COST-EFFECTIVENESS INDICATORS OF POLISH AIR NAVIGATION SERVICES AGENCY

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Reports presented by various Air Navigation Services Providers from Europe, contain diverse results of conducted service activities. One of the fundamental data, beside financial result, are cost-effectiveness indicators. In this article two types of such indicators will be analyzed, namely financial cost-effectiveness and economic cost-effectiveness. In general terms both of them, presents costs related to air traffic management. However, some differences exist between those indicators. This divergences regards costs connected with range of the provided services and arising from this possibility to assess the Polish Air Navigation Services Agency's effectiveness in comparison with other European Air Navigation Services Providers.

K e y w o r d s: PANSA, financial cost-effectiveness, economic cost-effectiveness, ATM/CNS provision costs, en-route ATFM delays, airport ATFM delays, average the costs of ATFM delays.

1 INTRODUCTION

Economic activity of each enterprise carries the necessity of obtaining positive financial results. It means that the revenues must exceed costs related to the functioning of the business. Of course there still exists the possibility of running the enterprise, in case when costs are higher than the revenues obtained with selling manufactured goods or services. However, described situation cannot exists indefinitely in the market economy. Financing of the enterprise using money obtained from bank loans or borrowings from other sources, creates the commitment to external creditors, what leads to insolvency of the enterprise and finally will cause its bankruptcy. The requirement of obtaining the best possible financial results additionally creates the competitiveness of the behavior in the market economy. What is more, competitive advantage consists of achieving better financial results than the other enterprises offering similar goods and services.

To reach the competitive advantage it is important to obtain high effectiveness of the enterprise, it includes mainly financial and economic cost-effectiveness. Company's financial effectiveness is a measure of viability of realized production or provided services. Goods or services are cost effective, only if the amount of received revenues in a given period, exceed the incurred costs. Financial efficiency in the general sense relates to the relationship of financial benefit to the entrepreneur's input costs. The second measure of the efficiency of business activity is economic efficiency, which is a quantity that describes utility (cost-effectiveness) of the enterprise from the society point of view.[8] The concept of general social utility is much more complex category and can not be identified solely as an achieved profit. According to the Cost-benefit Analysis Guide, developed by the European Commission, the project is a cost-effective, if and only if, "…it is *reflecting the values that society would be willing to pay for a good or service. In general, economic analysis values all items at their value in use or their opportunity cost to society (often a border price for tradable items*". [6]

This article aims at presenting the principles of calculating the financial cost effectiveness and economic cost effectiveness of the Polish Air Navigation Services Agency (PANSA). PANSA is specific company which activity includes provision of services related to the management of the airspace. Due to provided services, it is important to demonstrate the principles of calculation of cost-effectiveness indicators. The Agency is a company that finances its activities and investments, using revenues generated from the provision of air management services. Therefore, it must maintain a rational financial management, especially in a situation when huge competition exists in the European airspace. On the other hand, the range of PANSA's facilities caused that it is only institution providing this kind of services in Poland. Thus, the utility of its services is huge. Presenting the rules for calculating the cost efficiency indicators, it is possible to identify not only the differences existing between both costs, but also, it is possible to establish the rules for determining the costs of social utility, which is a key factor of economic cost-effectiveness.

2 FINANCING COST-EFFECTIVENESS INDICATOR

The financial cost effectiveness includes expenditures related to the activities allowing to obtain the revenue by selling goods and services. In case of Polish Air Navigation Services Agency financial cost-effectiveness indicator is calculated as a ATM/CNS (Air Traffic Management/ Communication, Navigation, Surveillance) provision costs by aggregated (composite) flight-hours. ATM/CNS provision is staff costs (for Air Traffic Control Officers - ATCOs in operations and support staff), capital related costs and non- staff related operating costs.[11]

Financial cost effectiveness indicator is calculated from the formula:

$$FCE = Pc/Fh$$

Where:
FCE - financial cost-effectiveness [€]
Pc – ATM/CNS provision costs (in €'000)
Fh - aggregated flight-hours [in '000]

Financial cost-effectiveness indicator is used to compare the financial costs of activities provided by various European ANSPs (Air Navigation Services Provider). It tells us about the hourly cost of the air traffic management. Presented diagram (figure 1) shows the financial cost effectiveness of European Air Navigation Services Provider in 2010. The figure shows that an average cost-effectiveness is estimated around 427 euros, while the PANSA cost equals 303 euros. It turned out to be far below the European average, what directly affect the value of fees for en route and terminal services provided by PANSA, and imposed on aircraft using Polish airspace.

