

## **Basic factors impact on the Development and Modernization of the Road Infrastructure in the Republic of Macedonia**

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### **Abstract**

Road infrastructure is the bloodstream of a national economy. The national roads, regional roads and roads of a local character are in the function of the national economy. Hence the undeniable fact is that road infrastructure is of great importance for each country. Bearing this in mind, it is clear that in the case of the Republic of Macedonia, particular attention should be paid to the development and modernization of the road infrastructure, following the example of the developed countries in Europe and the world.

Of course, the road infrastructure affects the economic development of each country. This means that the condition of the existing road infrastructure should be analyzed well, as well as the basic factors that influence the development and modernization of the road infrastructure in the Republic of Macedonia because it is of great importance and it is necessary rigorous planning of the further construction of new and modern roads. A necessary benchmark in such planning may be the trend and experiences that developed European countries have in this field, and the situation in the countries in the region should also be analyzed. Analyzing the problems from the scientific aspect, backed up with the data that arise from the needs of the Republic of Macedonia, as well as the economy and other needs that arise in the use of the road infrastructure of the Republic of Macedonia. In order to arrive at appropriate proposals and solutions for improving the current state of the road infrastructure in the Republic of Macedonia.

Hence, the subject of research in this paper is the analysis of the significance of the basic factors that influence the development and modernization of the road infrastructure in the Republic of Macedonia. It assumes an analysis of the current situation, as well as the development of the overall road infrastructure in the Republic of Macedonia, as well as proposing measures for its development and modernization in order to more efficient, more effective, safer use of the road infrastructure as well as to preserve a clean and healthy environment.

*Keywords:* road infrastructure, development, modernization, Republic of Macedonia.

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### **CURRENT STATE OF ROAD INFRASTRUCTURE IN THE REPUBLIC OF MACEDONIA**

After the dissolution of the SFRY and after gaining independence, the Republic of Macedonia felt the need for a new and more adequate road infrastructure that would aim at achieving the

European and world trends in the road network. It is almost undeniable that road infrastructure constitutes a real bloodstream of a state; more specifically highways, regional roads and local roads have a remarkably strong impact on the overall development of a state.

Hence, it is clear that each state must pay attention to the development of its road infrastructure.

Although the Republic of Macedonia is distinguished by a well-developed road network with a total length of 14.182 km, including highways, roads, regional and local roads. The main axes of the national road network are the two Pan-European corridors, Corridor 8 (East-West) and Corridor 10 (north-south).

Currently, the total length of the road network in the Republic of Macedonia is 14.182 km, of which 242 km are classified as motorways, 911 km are national roads, 3.771 km are regional roads and 9.258 km are local roads. The permanent road network is a good basis for further development of the country.

As in other countries, so in the Republic of Macedonia, road transport has the largest share in the total transport of goods and passengers. In the structure of the transport of goods transported along the roads throughout Republic of Macedonia, domestic transportation dominates over international and transit transport. Also, road transport dominates over rail transport. Basically, the existing road construction is solid and of good quality.

**Figure 1.** Road network of the Republic of Macedonia



Source: Public Enterprise for State Roads

Considering the road network of the Republic of Macedonia, we can conclude that the regional roads provide access to the main road corridors and the main road network and are in common with the local ones of great importance for the development of the local economy, attracting new investments, small businesses and agricultural activities across the country.

In accordance with the valid legislation, the Public Enterprise for State Roads is a body responsible for the management, construction, reconstruction, maintenance and protection of state roads in the Republic of Macedonia.

The Republic of Macedonia has the potential and opportunities for better development and modernization of road infrastructure in accordance with EU standards, but this infrastructure needs additional investments to meet the needs of the country. If comparisons are made with the road network in the developed countries, it can be concluded that the Republic of Macedonia needs a lot to work in this field in order to reach the European and world standards.

In order to have a developed state you should have developed, quality and modern road infrastructure, which has an impact directly or indirectly on the economic development and development of other segments of the state.

