

Artículo de investigación

# The insurance telematics as a tool to improve road safety in the context of the russian market of autoinsurance

El seguro telemático como herramienta para mejorar la seguridad vial en el contexto del mercado ruso de autoaseguro

A telemática do seguro como uma ferramenta para melhorar a segurança rodoviária no contexto do mercado russo de auto-seguro

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## Abstract

The relevance of the research is determined by the objective need for innovative technological solutions for traffic safety. The paper studies the main trends in the Russian auto market. The characteristics of the types of technological innovation in insurance. It is studied in detail the company's telematics product Raxel Telematics, which allows comprehensively influence the risks arising from the driver, such as the number of accident rate driving style, car parts wear and increased risk of the use of vehicle on the road. An attempt is made in practice to assess the effectiveness of this product in the Russian market. In particular, it was found that the number of road accidents with victims after the application of customer notification system about the need to be serviced decreased 3 times and considerably lower in relation to the global statistics. Identified the drivers of grows and barriers to the development of smart insurance in Russia. The study confirms the need for the insurance telematics in the Russian market with the aim of revitalizing the auto insurance and reduce road traffic injuries and deaths.

**Keywords:** Road safety, russian auto market, road accidents.

## Resumen

La relevancia de la investigación está determinada por la necesidad objetiva de soluciones tecnológicas innovadoras para la seguridad del tráfico. El artículo estudia las principales tendencias en el mercado automovilístico ruso. Las características de los tipos de innovación tecnológica en seguros. Es estudiado en detalle el producto telemático de la compañía, Raxel Telematics, que permite influir de manera integral en los riesgos derivados del conductor, como el número de accidentes, el desgaste de las piezas del automóvil y el mayor riesgo de uso del vehículo en la carretera. En la práctica, se intenta evaluar la efectividad de este producto en el mercado ruso. En particular, se encontró que el número de accidentes de tráfico con víctimas después de la aplicación del sistema de notificación al cliente sobre la necesidad de recibir servicio disminuyó 3 veces y fue considerablemente menor en relación con las estadísticas globales. Identificó los impulsores del crecimiento y las barreras para el desarrollo de seguros inteligentes en Rusia. El estudio confirma la necesidad de la telemática del seguro en el mercado ruso con el objetivo de revitalizar el seguro de automóviles y reducir las lesiones y muertes causadas por el tránsito.

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**Palabras claves:** Seguridad vial, mercado automotriz ruso, accidentes de tráfico.

## Resumo

A relevância da pesquisa é determinada pela necessidade objetiva de soluções tecnológicas inovadoras para a segurança no trânsito. O artigo estuda as principais tendências do mercado automobilístico russo. As características dos tipos de inovação tecnológica em seguros. Estudou em detalhe o produto telemático da empresa Raxel Telematics, que permite influenciar de forma abrangente os riscos decorrentes do condutor, tais como o número de acidentes com o estilo de condução, o desgaste das peças e o aumento do risco de utilização do veículo na estrada. Uma tentativa é feita na prática para avaliar a eficácia deste produto no mercado russo. Em particular, verificou-se que o número de acidentes rodoviários com vítimas após a aplicação do sistema de notificação ao cliente sobre a necessidade de ser atendido diminuiu 3 vezes e consideravelmente menor em relação às estatísticas globais. Identificou os drivers de crescimentos e barreiras para o desenvolvimento de seguro inteligente na Rússia. O estudo confirma a necessidade da telemática de seguros no mercado russo com o objetivo de revitalizar o seguro de automóveis e reduzir as lesões e mortes no trânsito.

**Palavras-chave:** Segurança no trânsito, mercado automobilístico russo, acidentes rodoviários.

## Introduction

Safety of road transport is a major problem worldwide. Injuries caused by traffic accidents, is among the three leading causes of death in the population aged 5 to 44 years (Global Plan for Implementing Actions to Ensure Road Safety 2011-2020)

According to the UN report on road safety the economic consequences of road accidents account for 1-3% of the GDP of the world, reaching a total of 500 billion. Dollars. USA (Global status report on road safety 2015). Prevention of traffic accidents - a very complex activity, since it requires both technical and functional competence. One of the innovative solutions that improve road traffic safety is the insurance telematics. This is an innovative direction in insurance, which implies the use of information technologies and monitoring tools to collect insurance on the operation object information and further use of the latter for the formation of insurance rates. The introduction and development of technology can serve to benefit all participants in the insurance market: insurance companies, their customers and society as a whole. This observation is the main motive of this study.

