

The social risk forecast indicator of the road traffic accidents in the territory of Khabarovsk and the Khabarovskiy krai

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Abstract. The paper analyzes the road traffic safety in the territory of Khabarovsk in 2011-2020 according to the following indicators: the severity of the accidents, the severity of the consequences, the social risk, the forecast indicator of the social risk in the city of Khabarovsk by 2024. The analysis is based on the exponential smoothing method using the statistical data of 2011-2020. The forecast indicator of the social risk is compared to the value established by the Road Safety Strategy in the Russian Federation for 2018 - 2024, as a target by 2024. An assessment of achieving the mortality rate reduction in the Khabarovskiy krai is also given. The impact of the pandemic consequences and the socio-economic situation on reducing the road accidents mortality are examined. The objective data on the costs increasing to support the population and business being evaluated, the target values are set by the national project in 2020 and the subsequent years. For the analysis, the empirical methods are used, such as: examining the results of the previous activities; the expert assessments; the methods of studying an object in time: retrospective, forecasting. The socio-economic factors are considered the most susceptible to reduce the traffic accidents mortality.

The road traffic safety improving to save the life, the health and the property of the citizens of the Russian Federation is one of the priority areas of the state policy and the important factor in ensuring the sustainable socio-economic and demographic development of the country [1].

The solution of the problem to ensure the road traffic safety is one of the priority tasks of Khabarovsk developing. Frequent traffic jams, wrong parking, poorly distinguishable markings, uneven road surface becoming the causes of accidents and other problems on the roadway, the traffic safety largely depends on the road traffic safety organization.

The city of Khabarovsk is a municipal entity that is a part of the Khabarovskiy krai, and has the status of an urban district.

The territory of the city is 38.9 thousand hectares, including the area of the right bank - 23.0 thousand hectares, the left bank - 15.9 thousand hectares.

Population as of January 01, 2020 - 616,372 people.

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The city includes 5 districts: Zheleznodorozhny, Kirovsky, Krasnoflotsky, Central and Industrialny. [2, 6-12]

According to ODM 218.4.005-2010 Recommendations on road traffic safety assessing the accidents degree both on the individual roads and on the road network as a whole, a system of characteristics has been elaborated to analyze the number and severity of the traffic accidents, account the vehicle mileage, the state of the road park and other factors. Included [3].

According to the official data reporting from the traffic police, over the past 10 years (from 2011 to 2020), 10,384 road traffic accidents took place in Khabarovsk, in which 472 people died and 12,800 were injured. [4]

The distribution of the road traffic accidents (RTA), the number of injured and fatalities by year are shown in Figure 1.

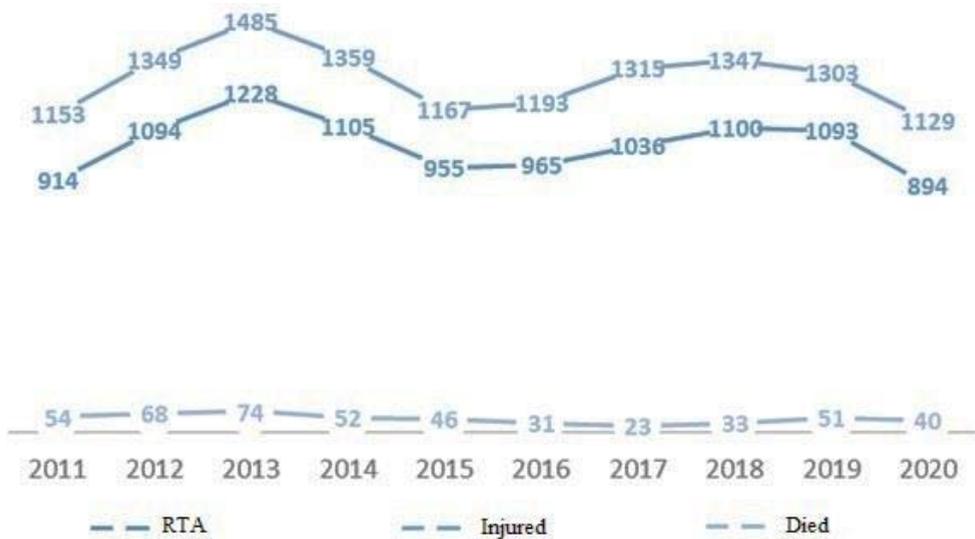


Fig. 1. Statistics of the road traffic accidents in the city of Khabarovsk 2011-2020.

