cloud services and supporting technologies. This paper provides an overview of the existing ICT solutions for video surveillance of traffic using cloud technologies, as well as proposals for their implementation.*

**Keywords:** *Video surveillance as a service (VSaaS), traffic safety, cloud computing (CC), information technology (IT).*

## 1. Introduction

As computing power exponentially increases every year, the implementation of computer video slowly becomes a viable solution to many of the current problems that the car industry faces. Intelligent Transport Systems (ITS) [35] use advanced computing, sensory [34], and telecommunication technologies in traffic systems. In the field of traffic detection, public agencies and consulting firms have been relying on magnetic strips installed for the past just under its surface for years [32]. Such a system, however, is expensive to look at installation costs, has limited coverage, and can only satisfy a limited number of functions such as counting vehicles or determining speed. In order to overcome the limitations of such a system, modern cloud video technology has been introduced into the co-administrative tool in support of decision-making in traffic control. Video surveillance of traffic is one of the most promising areas for the improvement and development of modern video technology. Although significant progress has been made in this field, there remain a number of problems such as vehicle occlusion and false detection. In addition to all available technologies for monitoring and managing traffic systems, the greatest progress is needed in the area of system adaptability to the dynamic nature of traffic [33]. Clouds services appear on the scene as a revolution in the control of large and complex video surveillance systems, which will be described in more detail in this paper. The available literature deals with these disadvantages and support technologies, and some of the most important research include: synthesis of data from video surveillance applications [3,10], elimination of damaged frames from images using histogram [8], improvement of service quality in mobile clutches for video surveillance [21], the collection of traffic data using Bluetooth technology [21], removal of vehicle shadows to prevent false detection [22,42], integration of radar and cloud technology in air traffic monitoring [26], assessment of the

condition on clustering analysis [30], software calibration of the video surveillance system [43].

## 2. Cloud service models

Cloud computing (CC) or commonly called "self-cloud" represents the delivery of computer resources on demand, that is, everything from software, hardware and data processing is delivered to users by model of renting services over the Internet. The hardware background of the cloud is a huge computer center distributed to all over the world by standard Internet protocols that pool individual resources in order to distribute and speed up task processing. The main purpose and also the benefits of cloud technology are "elastic resources" that allow the user to use as many resources as he needs for a specific purpose. An example of this may be the case that it is necessary to compress 12 hours of video material in a 4k resolution that was collected during one trip. An average home computer would need several days of continuous work for this job which would prevent users from performing other tasks on the same computer due to too much hardware load. By using cloud resources, the same task would be done in an hour, which saves time and money to the user, and the home computer can be used for other purposes.

Modern cloud video surveillance consists of three basic service models: 1. Software as a service (SaaS) is cloud-based applications running on remote computers and delivered to the user through the Web browser. The benefits of SaaS include the current availability of the latest software, the availability of software from any computer through one Internet account, exceptional software stability, cloud security, and dynamic scaling of resources relative to needs. 2. Platform as a Service (PaaS) is a middle application layer, such as an operating system or development environment that, in its turn, supports the entire lifecycle of building and delivering Web-based applications - without the cost and complexity of purchasing and



managing background hardware, software, settings and hosting. The benefits of the PaaS service model include faster development and delivery of applications, reduced complexity with the middle application layer through predefined and configured settings.

### 3. Infrastructure as a Service

- **(IaaS)** represents a hardware setting of computer resources such as a server, a network, a warehouse porter that the user can rent for their own needs. This service model is often called i-metal. Bare metall which indicates the lack of supporting software other than the one necessary for connecting hardware components. The advantages of IaaS include reduced operating costs because there is no need to purchase expensive hardware and its maintenance, infrastructure is piled as needed, and allows the use of ready-made innovative solutions on request. Figure 1 graphically depicts the architecture listed three service models in the cloud.

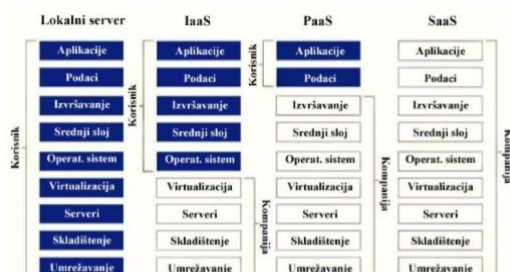


Figure 1. Characteristics of IaaS, PaaS and SaaS services

Cloud technologies can be divided into three basic types: 1. Public cloud (cloud) is a type owned by a company that is responsible for setting up and operating the cloud and exclusively leases its resources to users. In a public cloud, users share resources for which they pay for a specific period of time. In practice, this is accomplished using cloud resource units, so-called. -cloudlets where one cloudlet has 400 MHz processors and 128 MB of RAM. Key aspects of the public cloud include ready-made software solutions,

flexible and scalable IaaS for storage and data processing, as well as a strong platform environment for the development and delivery of applications. 2. Private cloud (Cloud) is a type of cloud that is intended for use within one organization, that is, all resources are put on the use of one user. It can be developed internally or by a third party and in most cases it is maintained internally through IT staff, although there are cases of third party support. Benefits of private cloud are reflected in increased resource control, specially designed interface, advanced security, because the location of data is known, high automation of the process tailored to the needs of the organization. 3. Hybrid cloud (Hybrid cloud) is an integrated use of the previous two types that implies the strategic integration and use of public cloud services in a private setting. In practice, a private cloud can not function in isolation from the rest of the organizational IT network and resources and public clouds. Most organizations resort to a solution where work processes are distributed across data centers, private and public cloud, and thus create a hybrid cloud [45]. Key aspects of the hybrid cloud allow the organization to retain critical applications and data within a traditional network or private cloud while using the flexibility of a scalable infrastructure to expand the capacity and processing speed. This type also allows portability of data and applications, if needed, with high transfer security.

### 3. Video surveillance as a service (VSaaS)

Video Surveillance as a Service (VSaaS) is intended to provide an omnipresent and on-demand access to the network of shared multimedia data. The service enables quick, easy download, processing and sending of materials without the need for interaction with the service provider and other third parties. The video surveillance process in the cloud is quite simple and reliable for the end user [47]: the set camera captures and transmits audio / video material, sends it using an Internet connection to a cloud

where Video Management Software (VMS) delivers, On request, the material to the end user. All architecture can be: public, private and hybrid. Public architecture implies that a user rents an almost solution from a service provider only by connecting his or her cameras to a personal account of a service. The entire process of processing and storage is done on the provider's side, which is in practice the most used way of using this service [28]. Private architecture is applied only in cases where there are staff capable of handling such a complex system, which is a much more expensive option.

Figure 2 gives an example of the architecture of the VSaaS workspace that was developed by the author [23]. The basic mechanism of the given work frame has the following characteristics: Video content is obtained from video cameras from different sources of application using the -push-pull mechanism; The main component is a post-subscribe broker (subscribe broker) who redirects cloud data to the user based on his subscription; All processes are regulated by a cloud manager whose purpose is to manage interactions between users and component directories; The directory of multimedia services contains all the functionality of video services and are designed according to the service-oriented architecture (SOA) of the architectural form; The resource allocation manager has the purpose to manage and allocate various resources of the Virtual Machine (VM) monitoring system and related services; Monitoring and accounting component monitors the use of resources and provides insight into usage statistics and service charge collection.

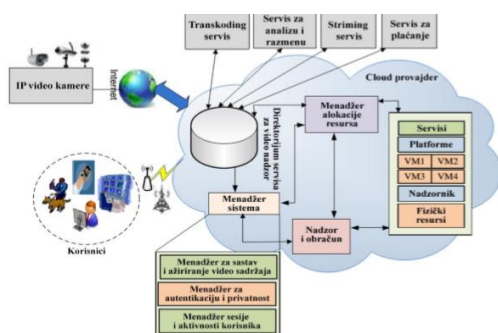


Figure 2. Example of the VSaaS of the working frame [23]

There are several versions of VSaaS services, such as [11-12, 15-17]: □ Intelligent Video Surveillance-as-a-Service (IVSaaS), □ Managed Video Surveillance-as-a-Service - MVSaaS), □ Cloud Video Surveillance (CVS) and □ Online Video Surveillance as a Service (OVSaaS).

Figure 3 shows the development trend of video surveillance technology since its inception in the early 1950s [11]. At that time, there were no ways of long-term recording of images, but only live monitoring in dedicated rooms by engaging a large number of staff. It was only in the mid-1960s that I discovered video tapes that it became possible to combine existing CCTV systems to store and delete video material. Video surveillance technology has been significantly improved by the introduction of a Digital Video Recorder (DVR). Although the first proposals for the development of this technology date back to the 1980s, the first commercial application for video surveillance began in the late 1990s. DVR technology has provided significantly more storage space as well as faster search of recorded material, as well as support for connection to a computer.

Internet Protocol (IP) video surveillance systems appeared shortly after the discovery of the IP camera in the late 1990s, and by 2005 most of the surveillance system was using this technology. VSaaS technology appeared in the early 2010s and is now the most advanced video surveillance solution. The future will be without discussion intelligent cloud systems, through neural networks and machine learning [29], which are currently in the research and development phase.



Figure 3. Trend of video surveillance development [11]

Compared to traditional systems, cloud video surveillance has significantly less security vulnerabilities. There is no need for a specific software, firewall and open ports [48-50]. There is also no possibility that the stored data be threatened by theft, user error, power failure, etc. Increased data security is the result of a distributed architecture, data is replicated at several times at several physical locations. Control is available from any smart device at any time, which provides even greater security. VsaaS service providers have dedicated security teams that detect vulnerabilities and apply software updates via cloud to devices at the control site.

#### 4. Application of cloud video surveillance in the assembly

Video surveillance of traffic is an important function in maintaining safety and rapid response to indications. Cloud video surveillance allows real-time tracking of real-time road conditions for a large number of cameras with a reduced number of operators in the control center. Through advanced algorithms, modern systems can simultaneously track thousands of cameras and provide notifications only if abnormal behavior is detected from the given parameters. So, if there is slowed down traffic on a particular route, the system can adjust the light signaling to disassemble that section. The same images can also be distributed to the public over the Internet in order for drivers to decide independently on the road to move. Using a computer video, it is possible to automatically monitor the number of vehicles, their speed, type of

vehicle, incidents and alert to the competent services [18]. All of these parameters significantly contribute to engineers in further design or alteration of existing roads for the purpose of more efficient traffic management. Vehicle type information helps in predicting road maintenance by analyzing the number of heavy vehicles that are most damaging to kolovoz. The system is also capable of recognizing the movement of the opposite tape, the crossing of the full line, the crossing of the pedestrians through the zebra or outside, as well as extending the duration of the red light if there are still people on the pedestrian crossing. Figure 4 illustrates the applicability of the cloud system for the needs of video surveillance for applications throughout the city system including the traffic systems.

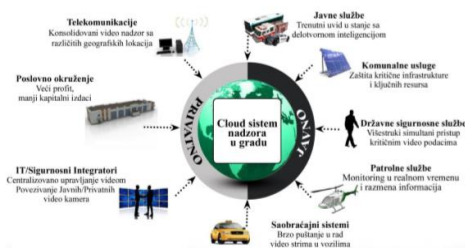


Figure 4. An integrated video surveillance environment in the city

A typical cloud solution for video surveillance includes [31]:

- Project design, management and implementation,
- Consolidation and centralization of existing cameras,
- Conversion of existing analogue cameras to digital,
- Design and integration of wall systems for display,
- Design and implementation of centers for monitoring,
- Choice of use between private or rented cloud,
- Possibility to carry out public-private partnerships (PPP),
- Building mobile data centers in rural areas,
- Fast and cost-effective implementation of data centers,
- Quick release of video streams in vehicles,
- Fast and economical implementation of wireless networks, etc.

The operating frame of the cloud video surveillance system that can be used in

traffic is shown in Figure 5. Specific components are listed as well as their interaction. The given framework provides a scalable and automated solution for obtaining, storing and analyzing video strips with minimal latencies and user intervention. The given work frame efficiently performs the above functions using Graphic Computing Unit (GPU) in the cloud setting, which significantly reduces the processing time as opposed to the classic processors. The software background of the framework enables the automation of the process of identifying and searching objects or significant events [14].

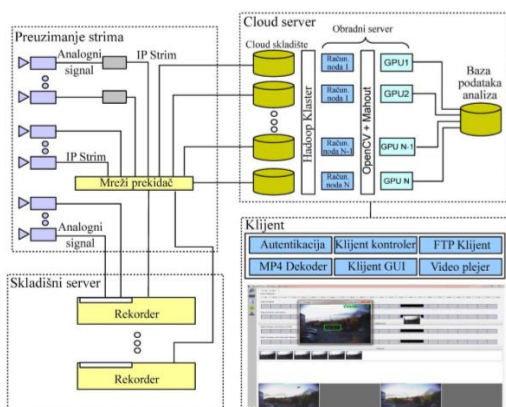


Figure 5. The operating framework of the traffic monitoring software system using cloud technology [4]

Automatic video analysis is performed with minimal interaction of the operator by defining the analysis requirements in the client control component. The request for analysis is sent to the cloud data center where, based on the given parameters, the required video is recorded from the cloud storage. The video is then analyzed and the results are sent to the database analysis. Then the operator can access this database and get a complete analysis report [13].

Workspace components are designed with a modular approach and are divided into client and server components. The server component is executed as a service on cloud nodes and performs the main task of analyzing video streams. The client component supports a multi-user environment and runs on local computers. Data flow and controls are divided into

three phases in this working framework: 1. downloading video streams, 2. video stream analysis and 3. storing results and notifying operators. The layout of the components is as follows:

□ Video streaming component is located at the source or location and is connected to the storage component on the server through the LAN connection; Cloud data storage and processing servers are located in the cloud center and / or service providers;

□ Client component or user software is located at the user's kernel on the computer. Table 1 gives the benefits of using cloud video surveillance in relation to the traditional system, based on which it can be clearly concluded that the use of cloud technology is of great advantage.

Cloud video nadzor	I tradicionalni sistem
Otvoreni sistem baziran na Internetu protokolu	Zatvorena arhitektura u privatnom vlasništvu
Centralizovano upravljanje videom i pristup kroz jedno prijavljivanje	Zahteva prijavljivanje na individualne DVR uređaje
Udaljeno snimanje i skladištenje videa	Lokalni DVR uređaj ili drugi uređaji za snimanje
Višestruki simultani pristup bez degradacije kvaliteta videa	Video kvalitet se smanjuje porastom korisnika
Integracija postojećih CCTV i IP kamera	Uglavnom koristi specifične uređaje
Redundantnost podataka i brzi pristup sa centralnog clouda	Odvojeni i nezavisni uređaji za skladištenje
Integrirani grafički korisnički interfejs (GUI) i korisnička kontrolna tabla	Individualni alati za svaku različitu sistemsku funkciju
Automatsko prepoznavanje uređaja i konfiguracija računarskih mreža	Zahteva konfiguraciju uređaja i softversku nadogradnju na terenu
Arhitektura prilagodljivog sistema	Samo funkcije definisane od strane proizvođača

Table 1. Benefits of using VSaaS services

Figure 6 shows the work frame of the software in charge of analyzing video streams. The analysis process begins by downloading a short clip of video streams with set-up cameras and a calibration of a scene that implies setting the stops for the capturing zones, entering the vehicle on the scene, counting and assigning attributes [6]. The input zone is determined by the bandwidth and length of the observed scene and represents the maximum region where the detection is performed [44]. The video is separated into image sequences, which are then individually added to the background removal filter, and then the Haar-Cascade detection algorithm for determining existing vehicles in the image.

For each detected vehicle, the tracking algorithm records its movement along the x-y plane of the road for all upcoming frames as long as the vehicle is in the input zone. With motion tracking, the dimensions of the vehicles are simultaneously







Figure 7. Software video analysis of traffic, counting and measuring speed

Figure 8 provides examples of software analysis of various traffic cases, and a) the availability of parking spaces, where the software automatically keeps track of occupancy, retention time and billing for collection. By using a mobile application, the driver is able to get an insight into the availability of parking spaces in advance, make a reservation and pay for parking. b) simultaneously tracking the speed of multiple vehicles, with automatic recording of offenses and alerting the operator; c) monitoring the observance of the traffic lights, where we can see how the car performs a violation by switching to the red light. This application has proved to be extremely useful as evidence and results in increased security and faster resolution of disputes. D) Pedestrian crossing monitoring is among the latest video surveillance functions due to the complexity of the implementation. It has proved successful in real situations where the system can extend the duration of the traffic light if a person is at the crossing passage or detects the improper movement of pedestrians or vehicles.

#### 4. Conclusion

The use of video surveillance is necessary in traffic systems, especially if modern information technology (IT) is supported. It provides protection for people, road infrastructure and minimizes accidental incidents. Previously only richer countries and cities could afford IP-based video surveillance, while this technology is now available to a wider circle for ease of installation, significantly reduced implementation and maintenance costs. Currently, about 10 percent of all video surveillance systems are connected to the worldwide network through cloud technologies with high growth rates. One of the key benefits of using cloud based video surveillance systems is their ability to protect the integrity and availability of recorded media.



Figure 8. Traffiko software system

Cloud services integrate many features that prevent data loss, backup of critical data, and fast recovery from unexpected cancellations. The network management system can monitor all networked devices, automatically generate alerts or notifications, and intelligently manage traffic signals and electric ramps at the crossings. Regardless of the current achievements in this field, further development is needed in order to create safer roads for both passengers and the general public.

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## EXPERT OPINION ANALYSIS OF BODILY HARM

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**Abstract:** *The expert opinion analysis of bodily harm is one of the most wanted and most popular forensic medical expert analysis. It is used to solve problems and issues that are closely related to human life and health. Forensic -medical expert opinion analysis can be used as a material evidence in the criminal proceedings. This expert opinion analysis must be conducted on the law basis, legal rules and norms and principles of modern achievements in medical science. In terms of form, that opinion must be clear, complete, conscientious and objective and to be justified and based on established facts. The court that is conducting the procedure must be careful when it comes to expertise, professionalism, moral, ethical and legal capacity of the doctor - expert.*

*In everyday legal practice in the field of medicine, the most common forensic - medical expert opinion analysis is performed to qualify bodily harm. Moreover, it is necessary to address not only the type and nature of the injury, but also the other issues related to the injury itself. Expert opinion analysis of doctor-specialist of bodily harm over living individuals consists of the following obligations: providing findings and opinion in written form; providing diagnosis and opinion in written form with expert opinion analysis of personal injury in criminal cases after an immediate revision of the injured person and providing diagnosis and opinion orally.*

**Keywords:** *means of evidence, facts, qualification, morality, ethics.*

### 1. SIGNIFICANCE, VALUE AND NEEDS FROM JUDICIAL MEDICAL EXPERIENCE

Every judicial medical examination must be carried out according to the principles of medical ethics, as well as on the basis of the best knowledge and skills of a particular expert. In this way, the expert examination is of paramount importance when making a final court decision, that is, a quality and objective judicial medical examination contributes to the preservation of the highest human values during the judicial process, such as the fate, honor, freedom, the life of man, etc.<sup>10</sup>

The importance of forensic medical expertise is becoming more and more the same, and it consists of:

- explaining and establishing certain facts in order to provide expert assistance from lawyers, and what is of great importance in the exercise of his function;
- use as evidence in court proceedings, if the expertise is carried out and based on objectivity and complete expertise, and
- use the latest medical achievements and their application in solving a number of problems and issues in court proceedings.
- The value of forensic medical examination consists in the fact that it can also be used in court proceedings as material evidence, if:
  - is performed in accordance with legal provisions, legal rules and norms;
  - designed and executed on the basis of the principle of modern achievements in medical sciences;
  - correctly in view of the form of the given expert judgment,
  - and useable, if the conclusion or opinion arises from the established facts and is reasoned clearly and comprehensively.

The need for judicial medical examination

<sup>10</sup> Belokaposki and others. Judicial Medical Exercise-Objectivity, V Congress of Forensic Medicine of Yugoslavia with International Participation, Proceedings, Herceg Novi, 1997, p.

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in the field of criminal offenses against life and body, criminal offenses against the sexes and morals, crimes against human and criminal offenses against traffic safety, consists in clarifying and resolving a number of issues, including related to: □ the severity of body injuries; □ time and manner of execution of the criminal offense; □ the means by which the criminal offense was committed and □ the mutual position between the injured party and the perpetrator.

## 2. THE ROLE OF SHEET-LADY IN THE BODY OF BODY BREEDS

For proper and objective assessment of the degree and severity of bodily harm, the expert doctor must be familiar with the basic principles of expertise, that is, legal provisions, legal rules and norms of the Code of Criminal Procedure and the Criminal Code of the Republic of Macedonia, to possess knowledge and experience from all medical fields they deal with diagnosis of procedures and the therapy of injuries and that they rule in forensic analysis and diagnosis. The expert witness is an uninterested person who has special expertise and whom the prosecutor, or the court, has asked to assist him in establishing important facts in the criminal proceedings.<sup>11</sup>

The expert witness should assist the court in establishing important facts based on his professional knowledge, knowledge and experience, observing the facts and giving expert opinion.<sup>12</sup>

Qualification of bodily injuries occurs at the time of their occurrence, however in some cases qualification of bodily injuries

is made after the completed treatment - treatment, because some of them can leave lasting consequences, depending on the nature of the injury, the way, the length and the outcome of their treatment. It should be noted that, when giving an opinion on the severity of physical injuries, all individual traits of injury at the time of injury (sex, age, physiological condition, menstruation, pregnancy, fortified condition, various illnesses or injuries, etc.) must be assessed.<sup>13</sup>

It follows from the provisions of the Macedonian Criminal Code on bodily injuries that a physician-expert should assess the degree of severity of physical injuries in the absolute sense of the word, and he must identify and explain the violation through the defined conditions referred to in paragraph 3, article 131, or to do so by way of elimination mentioned qualification elements.<sup>14</sup>

In other words, it is necessary for the expert to explain in the case of physical injury the assessment of the medical facts that carry a bodily injuries with him, and in addition to harmonizing this data with legal provisions, legal rules and norms, to determine the medical characteristics of bodily injuries, to explain the medical content of bodily injuries, to determine the causal link between incriminated action and bodily injury, to determine the possible consequences and complications, as well as to determine and evaluate other facts related to bodily injury, which are of importance in criminal proceedings, such as the time of the occurrence of a bodily injury, the means and the way in which the bodily injury was inflicted.<sup>15</sup>

If the examination of a bodily injuries is

<sup>11</sup> Buturovic J., Stevanovic M., Psychiatric investigation in the criminal procedure (legal synopsis), JRKK, no. 3-4, Belgrade, 1980, p. 429-448

<sup>12</sup> Kostid M., Forensic Psychology, Institute for Textbooks and Teaching Resources, Belgrade, 2002, p. 150.

<sup>13</sup> Pejakovic S., Principles of Forensic Expertise and Judicial Medical Commentary of the Criminal Code, Naučna knjiga, Belgrade, 1973, p. 5-53, 74.93. Pejakovid S., Judicial Medical Examination and

Medical Error in Society and Court, Scientific Paper, Belgrade, 1991, p. 7-35, 41-42., 111-132.

<sup>14</sup> Duma A., et al. Qualification of bodily injuries, Association of Judges RM, Judicial Review, no. 1, 1999

<sup>15</sup> Gutevska A., Davceva N., Chakar Y., Poposka V., Boskovski K., Duma A., Expertise of Accidental Violations, Police, Prosecutor's Office, Court and Lawyer in Pre-Criminal Procedure, Ohrid, 2000, p. 423-429.

carried out in this way, it also allows the judge conducting the criminal proceedings to correctly understand the violation, its gravity, its possible consequences, and that it can fit it into one of the provisions foreseen in the Criminal Code.

It is proper that the expertise is checked, especially more complex, in an expert institution or a state body specialized in certain types of expertise. One or more pledges may be involved in the expert procedure, which depends on the type and complexity of the expertise.<sup>16</sup>

Expertise today in judicial institutions has become a regular part of the criminal procedure, a very important evidence of which much is expected, and, on the other hand, evidence that slows down the court processes due to all the complexity discussed.<sup>17</sup>

### 3. METHODS OF BEHAVIOR OF BODY VEGETABLES

As a case of forensic medical expertise, where a large number of medical questions arise, there are also expert evidence of bodily injuries in the criminal proceedings. According to the court, expert witnesses of bodily injuries are necessary for life-threatening offenses, including: crimes of violation of physical integrity and damage to health, physical injuries and serious bodily harm, criminal offenses against sexual freedom and sexual morality (sexual offenses) and criminal offenses against the safety of public transport (traffic accidents).<sup>18</sup>

The examination of bodily injuries is carried out as a rule - examination of the injured person, and if this is not possible or not necessary based on medical documentation or other data from the file.

After describing the injury, the expert gives his opinion, in particular the type and severity of any particular injury, and their overall effect from the aspect of their nature or the particular circumstances of the case itself, how usually these injuries are affected, and how in the specific case and how and in what way them.

The previous Code of Criminal Procedure has provided the basic norms on the method of carrying out an expert assessment of a bodily injury. According to Article 271 of this Law, the examination of a bodily injury is done as a rule examined - injured, and if this is not possible or not necessary based on medical documentation or other data contained in the files. The new Criminal Procedure Code, in Article 249, regulates in a general manner the issues of: physical examination, taking of blood and other medical activities. The physical examination of the defendant or other person shall also be carried out without their consent if it is necessary to establish the facts that are relevant to the criminal proceedings. Taking blood and other medical interventions in medicine are done for the purpose of analyzing, identifying the person and identifying other facts that are important for the criminal procedure. This can also be done without the consent of the person being examined, unless it does not affect his health. So, the examination of bodily injuries is carried out in two ways: examination of the injured person or - insight into medical records or other data related to injuries, which are contained in the case files. The medical documentation should contain all data related to injuries and damage to health, the manner of their diagnosis, the taken therapeutic measures and the treatment method. In other words, medical documentation is a realistic and objective document, if it is the same comprehensive and well-written.<sup>81</sup>

<sup>16</sup> Stevanović Č., Đurđić V., Criminal law: process entities, process actions, Student Cultural Center, Niš, 1998, p. 254.

<sup>17</sup> Gerben Meynen, op. cit. in Milanovic S., Significantly reduced accountability in criminal law of BiH, Travnik 2016, p. 248

<sup>18</sup> Tasid M. et al., Judicial Medicine, Zmaj, Novi Sad, 2006, p. 5-35. Zečević D., et al., Expertise on the severity of physical injuries in criminal proceedings, Informator, Zagreb, 1986

Medical records include medical certificates, however, it may be a release list, a history of illnesses, medical examination reports, rent records, laboratory findings and other medical documents related to the treatment of the injury. A medical certificate is a means of proof that often leads to a final judgment. However, only the medical certificate, or any other medical document relating to the flow and treatment of an injured person, can not be the basis of the expert judgment by which a final court verdict can be issued, because it does not follow from the order of the court, that is, the court does not elect a doctor, a doctor chooses injured.<sup>19</sup>

#### **4. LIABILITIES AND TASKS OF THE JUDICIAL-MEDICAL LABEL WITH THE EXERCISE OF BODY BREEDS**

In its day-to-day operations, one of the tasks of a forensic medical expert is to provide the expertise of bodily injuries in living beings in written form.<sup>20</sup>

The carrying out of the judicial medical examination of bodily injuries in living beings consists of: giving diagnoses and opinions on the type and nature of the injuries after direct examination of the injured person, giving diagnosis and opinion on vision and karate injury in the examination of bodily injuries in criminal cases and giving oral opinion in progress court proceedings.

a) Providing diagnosis and opinion on the type and nature of the injury after the immediate examination of the injured person In the Republic of Macedonia, at the Institute for Forensic Medicine and Criminology, which is part of the Medical Faculty in Skopje, the most frequent is a physical examination of the injured person who received the injury for the time a criminal act - a fight or a fight, and an injured person who has received a violation during rape or some other unnatural

blasphemy (in which case, besides physical examination, insists on the anal), in order to determine the existence of injuries that have occurred criminal activity. The examination of bodily injuries during the examination of the injured consists of two phases. The first phase relates to the examination of the injured person and consists of the following tasks: □ taking general information about the injured person (name, surname, birthdate, address, marital status and occupation), □ taking data from an injured person related to the place of occurrence, the time (exact date and hour), the means used and the way in which the injury occurred, - □ the specification of the date and time when the inspection was carried out, - □ the inspection of the body injured in the presence of visible injuries, - □ the finding of each individual injury, which means accurate localization, vision and characteristic of injuries and their introduction, or drawing a special scheme, □ photographing each individual injuries.