## Materials and methods

Reduction of injuries and deaths related to accidents is a priority for many countries, as

evidenced by the extensive literature developed in the last decade (Bondar DA & Korneiko OV, 2018; Hughes et al, 2015; Sahoo S et al, 2018) and the existence of current programs and initiatives to improve road safety (Strategy of road safety in the Russian Federation for 2018-2024, 2018; the concept of Vision Zero; European Commission, 2010.).

In scientific literature one can find several examples of research to improve the safety and comfort of driving (Wouters & Bos, 2000), but it does not allow to reduce to zero the risk of an accident. In addition, the definition of -risk be continually reviewed by the scientific community: in 1982, the risk of exposure has been identified as a «measure of the frequency of being in a given traffic situation, which number can be used as the denominator in a fraction with the number of accidents which take place in that situation as the numerator, this producing an accident rate or risk of being in an accident when in that situation» (Wolfe, 1982). The approach of other works is focalization point of view, not by car, but on a certain road characteristics (Ferreira and Couto, 2012). Other researchers combined GPS-data boxes on road type, time, speed indicators of exposure, demonstrating the nonlinear relationship between the explanatory variables and the results (Capanni, L. et al., 2017). It is very interesting to note that the data collected by means of this approach, more

objective, if they relate to an interview with the drivers.

The purpose of this work - the analysis of innovation in the field of motor insurance as an example Raxel Telematics. dialectic and general scientific research methods were used to achieve the goals: complex analysis and synthesis, formal and dialectic logic generalizations comparative economic analysis.

### Results and discusión

Since 1996, the number of organizations engaged in insurance and reinsurance in Russia dropped

sharply. This is due to the rapid development of the market in the 90s, when most of the companies did not analyze the risks taken. Therefore, due to the crisis in the second half of the 1990s, many companies have left the market due to the inability to provide for the payment of damages. Later, the situation has stabilized for a couple of years. However, the number of insurance companies decreased by more than 5.6 times and in January 2017 amounted to only 251 companies compared with 1416 in 2004 (Figure 1) for the last fourteen years.

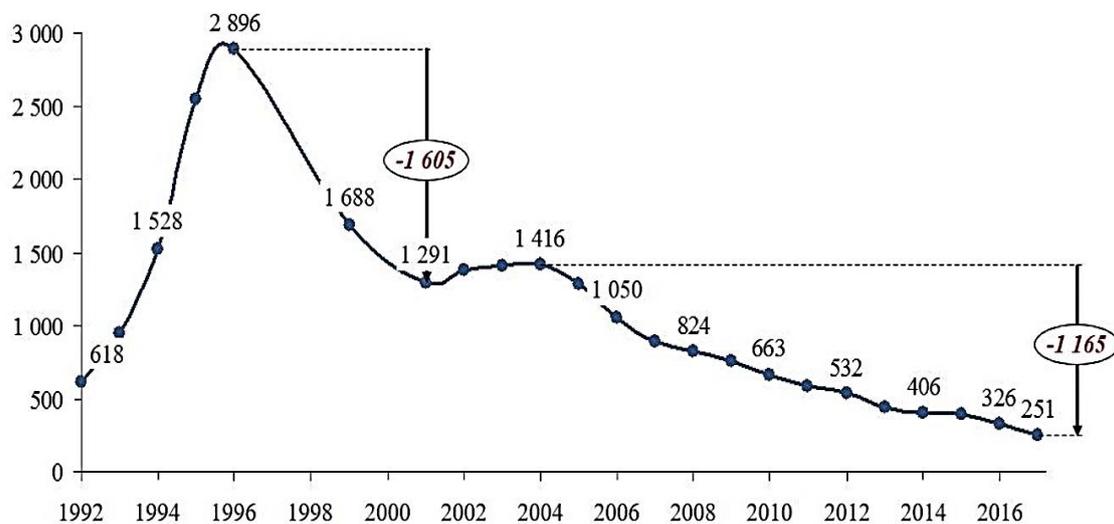


Figure 1. Dynamics of the number of organizations, insurers, Russia, 1992-2017 gg. Source: Calculations made by the authors on the basis of data of information portal "Insurance Today"

