PMS TOOLS FOR AGILE PROJECTS

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Purpose: This discourse aims to examine the categorisation of Project Management Software (PMS) with focused attention on those devised and integrated within the framework of Agile methodologies. The discourse highlights the functionalities of PMS that are most beneficial in Agile projects. It provides an overview of the underlying motives for their adoption and the potential advantages they can offer to project teams, Agile Project Managers, and their stakeholders.

Design/methodology/approach: A comparative analysis of existing tools supporting project management based on an agile approach was applied. Existing software features were analysed to identify similarities and differences, mainly in basic software functionality.

Findings: Effective communication within the project team through IT tools can be a basis for building a competitive advantage in the market. It increases the quality of project outputs through continuous monitoring of project implementation and quick interaction to improve the efficiency of project work.

Research limitations/implications: The number of existing tools and improvements to existing IT tools make it necessary to analyse the IT market situation cyclically.

Practical implications: The present article endeavours to serve as a comprehensive overview that draws upon relevant literature and existing market offerings of PMS to illustrate the discussed functionalities. The article is aimed both at practitioners deciding on the right tool and at software developers bringing newer versions of tools to market.

Social implications: The results of the comparative analysis have an indirect social impact. The agile approach relies heavily on continuous and direct communication between project stakeholders. The study results can help project teams choose the best tool to support project communication.

Originality/value: The literature search indicated a research gap in the comprehensive analysis of existing IT tools currently used in business practice.

Keywords: project management, agile approach, project management software, PMS.

Category of the paper: General review; technical paper.

1. Introduction

According to the authors, comprehending the potential benefits and hazards associated with PMS tools is paramount to the effective implementation of Agile projects within organisations of diverse natures. On the one hand, PMS tools can significantly aid participants in the project management process by facilitating their routine activities, communication, and project status determination. On the other hand, the consistent utilisation of selected IT support creates a foundation for accumulating project experiences and disseminating information pertaining to previously executed projects within the organisation. This enables, on the one hand, the enhancement of the quality of data regarding the actual progression of projects and the efficacy of planning projects similar to those previously executed (referred to as 'planning by analogy'), and, by systematising the Project Lessons Learned (PLL) process, a gradual increase in the project maturity level of the organisation.

Furthermore, in the context of the ongoing pandemic and the current labour market challenges, there is a rising interest in the re-structuring of project frameworks towards virtual (distributed) teams and remote work, specifically with regards to the delegation of tasks to remote teams located in areas that enable a reduction in overall personnel expenses in projects (Chaos Manifesto, 2020). Given the magnitude of the challenges in this domain, it is imperative to explore the sources and extent of potential support in the comprehensive processes of planning, executing, controlling, and steering the progression of projects, particularly those organised in a distributed manner with flexible Agile management frameworks.

For these reasons, and in view of the fact that the topic of this article is only partially addressed in international literature, if at all, the authors of this paper set out to examine and evaluate the scope of possible IT support in Agile projects and the most commonly used functionalities (especially GTD-type) in Agile projects, against the backdrop of the diverse PMS-type software available on the market, as well as the reasons for their use and the benefits that can be attained at different decision-making levels, with a particular emphasis on Agile projects.

2. Literature review

To acknowledge the extent of previous analyses in the subject area, the authors conducted a systematic literature review using two databases of scholarly studies: Springer Nature (SN) and Web of Science (WoS). The keywords taken into account were *Agile*, *software*, and *project management*. In the WoS database, when conducting a search across all fields (title, content), only one publication was identified when using the above-mentioned keywords.

