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Application of DSM (Design Structure Matrix) Principles to Project Risk Management of Thessaloniki Metro Construction Project

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ABSTRACT

The process of project risk management is strongly connected to the successful completion of a project. Most of the usual techniques include classical principles used for this purpose are based on the two concepts of probability and impact and they also independently analyse and manage individual risks. Therefore what most of them don't take into account are the relations and dependencies among risks (due to complex nature of risk interactions) and as a result they cannot represent risk complexity in a project. Design Structure Matrix (DSM) is a tool that visualizes and analyses relations and dependencies among objects. It has been initially used for scheduling issues, in product composition and people's organizations. In recent years DSM has started being applied in risk issues and particularly in the context of project risk management. In this thesis, an application of DSM principles to project risk management of Thessaloniki Metro construction project is presented. The purpose of this application is to indicate how these techniques can assist and improve the risk management processes of a large and complex civil engineering project. Particularly the model structured is based on the methodology introduced by Marle & Vidal at International DSM Conference in Sweden at 2008. At first the risks are identified and then a binary and square DSM matrix is defined in order to represent the project risks and the interactions between them. After that the numerical DSM matrix is defined using the multi-criteria decision making method AHP based on pairwise comparison so as to calculate its values. Then, clustering analysis of the above matrices is implemented in order to cluster risks according to their interactions and the strength of these interactions. The clustering results combined with the implementation of usual techniques can lead to a more effective risk management plan for Metro construction project.

KEYWORDS