Let's analyze the road traffic safety according to the following indicators [5]:

1. The severity of the accidents - the number of victims of the road traffic accidents per one road accident;
2. The severity of the consequences - the number of deaths as a result of the road accidents per 100 victims;
3. The social risk - the number of deaths in the road accidents per 100 thousand population.

The crash analysis is shown in Table 1.

The indicator of the social risk is not more than 4 deaths per 100 thousand of the population. set as a target by 2024 by the Traffic Safety Strategy in the Russian Federation for 2018-2024, which is the basis for planning the traffic safety policy implementation by 2018-2024 and provides an integrated approach to solving the problem of the road transport injury.

Table 1. The analysis of the traffic accidents in the period from 2011 to 2020

Year	Population	RTA	Died	Injured	Severity of accidents	Severity of consequences (%)	Social risk
2011	577 980	914	54	1153	1,32	4,47	9,34
2012	585 556	1094	68	1349	1,30	4,80	11,61
2013	593 636	1228	74	1485	1,27	4,75	12,47
2014	601 043	1105	52	1359	1,28	3,69	8,65
2015	607 216	955	46	1167	1,27	3,79	7,58
2016	611 160	965	31	1193	1,27	2,53	5,07
2017	616 242	1036	23	1315	1,29	1,72	3,73
2018	618 150	1100	33	1347	1,25	2,39	5,34
2019	617 473	1093	51	1303	1,24	3,77	8,26
2020	616 372	894	40	1129	1,31	3,42	6,49

The traffic safety strategy in the Russian Federation for 2018 - 2024, being an inter-sectoral strategic planning document for the medium term, is developed in pursuance of subparagraph "a" of paragraph 3 of the list of instructions of the President of the Russian Federation No. Pr-637GS of April 11, 2016 following the meeting of the Presidium State Council of the Russian Federation, held on March 14, 2016 [6].

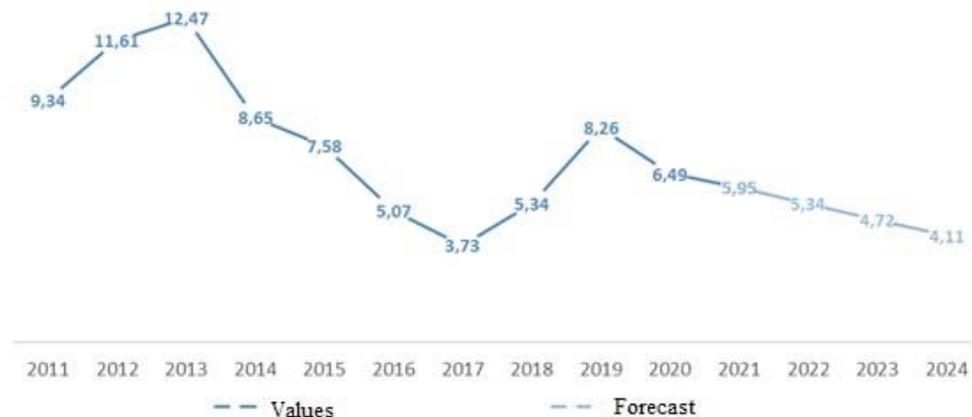


Fig. 2. Forecasting the social risk indicator in the city of Khabarovsk by 2024 based on statistical data from 2011-2020.

The social risk forecast indicator in the city of Khabarovsk by 2024 was 4.11 deaths per 100 thousand, which is more than the target.

However, it should be noted that the incomes of the population in the Khabarovskiy krai in the 1st quarter of 2020 are identical to the volumes achieved in the 1st quarter, 2019. It should be noted that, as in the same period of 2019, incomes still exceed the level of consumer spending of the population (Fig. 3).

The new import restrictions on the left-hand drive cars into the Russian Federation, which were to enter into force on July 1, 2020 (GOST technical regulations of the Customs Union, adopted by the EEC) complicate the procedure for the cars' customs clearance (duties will depend on their age and the environmental class). As well as the car owner will need to obtain a technical certificate confirming that the design of the car meets the safety requirements. These restrictions prompted many residents of the Khabarovskiy krai to purchase a used right-hand drive car.