In the SN database, there were 14 publications, but after analysing the content of the articles, only two of them could be utilised. Filtering of the searched articles was performed by considering the phrase: 'agile project+management+software' in the WoS database resulted in 9 articles, with only 4 of them being from the past 5 years. In the SN database, the same phrase resulted in 339 articles. Upon analysis, it was evident that the majority of the articles focused on the functionality of PMS software in relation to communication management in agile projects. The absence of a comprehensive analysis of other software functionalities valuable in agile projects impairs our understanding of the reasons for their utilisation and the potential benefits they bring to agile initiatives. This includes, but is not limited to, task management, documentation, the relationship between Scrum and kanban concepts, Scrum of Scrums project execution, and scheduling.

To address the article's main topic, the authors have devised a model for categorising IT support for project management. Using this framework, they present the extent, scope, and critical features of IT systems and software specifically geared towards agile project execution. The authors also elaborate on the reasons for using these systems and the benefits they offer in implementing agile projects.

3. PMS tools for project management

Information technology tools play a crucial role in the effective management of projects, both in conventional and agile methodologies, particularly for those classified as possessing high levels of complexity. The crucial role of IT tools is to provide support to project managers and team members during the defining, planning, and controlling phases of a project. Additionally, they furnish key stakeholders and decision-makers with timely and comprehensive information regarding the progress of the project, allowing them to revise the business case or assess progress at critical junctures in the project's implementation.

Although it is common in practice to refer to 'project management software', this terminology is incorrect. It is important to note that software does not manage the project itself, but rather serves as an aid to project stakeholders and decision-makers in collecting, analysing, disseminating, and reporting data. This enables them to make more informed and rational decisions about their projects, including those executed using agile methodologies. Therefore, it is more appropriate to use the term 'IT support for project management', which encompasses the following components:

- for support in managing individual projects: PMS (Project Management Software),
- for support in managing multiple projects: MPMS (Multiple Project Management System) or PPMS (Project Portfolio Management System).

Each of the aforementioned software categories possesses unique capabilities that can aid project managers in addressing various domains of influence. An illustration of the scope of such support is presented in Table 1.

Table 1.
Selected possibilities of IT support for project management

Features	IT support
Gathering project initiatives and defining the project	partial
Project planning, including:	
• structure planning,	partial
• scope and progress planning,	partial
• scheduling,	full
• resource planning,	full
• assigning tasks to staff/teams,	partial
• cost planning, budgeting.	full
Implementation controlling and project steering	partial
Gathering project knowledge, analysing changes, analysing deviations	full
Reporting and documenting project progress	full
Managing distributed/virtual teams, remote working	partial/full
Reporting and documenting the multi-project management process, multi-cutting analysis and knowledge gathering on project portfolios	partial

Source: own study based on: Trocki, Grucza, Ogonek, 2003, p. 299.

At present, a plethora of software options exist in the marketplace that cater to the needs of project management, particularly during the planning and execution stages. In particular, the agile methodology necessitates the utilisation of software that facilitates team communication and reporting, such as the SCRUM Burn-Down charts. These software offers vary in terms of pricing, with options available that range from being free of charge to highly sophisticated integrated systems that may cost upwards of several hundred thousand Polish złotys. The potential applications of these software solutions are extensive, encompassing simple scheduling, identification of critical paths, and basic resource management. Furthermore, they also offer advanced features such as multi-dimensional economic analysis of resource utilisation, networking, coordination of the progress across multiple departments within an organisation, and comprehensive support for the simultaneous management of multiple projects.

For the purpose of this study, the software solutions will be divided based on their leading functional scope and main purpose in relation to projects. In light of this classification, the subsequent section will present functionalities and exemplars of Information Technology (IT) support in agile projects. From this perspective, IT support for project management can be categorised into the following categories:

- specialised programs (fragmented support for project implementation),
- comprehensive support for single project management (PMS) – for managers and project teams,
- software to support multiple project management (MPMS, PPMS) – business, product owners, and key stakeholders (For more see e.g. Bukłaha, 2020; Harrin, 2016).