Reducing the number of insurance companies is aggravated by the deterioration of their financial situation. The total amount of insurance premiums grows more slowly than the amount of payout, reduces the number of contracts (Figure 2). This is due to a decline in real incomes of Russians (9.7% in the last year) and as a consequence, a fall in sales of new cars (from 2.5 to 1.5 million. Pcs. From 2014 to 2016.). So in

Figure 2 shows that total insurance premiums in voluntary motor insurance in the Russian Federation (CASCO) is strongly and positively correlated with sales of new cars and negatively correlated with the dollar. With the growth of the exchange rate rising car prices, reduced demand for their purchase and, therefore, the purchase of CASCO policies. In 2017, the negative trend has been overcome,

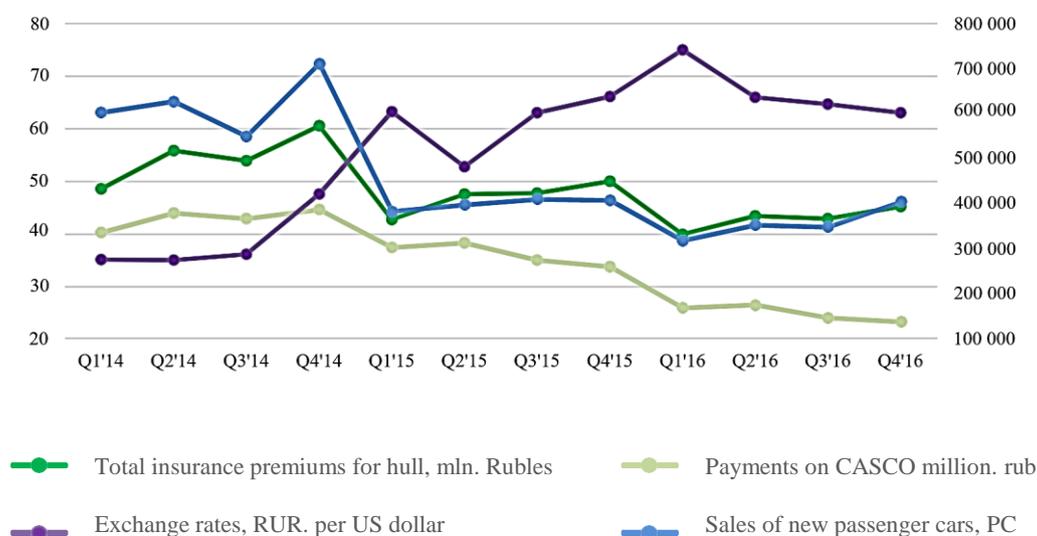


Figure 2 - Dynamics of total insurance premiums and payments to Hull, the dollar and the rate of sales of new passenger cars (the minor axis), Russia, 2014-2016.

Source: Calculations made by the authors on the basis of data of the Central Bank statistics, analytical agency AUTOSTAT

Experts predict that auto insurance CASCO market will continue to fall. This fact exacerbate the reduction of car loans, rise in the cost of insurance policies and of the motorists waiver additional insurance( RAEX rating agency, 2016).

Participants of the insurance market are forced to seek new ways to develop, optimize costs and increase profitability.

At the same time, Russia has four times the performance of road traffic injuries and deaths exceed those of European countries, despite the tendency to reduce them. For example, in Sweden to 100 thousand people who died of 2.7, Denmark - 2.7 people in Germany - 3.9 person, in Russia - 13 (Bondar D.A., Korneiko O.V. 2018.). The current backlog is due to several reasons, among the main of which is necessary to carry low discipline of road users, the technical condition of the vehicle, the condition of road networks and others. It is obvious that there is a need for innovative solutions to reduce the accident rate and, at the same time, improve the financial economic situation of the insurance companies on the Russian market.

