



# Assessment of the automatic toll collection in Poland

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## ABSTRACT

Nowadays, transport is one of the most important parts of life. Transport indicates the technological process of carrying the goods on the distance or relocating people. The most flexible type of transport is the motor transport. The article shows the electronic toll collection system present in Poland from 2011. However, the main goal is to introduce the entrepreneurs' opinions - the system users and the private people that are using the system, in order to compare their view on the functioning of that system..

**KEYWORDS: motor transport, electronic toll collection**

## 1. Introduction

Nowadays, transport is one of the most important parts of life. Transport indicates the technological process of carrying the goods on the distance or relocating people. The most flexible type of transport is the motor transport.

One of the most important aspects of transport is the finances. The motor transport is one of the most taxed activities but the condition of the road infrastructure is not perfect enough that there is no need to invest in it any more. The amount of vehicle circulating on the roads is enormous, thus, even the best roads will eventually need to be renovated. So, the road maintenance costs do not end with their construction.

Therefore, many countries, including the European Union countries, apart from the mentioned taxes also introduce the so-called electronic road toll and that topic will be the subject of this work.

The article shows the electronic toll collection system present in Poland from 2011. However, the main goal is to introduce the entrepreneurs' opinions - the system users and the private people that are using the system, in order to compare their view on the functioning of that system.

## 2. Road toll in Poland

Due to the increasing number of the goods vehicles that are using the public roads and the increasing costs of their maintenance

and construction every goods vehicles exceeding the total mass of 3.5 ton and every bus (regardless of its mass) that use the road infrastructure are obligated to pay the road toll. It suggests that every vehicle, the construction of which allows it to travel faster than 25 km/h (excluding the farm tractors), which wishes to travel on the public roads that are included in the electronic toll collection system, must pay fare. It is partially the continuation of the vignette system but it also introduces the principle saying that the vehicles which exploit the infrastructure the most have to suffer the greatest consequences in form of higher fare.

It is also important that the fare presently used in Poland is introduced with the principle recommended by the European Union saying: „user pays – contaminator pays”. The subject to the highest fares are the users of the oldest and the least ecological vehicles as well as the vehicle that wear the infrastructure the most. It is a fair principle, especially to the previous vignette fares based on the all-round amount.

The system that collects the toll is called viaTOLL [1]. The system was designed and constructed in full by the Kapsch TrafficCom AG consortium [2]. This company won the tender for the construction and managing of the National Toll Collection System.

The contract encompassed designing, constructing and introducing the modern electronic toll collection system for the roads in Poland, and the time frames of the contract were established on 2011 - 2018. Finally, the system is supposed to cover around 2000 km of motorways, 5000 km of dual carriage ways and 600 km of national roads.

The viaTOLL system is based on the wireless communication of short distance DSRC (dedicated short-range communication). Its basic elements are the OBU on-board devices and the system of antennas placed on the so-called gantries on the paid parts of the roads. This system ensures the constant movement of the vehicles, as it is able to communicate between the devices and the operator very quickly, which means that the driver can freely drive under the toll collection gates. The only duty of the driver during the vehicle operation is to observe the signals the viaBOX on-board device “sends”.

There are two types of gantries: the first (the basic) for communicating with the OBU and the second, more complex, the so-called control gates with the digital camcorders and cameras placed on them, the purpose of which is to capture the vehicles without the viaBOX device in them.

### 3. Introduction of the viatoll system in the users' opinion

In order to learn the actual opinion of the viaTOLL system users a survey was conducted [3], evaluating this system by the people who use it every day, but also those who use it only sometimes.

The survey was conducted on 40 people, divided in two groups: drivers and people conducting the electronic toll control department in the company. These were mostly the so-called transport managers, but also the owners or forwarding agents. Some of the questions were directed only to the particular surveyed group, as the people controlling the toll collection would not know the manner of system usage and the equipment in the cars, on the other hand, the drivers are not able to obtain the information on the costs of viaTOLL in the company as well as different contacts with the operator.

#### 2.1. General results of the survey of all the people participating in the study

Question 1: What is your assessment (generally) of the electronic toll collection system in operation in Poland?

The statistical data indicates that the great majority - 77.5% of interviewees assesses the system as good. The detailed survey results are shown on the diagram no 1.

