Applying sustainability theory to transport infrastructure assessment using a multiplicative AHP decision support model - DTU Orbit (16/03/2019)

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It is generally expected that the three dimensions of the economy, society and the environment must be included in any measurable sustainability pathway. However, these do not provide much guidance as to how to prioritize impacts within and between the dimensions. A conceptualized approach to sustainability based on the nested model is therefore presented seeking to provide an alternative approach to sustainable transportation assessment, namely the SUSTAIN Decision Support System (DSS) model. This model is based on a review of basic notions of sustainability presented by the Brundtland Commission report, which is used to validate the nested model of sustainability for countries operating under the paradox of affluence. This provides a theoretical rationale for prioritising longer-term ecological integrity over shorter-term economic concerns, in line with the stronger conceptualisation of sustainability supported by ecological economists. This conceptualisation is operationalized by the use of Multi-Criteria Decision Analysis (MCDA) and a multiplicative version of the Analytic Hierarchy Process (AHP). The planning and decision-making process related to a new connection across the Roskilde Fjord in Frederikssund, Denmark, is used as a case study. It is found that the SUSTAIN DSS model results provide a type of benchmark for connecting to the essence of sustainable development as well as to integrate sustainability more explicitly into the planning and assessment practice.

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