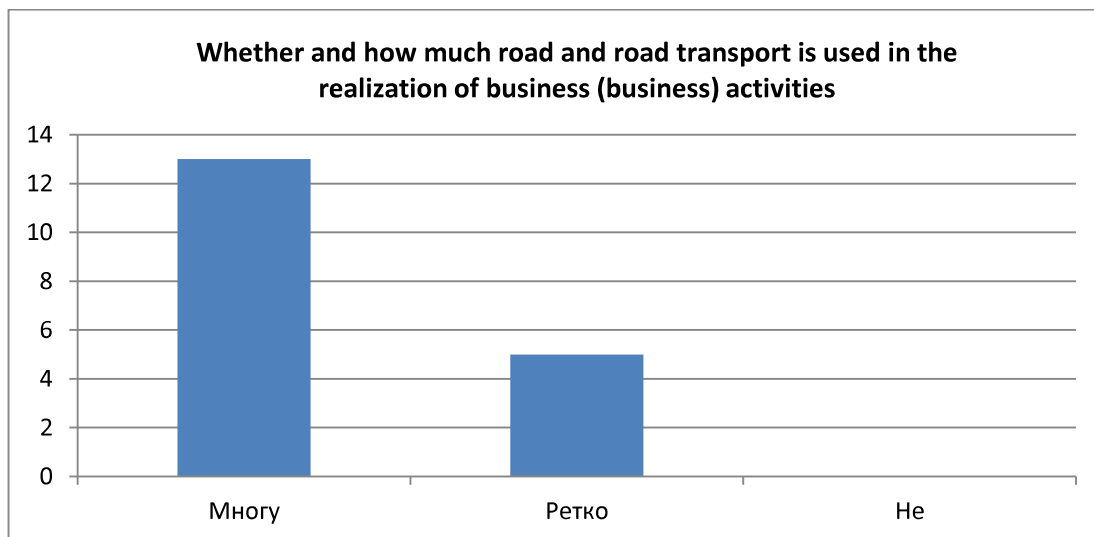
Keeping in mind the previous one, it is quite certain that special attention should be paid to the modernization and development of the road infrastructure. This applies equally to developed and underdeveloped countries and developing countries.

### **THE OPINION AND ATTITUDE OF BUSINESS SECTOR CONCERNING ANALYSIS OF THE DEVELOPMENT AND USE OF ROAD INFRASTRUCTURE OF REPUBLIC OF MACEDONIA**

In June 2016, a field survey was conducted in order to analyze the level of development and use of the road infrastructure in the Republic of Macedonia, through the views of the business sector in the Municipality of Gostivar (Survey Questionnaire - Attachment No. 1).

The questionnaires were divided into 35 companies operating in the Municipality of Gostivar. The feedback was received from 18 companies. The companies provided answers to all the questions, but without additional comments, except for the last question related to the situation with the road infrastructure in the Republic of Macedonia. The received answers from the businessmen from the Municipality of Gostivar served to obtain interesting information presented in the respective diagrams.