The software solutions in the first category are characterised by basic functionalities in selected aspects of project management. Examples of these software solutions include programs for creating and recording mind maps (mind mapping), managing work in distributed teams (such as *Getting Things Done*, GTD), and tools for planning, scheduling, and controlling tasks. These software solutions typically feature basic progress visualisation tools such as Gantt charts and simple network diagrams, the capability to generate rudimentary project progress control statements, and in some cases, the ability to define a project's critical path. This category encompasses a diverse range of freeware and shareware programs. Examples of these software solutions include:

- Mind Mapper, Free Mind (mind maps).
- Slack, Trello, Asana, Jira, Nozbe (for task management in distributed teams, especially useful in agile projects).
- Gantt Project, ConceptDraw Project, Project+ (task management and scheduling).

Software solutions belonging to the second category (PMS) offer a much more extensive range of functions and are primarily targeted towards project managers and project team members. In addition to the fundamental planning functions for time, resources, budget, and tasks, they generally feature advanced reporting and control modules, such as for resource utilisation, cost control, and budget execution (using techniques such as Earned Value Management), the scope of work completed, time and schedule, etc. They also possess the capability to visualise the project through network diagrams, determine critical paths using methods such as MPM or PERT, identify crucial stages in the execution of work, generate reports from a wide range of functional areas of the project, and assist in risk assessment. Furthermore, these types of software solutions enable the creation of resource alignment charts and their automatic balancing, the assignment of costs to individual activities, and the development and control of a project budget. These software programs may also incorporate a database of template documents that can be utilised at various stages of the project lifecycle (such as P2Ware PM for the PRINCE2 methodology). These include: Microsoft Project, Project Libre, dotProject.net, ProjeQtOr, P2Ware Project Manager.

The third category of software programs (MPMS/PPMS) is intended for organisations that have a mature project management practice and run multiple, often interconnected projects simultaneously (such as portfolios, programs, chains). It is aimed at key stakeholders, organisational boards, project steering committees, product owners, strategic project management offices (PMOs), program and project portfolio offices. They enable, among other things, control over the status of multiple concurrent projects, streamline the flow of information about ongoing projects, and provide modules for aggregating data and generating comparative analyses between projects, allowing for the assessment of the condition of each project in the portfolio and making prioritisation of project execution possible. Their distinctive feature is the ability to generate in-depth reports on individual projects as well as the entire

project portfolio, across a wide range of dimensions. Examples of programs in this group include Microsoft Project Server, Primavera Project Management (as part of the Oracle Business Solutions PPM software), Clarizen One, Daptiv PPM, Hadrone PPM, and FlexiProject.

4. Scope of IT support for agile projects

Within the IT support for project management, it can be observed that agile projects prioritise the first two categorisations, specifically, the sectional project support and programs that facilitate a holistic approach to agile project management, such as the SCRUM methodology. The third category of software, referred to as Enterprise Agile Planning (EAP) Tools, is still in its nascent stages within the realm of agile methodology. Consequently, the options for software **specifically** designed for this type of project are relatively scarce (exemplified by solutions such as SpiraPlan Enterprise Agile Program Management (https://www.inflectra.com/SpiraPlan/), PlanView SAFe Kanban Software (https://www.planview.com/…) and JiraAlign (https://www.atlassian.com/…).

It should be noted that a significant number of software programs are available for supporting teams in agile projects, with the market for this type of software exhibiting rapid growth. Therefore, in the interest of brevity, only a selected few programs pertaining to specialised support and intricate project management will be presented below.

