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A Stochastic Analytic Hierarchy Process Based Weighting Model for Sustainability Measurement in an Organization

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Abstract : A weighted statistical stochastic based Analytical Hierarchy Process (AHP) model for modeling the potential barriers and enablers of sustainability for measuring and assessing the sustainability level is proposed. For context-dependent potential barriers and enablers, the proposed model takes the basis of the properties of the variables describing the sustainability functions and was developed into a realistic analytical model for the sustainable behavior of an organization. This thus serves as a means for measuring the sustainability of the organization. The main focus of this paper was the application of the AHP tool in a statistically-based model for measuring sustainability. Hence a strong weighted stochastic AHP based procedure was achieved. A case study scenario of a widely reported major Canadian electric utility was adopted to demonstrate the applicability of the developed model and comparatively examined its results with those of an equal-weighted model method. Variations in the sustainability of a company, as fluctuations, were figured out during the time. In the results obtained, sustainability index for successive years changed form 73.12%, 79.02%, 74.31%, 76.65%, 80.49%, 79.81%, 79.83% to more exact values 73.32%, 77.72%, 76.76%, 79.41%, 81.93%, 79.72%, and 80,45% according to priorities of factors that have found by expert views, respectively. By obtaining relatively necessary informative measurement indicators, the model can practically and effectively evaluate the sustainability extent of any organization and also to determine fluctuations in the organization over time.

Keywords : AHP, sustainability fluctuation, environmental indicators, performance measurement
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