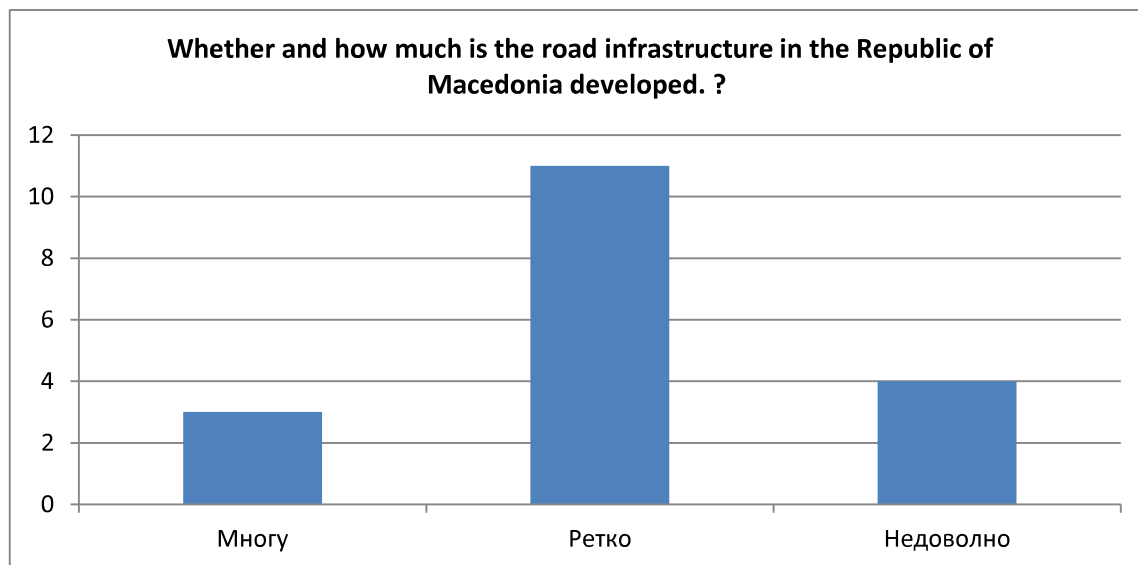
**Chart 1.** Whether and how much road and road transport is used in the realization of business (business) activities



Source: S. Aruči, Doctoral Dissertation, Management of the road infrastructure and its impact on the economic development of the Republic of Macedonia, Skopje (2018)

From the above diagram, it can be concluded that out of 18 respondents, 13 respondents reported that they use largely ("a lot") road and road traffic to realize their business activities, while 5 respondents reported the option "rarely" (means other types of traffic and transport). This means that road and road traffic is used mostly by companies to realize their business activities, it means that they need road and road traffic.

**Chart 2.** Whether and how much is the road infrastructure in the Republic of Macedonia developed.?

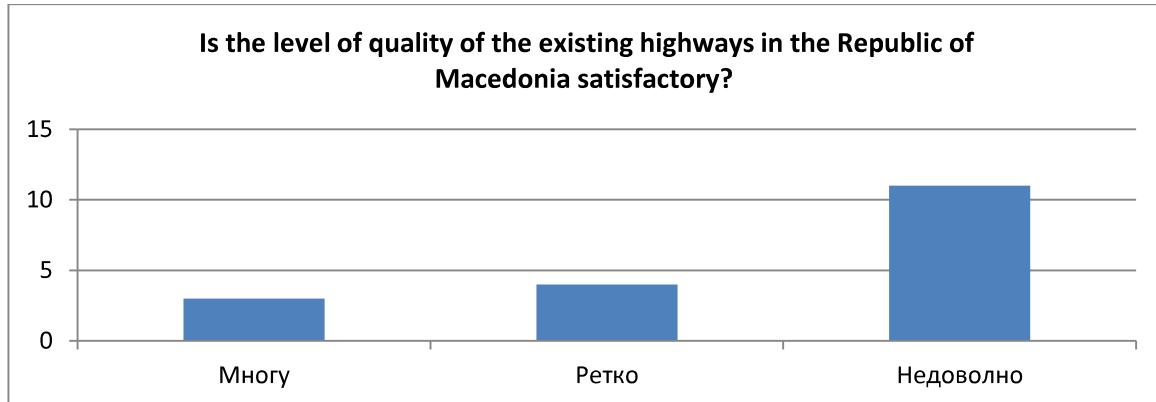


Source: S. Aruči, Doctoral Dissertation, Management of the road infrastructure and its impact on the economic development of the Republic of Macedonia, Skopje (2018)

From the diagram 3, it can be seen that only 3 companies believe that there is a satisfactory network of highways in the Republic of Macedonia, while the remaining 15 companies have a completely opposite opinion.