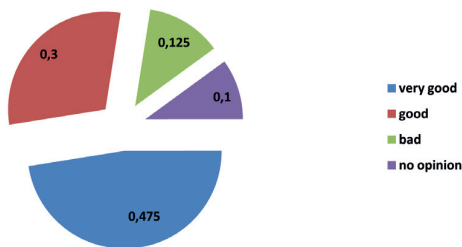


Fig. 1. Survey results - question 1 [own study]

Question 2: Was in your opinion the previous system (vignette) better?

Based on the survey among the users of the current system, most of the people claim that the previous system was worse than the current one (55% of the interviewees), 22.5% are opposite (similarly to the people who have no opinion of that matter or cannot decide). The detailed survey results are shown on the diagram no 2.

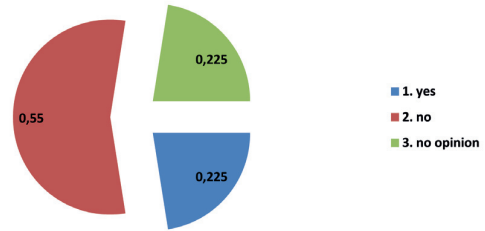


Fig. 2. Survey results - question 2 [own study]

Question 3: Which method of payment do you prefer?

As far as the payment method is concerned, most of the interviewees selects the post-paid method - 52.5%, the remaining 47.5% pays with the pre-paid method. The final result is quite balanced, thus it can be attested that each method has its supporters. The detailed survey results are shown on the diagram no 3.

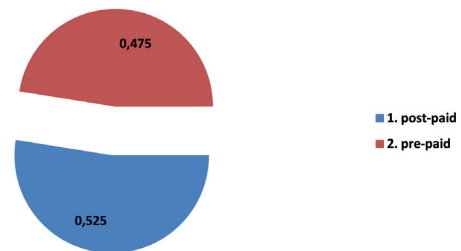


Fig. 3. Survey results - question 3 [own study]

#### 2.2. The survey results among the drivers

Question 4: What is your assessment (generally) of the electronic toll collection system in operation in Poland?

It is shown in statistics that the majority of drivers - 80% assesses the viaTOLL system as good and very good, only 10% as bad. The detailed survey results are shown on the diagram no 4.

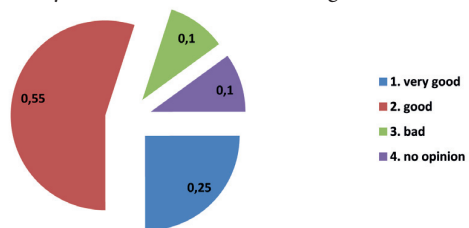


Fig. 4. Survey results - question 4 [own study]

Question 5: Was in your opinion the previous system (vignette) better?

Based on the survey results among the drivers using the viaTOLL system it can be attested that the majority of people considers

the current system as better solution than the vignettes - 60% of interviewees, 25% is of the opposite opinion. The detailed survey results are shown on the diagram no 5.

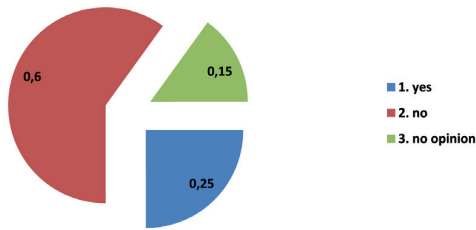


Fig. 5. Survey results - question 5 [own study]

*Additional comments of the drivers:*

The supporters of the vignette system believe that the advantage of the previous system was the lack of responsibility for the driver and the lack of interference in the company's financials, whereas nowadays they are encumbered with the duty of control over the viaBOX device and the amount of collected money on the viaTOLL user account.

**Question 6:** Is the control over the viaBOX devices while passing through the gantry cumbersome for you and does it divert your attention from driving the vehicle?

This question was directed only to the drivers. For the majority of the surveyed people - 65% the control over the OBU device while driving through the gantry does not pose any difficulties, however, for 25% it is a problem. The detailed survey results are shown on the diagram no 6.

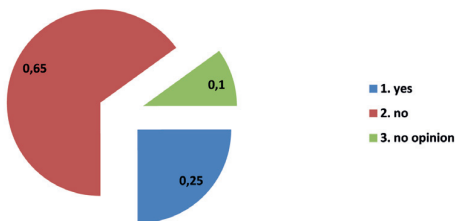


Fig. 6. Survey results - question 6 [own study]

**Question 7:** Do you think that the current system is fair?

Based on the results of the survey conducted among the drivers using the viaTOLL system it is attested that slightly over a half of people thinks that in general the current system is fair - 55%, the opposite opinion is represented by 35%. The detailed survey results are shown on the diagram no 7.