In auto insurance, there are three basic types of technological innovation:

- the first type - remote interaction with customers, insured persons, as well as security objects. The most famous example of telematics in the hull. With the help of a special device insurance organization can monitor performance

telematics by which insurers can define the style of the customer driving and abrupt acceleration and braking and many other measures, which is determined by the level of risk. If the customer drives the vehicle carefully, it can get a discount on insurance products. Telematics also finds application in the insurance houses, cargo and voluntary medical insurance (Kasco2go, 2018);

- the second type - Big Data and business intelligence tools enable quick time to analyze large amounts of data that affect the risks and losses. "Big data" allow to identify risks at an earlier stage than other types of analysis, as well as personalize the rates for almost every insurer that motivates customers to comply with rules of the road and as a result improves the driving style;

- the third type - the digitalization of business processes (security steps), from first customer contact to the settlement of an insurance case. In this type of technological innovation in the lead solutions that are based is blokcheyn (Lorenz, J. Et al., 2016.). Solutions based on blokcheyn allow you to check the individual data of the insurer and verify action options for insurance entities, as in the design of policies and in the work of the insurance cases, that is working on the reduction of loss from fraud. Also, the last time in the world began to appear community-based mutual insurance blokcheyn. This system is similar to P2P-lending, but the direction for risk management and insurance payments.

Since the inception of the program General Motors OnStar telematics facilities and services in cars are becoming increasingly popular in the world (Figure 3), extending for more than 70% of new cars in Europe and the US automakers. The Russian market for smart insurance is in its infancy. J'son & Partners Consulting estimates that by the end of 2017, the penetration of smart car insurance in Russia will be not more than 3% (of the number of active hull insurance policies), the main growth of the Usage Based Insurance (UBI) segment is expected after 2018 based on the use of built-in telematics solutions "ERA-GLONASS" and products of automakers (J'son & Partners, 2018).

Today's telematics insurance usually refers to a one-sided gathering of information available on the vehicle. Strictly speaking, this telemetry,

since it does not impose control of the vehicle, using two basic models (Telematics in auto insurance: what about the "smart" insurance market participants think):

- "Pay as You Drive" (PAYD): In this mode, the insurance company keeps track of the time that the car is in motion, frequent place of stay, the quality of traffic routes and as a result the company assigns the rating of the customer, as part of which is determined by the cost of personal insurance;

- insurance based on gathering information about the use of the vehicle (UBI - user-based insurance): In this mode, the insurance company collects data on the braking quality (sharp or smooth), high-speed mode, acceleration time, and traffic violations.

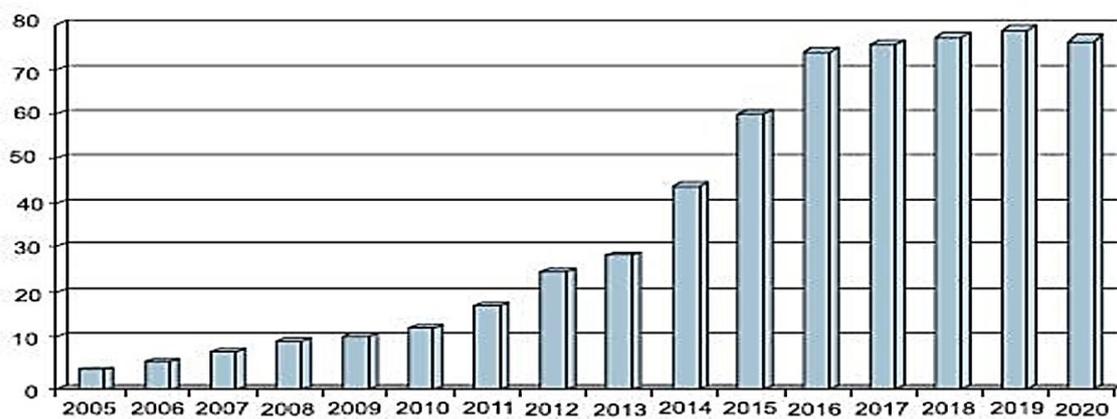


Figure 3 - Sales automotive telematics devices, one million pieces. Source: Calculations made by the authors on the basis of data of European GNSS Agency

We shall analyze the application of telematics devices, developed by Singaporean company Raxel Telematics Ltd., the Russian autoinsurance market. Telematics solutions are given company data acquisition and analysis system using the car (Table 1) consisting of three elements: OBD-device OBD mobile application rating mobile application.

