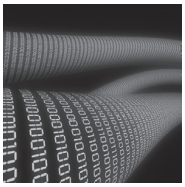

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Increase the efficiency of the fleet management in the public sector on the example of the police

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ABSTRACT
Logistics costs are a major expense accounts departments responsible for national security. Experience in business can be used, but must take into account the specificities of the public sector. The paper presents the results of research project, during the study looked for the best tools to improve the efficiency of the fleet management of the police. Fleet economy is inefficient – both in terms of the use of vehicles and service. In the research project prepared telematics solutions that reduce transport costs in the police. In particular, these are systems for monitoring fuel consumption. In addition, organizational changes are proposed which allow to reduce logistics costs and increase employee motivation.

KEYWORDS: ogistics, police, transport costs, vehicle

1. Introduction

The observation of changes in the public sector (not only in Poland) suggests that the adaptation of business solutions, may be a source of increased efficiency in this sector. A key instrument for the optimization of logistic processes are increasingly used in the logistics sector fleet monitoring systems based on telematics solutions (combining information technology and telecommunications). In particular, a vehicle tracking systems using satellite technology and systems available through the analysis of fleet operations in real time. Monitoring allows the assessment of efficiency of the fleet. This knowledge can also be used in operating activities of the Police.

Vehicle monitoring system is the key, but only one of many organizational and economic solutions, which should be comprehensive prepared with a special reference the organizational and economic police. The transfer of relevant business solutions to public sector operating conditions requires consideration of such differences in organizational culture and specific salary systems.

2. Optimization of the police fleet management as a subject of research

The problem of optimizing fleet management using satellite monitoring system was the subject of research within the research and development project No. R00 0138 O 11, which is realized from 09.01.2010 until 12.31.2011 year by a consortium of scientific and industrial, composed of: University of Economics in Katowice, as leader of the project, Voivodship Police Headquarters in Krakow, WASKO S.A. (a company operating in the IT sector, specializing in telematics hardware and software).

The project is designed to develop methods to optimize vehicle operating costs and increase efficiency of the fleet of the police. The project has been included analysis and studies, especially choice of method of measuring fuel consumption in vehicles. The demonstrator system has been installed in police cars selected.

The main functions of the system is receiving data from the GPS / GSM adapted to vehicles, especially fuel consumption (taken from the vehicle Controller Arena Network), processing of information collected by means of special algorithms, the presentation of calculation results in the client application, which is a fleet management tool. One of the functions of the system is able to monitor the vehicle position on a digital road map. This allows real–time surveillance of vehicle traffic police – example of the system shown in Figure 1.

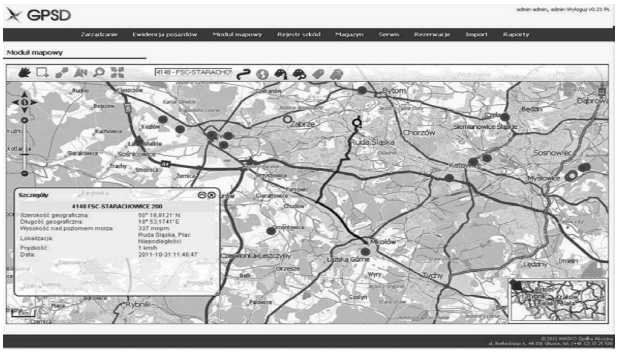

Fig. 1. Localization of the vehicle on a digital map

Otherwise may be enter and process information concerning the exploitation the vehicle (such as: identification, servicing, repair, fuelling). The application allows you to obtain data about the operating costs of official vehicles. Accurate measurement of fuel consumption will enable the management of fuel economy, which should contribute to reducing transport costs.

A prototype system – the so–called technology demonstrator – embraced 150 vehicles of various types of vehicles of the Police in Krakow. Vehicles are working in the police units located in areas typical of the Małopolska province (areas with characteristics of both mountain and lowland, and urban). The central servers (database and application), together with the workstation was located in Police Headquarters in Krakow. There has been the first positive observations: once installed in the vehicles selected for video recording devices nor of an accident involving one of these cars.

3. Police fleet

Polish police have over 20 thousand units of transport, the majority (over 90%) are cars and trucks (Tab. 1). The average age of vehicles is decreasing as a result of purchases (only in 2009 bought nearly 5 thousand vehicles) – for vehicles is 4.7 years (Fig. 2). In 2009, the average age of vehicles decreased in comparison with 2008 by 30% for cars. It should be noted that the fleet replacement program (Tab. 2) has been completed and is no longer continued in 2011, so the average age of vehicles will increase. Fleet is used extensively – the average car mileage is just over 17 thousand km per year (Fig.3) [4].