In special cases, a court order may also be sought: □ examination of the wardrobe, in the sense of the possible existence of suspected biological traces (blood, hair, sperm), and if any of these traces are found, their laboratory analysis is carried out to determine the affiliation of the blood group or the existence of sperm, □ gynecological or anal examination by taking vaginal or anal swabs, □ and taking blood from the vein and urine for possible evidence of the presence of ethyl alcohol, psychoactive substances and medicaments. □ The second phase refers to the provision of diagnosis and opinion in a written form consisting of: □ headings, listing all the questions raised in the delivered written order by the court or in a written written request by the injured person, □ a finding in which all the information obtained during the examination of the injured person or the general about the person, a description of the occurrence-event and a detailed description of each injuries detected in terms of the exact localization that is

<sup>19</sup> Aleksandric B., Pandurovic S., Doctoral certificate, Medical subsp., XXXIV year, no. 4, 1982.

<sup>20</sup> Boskoski K., *Expertus*, Independent editions of Gjurgja, Ohrid, 1994, p. 15-29.

carried out over a fixed-point point on the body, □ and an opinion in which an answer is given to the questions asked, which must be written in a language comprehensible to all legal entities.

b) Providing diagnosis and opinion on the type and nature of injuries based on medical records (examination of bodily injuries in criminal cases) This form of expertise meets in three stages. The first phase relates to the overall and detailed viewing, acquaintance and study of the questions set out in the written order and the files contained in the case (indictment against the accused) filed by the Basic Public Prosecutor's Office, the decision with which the investigation against the Accused was conducted by a public prosecutor or a private criminal complaint filed by the injured party. These documents contain all data regarding the criminal offense, that is, the date, time, place, means and manner of the occurrence of the violation, medical documentation relating to the injured person's injuries, the record from the investigation, statements made before the court by the injured party, the accused and by the witnesses, photo documentation and sketches of the place of events prepared by the MUP's crime technique, expert examination by the MUP technician's crime, and if there is an expertise of a doctor of another specialty. The second phase relates to the written notification of the injured person to the Institute with the aim of delivering supplementary medical documentation which is not in the case and to be screened. At this stage, medical documentation is completed that is related to the treatment of the injured person's injury, and the examination is performed if there are any consequences, complications or scars.

The third phase relates to the delivery of findings and opinions in a written form, and it consists of: □ headers, indicating who is seeking expertise and questions set out in the written order contained in the case files, □ the findings in which it is quoted the overall medical documentation related to

the injured person's injuries, and in some situations, certain facts from the records on the inspected place of the place, the statement of the injured party, the accused and the witness are given before the court, □ the findings of other expert witnessing, among which is the expert's assessment by the doctor specialties, opinions that are the last and most responsible part of the expert examination explaining the important facts and details that have been established and arising from the findings, and giving an opinion in relation to the severity and severity of each individual injury and their overall effect.<sup>21</sup>

In cases of non-existence of all necessary facts in the attached medical documentation (incorrect, imprecise or unclearly written) and other files in the case, which are crucial for giving opinions, and in cases when the treatment has not been completed, we can not be produced with absolute certainty, so in such cases we often hear expressions like -not excludes the possibility "; - there is a small and a high probabilityl. c) Provision of oral findings and opinions during court proceedings Although in practice the examination of bodily injuries is most often in writing, it is of utmost importance that the statements of a court medical expert during court proceedings are given verbally. In giving an oral testimony before the court, a forensic medical expert has the following tasks: he should not participate in the interpretation of legal issues and questions concerning who is guilty; the questions asked by the judge and the participants of the conflict to give explanations only to those questions that are specifically set up in the field of medicine and are medically resolved; if they are asked questions in relation to clarifying and assessing new data collected and supplemented by medical records, in this case, may request access to them or may request that he be given a certain period of time in order to give an opinion on specific emerging issues, can pose questions to participants dispute, whose possible answers could be of great

<sup>21</sup> aneska B., Expert and Expert, Doctor for Physicians, Modern Diagnostics and Therapy in

Medicine, Chapter XXIX, Skopje, 2000, p. 2118-2119.

importance in establishing the rule of truth in the present assessment.

## Conclusion

During expertise violation of one of the most important questions posed in front of a doctor - a specialist is that to estimate the degree of difficulty of bodily injury in the context of the legal provisions and the conditions defined in the Criminal Code, or to determine whether it is a case of physical injury or a serious bodily injury. Qualification of the violation is done at the time of its formation, but in some cases is done qualification grievous bodily harm after completing treatment, because some of them may leave permanent damage, which will depend on the nature, manner, length and outcome of treatment. The doctor-expert in the expertise of physical injuries need to decide not only on medical facts that carries bodily injury, medical characteristics and medical content violations, but also in terms of cause - effect relationship between incriminated reaction and personal injury, possible consequences and complications, time its origin, as well as the way and means with which the injury occurred. Qualification of a violation is a special procedure prescribed by the Criminal Procedure Code. Any infringement case for himself, and to carry out criminal legal qualification needed is that all injuries are analyzed in terms of localization and type some and the clinical symptomatology, and then to define the qualification elements contained in the provisions for personal injury of the Criminal Code.

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## EMPLOYEE OF THE 21st CENTURY

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**Abstract:** *With certainty we can say that in contrast to today's employee who comes to work by established procedure, an employee of the 21st century, respectively employee of the future could work anywhere, at anytime and on any workplace with the acquired competencies. Already during the school and preparation for employment any employee of the future will need to possess a specific list of competencies, knowledge and skills to meet the challenges that accompany the problem of first employment and the development of his career. Today's organizations introduce new business models, compared to conventional kind which prevailed two decades ago. Crucial role in the acceptance of "new" employee have played a globalization changes related to market requirements. Therefore, it is necessary for organizations to set up a competence approach. Implementation of effective organizational values, clearly profiled strategy and expectations from an employee, in developed countries have proven to be the main reasons for the introducing the competences. Those competences are regarding the ability of employees. They represent the basic unit in developing and satisfying human resources and work place. At the same time they create a way of communication in organizations that allow employees to demonstrate a certain kind of behavior in terms of performance, efficiency, effectiveness, and their attitudes.*

**Keywords:** *competences, human resources, knowledge, organization and labor market.*

## INTRODUCTION

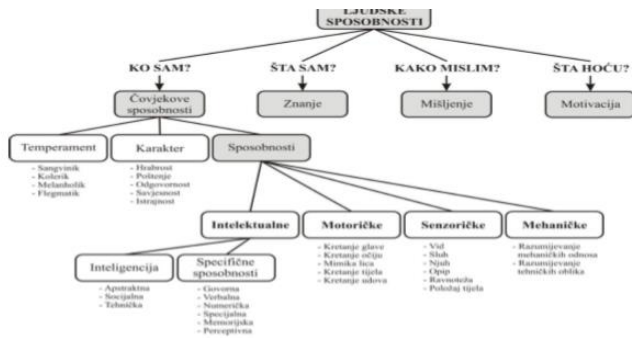
Dynamic changes in the world have inevitably contributed to the different criteria of employers and their expectations from future employees. All economic analyzes say that the changes will become more pronounced in the XXI century due to even greater upcoming globalization and new approach to technologies. Authors who write about human resources believe that management can handle human resources the same way as with all others. In their opinion, the role of the overcoming of human resources should belong to managers. Of course, this opinion is very rough. Because people besides that, that they can be sources, they also have resources and they own them themselves, not managers or managers. In the former Yugoslavia, the term "liberation of human abilities-for which a compatible translation" Human Resource Management- was used. And if it was a translation, it would be assumed that human capabilities in the work are more or less blocked, and it is the task of managers to find the most effective way to do this. In any case, a man (employee) and his abilities are essentially an integral part of every event.

Effective inclusion of human capital, the intellectual capital of employees in business activities can substantially change the results in the end. Therefore, it is not only enough to understand the capabilities of employees as intellectual capital, but they must be respected, valued, and included in the planning and implementation of various activities.

## 1. DETERMINATION OF HUMAN RESOURCES

Researchers, who announce the future and predict the conditions for successful overcoming of future problems, emphasize that the decisive role in the XXI century in all segments of business activity will be played by people and their abilities. There will be no more technical secrets among the competitors. Although there would be a technical advantage over one another, it will only happen for a short time. For this reason, some do not see a special competitive space in technical advantages, but see it in unused and even unknown human abilities.

## 1.1. Rast and competitiveness



In terms of growth and competitiveness, it should be emphasized that all management activities will adapt their strategy and support to the needs of a specific market. In the growing markets of Asia, the Middle East, Africa and South America, they will focus on high quality training and development to ensure that their employees have the skills required to manage sustainable growth. In the developed markets of Europe and North America, the management structure has long been using performance management and development activities to ensure that employees are equipped to secure, or increase operational competitiveness, and thus provide clients with top quality services.

In all markets, human resources are focused on high quality and leadership that manages a high level of employee engagement and their responsibility.<sup>22</sup>

## 2. HUMAN CAPACITY

Human abilities are an extremely broad concept, which involves all known and unknown traits. That is why we are talking about human abilities in a wider sense, and they are numerous and diverse and relate to different areas of human life. So we talk about psychological abilities, physiological and physical. In addition, we can distinguish people's abilities in terms of how they acquire these skills. One man developed a great deal in relation to hereditary dispositions, among which all kinds of abilities belong, while others

acquired in the course of their lives. Among them, knowledge of all kinds belongs. When talking about human abilities in the narrow sense, we have in mind in most abilities, knowledge and motivation. Regardless of how much and how much ability we can find in man, the organization and behavior of people in them are decisive.

### 2.1. Human abilities are numerous

*Figure 1 illustrates human abilities in the broader sense.*

#### 2.1.1. Ability

Abilities are essentially human potentials for the development of certain values. By themselves, they decisively influence the solution of problems with completely unknown solutions, yet they come to the fore in combination with knowledge. Business ability is the capacity of a natural and legal person to create legal effects by own manifestations of will, or to acquire rights and obligations. The physical capacity of a natural person is acquired by age, and the legal date of creation, unless otherwise determined by legal regulations (law). There are three levels of activity in the physical capacity of individuals: full capacity, partial capacity and complete incapacity. A person who is not an adult can only create legal effects determined by law. Instead of a person who does not have the capacity to work, his / her legal representative or guardian will be able to read his will.

#### 2.1.2. Knowledge

Knowledge is part of man's abilities and enables the solving of known problems, such as those already seen and resolved. Regardless of where and how this knowledge has been gained, it mostly helps solve problems with known solutions. With the capabilities of man or employee, knowledge can be used to solve problems with still unknown solutions. Knowledge

<sup>22</sup> J. Bramham, Human Resource Planning, Institute of Personnel Management, London 1990, 48.

definitions in most of the literature are much more complex than the definitions of information and data. It should be noted that knowledge is ambiguous and ambiguous, since there is still no consensus on the nature of knowledge, except that knowledge is based on the perception of reality and offers a rational explanation for it. Knowledge is a combination of data and information that adds opinions of experts, skills and experience, and results in a valuable set used in decision making. It is built on the basis of information extracted from the data. While data is a property of things, knowledge is the property of people who use things in a certain way.<sup>23</sup>

Knowledge can be defined in various ways, such as: - facts, information and skills that a person has acquired through experience or education; theoretical or practical understanding of an object, - the totality of everything known in a field; facts and information, - awareness or familiarity acquired through the experience of a fact or situation.

The authors define knowledge in different ways: - Knowledge is confirmed true faith - most philosophers accept this definition, especially empirical philosophers who believe that knowledge can be confirmed by facts.<sup>24</sup>

- Knowledge is information in context - knowledge has value if it fits without contradiction into a wider framework of knowledge,<sup>25</sup>

- Knowledge is information in context - knowledge has value if it fits without contradiction into a wider framework of knowledge,<sup>26</sup>

- Knowledge is experience or information

through which they can communicate and which can be exchanged.<sup>27</sup>

- Knowledge, which consists of data and information, can be considered as a much wider understanding of situations, relationships, causal phenomena, and theories and rules (explicit and implicit) that lie in a given domain or problem, where the emphasis is on understanding.<sup>28</sup>

- Knowledge can be considered as composed of understanding, generalization, and abstraction, which we carry with ourselves on a permanent or semi-permanent basis and apply for the interpretation and management of the world around us.<sup>29</sup>

Philosophical debates generally begin with Plato's formulation of knowledge as "justified by true belief." There is, however, no universally accepted definition of knowledge, nor does it seem to be visible, and there remain many contests of the theory. Acquiring knowledge involves complex cognitive processes: perception, learning, communication, association and conclusion. The term knowledge is also used to indicate a reliable understanding of an object, with the potential ability to use it for a specific purpose.

### 2.1.3. Skills

Skills indicate the ability to handle the performance of a particular action or activity. These are predominantly abilities, which relate to man's motor skills and abilities. They enable quick and motor skills and skills. It enables a quick and effective motor response to the difficulties. Although the expression of skill is used in various meanings, it is largely reserved for

<sup>23</sup> <http://autopoiesis.foi.hr/wiki.php?name=KM+-+Tim+55&page=Definicija+znanja>

<sup>24</sup> I. Nonaka & H. Takeuchi, *The Knowledge – Creating Company: How Japanese Companies Create the Dynamics of Innovation*. Oxford University Press, 1995.

<sup>25</sup> B. Aune, *Rationalism, empiricism, and pragmatism: an introduction*. Random House, New York 1970, 35.

<sup>26</sup> W. James, *Pragmatism's conception of truth*. *The Journal of Philosophy, Psychology and Scientific Methods* 4, 1907, 141–155.

<sup>27</sup> V. Allee, *Twelve principles of knowledge management, Training & Development*, 1997, Vol. 51 No. 11, pp. 71-4.

<sup>28</sup> N. Bennet, E. Dunne i C. Corre, *Skills development in higher education and employment*, Open University Press □ SRHE, Buckingham 2000, 69.

<sup>29</sup> K.M. Wiig, K. M. *People-focused knowledge management: how effective decision making leads to corporate success*, Elsevier Butterworth-Heinemann, Oxford 2004, 132.

the motorcycle area.

#### 2.1.4. Personal traits

These are all the virtues of man, which in themselves are not necessary in solving the problem, but give a personal emphasis to every human reaction. In this case, it is about character, temperament, etc. which act as catalysts for human response, while they themselves do not solve the difficulties. Thus, the perception of personal traits is narrow. The comprehension of personal traits in the broadest sense would include all human traits or abilities to personal traits in the narrow sense, that is, human characteristics in general.

#### 2.1.5. Human abilities

In management practice, we understand human abilities less structurally, but therefore more functional. We are less confident about types of human competencies (Who am I), but they are more concerned with the question of what skills a person should have to do the job (WHAT can I do?). In this case, it also comes to the replacement of the notion of possibility with the concept of ability. Thus, in the management circles, they are happy to talk about sponditions for doing some work. So they think of the possibility or what a person can do. These abilities are composed of abilities and knowledge, and not only abilities.

From the ability, which each individual has, we can evaluate his future success, but the announcement is much more detailed, if we can also answer the question of what he wants (What do I want to do?). Thus, the abilities, knowledge and motivation of the central competence, which we try to recognize and influence on them. It is not possible to reach the result if, in combination, the lack of one of these abilities. Thus knowledge, abilities and motivation are the main human mobilization force and give it the

opportunity to achieve success. Therefore, they are justifiably called the possibilities.<sup>30</sup> When we talk about abilities below, we mean knowledge, abilities and motivation. Motivation is very important for the behavior of people in the organization. So it can be concluded that human success depends on their abilities, knowledge and motivation.

#### 2.2. The need for a new employee profile

As we know the end of XX. and the beginning of XXI. centuries has been a period of economic and political transformation, resulting in a multiplicity of integration of the world economy with new open markets in previously closed regions and new emerging competitors often with very different operational norms. This forced companies to adapt to the cultural norms of those countries with which they operate. At the same time, the information and communication revolution allowed access to an enormous amount of information. The emergence of the Internet has made it possible to access information and work together in dispersed conditions, as it has never been possible before. There was the emergence of the economy of any time / any space that allowed the work to be done anywhere and at any time. This created the presumption of a new profile of employees, employees of the 21st century, who appeared in every place and at all times, and when his need ceased, he also disappears.

C.D. Jerald points out that in the 21st century we will need employees with new skills due to changes in automation, demography, personal risk and responsibility. All these dimensions have been incorporated and major changes in business have been introduced. It is evident that in successful organizations in business much less control and hierarchy, and more and more autonomy and personal responsibility. In support of this claim, there is a reflection, or research, of the National Association of Colleges and

<sup>30</sup> B. Lipičnik and D. Mežnar, Human Resources Management, *Gospodarski vestnik*, 1998, 27.

Employers (NACE), in which human resource managers articulated the most desirable employee characteristics (ability to work in a team - teamwork, quick decision-making and troubleshooting, skills verbal communication with people inside and outside the organization, as well as the ability to plan, organize and define priorities).

### 2.3. The role of the education system in employee profiling

The educational system will surely have continuous exponential development under the direct influence of three factors: - dynamic changes in scientific and technological knowledge, which requires constant changes and an increase in the intensity of full-time education, ever-shifting changes in the world economy and economy that will require a flexible, efficient and easily accessible the system of retraining, training, innovating knowledge, etc. and - dramatic cultural changes from the perspective of the individual and, above all, young generation (technological and communication influence on the process of socialization, changes in the structure, function and dynamics of the family, globalization of cultural and information offerings). In this atmosphere and domestic education policy, it will not be possible to avoid taking a certain number of priorities and goals that relate to profiling of employees. The most important function will surely be inclusion in the global division of labor and the aspiration to achieve the best possible position in it. By integrating and expanding the European Community as well as intensifying economic ties with other countries of the world, processes of a specific division of labor will continue in Europe. Bosnia and Herzegovina will necessarily have to define its economic profile. The undisputed interest of our country is that it does not remain the raw material base and the source of cheap labor, but to get better quality positions with emphasis on the sphere of

highly specialized production (food and biotechnology, software) and high-profile services (trade with the east of Europe and the Middle East , catering, traffic, intellectual services). The basic basic requirement for achieving desired positions significantly different from today's priorities (primary agriculture and industry, unrealistic ambitions in low-budget tourism) are urgent staff restructuring through changes in education to create a critical mass of adequately educated employees.

### 2.4. Human Resources Management in Enterprises of the 21st Century

Human Resources Management is a function that helps organizations achieve goals by achieving and maintaining employee effectiveness. Specific objectives related to human resources management are: - improving the motivation and performance of the individual; - developing individual careers and planning progress; - securing an incentive reward system; - identifying and developing potentials at the individual and overall, organizational levels; - determining the needs; and plans of education and training, - professional orientation and distribution of people to workplaces that better suit their abilities and preferences.<sup>31</sup>

## CONCLUSION

What is evident in the past twenty years, Bosnia and Herzegovina has not improved its practice of educating and developing employees because education and development are not yet activities that attach strategic importance. There is no significant correlation between the characteristics of organizations (size, ownership, activity, age and education structure) and the importance they attach to education and development of employees, ie that education and development in Bosnia and Herzegovina does not

<sup>31</sup> A. Marcetid, [http://www.poslovnisavjetnik.com/sites/default/files/privitak/ps\\_106\\_low\\_part43.pdf](http://www.poslovnisavjetnik.com/sites/default/files/privitak/ps_106_low_part43.pdf).



significantly predominate those organizations that were expected. All external research indicates the need for significant investments of BiH organizations in the education and development of their employees, employees for the 21st century not only for the purpose of competitiveness in the domestic market, but also in order to achieve competitive advantages in an increasingly integrated European and world market. Knowledge in the contemporary society is a key factor in achieving competitive advantages; knowledge and skills of employees represent the basic resource of organizational success, and permanent education and development become an inescapable need. In other words, "continuous, ie lifelong learning and the continuous improvement of individual and organizational skills and knowledge have become the *conditio sine qua non* of those companies that want to survive in the highly competitive global marketplace that surrounds us."<sup>32</sup> As the nature of the work is changing irreversibly, so are the people who need to do it. "The knowledge economy, a value that incorporates all the attributes of the future global economy, is based on the concept of" the workers of the knowledgeable qualities of high professional qualification and flexibility of doing work, which in turn produces temporary labor (without permanent employment). Basic characteristic of employees XXI. It is believed that in the future, more and more people will have to work without a formal workplace in the future and be dedicated to the concept of continuous learning (advanced training) and they rely on future employers precisely on the opportunities that they can provide in this regard. Working practices such as temporary engagement, by project, flexible working hours, work at home, virtual offices and teams actually give the greatest emphasis on the organization's flexibility and innovation, and thus the ability of global survival.<sup>33</sup>

<sup>32</sup> N. Pološki Vokić, Human Resources Management in Large Croatian Organizations, *Economic Review*, 2004, (55), 5-6: 455-478

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<sup>33</sup> R. Rudman, *Human Resources Management in New Zealand 4th edition*, Pearson Education, Auckland 2002, 15.

## IMPACT ANALYSIS OF THE DAMAGE VEHICLE FINDINGS AND OPINION EXPERTS INFURNISHED TRAFFIC ACCIDENTS

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**Abstract:** *Comparative analysis of vehicle damage is the basic method for clarifying furnished traffic accidents. Objective of this work is the introduction of a variety of situations furnished accidents, to work expert in this and similar situations was facilitated. Precise and detailed analysis of the damage to the vehicle shows a mismatch is damage to the vehicle according to the intensity and direction of the force. This way of comparing the most effective is to identify the set of accident or attempted fraud in the field of insurance from auto-responsibility. The success of disclosure furnished accidents exclusively depends on the knowledge model occurrence of such accidents. In this paper in relation to that presents a few typical examples of traffic accidents furnished model "vehicle-to-vehicle".*

**Keywords:** *furnished traffic accidents, insurance fraud, damage analysis*

### 1. INTRODUCTION

The analysis of material evidence and the statement of the participants in a traffic accident is the basis of the analysis of the credibility of the occurrence of a traffic accident. Because of the volume and diversity of traffic accidents that occur, it is not possible to define the unique content and type of analysis that must be carried out in order to determine the credibility of the described manner of occurrence of a traffic accident. The identification of the credibility of a traffic accident is similar to the agreement of elements of the mosaic, with the elements available to the experts of the traffic engineering profession, material evidence of a traffic accident related to: vehicle damage, accidental traces, traffic situation and statements by the participants of the accident. (Cvijan and Smailović, 2012: 160).

However, the most common cases of analysis are related to the establishment of the credibility of an accident described by the participants and (or) witnesses of a traffic accident. At best, it is possible to arrive at some conclusions by a comparative analysis of only damage to the vehicle.

In some cases this will require a detailed and comparative analysis of vehicle damage, while in some traffic accidents a detailed and comparative analysis of all elements of the accident is required.

Fraud in the insurance of motor vehicles does not imply only casualties that have not been objectively incurred, but frauds also imply the presentation of damage that did not occur, could not have happened, or could not have happened in the presented accident. It is not unusual that participants in a road accident show more damage than those that happened objectively or could have happened in the traffic accident.

### 2. METHODOLOGY OF RESEARCH

#### 2.1. Subject research

The subject of the research in this paper are examples of the expert assessment of traffic accidents from the old Institute at the Faculty of Traffic in Belgrade and Doboj.

#### 2.2. The aim of the research

Examine the findings and opinions of an example of an expert in the design of traffic accidents in order to point out the facts and

procedures of adjusting traffic accidents and the application for insurance compensation.

### 2.3. Method of data collection

Data collection was carried out on the basis of the accompanying documents and photo documentation for the analysis of traffic accidents.

### 2.4. Sample research

Three characteristic examples of damaged traffic accidents with material damage were selected.

### 2.5. Method of research

After selecting an example according to a predefined criterion, the analysis of the selected traffic accident documentation was initiated with a focus on characteristic damages that were not incurred in the accident.

## 3. RESULTS OF CHARACTERISTIC DAMAGE EXAMINATION

Investigation of characteristic damage on vehicles carried out on three examples of damaged traffic accidents with material damage.

### 3.1. Example 1 - Damage did not occur in the traffic accident

In this example, an allegedly traffic accident with material damage took place involving two passenger cars, MERCEDES and YUGO, Figure 1.



Figure 1. Width appearance of engine bonnet damage [3]

Figure 2. Engine bonnet damage display [3]

A detailed analysis of the submitted photographs from photo documentation found that the bonnet of the engine compartment MERCEDESA in the right front part was deformed by the action of a force in different directions and directions with a center of impact in several different places, figure 1. The damage to the front left part of the bonnet of the engine compartment is in the form of deformations sheet by the action of forces in different directions and directions, with a center of impact in several different places, Figure 2.

The front decorative mask MERCEDES is broken and most of the right part of the front decorative mask is missing. The front bumper's front tire is damaged by the left corner being deformed by a force acting in the direction from the front left corridor to the rear right corner of the MERCEDES and is moved upwards, while at the height of the center of the forehead part of the MERCEDES, it is deformed by the action of the force, approximately from the upper to the lower part of MERCEDES, figure 3. Damage to the engine coolant cooler and the MERCEDES air conditioner cooler is located out of its tray and are moved downwards. On the lower part of the coolant coolant radiators and the air conditioner cooling radiators, they are in the form of a deformation of the sheet by displacing it backwards by acting force in the direction from the front to the rear of the MERCEDESA, fig. 4.



Figure 3. Display of the damage of the upper left-hand cooler "connecting bracket" [3]

Figure 4. Discharge of the lower part of the engine cooling and cooler air cooler [3]  
The upper left "coupling bracket" is deformed at the height of the left head by pushing it backward, towards the middle of the engine compartment MERCEDESA, by acting force in the direction from the front left corner to the rear right corner of the MERCEDES, Figure 5. Damage to the

MERCEDESA on the front left mud track like scratch marks and traces of reddish traces, Figure 6. and 7.



Figure 5. detailed damage left fender [3]

Figure 6. Only damage to the left front fender [3]

Damage to the front left door of the MERCEDES, are traces of scratch marks and traces of red-colored tracks, and are provided from the front to the rear edge of the front left door of the Mercedes, Figures 7 and 8. At the rear of the lower edge of the front left door MERCEDES damages are in the form of deformation of the sheet formed by the action of force in the direction from left to right side of the MERCEDES.



Figure 7 and Figure 8. Damage to the front left mudguard and front left door [3]

A detailed analysis of the delivered YUGA damage images resulted in damage to the rear right-hand corner of the YUGA in the form of sheet metal deformation by moving it forward and rightwardly by force acting approximately from the rear to the right side of the YUGA. The rear bumper is "deformed" by deformation in the right-hand corner and displaced rearward by force acting approximately, from the rear to the right side of the YUGA, with the impact center at about 0.3 m from the rear right edge of the YUGA (estimated on the basis photo from photo documentation). The rear bumper YUGA is deformed by being detached from the vehicle in the rear right and moved downwards. On the right side of the right YUGA bumper there are traces of scratch marks, Figure 9. In the lower half of the rear right-hand fender YUGA, and approximately at the height of the rear right-hand corner of the YUGA, there are

traces of traces of black color, while in the upper half of the rear right mudguard YUGA there are traces of scratch marks. By analyzing the damage of the YUGA, the rear right-hand side glass is broken on its entire surface, Fig. 10.



