REPORT ON DATA IN TRANSNATIONAL TEMPLATE

DESTINATION/MUNICIPALITY: **ZRENJANIN**
PROVINCE: VOJVODINA
REGION: **CENTRAL BANAT DISTRICT**
COUNTRY: **SERBIA**

The city of Zrenjanin is located in the north-east of the Republic of Serbia, in the center of the Serbian part of Banat, part of the Autonomous Province of Vojvodina. The area of the City extends to 1,327 km^2, which is slightly more than 6.1% of the surface area of the statistical region of Vojvodina, and the second is by surface in the Republic of Serbia.

Executive summary

Analysis of the collected data through the questionnaire for the city of Zrenjanin shows a decrease in the total number of the population, while at the same time the number of non-permanent residents and tourists arriving in Zrenjanin is increasing. All this, in addition to other factors, affects the general increase in mobility.

It was recognized as disadvantage for purpose of future plans and scenarios missing data in the given template, due to no reliable information that data are being collected or existing for area of Zrenjanin, especially data related to movements (productions and attractions of travel). Also, last traffic study in Zrenjanin was realized back in 1973. Since then, no similar study has been produced to track the needed and satisfaction of transport needs in Zrenjanin.

In order for Zrenjanin to further develop in the right direction and in a better way towards sustainable mobility, it is necessary to proceed to the development of a new traffic study in the coming period.

Investing in infrastructure is visible, investing in the bypass, construction of the highway Belgrade - Zrenjanin and the express motorway Novi Sad – Zrenjanin, investing in cycling lanes and in plans related to this mode of traffic. All this is an indication that Zrenjanin is seeking to move towards to establishment of sustainable mobility and makes priorities - planning for people and the environment, not for cars and traffic.

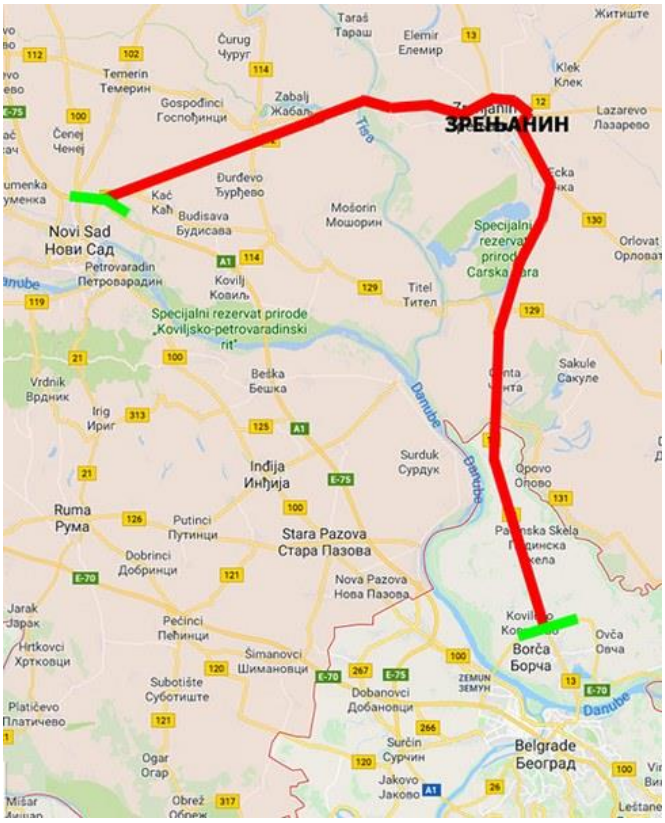

Figure 1. Future express motorway/highway on route Novi Sad – Zrenjanin - Belgrade

A more detailed overview of the conclusions is given in the text below, classified in the following chapters:

1. Demographic and socioeconomic data
2. Transport demand
3. Transport supply
4. General state of mobility in your municipality
5. Main negative externalities from mobility

Demographic and socioeconomic data

From the aspect of demographics data, Zrenjanin has no complimentary data due to the negative population growth that is increasing from year to year. Population of the city of Zrenjanin on yearly period is in a limited decline (growth rate of app. -0.5% per year). For the period of 10 years the number of inhabitants has decreased by almost 10,000 inhabitants. In 2017, number of permanent residents is 117735. Average age of permanent residents from 2006. to 2017. year is 42.5 years. Average members for household are 2,77 members.

There is a trend of increasing the population of over 65 years (in the period of 10 years it has increased by just over 14000), and a decrease in the number of inhabitants from 0-14 years (in the period of 10 years it has decreased by almost 6000).

It is noted that the densest areas of the City of Zrenjanin are Zrenjanin itself, then settlements Ecka, Klek, Stajicevo, Lukicevo and average population density amounts 89 inhabitants per km^2. The problem is in the data on non-permanent residents (transfer student, transfer workers, etc.) about which there are currently no records.