Table 1. Polish police fleet (2009)

No.	Transport units	Units 31.12.2009 r.	Percent
1	Cars	12 955	64,2
2	Jeeps	695	3,4
3	Vans	3 642	18
4	Trucs	520	2,6
5	Buses	108	0,5
6	Special cars	356	1,8
TOTAL		18 276	90,5
7	Boats	280	1,4
8	Other	1 629	8,1
TOTAL FLEET		20 185	100

Table 2. The financing of fleet purchases (2007–2010)

Funding source	PLN (mln)	Percent
The modernization of the police	362,7	89
Local government sources	14,6	3,7
The Norwegian Financial Mechanism	21,0	5,3
National Fund for Environmental Protection and Water Management	0,6	0,2
Sponsoring	7,3	1,8
TOTAL	406,2	100

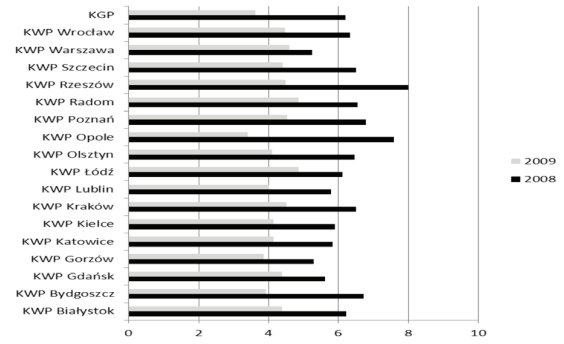

Fig. 2. Average age of fleet

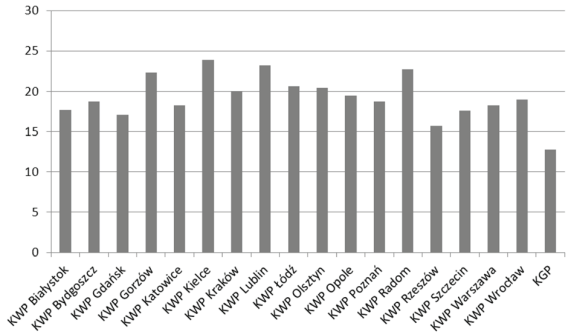

Fig.3. Average vehicle mileage in 2009 (in thousand kilometers)

Operating costs of the fleet is around 246 million PLN per year (2009), including fuel costs are almost 130 million PLN. The cost calculation does not include some of the costs: in particular, depreciation and payroll. So the calculated unit cost was estimated at 0.71 PLN / km for 2009. Maintenance costs are high (Fig. 4) and its low efficiency (Fig. 5).

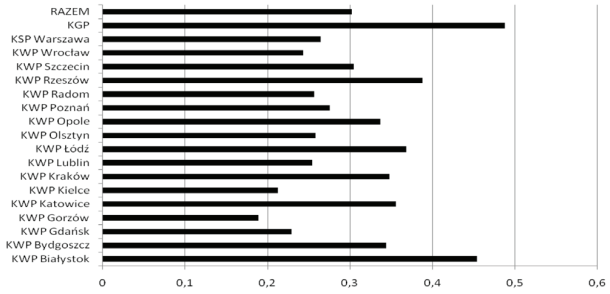

Fig. 4. Unit costs technical maintenance in PLN/km – data for 2009

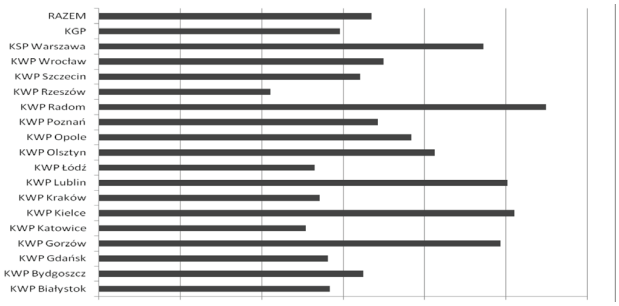

Fig. 5. Maintenance efficiency (mileage per employee) – 2009 r.

Poor use of the fleet is not reflected in the account of unit costs. Moreover, optimization actions impair the use of rolling stock – at market conditions, such an economy would be impossible, as would lead to an increase in fleet costs [4].