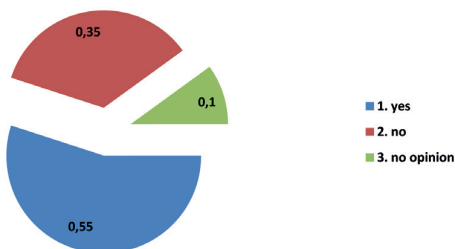


Fig. 7. Survey results - question 7 [own study]

*Additional comments of the drivers:*

People, who think that the current system is fair claim that there are similar systems in the whole Europe, so why Poland should be different. Moreover, the fare dependant on the amount of actually travelled kilometres is considered advantageous. The disadvantage and unfairness is considered to be the unequal deployment of the paid road section in the whole country, as well as the amount of the penalties, which are completely inadequate to the committed violations.

**Question 8:** Do you think that "avoidance" of the paid sections of the roads is profitable?

The great majority of drivers - 60% believes that the avoidance of the paid sections is not profitable, only 15% claims it is thriftness. The detailed survey results are shown on the diagram no 8.

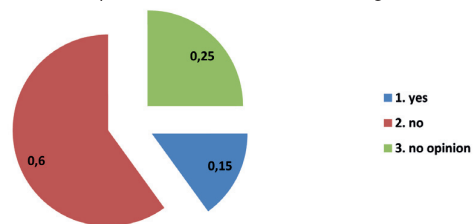


Fig. 8. Survey results - question 8 [own study]

*Additional comments of the drivers:*

In opinion of the majority of the drivers the "avoidance" is completely not profitable, as there are many junctions and limitations on the local and alternative roads, which can elongate the journey time and cause the faster wear of the vehicle. Moreover, it is sometimes linked with the "catching kilometres", which causes more fuel consumption.

**Question 9:** Have you ever encountered a wrongly charged fare for the roads included in viaTOLL system?

The majority of the interviewees have not encountered a wrongly charged fare - 60%, but 40% of drivers have. The detailed survey results are shown on the diagram no 9.

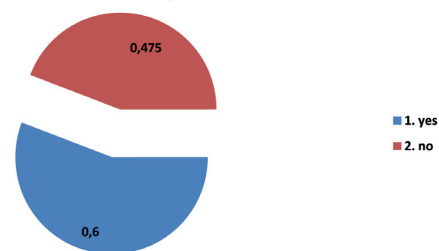


Fig. 9. Survey results - question 9 [own study]

**Question 10:** Do you think the current electronic toll collection system is convenient?

For the majority of drivers - 60%, the viaTOLL system is convenient to use and service, for 35% to pay, and only 5% of people thinks it is not convenient at all. The detailed survey results are shown on the diagram no 10.

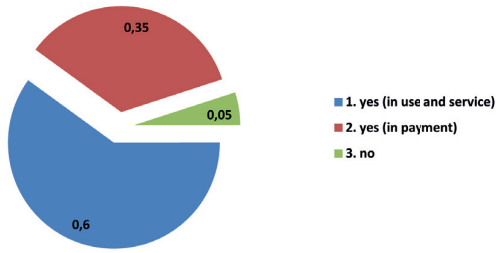


Fig. 10. Survey results - question 10 [own study]

It happened that the answers „YES” had been simultaneously marked in three surveys.

*Drivers' comments:*

One of the drivers claimed that the viaTOLL system is inconvenient because the top up stations can be found only in selected petrol stations, as opposed to all petrol stations. Moreover, the drivers would prefer that the viaBOX device had a built-in display that would show the account status.

### 2.3. The survey results among the people controlling the road toll in the company

Question 11: What is your assessment (generally) of the electronic toll collection system in operation in Poland?

The statistical data indicate that 75% of the interviewees who runs the toll payment in the company assesses the viaTOLL system as positive, and 15% as negative. The detailed survey results are shown on the diagram no 11.

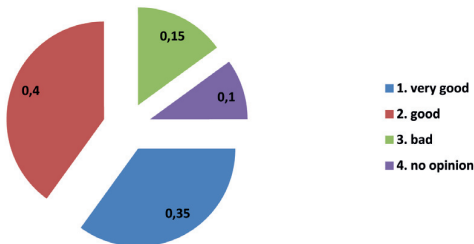


Fig. 11. Survey results - question 11 [own study]

Question 12: Was in your opinion the previous system (vignette) better?