Figure 9. Rear bumper damage [3]

Figure 10. Damage to the right rear fender and side glass [3]

In this example, by analyzing the traces and damage, it can be concluded that the collisions between MERCEDES and YUGA could not be as described in the analyzed documentation. In the event that a traffic accident happened in the manner described in the analyzed documentation, then at the front edge of the front left mast MERCEDES there should be damage caused by the force acting from the front to the rear of the MERCEDES, which in this case was not the case. If the collision of the front left-hand side of the MERCEDESA and the rear right-hand side of the YUGA comes in the way indicated in the analyzed documentation, a collision in the form of a deformation of the sheet metal from the left to the right side of the MERCEDES would result in a collision on the front left mudguard of the MERCEDESA. which was not the case here.

### 3.2. Example 2 - Damage did not occur in the traffic accident

The analyzed traffic accident in this example occurred with injured persons, in which two passenger cars, brands BMW and HYUNDAI participated. Based on a detailed analysis of the material elements from the file, and in particular photographs from photo documentation and photographs of damage to BMW, it was found that the left side of the front left wheel tire was damaged in the form of a "split". On the rim and a spider of the front



left-hand mark, traces are like "dark-colored" marks, approximately at the height of the left-hand wheel left-hand tire damage, figure 11. BMW's damage is also on the back of the plastic part (below front left mudguard) separated from the front left mudguard and moved to the front of BMW, Figure 12.



Figure 11. and Figure 12. Damage to the tire - "splitting" [3]

On the right-hand side of the BMW's rear bumper, the traces are like scratches, Figure 13. In the upper part of the damage to the right part of the BMW's rear bumper, there are "cracks", Figure 14.



Figure 13. and Figure 14. Scratches on the rear bumper and cracks on the right-hand side of the rear bumper [3]

The right front left-hand holder is "interrupted" and the front left is not in the tray, Figure 15. The front left shoulder is "interrupted", Figure 16.



Figure 15. and Figure 16. Display of the right holder of the left head and left lower shoulder [3]

By analyzing the damage photos of HYUNDAI, damage to the front bumper (at the height of the front left-hand corner of HYUNDAI) was determined by the force of the front to the rear of HYUNDAI, Figure 17. The front left mudguard of HYUNDAI was damaged (at the height of the front part of the mudguard ) by acting force from the front to the rear of HYUNDAI. Analyzing damage to the front of the front left mudguard of HYUNDAI on damage is the scratch trace, Figure 18.



Figure 17 and Figure 18. Display of front bumper damage and scratch marks [3]

On the left side of the left side mirror of the HYUNDAI, traces are like traces of scratches and traces of blue, in the front left door, at the height of the middle of the door (viewed in length) and in the lower half of the door, it is visible damage in the form of "scratch" ', Figure 19. On the lower edge of the "edge" of the front left mudguard, the trail is "bright colors", Figure 20.

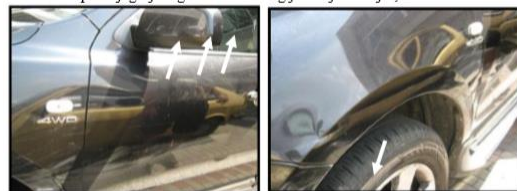


Figure 19. and Figure 20. Display of left-hand side mirror damage and "bright" color trace [3]

On the rim and the vapor, there are traces of "dark color", figure 21. The left side of the tire with traces of "dark color" is damaged in the form of a "split" tire, Figure 22.



Figure 21 and Figure 22. Tire damage display [3]

The detailed and comparative analysis of the material elements from the file was not determined at the position of which point (or where) the track was found with traces of "dark color" on the rim and the paw. An



analysis of the HYUNDAI damage images shows that the left threshold is damaged. On the left "threshold" is missing the left side. At the edges of the threshold part, which is located on HYUNDAI, the damage is like "tearing" or "cutting" of the material.

In this example, it was determined, and based on a detailed and comparative analysis of all damage to BMW and HYUNDAI and the site of the site, the damage did not correspond to the described manner of occurrence of a traffic accident. Based on the damage to BMW, they do not correspond to the damages on HYUNDAI, which means that such damage could not have occurred in the traffic accident described in this way.

### 3.3. Example 3 - Damage did not occur in the traffic accident

The analyzed traffic accident with material damage in this example occurred at the crossroads, involving two passenger cars, brands TOUAREG and FORD.

A detailed and comparative analysis of TOUAREG damage images found that the TOUAREG front bumper was deformed by the action of the force in the direction from the front to the rear of the TOUAREG, with the center of impact at the height of the front left corner. On the TOUAREG front bumper, about 0.4 m to the right of the left side of the TOUAREG, the damage is similar to the "tear" of the front bumper TOUAREG, Figures 23 and 24.



Figure 23. and Figure 24. Damage to the front bumper and "tear" of the front bumper [3]

The decorative plastic on the lower part of the front bumper TOUAREG was damaged in the form of a "crack". At about 0.4 m (estimated from TOUAREG damage photos) to the right of the left side of the TOUAREG, the damage is "crack", the position "a" in Figure 25. At about 0.2 m

(estimated from TOUAREG damage images to the right of the left side of the TOUAREG, the damage is "crack", the "b" position in Figure 26. The front left TOUAREG fog is damaged by the glass front left fog lamp "broken" and not in the tray, Figure 25.



Figure 25. and Figure 26. Characteristic damage of decorative plastic and Damage to the front left wheel wheel [3]

A detailed analysis of photographs from photo documentation on the front right-wheeler wheel, on the front left-wheel rim and on the rear left-hand wheel of the TOUAREG traces are like traces of scratches, Figures 27 and 28. A detailed analysis of photographs from photo documentation lacks the front left of TOUAREG.



Figure 27. and Figure 28. Rear wheel left wheel rim and rear left wheel rim

On the lower part of the TOUAREG, the tracks are like "yellow" marks, figure 28. The traces on the right side of the "track" of the front bumper TOUAREG are like scratch marks.

Detailed analysis of photographs from photo documentation found damage to FORD's front left mudguard in the form of deformation of sheet metal caused by the action of force in different directions, with a center of impact in several different places, Figure 29. The front edge of the front left mudguard FORD is at about 0.7 m above the surface (estimated from photographs from photo documentation) deformed by force acting roughly, in the direction from the upper front of the front left mud to the lower middle part of the FORD, the position "a" in figure 30. The

front edge of the front left mudguard FORD -a is approximately 0.6 m above the surface (estimated from photographic photo documentation) deformed by force acting approximately, in the direction from the front of the front left mud to the rear of the front right mudguard, the position " b " in figure 30. Na the front left part of the bonnet of the FORD motor vehicle, and at the height of the front left corners of the trail are like scratch marks. The front edge of the FORD bonnet cover at about 0.5 m to the right of the left side of the FORD is damaged by the front of the bonnet of the bonnet of the bonnet being pushed to the FORD engine compartment. The FORD bonnet cover is not located in the tray, figure 30. FORD's front left-hand mirror is broken and the front left of FORD is not in the tray. The front bumper and the front decorative mask of FORD, figure 30, are missing.



Figure 29. and Figure 30. Widely looks at the damage to the front left mudguard and shows a closer look at the damage to the front left mudguard [3]

In this example, based on detailed and comparative analysis of damage to TOUAREG and FORD, it was found that damage to the front right corner of the TOUAREG and front left-hand corner of FORD did not correspond to the collision of the front right corner of the TOUAREG and the front left-hand corner of the FORD- as described in the analyzed documentation. Also, based on a detailed and comparative analysis of material evidence from the analyzed documentation, it has been found that the traces of this traffic accident (listed in the inspection documentation) do not correspond to the traces that should result from the collision of the front right corner of the TOUAREG and front left corner of

FORD. Namely, neither on FORD nor on TOUAREG have any traces (damages) that would lead to traces on the car in front of FORD (visible on photos from photo documentation).

#### 4. CONCLUSION CONSIDERATIONS

When analyzing three traffic accidents, all material traces, damages, and elements describing an accident are important. If there is a dilemma whether an item (photo, damage, trace, etc.) should be an integral part of the documentation, it should always be possible for all available items to be contained. Workers of insurance companies and courts should have this in mind and try to collect as much as possible elements of material evidence, material evidence and statements describing a particular accident at the stage of the collected data on the accident. It is important to make good quality photographs of damage to vehicles reported for damages in a timely manner. Photographs made at the right moment can in some cases show more realistic elements that are important to exclude the possibility of the described incidence of an accident. When visiting a damaged vehicle, damage assessors in insurance companies should measure the typical damage to the vehicle. The possible way to exclude the possibility of an accident is to exclude the characteristic parts of the vehicle, their detailed and comparative analysis with the elements visible on the photographs.

From the above examples, it can be concluded that in one particular case all three conclusions concerning vehicle damage can be encountered. In the examples, it is possible to exclude the possibility that certain damage has occurred in the accident in question. The first example shows detailed damage to the MERCEDES vehicle, while on the basis of a small number of elements (two photographs) on the YUGO, it can be determined that the damage was not caused by the accident. To prove the accident, additional comparative analyses of material

evidence and statements by the alleged participants of the accident are necessary. In the second example, the damage to the BMW and HYUNDAI vehicles has been demonstrated, based on the analysis of the BMW vehicle damage data and the damage caused by HYUNDAI vehicles, can lead to positions that exclude the possibility of damage in the reported accident. In the third example of the traffic accident of TOUAREG and FORD, it was shown that all damage could not have occurred in the analyzed accident. The expert in the traffic and technical profession in some accidents can not exclude the possibility that some damage has occurred in the presented traffic accident. Such cases are extremely important for insurance companies, their recognition and making the right decisions, where insurance companies can retain significant tangible assets.

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## APPENDIX DEFINING POINT OF BUSINESS LOGISTICS

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**Abstract:** *Logistics is a term that has been accepted by economic science from military science and practice, where it is commonly used as a synonym for military supply and military formation on the field (as a professional name for a part of the war skills). Otherwise, today the term logistics usually means controlling the flow and storage of materials respectively all activities in the transfer of raw materials, semi-finished and finished products from the first producer to final consumer. However, it should be noted that logistics has been for a long time a completely new area of economic scientific exploration, and its content was most commonly identified with transport and storage. The interest for the management of activities in the field of logistics has led to different interpretations of the concept of her and she answered with a kind of confusion, because the number of terms used to denote the process of physical movement of goods from suppliers through manufacturers and intermediaries to the final consumer. As with most economic terms, in the scientific and professional literature today there are more opinions, even about the origin of the concept of logistics and many of its definition, which this paper will try to scientifically illuminated and somehow relatively harmonized.*

**Key words:** *logistics, business logistics, supply chain, streams of material, physical distribution.*

## 1. INTRODUCTION - THE ETYMOLOGY OF THE CONCEPT

*In essence, the battle was won and decided by the officers for the supply and before the shooting started. (Erwin Johannes Eugen Rommel)<sup>34</sup>*

Etymological<sup>35</sup> 3, logistics is most often associated with the Greek word *logistikos*, which marks the skill and experience in computing, and is also associated with a certain stock of clerks. One should take into account the word *logo*, which means the notion, reason, or wit, and the word *logismos*, which means the bill or salary.<sup>36</sup>

In ancient Athens, logistics are called people who led finances and preparations for wars and supplies of military formations on the ground. Also, Abidin Deljanin<sup>37</sup> says that many logistics with the Greek word *logistikos*, as a skill in solving problems with letters (instead of digits), which was also used by the Latin so-called. logistics, or finance officials.

The origin of logistics is also associated with logic, as it deals with the integration of certain activities that lead to the achievement of a goal. Velibor Peulić<sup>38</sup> binds the concept of logistics with the English word logistics which signifies the science of the back office (transport and supply). In the analysis of the genesis of the notion of logistics, it is necessary to start

<sup>34</sup> German general from the Second World War (1891-1944)

<sup>35</sup> Etymology is the determination of the origin of the word and its relation to other words of the same or other languages. See the clause in Klaid, B.: Dictionary of Foreign Words - Strangers and borrowers, Nakladni Zavod Matice Hrvatske, Zagreb, 1990.

<sup>36</sup> Logistics. Available at <https://www.fsb.unizg.hr/zindin/LOGISTIKA.pdf> (February 13, 2017).

<sup>37</sup> See more at Deljanin, A.: The Logistics in Transport and Communication (Part I and Part II), Faculty of Transport and Communications, University of Sarajevo, Sarajevo, 2009. Available at <http://web.efzg.hr/doc/market/lectures/plbj11-12.pdf> (March 16, 2017)

<sup>38</sup> Peulid, V.: Logistics and Forwarding, Pan-European University Apeiron, Banja Luka, 2016. Available at <http://www.apeiron-uni.eu/lycboardclient/Detail.aspx?DocumentID29822> (March 14, 2017). 147



from the time of Byzantium, because the Emperor Leontos-Leo VI is there. Wise (886-911) first introduced the concept of logistics that, according to him, was to arm the army proportionally with the need for protection and weaponry, to take care of its needs on the ground in time, and to prepare its actions in the war effort.<sup>39</sup>

Logistics links Wikipedia<sup>40</sup> with the Greek words of logos (the science of principles and forms of correct thinking) and logistics (skills, experience and knowledge on the preservation, evaluation and judgment of relevant elements in the space and time necessary for optimal solution of strategic and tactical tasks in all areas of human activities). In scientific literature, other views on the origin of the name of logistics are also encountered, and some consider it to originate from the French word logger (to live, to spend the night underneath the clear sky, to end), which various authors use in various contexts and in various contexts define the concept of logistics, for example:

■ John P. Magee<sup>41</sup> says that logistics are of French origin (from a logger that means to settle there), and in military terminology means the mode of transport, supply and accommodation of military hulls and defines logistics as the art of running material and goods flow from suppliers to the bearer of need.

■ In addition, the source<sup>42</sup> of the constipation mentioned below is associated with the word logger, which, according to this source, means to reside, to stay, to

reside and to take care of the guest or soldier for a short time and its placement in the living room.

■ Also, Abidin Deljanin<sup>43</sup> claims that many authors have the concept of logistics for word logger, which, according to him, means to settle down, to settle down, to lie under the clear sky, and in military terminology means the mode of transport, supply and accommodation of the army, storage and storage of military goods.

■ Finally, on Wikipedia<sup>44</sup>, among other things, claims that logistics comes from the word logger, which, according to the authors, means to live, to spend the night under the clear sky, to be accommodated.

Therefore, Wikipedia deals with the etymology of the notion of logistics, and besides the above, it claims at the same site that it originates from the French word logistique, which was derived from the officer's logistic logic (marechal de logis), whose task was to plan everything administrative affairs related to the progress of forces in the French army in the 17th century. In his book, Josip Šamanović<sup>45</sup> says that logistics specifically refers to the strategy of accommodation and supply of army and military formations on the ground, and that military logistics includes transportation, accommodation (hiring and supply), transport, storage and maintenance of military goods and technology.

<sup>39</sup> See more in the Business Administration (script), Technical Faculty, Zrenjanin, University of Novi Sad, 2014 p. 4.-7. Available at [http://www.tfzr.uns.ac.rs/Content/files/1/Skripta-POSLOVNA\\_ADMINISTRACIJA.doc](http://www.tfzr.uns.ac.rs/Content/files/1/Skripta-POSLOVNA_ADMINISTRACIJA.doc) (March 11, 2017).

<sup>40</sup> See in Logistics. Available on [hr.wikipedia.org/wiki/Logistics](http://hr.wikipedia.org/wiki/Logistics) (February 15, 2017).

<sup>41</sup> Translated from Ivankovic, M.: Traffic Logistics, Faculty of Traffic Sciences, University of Zagreb. Available at <http://www.docsity.com> ...> Slides Logistics in Traffic (March 18, 2017). 150

<sup>42</sup> See more on Logistics - meaning, definitions and concepts. Available at <http://www.logisticmagazin.com/?p=442> (March 22, 2017).

<sup>43</sup> See more at Deljanin, A.: The Logistics in Transport and Communication (Part I and Part II), Faculty of Transport and Communications, University of Sarajevo, Sarajevo, 2009. Available at <http://web.efzg.hr/while/market/lectures/plbj11-12.pdf> (March 16, 2017).

<sup>44</sup> See in Logistics. Available on [hr.wikipedia.org/wiki/Logistics](http://hr.wikipedia.org/wiki/Logistics) (February 15, 2017).

<sup>45</sup> See more at Šamanović, J.: Logistics and Distribution Systems, Faculty of Economics, University of Split, Split, 1999 p. 13.



## 2. CONCEPT - DEFINITIONS OF LOGISTICS

*Amateurs talk about strategy, professionals about logistics. (Colin Pauwel<sup>46</sup>)*

According to one view<sup>47</sup>, the logistics first appeared in 1670 in the military documents of King Louis XIV of France. (1638-1755) on the importance of supplying military troops on the battlefield with the necessary material resources and food, or their armament, equipping and food, and transport support in their shifting from one position to another. Thanks to the development of information technology, military logistics reached very high reach during the Korean and Vietnamese war.

This has attracted the attention of scientists and businessmen who have dealt with management problems and they are trying to apply logistics to production and the market. Military logistics is based on political-military criteria, accommodation and supply of the army, while economic, technical, legal and similar criteria apply to business logistics. Unlike military logistics, which relates to activities related to transportation and accommodation of military goods and troops, and maintenance of equipment, business logistics relates only to activities related to the movement of goods, but the maintenance of facilities and equipment is not included in logistic activities.

The abovementioned author Abidin Deljanin, in the same place, argues that logistics is a multifaceted term and is used in various areas, primarily in economic science and practice, transferred from military terminology. Although there are many definitions, nowadays, logistics is usually understood as managing flows and storing material, or all activities in relocating raw materials, intermediate products, intermediate goods and finished

products from the first producer to the end consumer. The Council of Europe defines logistics as the management of goods and raw materials flows, processes of production of finished products and associated information from the point of origin to the point of final use in accordance with the needs of the buyer. The author also introduces a new aspect, arguing that in a wider sense logistics involves the return and disposal of waste materials.

In modern conditions, logistics is most often used to indicate business functions and scientific discipline that deals with the coordination of all movements of materials, products, and goods in physical, informational and organizational terms through the circular process of procurement, through production and sales to consumers. In this regard, it is said that logistics as a science represents a set of multidisciplinary and interdisciplinary knowledge that studies and applies the principles of planning, organizing, managing and controlling the flows of materials, faces, energy and information in systems, seeks to find methods for optimizing these flows in order to achieve positive economic effects (profits), while logistics as a business function encompasses all the activities necessary for the complex preparation and realization of spatial and temporal transformation of goods and knowledge.

In fact, with the use of human resources and resources in systems, logistics is trying to satisfy the consumer's researched interests, with emphasis being always put on cost and optimization, and in order to increase profitability. In his online attachment on logistics and freight forwarding, Velibor Peulic<sup>48</sup> claims that logistics had only had a breakthrough in all economic activities in the early 19th century in order to rationalize production, trade, warehousing, transport, distribution, supplying consumers and

<sup>46</sup> Retired US Army and former US Secretary of State

<sup>47</sup> See more on Logistics - meaning, definitions and concepts. Available at <http://www.logisticmagazin.com/?p=442> (March 22, 2017).

<sup>48</sup> Peulic, V.: Logistics and Forwarding, Pan-European University Apeiron, Banja Luka, 2016. Available at <http://www.apeiron.uni.eu/lycboardclient/Detail.aspx?DocumentID29822> (March 14, 2017).

users to various products. In the same place, the author also lists several interesting definitions of logistics (paraphrased):

■ American Logistics Management Council: Logistics is the process of planning, applying and controlling efficient and effective flow (and storage) of raw materials, production processes, finished products, services and related information, from place of origin to place of consumption (including input and output outgoing and internal and external developments) in order to adapt to the demands of consumers.

■ European Logistics Association: Logistics is the organization, planning, implementation and control of flows of goods from development and from purchasing (from place of origin to place of sale) through production and distribution to the end customer with the aim to minimize costs and minimize capital expenditure (minimum investments) satisfy market demands.

The Logistics International is defined in a somewhat narrower sense from the point of view of engineering application, and it is said that it is the skill and management, engineering and technical activities related to technical requirements, design and development, supply and provision of resources for maintenance of technical material assets, with the aim of providing effective support to plans and operations. In other words, the difference between military and economic logistics is primarily reflected in their goal: military logistics has a strategic and political goal, while economic logistics has an economic and economic goal. The above-quoted author lists some more in the literature of categorized definitions and logistical observations (paraphrased):

■ Logistics is a strategic process by which the company organizes and supports its activity.

■ Logistics is the management of all

activities that contribute to product circulation and coordination of supply and demand. ■ Logistics is the management of the physical distribution of materials and products, or the external movement of products from producers to consumers, including information that serves the successful performance of all the activities it deals with.

■ Logistics includes activities that manage product flows and resource and market coordination, achieving the necessary level of services with the lowest cost.

■ Logistics includes all the activities through which the spatial and temporal transformation of goods, its quantity and structure takes place.

Transformations from the last definition make the logistic determinant of the overall flow of goods that is planned, managed, realized and controlled. All activities should be mutually harmonized to ensure an efficient flow of goods from the place of dispatch to the place of reception. Paraphrasing the previous Peulić's statement on the transformation from his last definition, Abidin Deljanin<sup>49</sup> notes that joint activities of these activities also trigger the flows of goods that effectively connect the point of delivery and the point of receipt. In addition to the already presented definitions from other sources, in his Deljanin he presents the often cited definition of Hans-Christian Pfohl<sup>50</sup>, who says that logistics covers all the activities that plan, manage, realize and control spatial-temporal transformation of goods in relation to their quantity, type and character, handling, and logistic determination.

Also, the British Logistics Institute defines logistics as a time positioning of resources within the supply chain, while the US Council (Advice, Board) for Logistic

<sup>49</sup> See more at Deljanin, A.: The Logistics in Transport and Communication (Part I and Part II), Faculty of Transport and Communications, University of Sarajevo, Sarajevo, 2009. Available at

<http://web.efzg.hr/while/market/lectures/plbj11-12.pdf> (March 16, 2017).

<sup>50</sup> A distinguished German scientist, theoretician and author in the field of logistics.

Management (CLMa<sup>51</sup>) is defined as a process of planning, production, control, more efficient and effective flow and storage of goods and information from sources to the place of use for the purpose of satisfying the consumer. During the late 70s and early 80s of the 20th century, the need for the integration of functional areas within the company appeared in the world. Supply chain management extends the concept of functional integration from one company to all participants in the supply chain, creating the notion of integration in the 1990s.

Observed in a broader sense, the above-quoted author Deljanin also states the following definition: Logistics is a system of activities that enable the design, design, direction, introduction and regulation of the flow of goods (materials, products), energy and information within and between systems. From the aspect of the movement of goods, logistics can be defined as a set of all activities through which design, design, management and control of procedures in the field of manipulation, storage and transport of goods are carried out in a particular system.

Thus, logistics involves controlling logistics activities in accordance with the plan or strategy, and attention must be focused on two interdependent basic activities, namely: movement (denotes flows of input materials from the supplier to the production process in the company and the flows of finished products to the user, which relates on the selection and use of transport modes based on certain criteria to be analyzed) and storage (the input materials are stored before processing, process materials in the intermediate stages, and the finished products are dispatched to the user, which is related to determining the number, size, design, type and location of the warehouse and the definition of other stock-related problems).

The below quoted and unauthorized Internet attachment<sup>52</sup> is the fact that in the context of the Logistics concept, many terms are used (their number varies between different managerial specialties, especially between researchers in the field of logistics and marketing, and are usually dealt with the following syntagms: industrial logistics, marketing logistics, business logistics, technical logistics, distribution management, supply chain management, logistics management, material management, and the like.

Also, several pubertified definitions of logistics are stated, as follows: Logistics deals with the acquisition of space and time with the least cost; it is the process of strategic management of the procurement, movement and storage of materials and finished goods through the organization and its marketing channels, and in the most cost-effective, most appropriate and profitable way for the company and the buyer; and it includes all business functions and scientific disciplines that deal with the coordination of physical, informational and organizational movement of materials, products, goods.

From the above text, it can be concluded that there is no universal definition of logistics, but from the above-presented definitions, it is clear that logistics business is easiest to describe as supply chain management (SCM<sup>53</sup>), that is, it can include all the activities required to deliver the goods our supplier to our customer. As a rule, these activities should not include the activities of finding a supplier and contracting the prices and quantity of goods we order, as well as the activity of selling goods to customers, but should be done through other parts of the company's organizational structure (procurement department and sales department). Simply put, in economic activities, logistics is a set of activities for successful business process

<sup>51</sup> Acronym of the Council of Logistics Management.

<sup>52</sup> Logistics Definitions, 2008. Available at <http://bestlogistika.blogspot.hr/2008/07/definicijelogistike.html> (March 25, 2017).

<sup>53</sup> Acronym of Supply Chain Management.

management and business goals.<sup>54</sup> However, in order to determine the general definition of logistics, its basic tasks and goals must be emphasized, and they are different nowadays than before. As the main task of logistics is to manage material and related information within the supply chain, and the main goals of cost optimization and the fulfillment of user requirements, it is worthwhile to analyze the already cited definition of logistics by the American Council (councils, committees) for logistical management that outlines efficiency and effectiveness flow of raw materials, semi-finished products and finished products from the source point to the point of consumption for the purpose of satisfying the customers' requests.

When it comes to efficiency, we can say that this is a general concept that can be defined by the relationship of two components: the values of the system characteristics and the value of the spent resources. Also, efficiency explains the relationship between the system and the environment, so it can be talked about internal (internal) and external (external) efficiency. On the other hand, effectiveness is an efficiency-related concept, but primarily refers to external (external) efficiency. By defining this distinction, Peter F. Drucker<sup>55</sup> says efficiency means to do things in the right way, and effectiveness means to do the right thing (hence, the system can be internal, but not necessarily, and externally efficient, that is, it has an effect).

Accordingly, an efficient logistics system (efficient logistics) is a successful (efficient) system that works in the best possible way and with the least losses, while the effective logistic system

(effective logistics) is adequate in fulfilling the purpose, that is, the one that achieves the intended or expected result. Efficiency can be defined as the level of resources used, which can be linked to cost, and effectiveness as a goal of achieving goals, which implies the realization of the optimality of several parameters related to the fulfillment of user requirements, and hence the logistic system should aim at achieving the optimal level of fulfillment of user requirements in relation on costs (effective) and reduction of logistics costs (efficient).

In the magazine *Industrija*<sup>56</sup>, logistics is defined as the process of managing transport, stockpiles, storage and information on goods and materials from the source (place of production) to the place of final consumption, as well as the activity that deals with space and time mastering at the lowest cost, and involves transport, stocks, storage and information, as four subsystems of logistics or logistics management. Lately, due to technological development, in particular the information and communication industry, there has been a significant change in the approach and application of logistical aspects lately. Indeed, due to the complexity of the whole area, it is better to talk about the supply chain and its management, because it is more comprehensive and broader than the concept of logistics.

John W. Langford<sup>57</sup> says that logistics uses quantitative methods of engineering and analysis to incorporate logistic assumptions into product design, its development, production and functioning, but is at the same time a kind of art because it integrates human experience, intuition and creative judgment, while Sandra Renko<sup>58</sup>, defining

<sup>54</sup> See more at Logistics. Available at <https://www.fsb.unizg.hr/zindin/LOGISTIKA.pdf> (February 13, 2017).

<sup>55</sup> A renowned American scientist and prolific author in the field of management and entrepreneurship (1909-2005).

