

The negotiation processes are usually complicated and involve many issues. The good examples are the business-to-business or business-to-government negotiations over the potential contracts on new supplies or services within the investment projects, where the negotiation problem is not limited to the single and most intuitive issue of price only, but involves a series of other parameters, such as the time of delivery / completion, time of payment, warranty, returns etc. A multitude of negotiation issues makes the evaluation of the potential contract as well as all the negotiation offers submitted during negotiation process difficult. The offers submitted by a counterpart are usually good for some of issues, but simultaneously not satisfying for the others. For instance, some of them offer a various combinations of low and satisfying price, but a short time of payment and long time of delivery; the others are most expensive, but the time of delivery is sooner and the time of payment postponed. Thus, the negotiator needs to evaluate, what are the trade-offs between different resolution levels of various issues and to what extend the shortages in one issue may be compensated by the surpluses in others. In many situations such a trade-off analysis is conducted implicitly by the negotiators, based on their internal beliefs and intuition. Such an approach is seldom efficient. It is, however, biased due to the limited cognitive capabilities and the heuristic-based errors made by the negotiators, and may result in false definition of the negotiation problem and negotiator's goals and accepting unprofitable and inefficient contracts. What is more, the intuition is not enough to explain the decisions on accepting or rejecting the negotiation offers during the negotiation process and present a convincing reasoning proving the profitability of the negotiated agreement in the situation, where the negotiator negotiates on behalf of a company or a group of stakeholders. To support negotiators in making their decisions, evaluating offers, compromises scales of concession and tracking the negotiation progress, a separate scientific discipline has been developed since early 1980s, that is called the negotiation analysis.

The classic and most simple method commonly recommended for the negotiation support and which allows for conducting a formal analysis of the negotiator's preferences and building the negotiation offer scoring system is a simple additive weighting method (SAW) and its variant used in discrete negotiation problem – SMART (Simple Multi-Attribute Rating Technique). This approach consists of the evaluation of the elements of the decomposed negotiation problem, i.e. the individual issues and their resolution levels separately, by assigning to each of them the abstract rating points (quality, utility, desirability, satisfaction etc.) and determining the global rating of each offer as a sum of the rates of resolution levels that comprise this offer. Being technically simple, this approach assumes however, that the negotiators are well skilled in the formal and analytical thinking, and are able to decompose the negotiation problem and evaluate its elements independently, without reference to the remaining options. The decision and negotiation experiments conducted recently indicate, however, that in majority the negotiators have problems in using SAW-based negotiation support tools properly, which results in misperception and misinterpretation of the scoring systems built this way and making bad, inconsistent and irrational negotiation decisions. Therefore, it seems vital to develop an alternative methods for negotiation support that will generate for the negotiators the offer scoring systems that are precise and accurate at one hand, but also close to their intuition, comprehensible and understandable, and can be easily used for evaluating the offers and making decisions on their acceptance or rejection.

This project is focused on the analysis of the applicability and efficacy of a certain group of multiple criteria decision making methods that drive from different philosophy of defining the preferential information than SAW and SMART. Here, the holistic approach of preference analysis is applied, that stems from the notion of preference disaggregation and uses such method as UTA, GRIP or MARS. Thus, it is assumed that the negotiation offer scoring system may be inferred from the examples of offers (defined as complete packages or describing some bundles of resolution levels only) provided by the negotiators, for which she/he is able to consider which are better or worse and, possibly, of how much. Based on the preferences defined this way and according to chosen algorithm of disaggregation the evaluation of all remaining elements of the negotiation problem can be determined that consequently allows to score any feasible negotiation offer (as it was done in SAW and SMART approaches). The holistic approach is, however, very user-oriented. It is the negotiator who builds the offer examples herself/himself (the reference set of alternatives), and express the preferences over them or in pair-wise comparison of them using the way most convenient to her/him, e.g. by means of verbal description, ordinal scale, cardinal rates or considering only that one is better than another.

The project's main objective is to verify, whether the negotiation offer scoring system built by means of the holistic methods and the resulting negotiation support (e.g. analyzing the scale of concessions, tracking the negotiation process, visualizing the negotiation history etc.) can be more efficacious, simple, comprehensible and useful for the negotiator than a corresponding support provided by means of the classic negotiation analysis tools. Therefore, within the project a detailed recognition of the existing methods and techniques of the holistic decision support will be performed and the modification of these methods as well as new authorial algorithms will be suggested that fit the negotiation decision making context the best and, simultaneously, take into account the negotiator's cognitive capabilities and limitations and their general decision making profile. Next, in the series of experiments and using a dedicated software support tools and on-line questionnaire-based surveys, the usefulness of the proposed methods and algorithms will be verified. The results of such a verification will be compared with those obtained by means of classic tools provided by Inspire, a well-known electronic negotiation system. That will allow to conclude, which of the approaches the holistic or the classic is more useful (a subjective negotiator's perspective) and efficacious (an objective accuracy measure) in the negotiation support.