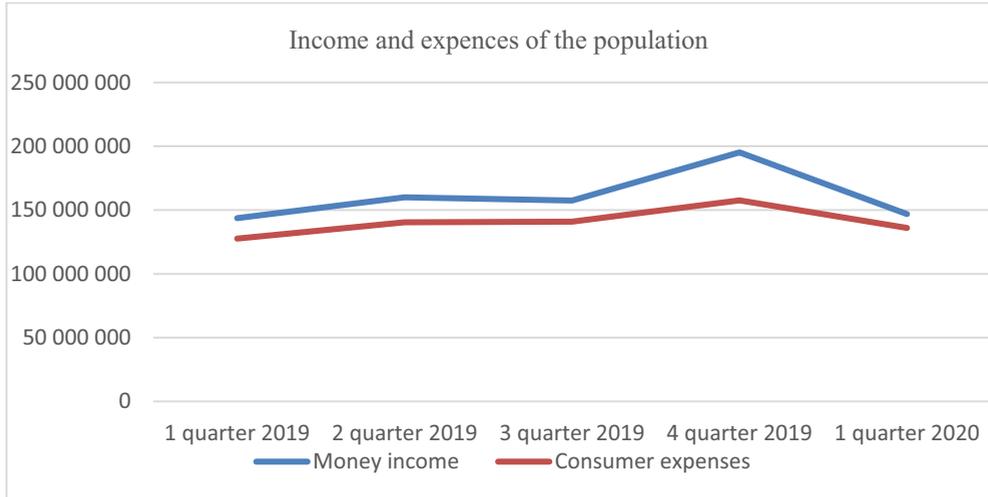


Fig. 3. Income and expenses of the population in the Khabarovskiy krai.

In 1 quarter of 2020, it was imported and registered in the territory of the region by 37.5% more than in 1 quarter of 2019 (2260 cars / 2019; 3108 cars / 2020). During this period, in the Khabarovskiy krai, the number of the purchased cars manufactured in Russia increased by 12.3%.

It should be noted that the new cars' prices increased significantly from 4% to 20%, depending on the car make and the model of a car, while the supported cars, prices on the contrary, fell from 1% to 8%.

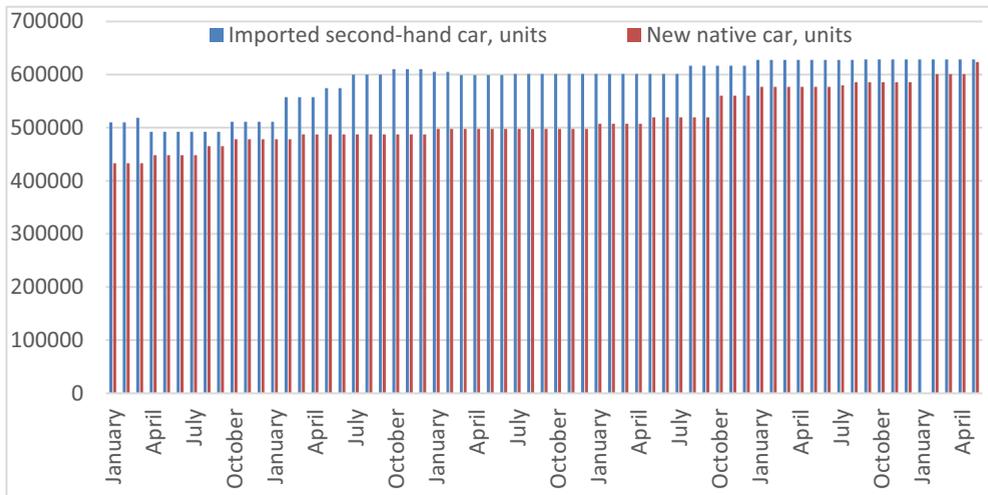


Fig. 4. Costs for the cars in the Khabarovskiy krai.

The rising prices and the declining demand for the new vehicles (as much safer), the increasing demand for the used vehicles (as less safe) and the vehicles' operation, repair and maintenance costs result in increasing the number of technically faulty vehicles. It has a significant impact on the achievement not previously received social risk index in 2020 and subsequent years. An equally high level of the failure impact to achieve the social risk indicator in 2020 and subsequent years lead to increasing unemployment and, therefore, to increasing the violations committed by the population not involved in production. It includes

those related to the illegal transportation of the passengers and the goods, the alcohol consumption and the drunk driving, etc.