<sup>56</sup> Logistics - Some questions of theory and practice: in the journal *Industrija* (publisher: IndMedia, Belgrade), number 36, February 2012. Year VII. pp. 27 -32. Available at:

<http://www.industrija.rs/images/.../casopis/Industrija.36.pdf> (February 13, 2017). 165

<sup>57</sup> Langford, J.W. : Logistics: Principles and Applications, McGraw-Hill, 1995. p. 35.

<sup>58</sup> Renko, S. : The concept and history of business logistics (PowerPoint presentations for lectures), Faculty of Economics, University of Zagreb. Available at <http://web.efzg.hr/doc/TRG/1.nastavna.celina.pdf> (April 10, 2017).

the objective of business logistics (to connect the place of the source of goods more effectively with the point of its delivery to consumers), paraphrasing the definition of CLM<sup>59</sup> from 1991, and says: Logistics is the process of planning, implementation and verification of the success of the actual flow and storage of goods, services and relevant information from the place departure to the place of consumption, all in accordance with the requirements of customers.<sup>60</sup>

Josip Šamanović<sup>61</sup> says that business logistics presupposes the skill and experience in assessing all the elements necessary for making optimal strategic and tactical decisions and assuming a systemic approach to managing and controlling the physical flow of material assets and the necessary information that the company sends to the market and from the market. In the quoted script<sup>62</sup> it is claimed that from the beginning of civilization development to the present there is a geographical dislocation of the seller and the insurer, which causes the need to move goods, and this is what allows the logistics activities. So logistics is also a very old and very new area of business, underneath it when it was implied. In the same source, it is noted that certain definitions can enable a more complete understanding of the nature and importance of logistics. Therefore, any definition that corresponds to the given business situation can be used. On the other hand, while attempting to define business logistics, two Osijek authors<sup>63</sup> simply say that it implies the totality of activities in setting up, securing and improving the availability of all persons and assets, which are a prerequisite, auxiliary assistance or insurance for flows within the system.

In many places and in many versions, the definition is 7R or 7P (Right = Right), which is sometimes said to be a layman's description of logistics, and paraphrased as follows: To ensure the availability of the right product, in the right quantity, in the right state, in the right place the right time, for the right buyer, at the right price and at a minimum cost. This definition contains the most important logistical activities, since it emphasizes the spatial and temporal dimension (place, time, movement and storage) and provides a thorough understanding of the logistics area, and emphasizes price and service, as logistics managers have to continuously evaluate the costs and level of services, necessary changes in the logistics system.

In addition, this definition highlights another very important aspect, ie emphasizes the importance of satisfying the needs of consumers. Consumer focus is essentially logistics, as logistics plays an important role in meeting consumer demand. An additional element of the definition of quality is the idea that the company must perform the right task at the right time or the real task in the competitive market. The importance of quality in the production of products, as well as in other areas of company's activity, and especially in the field of logistics, is noticed.

Logistics can also be defined as efficient management and as an effective control of stocks (raw materials, semi-finished goods and ready-made goods) in their movement or retention in plants. This simpler definition suggests that supplies are the essence of logistics, because they are important when they are at rest and when moving. The costs of providing services to customers are also significant. Breaking

<sup>59</sup> The acronym of the Council of Logistics Management (American Council of Logistics Management).

<sup>60</sup> Transferred from Brčić-Stipčević, V.: The importance of logistics in the improvement of sales, *Modern Trade*, Vol. 21. br. 3/1994. p. 58.

<sup>61</sup> Šamanović, J.: *Logistics and Distribution Systems*, Faculty of Economics, University of Split, Split, 1999 p. 13.14.

<sup>62</sup> See more in *Business Administration (script)*, Faculty of Engineering, Zrenjanin, University of Novi Sad, 2014 p. 4.-10. Available at [http://www.tfzr.uns.ac.rs/Content/files/1/Skripta-POSLOVNA\\_ADMINISTRACIJA.doc](http://www.tfzr.uns.ac.rs/Content/files/1/Skripta-POSLOVNA_ADMINISTRACIJA.doc) (March 11, 2017).

<sup>63</sup> Transferred from Segetli, Z. and Lamza-Maronić, M.: *Distribution system of trading companies*, Faculty of Economics, University J.J.Š. Osijek, Osijek, 1995. p. 80.



this simpler definition requires serious discussion and analysis. Flow and storage of materials (in the logistics channels) from the seller to the consumer provides perspective logistics. Therefore, raw materials, semi-finished products and finished products must be driven to different distances between suppliers, factories (warehouses) and markets (consumers), and the company must arrange these goods and secure them in quantities that are sufficient for its anticipated needs.

Transport decisions affect storage (for example, a slower and less reliable way of transportation usually requires holding large stocks), and the number and location of the warehouse affect the size of the delivery and the available modes of transport. The CLM definition contains a number of logistics activities. However, it does not provide an overview of the specific activities of the logistics system. However, the definition emphasizes the managerial nature of logistics (planning, implementation and control) and emphasizes its main role in meeting customer demands, as the market is increasingly compelling companies to pay special attention to delivering services to consumers.

Ronald H. Ballou<sup>64</sup> similarly defines business logistics as planning, organizing and controlling all activities that allow the product to move from the place where raw materials are purchased to final consumption, as well as the movement of the accompanying information. In the same source, the author claims that a successful logistics management company requires careful coordination and movement and storage activities. It also requires the possession of knowledge and interest in related areas, such as handling materials and industrial packaging. These two areas between warehouse and transport deserve special attention. For example, the size and

type of packaging affect the use of transport equipment (stacking of goods for more complete utilization of vehicle load) and storage space, as well as transfer of goods between transport equipment and warehouses.

As we have said, the definition of CLM clearly includes both internal and external movement of materials and products, and hence a unique material management concept (MM<sup>65</sup> 3) and physical distribution management (PDM<sup>66</sup>). This definition particularly emphasizes the movement and storage of goods from the source to the consumption, and shows that the company should include other areas, to carefully coordinate them in order to achieve the efficiency of the overall logistics system. Therefore, material management and physical distribution management are integral parts of logistic movement. Raw materials, parts, semi-products and other goods move to the company from external sources, and in the process of production they are transformed into finished products.

Hence, it can be concluded that material management is related to regulating the flow of goods up to the beginning of the production process, while managing physical distribution is linked to regulating the flow of finished products from the completion of the process of production through the warehouse to the consumer. In this regard, it is useful to compare the above presented logistics definitions, but before analyzing and analyzing the specifics of these definitions, all the above terms should be analyzed to indicate the different components of the physical movement process of goods (from suppliers through producers and intermediaries to the end consumer).

Also, different author's views on this process should be analyzed. The analysis of the reason for the use and the differences

<sup>64</sup> See more in Ballou, Ronald H. : The evolution and future logistics and supply chain management, *European Business Review*, 19 (4), p. 332.-348. Available at <http://www.emeraldinsight.com> (April 12, 2017).

<sup>65</sup> Acronym of Materials Management.

<sup>66</sup> Acronym from Physical Distribution Management

between the individual terms and the guidance of the authors, who and when they formulated, would in theory have been virtually useless at this time. It is important to know that the terms mentioned refer to the description of certain physical flows of raw materials, semi-finished products, finished products, services and information, both in one and between several companies. From the above definitions it is evident that in us and in the world there is a different understanding and interpretation of the very concept of logistics. In general, we can say that the term has two meanings. First, this term refers to the scientific discipline, and secondly, the specific function in organizational systems of support for improving the efficiency of these systems is indicated.

### 3. CONCLUSION

Logistics is a combination of science and art. (John W. Langford<sup>67</sup>)

In economic literature, business logistics came to the market five decades ago, under different names such as distribution logistics, logistics logistics, industrial logistics, marketing logistics, distribution engineering, procurement logistics, distribution logistics, and the like. Many experts in this field interpret different terms differently, and often replace them. Most of them under any of the above concepts include a set of activities that relate to relocation of work items and information in the process of reproduction, that is, a system of management and insight into the flows of work items from their source to the users, that is, from the supply of raw materials to the delivery of finished products.

The application of logistics in various forms of human activity also caused its differentiation, so, apart from military and technical, the business logistics developed

in this paper, and we attempted to give an annex to its definition. Some authors opt for the term logistics, whether it is used as business logistics, logistics management, integral logistics management, logistics management, or somehow similar, and can in large part be considered synonyms, which, in my view, is apparent from of this article, we were not the very first to agree. However, it should be noted that the terms of material management and physical distribution describe a subset of activities within the logistics function itself.

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## THE USE OF METAL-CONTAINING POLYMERS IN THE AUTOMOTIVE INDUSTRY

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**Abstract:** *Modern machine building requires expanding the range of wear-resistant materials possessing strong exploitation characteristics. In this respect, obtaining new polymer composite materials is of great interest. Such materials have been developed based on thermo resistant polyamide S-1 by means of introducing powder-like carbonyl nickel. The compositions were prepared by means of mixing the components within the rotating electromagnetic field. According to the obtained data, the characteristics of this system are defined by the filling degree. In this way the impact strength reaches its maximum at nickel content of 15 mass %. As for the hardness, compression strength and thermo physical properties of metal-containing polymers, they all grow with the increase of Ni content, which is provided for by good adhesion between the filler and the binder. The smallest wear in the conditions of dry friction is that of the composition material containing 15 mass % of carbonyl nickel. This system is more than eleven times as wear-resistant as pure S-1. With this regard, developed metal-polymers have been designed from metal-containing polymers for pivot knots and brake systems of ZIU, UMZ, Skoda trolleybuses instead of bronze. These have shown good performance and reliability at exploitation. Due to the proposed bushings dimensions, the entire range of sleeves repair can be solved and purchases of new ones can be reduced. Thus, given the reliability and work efficacy of the mentioned bushings, replacing the series parts of trolleybus friction knots made of alloys based on non-ferrous metals with the metal-containing polymers ones becomes profitable.*

**Keywords:** *polymers comprising a metal, thermal resistant polyamide, S-1, carbonyl nickel, trolley buses, ferrous metals*

## 1. Introduction

According to the data from Kostetsky [1], only 10 - 15% of machine and mechanism details go out of the machine due to insufficient strength, the rest - from the amount. In the work [2] also it is noted that 30% of all the aviary is made out of the amount, in this case, because of the abrasive amount they are 30%, because of the adhesion - 15, the stabilized - 15, the thermal stability - 12, the contact corrosion - 10, corrosion - 10, because of cavitation - 8%. It is evident that the increase in the amount of hard surfaces is an important scientific and production task. Nowadays she is in the forefront of the problem of increasing the reliability and longevity of modern technology [3, 4]. In connection with this, scientific interest represented the study of the influence of the regime of exploitation on the tribo technical characteristics of metalopolymers.

## 2. Objects and methods of research

Investigating the metalopolymers on the basis of the aromatic polyamide phenylene S-1 (TU 6-05-221-101-71) - one of the perspective thermostatic polymers, which is capable of working up to 533 K temperature and gives away only the best marks of arculated plastics. (PNK-2K10, GOST 9722-97), medi (PMS-1, GOST 4960-2009), aluminum (PA-1, GOST 6058-73), titanium (PTK-1 (2), TU 14-22-57-92) and bronze (BrO5C5S5, GOST 613-79). The degree of charge was 5-20%. %. The basic properties of press-pots are given in Table 1. Physico-mechanical properties were determined in accordance with GOSTs for plastmass, and tribological characteristics on the disk drive system according to the methodology described in [5].

Table 1. Basic properties of press costs

Символ	Цвет пресс-порошка	Плотность, кг/м <sup>3</sup>	Насыпная плотность, кг/м <sup>3</sup>	Температура плавления, К	Размер частиц, мкм
C-1	розовый	1350	200 – 300	543*	35 – 50
Ni	серый	8900	1200 и больше	1726	12 – 21
Cu	красный	8960	1250 – 2000	1356	33 – 57
Al	серебристо-белый	2699	960	934	129 – 172
Ti	серебристо-белый	4505	2850	1933	158 – 284
Br	золотистый	8800	3700 – 4700	1203 – 1373	43 – 90

\* Vika's Smudging Temperature

## 3. Results and their discussion

In the course of the investigations of the physico-mechanical properties of elaborated metalopolymers, it was found that a more plot structure is formed around the metallic particles, which is the result of the comparison of the scales calculated for the law of additivity and obtained experimentally hydrostatic method. This structure leads to the increase of the properties of metalopolymers by comparison with the non-charged polymer (see Table 2).

Table 2. Properties of metalopolymers containing 15 mass% of fillers

Свойства	C-1	Al	Br	Cu	Ti	Ni
Экспериментальная плотность, кг/м <sup>3</sup>	1350,0	1476,0	1549,0	1570,3	1518,2	1550,9
Расчетная плотность, кг/м <sup>3</sup>	1350,0	1459,4	1546,4	1546,9	1509,1	1546,8
Твердость, МПа	180	221	230	227	260	241
Предел текучести при сжатии, МПа	228,8	251,3	261,7	267	269	259,5
Предел пропорциональности при сжатии, МПа	152,6	187,5	200,8	210,0	203,0	212,8
Модуль упругости при сжатии, ГПа	2,75	3,31	3,06	2,99	3,35	3,10
Ударная вязкость, кДж/м <sup>2</sup>	30,8	34,8	14,1	13,2	35,6	42,0

The appearance of metal precursors in the polymer matrix leads to an increase in hardness to 23-45%, liquidity and proportionality regions at 11-18 and 23-39%, the Yung modulus at 11-25%. The introduction of Al, Ti, Ni increases the impact of the compositions, which is motivated by the better dissipation of the energy of the shock for the increase in the degree of crystallinity and the polarity of the polymer matrix. Tribological investigations of metalopolymers (Figure 1) are associated with decreasing the intensity of the amount with the increase in the content of the filler. At this, the intensity of the amount will reach its minimum content with a content of 15% by weight, which is explained by the greatness of the compositions. In the course of research it was established that changes in contact zone (see Figure 2) occur in the process of



thrusting under mechanical and thermal loads. If for the surface of the phenylon form, not a verified test for the amount, a characteristic globular structure, it is after the tests that the particles and the deformed zones are deformed, which can be considered as the micro-points of the capture. Their formation is due to the discrete contact of the contacting micro protrusions, which leads to their mechanical destruction under the influence of tangential force, with the exposure of the underlying layers.

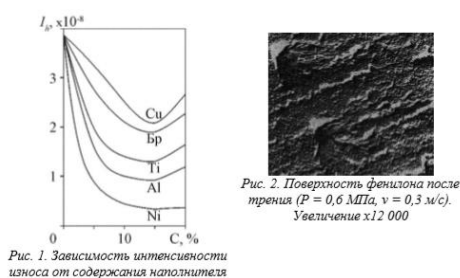


Рис. 1. Зависимость интенсивности износа от содержания наполнителя

The appearance of dispersed metal powders in a polyamide matrix strengthens the composite material and inhibits the development of deformation processes in the matrix during abrasion, which increases the wear resistance of metal polymers. On the other hand, an increase in the content of the metal filler reduces the temperature at the interface between the composite and the counter body, by increasing the thermal conductivity, which inhibits the development of destructive processes and, as a result, leads to an increase in the wear resistance of the systems. As a consequence, the friction surfaces of the metal polymers (see Figure 3) have a furrowed structure formed as a result of plowing. On the friction surfaces, there are no microcracks, which indicates the plastic destruction of the compositions. Also on the friction surfaces, traces of setting are seen in the form of areas of material displaced in the direction of friction, but they are much less common than in phenylon, and the higher the degree of filling, the less they become [6].

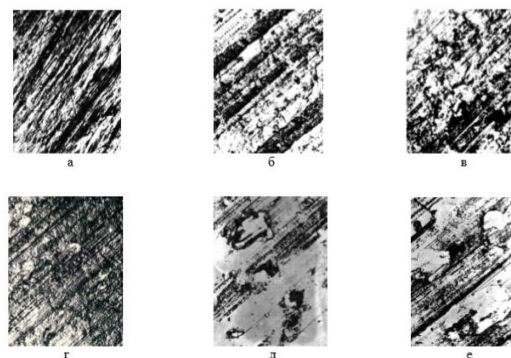


Fig. 3. Friction surfaces of phenylon (a) and metallopolymers based on it, containing 15 wt.% Ni (b), Br (c), Cu (g), Al (d), Ti (e) Given that the optimal tribological complex properties (minimum coefficient of friction and wear) have metal polymers containing 15 wt. % of the metal filler, further studies of the tribological properties of materials were carried out for metal polymers with the optimum content (Table 3).

From Table. 3 that the introduction of a finely dispersed powder of carbonyl nickel into the aromatic polyamide of phenol improves the wear resistance of phenylon by almost 11 times, and that of copper by 2.

Table 3. Tribological properties of metal polymers

Свойства	C-1	Al	Br	Cu	Ti	Ni
Интенсивность износа, $10^{-3}$	3,95	0,92	1,9	2,08	1,3	0,35
Коэффициент трения	0,52	0,35	0,27	0,39	0,25	0,43

Since the filling of the phenylon with metal particles provides good wear resistance to the polymer, the study of the effect of friction regimes on the properties of metal polymers was of scientific interest (see Fig. 4).

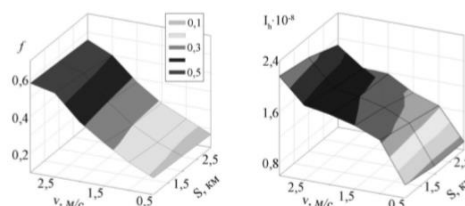


Fig. 4. The effect of operating conditions on the coefficient of friction ( $f$ ) and the wear rate ( $I_h$ ) of a metal polymer filled with 15 wt.% Ni at a load of 0.6 MPa

As can be seen from Fig. 4, at small and medium slip velocities, the friction coefficient remains practically unchanged, since in this case the friction is mainly due to local adhesion and shear in the transfer film regions.



In the process of wear, fine-dispersed wear products are formed, which are a fine powder, in color close to the original composition. These particles fill the micropaths on the surface of the counterbody, as a result of which friction is realized not by steel but by wear products. This indicates a pseudoelastic mechanism of abrasion, which ensures the longest service life of the interfaces and minimal growth of joint clearance [7].

The transfer of material from one surface of the sliding pair to the other can be regarded as an integral part of normal wear, at which adhesion at the interface between the MP and the counterpart decreases and, as a consequence, the frictional force decreases.

With an increase in the slip velocity, the interface can not reach a stationary temperature state, which leads to local destruction of the transfer lubricant film and an increase in adhesion, and as a result, the coefficient of friction increases [8].

As for the wear rate, an increase in sliding speed leads to an insignificant increase in the wear of metal polymers, which is due to an increase in adhesion. It is interesting to note that wear and friction coefficient decrease depending on the distance traveled, and this can be explained by an increase in the area of actual contact.

The positive results of laboratory studies of the wear resistance of the developed metal polymers in friction without lubrication made it possible to proceed to the pilot-industrial tests of metal-polymer pivot bushes in passenger electric transport.

In the design of trolleybuses of Ukrainian manufacture, the release of which was established as far back as 1993 - 1994. bronze parts were laid in many bearings and movable joints. The operation of these machines has recently become very expensive, as the increase in the deficit of bronze in the Ukrainian market and the depreciation of the national currency have led to an instant increase in its value. As you know, the friction units made of bronze

should work under good lubrication conditions, as they are not working in a dry environment.

The objects of research for the order of the Dnieper depot (Dnepropetrovsk) were the bushings of the kingpin of the front bridge (see Figure 5) of Ukrainian trolley buses (YMZ T-2) and Russian (ZiU-9) production. The introduction of research results should simplify maintenance and reduce the cost of parts.

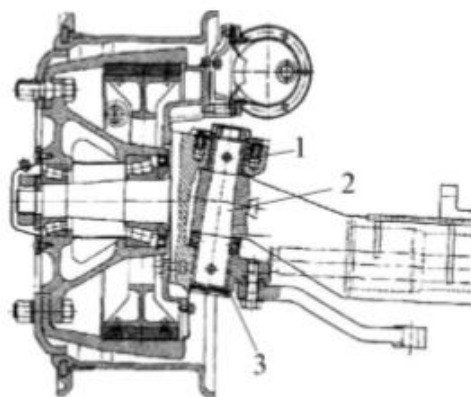


Fig. 5. The front axle of the trolleybus: 1 - the upper pivot sleeve, 2 - the pivot, 3 - the lower pivot sleeve

Analysis of technical maintenance of the rolling stock in the depot of the city of Dnipro noted the low quality and non-compliance of the technical staff with the service regulations. However, even with a high level of maintenance, the cost of the standard bronze bushings and their maintenance is too high for use in this type of transport. In the trolleybus depot number 1 there were cases when the kingpins were self-sharpened in a mechanical shop from pipes or a circular profile. This was a forced production step due to a lack of original spare parts and working capital. However, this did not solve the problem due to the discrepancy of the bronze brand with technical requirements. It should also be noted that the specialists of trolleybus depots used parts made of pure polyamide-6 instead of bronze parts, but it did not give any tangible positive results: they operated under limited lubrication conditions, but after 3200-3,500 kilometers they were required for replacement because of intensive wear. Using the results of

laboratory studies, it can be argued that in these sites, in order to reduce metal consumption and reduce the cost of maintenance, it makes sense to replace the bronze bushings on parts made of a polymer composite material based on aromatic polyamide phenyl-C-1 filled with finely dispersed carbonyl nickel. During the next on-line repair of the trolley buses, metal-polymer experimental parts were installed (see Table 4), which were subsequently operated under normal production conditions. Before testing, the parts were greased with grease. In the future, they did not lubricate. In the process of testing there was not a single failure of the experimental parts, the operation took place in accordance with the regulations.

Table 4. Characteristics of pivot bushes of trolleybuses

№	Марка троллейбуса	Размер, мм			Вес, кг		Количество
		D	d	h	МП	БрАЖ 9-4	
1	ЗИУ	60	46/48	50	0,08	0,38	40
2	ЮМЗ	60	46/48	70	0,10	0,53	24
3	Skoda	60	46/48	57	0,09	0,43	28

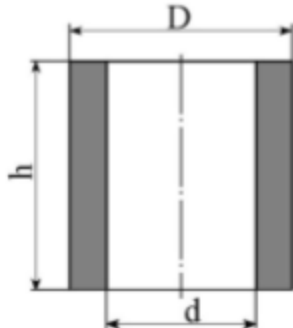


Fig. 6. Pivoting sleeve

According to the test report for the period from 11.04.2016 to 17.10.2016, the run of trolleybuses equipped with experimental details amounted to 21179-23298 km, which is 6 to 7 times the maximum permissible run of bronze bushes. On the day of the technical condition check, it is established that the experimental bushings have little wear: the loopholes in the pivots are insignificant and are within the permissible limits (i.e., less than 0.3 mm). In connection with the technical suitability for operation, the experimental bushings were left to continue testing.

Considering the considerable increase in the durability of metal-polymer pivot bushes, their introduction is able to ensure a saving in the working capital of trolleybus depot No. 1 by at least 2 times, although the cost of these bushings is 3.6 times more than bronze ones. It should be noted that thanks to the offered sizes of bushes it is possible to cover the whole range of repaired ones and to reduce purchases of new pivots. Parts to the repair size are machined using the usual machining methods. Thus, options are offered to replace the serial parts of friction units of trolleybuses from non-ferrous alloys to metal-polymer ones.

#### 4. Conclusions

In the course of research based on heat-resistant polyamide C-1, a number of new metallopolymers with an improved set of characteristics were obtained. It was found that the appearance of metallic fillers in the polymer matrix leads to an increase in hardness by 23-45%, yield strength and proportionality by  $11 \pm 18$  and  $23 \pm 39\%$ , and Young's modulus by  $11 \pm 25\%$ . The introduction of Al, Ti, Ni increases the toughness of the compositions. It was found that the least wear in conditions of friction without lubrication is characterized by a metal polymer containing 15 wt. % carbonyl nickel. Industrial tests proved the expediency of using metal-polymer bushes in passenger electric transport instead of bronze ones. It is shown that experimental bushings provide an increase in the range of electric transport in 6 - 7 times.

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## THE USE OF RFID TECHNOLOGIES IN PRODUCTION OF POSTAL SERVICE

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**Abstract:** *RFID is a technology that uses a technique of frequency radio waves to exchange data between the reader (eng. Reader) and a device called tag (eng. Transponder). Tag contains a silicon microchip and an antenna. The antenna emits radio waves and thus sends the data to the microchip that the reader through the entries in the computer. The transponder is on the production and the packaging contains a unique serial number. RFID - technology is mainly used for the identification of packaging products to be transported, stored or periodically enumerated and is a type of electronic 'smart packaging' (eng. Smart packaging). In order to approach the consideration of the application of RFID in traffic, it is necessary to first see how the system works, which are the basic elements of this technology, and the possibility of application in other systems. This paper presents the basics of RFID technology in terms of product identification in automated postal systems. These are the advantages of this technology as well as disadvantages, with particular emphasis on bar code technology that RFID system needs to succeed in the postal service.*

**Keywords:** *RFID, Technology, Post, Traffic, Shipment*

## 1. INTRODUCTION

The idea of introducing the postage stamp is attributed to Lovrenc Kosir, an Austrian clerk (of Slovenian origin) who in 1835 proposed to the Austrian Ministry of Trade the replacement of the postage payment system from the recipient of the shipment by collecting from the sender in order to spread the mail and the possibility of sending the shipment to a wider population.

The idea was also dealt with by James Chalmers, who three years later made the first draft of the postage stamp as we know it today. This proposal was rejected by the Austrian side for the idea to be supported by Sir Rowland Hill, in charge of England's postal reform, which issued the first postage stamp on May 1, 1840, called One Penny Black, which was released on May 6, 1840 (the curiosity is that there is a copy dated May 2, 1840). On the first postage stamp is a portrait of Queen Victoria on a black background and worth one pennies.

(The motto was selected from 1,100 proposals, and the graphic design was processed by Henry Corbald).

Today in BiH there are three post offices that issue stamps in the common currency of the Convertible Mark (KM) or BAM and which are valid throughout Bosnia and Herzegovina. In addition to BiH, there are several other countries in Europe and the world that have several post offices (Andorra, Australia, Cyprus, Great Britain, Denmark, Indonesia, China, France, Serbia, Croatia, Italy, etc.). The reasons for the issuance of different stamps and the existence of multiple post offices in these countries are multiple from geographic, political, historical, and many others. The reason for the existence of three post offices in B & H is the disintegration of Yugoslavia and the subsequent wars, which led to the need for contacts between the population, money transfer, etc., since postal items from Europe mostly came in private channels or through post offices of neighboring countries, with a mandatory indication of the entities. Another specific feature of postal traffic in some cities in BiH is the existence of two post offices less than a kilometer away in which two types of postage stamps can be purchased (Sarajevo, Vitez, Mostar, Novi Travnik, Gornji Vakuf, etc.). In the literature, such a case is mentioned in the United Arab Emirates and Oman in the border area. This specificity was reflected in the relatively high demand of Bosnian stamps in Europe, but also on the development of graphic design and original ideas that produced high quality stamps.

RFID technology is based on the transmission of data via radio frequency, that is, radio waves. RFID technology can be defined as a technology that combines the use of electromagnetic or electrostatic couplings in the radio frequency section of the electromagnetic spectrum to uniquely identify an object, an animal, or a person. The following definition states that RFID is a wireless data collection technology that uses electronic stickers to store data. RFID

technology is based on a system with three main components: RFID tag, reader, and RFID - a computer.

## 2.1. Elements of the RFID system

The basic element of the system is the RFID tag (label, label, pendant, metal tip) that can appear in the form of a label (whose size varies from the size of a miniature postmark to a large postcard) or some other object that is embedded in the product or fastens with it (the size also varies, and the smallest can be the size of the grain of the rice). In practice, the English name tag is retained for this device and will be used in this work as well. The tag consists of a silicon microchip (in which data memory is stored) and an antenna (which receives and transmits radio waves). These two basic elements are usually wrapped in an environmental impact resistant housing. Tag represents a technological innovation (unlike readers and computer systems that have already been used in other technologies - for example, a barcode, OCR, etc.) making it the most important element of the RFID system.