Table 2.
Selected examples of PMS software for agile projects

No.	Program name	Developer	Selected features
1.	**Active Collab**	Active Collab	documentation **management**, task and resource allocation, GTD, reporting, remote collaboration, SCRUM-ready
2.	**Asana**	Asana	documentation **management**, task and resource allocation, GTD, remote collaboration, SCRUM-ready
3.	**Backlog**	Nulab	task management, GTD, versioning, change control, SCRUM-ready
4.	**Blueprint**	Blueprint	document **management**, task and resource allocation, GTD, reporting, remote collaboration, Scale Agile Mgmt.
5.	**ClickUp**	ClickUp	document **management**, task and resource allocation, GTD, kanban boards, remote collaboration, SCRUM-ready
6.	**Github Project Management, Github PM**	GitHub	task and resource allocation, GTD, kanban boards, remote collaboration, SCRUM-ready, bug tracking
7.	**Jira, Confluence**	Atlassian	documentation **management**, task and resource allocation, GTD, reporting, remote collaboration, SCRUM-ready, scheduling
8.	**Project Insight Software**	Project Insight	task and resource allocation, GTD, kanban boards, remote collaboration
9.	**ScrumMate**	Adaptive Consulting	kanban boards, task management, remote collaboration, SCRUM-ready

Cont. table 2.

10.	**Scrumwise**	Scrumwise	documentation **management**, task and resource allocation, GTD, reporting, remote collaboration, SCRUM-ready, scheduling
11.	**Teams + Planner**	Microsoft	documentation **management**, task and resource allocation, GTD, remote collaboration, SCRUM-ready
12.	**Toggl Plan**	Toggl Plan	task and resource allocation, GTD, kanban boards, remote collaboration, SCRUM-ready, bug tracking
13.	**Trello**	Atlassian	documentation **management**, task and resource allocation, GTD, remote collaboration, SCRUM-ready
14.	**VersionOne**	VersionOne	documentation **management** "Budgeting, task and resource allocation, GTD, reporting, remote collaboration, SCRUM-ready, budgeting, scheduling

Source: own study based on: https://www.softwareadvice.com/project-management/agile-comparison/; https://toggl.com/blog/agile-project-management-tools; https://blog.capterra.com/agile-project-management-software/; https://clickup.com/blog/agile-tools/; https://www.capterra.com/agile-project-management-tools-software/; https://thedigitalprojectmanager.com/agile-tools/.

Based on the aforementioned overview, a clear representation emerges regarding the magnitude and breadth of project delivery assistance provided by Project Management System (PMS) programs, with regards to facilitating the strategic planning, steering, executing, and controlling of Agile projects. Additionally, a significant number of PMS programs offer both free and premium versions of their software. It should be noted that the free versions often come with limitations in terms of functionality compared to the premium versions. They may also restrict the number of team members or concurrent projects that can be managed through the program. As an illustration, Table 3 presents a condensed summary of selected features of the free and premium versions of several prominent Getting Things Done (GTD) programs.

Table3.
Comparison of key features of GTD tools for agile projects

Features	Asana		Trello		Jira	MsTeams Planner
	Free	**Premium**	**Free**	**Premium**	**Premium**	**Premium**
Goal setting	+	+	-	-	+	-
Timeline	+	+	-	-	+	+
Monitoring project progress	+	+	+	+	+	+
Automatic operation/ calculation/chart generation	+	+	-	-	+	+
Kanban boards	Up to 1000 tasks	+	+	+	+	+
Project calendar	+	+	-	+	+	+
Assigning tasks to team members	+	+	+	+	+	+
Milestones	+	+	-	+	+	+
Appearance personalisation	-	+	+	+	+	-
Project overview and summaries	+	+	-	+	+	+
Attachments	Up to 100 MB	+	Up to 10 MB	+	+	+

Cont. table 3.

Team mate cooperation	Up to 15 team mates	+	+	+	+	+
Comments and activity	+	+	+	+	+	+
Suggested size of agile projects	Medium and large		Small and medium		Medium and large	Small and medium
The project management approach	is executed through multiple perspectives, which encompass the task list, kanban board, schedule, and calendar views.		is executed on a single kanban board (additional widgets can be used).		is executed through multiple perspectives, which encompass the backlog, kanban boards, reports, releases, components, incidents, etc.	is executed through multiple perspectives, which encompass the task list, Kanban board, schedule, and calendar views.

Source: Malesińska, Bukłaha, reproduced material, own study.