The majority of people (55%) claims that the current system is better than the previous one, 20% of the surveyed people claims the opposite. The detailed survey results are shown on the diagram no 12.

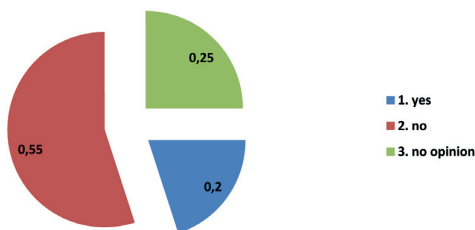


Fig. 12. Survey results - question 12 [own study]

*Interviewees' comments:*

The previous system was of a burden for the companies and by buying the one year vignette one could save some time and money, when it comes to drawbacks of the previous system, there is a lack of none-stop travel through the motorways and the unfairness of the infrastructure usage. People who were using the roads frequently paid the same money as people who were using it rarely.

Question 13: How do you assess the contact with the system operator (Customer Service Office)?

This question was asked only to people managing the fares. The great majority of the surveyed people - 80% evaluated the contact with the system operator as positive, none of the people evaluated the contact as negative, and 20% never used this service. The detailed survey results are shown on the diagram no 13.

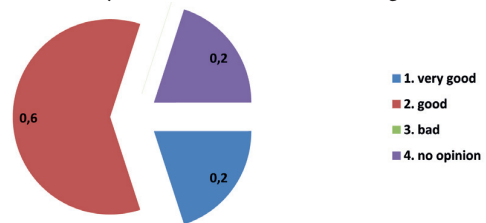


Fig. 13. Survey results - question 13 [own study]

Question 14: Do you think that the current system is fair?

After analysing the surveys made by the people managing the fares it can be concluded that the majority of people - 65% finds the current system fair, 15% as unfair. The detailed survey results are shown on the diagram no 14.

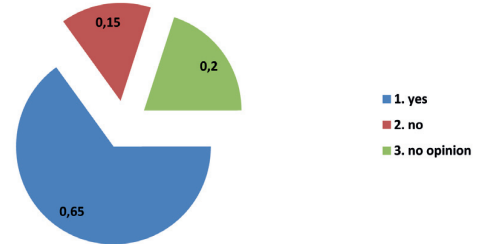


Fig. 14. Survey results - question 14 [own study]

*Interviewees' comments:*

Similarly to the drivers, the opinion here is that the viaTOLL system is fair when it comes to fare amount based on the amount of travelled kilometres.

Question 15: Do you think that "avoidance" of the paid sections of the roads is profitable?

According to the interviewees, the "avoidance" of the paid sections of the roads is completely unprofitable, as such opinion was held by 70% of people. 20% claims that such practice is profitable. The detailed survey results are shown on the diagram no 15.

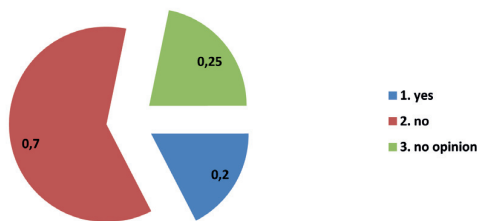


Fig. 15. Survey results - question 15 [own study]

**Question 16:** Have the introduction of the viaTOLL system resulted in significant financial effects for your company?

When it comes to this question, a comparable amount of people claims that the new system had negative effects on their financial situation - 40%, or remained the same - 45%, 15% of the interviewees finds their financial situation more positive with the introduction of the electronic toll collection system. The detailed survey results are shown on the diagram no 16.

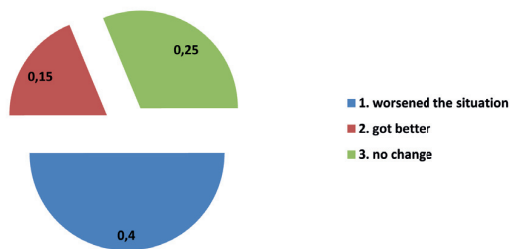


Fig. 16. Survey results - question 16 [own study]

**Question 17:** Have you ever encountered a wrongly charged fare for the roads included in viaTOLL system?

Among the surveyed people, 55% have encountered a wrongly charged fare, 45% have not encountered such a problem. The detailed survey results are shown on the diagram no 17.