It turns out that the business sector in the Municipality of Gostivar is not satisfied with the construction of the highways in the Republic of Macedonia.

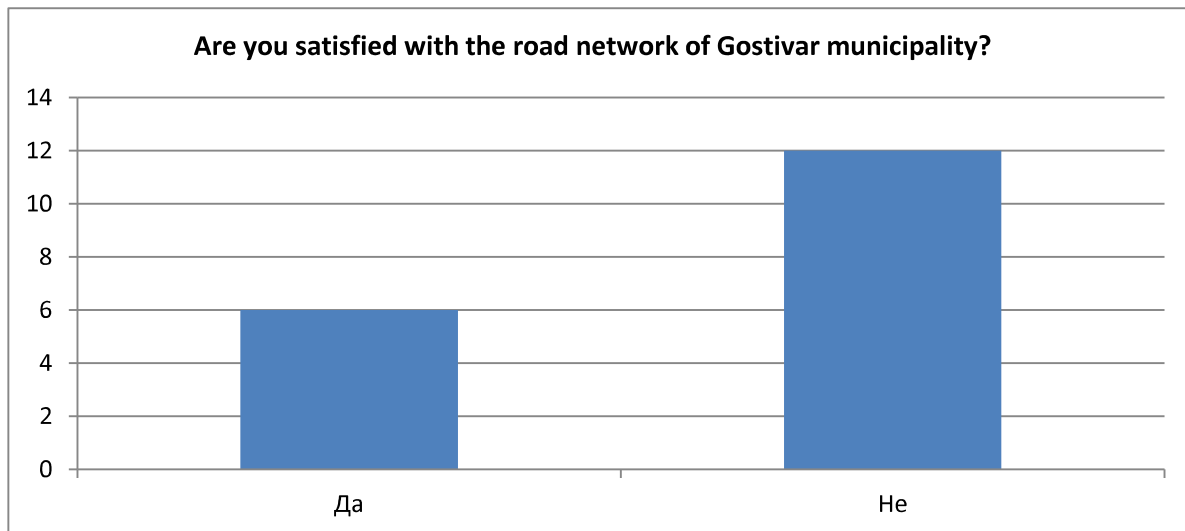
**Chart 4.** Is the level of quality of the existing highways in the Republic of Macedonia satisfactory?



Source: S. Aruči, Doctoral Dissertation, Management of the road infrastructure and its impact on the economic development of the Republic of Macedonia, Skopje (2018)

From diagram 4 we can conclude that there are a small number of companies (3) who are satisfied with the level of quality of existing highways in the Republic of Macedonia. Relatively satisfied are 4 companies, and 11 companies are dissatisfied. The given answers show that the businessmen of the companies from Gostivar municipality are not satisfied with the quality of the existing highways in the Republic of Macedonia.

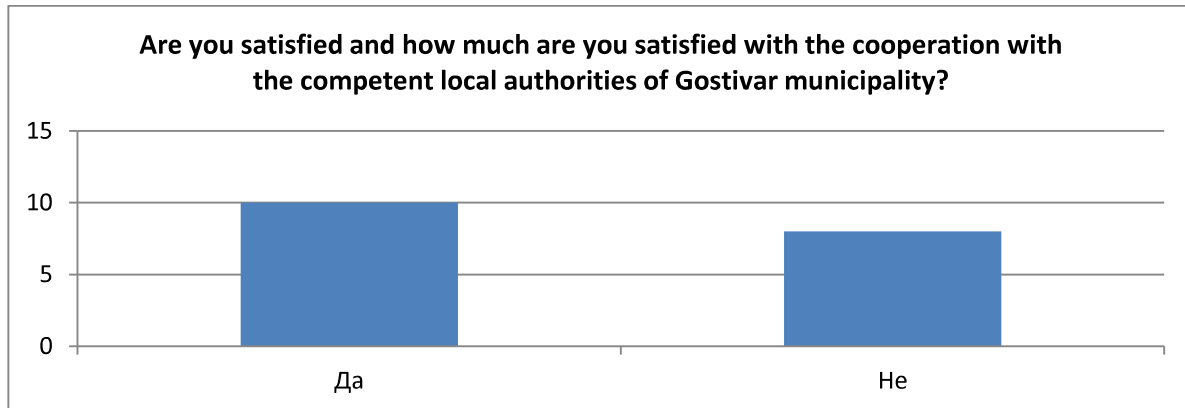
**Chart 5.** Are you satisfied with the road network of Municipality of Gostivar?



