

**8 AIROYoung Workshop 2024 — Book of Abstracts**  
**Supplier Selection for Global Service  
Providers: a Decision Support System**

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*Abstract* In this paper, we develop a decision support system (DSS) aimed at solving a real-world supplier selection problem (SSP) for a global service provider (GSP) operating in the facility management industry. The GSP provides its customers with facility management services, which are subcontracted to external suppliers selected on the basis of multiple criteria, like economic soundness, quality of service, capacity, and closeness. The SSP is formulated as a multi-objective generalized assignment problem, where the quality and the closeness of the selected suppliers are maximized, whereas a penalty produced by overcapacity assignments is minimized. The quality of each supplier is

computed by applying a weighted sum method, resulting from a multi-criteria decision analysis in which the criteria weights are determined through an Analytic Hierarchy Process. The DSS is developed using a modular architecture with a relational database, a supplier evaluator, and a simulator, as well as an additional user-friendly interface. The simulator relies on a rolling horizon algorithm and three alternative configurations to assign contracts to suppliers. The effectiveness of the DSS is assessed by means of extensive computational experiments on historical data from the GSP. The results show a significant average improvement of at least 25% in terms of objective function value compared to the solution adopted by the company and prove the advantage of using the DSS.

**Keywords:** Decision Support System, Supplier Selection Problem, Global Service Providers, Integrated Multi-Criteria Decision Analysis.

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