OBD-device - a device that records the parameters of the accelerometer, a gyroscope, a vehicle acceleration, abrupt deceleration and turns, fuel consumption, battery charge, binding data for a particular trip. Also OBD-device detects errors that are transmitted through the device onboard vehicle computer. On the basis

of the vehicle data errors, the device makes a diagnosis of the car, that is, estimating the aggregate of errors in the vehicle, the device reports a probability of breakage of the car, which also affects the probability of getting into an accident or prevent it.

OBD mobile application - an application that allows you to record accelerometer performance, gyroscope, all tracks perpetrated this vehicle. At this track, you can see a sharp acceleration, sudden braking and turns, as well as travel time. The application also allows you to track the location of the vehicle on the GPS receiver.

Rating mobile application - an application that displays all the tracks, summarizes all data from all tracks and calculates the overall score that determines the driver's driving style and his potential accident risks in accordance with the scoring model Raxel Telematics. To determine

the degree of driving safety it uses more than 20 parameters, including: respect for speeding, harsh acceleration and braking, cornering style, driving time, mileage, the use of the phone while driving, and more.

**Table I** - Collected Raxel Telematics Ltd. telematic data.

Index	Description
Acceleration and deceleration, including the side	It shows the manner of driving of the insured. Points to the positive side of smooth acceleration and braking
Location on the gps and cell towers	Data for imposing speed limits, maps covering the roadway, etc. Vysokozagruzhennyh driving on road sections, as well as in hazardous areas increases the risk of accidents.
Errors in a vehicle with onboard computer	It indicates risk of vehicle damage. Makes it possible to reduce this risk, I offer the client be serviced.
Fuel consumption	Indirectly indicates the status of the vehicle, on the movement of costs
Data on the mobile phone's position	It complements the data on where the policyholder is after stopping the car if he always manages insured cars, etc.
Data on acceleration and deceleration from a mobile phone	Also complements data, increasing their accuracy. It provides information about using the phone while traveling. Eliminating the use of navigators, only high-risk activities such as talking on the phone, typing, etc.
Information about the vehicle VIN and customer data of the passport driver's signature - the unique features of a particular person driving	It makes personal data binding
overspeed	A set of indicators measuring the driver. It enables the separation of persons driving that affect the risks.  Direct effect on the risk of the insured event. Demonstrates policyholder dangerous areas where it exceeds the speed.
All information about the car: make, model, engine, if an accident were what penalties, if the loan is on Auto	Additional data for the analysis of possible correlation with the risk of the insured event. It gives information about the required periods of passage maintenance of the vehicle wear.
Customer credit history	Additional data for the analysis of possible correlation with the risk of the insured event

The cost of the trip for the cost of fuel and the cost of auto	Determines the costs to the insured vehicle
Predicting failures of errors with the onboard computer Points Of Interests. It is the customer's point of interest: where the house, where the work is, it is recharged at public filling stations, which goes to the shops, where rides on weekends, etc.	Influence on the risk of the insured event. Makes it possible to reduce this risk, I offer the client be serviced. Additional data for the analysis of possible correlation with the risk of the insured event. Defining preferences and way of life of the customer. The ability to use the data for integration with partners to offer a variety of loyalty programs.
Accident. The system draws more accident reconstruction. Where he was hit, a force, which was Auto	Reduces the risk of fraud (fraud on the part of the insured), it simplifies the process of reconstruction of road accidents, provides additional data for use in the legal field of the accident issue
Riding on the sidelines	Direct effect on the risk of an accident
Driving on the wrong side	Direct effect on the risk of an accident
Riding on dedicated lanes	Direct effect on the risk of an accident
Car mileage	It gives information on the wear of time passing Maintenance
parking place	Parking in the wrong places increases the risk of accidents.