4. Model optimization of the police fleet management

Increase the efficiency of the transport industry requires comprehensive solutions, modelled on the approach used in business, taking into account not only the introduction of new monitoring techniques, but also organizational innovation. It is necessary to integrate the management of key fleet management processes (Fig.6). In particular, it is necessary to draw attention to the integration of basic management functions for the processes [4]:

- the supply of transportation equipment – the impact of police units on purchases of rolling stock is too small, the dominant factor in this process is the availability financial resources do not sufficiently take into account the structure of the owned fleet (which affects the costs of maintenance and operation), questionable whether this planning process, and its organization,
- rolling stock, which is crucial for the effectiveness of the police fleet – the primacy of operations negatively associated with vague supervision over the operation of rolling stock (it is not possible to assign specific fuel consumption for users of rolling stock), and complement this picture is the lack of economic incentives that induce users to efficient use and care of the fleet,
- fleet service – service is based on the work of its technical equipment, it is time to commute to the service station, self–service system seems to be cheaper than based on outsourcing, probably because it does not take into account the costs of travel to the service station and the exclusion from the work of officers supplying equipment for service stations,
- cassation fleet – fleet retires from service reluctantly, no motivation, fleet sales resources go directly to the state budget, it appears that this process should be directly related to the procurement process in transport equipment and should also include elements of motivation.

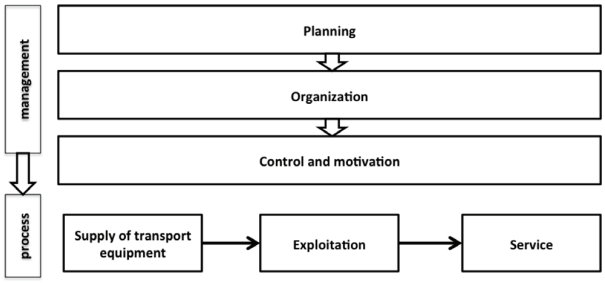

Fig. 6.Optimization model of police fleet

The key to effective control of transport costs to implement a system that allows monitoring of rolling stock including for precise control of fuel economy. The experience of road transport operators allow to expect significant economic benefits here (especially if we consider that at present the police are monitored only large, oversize excess fuel consumption and there is no incentive system to encourage savings in this area). Monitoring systems are offered with both the brand of vehicles, as well as independent solutions for use in the rolling stock of the carrier. An example of the first type of solutions can be FleetBoard offered by Mercedes, which is already installed in more than 75 thousand. vehicles (including in Poland, about 350). This system monitors events responsible for more than 80% of transport costs, it allows to improve transport security and optimization of drivers (which also has an environmental dimension) [1]. There are also solutions that integrate fleet management operators – offer comprehensive fleet management (in particular, to refuel and service). Examples are offered in Poland AutoGuard party products, FmSolutions, and systems related to satellite navigation systems (GPS) – a solution based on these data integration on the work vehicle and its components, and location data [2,5].

The monitoring system created for the police must take into account the specificity of the operating business and that the measurement of fuel consumption in passenger cars is complicated. A major problem is the preparation of solutions to the economic incentives for drivers – police system of remuneration is stiff and

formalized, so you need to seek appropriate forms of bonuses or legislative changes to allow the introduction of such solutions. A major challenge will also prepare proposals for the management of the state of rolling stock (reduction and transfers between units) and the working time of the drivers.

Bridge gaps between different lines of action should be optimization software allowing user to use information from the satellite monitoring system – such an approach is presented in the project (Fig. 7). As you can see the GPS monitoring is only one of many elements of a computer system that includes the economy as a whole fleet of the police.

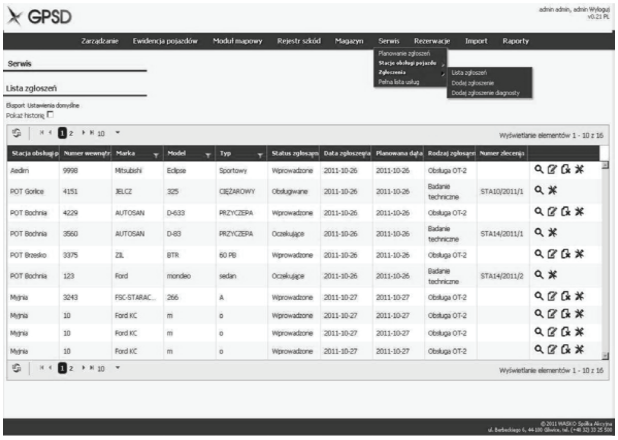

Fig. 7 The structure of the fleet management system with the expanded service module

5. Conclusion

Optimization of the police fleet is a difficult task due to the specific cost accounting in the public sector and the limitations budget system. However, the use of the police business solution bring measurable economic benefits. Satellite monitoring (treated as a key element of an integrated fleet management system) is an opportunity to improve transport efficiency of the police. In particular, the expected decrease in cost of operation and servicing of rolling stock, and greater attention to transport equipment. It is possible to more effectively manage the fleet. Obtaining the benefits depend on the implementation of telematics and organizational changes in the police. The reforms require the salary system (it is necessary motivational factors) and the system of buying and selling of vehicles. Effective management of the police fleet is a benefit in terms of logistics costs and improving operating efficiency of the police.

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