However, not all of the costs incurred by PANSA are included in the calculation of financial cost-effectiveness indicator. Polish Air Navigation Services Agency provides a range of services for which no charge is collected, covering the occurring costs using revenues achieved from the commercial tasks. In accordance with the Act on the Polish Air Navigation Services Agency the following costs categories have been excluded from the financial cost-effectiveness analysis:[1]

- Costs relating to services provided to military OAT (Operational Air Traffic);
- METEO costs (whether provided internally or externally);
- Payments to governmental or regulatory authorities;
- EUROCONTROL costs;
- Payment to other ANSPs or States for delegated services.

The above expenditures are not included into calculation of the financing cost efficiency indicator, however they can constitutes even more than ten percent of incurred costs. For example in 2011 the METEO,EUROCONTROL and CAA costs of out of control of PANSA amounted to PLN 69 564 thousand and constituted 11,05% of total costs.[10]

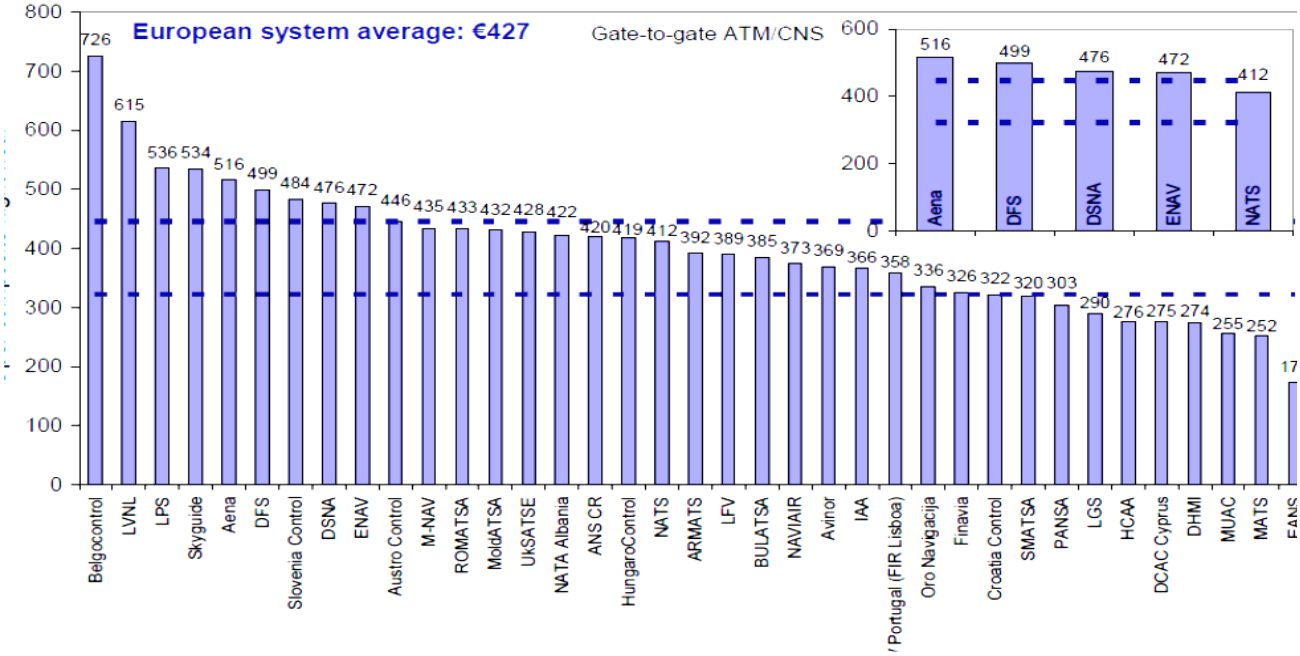

Figure 1. Financial Cost-Effectiveness Indicator in 2010

Source: EUROCONTROL, ATM Cost-Effectiveness (ACE) 2010 Benchmarking Report with 2011-2015 outlook, Brussels 2011.

