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Universidade Federal de Pernambuco, Recife (Brésil)

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Multicriteria Web-based Decision Support System For Resource Allocation In Brazilian Public Universities

Jury:
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Keywords: Resource Allocation, Budgeting, MCDM /A, Universities, Web-based DSS, Model-driven DSS

Abstract: The allocation of scarce resources is a complex problem, specially when it comes to budget constraints. Thus, this work aims to propose a multicriteria web-based Decision Support System for resource allocation in the context of higher education organizations, more precisely, public universities that have budget constraints, such as Brazilian federal universities. To do so, the survey was divided into three steps: identify the Brazilian general allocation model and the models from each federal university; find similarities between the models; and, divide the models into categories, according to their similarities. Subsequently, a Brazilian federal university was chosen (Federal University of Mato Grosso do Sul / UFMS) as a parameter to make a numerical application to validate the multicriteria model for resource allocation proposed and, afterward, a web-based DSS was developed. For the MCDM resource allocation model, an additive value function was considered to set the percentage of the total budget that every alternative should receive. The problem was seen as a special case of project portfolio selection problem because its approach is deemed to be appropriate for a resource allocation decision context. Also, the study analyzed the effects of possible scaling issues in additive value functions, when considering resource allocation problems and a sensitivity analysis was performed to analyze the robustness of the model. For the web-based DSS, the analysis was carried out by developing a DSS Database model to store and retrieve data, defining the user's interface based on his detailed requirement analysis and using a web application to transform the prototype into a web-based system. The results were satisfactory. Regarding the model, the percentage of the budget that should be allocated to each alternative remained the same when varying the weights of the model. Regarding the web-based DSS, the system provided a clear vision on how the resource allocation procedure works, the entire process became more transparent to the ones that are affected by it, to the decision makers and to the government, enabling them to take safer and reliable decisions, seeking to reduce uncertainties and to maximize their results. The multicriteria web-based DSS
presented here could be extended and applied by other federal universities in Brazil or in other countries, adapting the alternatives and criteria for each specific internal allocation model and to the DM needs.