### 2.1.1. RFID tag

Each tag is primarily a bearer of information on which a whole set of information (related to the origin, composition, quantity of products, etc.) can be written that the same product uniquely identifies and differs from others. RFID tags or transponders allow "read" or "write" of data, so three types occur:

- Read Only (R) - allow only reading data from a tag that produces its unique serial number in the production process. Once stored information can not be changed;
- Write Once Read Many (WORM) - the user himself programs the transponder memory to his needs. The data can be written only for the first time, after which it remains stored permanently and can be read indefinitely;
- - Read / Write (R / W) - the user can write the information on the tag many times and also read. R / W tags are still much more

expensive than R tags.

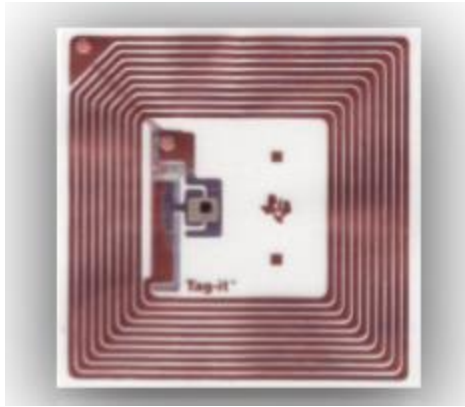


Figure 1. RFID tag

The most common division of tags is the one with regard to the independence of the power supply, because it is precisely this feature that most affects their ability to use on different products and in different conditions. There are three basic types of tags with regard to the type of power: - Passive tag - do not contain internal power supply, but the energy is received by the current electronic submersion in the antenna that arrives with the input radio frequency signal sent by the reader. They are smaller, lighter, cheaper than the active tag and have virtually unlimited life expectancy. The range of their communication ranges from a few millimeters up to 5 meters. Due to the relatively low price, they can be rejected together with the packaging after use (such as bar codes). The relatively small range and the possibility of storing smaller amounts of data are basic defects, which also include poorer resistance to electromagnetic noise in the environment; - Half-sized tag - contain a battery powered by a microchip, but for transmitting and receiving radio waves they use the energy sent by the reader;

- Active tag - contain a battery that serves for its own power supply (this results in a limited lifetime of up to a few years), which allows them to range up to several kilometers. The memory capacity is much higher, as is the frequency of the radio frequency

signal that provides improved performance in an environment of electromagnetic noise or other disturbing factors (humidity, metal). The disadvantages are primarily

related to the much higher price in relation to passive and semi-obscure tags (due to this fact, they are mostly used in marking and monitoring expensive products)

### 2.1.2. RFID reader

A device that is in the RFID system for communicating with tag transponders is called an RFID reader (reader, interrogator). After collecting data from one or more tags - this sends them to the computer, and in fact represents the connection between the tag and the information system. The readers contain an antenna for reading (a different form and function than tags) and a connection to a data processing system or a computer. Also, readers can also serve to write data to tags. Such a type of reader is most commonly used at the end of the conveyor belt at the factory or within a distribution center where initial or additional product data is recorded. Functions as well as reader techniques are evolving daily in the direction of faster and easier processing and data transfer.



Figure 2. RFID reader

### 2.1.3. RFID - computer

An indispensable part of every RFID system and an RFID computer, or more precisely a computer system. It consists of computer hardware and data processing software that connects the reader to the computer system. This software is also called RFID-middleware, which translated from English means a program or program



that works between the application and the network.

The software most commonly used in RFID systems is called Savant. Savant is a software developed by the Massachusetts Institute of Technology (MIT), with its Auto - ID Laboratory, covering many areas of application of RFID technology, especially in the supply chain management activities. The basic functions are the collection, storage and processing of information, and communication with other savants. It also corrects errors, eliminates double codes by two readers, and determines which information is preferred. It can also be programmed to achieve custom tasks for specific situations, for example, to automatically notify the warehouse that there is a minimum number of products on the shelf in the store as an alarm to supplement the shelf with new products.



Figure 3. Simplified RFID model of functioning

The goal of each RFID system is to simplify and quickly translate information about a single unique product into a digital form that enables the fastest processing of the same. Figure 3 shows a simplified RFID model of functioning - its elements and relationships among them. The RFID tag, located on or in the product, is irradiated by radio waves emitted by the reader and its antenna. Using your own antenna, the tag receives the signal converted into an electrical energy that allows it to function. At the same time, it sends the contents of its memory to the reader (product information). The reader can simultaneously read a large number of tags, abrasion and reader rate depending on the reader's ability and type of tag, and of course the size of the reader field reader field - tags outside the reader's field of coverage They receive radio waves and can not be read. The received information is converted into a digital form by the reader

and forwarded to the computer, i.e. computer system.

## 2.2. Benefits and benefits of the RFID postage stamp

Realization of the RFID Project Stamps should provide unimaginable advantages over the traditional and up-to-date practice of garbage collection, postage and Trace & Tracking shipments, and thus provide a number of benefits for postal and courier companies, but also for participants in postal traffic (physical, legal entities and state institutions).

The benefits and benefits of introducing the RFID Postage System are as follows:

- Increase in quality in distribution and deliver shipments through faster automated delivery flows.
- Measuring the quality of delivery of shipments, not on individual samples, but on the entire sample (all consignments), and therefore obtaining absolutely accurate data on the quality of delivery (more reliable quality coefficient)
- Monitoring the quality of delivery to the final recipient of the shipment through the measurement of speed and delivery efficiency, as well as the satisfaction of the users of the service (possibility of electronic measurements of user satisfaction through, for example, simple digital surviving systems).
- Setting up the Data Warehouse concept in delivery of the shipment, which will allow for a more quality and comprehensive study of the behavior of users of delivery services in order to influence their behavior, change awareness and routine in the use of individual services and create new delivery services and the related delivery industry.
- Creation of new services in delivery of the shipment and creation of new profit centers.
- Starting direct (targeted) marketing in the promotion or sale of services to end-users, with the possibility of selling databases on service users to other industry.
- Increase the reliability of receiving the consignment by the recipient.
- Technical update of plain shipments to a higher

priority ranking (in the ranking of recommended shipments, etc.).

- Increase the privacy of the shipment, as it is not necessary for them to have visually visible information about the sender and even the recipient of the shipment.

- This delivery system of shipments is an important link in the security systems of the fight against terrorism.

- Enabling the Trace & Tracking system for all shipments (and for ordinary shipments).

- The system itself, the Trace & Tracking system itself, allows the delivery system to be tuned up in terms of better routing of the shipment and, therefore, the acceleration of delivery.
- Reducing the cost of transferring and delivering shipments through a better organization of transport and delivery.
- Increase the security of delivery by reducing the problem of physical loss of the shipment.

- Significant progress in the concept of consumer protection in the use of mail delivery services or courier services.

- Setting up a "Personal Hybrid Mail" concept - which allows an automated mail delivery system (for example, large companies) to be sent without a mail or courier service. Users will be able to authorize their RFID Stamps through personal applications (mobile phones, tablets, etc.) and hand over them to delivery at standalone postal terminals.

- Facilitating and increasing the security of customs procedures in international shipments.

- Increasing the legal safety of the sender and the recipient in the delivery of shipments.

- Rapid materialization of goods in the hands of users in the processes of Internet commerce.

- Enormous benefits for the national service market regulator, as it obtains precise transport data and delivers shipments, so it can, in a much simpler way, control the market and participants on it.

- Placing all participants in the delivery of shipments under equal market and technical conditions - making better regulation in one national market.

- Enabling legal logistics to come to all logistics companies that also deal with the

transport and delivery of goods (goods) to known customers in wholesale or distribution of goods to retail.

- Regulation of the market through better collection of postage, taxes, taxes, customs and other charges in the process of delivery of shipments.

- Monitoring the transport of goods and shipments from the aspect of local taxes, duties and taxes.

- Better control of courier organizations and bringing them under a single cap of the national market, in order to prevent illegal channels for distribution of shipments.
- Introduction of licensing of postal, courier, delivery and transport organizations through the acceptance of such a unique system.

- Prevention of unfair competition between postal / courier and logistics / transport companies.

### 3. CONCLUSION

Today, practically in all postal administrations and large global courier companies, projects are being developed to implement RFID technology in improving and improving delivery of shipments. Obviously, RFID technology will be the future standard in postal mailboxing, especially considering the fact that this technology has a growing price tag for chips and associated RFID infrastructure equipment, which removes the last the barrier of its massive application. The use of RFID in the function of a postage stamp gives unimaginable advantages and benefits in the exploitation of postal traffic, which are reflected in the setting up of viable, economical, cheaper and safe postal services.

RFID in the function of the postage stamp ensures that the continuous concept of quality monitoring in the provision of services not on the sample (as before) than on the overall traffic segment gets much more complete data not only on the overall quality of the service, but also on evaluating the service by monitoring the cost price in each segment delivery. Also, the reaction to the observed deviant phenomena or

omissions in the supply chain can be much faster and more comprehensive, which will lead not only to raising the quality of the service, but also to reducing the costs of exploitation.

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#### THE MISSION AND VISION AS THE BACKBONE OF STRATEGY DEVELOPMENT OF THE HIGHER EDUCATION INSTITUTIONS

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**Abstract:** *In short, the strategy is a way to achieve the objectives, so under the strategy it is usually considered long-term planning behaviour of some companies in order to achieve the set goals. It defines a way how to use individual resources to take advantage of creating desired effects. Otherwise, by strategic planning company tries to answer a five questions: where the company goes and what company wants to achieve, environment, how to get where company wants to go, what resources needs on this way and when you will achieve the desired goals? The strategy defines the area in which the company operates, the reasons for its existence, as well as sources of competitive advantage, distinctive abilities (competencies) arising from these advantages and the special position that the company will take. The term strategy is now used in various types of human activities and there are a number of different strategies, for example: entrepreneurial, marketing, business and other types of strategies of individual business functions and strategy development company in certain areas of activity (branches). In this paper we concentrated on some segments of the strategy of the university. Abstracting complex structure of such a strategy, the structure of this work, except the introduction, conclusion and references, includes general theoretical observation about the concept and character of the strategy and the elaboration of the concept and content of the mission and vision of higher education institutions as well as the underlying assumptions for the design of its development strategy.*

**Keywords:** *higher education institutions, strategy, mission, vision.*

## 1. Introduction

*By strategic planning, management determines future goals and tasks, decides on ways, deadlines and activities for their realization, and determines, directs and optimally uses resources. (Đuro Horvat and Davor Perkov)<sup>68</sup>*

The overall strategic goal of higher education of each community is to ensure the fulfillment of the needs of all subjects and users in higher education, integrate the higher education system into the international development directions, especially in the processes of implementation of the Bologna process in the member states of the European Union, which aims at the entire community as the ultimate goal of social reforms. By joining the EHEA<sup>69</sup> and the ERA<sup>70</sup> as an equal partner and part of a comprehensive system, equal social opportunities for all categories of students will be ensured and the level of public accountability of higher education to the general public will be increased.

By accepting the Bologna Declaration, it was assumed that the state would adjust its existing model and higher education system and incorporate all relevant subjects into the processes and activities initiated by it. Unfortunately, strategic directions or strategies for the development of higher education in some countries have not yet been adopted, and a very small number of local higher education institutions have their development strategies. Recognizing such an unsatisfactory condition, it is important to know that a significant impetus to the development of higher education can only give the harmonized efforts of the entire community, in particular all the relevant stakeholders (bodies) of the executive in charge of higher education.

In addition, it should be noted that education incorporates a segment of environmental protection, intensive economic development, social and cultural dimension, economic variability and prosperity, a sustainable lifestyle and building a future based on environmentally, economically, socially and culturally sustainable solutions. Education for sustainable development implies developing skills for life in a society that is changing in terms of solving problems and creative thinking, as well as developing interests and motivation for responsible behavior in order to achieve positive changes in society. Therefore, qualitative changes are needed to a single self-sustaining system, which requires adaptations in education that will be the consumers of services in due course and prepare.

These are the reasons why each HEI<sup>71</sup> should be structured as a strong, integrated, responsible and autonomous educational entity that will be able to guarantee a combination of resources and expertise for change. In that sense, the development strategy of the High School has to take into account changes in the environment that will have an impact on its modernization and strengthening, with the Bologna process, scientific and research and education policy, as well as the eventual accession to the member state's society European Union. In other words, the Bologna Process, as the Declaration of the Ministers of Education of the EU Countries in 1999, refers to the reform of the higher education system, highlighting the six objectives, which we will talk about later.

The development strategy of any HEI according to the goals and principles of the Bologna process can not be realized without support from the local community budget and from public funds, with clear

<sup>68</sup> All the quotations in the sub-headings and texts which sources are not listed in the footnotes, were transmitted from Kuvačić, N.: Anthology of our and world wisdom and stupidity (from antique polis to global village), Beretin, Split, 2013.

<sup>69</sup> The acronym of the European Higher Education Area (EHEA).

<sup>70</sup> Acronym of European Research Area.

<sup>71</sup> The acronym of the higher education institution.

responsibility for achievements, monitoring of efficiency and a precise system of evaluation of educational and scientific research activities. In addition, it is necessary to position the dominant resources in the economy and society in order to ensure mechanisms of mutual economic and educational interaction, while ensuring social, as well as ecological stability and / or sustainable development. Since the author and author of this paper have a lot of experience in strategic planning, in this paper we will discuss some of the assumptions of designing an effective strategy for the development of individual HEUs, primarily the mission, the vision we will be addressing here.

Otherwise, in addition to the above two assumptions, each SGS strategy must include an environmental analysis, a SWOT analysis, a quality assurance system, three priority strategic areas (usually education, resources and cooperation), an improvement plan (indicating indicators, bearers of individual activities and deadlines for fulfillment) and the projection of the implementation of the strategy (the development limits, general success indicators and projection of the implementation of the strategy should be stated). In connection with the implementation of the strategy, Zdenko Kopic cited three steps: analysis of strategic choice, choice of approach to implementation and immediate implementation of the strategy.<sup>72</sup>

However, in order for the formulated strategy to be successfully implemented, among other things, it is necessary to apply more appropriate instruments (programs, budgets, rules, procedures, etc.). In addition, the strategy should include the relevant strategic legal acts of the HEAD, and the responsible persons and expert bodies for the implementation of the HEI's strategy. In case of prior accreditation of the High School, it is necessary to list the

positive findings, the observed shortcomings and the recommendations for improvement, which were pointed out by the external evaluation committee. In accordance with this, the structure of this paper, besides this introduction, conclusions and the list of used sources, contains a general theoretical observation on the concept and importance of the strategy and the elaboration of the concept and content of the mission, the vision of the High School.

## 1. THE POINT AND THE IMPORTANCE OF THE STRATEGY

The strategy determines the company's long-term goals, the adoption of action directions, and the allocation of resources necessary to achieve those goals. (Alfred D. Chandler)

The term strategy is derived from the ancient Greek word *stratēgos*, which literally means guiding the army, in fact it is from Greek (*stratos* = army; *ago* = lead; *strategos* = military leader) derived synonym for war skills, ie military science based on the reciprocity of political, economic, and other factors devise plans for warfare. In a transmitted meaning (strategy), it is a synonym for cunning, mastery, cursing, prank, mud rolling, and the like. In different contexts, the term is used in economic science and entrepreneurship in general, especially in the field of management, in the form of different strategies. Over time, this original meaning goes beyond, and the term is used to denote actions aimed at achieving a specific planned goal.

The concepts of strategy and tactics are closely related, as both indicate the proper use of certain resources in time and space, where (very simplified) strategy refers to

<sup>72</sup> Klepić, Z.: Strategy and Strategic Planning, PowerPoint Presentation, 2015 Available at

[www.ef.svemo.ba/sites/default/files/nastavni-materijali/strategijski%20management.pdf](http://www.ef.svemo.ba/sites/default/files/nastavni-materijali/strategijski%20management.pdf) (January 12, 2017)



the goal, and tactics in the way how to achieve the set goal.<sup>73</sup>

Modern entrepreneurship operates in a complex and dynamic environment characterized by rapid, turbulent and unexpected changes. Complexity, dynamism, uncertainty and instability are the main features of today's business environment, which decisively influences the emergence of the so-organizational darwinism, according to which the survival and development of a company are linked to the ability of entrepreneurs or management to continuously monitor changes and adapt them, that is, quick and effective responses to all these influences.

The most common are different strategic responses, ie selection of the appropriate business strategy. Therefore, as a kind of business concept, the strategy is often referred to as the strategy of customization.<sup>74</sup>

At the metaphorical level, the observations of Sun Cua (544-496 before the new era) are particularly interesting, a mysterious Chinese warrior and philosopher. Just two and a half millennia ago he wrote the Art of War, an interesting book on strategy (warfare) and a good handbook for success. Contemporary Asian politicians and business people still study this work, just as the military men and businessmen there have been studying for centuries. Sun Cu wrote a lot of advice on strategy (warfare), and not just about strategy and not just about warfare, for example:

If your strategy is wise and comprehensive, your budgets will ensure victory even before you begin to fight; If your strategy is short-sighted, your budgets will not be of much benefit, and you will lose even before the fight has begun.<sup>75</sup>

In order to be effective in the implementation of strategies, it must be:

realistic (based on opportunities in the environment and on the company's advantages compared to competition), successful (the company must concentrate its limited resources and skills where the likelihood of success is greatest) and optimal is based on the company's capabilities and real goals). In several places in the literature, as transmitted in the previously quoted Internet source, it is noted that each company must choose its own strategy that is consistent with the goals and capabilities, so the most commonly used strategy is proposed:

- **Offensive strategy:** Its goal is to achieve leadership in the industry, so the company in the market has to offer something new, which can bring high profits, but it is high-risk;
- **Defensive strategy:** Its aim is to defend itself against competition and retain its existing market share and does not bring high profits;
- **Imitation strategy:** Its goal is to retain the second place (positions behind the leader in the branch) and presuppose copying the leader;
- **Subordinate strategy:** It is about different variants of the addictive strategy that results in the dependence of one subject on the other;
- **Traditional strategy:** It is a conservative strategy in which a company does not want to change the character of its product and / or service, but retains it in an old, but previously recognizable form; you
- **Opportunist strategy:** Its aim is to search for free space on the market (some market niches), where the company wants to insert and take advantage of the opportunities offered by the market.

Each strategy is based on mission and vision and represents the way, or the chosen directions of action to achieve the goals of the entire business activity of the entrepreneur. So, the strategy starts from the defined goals and points to the best

<sup>73</sup> Available at <https://en.wikipedia.org/wiki/Strategy> (January 20, 2017)

<sup>74</sup> Kuvačić, N. : Entrepreneurial Bible, Beretin, Split, 2005. p. 523

<sup>75</sup> See more at Sun Tzu (Cu): The Art of War, Misli, Zagreb, 1999.

ways to achieve goals that are consistent with market opportunities and available resources, which enables their rational and efficient combination. The strategy is a prerequisite for designing tactics, as a chosen way, or a combination of actions and means in implementing the strategy. The strategy requires a complex view of the situation and planning, while the tactic focuses on individual decisions. When a strategy is already made, it is relatively easy to make tactical decisions, with the goals of the business activities assumed here always in the focus.<sup>76</sup>

Subsequently, the quoted author notes that the tactic presupposes a selection of policy tasks that specify the principles, attitudes and criteria that guide decisions and actions in order to achieve the planned goals of overall business activity, and these goals are consistent with the strategy and tactics of the entrepreneur. Business policy is realized through permanent - operational activities, and within the framework of the set political principles. Finally, the plan is the result of the process of planning business activities for a specific planning period, and is a set of related and interconnected jobs that rationally realize all the business activities of an entrepreneur. The plan is a written document in which quantitatively and qualitatively precise and terminate the tasks and tasks of management in achieving the goals of the entrepreneur for a certain planning period.

In the literature we have a lot of classification strategies, so on the Internet, for example, we find a division into enterprise strategy, corporate strategy, business strategy and functional strategy.<sup>77</sup>

We also find in the literature a multitude of definitions of the strategy that allow for its more complete understanding. Thus, in the source cited in the first footnote, Igor Harry Ansoff concludes (paraphrasing) that the

strategy is a set of guidelines for management and management that detail the company's position, the directions in which it seeks to grow and change, the instruments it will use, the means with which it will perform on the market, the way in which they will shape their resources, the power they will try to exploit, and the weaknesses that they will endeavor to overcome. A broad understanding of the strategy resulted in a large number of texts, and for the purposes of this article from the same source we will provide some interesting author's definitions and observations on the various aspects of the concept of strategy:

- The strategy can not be realized without the appropriate organizational culture and organizational structure. (Richard M. Hodgetts)
- Organizing is nothing but a business function by which management creates the preconditions for achieving an already formed business strategy. (Đuro Horvat)
- You need to create a strategy that will lead to your goal! (Jan Carlzon)
- Strategy is the unity of the goal and action plan. (Tihomir Luković)
- The strategy determines the company's sketch to be painted in plans. (Nicolo Berac)
- Success is built on a clear strategy and on a capable leadership, so the company must bring a clear and concrete strategy for future development with clearly stated priorities. (Velimir Srića)
- You can accomplish most of the things you want if you devise the right strategy, do the right job and cling to the heels of the hips. (Armand Mammer)
- The strategy is to determine the company's fundamental long-term goals, adjust the direction of business activities, or determine the concepts and choice of resources needed to achieve the set goals. (Alfred Chandler)
- The strategy is to determine the company's fundamental long-term goals, adopt the directions of actions and allocate

<sup>76</sup> Kuvačić, N. : Entrepreneurial Bible, Beretin, Split, 2005. p. 304.-306.

<sup>77</sup> See more at [https://hr.wikipedia.org/wiki/Strategija\\_u\\_ekonomiji](https://hr.wikipedia.org/wiki/Strategija_u_ekonomiji) (January 20th, 2017)

the resources necessary for their realization. (Harold Koontz and Heinz Weichrich)

■ There are strategies in which tomorrow's competitive advantages are created faster than competitors can copy the competitive advantages that you have today. (Gary Hamel)

Regarding the place of the strategy in the management process, one should know that the mission answers the question of why we exist, the basic principles answer the question we believe in, the vision answers the question of what we want to become, and the strategy must offer a plan (focus) of the action, initiative to do, personal goals (what should I do) and how to implement it. In addition, implementation must result in values for the owner, customer values, efficient processes, and motivated and satisfied employees.<sup>78</sup> According to Zdenko Klepic<sup>79</sup>, each strategy consists of four basic components (scope - area of activity, resource allocation, specific competences - what distinguishes it from competition and synergy), and it must (adapted) to answer questions about:

- How to adapt to changing environmental conditions;
- How to allocate resources;
- How to apply where a company is trying to meet the needs of customers;
- How to position a company, its product or service in relation to the competition;
- How to avoid market competition difficulties; you
- How to identify actions and approaches that strengthen each functional and operational part of the company?

## 2. MISSION of HEI

The mission is a means by which the strategy is transferred to the hearts and minds of managers and employees, bearing

in mind that human resources are the main source of competitiveness. (Nicolo Berac)

Strategy HEI's, like any other, based on its mission and vision, where one should know that the mission is the purpose of HEI's and what it is trying to achieve (principles of action), while vision offers a view of orientation, purpose and effect, or what the company could become (a desirable future). A well-defined mission is the basis for the implementation of goals, strategies and plans and must include the reason for the HEIs to exist. There are five fundamental questions for reconsideration of the mission (tailor made: by which the work of the Higher School of Arts is concerned, who are the customers of its services and what is their value, what are the possibilities of the High School, which should be the future work of the High School, and what is the content the mission of the High School for Peace), and five are the key elements of the mission's content:<sup>80</sup>

1. The development of HEI-s (the mission due to its history and traditions);
2. Current preferences of managers and owners of high schools;
3. The environment in which the third-HEI and exists;
4. Means which has a HEI; you
5. Specific qualifications HEI-s.

The European Higher Education Strategy highlights the fact that the beginning of the third millennium in science marked the transition from the theoretical and methodological to the preparation of strategic programs and projects of scientific and research development. In the EHEA and the ERA, there are ambiguities in the rationality of approaching and managing organizational efficiency and the achievement of scientific and professional thought on the principles of quality development. Reproductive and repetitive knowledge is opposed to innovative

<sup>78</sup> See more in Group of authors: Strategy, definition, modalities, levels, PowerPoint presentation, 2011. Available at [www.ef.uns.ac.rs/.../2011-03-21-strategija-poja-m-modaliteti-nivo](http://www.ef.uns.ac.rs/.../2011-03-21-strategija-poja-m-modaliteti-nivo) (28 January 2017)

<sup>79</sup> Klepic, Z.: Strategy and Strategic Planning, PowerPoint Presentation, 2015 Available at [www.ef.svemo.ba/sites/default/files/nastavnimaterijali/strategijski%20management.pdf](http://www.ef.svemo.ba/sites/default/files/nastavnimaterijali/strategijski%20management.pdf) (January 12, 2017)

<sup>80</sup> See more in Klepic, Z.: Same.

knowledge and skills. How to sell human energy formed in education programs is a fundamental issue of education management. Starting from such thinking, the mission of the High School will be based on the tasks set forth in the current legal framework of the domicile community, with the aim of integrating all of its organizational units and ensuring their unity and concerted action.

It should be especially emphasized that the HEU makes strategic and development decisions on academic issues and profiling scientific research, financial operations and legal transactions, investments and development plans, as well as on external partners in scientific activities of higher education and on the continuous enabling of internal and external mobility of students, on the rational use of intellectual and material capital, on development of multidisciplinary studies, on the supervision and continuous growth of quality, competitiveness and international competitiveness of teaching, scientific and professional work, and the like. In addition to other organizational units, it is necessary to include in the mission an exhaustive list and briefly elaborate all the areas of academic activity of the Higher School of Arts, and in the context of the six objectives of the Bologna Declaration, as follows:

1. Acceptance of a system of easily identifiable and comparable degrees (levels) by the introduction of the Diploma Supplement, in order to encourage employment and increase the international competitiveness of the European higher education system;
2. Acceptance of the system from two main cycles, undergraduate and graduate (in variants of 3 + 2 or 4 + 1), after which a three year doctoral study is possible;
3. The introduction of the ECTS211 score system as the means of implementing the broadest exchange of students (HEIs can also recognize points achieved beyond university education, including life long learning);
4. Enhancing mobility, enabling students to study and access the study and services, and

teachers, researchers and other staff are recognized and valued research, lectures or learning in Europe without prejudice to their statutory rights;

5. Enhancing European cooperation in quality assurance, with the aim of developing comparable criteria and methodologies; you

6. Enhancing the necessary European dimension in higher education, in particular in curriculum development, in inter-institutional cooperation, in mobility schemes in integrated programs, studies, training and research.

Therefore, it should be emphasized, for example, that on all study programs in module 3 + 2 students usually listen to and take a total of 39 courses - courses (by years: 10 + 10 + 7 + 8 + 4), and in module 4 + 1 they usually listen and have 41 subjects (by years: 10 + 10 + 8 + 8 + 5), after completing a three-year undergraduate study, students write and defend the final work, and after a four-year study they write and defend the thesis, after completion of the second, master's cycle in the 3 + 2 or 4 + 1 variant), students write and defend the master's thesis, in the third, doctoral three-year cycle, students usually take 5 exams and write and defend the same number of seminar papers, and in the end write and defend the doctoral dissertation.

