Designing of the Task Threatness Matrix during Project Planning Phase

Josef Havlíček | Supervisor: Petra Pavlíčková

FACULTY OF INFORMATION TECHNOLOGY CTU IN PRAGUE

Motivation

Modern project management relies more and more on software tools. These tools allow you to plan a project, manage the distribution of resources and monitor how the project proceeds in time. Successful completion of the project is the main goal of the project management and these tools facilitate achievement of this goal. But they do not focus on it directly. In this respect, the **task threatness matrix method** can be a useful tool to the project management. This thesis is based on scientific research dealing with this method and implements its outputs for real use.

Task Threatness Matrix Method

The task threatness matrix method (introduced in articles [1] and [2]) evaluates the possible negative impact of individual tasks in a project on successful completion of the entire project. The threatness of project task is combination of two views – task **criticalness** and **failureness**.

Task Criticalness

The task criticalness potential is based on **quantitative evaluation** of project tasks from the perspective of project plan. This potential is calculated by multiple attribute decision making method using five indicators of the task criticalness, which are based on values from project plan, transformed by linear utility function and fuzzified using fuzzy linguistic scale. These five task criticalness indicators are **duration**, **slack**, **cost**, **work** and **topology**.

Task Failureness

The task failureness potential is based on **expert's estimate** of probability that task will fail in one of the three aspects derived from the project triangle – **duration**, **cost** and **quality**. These three task failureness indicators are evaluated by expert individually and expressed using fuzzy linguistic scale.

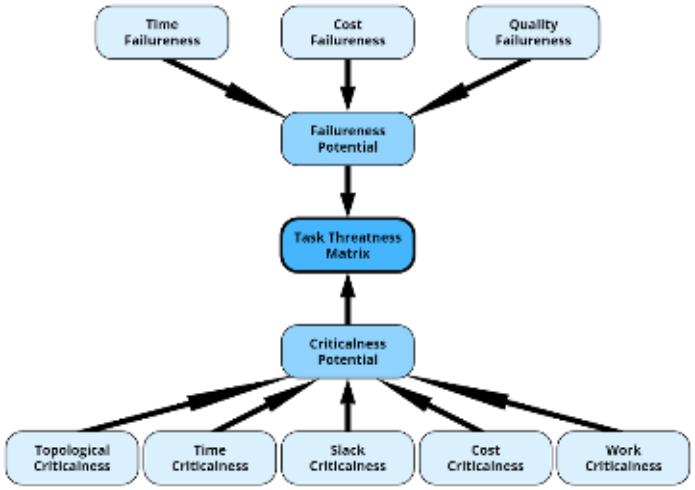

Figure 1: Diagram of all components of the task threatness matrix

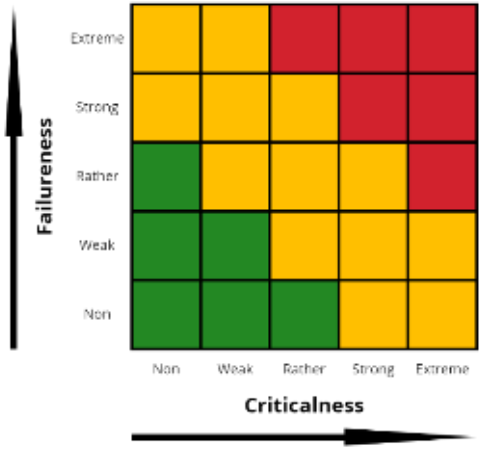

Figure 2: Task threatness matrix template

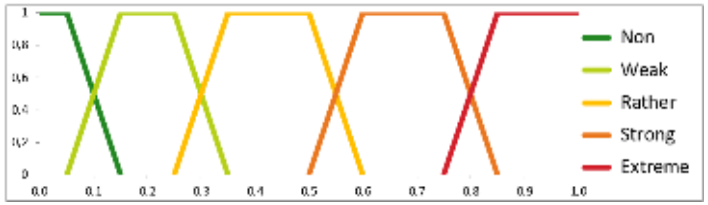

Figure 3: Five-step fuzzy linguistic scale used for criticalness and failureness potentials

Task Threatness Matrix

The task threatness matrix is a two-dimensional **graphical representation** of these two potentials. The fuzzy values of criticalness and failureness are used to place project tasks in their corresponding cells in the matrix. The task threatness matrix is inspired by Winterlink's crisis matrix.

Objective

The goal of this thesis was to create an **add-in** for **Microsoft Project**, that extends capabilities of Microsoft Project, covers the task threatness matrix method and enables its use for ordinary users.

Conclusion

Created add-in provides Microsoft Project users (e.g. Project Managers) with tool to track and visually display criticalness and failureness potential of all tasks in their projects. Use of add-in enables easy identification of the most threatening tasks in the project.

The add-in is being further improved and expanded with additional functionalities.

References

[1] H. Brožová, T. Šubrt, J. Rydval and P. Pavlíčková, "Fuzzy Threatness Matrices in Project Management", in *Proceedings of the 15thInternational Symposium on Operational Research SOR'19 25.09.2019, Bled.* Ljubljana: Slovenian Society Informatika – Section for Operational Research, 2019. s. 581-586.

[2] H. Brožová, J. Rydval, P. Pavlíčková and T. Šubrt, "Task threatness matrix in the Project management", in *Proceedings of the 37th International Conference on Mathematical Methods in Economics 2019 11.09.2019, České Budějovice.* České Budějovice: Jihočeská univerzita v Českých Budějovicích, 2019. s. 234-239.