

IT Project Portfolio Management Tools – Towards a Taxonomy

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1 Introduction

Over the last decade information technology (IT) has developed from the single implementation of IT applications towards a driver for IT-enabled innovation and change (De Reyck et al., 2005). Worldwide, the IT spending is constantly increasing, and the global researcher Gartner has forecast that the global spending in IT initiatives will reach 3.8 Trillion Dollars in the year of 2021 (Gartner, 2020). In addition, IT departments are becoming more and more project driven organizations and subsequently an effective management of multiple IT projects is extremely gaining importance (De Reyck et al., 2005; Kock et al., 2020).

With this increasing dependency of organizational performance on IT departments, the initial evaluation and subsequent selection of the right IT projects for execution is becoming an essential challenge for organizations (Tavana et al., 2019; Pedersen, 2016). However, IT projects are often characterized by long payback periods and their true business value is difficult to identify and to evaluate (Bardhan et al., 2004; Jeffery and Leliveld, 2004). Furthermore, IT projects typically have cross-functional interdependencies, are dynamic and have a variety of uncertain aspects (Karrenbauer and Breitner, 2020).

On this basis, the central question of *“How do we maximize the business value from IT investments?”* arises on the management level and IT Project Portfolio Management (IT PPM) aims to answer this question (Jeffery and Leliveld, 2004).

The objective of IT PPM is to select those IT projects for the portfolio that are aligned with the overall strategy of the organization under consideration of project interdependencies and multiple portfolio constraints, such as scarce resources or budgetary constraints (Costantino et al., 2015; De Reyck et al., 2005).

Based on this increasing importance and complexity of IT PPM, a large number of commercial IT PPM tool vendors have entered the market and the number of available IT PPM tools is constantly growing (Kock et al., 2020). The objectives of such IT PPM tools are to provide visibility into the IT project portfolio and further, to support decision-makers with the prioritization and strategic alignment of IT projects in order to increase the business value of the overall IT project portfolio (Symons, 2009).

However, previous researchers have highlighted that available IT PPM tools on the market vary quite extensively regarding the functionalities that they provide in order to support decision-makers during the IT PPM process (Kock et al., 2020). Gerogiannis et al. (2010) have highlighted that due to the large amount of available IT PPM tools, the great variety of different functionalities and different requirements of potential users, the selection of an appropriate IT PPM tool is an extremely challenging task.

Further, Gerogiannis et al. (2010) stated that often the decision about the selection of an IT PPM tool is rather taken ad hoc or based on the personal opinion of the decision-maker, which might lead to the implementation of an unsuitable IT PPM tool.

With respect to the literature, previous researchers have mainly focused on specific methods and approaches for the initial selection and prioritization of IT project proposals and suggested different mathematical optimization models for the creation of an optimal IT project portfolio (Cho and Shaw, 2013; Neumeier et al., 2018). However, the specific domain of commercial IT PPM tools has not yet been extensively researched and currently no holistic overview over the functionalities and characteristics of commercial IT PPM tools exists.

Therefore, this paper aims to develop a taxonomy of IT PPM tools, which allows for an appropriate distinguishment between commercial IT PPM tools and provides a holistic overview over their characteristics. Accordingly, this paper addresses the following three research questions:

RQ 1: How can IT PPM Tools be classified with respect to their characteristics?

RQ 2: What cluster of IT PPM Tools can be defined based on common characteristics?

RQ 3: To what extent do IT PPM Tools differ in regard to their performance?

Therefore, chapter 2 provides the theoretical background, which starts with a definition of the term “Project Portfolio Management (PPM)” and its related concepts. Furthermore, the importance and relevance of PPM in the area of IT is explained again and several common IT project selection techniques are introduced. Finally, the theoretical background is completed with a presentation of previous classification scheme in the field of IT PPM tools. In the third chapter, the research design is introduced which is followed by the development of a taxonomy of IT PPM tools in chapter 4. Furthermore, chapter 4 includes an evaluation of the developed taxonomy, which is conducted based on five interviews with real-world practitioners of IT PPM tools. Chapter 4 also includes a taxonomy application, in which the distribution of all analyzed IT PPM tools into the taxonomic structure is analyzed and respective IT PPM tool archetypes are identified. Subsequently, in chapter 5, a benchmarking of IT PPM tools is performed in order to analysis if the usage of different IT PPM tools can result in a different initial ranking of IT project proposals. The research results of this paper and relevant implications for research and practice are discussed in the subsequent chapter 6 and afterwards in chapter 7 important limitations of this paper are formulated. Finally, in chapter 8 the most important results of this paper are summarized.