It should also be noted, for example, that all subjects in all studies are one-syllable, that they can be compulsory and optional, that the student's weekly workload in active summer and winter semester can not be less than 20 or more than 30 hours, and exercises are conducted according to modern teaching methods and techniques, with practical training of students and continuous monitoring of success during the duration of studies, that the system of improvement and quality assurance is implemented, that institutionalized evaluation of the quality of the study program and teaching process, in order to monitor and constantly improve quality .

In terms of linking to the ultimate goals, it can be noted that the High School will

educate a versatile, socially responsible and professional graduate capable of facing complex management problems of economic activity and establishing a constant growth of added value. Otherwise, the mission of each HEI must be consistent with the program's objectives, so that the mission and objectives must be reconsidered periodically and evaluate the complementarity of the study programs with the needs of the planning and development of the local and wider community. In addition to the aforementioned, such a designed mission assumes continuous improvement and improvement activities of the already initiated processes, so it is necessary to list the long-term expected and desired results of these activities in the following manner.

Regarding the results, the given space does not allow us to state and explain only some practical examples, because we had strategies in whose missions it was stated and in dozens of expected results, especially regarding the development of intellectual capital and scientific research competencies, the alignment of study programs with the needs of a gravitating economy, the development of modern knowledge and skills, and general and specific professional competencies of students, encouraging the internal and external mobility of teachers (scientists) and students, and cooperation with other institutions in the fields of education, science and economy in the country and the world; higher education, organization and implementation of lifelong education programs, enabling even more active engagement of students in all aspects of the life and work of the High School for the development of the freedom of creativity and the like.

### 3. Vision of HEI

The vision gives an answer to the question what the company wants to achieve in the future, directs the energy of employees in

the desired direction and represents the image of the company's ideal future.

The vision is derived from Latin (*visio* = phenomena, imagery, thought) as a synonym for the idea, or the idea of a future state or event. In the context of the HSE management, it signifies a picture of a future state, a mental picture of a possible and desirable future that is real, credible and attractive. The vision is a clear image of future events (the future), that is, the long-term desired result, within which the employees are free to identify and solve the problems that stand in the way of its realization. It also helps the management to see the position of the High School in the future and to start preparing for it. Vision is needed by all companies so that they can follow - they know the direction they need to go.<sup>81</sup>

In this context, the orientation, purpose and action should be briefly defined.

A. Orientation: Within this part, it should be emphasized, for example, that by planning and implementing teaching and research activities and other forms of work with students and other service users, the High School wants to build an image of an institution that will become a significant development factor at the local, regional and state level, and to constantly review the answers to questions related to the role of science and education in the development of society.

B. Purpose: Within this section, it should be emphasized, for example, that through active cooperation with economic resources, community development partnerships, involvement in ERA and EHEA and organization, HEIs will demonstrate their public responsibility and contribute to the overall transition into the knowledge society and that, as an organized educational institution, it will systematically encourage mobility and development of research career and continually enable the expression of the talent and entrepreneurial energy of each

<sup>81</sup> See more in Klepic, Z.: Strategy and Strategic Planning, PowerPoint Presentation, 2015 Available

at [www.ef.sve-mo.ba/sites/default/files/nastavnimaterijali/strategijski%20management.pdf](http://www.ef.sve-mo.ba/sites/default/files/nastavnimaterijali/strategijski%20management.pdf) (January 12, 2017 .)



individual (students, teachers and other employees).

Hence, the future development of the University will be based on professional and scientific research in areas that directly support the economic development of the local and wider community, and by increasing the efficiency of teaching and exchanging knowledge with other higher education institutions, with the engagement of guest professors, the needs of the local community for professionals from particular areas of business. For this purpose, further development of postgraduate studies with study groups will be encouraged for the establishment of sustainable socio-economic development.

C. Performance: Within this part, it should be emphasized, for example, that by assessing the results and analyzing the content of the study groups and by comparing it with competitive institutions, the HEAD will also conduct a continuous modernization of the teaching process. Thus, the existing theoretical knowledge will be transformed into creative practice as a guide for the manner of expression of each teacher, and will continually build relationships with institutions and institutions that give international legitimacy to this educational project, as well as relations with service users in the local community and region, to build internal structures according to requirements (Application of international standards in the quality system and environmental management and the adoption of European norms of evaluating the quality of education, educational process and research activity).

In order to achieve such a social role, it should be emphasized that the HSE, together with their partners, co-fund and continuously insist on transforming teaching practice in accordance with social needs and challenges of an uncertain future, intensifying teaching by applying the most contemporary pedagogical audiovisual methods and techniques in teaching processes, at the introduction innovation in

all forms of education and their undergoing constant qualitative and quantitative analysis, on enriching teaching activities with creative methodical activities of teachers, on transforming purely cognitive knowledge of students by mastering methods of research work, increasing the efficiency of all scientific, teaching and administrative-technical processes through modern organizational changes and education of employees in accordance with the recommendations of the World Declarations on Higher Education and on the improvement of the system of quality management of services according to the requirements of the users.

## CONCLUSION

As we have seen from the title, in this paper we concentrated on some segments of the HSE strategy and, by abstracting the complex structure of such a strategy, apart from the introduction of these conclusions and the list of sources used, we elaborated the general theoretical observation on the concept and significance of the strategy and the concrete aspects of the concepts and contents of the mission and vision of the HEI. In addition to the three assumptions we have dealt with, each HEI strategy must include an environmental analysis, a SWOT analysis, a quality assurance system, three priority strategic areas (usually education, resources, and collaboration), an improvement plan (indicating indicators, the bearers of individual activities and deadlines) and the projection of the implementation of the strategy (the development constraints, general success indicators and projection of the implementation of the strategy should be stated).

Paraphrasing a multitude of observations about different aspects of the concept of strategies, we can say that speed, simplicity and security is a new strategy for the future, with only two types of managers: fast and dead. The integration of people and jobs is a fundamental right strategy design, because it is not a long-term plan of action, but the development of a central idea

through changing times, and in real life, it is actually very simple: it is necessary to choose the main direction and move to a painful realization. If the strategy does not aim to build and maintain competitive advantage, it is unlikely that the company will successfully operate, and with the help of entrepreneurial and managerial knowledge, an entrepreneur must define goals and strategies for achieving and maintaining competitive advantages, and each strategy must be in the function of building competitive advantages that companies will ensure effective competition. Therefore, the strategy is the way to achieve the goals of the company, that is, a set of guidelines for which management will achieve the set goals.

However, in order for the formulated strategy to be successfully implemented, among other things, it is necessary to apply more appropriate instruments (programs, budgets, rules, procedures, etc.). In addition, the strategy should include the relevant strategic legal acts of the Supreme School, as well as responsible persons and expert bodies for its implementation. In case of prior accreditation of the High School, it is necessary to list the positive findings, the observed shortcomings and the recommendations for improvement, which were pointed out by the external evaluation committee. With regard to the implementation of the strategy in the literature, three steps are outlined in several places: analysis of strategic choice, choice of approach to implementation and direct implementation of the strategy. Mission and vision are two essential prerequisites for designing a successful HEI strategy. Otherwise, success requires a strong will of managers and employees, a concrete mission, a clear vision, a defined strategy, an action plan and a competent team. The mission defines philosophy as the basis for business policy (values, beliefs and leadership) and intentions as the basis for goals and strategies (activities that the company will undertake and implement).

The mission expresses the reason for the existence of a company and signifies its

basic function or task, and it is significantly different from the company to the company. Unlike the vision, which is focused on expressing the final state that is to be achieved in the future, the mission describes the values, aspirations and reasons for the existence of the company. The internet claims that vision is a necessary part of any strategy, as an irrational ambition of a company that is skipping barriers. Otherwise, the vision of the answer to the question what, the mission to the question why, and the strategy on the question of how to do what you want to do? Of course, everything is preceded by an environmental analysis, that is, the diagnosis of factors influencing the choice of strategy, which involves analyzing the general or social environment, analyzing the business environment or the environment of the task and analyzing the internal environment or internal analysis. This is based on the SWOT analysis (analysis of strengths, weaknesses, opportunities and threats) as a fundamental basis for the development of a global framework for strategic development and the positioning of the HEI.

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## REGIONAL COOPERATIONS OF THE WESTERN BALKANS AND THE INFLOW OF FOREIGN DIRECT INVESTMENTS

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**Abstract:** *The main precondition for successful economic development of every economy in modern conditions business, includes availability of sufficient financial resources which would funded a successful and sustained economic growth and development. Having in mind that the financial capital is very limited resource and that many countries do not have in sufficient quantities, they are forced to seek in the lack of foreign investment as the most favorable conditions financing of its economy. In the case that the amount of foreign investments is insufficient, concrete States are in that situation must manage in other ways that are always uncertain and generally, very expensive. Foreign direct investment is significant for each country because it affects its economic development, increasing employment, increasing exports and increasing the gross domestic product. In this sense, all Western Balkan countries are trying to attract as many foreign direct influences as possible. Is it Region an opportunity or a competitor to increase the inflow of foreign direct investment?!*

**Keywords:** *Foreign direct investment, economic growth, regional cooperation, financial capital, macroeconomic policy, competition, economic development*

### 1. INTRODUCTION

Foreign direct investment as a form of international capital movement is a contribution to a more efficient business of the economy, entering the international market, raising the living standards of the society. Foreign investment is a key development factor in the modern economy, along with trade, the most important means of doing business, organizing production, supplying goods and services on a global scale.

Interest in attracting foreign investment is shown by developing countries, transitional, and developed countries. Foreign direct investment has an impact on economic growth, and the effects depend on the shape of the investment and the investment environment. In the further explanation of the authors' intention is to emphasize the importance of the region in the increased inflow of foreign direct investments and the necessity of cooperation of the Region, in order for the Region and each country separately benefit from the increased inflow of foreign direct investment.

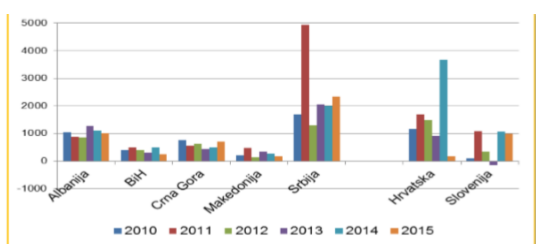
Also, in the continuation of the paper, an overview of the state of foreign direct investments is given to the regions of the Region, the largest investors by countries that come as well as the structure by sectors of economy in which foreign investors have placed capital and by the number of employment. The advantages of the region are highlighted and the reasons for cooperation in attracting foreign direct investment, as well as the place of Bosnia and Herzegovina in these processes.

### 2. SITUATION AND INDICATORS OF FOREIGN DIRECT INVESTMENTS IN THE REGION

At the present moment, the dynamics of the economic development of the Western Balkan region, including Bosnia and Herzegovina, is highly dependent on the inflow of foreign direct investments. The reasons for this lie in the fact that FDI create a number of direct benefits and have strong multiplier effects on the national economy, affecting the overall employment and income growth of employees, through corporate and indirect taxes, increasing the overall tax revenues of the state, facilitating

technological transfers and creating completely new sectors, and contribute to regional development. The countries of the Western Balkans have developed into interesting investment locations, especially due to the open prospect for EU membership. In previous years, some countries have made significant progress in increasing foreign direct investment inflows, while others remain far behind what will be discussed below with the graphs below.

Chart 1: DSI in the Western Balkans, 2010-2105, mil USD



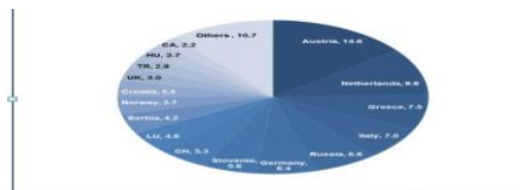
When we analyze this chart, we see that Serbia and Croatia's leaders are in the flow of foreign direct investment in the period 2010 - 2105. Year, and then Albania, which does not have large fluctuations in the inflow of foreign direct investment in this time period. Unfortunately, it is evident that Bosnia and Herzegovina, with Macedonia, has a very small inflow of foreign direct investments.

Chart 2: DSI in the Western Balkans in 2016



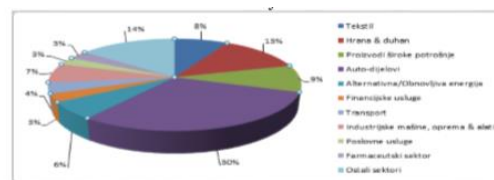
From the preliminary receipts of the inflow of foreign direct investments for 2016, the year is visible that the Republic of Serbia remains the leader in attracting FDI in the region, with close to two billion euros of foreign investments. The Republic of Croatia also increased the inflow of investments in 2106 as well as other countries of the region, excluding Bosnia and Herzegovina.

Chart 3: The country's top investors in the Western Balkans



From this chart, it is evident that the country that invests most in the Western Balkan region is Austria, with a share of 14.6%, followed by the Kingdom of the Netherlands, Greece, Russia, Slovenia and other EU countries. These indicators tell us that countries are investors in the Western Balkans, in fact, countries that are well aware of this region and have a historical connection with this part of Europe and recognize the resources and potentials of these countries in economic terms, regardless of all negative trends and image which the Western Balkans has in the world.

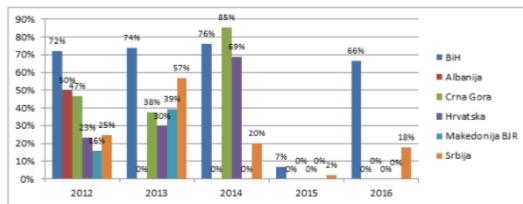
Chart 4: Foreign investment flows in South East Europe for the period 2011-2015. year after creating jobs



Unemployment in the countries of the Western Balkans is a very significant problem, so it is important to know which sector has opened up the most jobs thanks to direct foreign investments in the Region. From this chart, we see that the leading sector of car parts with as much as 30 percent of the share, followed by the food and tobacco sector, textile and consumer goods sectors. As all the countries in the Region were hit by the economic crisis, which also affected the increase unemployment, it can be said that regional cooperation is crucial to attract foreign direct investment and thus contribute to reducing unemployment.

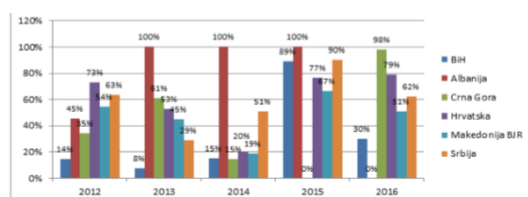
*Chart 5: The share of investments motivated by natural resources in the countries of the region (according to the value of the announced investments) in the period 2012-2016*

Source



This chart shows the motives of foreign investors when it comes to natural resources. Although the countries of the Western Balkans point out that their strengths and natural resources are at their disposal, it should be emphasized that in most countries of the region there is a trend of declining investments that are motivated by the availability of natural resources. Even more, it is evident that in addition to Bosnia and Herzegovina and Macedonia, such types of investments have not been recorded in other countries of the region in the last two years.

*Chart 6: The share of investments motivated by the conquest of new markets in the countries of the region (according to the value of the announced investments) in the period 2012-2016*



When considering investment in certain areas, foreign investors are also considering access to the market, and the availability and "conquest-specific markets" can be a strong motivation for investing. A review of the share of investments motivated by the acquisition of new markets in the countries of the Region according to the number of announced projects shows that Albania is the leading, while all other

countries have approximately the same representation of projects of this type in the overall structure according to the number of projects. Looking at each other, markets in the region are very small. Regional alliances are inevitability and a channel that can enable us to be the main players in big markets and, therefore, to make big foreign companies a worthy competitor. Without combining strength, quality and experience, other big players will overtake us Chart 7



The common problem of the Balkans is a slow and bulky bureaucracy, which makes the countries badly placed on the lists of competitiveness.

The goal of a stronger link is that standards and legal regulations are equal in all countries in order to be shared. From this chart we see how ranked countries of the Western Balkans are in the World Bank's report on ease of doing business. In the above Report, Macedonia is the best ranked, which in recent years has undertaken a number of activities in order to make the investment environment in the country as favorable and simpler as possible, and in the Report it has taken an excellent 12th place in the overall ranking. The Report is also ranked well by Slovenia and Montenegro, while Bosnia and Herzegovina and Albania are in the last places.

A stable and favorable business environment is one of the basic requirements of foreign investors to think about investing in a particular country at all. That is why most Western Balkan countries still have to do a lot more so that the business environment would be favorable and attractive for a foreign investor.



In addition, predictability in the business, the efficiency of the tax system, the reduction of taxes and the good education of employees, are some of the prerequisites for increasing liquidity in the economy and creating a better business environment. Economic and political stability is expected by domestic businessmen, but also by any foreign investor.

The conducted analysis of the regional inflow of FDI mainly leads to the conclusion that the region's poorly exploited potential as an attractive investment space is investment. But significant progress has been made in opening the countries of the Western Balkans to foreign investors. The region no longer has a negative perception among investors. In fact, confidence in this part of Europe and its prosperity is in the ascending path. The countries of the Western Balkans have developed into interesting investment sites, especially due to the open prospect for EU membership.

### **3. COMPETITIVE ADVANTAGES OF THE WESTERN BALKANS FOR FEES INVESTMENT**

It is clear that the future of the region is in the European Union, and regional cooperation reflects this process, but it also leads to the regulation of space and its long-term sustainability, because it is precisely the political and economic development that makes the region more attractive to investors, facilitates trade and speeds up modernization. Cross-regional cooperation, countries practically express unity through a compromise that drives the Region to EU standards and European practice of cooperation.

When we talk about the competitive advantages of the Region, we think that these are the following:

- Traditional connectivity between economies and markets
- Mutual knowledge, common voice and existing cooperation within the countries of the region

- Existence of the CEFTA free trade agreement

- Adopting legislation according to EU directives and activities on the path of EU accession. Further strengthening of regional cooperation, stronger linking and deepening of integration have been guided by a clear perspective of EU accession. One of the advantages of the region is precisely the proximity of the EU market.

- For the purpose of regional cooperation, the European Union will support the transport and energy connections of the Western Balkan countries through projects "Western Balkans" 6.

- RCC Regional Cooperation Council, South East Europe SEE 2020, I Strategy 2020, was adopted by 7 countries in the region in November 2013. The goal of the strategy, modeled on the EU 2020 strategy, is to support the achievement of national goals through regional cooperation, with the main goal of improving living standards in all countries of the region and contributing to the creation of new jobs. Countries that have adopted the strategy Albania, Bosnia and Herzegovina, Croatia, Kosovo, Montenegro, Serbia and Macedonia. Due to joining the EU, Croatia is only partially involved in implementing the measures of this strategy.

- The size of economies and markets that can only attract large investors and projects, in particular for remote markets (eg Platform 16 + 1, NR China for countries of Central and Eastern Europe)

- In order to attract investors, Serbia, Macedonia, the Republic of Srpska, Croatia and Bosnia and Herzegovina initiated a joint program - Business Environment Certification Program in South East Europe BFC SEE BFC SEE project establishes the first regional platform for improvement and harmonization of local business conditions in the countries of Southeastern Europe - Bosnia and Herzegovina, Croatia, Macedonia, Serbia, from 2016 and Montenegro

- Strategic geographic position

- Low labor costs in combination with a relatively educated population

- Favorable tax system

It is very important that with the support of the EU we jointly conceive a strategic program of larger investments in regional "binding," "solid" and "soft" infrastructure, in transport, energy, information technologies, knowledge ... This will promote the creation of programs that lead to an increase in employment, especially young people. Such common strategies would make it impossible for themselves to build important road, rail and energy corridors of regional and wider importance, but also a stable path for faster regional development and its essential Europeanization.

## CONCLUSION

Since the work mainly focuses on foreign direct investments, it is enough to say that in the last decade the Western Balkans has not been able to attract even 1% of the total world FDI. Analyzing this data, it is clear that the Region has not used its investment potential, and that with the efforts to achieve and maintain political and macroeconomic stability, weakening labor market rigidity and reforming a bulky bureaucratic state apparatus, it will become a desirable destination for foreign investors.

When attracting foreign investments, it is important that the countries of the Region think how to overcome the presentation of individual advantages, and to think more about the representation of the Region. The great interdependence of the countries of the Western Balkans is reality and inevitability, and the task of all of us, both from the business, public and scientific sectors, is to strategically approach this interdependence and strengthen its positive aspects that are most obvious in the field of economy. To the extent that we further strengthen the positive aspects of economic interdependence and regional competitiveness, the economic prosperity of individual countries depends to the same extent. Coordinated development of strategic economic and infrastructure projects, development of entrepreneurship and joint initiative in attracting foreign direct investments, greater integration of

financial markets represent insufficiently used potentials of regional integration. Tourism, food, energy and financial markets are fields that, for the sake of competitiveness in the European and global markets, require a greater degree of association between the countries of our region. Regional integration processes are also important for attracting foreign direct investment. It should be noted that the regional cooperation of the countries of the Western Balkans is one of the formal conditions for improving the relations of these countries with the European Union, and that initiatives in this area can accelerate the process of approaching it. Bosnia and Herzegovina is making more efforts to contribute to the development and improvement of the region's cooperation, which will undoubtedly contribute to the development of Bosnia and Herzegovina.

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**FISCAL FEDERALISM - THEORETICAL APPROACH**

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**Abstract:** *One of the most complex financial functions in state administration is collecting and distributing of fiscal revenues. This matter, besides economic, legal, sociological and demographic aspects includes a number of other aspects. Regulating this matter is an interdisciplinary approach and often it is the main stumbling block in organizing inter-ethnic and other relationships in a complex social community. Particularly the issue is compounded by the federally regulated state communities, and there are a number of problems in the unitary states that follow. Keeping this in mind, it is necessary constantly to seek out newer and more contemporary techniques that could contribute to the improvement and development of solving these issues. The theoretical approaches in this paper can be the basis for an analysis of existing solutions and possibly stimulate reflection on some new approaches to addressing conflict issues.*

**Keywords:** *fiscal functions allocation, redistribution and stabilization, fiscal equalization, principles of fiscal function allocation.*

## **1. Introduction - Basic features of federally organized communities**

Defining fiscal federalism in a social community is reflected in the relationship between central and lower levels of fiscal power. Today there is a growing number of socially-owned communities in which there is only one level of fiscal authority. This is due primarily to the fact that most of the community-based states are organized on a complex basis because of the existence of different national, demographic, social, territorial, urban and other interests. The tasks of the state in the 21st century are very different from those that prevailed since the beginning of the 20th century. In the previous century, the focus of state problems has been addressed to key issues such as: defense financing, internal and external protection, and interventionism in order to achieve maximum economic growth.

Although the financial theory has directed a practical policy to meet the goals of achieving the highest social justice, redistribution of national income and raising to a higher level satisfying general and common needs, many developed countries have directed their fiscal activity on other issues that directly or indirectly led to change of priorities in order to achieve the highest level of domination in the world economy.

In the light of such a policy, the main tasks of the 20th century are marginalized, such as full employment, permanent economic growth, social justice and social security of citizens, except in some of the most developed Western countries. Although it can be concluded with certainty that state expenditures are constantly increasing and that the share of state funding is growing in GDP, the effects of this consumption are getting weaker. It is especially noticeable in transition countries and underdeveloped countries .... "A recent very comprehensive study has shown that the decline in tax revenues observed in the poorest 1980s and 1990s can be largely explained by the demise of customs. The 1970s brought

about 5% of national income. <sup>82</sup>  
 Globalization as the world process provides a free market for large world companies while underdeveloped and developing countries through the loss of their budget revenues indirectly finance the profits of the most powerful companies and directly instead of increasing the competitive ability of domestic producers, lead to the deterioration of the existing economy and, consequently, , tax revenues and the like.

"The issue of the return of the role of the state is not set in the same way in 2010 as in the 1930s for the simple reason: the role of the state is much higher today than at that time, even greater than it ever was. Therefore, in the current crisis, they are simultaneously accusing the market and challenging the role of the state. This second one does not cease from the 1970s and 1980s and will never stop; since the state plays a key role in economic life and social life in the post-war years, it is normal and legitimate to constantly discuss this role and to question it ... it is also necessary to find new instruments for taking control of the frustrated financial capitalism and thoroughly and continuously renew and modernize tax and transfer systems that are at the center of a modern welfare state and have reached that level of complexity that it sometimes seriously undermines their social and economic comprehensibility and effectiveness. <sup>83</sup>

A modern social state presupposes respecting the needs of its citizens and meeting the same equal and at the highest possible level. Bearing this in mind, we can assume that fiscal federalism is a key lever in the practical implementation of set social goals.

Fiscal sovereignty represents the right to introduce a fiscal obligation and the right to incomes from the imposed fiscal obligation. Fiscal sovereignty is conditioned by many factors and is most often the result of historical development and political relations in the social community. In relation to this question, there are at least two possibilities: firstly, a fully centralized

fiscal system and a system with a high degree of decentralization. Starting from these two opposing models, in practice, the most common combination is both one and the other with greater or less decentralization. In this respect, we are talking about fiscal federalism and the right of lower levels of government to participate in the introduction of fiscal obligations and the distribution of fiscal revenues. Things start to complicate when considering different fiscal forms, the cost of collecting them, and the distribution models.

In the construction of the fiscal system, one must bear in mind the specific function of fiscal policy, which can only be realized if there are certain systemic assumptions, and above all, we emphasize:

- a) allocation function;
- b) the redistribution function;
- c) stabilization function;

a) The function of allocation starts from the basic assumption that there are goods that are regarded as public-social and private goods. Functioning of public goods can not be ensured on the basis of market principles, because in some cases the market is inefficient and in others, however, completely inefficient ... Basic characteristics of public goods - not limited to only one particular consumer who purchases such goods, as with private goods, but also available to others ..<sup>84</sup>

The market mechanism is efficient in securing private goods under the laws of supply and demand. Benefits of public goods are not determined by the right of ownership but by the individual, so the market can not function. When public goods are available to everyone, the consumer will not volunteer to pay to the bidder of these goods. In this way, the connection between bidders and consumers has been discontinued, and the state must be involved in meeting such needs. Difficulties arise in deciding on the type and quality of the social goods to be offered and determining the counterweight - the price (people will rather enjoy themselves

<sup>82</sup> Piketty T., (2015), Capital in the 21st Century, Sarajevo: Buybook str. 529.

<sup>83</sup> Ibidem, p.507-508.

<sup>84</sup> Musgrave R. P., (1993), Public Finance in Theory and Practice, Zagreb: Institute of Public Finance. p. 7.

as "free riders" in what others have secured). A different technique is needed in order to determine the supply of social goods and the allocation of costs of that offer. The process by which the total use of resources is shared between private and public goods and which selects a certain combination of consumption of public goods is called the allocation function of the budgetary policy. Regulatory policy, which can also be considered part of the allocation function, is not included because it is not primarily a part of budget policy.<sup>85</sup>

b) The redistribution function, the adjustment of the distribution of income and wealth, to ensure what society considers a "fair" and "fair" distribution. In spite of all the difficulties, the distribution of income remains an issue of state policy. It seems that attention is shifted from the traditional concern about the relative position in the distribution of income, i.e. with a general state of equity and with high income in the upper part of the scale, on the adequacy of income in the lower part of the scale. Thus, in current discussions, emphasis is placed on preventing poverty and determining what is considered a tolerant threshold in the lower part of the income scale, not limiting the upper income limit, which was once the main concern of the redeployment policy. This significantly influences the formulation of the tax structure.<sup>86</sup> As can be concluded from the previous one, defining the current political goals in the direction of defining the threshold of the lower poverty line implies changes in the tax structure as well as in budget expenditures.