In the region, due to the coronavirus pandemic, 20% of the employees have lost all or a part of their labor income. Among them are the entrepreneurs and the self-employed: 41% have already completely stopped their business or work, the others 33% have lost income. The unemployment in the region has grown by 27.6% since March 2020.

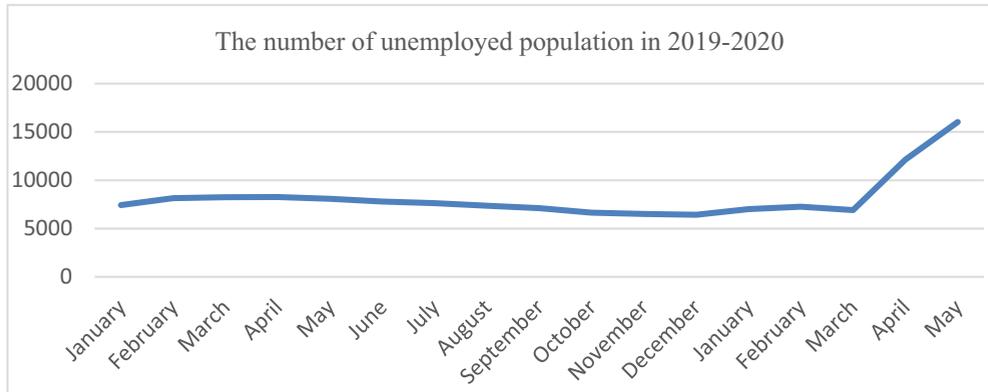


Fig. 5. The number of the unemployed population in the Khabarovskiy krai

It should be emphasized that the sharp increase of the unemployed population is associated primarily with the mass registration of the population employed earlier at the enterprises that admit employment without registration. However, the presence of a sufficiently large number of the vacancies in various sectors of the economy acts as a buffer for the consequences of the crisis on the labor market. This is confirmed by a relatively low indicator of the tension coefficient on the labor market (1.0 as of June 17, 2020).

The increasing number of the population at the moment did not affect the growth of the road traffic accidents in general and the number of the road traffic accidents in a state of an alcoholic intoxication, in particular.

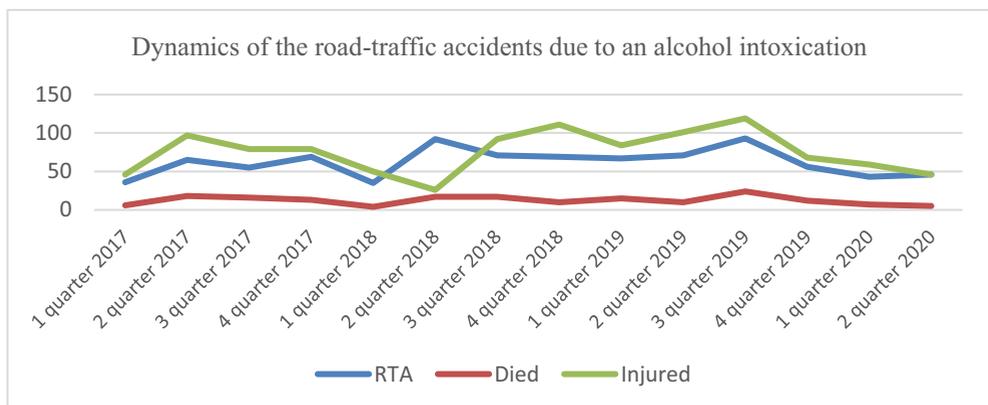


Fig. 6. The dynamics of the road-traffic accidents due to an alcohol intoxication of the drivers in the Khabarovskiy krai

The reduction of the subsidies for air, rail, water and other transport means leads to increasing the road transportation volume, the reduction of the subsidies for purchasing the

new road transport; result in an amount of the road traffic accidents due to technical malfunction of the vehicles purchased in the secondary market.

The increasing goods and passengers road transportation (as the most economically profitable) and the transportation within the framework of delivery services, increases the risks of worsening the state of the road traffic accidents in the coming years.

Large distances between the settlements of the Khabarovskiy krai do not imply an increase in daily labor migration between them. Labor migration within the boundaries of one agglomeration can be redistributed, but the impact on the existing traffic intensity is not significant (within 1.5-2%).