3 ECONOMIC COST-EFFECTIVENESS INDICATOR

Economic Cost-Effectiveness Indicator is another measure of PANSA'S service efficiency which takes into account not only financial aspects but also the quality of provided facilities. What is more, those facilities are mainly connected with the air traffic delays costs. [7] In order to estimate the economic cost-effectiveness indicator it is necessary to calculate previously several values which are strictly linked with PANSA service activity. Firstly, to calculate the economic cost effectiveness, it is important to specify the extent of delays occurred as a result of the Air Traffic Flow Management (ATFM). Delays generated in minutes concern both en-route ATFM delays as well as airport ATFM delays.

1) $$Td = Erd + Ad$$

Where:
Td - total ATFM delays ['000 minutes].
Erd - en-route ATFM delays ['000 minutes].
Ad - airport ATFM delays ['000 minutes]

Further step, allowing to calculate economic cost-effectiveness indicator, is estimation of the Air Traffic

Flow Management (Cd) delays costs. This quantity is the product of the total time of ATFM delays and the average cost of ATFM delays that are incurred by the Air Navigation Services Providers (ANSPs) in the Single European Sky. The costs of ATFM delays (Td) includes direct costs (crew, passenger compensation, etc.) the network effect (i.e. cost of reactionary delays) and the estimated costs to an airline to retain passenger loyalty. The cost of time lost by passengers is only partly reflected.[5]

The Average costs of ATFM delays (Acd) is determined annually for all European ANSPs. Additionally, it is calculated by Dividing the total ATFM delay cost by the total number of ATFM minutes which gives an average value of euro per minute.[2]

2) $$Cd = Td \; x \; Acd$$

Where:
Cd - costs of ATFM delays [€'000]
Acd – average the costs of ATFM delays [€/minute]

Utility costs (UC) is the quality obtained by dividing the cost of ATFM delays per aggregated (composite) flight-hour. This costs represent expenses incurred as a result of the socio-useful character of the enterprise. The nature of the incurred costs leads to the conclusion that … "*social utility is a part of the activities which failure to perform may be detrimental to the society or part thereof*".[9]

3) $$Uc = Cd/Fh$$

Where:
Uc - cost of delay per aggregated flight-hour [€]

Economic cost-effectiveness (ECE) is a sum of two previously calculated PANSA's expenses, including financial cost-effectiveness and utility costs of the enterprise. Therefore, economic cost-effectiveness is a collation of the financial cost-effectiveness and costs associated with the social utility of the services provided by PANSA. However, the utility costs mainly refers to the quality of provided facilities, in particular the costs of air traffic delays, which are simple to calculate.

4) $$ECE = Fce + Uc$$

Where: ECE- economic cost-effectiveness [€]

Comparison of economic cost-effectiveness indicators of the various European Air Navigation Services Provider (Figure.2) indicates that PANSA is highly competitive in this regard. What is more, the same situation is presented on the example of financial cost effectiveness, where PANSA results are substantially below the European average. Sample data presented in Figure 2 indicate that PANSA's ECE reached 389 euros in 2011, while the average value for the European agencies amounted to 507 euros. However, the chart clearly shows, that despite small PANSA's ECE, the cost of delay per aggregated (composites) flight-hour constitutes its large part. What is more, high costs of delays generated by PANSA, result in the deterioration of the Agency's image in the field of economy.