There are different instruments used in the policy of redistributing income, and the most direct are the following:

tax - transfer schemes; a combination of progressive taxation of high incomes with subsidies of socially disadvantaged people with low income,

progressive taxes used to finance public services - social housing, etc.

a combination of taxation of goods that are mainly purchased by high income

consumers and subsidies of those goods that are mostly used by low-income consumers.<sup>87</sup>

In order to ensure the conditions for the implementation of redistributive policy instruments, it presupposes good social organization and cost effectiveness, while fully balancing the conflicting goals of justice and efficiency.

c) The stabilization function can not be viewed separately from monetary policy. That is why it is very important that when implementing stabilization fiscal instruments, we do so in cooperation with monetary instruments, taking into account the maximum time dimension. The implementation of certain measures requires the definition of a time limit and this should be followed. For these reasons we will first mention monetary instruments that include:

- the money supply must control the central banking system and adapt it to the needs of the economy in terms of short-term stability and long-term growth;
- monetary policy including mandatory reserve, discount rate and open market policy becomes a necessary component of the stabilization policy;
- fiscal instruments, the growth of public expenditures will act expansively, as demand increases, first in the public sector and then in the private market.<sup>88</sup> Similarly, tax cuts can act expansively because taxpayers are left with higher incomes. Naturally all this should be in coordination with the budget deficit and surplus.
- Coordination of budgetary functions in order to implement the stabilization policy relates primarily to the following issues: a) increasing the supply of public services, in order to achieve this, it is necessary to increase taxes, which raises the question; how should they

<sup>85</sup>Ibidem p. 6

<sup>86</sup>Ibidem p. 11

<sup>87</sup>Ibidem p. 12

<sup>88</sup>Ibidem p. 15



be distributed? Depending on which taxes are used, taxation changes the amount of income left for private use. That is why some voters can favor (reject) proposed changes in income distribution, not because they want (or do not want) public services. Similar is the opinion regarding the reduction of taxes and public services. b) promotion of distribution to greater equity. Such a shift can be made using a progressive (regressive) tax on the financing of transfers to lower (higher) income. But the same can be achieved by increasing (reducing) the supply of public services that consumers want to have along with the given distribution of income. c) in the event of a need for a higher expansive policy, which can be achieved by increasing (decreasing) expenditure on public services or by reducing (increasing) the level of taxation. In the first case there was interference with the function of allocating fiscal policy, while in the latter case it was not. But in the case of the last case, the question arises as to how to make changes in the level of taxation. In order for the stabilization measures to be neutral, both according to the allocation goals and the distribution goal, proportional changes in the level of tax rates could offer an appropriate solution.<sup>89</sup>

The management of certain instruments of fiscal, and above all monetary policy, in itself, requires a certain degree of centralization of the social community and efficiency in implementing them with a high degree of cost efficiency.

"The division of competences between certain political-territorial units is conditioned by the organization of society and the state, historical, national and

religious reasons, size of territory, population, economic development and other factors."<sup>90</sup>

In particular, the problem of the allocation of public functions and funds for their financing is complex and politically sensitive in multinational federal states in which there are greater differences in economic development between individual federal units (the so-called transfer of funds from economically developed into underdeveloped areas practically to the burden of the whole).

The degree of centralization or decentralization is not solely determined by the fact whether it is a federally regulated or unitary state. In general, the degree of decentralization is higher in federally regulated countries. However, it has unitary states where the degree of decentralization is higher than in the federal states. The degree of centralization-decentralization largely determines the distribution of revenues between political-territorial and administrative-territorial units, or, in other words, the financial relations between them.<sup>91</sup>

When it comes to levels of government, there are three levels: central government, federal units and local government. In unitary states, it is usually the central government and the authorities at the local level.

Distribution in federal states:

<sup>89</sup> Musgrave R. P., (1993), *Public Finance in Theory and Practice*, Zagreb: Institute of Public Finance, p. 14.

<sup>90</sup> Jelčić B., (1998), *Financial Law and Financial Science*, Zagreb: Informator. p. 411.

<sup>91</sup> *Ibidem* p. 412

Country	Central level of government	Federal Units		Local level of government	
		1975 1985	1985 1995	1995 1975	1975 1985
Austria	51,7 13,1	48,9 10,1	46,2 12,4	10,6 10,7	10,8
Germany	33,5 22,0	31,6 21,5	31,2 9,0	22,3 8,9	7,3
Switzerland	27,3 22,6	28,7 20,4	26,5 19,5	16,7	24,0 15,8 <sup>92</sup>

#### Distribution in Unitary States:

Country	Central level of government	Federal Units		Local level of government	
		1975 1985	1985 1995	1995 1975	1975 1985
Denmark	68,5 -	68,5 -	64,9 29,8	28,3	- 31,6
Sweden	51,3 -	54,1 -	44,7 29,2	30,4	- 32,4
Greece	67,1 -	62,5 -	66,1 3,4	1,3	- 1,2 <sup>93</sup>

Based on the data from the table, it can be concluded that unitary states in the allocation of fiscal revenues are dominated by central government, social security and local self-government, while in federally regulated countries central government has considerably lower participation in total fiscal revenues.

At the level of the Federation, the following issues are usually defined: customs, the most important taxes in the tax system, and the most important tax policy measures (tax rates, tax exemptions and facilities, etc.), issues that are more easily addressed at the Federation level are:

- problems of efficiency of the economic system, its harmonious development, strengthening of the competitiveness of domestic producers, faster integration of domestic production into the international division of labor;
- fight against inflation,
- measures aimed at reducing unemployment,
- reducing the tension in the society caused by the existence and deepening of the differences in the economic strength of certain areas and its inhabitants;
- matching supply and demand and price ratios;
- credit and monetary flows;

The supporters of this system most often dispute the need to ensure the active participation of federal units (through parliamentary bodies or in some other way) when choosing and introducing measures that contribute to the unified economic system. The advocates of the decentralized Federal Government, or the decentralization of public functions in federal states, emphasize that public needs can be easily identified and easier to raise funds for their financing, if meeting these needs is within the competence of the narrow political-territorial units, or if it is entrusted to the body in direct contact with users of these needs.

Considering the majority of important determinants of historical, national, social, demographic, developmental, etc., the relationship between federation and federal units is defined differently. The modalities of regulating these relationships have contributed to improving communion, faster and more successful overcoming weaknesses, and facilitating the achievement of economic goals. However, inadequate regulation of inter-financial relations in the federation can contribute to the deepening of certain contradictions between and within federal units, members

<sup>92</sup> Nedostajući dio sredstava u svim prikazanim državama ide na finansiranje socijalnog osiguranja. primjer Švicarska za 1975 god=27,3+24,0+19,5+soc.osiguranje =100%.

<sup>93</sup>Jelčić B., (1998), *Financijsko pravo i financijska znanost*, Zagreb: Informator.str.413. Podaci preuzeti iz tabele br.14.

of different national, religious and ethnic groups.<sup>94</sup>

In the United States, the multilayered decision-making system includes the federal government, fifty state authorities, the District of Columbia and 80,000 local jurisdictions. Three-tier arrangement can be observed in Canada, Australia, Germany ... UK, Denmark, Sweden operate only with two-tier fiscal authorities - central and local authorities. The work of R.P.Musgrave prevails the economic factor in the selection of central ones in relation to local policies. Thus Mesgrave claims that the distribution function must be carried out at the central level for reasons of different propensity to distribute. Also, the stabilization function must be carried out at the central level due to large deflections in lower level chests. When it comes to the allocation function, it is dominated by a lower level of government, for the following reasons:

- how the incidence of the use of different social goods is subject to a spatial restriction, each service must be decided and paid within the boundaries of the area in which it is used.
- this principle of user regions leads to the concept of an optimal community size;
- When it comes to social goods, it would be desirable to have as many residents as possible and thus reduce the cost per capita. However, there is a cost of extrusion that limits the optimal size of the community;
- the role of congestion and economies of scale also appear in determining the optimal size of the community;
- taking into account the differences in preferences, we have concluded that people with similar tastes for social goods will enter the same areas; (this leg motion mechanism becomes a mechanism for detecting tendencies);

- the impact of income differences on location selection is considered;
- The overflow of benefits include externals requiring correction;
- the reason for decentralization in meeting local services is linked to the conclusion that the cost should be borne in the area in which it is used;
- the previous paragraph requires the use of federal regulations in the financing of federal services and the financing of local services to taxes charged to the user's territory;

Concerning the distribution function, the conclusions are as follows:

- although distribution preferences are different, the distribution function must be carried out mainly at the central level;

Concerning the stabilization function, the conclusion is:

-stabilization function must be centralized due to outflow at the local level.<sup>95</sup>

Bearing in mind the theoretical considerations of Musgrave, we can conclude that the use of fiscal policy instruments is more complicated as a more complex structure of state regulation, and the degree of decentralization is more difficult to implement. Regardless of these theoretical attitudes, practical solutions are different in some federally regulated countries. A higher degree of decentralization has been achieved in the area of allocation of public services belonging to lower levels of government, while their financing is either insufficiently or far below the average level of federal union. In this regard, the experiences from the FBiH are very useful for the analysis. The technique that can be used in such cases, high fiscal anomalies in meeting public services, falls into the field of fiscal equalization.

## 2. Fiscal equalization

Financial equalization can be defined as a deliberate undertaking of measures by the

<sup>94</sup> Ibidem p. 420

<sup>95</sup> Musgrave R. P. (1993), *Public Finance in Theory and Practice*, Zagreb: Institute of Public Finance, p.491.

federal authorities in removing differences in the degree and quality of satisfying public services. Financial equalization is the subject of system solutions that fall within fiscal policy frameworks. If all measures and procedures are not adequately implemented, they can lead to increased social and political tensions between individual federal units and between individual units and federal levels of government. In order to avoid unwanted effects, the so-called Financial equalization. The financial equalization can be:

- horizontally and vertically,
- domestic (national) and international (international),
- active and passive.

### **2.1. Horizontal and vertical fiscal equalization**

Horizontal equality is expressed in the following requirements:

- even distribution of tax burden, i.e. in the requirement that persons having the same tax force have the same tax treatment, regardless of the country they live in;
- the demand for regional and local horizontal equity in the exploitation of the public good has no absolute value because it is primarily influenced by demographic, geographical, socio-economic and other reasons,
- The reduction in income per capita income exists in almost all countries between individual regions and local communities, and are conditioned by economic development and productivity, geographical location, natural resources, and so on.

Horizontal fiscal equalization is the regulation of financial relations between political territorial or administrative units of the same rank (municipalities, republics, cantons, provinces, etc.).

Vertical financial equalization is the regulation of financial relations between lower and higher levels of government

(between provinces and the central government, between cantons and federal authorities, etc.).

### **2.2. National and international financial equalization**

We talk about national financial equalization when they deal with the regulation of fiscal relations between political territorial units within one state. International financial equalization is the arrangement of fiscal relations between the community of states that, by mutual agreement, deliberately limit their fiscal sovereignty, and regulate mutual relations jointly. International financial equalization may arise as a subject of an agreement between the two countries (double taxation avoidance agreements).

Transnational financial equalization exists internationally as an integral part of economic integration, and is implemented by harmonization of tax systems (harmonization of tax systems). Harmonization in taxation appears as an indispensable condition in financial equalization in an economic or political community.

### **2.3. Active and passive financial equalization**

Active or financial equalization in the strict sense implies regulation of the distribution of public revenues between territorial units, primarily in federally regulated states. It primarily refers to the distribution of taxes between the political-territorial units in it, that is, the distribution of certain forms of tax sovereignty among them. Passive financial equalization represents a division of division of tasks and measures from the jurisdiction of certain territorial units. There are different ways of collecting budgetary funds, which is a matter of the organization of the fiscal system. The simplest model would be to collect all the funds in a centralized manner and then deploy according to the established model to lower levels of government. Due to the rationality in the collection and use of

funds, combined models are generally used in practice. So, for example, belonging to local community taxes are collected at that level and included in the budgets of local communities (for example: property tax and property income).

In practice, different models are used for allocating fiscal revenues, primarily those that are harvested at the central government level, towards lower levels of government. Different points of view regarding the factors to be considered, of course, are greatly affected by the obligations assigned to lower levels of government in providing services to citizens. Among the most commonly used factors, the following are mentioned:

1. number of inhabitants,
2. financial needs,
3. financial strength,
4. tax burden,
5. per capita income.

These factors should converge with criteria that are referred to as instruments of passive financial equalization, and these include the following criteria:

- 1) the criterion of self-government - public functions should be left to lower territorial units if they are willing and economically strong enough to execute them.
- 2) the criterion of minimum satisfaction of public needs. Full decentralization of public needs would result in some territorial units not being able to finance certain public needs (for example: health services, quality education, etc.) a certain degree of centralization of public functions should ensure geographical equity in meeting public needs.
- 3) the minimum size criterion - in the allocation of functions, the ratio of costs and the number of users of public goods should be taken into account. If the number of beneficiaries (hospitals, educational institutions, cultural and entertainment establishments, sports facilities, etc.) is small, the costs of providing these services are disproportionate.
- 4) the criterion of the importance of the goal - for the objectives of national importance,

the competence of the federal central government (defense, external affairs, central bank, full employment, etc.) should be the competence of the central authorities and territorial unit.

5) the criterion of the necessary average costs - when distributing public functions, it is necessary to take into account that the execution of certain tasks and measures within the competence of the state is entrusted to those territorial units in which the average costs of their financing will be the lowest.

6) the criterion of favorable cost-benefit ratio. In order to prevent the occurrence of a certain circle of potential users of public goods due to high costs, the fulfillment of some needs should be transferred to wider territorial units in order to ensure that as many users as possible participate in their financing.

In this way, there will be a favorable relationship between benefits and costs, and thus the normal use of public revenues.

The stated criteria for the allocation of public functions between territorial units in practice are combined in order to achieve as much rational use of resources as possible and to maximize the satisfaction of public needs.<sup>96</sup>

## Conclusion

By establishing the basis of the fiscal system, the pervasive division of fiscal sovereignty, at the same time, it is necessary to incorporate criteria for allocating fiscal revenues. These criteria should take into account the basic specifics of individual federal communities. Possible anomalies in the distribution model can be corrected by incorporating into the system, the criteria of active and passive fiscal equalization. Defining through the legal frameworks of relations between higher and lower levels of government should be based on the criteria for vertical and horizontal fiscal equalization. The reform of the fiscal system should be based on the conclusions of the conducted

<sup>96</sup> Jelčić B., (1998), *Financial Law and Financial Science*, Zagreb: Informator p.431-440. more.



comprehensive fiscal analysis and on the instruments of this analysis.

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### HIGH STRENGTH COATING TESTING LAYERS ON MACHINE PARTS ON THE ABRASIVE WEAR

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**Abstract:** *This study was conducted plasma technology application of coatings on machine parts. During the application the formed spray hits the surface of the material and the particles are deposited on the surface. In this way, the layers can be applied with a high thickness, and thus revitalized worn machine parts. Studied was the resistance to abrasive wear two types of layers: Al<sub>2</sub>O<sub>3</sub> and the Al<sub>2</sub>O<sub>3</sub> with phosphates, applied on the base material using plasma technology. Resistance to abrasive wear of coating was investigated by the method ASTM G 65-85. Shown are the result of material volume loss due to abrasive wear of the two aforementioned types of coatings on three samples. It was also presented the results of the material volume loss at different wheel revolution per minute. The layer impregnated with phosphates showed significantly greater resistance to abrasive wear.*

**Key words:** *plasma spraying, ceramics layers, abrasion wear*

## 1. INTRODUCTION

The research of metal materials is directed in two directions in the world: on the creation of new materials and on the improvement of the existing ones. Aluminum is the metal most commonly found in the Earth's crust (7.5%), and belongs to the group of light metals whose specific weight is 2.7 mg / m, which is 1/3 of the specific gravity of steel. It is corrosion resistant and has high electrical conductivity. Therefore, it is necessary to direct research into the application and satisfactory exploitation of these materials.

One of the basic conditions for long-term protection of metals from corrosion is the qualitative surface preparation. The coatings coated with the plasma-coated aluminum plasma method showed high quality, providing improved adhesion and corrosion protection [1].

The application of Torlo is a very widespread coating method. The basis of the hot application is the melting of the additional material and the direction of the molten material towards the surface of the base material, where rapid hardening and precipitation occurs. Different hot

application methods differ according to the characteristics of the additional material (wire or powder) and the energy source needed for melting [2].

One of the hot application methods used is the application of a plasma that can be applied to different materials (ceramics, metals or alloys). In this procedure, the gas mixture is ionised by an electric arc. The energy obtained in this way is used to apply additional material, supplied in the form of a powder, at a high speed over the base material. The achieved high temperatures (1600 ° C) enable the melting of ceramic materials [3]. Application of ceramic coatings has been applied in many cases where high temperature resistance as well as resistance to wear and corrosion is required [4].

How these coatings can be coated with large thickness (up to several mm) can be used to improve the exploitation characteristics of new or reparation of damaged machine parts. About 50% of all cases of waste are wasted on the abrasion process. The characteristic of this type of wear is the presence of hard abrasion particles of mainly mineral origin and is often referred to as mineral wear. Typical examples of abrasive wear are working parts of agricultural, construction and mining machinery, submersible sludge pumps, particle processing tools, etc. The highest resistance in these tribo systems is caused by excessive abrasion wear, low surface fatigue resistance, and the least dangerous, ie tribocorrosive wear is acceptable.

These coatings can be successfully used to restore fragile parts of agricultural technology. A quality regenerated part can be reliable to perform its function in a technical system.

## 2. MATERIAL AND METHOD OF WORK

### 2.1 Method of operation

The plasma application procedure was carried out in the Institute for Materials of the Faculty of Technology in Tampere, Finland. The Al<sub>2</sub>O<sub>3</sub> layers were applied using the plasma A 3000 S, using the Amperite 740.1 powder layer, between 350 and 400 µm layers. The basic material was biosteel (S235JO).

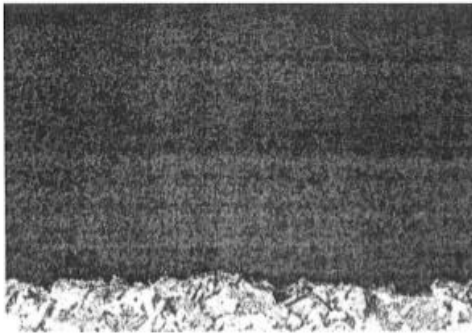
In samples with aluminum phosphates, the porosity of the Al<sub>2</sub>O<sub>3</sub> layers was reduced by the addition of phosphate, using a solution of Al (ON) 3 - N<sub>3</sub>RO<sub>4</sub> by weight ratio 1: 4.2; with the addition of 20% distilled water. The solution was impregnated at room temperature and atmospheric pressure.

The duration of the impregnation was 12 hours after which the samples were thermally treated. Thermal treatment was carried out in three steps: 2 hours at a temperature of 100 ° C, 2 hours at a temperature of 200 ° C and 2 hours at a temperature of 400 ° S [5].

### 2.2. Metallographic analysis of samples

Experimental investigations in this paper include the examination of structural characteristics by metallographic testing using optical microscopy. Samples were prepared for metallographic analysis by rope cut, then crushed into the nital. When cutting the sample (mechanical and thermal method), it is necessary to pay particular attention to the absence of structural changes. The magnification of the light microscope was optimally 200 times [6].

Figure 1 shows the microstructure of the sample to which the layer Al<sub>2</sub>O<sub>3</sub> is applied, and in Figure 2, the microstructure of the sample onto which the Al<sub>2</sub>O<sub>3</sub> layer is impregnated with aluminum phosphates.



Picture 1. Microstructure of the sample onto which the  $Al_2O_3$  layer was applied, 200: 1 magnification

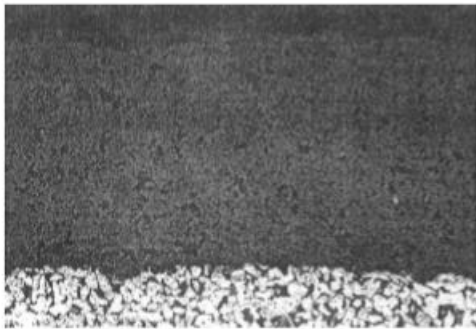


Figure 2. Microstructure of the sample onto which the  $Al_2O_3$  layer is impregnated with aluminum phosphates, magnification 200: 1

### 2.3. Hardness testing

The hardness test was carried out using the Vickers HV 0.3 method, and the results are given in Table 1. The test is performed using a presser that is imprinted on the test material and the size of the imprinted trace is measured. The diamond indenter is made of diamond in the form of a regular four-sided pyramid with an angle at the top of  $136^\circ \pm 0.5^\circ$ . According to the standard procedure, the optimum impulse was 10 N. The loading time of the injection force into the sample surface of the material was 10-15 s, with a uniform increase in force.

Table 1. Results of hardness testing

Vrsta sloja	Tvrdoća HV 0,3
$Al_2O_3$	920
$Al_2O_3$ impregniran Al fosfatima	1120

### 2.4. Resistance testing for abrasive wear

The Abrasive Abrasion Resistance Test was carried out using the "dry sand / rubber wheel" method according to ASTM G 68-85, and to the variants of procedures B and C, Table 2 [7].

Standard device ASTM G 65-85 test device using the dry sand method and rubber wheel, and consists of abrasion tubes  $12 \times 12 \times 75$  mm, with standard rounding with quartz sand Ottawa AFS 50 70. The tube rests on a hard-padded tire with a hardness tire about 64 Shore, and is loaded with weights over the crankshaft. The force  $F$  is 130 N or 45 N depending on the variant of the procedure, and the speed of the wheel is regulated by the speedometer. The diagram of the abrasion resistance tester is shown in Figure 3. The diameter of the rubber point on the testing device is 228.6 mm, the width and thickness of the rubber ring is 12.7 mm, the sanding nozzle is made of chic (DIN EN S235JRG2) and achieves a flow of 250-350 g / min, the speed of the drive electric motor is 196 rpm.

The results of the monitoring of the behavior of regenerated machine elites in exploitation show that the age of thieving is not the same. Already often higher. The cost of regeneration makes up 10 to 20% of the new machine part.

Table 2. Process variants

Varijante postupka	Veličina sile na epruveti	Broj obrtaja točka [o/min]	Relativan pređeni put [m]
A	130	6000	4309
B	130	2000	1436
C	130	100	71.8
D	45	6000	4309

For version B, the test sample was 130 N and the speed of the revolver was 2000 rpm. For the C variant, the force of the test sample was 130 N, but the speed was 100. For both types of layers, three samples were tested. Samples after wear are shown in Figure 4. The results of the volume loss  $\Delta V_{ASTM}$  in  $mm^3$  are shown in Table 3 and in Figures 5 and 6. The density of the layers when calculating  $\Delta V_{ASTM}$  was  $3.98 \text{ g/cm}^3$ .

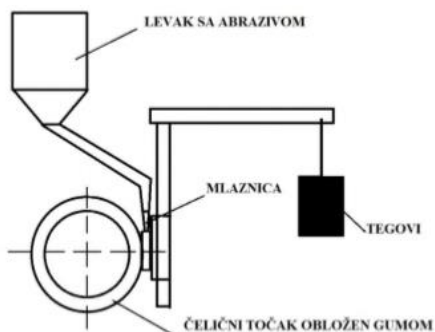


Figure 3. Schematic of the abrasion resistance tester

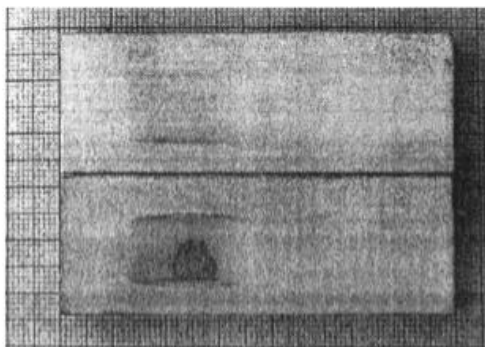
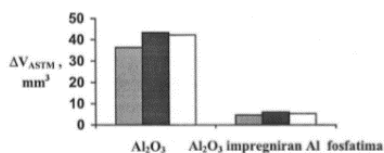
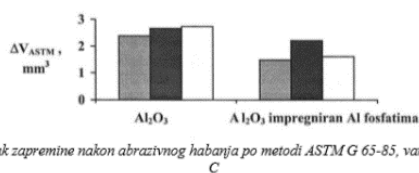


Figure 4. Samples after wear



Slika 5. Gubitak zapremine nakon abrazivnog habanja po metodi ASTM G 65-85, varijanta postupka B



Slika 6. Gubitak zapremine nakon abrazivnog habanja po metodi ASTM G 65-85, varijanta postupka C

Table 3. Results of abrasive abrasion resistance test using the ASTM G 65-85 method

\* - There was a breakdown of the surface layer

In addition to testing the ASTM G 65-85 routine, the sampling rate of the samples was also reversed, with a force of 130 N after the force, after 100, 200, 300, 400 and 500 rotation points. The results of the

volume loss  $\Delta V_{ASTM}$  in mm<sup>3</sup> are shown in Table 4 and Figure 7.

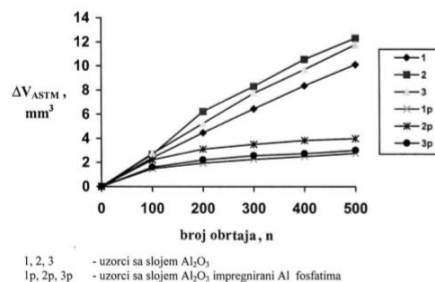


Figure 7. Abrasive abrasive flow Table 4. Results of abrasive wear monitoring

Broj obrtaja ns	$\Delta V, mm^3$					
	Al <sub>2</sub> O <sub>3</sub>			Al <sub>2</sub> O <sub>3</sub> impregnated Al fosfatima		
	1	2	3	1	2	3
100	2,387	2,663	2,733	1,482	2,211	1,608
200	4,472	6,231	5,251	1,960	3,116	2,211
300	6,457	8,317	7,739	2,261	3,518	2,563
400	8,367	10,553	9,698	2,487	3,844	2,739
500	10,126	12,337	11,784	2,764	3,995	3,015

### 3. CONCLUSION

The results of the test show that the A112 A3O3 impregnated with Al phosphates is more resistant to abrasive wear compared to the A12O3 layer according to ASTM G 65-85. For the variant of Method C, this increased resistance is less pronounced, while in the process variant B, the layer A12O3 is impregnated with Al phosphates, more resistant to abrasion than the layer A12O3, six to nine times. In this case, the removal of the A12O3 layer in the process variant B was complete

Abrasive abrasive flow monitoring indicates that the abrasion resistance of the A12O3 layer of impregnated Al phosphates and the A12O3 layer begins to differ significantly after 200 rpm. With a further increase in the speed, this difference in resistance is increasingly increasing in favor of the layers A12O3 of impregnated Al phosphates.

In addition to the constant control of the tribometer device, it is especially necessary to control the quality of sand AFS (50/70), the granulation composition is round and square. The moisture must not exceed 0.5%. Sand that is exposed to moisture can

adversely affect the results of the test. Multiple use of sand is not recommended.

The selected coatings are particularly resistant to abrasion wear and can be applied to the demanding parts of modern agricultural technology.

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#### PUBLIC TRANSPORTATION AS A REDUCTION FACTOR OF TRAFFIC CONGESTION IN URBAN AREAS

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**Abstract:** As a residents of urban areas, everyday we witness increase in the number of registered vehicles that daily move through urban zone of small, medium and large cities. Such an increase in vehicles number results in various forms of congestion like gas emissions and air pollution, usage of traffic areas and daily traffic jams, excessive noise as much as reduced traffic safety. The future development of public transportation in urban areas should give solution to traffic congestion in all respects. This research will present analysis of the existing traffic conditions in urban areas through the analysis of exhaust gas emissions, usage of traffic areas, traffic congestion as well as traffic noise, increase the level of traffic safety. As a result of this research: proposal of potential measures for reducing the harmful impact of public transport on the environment, its role as a generator and a key factor in reduction of traffic congestion in urban and highly urban areas.