In Raxel Telematics has developed its own scoring system from 0 to 100 points, which is a complicated mechanism that uses an artificial neural network. The client of the insurance product with telematics receives information through a mobile application on the dynamics of their scoring points and the factors that increase the risk of accidents. The more the client calculated driving score, the better deal on the insurance policy it will receive (pay-as-you-drive insurance or smart). The calculation of the driver's level of risk based on the application of technology is more accurate compared with standard coefficients used in calculating insurance rates. The insurance company to give information on the breakdowns with the onboard computer can warn the customer about the urgent need to pass maintenance (TO). Early customer warning about the need to carry out MOT decreases the level of losses, as the insurer and the insured, as well as provide additional information to the insurer for the solution of

controversial issues. Client on the mobile app receive a notification of the need to go as planned maintenance, based on mileage or time from the date of the last MOT. These features allow for a much lower statistics on road accidents with victims due to technical faults, compared with the average worldwide (Table 2) after the introduction of technology reminders to go in the middle of 2016. Client on the mobile app receive a notification of the need to go as planned maintenance, based on mileage or time from the date of the last MOT. These features allow for a much lower statistics on road accidents with victims due to technical faults, compared with the average worldwide (Table 2) after the introduction of technology reminders to go in the middle of 2016. Client on the mobile app receive a notification of the need to go as planned maintenance, based on mileage or time from the date of the last MOT. These features allow for a much lower statistics on road accidents with victims due to technical faults, compared with

the average worldwide (Table 2) after the introduction of technology reminders to go in the middle of 2016.

**Table 2** - Comparison of the global statistical data Raxel Telematics Ltd.

Year	The number of traffic accident cases, thousands. According to Association For Save International Road Travel	The number of traffic accident cases, thousands. According Raxel Telematics Ltd.
2015	14450	0.12
2016	21340	0.13
2017	21670	0.11
Year	The number of used cars in the world, thousands. According to Association For Save International Road Travel	The number of cars that are connected to Raxel system thousand. According Raxel Telematics Ltd.
2015	476000	25.1
2016	494000	57.9
2017	498000	69
Year	% Of accidents with victims to the total number of cars, according to the Association For Save International Road Travel	% Of accidents with victims to the total number of cars, according to Raxel Telematics Ltd.
2015	3.03%	0.48%
2016	4.32%	0.22%
2017	4.35%	0.16%

Source: Association For Save International Road Travel and Raxel Telematics Ltd.

As seen from Table 2, the number of traffic accident victims after application clients notification systems need to pass TO decreased 3-fold and significantly lower in relation to global statistics.

Collected telematics information is also transmitted to automakers so they can make cars safer, to see the relationship between the style of driving their vehicles with actually occurred accident.

With the introduction of the telematic device reduces the risk of fraud on the part of insurers. They are harder to fake the insured event due to the presence detectors and automatic notification of all actions.

Thus, the results of the implementation of telematics insurance are:

- reducing the cost of the insurance company;
- increase the accuracy of calculation of insurance rates;
- increasing customer loyalty;
- improving the discipline of road users;
- timely MOT and improving vehicle technical condition;
- reducing the risk of fraud;

- increase the level of automation of business processes of insurers.

### Conclusion

This study allows us to conclude that road safety is an issue, both local and global, to exit that requires a comprehensive approach. Insurance Telematics is regarded as an innovative solution to improve not only the safety of road traffic, but also economic and financial stability of the insurance market. Particularly relevant insurance telematics gains on the Russian market of voluntary auto insurance, having a hard time when car owners because of declining real incomes are unable to buy insurance policies and insurance companies can not give in to the pricing policy. In this situation, the company's telematics system Raxel Telematics - a reflection of global trends and a great leap forward in the development of "intelligent security" in Russia. Scaling System Pay-as-you-drive certainly will significantly revitalize the Russian market car insurance, which is experiencing, as noted above, the negative impact of the prolonged economic and financial crisis.

Drivers of market growth in the insurance telematics are:

- the ability to get a cheaper insurance policy CASCO with additional services, such as anti-theft, E-Call, B-Call and other value-added services;

- general global trend to increase the number of implemented telematics solutions in the field of motor insurance.

The main obstacles to the development of insurance telematics market in Russia is:

- the rejection of any kind of voluntary insurance in connection with a decrease in disposable income;

- Conservative insurers, distrust of insurance companies, concerns about the lack of privacy.