The main volume of the commercial traffic in the Khabarovskiy krai falls on the passenger transport, in the context of decreasing the population income, the public transport volume decreasing and the increasing travelling by private cars are expected.

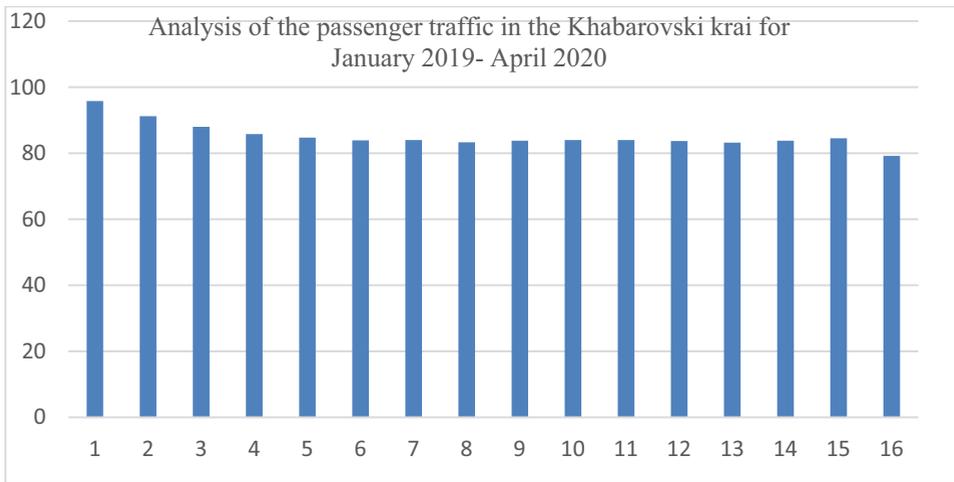


Fig. 7. Analysis of the passenger traffic in the Khabarovskiy krai for January 2019- April 2020

Limiting visits to the foreign countries in summer will lead to an increase in the interregional tourist trips, an increase in the interregional movements of the citizens by a personal road transport.

About 20% of the road traffic accidents occur on the interregional and federal roads of the Khabarovskiy krai.

In connection with the closure of the international traffic, the residents of the Khabarovskiy krai consider the Primorsky krai and the Krasnodar krai as the recreation places.

The travelling restrictions to the Krasnodar krai should be considered: the cost of a flight (voucher) to the Krasnodar krai, the need for a certificate of the absence of coronavirus, the rules for transporting the passengers during the air travelling, the fear of infection.

Among the significant restrictions on the interregional road trips, the following should be indicated: the presence of the internal restrictions in different regions (the need to sit in a quarantine zone or provide a certificate); the lack of the developed infrastructure; the cost of a ticket that does not correspond to the service level.

Today, it should be noted that the regional projects funding aimed at ensuring road safety has been decreased.

The funding has been decreased in the related programs and the projects of the region in the field of transport, road facilities, health care, education, education, infrastructure,

industry, crime prevention and public order, which are aimed at improving the overall systems functioning in these areas.

The lack of the funding creates some difficulties in the activities of the executive authorities in resolving the issues directly or indirectly related to ensuring the road traffic safety.

The insufficient funding reduces the efficiency of functioning and a further development of the intelligent transport systems (ITS), and in particular the system of the automatic photo and video recording of the traffic violations (more than half of the complexes installed in the Khabarovskiy krai are in a malfunctioning state).

Conclusions

Based on the obtained results of the assessed factors, it is possible to determine the likelihood of achieving the regional values of the social risk and to offer the reasoned proposals for changing this indicator in 2020 and the subsequent years.

An assessment of the change in the social risk indicator in relation to the previous period shows that the deviations of this indicator from the one laid down in the Safe and Quality Roads (SQR) program occurred in 2018 in the context of the funding restrictions. In the future, it was not possible to provide a gap between the established indicators and the actual level within the framework of the allocated funding without revising the main activities of the SQR.