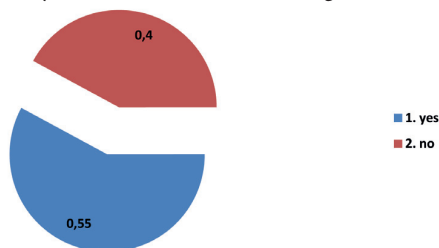


Fig. 17. Survey results - question 17 [own study]

*Interviewees' comments:*

*The people who have encountered a wrongly charged fare claim that this situation took place just after the viaTOLL system was introduced and with time such problems became less frequent. Moreover, every person who encountered the wrongly charged fare had it returned with interests.*

**Question 18:** Do you think that the current electronic toll collection system is convenient?

The great majority of the surveyed people finds the viaTOLL system convenient - 90%, only 10% thinks the opposite. The detailed survey results are shown on the diagram no 18.

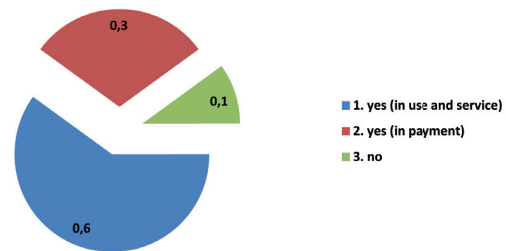


Fig. 18. Survey results - question 18 [own study]

## 2.4. Additional information resulted from the conducted survey

Apart from the general opinions that were shown on the diagrams the survey study also provided many detailed information. They mostly apply to the amounts the companies are obligated to pay for the travel on the paid roads. Based on the answers it can be seen that the system is truly fair and the "user pays – contaminator pays" principal is very followed in Poland.

Some of the companies released in the surveys the data regarding the particular amounts depending on the size of the company and the frequency of using the viaTOLL system. Large companies that own several vehicles and travel on the paid roads every day, pay the amounts of a few thousand zlotych a month. For example: Transport company that travels every day in the country and owns 10 vehicles obligated to pay for the usage of the roads included in the electronic toll collection and employing 15 workers must pay every month over 10 000 zl. When it comes to one-man company that owns one vehicle, which travels rarely - a few times a week the toll is only 300 zl, thus, it can be inferred that the introduced viaTOLL system is reasonable and actually works properly. The users that wear the road infrastructure the most pay the highest prices, and those who use it less often pay less.

Thanks to the surveys it was also found out what the users would change in the system. The drivers would change their responsibility for the lack of money on the account, as in many cases the balance cannot be checked by calling the customer service (the driver is not authorized to receive such information, moreover, even if there was such an option, it imposes more duties for the drivers). Another idea is to introduce better quality OBU devices with displays, which would significantly improve the system usage. Many of the surveyed people believe that the amount of the toll is too high, they also claim that the amount of the penalties is inappropriate to the violation. Crossing one gate without paying is equal to the penalty of 3000 zl, while the fare for that section of the road would be a few zlotych. Very interesting idea would be introducing on the motorways a few different lanes in order to completely eliminate the need for stopping or slowing down while traveling. It would reduce the traffic jams and the time of delivering the goods would be even shorter. There were also five opinions suggesting not to change anything in the current system.

### 3. Summary of the survey

Conducting the survey allowed to learn the actual opinion of the viaTOLL system users. As a result, both the drivers and the people responsible for electronic toll in the companies evaluate the current electronic toll collections viaTOLL system positively. According to the interviewees the advantages of that system is mostly the fair toll dependent on the actual amount of travelled kilometres, good contact with the customer service and the lack of need for stopping the vehicle while traveling on the motorway to pay the fare. Despite some signals that the vignette system was easier to use and less expensive for the companies, finally everyone found some positive features of the introduced viaTOLL system. On account of the results of the question whether the previous system was better (the majority of the interviewees - 55% responded that it was not), it can be inferred that the introduction of this solution in Poland was a good step.

### 4. Conclusion

The introduction of the electronic toll collection system in 2011 by the Polish authority was a good undertaking. It prepared Poland for future introducing the Electronic Toll Service, according with the EU recommendations. Moreover, it replaced

the faulty vignette system. The viaTOLL electronic toll collection system is also very airtight system, as appropriately equipped authorities that can conduct the controls regarding the proper toll payment and the stationary control operations results in fact that the attempts of fraud and not paying the toll for the travel on paid roads is almost impossible.

The electronic toll collection system has been meticulously controlled by the Supreme Audit Office, which despite pointing out some minor problems assessed the current solution positively. Another important positive assessment is issued by the system users who, based on the survey, in great majority positively assess the viaTOLL system and its solutions. Despite some minor flaws, the majority of the surveyed people would not want to return to the previous system.

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