**Keywords:** Public transportation, emissions, pollution, air, noise, congestion, safety.



## 1. INTRODUCTION

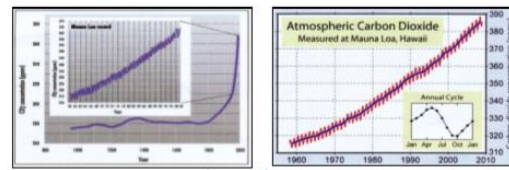
Public transport is of paramount importance in the challenges that we encounter daily as inhabitants of urban areas. It is primarily meant to improve the quality of life in cities, by reducing traffic congestion, reducing travel time and lowering stress. As a positive example, we will teach US public transport lessons and save up to approximately 780 million hours in travel time and about 640 million gallons of fuel annually. Analyzing globally, on a global scale, assuming that no public transport funds are used, the costs of traffic jams would increase to around \$ 50 billion.

Traffic development, in today's context, leads to physical congestion of traffic surfaces, environmental pollution (through emission of harmful gases and noise), a decrease in safety and a significant increase in costs (weather, energy and financial). It is justifiable to ask what kind of traffic we have in cities and how can we influence it?

As one of the largest and most important sources of air pollution, road traffic appears. Carbon dioxide (CO<sub>2</sub>) is released from the exhaust gases of motor vehicles, which leads to a gradual global warming (causing the so-called greenhouse effect, acid rain formation, damage to the upper layers of the atmosphere and other consequences).

Requests for improving the quality of life are being tightened, and in this respect, at the UN level, the Kyoto Protocol to the UN Framework Convention on Climate Change has been agreed. The Protocol is annexed to the international agreement on climate change and opened for signature on December 11, 1997, with the aim of reducing carbon dioxide emissions and other greenhouse gases. Experts estimate that by 2050 more than 6.2 billion people will live in cities. (about 2/3 of the world's population, which will then amount to about 9 billion). Urban population increases by about 50 million each year. Cities are getting bigger and so urban transport demands, which need to support the

mobility of people and goods in cities, are increasing proportionately, and therefore environmental pollution from the JGP.



Source: [www.bom.gov.au](http://www.bom.gov.au)

Figure 1. A marked increase in CO<sub>2</sub> concentration is visible in the second half of the twentieth century

## 2. DESTRUCTIONS IN URBAN ENVIRONMENTS AND REQUIREMENTS FOR THEIR REDUCTION

In order to carry out transport activities, regardless of whether it is a passenger car, public transport or logistics, it inevitably requires appropriate resources, such as: land, materials and energy, and in doing so produces unwanted side effects: atmospheric pollution, noise and starvation in traffic accidents.

### 2.1. Taking over the land

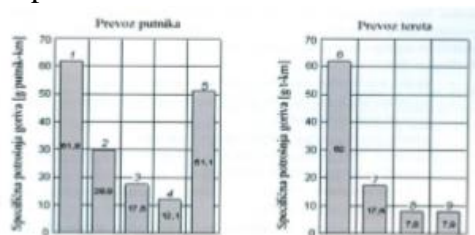
For the development of public transport, infrastructural surfaces are necessary. If the minimum needed surfaces are analyzed for the normal development of public urban transport, then it can be concluded that with regard to the take-up of the required land area for the railway transport infrastructure, considerably less land is required than road

transport. The smaller width of the land surface, which is occupied by the rail track, is important in the complex confrontation of the terrain, and is especially important in urban zones. The width of the 2-track light rail system with curbstones is 7.15 (m), and the total width along with a safety area of 2x0.7 (m) width is 7.75 (m). The necessary traffic areas, for the same volume of transport, with passenger cars are 42 to 48 times higher than rail systems for mass transport of passengers, which saves energy

consumption by 18 to 32 times and achieve a higher transport speed of 2.5 to 4 times, especially in the narrower city area.

## 2.2. Energy needs

If specific energy consumption is analyzed, rail transport for the same energy consumption as other means of transport can carry out the largest volume of transport.



Source: Passenger transport systems in cities

Figure 2. Specific energy consumption by different means of transport: 1. Passenger car in the city, 2. Passenger car on the highway, 3. Regular intercity train, 4. High speed train - TGV, 5. Avion, 6. Normal truck, 7.. Heavy duty truck, 8. Marsh train, 9. River freight transport

From Figure 2. it is visible that the energy efficiency of rail transport is 2 to 3 times higher than the automotive. Rail transport represents the best alternative to other modes of transport from the point of view of environmental protection by energy consumption.

## 2.3. Environmental pollution

The basic form of the negative impact of public urban transport on the environment is atmospheric pollution, the level of which is constantly increasing, due to a steady increase in automotive transportation, although by completing the design of internal combustion engines, the content of harmful substances in exhaust gases is reduced.

The data from 2005 tells us the amount of pollution caused by transport in the total amount of harmful substances in the atmosphere created by human activity: - 63% in nitrogen oxides (NO<sub>x</sub>). - 59% in carbon monoxide (CO), - 45% in hard

particles, which has harmful effects on health, - 42% in floating organic non-metallic compounds, - 39% in carbon dioxide (CO<sub>2</sub>), which is the main cause greenhouse effects.

Also, if you are analyzing forms of public urban transport, the share of rail transport in harmful substances amounts to 0.1 to 0.8%, and the car is from 94 to 99%. From these data, it is possible to clearly notice the importance of using various forms of public urban transport in order to meet ecological factors.

Transportno sredstvo	Potrebe energije (MJ/pkm)	Specifična količina izbačenog CO <sub>2</sub> (g/pkm)
Prigradski dizel-voz	0,78	59,6
Prigradski elekto-voz	0,85	47,7
Metropolitien	1,1	61,6
Laki šinski sistem	1,0	56,2
Zglobni autobus	1,17	89,4
Autobus velike zapremine	1,06	80,8
Gradski autobus	1,37	104,3
Međugradski autobus	0,96	74,5

Source: Passenger transport systems in cities  
Table 1. Amount of carbon dioxide (CO<sub>2</sub>)

Table 1 gives the comparative values of various rail and bus transport vehicles. For passenger cars the budget takes CO<sub>2</sub> values of 278 (g / pkm) in the city and 210 (g / pkm) outside the city. This means that increasing the share of rail transport in public transport contributes to the solution of energy and environmental problems.

The main air pollutants emitted by motor vehicles are carbon monoxide (CO), nitrous oxide (NO<sub>x</sub>), various non-combustible carbon dioxide (CXHY), sulfur dioxide (SO<sub>2</sub>) and solid particles (carbonyl). In addition to these, motor vehicles emit a series of highly toxic components: benzene, formaldehyde, polynuclear aromatic carbohydrates, lead whose emissions are associated with fuel quality and fuel additives.

The noise caused by the movement of vehicles in the city also leads to the psychological and physiological disturbances of the inhabitants. Some types of vehicles broadcast the following noise:

	dB (A) Srednja vrijednost	dB (A) granica
Putničko vozilo (1100 ccm)	70	67-75
Putničko vozilo preko 1600 (ccm)	72	68-77
Dostavno vozilo	73	69-77
Teretno vozilo i autobus	81	76-86
Motocikl	77	72-86
Tramvaj-stara konstrukcija	81	76-86
Tramvaj-nova konstrukcija	75	73-77
Podzemna željeznica	75	73-77

Source: *Passenger transport systems in cities*  
Table 2. *Types of vehicle and noise emission*

The table above shows that a freight vehicle or a bus develops, under certain urban traffic conditions, as much noise as 10 passenger cars and that the passenger car causes 10 dB (A) less noise than a freight vehicle or bus. However, it is necessary to make a certain difference between freight vehicles and buses, because buses are usually quieter. Compared with a passenger car, it should be noted that the bus, in terms of its capacity, or the number of passengers it transports, replaces 30-40 passenger cars, giving it a relative advantage in general traffic compared to passenger cars, but which does not necessarily exclude the need to the noise produced by the bus does not decrease to a tolerable extent.

Special progress has been made in the modern construction of trams, where it is suited to the solution of the main sources of noise (reducer, compressor, vibrations of rotary masses, etc.) it is minimized.

The gas engine in relation to the petrol engine emits:

- up to 80% less carbon monoxide (CO), especially in idle.
- up to 50% less lung oxide (NOx).
- up to 50% less indelible hydrocarbons (CH).
- almost all compounds in the oil and gas exhaust are carcinogenic.
- no exhaust gas compound is cancerous.

There is no exhaust gas in the gas:

- lead compounds;
- benzole;
- sulfur dioxide;
- aldehyde;
- and there are very few particles in the soot.

## 2.4. Transportation security

In the analysis of various environmental impacts, the aspect of transport safety is particularly important, because in transport, the preservation of people's lives and health is very important. In relation to the volume of transport for each type of transport, the indicators of mortality of air and rail transport are approximately the same (0.25 and 0.18 killed per 1 billion passenger / km). It is about 75 times less than in car transport (15 killed per 1 billion passenger / km). An effective policy in the field of security is considered as an important factor in the conduct of public transport policy, which gives priority to the development of rail transport.

## 3. MEASURES FOR REDUCING THE NEGATIVE INFLUENCE OF PUBLIC TRANSPORT OF THE PUBLIC TRANSPORT IN THE ENVIRONMENT

The guidelines of the "pure public transport" concept in the EU countries are as follows:

1. Further evolution of EURO regulations regarding emissions of exhaust gases (with the trend of reducing the maximum engine emission value in (gr / kWh));
2. Use of diesel fuel in accordance with Directive 2003/17 / EC regulating the quality of diesel fuel, in particular the maximum sulfur level;
3. Application of SCRT (Selective Catalytic Reduction Trap) technology for buses with EURO 2 and EURO 3 engines in order to reduce the emission of nitrous oxide (NOx) and particles;
4. Use of buses on natural gas CNG, LPG;
5. Use of renewable biofuels (Biodiesel, ethanol, biogas);
6. Use of diesel-electric "hybrid vehicles";
7. Rehabilitation of trams and trolleybuses;
8. Application of hydrogen fuel technology (Fuel Cell).

As a first step, it is desirable that all bus operators, in cooperation with the

competent local authorities, define the future strategy for introduction into the exploitation of environmentally friendly vehicles.

When defining the strategic plans for the development of public bus operators in cooperation with the competent local government bodies in the City of Sarajevo but also in other major cities in BiH, where public transport is developed, taking into account the fact that Bosnia and Herzegovina will become a member of the EU in the forthcoming period, account must be taken of the following:

- Further development and modernization of electro subsystems of public urban passenger transport (trams and trolleybuses);
- Used vehicles with conventional low-emission gas emissions
- EURO 4 and EURO 5 standard, and in the perspective of introduction of EEV standards with even lower pollution emissions;
- Introduction into the exploitation of buses with hybrid drive, ie diesel-electric drive.
- Introduction to the operation of buses using alternative fuels such as compressed natural gas (CNG or LPG), biodiesel.
- Harmonization of standards and regulations in the field of emissions of harmful gases with the EU;
- Amendments to the legislation and by-law in the sense of a more severe sanctioning of the owner of vehicles whose vehicles do not meet the requirements in terms of maximum emission values of harmful combustion components;
- Introduction of an inspection program for the emission of harmful components of combustion (in different places on the vehicle: emission control on exhaust, control of emissions of fuel volatility, etc.);
- Determination of the effect of the traffic light cycle on the fuel consumption of public urban transport and, in this respect, the development of corrective measures on traffic lights;
- Control emission of harmful components of combustion through reduction of traffic density, ie stimulation of citizens to use the means of public urban transport.

In order to reduce unacceptable noise levels in Canton Sarajevo, the following activities should be carried out:

- Amend and amend the legislation and by-law on the sanctioning of excessive noise;
- Activate the noise measurement equipment, "the phonometer, owned by the traffic police, and control the roads, and the owners of cars that produce excessive noise values will be sanctioned;
- Construction of roads that will be designed to provide maximum possible protection against noise for nearby residential buildings.

As guidelines for the drafting of legal noise legislation in the Canton Sarajevo, account must be taken of:

- Rules on protection from traffic noise at federal and state level,
- Methodology for calculation of noise on roads and railways,
- Determination of the noise limit value on roads and railways,
- Guidelines for protection against road noise,
- Noise calculation methodology in parking spaces,
- Sizing the noise protection device.

It is necessary to periodically measure emissions of harmful components of combustion as well as noise levels, to analyze the obtained data, to compare with the defined standards and values measured in the previous period and to take appropriate actions in order to improve the situation.

#### 4. CONCLUSIONS

Ecologically clean public transport system is an imperative for the sustainable development of the European Union's security forces. Observing legislation and available options for using alternative fuels in EU countries, it is necessary to actualize and initiate this issue within Bosnia and Herzegovina as well.

The experience of public transport companies and local governments of the EU cities related to sustainable

development is a roadmap for finding solutions that will make the public transport system in Sarajevo a promoter of sustainable urban development. The ultimate goal is to connect Sarajevo with a green map of Europe.

The current state of the economy of Europe, especially the bad state of affairs in BiH, should not create pessimism in terms of the large financial needs of investing in the public transport system. Procurement and introduction into the operation of buses with ecologically clean SUS engines should be gradually with a trend of acceleration of the dynamics of procurement of new buses that would replace buses with conventional fueled engines. Also, efforts should be directed at purchasing a modern tram (low-floor) vehicle fleet.

Developing awareness of ecologically clean public transport, harmonization of domestic standards and regulations with the EU, procurement of ecological "clean-buses" with the aim of reducing emissions of harmful combustion components, a new tram fleet, must be an imperative and an integral part of all strategic plans of public auto transporting companies in Sarajevo, the Ministry of Transport and Communications of the Canton Sarajevo, as well as other local government bodies, that is, municipal and city authorities.

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## ANALYSIS OF FUNCTIONING PUBLIC TRANSPORTATION SYSTEM IN SUBURBAN AREAS

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**Abstract:** *The existence of passengers in the public transport system puts extremely high demands on the organizers of this process, because any disturbance in the carriage of passengers reflects the satisfaction of the quality of transport services. The quality of public transport depends on the policy planning of the city development and mobility that is now developing. The main objective of the work is reflected in the presentation of the importance of a system of public transport and good connections lines for people who live in the peripheral areas of the city. Better access to the locations of jobs, the city center and other facilities is a priority towards sustainable development of the village. As a special part of this work will be presented research of counting of passengers in vehicles on suburban routes 33 and 39 in Nis. Based on that graphical representations are made passenger flow by driving directions for each departure, taking into account the working day, saturday and sunday. They will also be given a description of the route of line with the basic data for the two lines. The results were analyzed, graphically presented and carried out on the basis of their conclusion.*

**Key words:** *settlement, public transportation, availability.*

### 1. INTRODUCTION

The importance of public transport is preempting all available transport infrastructure resources to participate in the development of its functionality, efficiency and multimodality.

Neglected in some countries during a period of rapid increase in motorization, public transport of passengers (JGPP) is now considered necessary for the establishment of aesthetic, attractive, environmentally cleaner, financially and energetically rational cities from the aspect of transport services. As such, JGPP has received increasing support from city administrations in transport policy and financing in recent years.

The functioning of large cities is impossible without public transport. A large number of residents and a large number of jobs create a deficit of space. Public transport is therefore one of the most important sectors whose task is to create a "justified urban environment, in a world defined under the concept of sustainable development.

JGPP is the most important mode of transport under limited space per passenger and is currently the best response to transport needs in densely populated urban areas. JGPP is a more economical view of cars in cities where the density of the dwelling is greater than 20 inhabitants per hectare. JGPP consumes 4 times less energy per passenger, and ultimately, the surface JGPP uses considerably less road space than the car. Successful JGPP requires a combination of measures that control excessive use of cars with the development of a JGPP competitive service. [1]

JGPP causes traffic problems in cities in cases where it is not available or when it is not sufficiently developed. Nowadays, a special contribution to quality JGPP is given to the expert public, which in the first line points out that the existence of the JGPP is not enough, but it is necessary to keep up and not neglect, but to upgrade and modernize the principles of its functioning.

JGPP, as the most complex system in the city, was observed through two characteristic principles: in the top clock and outside the clock.

As a special part of this paper, a survey of passenger counting in vehicles on lines 33 (Niš-Sečanica) and 39 (Niš-Supovac-Sečanica) is presented. Based on this, graphic representations of the flow of passengers by driving directions for each departure for a working day were made. Also, a description of the route line with basic data for these two lines is given.

## 2. CHARACTERISTICS OF PUBLIC TRANSPORTATION IN SUBURBAN SETTLEMENTS

Suburban transport is a mode of transport with poor passenger flows, where often the lines are defined by the departure of vehicles to certain places, often with related time and with quite unfavorable infrastructure.

Accessibility to the city center and other important facilities is important for residents of peripheral parts of the city. The density of the JGPP line network as the frequency of vehicles, are important for the reason that the real estate in the settlement can substantially redistribute the value of the site, creating an area more or less attractive for housing than before.

The basis of the urban strategy is to establish a balance between the number of jobs and the density of population. The results of the research in the world reveal that the condition for such a connection is actually improvement of public transport, with the goal of more balanced development of rural areas. Access to public transport, both to an individual and to low-income families, can become limited to most households living in suburban areas. Also, many authors state that public urban transport encourages and promotes independence and allows the redistribution of the home budget to other things within the household.

Improving suburban mobility is a great challenge. Suburban development had several major consequences for the provision of transport services [2]:

- Suburban regions are larger than traditional cities and have significantly lower density. This means higher travel distance for most journeys, less access to destinations at pedestrian distances and more mileage in everyday activities than in urban areas.
- If there is diversity in the purpose of traveling in one suburban settlement, the requirements will be much more pronounced at different times of the day, depending on the purpose of the trip. In order to maintain a reasonable level of service and efficiency, the service must be adapted to different route path patterns and terrain configurations.

Lower average density in suburban areas means not only less generating of travel and hiking destinations, but also that the distance traveled between points is on average higher. The lack of connected street systems leads to less direct travel and more mileage kilometers for some activities than in urban areas.

When planning transport, other factors must be taken into account, for example, to be competitive with respect to private cars, so that [3]:

- minimizes travel time ensuring good connectivity;
- provides connection with the possibility of short walking;
- considers mechanisms for the formation of one price of the whole trip;
- provides a direct, comfortable connection between the station and the destination.

The challenges of sustainability of public transport in suburban settlements are enormous. He compete today with cars in suburban areas, the amount of free parking space, and the unfavorable relief of the hiking area. Effective planning and promotion of a range of market-oriented services should help to capture a higher share of the suburban travel market and

thereby help communities and pay attention to their mobility and environmental problems.

The term "attachment" is a generic identification applied to the developed areas of surrounding traditional urban centers, and this implies a homogeneous type of settlement characterized by family houses and buildings.

The subassembly network is designed to apply the following principles:

- To achieve technological unity of urban and suburban transport, by integrating these two types of transport in basic technological elements (common positions, unity of the tariff system, ticket system and payment system);
- Public transport must be available to all residents;
- Equalize the conditions for users to use the existing suburban bus station.

### 3. ANALYSIS OF THE EXISTING SITUATION ON LINE 33 AND 39 IN NIŠ

In the requirements for transportation in the JGPP system, Niš has a marked number of trips from the perimeter to the city center due to the high concentration in the central city area and its activities in it. On the other hand, the elongated position of the city along the Nisava River, where the highest concentration of housing and work places, significantly highlights the basic corridor, along which the greatest transport operation of the system is realized, as a result of the strongest passenger flows.

The needs for such transportation requirements are met with a network of radial and diametral lines. The basic problem that can arise is the establishment of a link between offered capacities and requirements when they are not objectively determined. In addition, account should be taken of the relationship between JGPP and other modes of transport, due to the increase in congestion in the center of the street, the lack of parking space ...

The total exploitation length of the suburban line network in Niš is 561.8 km, while the construction length of the network has not changed and remained at the level of 241.40 km. This means that the network overlap index is 2.33 compared to 2.29 in 2006, which is a consequence of the need to bend the line mainly after a longer common part of the route, to connect distant settlements, so it is not rare that the line defines a minimum number of passes to such a line places. Such lines are essentially only the sub-lines of other suburban lines with a partially altered track. [4]

The total number of stops is 420, and the mean length of the interstate distance on the network of suburban lines is 1.05 km.

In the territory of the city of Niš, in the urban and suburban passenger transport, the zone tariff system is applied. The first and second zones are urban, and the third and fourth suburban. Within this research, the suburban settlement Sečanica was selected, characterized by the fact that there are two lines to this settlement with two different routes.

Sečanica is a populated place in the city municipality of Crveni krst in the area of Niš in Nisava district. It is located in the Mali Jastrebac valley, in front of the entrance to Supovo passage, about 14 km northwest of the center of Niš. There are 723 adult population, and the average age of the population is 44.8 years (43.3 in males and 46.4 in females). There are 259 households in the settlement, and the average number of members per household is 3.37. [5]

Suburban town Sečanica belongs to the third zone of the existing zone system in Niš. Line 33 length is 18.7 km and the time of the craft is 90 minutes. Line length 39 is 25.0 km, while the turning time is 100 minutes. Route lines 33 and 39 are shown in Figure 1:

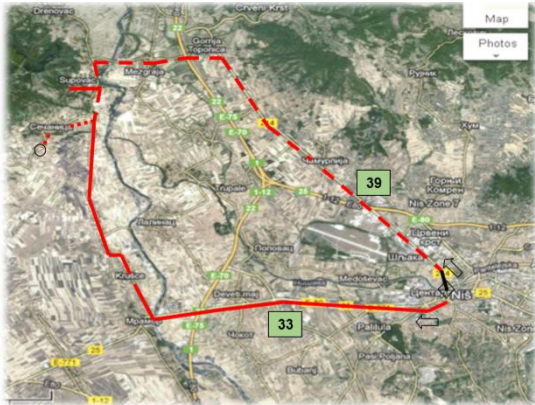


Figure 1: Route lines 33 and 39 with start and end terminals

### 3.1. DISPLAY OF THE NUMBER OF PASSENGERS ON LINE ON LINE 33 AND 39

In order to understand the movement of people living in Sečanica, which are conditioned by the use of suburban transport, the total number of passengers that is being reported for each departure from Niš and Niš is analyzed. On the basis of the obtained graphic representation, it is possible to analyze the time period in which greater mobility occurs and, therefore, determine the most pressing departures, find the solution for their reduction and more uniform load, as well as the target aspects, due to which in some parts of the day there is no departure.

Diagram 1: Number of passengers by directions on line 33 for a working day

In diagram 1, the oscillations in the number of passengers in direction A can be more pronounced, in which the maximum value of the number of passengers appears at the seventh and ninth departures and reaches 60 or 61 passengers. Starting from the first departure, the number of passengers gradually increases until the third departure when it begins to decline and grow alternately. From the 9th departure, the number of passengers gradually decreases, so in the last departure the number of passengers is 11.

In direction B there are also oscillations of the number of passengers depending on

departure, but they are in a milder form than in direction A. Since the first departure when there were 13 passengers, this number is rising rapidly to a value of 88 and up to 92 passengers in the third departure, which is also the highest value of the number of passengers in direction B. The number of passengers then drops in fifth departure to 39 passengers, and then again grows to the value of 85 passengers in the seventh departure. After that the number of passengers gradually decreases to a value of 10 passengers in the last thirteen departure.

For each departure on line 39, for which the counting of passengers on the bus was performed during the working day, changes in the number of passengers departed and departed by bus departures will be displayed during the working day.

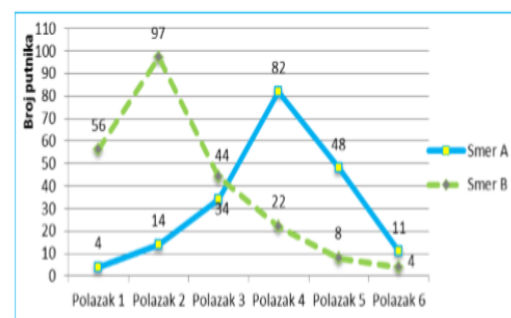


Diagram 2: Number of passengers per route on line 39 for a working day

During the working day on line 39, the first departure is 4 passengers, in order to increase this number until the fourth departure when the number of passengers is 82. Then it decreases, and in the sixth last departure there are 11 passengers. In direction B in the first departure there are 56 passengers, and in the second, there are 97 passengers, which represents the highest value. After that, in each subsequent departure, the number of passengers is reduced, in the last 4 passengers.

### 3.2. PASSENGER PROTECTION BY LINKS 33 AND 39 IN NIS

Knowing the number of passengers and their distribution on departures during the day, graphs can be graphically represented by the fluctuations in the value of the flow



of passengers depending on the capacity of the bus operating on that line (represented by a horizontal intermittent line). The working day will show changes in the passenger flow in diagram 3:

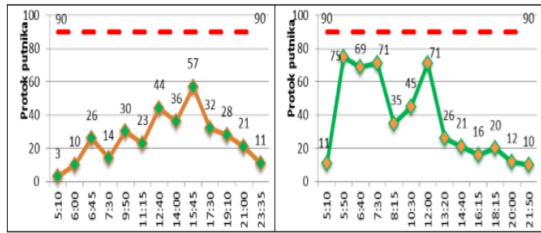


Diagram 3: Passenger traffic on line 33 in the direction of Niš-Sečanica (left) and in the direction of Sečanica-Niš (right) for a working day

Starting from the first departure at 5:10, the flow of passengers is increased with less oscillations and its maximum value reaches the departure at 15:45 and is 57 times per hour. After that, it starts to fall almost linearly. The lowest flow value was not recorded at the last departure at 23:35, but on the first departure when it was 3 times / h.

Observing the line 33 in the direction of Sečanica-Niš, we can notice the variation of the flow during the entire day line operation. On the first departure, when the lowest flow rate of 11 times / h occurs, its value extends extensively at the second departure at 5:50 and reaches 75 times / h, which represents the maximum flow value for this direction for a working day. This high flow value is retained in the next two starts when it starts to drop to 35 times per hour and then re-grows and at the end of 12:00 it is 71 times per hour. After that, it starts to decline until the last departure.

Similarly, a change in passenger flow has been made, previously calculated, at bus departures for a working day on line 39. An intermittent horizontal line indicates the maximum number of seats on the bus.

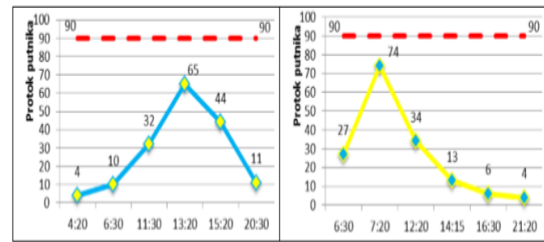


Diagram 4: The flow of passengers on the line 39 in the direction of Niš-Supovac-Sečanica (left) and in the direction of Sečanica-Supovac-Niš (right) for the working day

Beginning from the first departure in which the passenger flow is 4 times a day, in other cases, it is rapidly increasing when it reaches a value of 65 times / h in the fourth departure at 13:20, which represents the highest value of the flow in this direction. It also suddenly then begins to decline when it has a value of 11 times / h in the last departure.

On the diagram 4, at the first departure at 06:30, the flow value is 27 times per hour, and already at the second exit at 07:20 it has its highest value of 74 times / h. After that it starts to decrease and its value decreases at the last departure to only 4 times / h.

Increasing the quality of public transport by reducing travel time is a gradual and slow process of realizing static and dynamic parameters that characterize public transport as a system. Planning and design of public transport must go from users who subjectively assess quality and have different attitudes and behaviors. In the case of suburban lines 33 and 39 in Nis, their operation is described by the number of passengers. Also, for each departure during the working day, the values of the flow of passengers are presented, and therefore the utilization of the capacity of the vehicle.

This study looked after users who live in suburban areas and are primarily dependent on public transport. Daily and permanent monitoring of the operation of vehicles on the lines is necessary and think about improving the existing network line by



some of the measures in the future period using intelligent transport systems.

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