Source: S. Aruči, Doctoral Dissertation, Management of the road infrastructure and its impact on the economic development of the Republic of Macedonia, Skopje (2018)

Taking into account the received answers, it can be concluded that most of the businessmen in the companies of Municipality of Gostivar are not satisfied with the existing road network in the Municipality of Gostivar (12), and less twice satisfied with the same (6 companies). From here we can conclude that the businessmen of companies of Municipality of Gostivar are not satisfied with the road network at the level of the Municipality.

**Chart 6.** Are you satisfied and how much are you satisfied with the cooperation with the competent local authorities of Municipality of Gostivar?



Source: S. Aruči, Doctoral Dissertation, Management of the road infrastructure and its impact on the economic development of the Republic of Macedonia, Skopje (2018)

The responses presented in Chart 6 suggest that slightly more than half of the companies covered (10) are satisfied with the cooperation with the competent local authorities of Municipality of Gostivar, while the rest (8) are dissatisfied with the level of cooperation with the municipality. Analyzing the above considerations, we come to the conclusion that there is a need for construction of new highways, reconstruction of the existing road routes as well as complete modernization of the road infrastructure. The need is great, for the construction of the underdeveloped road infrastructure, as well as the reconstruction of the existing roads in the Republic of Macedonia, such as highways and other types of roads, of regional and local character.

## **CONDITION OF ROAD INFRASTRUCTURE IN CERTAIN EUROPEAN COUNTRIES AND IN THE NEIGHBORING COUNTRIES OF REPUBLIC OF MACEDONIA**

The total length of roads in the Republic of Germany is 656,140 km, of which 650,891 km or 99% are solid ground.

The Republic of Germany is the first country to build highways in 1932, the Cologne-Bonn road. There are highways with three or more lanes in one direction. The past 20 years' highways have been extensively expanded. Lower-ranking roads are also of high standards and very dense. The state highways are connected with the big cities and they are connected with the main railways, they serve the main European corridors and carry two-character names, such as A + number, where A1 to A12 are state highways, and from A11 to A99 are highways. The number of classical highways connecting cities is large, there are circular highways around big cities.

Switzerland is an important country in terms of transit traffic for people and goods traveling to the interior of the European Union. Due to its geographical position, it has great importance in international traffic with a well-developed road infrastructure. The total length of the road network is 71011 km, of which 1638 km belongs to the motorways.

The road network of the Republic of Serbia is approximately 40,845 km long, as follows: 5525 km of state roads of first order, 11,540 km state roads of second order and 23,780 km of local roads. The road network contains 498 km toll roads and 136 km toll collection points.

In the Republic of Serbia, 32% of the roads from the first and second lines are over 20 years old, about 14% to 10 years old. After years of insufficient investment in maintenance and reconstruction of the roads, the current situation is at an unsatisfactory level.

## **FACTORS THAT HAVE IMPACT ON THE DEVELOPMENT AND MODERNIZATION OF ROAD INFRASTRUCTURE IN REPUBLIC OF MACEDONIA**

Geopolitical changes in Europe have created political and economic relations between countries, where transport policies largely prefer market relations, which are an important stimulus for overall development, especially for countries in Eastern Europe and the Balkans.