It is understood that the most important result of the spread of telematics insurance is to reduce injuries and deaths related to the accident, so resist the penetration of innovations in the market of auto insurance is pointless and dangerous. In order to ensure the safety of all road transport market participants need to adopt new technology solutions discussed in this study.

## References

Association For Safe International Road Travel. Statistics. [Electronic resource] // «ASIRT»: official of. Website - Access: <http://www.asirt.org/>

Bondar DA, Korneiko OV 2018. - Innovations of road safety control by Raxel Telematics // National security / nota bene. - No. 2. - P. 10 - 18. DOI: 10.7256 / 2454-0668.2018.2.26136

Capanni, L., Berzi, L., Barbieri, R., & Capitani, R. (2017). A method to assess and model the risk for road accidents using telematics devices. *Journal of Transportation Safety & Security*, 10 (5), 429-454. doi: 10.1080 / 19439962.2017.1294227

European Commission, 2010. Towards a European road safety area: policy orientations on road safety 2011-2020 (No. Communication from the Commission COM (2010) 389 Final). Brussels.

Ferreira, S., Couto, A., 2012. Categorical Modeling to Evaluate Road Safety at the Planning Level. *J. Transp. Saf. Secur.* 4, 308-322. doi: 10.1080 / 19439962.2012.679385

Global Plan for Implementing Actions to Ensure Road Safety 2011-2020 [Electronic resource] // "World Health Organization": official. site - Access

mode: [http://www.who.int/roadsafety/decade\\_of\\_action/plan/russian.pdf](http://www.who.int/roadsafety/decade_of_action/plan/russian.pdf)

Global status report on road safety in 2015 [Electronic resource] // "World Health Organization": official. site - Access mode: [http://www.who.int/violence\\_injury\\_prevention/road\\_safety\\_status/2015/GSRRS2015\\_Summary\\_rU.pdf](http://www.who.int/violence_injury_prevention/road_safety_status/2015/GSRRS2015_Summary_rU.pdf)

Hughes, BP, Newstead, S., Anund, A., Shu, CC, Falkmer, T., 2015. A review of models relevant to road safety. *Accid. Anal. Prev.* 74, 250-270. doi: 10.1016 / j.aap.2014.06.003

J'son & Partners. Smart Insurance Market (UBI) in Russia and the World / Analytical Report. 2018 Kasco2go - ICO White Paper We are all different, so why should we pay the same? [Electronic resource] / Kasco2go - URL: [https://kasko2go.com/uploads/document/file/1/kasko2go\\_whitepaper.pdf](https://kasko2go.com/uploads/document/file/1/kasko2go_whitepaper.pdf) (reference date: 05/05/2018)

Lorenz, J., Higginson, M., Olesen, PB Blockchain in insurance - opportunity or threat? // McKinsey & Company Insurance. 2016. №6.

RAEX rating agency (2016). Results of 2016 the insurance market: to keep from falling/Expert RA [Electronic resource] / [Http://raexpert.ru/docbank/363/167/889/33b263c58f0aba9502cfec3.pdf]

Sahoo S., Mitra A., Kumar J., Sahoo B. Innovation as Road Safety Felicitator. 3rd International Conference on Communication Systems. *Materials Science and Engineering 331* (2018) 012017 doi: 10.1088 / 1757-899X / 331/1 / 012,017

Strategy of road safety in the Russian Federation for 2018-2024. Order of the Government of the Russian Federation of January 8, 2018 N 1-r Moscow

Telematics in auto insurance: what about the "smart" insurance market participants think [the Electronic resource] // «Galaxy insurance»: official of. Website - Access: <https://galaxyinsurance.ru/poleznoe/blog/telematika-v-avtostrahovanii-chto-ob-umnoy-strahovke-dumayut-uchastniki-ryinka/>

The concept Of Vision Zero [Electronic resource] // "Vision Zero Traffic safety by Sweden»: official site - Access mode: <http://www.visionzeroinitiative.com/>

Wouters, PJ, Bos, JM, 2000. Traffic accident reduction by monitoring driver behaviour with in-car data recorders. *Accid. Anal. Prev.* 32, 643-650. doi: 10.1016 / S0001-4575 (99) 00095-0