8 Conclusion

Modern IT organizations are developing more and more to project-based organizations and the question of the right prioritization and selection of IT project proposals is extensively gaining importance. In this regard, IT PPM is becoming an increasingly relevant functions in companies in order to ensure a centralized management of the IT project portfolio and to enable rational and comprehensible decisions on the IT portfolio level.

This importance of IT PPM is also reflected in the software market and over the last decade a large quantity of commercial IT PPM tools has entered the market that provide a wide range of different functionalities in order to support decision-makers along the IT PPM process. Whereas the amount of available IT PPM tools is continuously increasing, only very few research has been conducted on the specific domain of commercial IT PPM tools and currently no holistic overview and classification of the great amount of available IT PPM tools and their respective functionalities and characteristics is existent.

This paper closed this research gap by the development of a comprehensive taxonomy of IT PPM tools, which considered relevant findings from the literature, important findings from actual IT PPM tools and which subsequently was evaluated by practitioners in order to ensure the completeness and usefulness of the taxonomy.

During the taxonomy development process the focus was clearly set on all characteristics of IT PPM tools, that support decision-makers along the IT PPM process, which is reflected in the taxonomy by the three perspectives: “Portfolio Structuring”, “Resource Management” and “Portfolio Steering”. In addition to the IT PPM specific characteristics, the developed taxonomy also considered IT PPM tool characteristics that are not directly related to IT PPM but are from high importance when evaluating commercial software solutions. Subsequently, the developed taxonomy includes a fourth perspective “Non-Functional”. On this basis, the results of the taxonomy development show that IT PPM tools can be classified in a total of 20 dimensions and 51 mutually exclusive and collectively exhausted characteristics.

A subsequent distribution of 60 investigated IT PPM tools into the taxonomic structure revealed important insights about which IT PPM tool characteristics are commonly existent and which characteristics are rather under present in current IT PPM tools. In order to empirically analyze the results from the distribution of the 60 IT PPM tools a cluster analysis was performed, which resulted in the identification of three IT PPM tool archetypes: “Portfolio Overview Tool”, “Portfolio Analysis Tool” and “Portfolio Dependencies Tool”.

In general, the results from the cluster analysis indicate that currently IT PPM tools have a high focus on efficient resource management and on the steering of the

portfolio, as across all three archetypes IT PPM tools typically provide functionalities to analyze the current resource capacity and demand and allow to summarize the overall portfolio status in dashboards and status reports.

In regard to the initial structuring of the IT project portfolio, the results of this paper show that most commonly IT PPM tools apply a scoring model in order to rank and prioritize IT project proposals. However, a subsequent IT PPM tool benchmarking, in which a set of 50 sample projects was scored and prioritized by different IT PPM tools revealed various limitations of a purely scoring based IT project proposals prioritization, as on the one side the weightings and the evaluation of the individual qualitative criteria needs to be conducted manually and further, as IT project proposals are evaluated independent from each other and subsequently IT project interdependencies and portfolio constraints (e.g. resource availability, budget, time) are not considered.

Whereas the most sophisticated IT PPM tools typically allow to analyze the impact of IT portfolio decisions through a “What-if scenario analysis”, IT PPM tools currently do not provide the possibility for an automated selection and creation of the IT project portfolio, in which IT project interdependencies and the mentioned constraints are considered. On this basis, this paper identified a clear gap between assumptions from relevant literature and actual characteristics of IT PPM tools. Whereas in the literature different mathematical portfolio optimization models are suggested, in which multiple factors and constraints are considered during the IT project portfolio selection, the large majority of current IT PPM tools do not provide such sophisticated IT portfolio optimization models.

All in all, the research results of this paper allow the statement that currently IT PPM tools can be of great support in order to create transparency over the IT project portfolio, to analyze specific variables that are important for the project selection and to indicate and estimate high-level priorities. On the other side, IT PPM tools have not yet reached a level of maturity in which they provide sophisticated functionalities for a fully automated and tool-based IT project selection, which considers multiple decision variables.

However, during the expert interviews it was highlighted that due to the increasing importance of IT PPM in general, various new requirements from practice will occur over the next years and it can be expected that also IT PPM tools will further develop in order to meet these increasing requirements. In this regard, it will be of great interest for research and for practice to reevaluate the findings from this paper over time and to analyze if IT PPM tools in future develop more towards sophisticated decision-making tools.