

Comparable aggregated indicators of QoS in telecoms market

The Office of Electronic Communications (UKE)

Background

For historical reasons, the Polish telecommunication company TP S.A. has always had a dominant position in the Polish telecoms market. This monopolistic situation hindered the development of the telecommunication market in Poland, resulting in relatively high prices and low quality of services.

In Poland, the regulatory activities for the telecom market are provided by the Office of Electronic Communications (UKE). In 2009, after many complaints and negative reports about monopolistic practices of TP S.A., UKE imposed an agreement between UKE, the alternative operators (AO's) and TP S.A. The agreement states that TP S.A. shall designate within its structure the TP-Wholesaler (TPW) to ensure equal access and wholesale service level to all alternative operators (independent ones as well as those related to TP S.A.). Moreover, to check if the agreement is fulfilled properly, a set of quantitative indicators (Key Performance Indicators – KPI's) was defined to measure the quality/level of various aspects of provided services. In particular, this shall enable UKE to control whether some of AO's are favored or discriminated by TPW.

For each periodic report, UKE receives a table of all (over 60) KPI's for all AO's (about 500). The problem is that some of the cells in the table may be empty (no data available), as well as dimensions and structure of the table may vary from period to period. Therefore, UKE doesn't know how to properly interpret the data.

Problem description

Main challenge:

- Based on the table with KPI's, construct aggregated indicators that measure the level of service rendered by TPW to AO's. Indicators must be comparable in a sense that they should tell whether some AO's are favored or discriminated.

Secondary challenge:

- Additionally, the aggregated indicators should be designed in such a way that it is possible to compare several reporting periods.
- Check whether proposed solutions are immune to machinations of any party of the agreement.

Specification of input data:

- KPI's are of various types (usually integers and percentages) and of various range.
- Various AO's choose various subsets of services offered by TPW. For that reason some KPI's for a given AO may be indefinite.
- Some KPI's may be indefinite for some reporting periods, despite the services related to those KPI's are provided (e.g. because of lack of data).
- The set of KPI's for individual AO may vary for various reporting periods (e.g. because some services are included to or withdrawn from the offer of TPW).
- The set of indefinite KPI's for a given AO may vary for various reporting periods (e.g. because the AO starts or stops using some services).