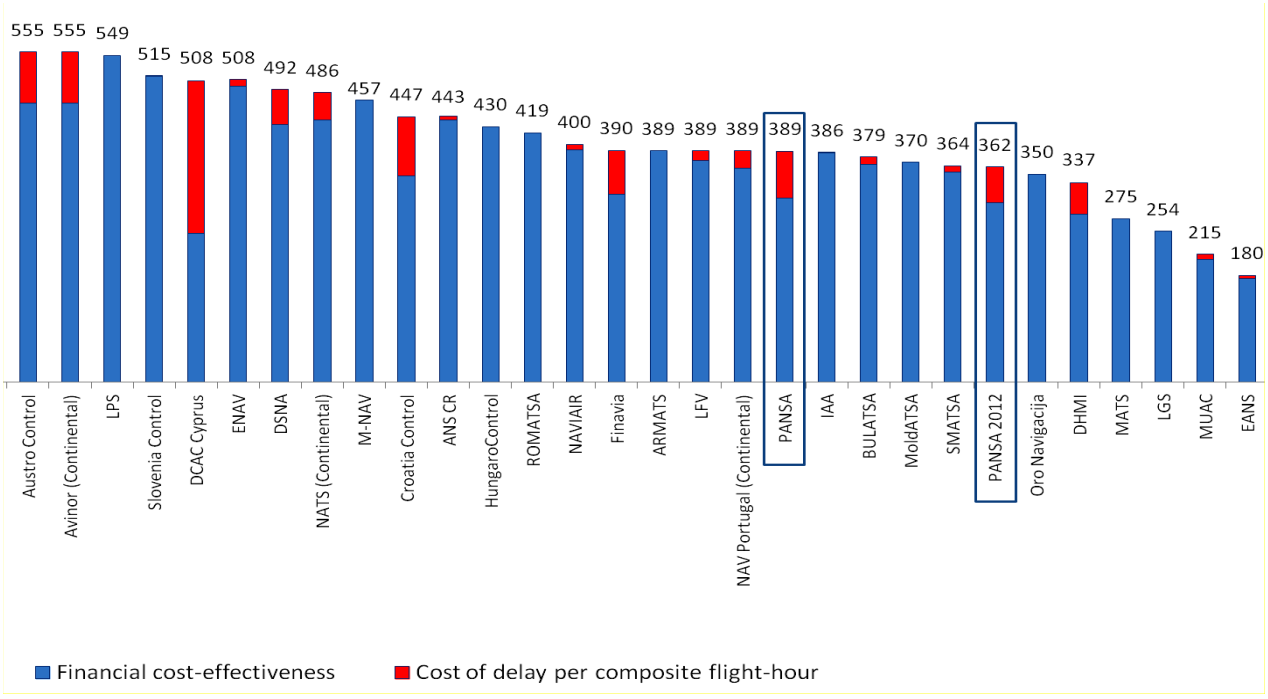

Figure 2. Economic Cost-Effectiveness Indicator in 2011

Source: EUROCONTROL, ATM Cost-Effectiveness (ACE) 2011 Benchmarking Report with 2012-2016 outlook, Brussels 2011.

CONCLUSION

Cost effectiveness indicators are important factors which describes efficiency of PANSA's expenditures and medium-term unit costs. Therefore, the necessity of estimation of described indicator is an essential element of the PANSA activity. Results presented in mentioned way allows to define the areas of agency activities which to the greatest extent impinge on the ability of competitiveness in the area of airspace management. The effectiveness of this method is proved by the place, which PANSA occupies among other European service providers. However, despite achieving financial and economic cost effectiveness below the average, nowadays many possibilities of reducing costs associated with delays (utility costs) emerged.

Noting the importance of the results offered by the calculation of financial cost-effectiveness and economic cost-efficiency, it becomes essential to continue the analysis of this area of PANSA activity. It should focus on detailed examination of individual components, which aim at calculation of the cost-effectiveness indicators and identifying courses of activity that should be taken by PANSA, in order to maximize the efficiency of its operation.

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