Therefore, Republic of Macedonia should build its own transport policy in conjunction with the newly emerging geopolitical positions. An important factor for the development of Balkan countries for the development of mutual trade, and international transport that connects the markets of Central and Eastern Europe to the Middle East and North Africa are the construction of complex infrastructure corridors 8 (eight) and 10 (ten) crossing precisely on the soil of R. Macedonia, with the connecting roads that service the respective regions. Moreover, when the international corridors are planned, besides the interests of the country, which should be dominant, the interests of the neighboring countries as well as wider should be respected. This is due to the signing of bilateral and multilateral agreements, for the consent of the interests of the states, which is clearly expressed in the Critical Declaration, where European corridors were defined, including the new corridor number 8 (eight).

The main groups of problems in the transport infrastructure of the corridors are reduced to: economic, technical, technological, ecological, political, legal and development elaborations.

The main factors that influence the development and modernization of the road infrastructure of the Republic of Macedonia are:

- Economic development of the country;
- Use of natural resources of spatial development: agricultural land and mineral resources;
- Water resources and water resources infrastructure;
- Energy sources and energy infrastructure;
- Demographic development: natural population movement, fertility rates, mortality rates, migrations, territorial distribution of the population;
- Urbanization and system of settlements;
- Housing;
- Public functions: educational activity, healthcare activity, social protection, cultural activities, physical culture;
- Development and deployment of industry;
- Traffic infrastructure and communication systems;
- Environmental Protection;
- Protection of natural heritage;
- Protection of cultural heritage;
- Development of tourism and organization of touristic areas;
- Protection against military destruction, natural and technical - technological disasters.

## **ACTIVITIES OF ROAD INFRASTRUCTURE ON THE DEVELOPMENT OF REPUBLIC OF MACEDONIA**

The roads are the largest infrastructure projects laid over thousands of kilometers of territory, with a variety of graphic art and various accompanying facilities. All countries invest huge amounts of money on the roads every year. Also in the most developed countries, there is a need for investment in the road infrastructure. Because of the above, it is to build a cadre that fulfills the economic requirements of the "Cost-Benefit" method, viewed through the horizon of the end-time period of the region where it is invested. From here, the need for concentration of the financial assets obtained in relation to motor fuels and lubricants, as well as other financial means intended for this purpose.

The developmental economy is preoccupied with issues related to the growth and shifting of economies and societies over time.

The question of economic growth and the development of societies was a preoccupation for classical economists. Economists emerging after the Second World War were aware of such intellectual ties and roots. From the very beginning, they recognized the legacy of the classical growth economy. At that time the economists of the development theory were also directly preoccupied with the changes in the set-up and role of the institutions in the growth process, problems that are strongly emphasized by economists working in this field in recent years. It is therefore important for a new generation of development economists to have a connection and interaction with previous economists.

The policy framework adopted and applied by individual countries is considered critical in explaining the characteristics and dynamics of the development process. Three central components of the development dynamics are indisputable: the development of human resources, the macroeconomic stability and the openness of world trade.



The development and economy of individual sectors also depends heavily on the development of road infrastructure. The developed and modern road infrastructure is an important factor for the development of certain sectors of the economy.

There is a direct impact on the transportation of different products and the transport of passengers from one settlement to another, from one region to another, as well as international and transit trips, which are of great importance for the movement of people (tourists or other types of travel).

Road infrastructure has direct or indirect influence on all sectors of the economy, especially in the transport of raw materials, semi-products and finished products that need to be transported to warehouses, warehouses and retail stores, and used by end consumers.

One of the major issues in developing countries is the balance between the economic and social infrastructure where the road infrastructure belongs, in the allocation of scarce investment resources.

The zoning process means a long-term strategy for infrastructure development of the space for a particular economic purpose. The zones appear as spatial integrations in whose frames industrial and other economic and non-economic entities achieve a high rationalization of the costs of investing and acting in an aggregate location.

Due to the specific assumptions that the state should first provide, the zones have the character of highly capital intensive agglomerations whose economic efficiency comes to full expression in the developed countries.