From the aspect of socioeconomic data, as well as in demographic data, Zrenjanin has decrease in the number of students, so for a period of 10 years the total number of students decreased for more than 25%. As for the number of employees, it was spotted gradual increase in the number of employees in public sectors as well as the industry, while the reduction in the number of employees occurs in the private sector as well as in agriculture. Positive are data on the number of unemployed residents which, for the period of 10 years, decreased by more than 2.5 times (from 15365 (in 2007) to 6052 unemployed (in 2017)).
As for income, in relation to the national total number for 2016. year, Zrenjanin makes 1.5%. The income of Zrenjanin ranges from 25.3 to 41.5 million euros per year.

Transport demand

From aspect of transport demand, observing the data collected with the questioner it can be concluded that while number of residents declining over time, at the same time the number of commuters is increasing. Also, average number of tourists is 14,753.00. Great changes are also observed in annual level of total trips in Zrenjanin, it is noticeable that the number of trips has grown from year to year, so in 2017 it was higher for 448,427.0 trips, or 2.2 times. Next, in regard to reason of transport, the largest number of trips are trips for work, then trips for study.

In aspect of mode of transport, the largest number of trips in Zrenjanin is done walking, immediately after walking are travels made by car and by bus. Also, a huge number of people use a taxi as theirs travel mode choice.

Also, data on the number of registered vehicles by categories, number of cars per 1000 inhabitants, are different from year to year, and also shown an evident increase in the degree of motorization, especially in the number of passenger cars.

When collecting the necessary data, all relevant institutions in the city of Zrenjanin were contacted to get the accurate data collection for the needs of the formation of more mobility scenarios for the city of Zrenjanin. A major drawback to the transport demand is the lack of important data among which are number of originated and attracted trips, data on freight trips, freight movements, data of fuel distribution for engine classes, modal share of freight transport, etc.

This chapter also deals with a various tourist information. Tourists arrivals by means of transport in Zrenjanin has a distribution so 60% is by car, 25% by bus, 5% by bike and 1% by boat. Daily spending per overnight tourist on accommodation, food, drinks, and other services is ranging from 63 to 75 euros, and daily spending per same day visitors is ranging from 16 to 23 euros. Highest number of tourists is in the age group of 45-64 years. The motivation for visiting Zrenjanin is various, but according to the data, tourists are coming mainly because of cultural holiday, natural, active or relax and wellness holiday.

The problem is also the lack of data on traffic flows on local roads in Zrenjanin. Data are available for State roads IB category passing through Zrenjanin.

Zrenjanin should in next period work on elaboration of transport model which will use to evaluate existing conditions and to project future effects and needs of transport.

Transport supply

In Zrenjanin there are several transport modes available. For passenger trips there are car, taxi, bus, train, bicycle, motorcycle, walking, and for freight trips there are car, light and heavy vehicles, train, airplane and motorcycle. Transport infrastructure of Zrenjanin consists of 68.2km of urban roads, 129.3km of extra urban roads, 55km of railways, 35km of cycling lanes, 2.4km^2 of pedestrian area.

Urban and suburban public transport is entrusted to Net Bus company, which has 50 vehicles with which it can transport a total of 3,855 passengers and each year it travels 4,000,000 km.
Currently, there is no bike sharing and car sharing system in the city.
Number of parking lots in Zrenjanin is 2191 of outdoor parking lots among which 662 is closed parking lots and 1529 is on street parking lots. Parking charge is carried out by zone, where in I zone is 0.42 €/h, in the II zone is 0.33 €/h and in the III zone is 0.25 €/h.

Main problem related to mobility is insufficiently built infrastructure that would significantly change the traffic image on the network and thus impact the redeployment of modes of transport which would significantly affect the overall mobility. Resource management requires the introduction of new methods for understanding mobility in order to sustain the city's development.
In the last ten years, there have been new open-source sites in the city that have influenced the mobility i.e. layout of the user's movements on the network. All the changes that happened on the traffic network they were not accompanied by its impact on the transport process.

General state of mobility in your municipality

Zrenjanin, like many cities of today, faces a multitude of challenges related to traffic jams, noise, air quality, health, safety, quality of life and various other problems in the field of urban traffic. On a global level, the challenge of climate change and their impact on the environment, health and economy is strongly related to traffic and behavior that is accompanied by unsustainable mobility. Promoting a long-term change in the commitment of the users of the traffic system to more efficient and less polluting traffic are some of the goals that are set out today in many strategic decisions.

