ON THE MEASUREMENT OF PREFERENCES IN THE ANALYTIC HIERARCHY PROCESS

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Abstract: At present, alternative prioritization methods are often portrayed as rivalling approaches, and the emphasis tends to be placed on the differences rather than on the similarities. Against this background, there is a continuing need for comparative research which seeks to clarify interrelationships between the methods, thus helping practitioners in the choice of well-suited approaches to the problems they are facing. It is clear that the convergence of the methodologies will benefit the most important goal of improving the practice of decision analysis.

Starting from the foundations of multiattribute value measurement, we demonstrate that in ratio estimation the comparisons should be interpreted in terms of value differences between pairs of underlying alternatives. The need to emphasize this interpretation is general. It applies to all methods which make use of ratio statements in the elicitation of hierarchical weighting models like the AHP and SMART. When the questions in AHP are modified according to the value difference interpretation, it can be regarded as a variant of multiattribute value measurement. While it is still unclear to what extent the DM's intuitive responses to the standard AHP questions conform to the value difference interpretation, we feel that AHP practitioners could improve their analyses by stating the pairwise comparison questions accordingly.

The other issues debated i.e. the choice of the scale and whether to use or not to use normalizations are important issues which should be seen as practical procedural choices the consequences of which need to be understood. The use of a fixed scale and verbal ratio descriptions can be convenient both in the AHP and in MAUT based techniques like SMART. The main problems related to the original one-to-nine scale of AHP is that it strongly restricts the range and distribution of possible priority vectors. The new balanced scales proposed here provide an essential improvement in this matter. However, the assumption that verbal expressions can be mapped onto numbers in the same way, no matter who is responding and in what context is problematic. The decision analyst should carefully consider the scale selection especially if the results are to be used in a normative way. The risks can be lowered essentially by the availability of software tools, such as HIPRE 3+, that allow the practitioner to check the results with different scales. Often hierarchical weighting procedures like the AHP are only used to increase the problem understanding and improve communication among a group of decision makers with little interest in the details of the numerical results. Even in this kind of a case the analyst should use correct elicitation techniques. The decision makers need to understand that both the structure of the hierarchy and the criteria weights need to reflect the set of decision alternatives and their differences.