The examination of Project Management System (PMS) software market offers reveals a continuous progression of development and adaptation by the software providers to meet the current demands of project teams and comply with the updated standards for project implementation. The adoption of agile methodologies for software development has seen a surge in recent years, resulting in an increased demand for tools that can support this approach (Azizyan, Magarian, Kajko-Mattson, 2011).

Irrespective of the magnitude of IT support for agile project management, the utilisation of Project Management Systems software has been observed to result in the following advantages. In particular, these include:

-   for **project planning**:
    - increasing the accuracy of task planning,
    - better structuring of the project with clearly defined objectives,
    - more efficient gathering of experience and its use in the planning of future projects,
    - faster availability of project data,
    - improved communication between project participants and between the project and its environment,
    - improving the transparency of ongoing projects,
    - closer monitoring of project progress,
    - ability to integrate with other data sources in the organisation;
-   for **scheduling**:
    - setting more realistic deadlines for tasks,
    - shortening/optimising project implementation time,
    - agreeing deadlines more effectively with project participants and stakeholders;

– for **task assignment and organising the work** of the project team:

- setting deadlines more effectively with project participants,

- allocating resources and people to tasks more efficiently,

- better opportunity to verify competence against assigned tasks,

- providing a unified information platform to allow distributed teams to operate more effectively;

– for **resource planning**:

- transparent resource planning and better use of resources,

- faster identification of resource bottlenecks and overallocated resources,

- ability to enforce accountability for the accuracy of the data entered;

– for **planning and cost analysis**:

- more precise cost analysis and control,

- project liquidity analysis,

- better ability to define project evaluation indicators;

– for **project steering and work implementation control**:

- a clearer overview of the project progress,

- the ability to integrate project, resource and cost data with other services used in the project management process through a number of plug-ins,

- near real-time project control,

- faster response to risks and changes in monitored projects,

- a more carefully prepared project steering process,

- providing a uniform source of up-to-date information for reports and analysis.

5. Conclusion

The successful development of IT project management systems is becoming a source of competitive advantage for many organisations, which means that the implementation of PMS software, among others, is a big step into the future (Sánchez, 2015). Project management tools, such as Trello, Jira, Asana and GitHub PM, are widely utilised in agile teams to facilitate the efficient and effective delivery of projects. These tools enable project teams to have a comprehensive overview of the project, allowing for the creation and execution of tasks, ensuring adherence to deadlines, coordinating work and resources, and facilitating the production of detailed notes and plans. Additionally, they provide templates for standardising the summary of information, which is crucial in managing projects, programs, and portfolios. Utilised effectively, project management tools have the potential to enhance team productivity and significantly reduce the frustration caused by overlooked assignments or

duplicated efforts (Nowogrodzki, 2020). The level of support provided to teams, managers, and stakeholders varies based on the nature of the project and the degree of project maturity within an organisation. Nevertheless, the rapid pace at which the software industry is adapting to the evolving needs of agile project environments suggests that the functionality of project management tools will continue to improve in the future. Despite the authors' assertion that a complete unification of the functionalities of project management tools is unlikely, the diverse range of offerings in the market will allow agile teams to identify the most appropriate solution for their specific projects.

Despite the availability of numerous tools that support the management of agile projects, proper communication between the parties involved remains a persistent challenge for distributed project teams. This is crucial for ensuring the quality of the final product. This challenge is especially relevant in regards to coordination issues, including the sharing of requirements, schedules, tasks, changes, and code artefacts (Eckhart, Feiner, 2015). This once again highlights that while software and IT systems can provide support for teamwork, they cannot substitute interpersonal relationships that serve as the foundation for communication within projects, especially those subjected to intense change during implementation, such as agile projects. Nevertheless, if feasible, teams should be provided with support in areas that can benefit from improved information flow, coordination, and control. In this regard, project management software can prove to be invaluable, both in the present and in the future.

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