In driving demand management, encouraging alternative transport models include measures to encourage the use of environmental transport models through different campaigns. The basic concept of these models is an attempt to raise the level of awareness about the environment in which users move and the ways in which their movement affects the environment, but also on them. Increase in the number of campaigns related to the improvement of the public transport

system, the promotion of the participation of bicyclists and pedestrians in traffic, the integration of different modes of transport, all in order to increase the quality of alternative urban mobility.

Transport information and public campaigns can affect people's awareness, attitudes and behavior of passengers in such a way as to encourage the use of bicycles, hiking and the use of public transport. Campaigns can be conducted to raise awareness of the general public, target groups, or as individualized campaigns.

One of the goals of mobility management is finding ways to meet the need for moving through more efficient and integrated use of existing alternative modes of transport and infrastructure, as well as to improve cooperation among different modes of transport, facilitating the interconnection and functioning of existing transport networks.

The use of public transport includes walking, both at the beginning, at the end of the road, as well as during the transit. In general, walking is an alternative to short trips. Street design refers to factors such as the size of residential blocks, intersection (number, width and use of traffic lanes, parking lots, traffic islands, and sidewalks), traffic calming characteristics, pavement conditions, street mobilier (benches, poles, bins, gardeners) The application of street design that reduces the speed of motor vehicles, improves connectivity, favors alternative modes of transport and improves conditions for walking and cycling, striving to reduce the use of cars and encourage the use of alternative modes of transport.

Motorcycles are generally considered recreational vehicles, although there is a growing tendency for their use in our area when traveling to work. The primary advantage of these vehicles in urban environments is their efficiency in terms of space and fuel.
Taxis are considered to be an integral part of public transportation systems in some countries. In any case, there is also a taxi service that represents an important part of traffic for those who do not own a car, older citizens and categories of citizens with reduced mobility. In the last few years, this type of transport has become equal with other forms of public transport, and in some cases, taxi is the most viable mode of transport.
Measures to use a private car are undertaken in order to make it more efficient. The measures are concentrated primarily on improving the traffic flow itself and increasing the utilization rate of the vehicle itself.

In the last ten years, there have been new open-source sites in the city that have influenced the mobility i.e. layout of the user’s movements on the network. A new Medical School was opened and it was significantly built on a brand-new location. Two industrial centers "Istok" and "Jugoistok" with completely new infrastructure were opened. Various facilities were opened in these locations, which enabled the opening of thousands of new jobs.

Main negative externalities from mobility

The main parameters for negative externalities from mobility are quantity of sold fuel, air quality (traffic emissions), noise pollution, number of road accidents, number of most congested zones.

In Zrenjanin there are devices intended for measuring and control of air quality and noise pollution. Devices are located in many locations in the city. Main negative side is that air quality measurement devices do not measure data related to CO2 emissions.

As for noise, based on the measured data for a period of 10 years, it is characteristic that the noise in the zone of the school, both day and night, is higher than the allowed. The same is in the hospital zone. There is noise in the industrial zone, as well as on the main roads, where there is a distinctive higher sound than allowed from 2007 to 2015. In the last two years, the noise in these two zones is moving within the limits of allowed values.

Another problem is the phenomenon of road congestions. Main reasons of congestion are overloading of traffic infrastructure, the number of vehicles exceeds the projected possibilities of the road. The old infrastructure inherits new traffic situation (industrial development, increase in the number of vehicles...). Periods when road congestion occurs is: 07:00-09:00 h and 14:00-16:00 h.

Congestions in Zrenjanin arose after the closure of the central street near the city square and the lack of alternative roads (the above intersections took over the entire burden of traffic through the city center). These places are:

- Intersection Zitni trg - Nikola Pasic - Djurdja Smederevac
- Intersection Zmaj Jovina - Skadar and intersection Zmaj Jovina
- Vojvode Petra Bojovica - Djure Jaksica
- The roundabout of the main road - Brigadier Ristic and Obala Sonja Marinkovic

The transnational data model for Zrenjanin is filled with all the available data that were found for the requested areas and for the requested period. For a large part of missing data in the given template, there is no reliable information that data are being collected or existing for area of Zrenjanin.

Good example of planning, development, monitoring and development of the traffic system was realized through the 1973 Zrenjanin Traffic Study. Since then, no similar study has been produced to track the needed and satisfaction of transport needs in Zrenjanin. Considering the past period from which the study was developed to date, as well as the development of Zrenjanin in last 40 years, the study data is not relevant for further use. Proposal is, especially due to the bypass construction planning, to make a traffic study in the coming period to gather all the necessary data for the further development of the city.

Data requested for the needs transnational data model are very important for the development of the city, proposal for the city of Zrenjanin is to establish a methodology for collecting data on transport characteristics and to form an information system that would monitor all areas defined in the transnational template in the coming years.