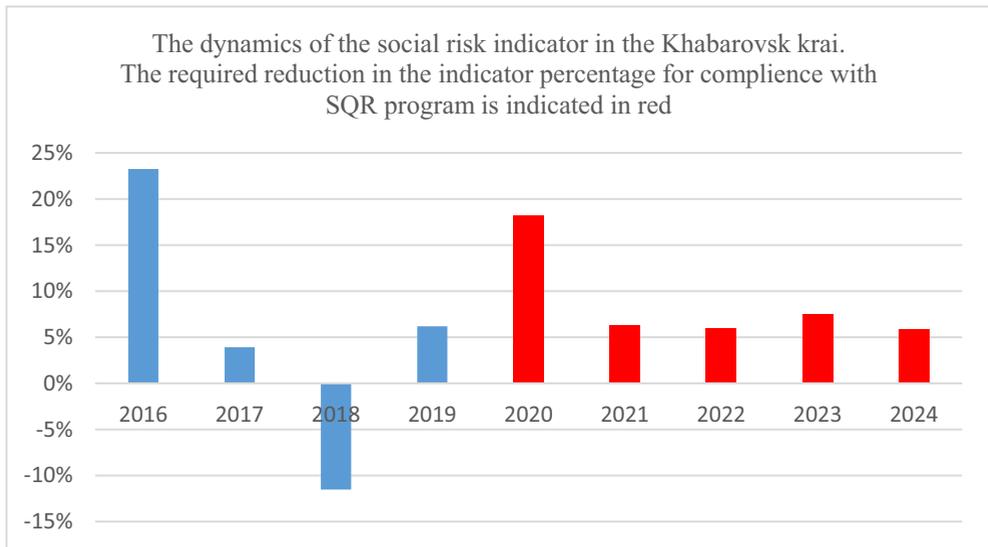


Fig. 8. The dynamics of the social risk indicator in the Khabarovskiy krai.

The SQR program realizing the target indicators involves ensuring the social risk reduction by 18% compared to 2019, which is not achievable in the difficult socio-economic situation caused by the pandemic, or a deficit in funding.

With the existing system of funding and the measures being taken in the field of the road safety, the social risk is likely to be reduced by 6% per year.

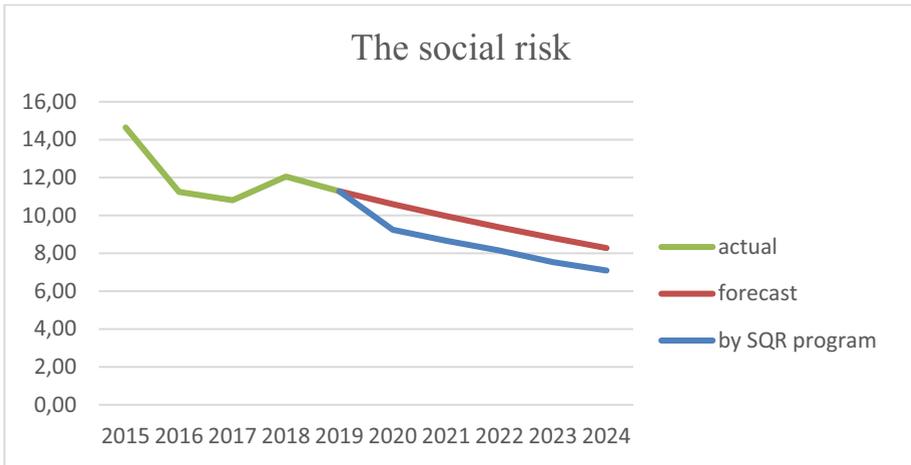


Fig. 9. The social risk forecast in the Khabarovskiy krai

Table 2. The social risk significance

The social risk significance										
	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
For the SQR program	-	-	10,80	11,00	10,00	9,24	8,66	8,14	7,53	7,09
The actual and required change in the indicator in %		+ 23 (fact)	+ 4 (fact)	- 12 (fact)	+ 6 (fact)	18 (requi-red)	6	6	7	6
Possible under maintainin g a stable funding	14,65	11,24	10,80	12,05	11,28	10,60	9,96	9,36	8,80	8,27

It is possible to achieve such results with an increase in funding to improve the road safety in the urban agglomerations of Khabarovsk and Komsomolsk-on-Amur, and the revision of the SQR program. As well as to intensify the certification and the development of the projects to organize the road network in the cities' and the large settlements', to bring the technical traffic, transport and operational indicators of the roads to the norm.

It is necessary to improve the road infrastructure in terms of improving the road safety (eliminating the road traffic junctions, eliminating the unsatisfactory road conditions), to develop the proposals related to the road safety issues in planning and developing the territories, to improve the automation of the road traffic control based on the high-tech electronic and mobile technology, to integrate the traffic management systems into the intelligent transport systems using international experience [13].

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