## CONCLUSION

Starting with the question, whether the development of mankind was first caused by the building of roads or whether there the development first took place, is can still not be given a precise answer. Depending on the affinity of those dealing with this issue, priority is given to both, and each one has its own arguments. However, all agree in one argument, if the wheel is the most important invention of man, then the road is right after it. From prehistoric times, he was a factor that decided directly on the development of man and the area in which he lived, through him everything was transferred, from what meant the need for everyday life to elements that had a key influence on cultural, economic and political development. The development of the settlements took place at the crossroads or the important traffic routes through which the life of man in general flowed.

- Almost every economic sector can develop with good road infrastructure;
- Republic of Macedonia harmonizes trans-state policy between states;
- The fact that road infrastructure is a real bloodstream of a state is indispensable;
- The Republic of Macedonia needs to be included in the European road network;
- Republic of Macedonia should have a modern and high quality road infrastructure to be connected with all production plants, factories and industrial zones, etc.;
- Republic of Macedonia has the need for construction of new highways and modernization of existing highways in order to increase traffic safety, reduce transportation costs (fuel and depreciation of motor vehicles);
- Of particular interest to the Republic of Macedonia is the adjustment of our road system to the European;
- To form an association of experts, a kind of advisory body of the state bodies, which will deal with the problems of the overall road infrastructure at the state level and will

- propose possible solutions for the further development and modernization of the road infrastructure in the Republic of Macedonia;
- Granting a concession on some road routes and its resurgence could have a positive impact on the quality, efficiency, structure of the highways, as well as the overall road infrastructure of the Republic of Macedonia.

## Attachment No. 1

### SURVEY LIST

for analyzing the degree of development and use  
of the road infrastructure in the Republic of Macedonia

- Analysis of the attitudes of the business sector in the Municipality of Gostivar –

1. Company
2. Basic activity
3. Whether and how much road and road transport is used in the realization of business (business) activities?  
A lot              Rarely              Not  
Comment:
4. Whether and how much is the road infrastructure in the Republic of Macedonia developed.?  
Enough              Middle              Not enough  
Comment:
5. Does the Republic of Macedonia have sufficient highways?  
Yes                      No  
Comment:
6. Is the level of quality of the existing highways satisfactory?  
Enough              Middle              Not enough  
Comment:
7. Are you satisfied with the road network of Gostivar Municipality?  
Yes                      No  
Comment:
8. Are you and how satisfied are you with the cooperation with the competent local authorities in the Municipality of Gostivar?  
Yes                      No  
Comment:
9. Your comment on road infrastructure in the Republic of Macedonia.

\_\_\_\_\_  
GOSTIVAR

M.P. \_\_\_\_\_

\_\_\_\_\_  
Signature

## REFERENCES

- [1]. Lepavtsov, Engineering articles and roads, theoretical and practical evictions, Skopje (2001)
- [2]. S. Aruci, Doctoral dissertation, Management of the road infrastructure and its impact on the economic development of the Republic of Macedonia, Skopje (2018)
- [3]. P. Nedanovski, Economic Aspects of Environmental Protection, Economic Faculty, Skopje (2001)
- [4]. N. Nikoloska, Regional Economy, Skopje (2000)
- [5]. [www.ec.europa.eu/enterprise/entrepreneurship/index\\_en.htm](http://www.ec.europa.eu/enterprise/entrepreneurship/index_en.htm); "SBA FACT SHEET; Albania, Croatia, FYROM, Serbia, Slovenia. Norway "(2009)
- [6]. [www.ec.europa.eu/enterprise/entrepreneurship/index\\_en](http://www.ec.europa.eu/enterprise/entrepreneurship/index_en); " Supporting the internationalization of SMEs ";
- [7]. Final Report of the Expert Group; European Commission; December (2010) Public Enterprise for State Roads, Skopje.
- [8]. Roads in Macedonia, Skopje.
- [9]. [www.aashto.org](http://www.aashto.org)
- [10]. State Statistical Office.