

Project Management Tool: A Review

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Abstract: Over the past few years, project management has gained a reputation as an effective management tool that can improve business performance. It can be incredibly challenging to manage a software project, which involves many organizational resources, team resources, and personal resources. As a result, the quality of the software product is determined by the methodology used to complete the project. The impact of time delays and low productivity on software development projects is often felt at the bottom line. During the rapid development of software and non-software project management tools, the number of available products has increased dramatically. The aim of this work is to study the importance of project management systems as well as the tools and techniques that help manage tasks effectively. After analysis of existing studies and surveys conducted, we propose Projectify - A Project Management Tool.

Keywords: Project Management, stakeholders, Project management tools and techniques (PMTT), Analytical Hierarchy Process (AHP)

INTRODUCTION

Project management aids an organization in reducing development time, maximizing resources, handling technological complexity, satisfying stakeholders, and increasing global competitiveness. An IBM study found some sobering statistics, such as 3 of 5 failed projects were caused by poor time, resource, and people management. Furthermore, it states that communication among all team members, managers, and all stakeholders play an important role. In order to enable users to use technology that is most appropriate for them, we must apply a multi-criterion, decision-making approach.

Purchasing project management software is often driven by functionality, with price coming in second. Ease of use has now overtaken customer service as the third biggest concern of users. The study found that cost-consciousness is a big factor in purchase decisions, as the vast majority of users are on a budget, with no more than 3% exceeding their budgeted expenditure.

A majority of users picked their PM software and implemented it in less than six months: 63% spent less than six months choosing their PM software and 61% spent less than six months developing the software. Among the most frequently used PM tool features are reports/dashboards, document management, and team collaboration. There is a constant need for upgrading technologies, but it is difficult to find skilled professionals to do the work, so choosing the right technology and sticking with it throughout the project is far more important.

In order to manage and support these activities, managers sometimes choose to use a software project management tool to manage and execute the project. Planning, executing, and controlling projects can be done with these tools. These functions can also be performed by many commercial project management tools along with resource management and scheduling. Thus, buyers base their decision solely on price. They must, however, carefully analyse the features of the different tools available to them to make an informed decision.

The organization of this document is as follows. In Section 2 Literature survey. In Section 3 Proposed system is discussed. In section 4 Conclusion is the last part.

LITERATURE SURVEY

In unstructured problems, Analytical Hierarchy Process (AHP) is a powerful and flexible decision-making method that uses multiple criteria to solve the problems. It can be applied to solve simple personal decisions up to complex and capital-intensive decisions. In order to apply the AHP model, three stages are required: structuring complexity or decomposition, measuring on a ratio scale or comparing judgments, and synthesizing the results. Through the application of the AHP model, software project managers can determine which tool works best for their particular project which mainly includes Task Scheduling, Resource Management, Resource Management, Time Tracking, Estimating, Risk Assessment, Risk Assessment, Reporting/ Charts, File Attachment, E-mail notification, Process/ Methodology, Portfolio Management as the Software Project Management tool selection criteria [1].

Choosing among all these tools depends largely on which features are needed for the project you are undertaking. Software packages offer a wide variety of features. Due to varying prices for various packages or sets of features, all project managers should select the tool which has the optimal set of features for maximum expected utility across projects [1].

A Brief Comparison of Project Management tools

Taking a look at the comparison chart, it appears that the most popular open-source project management and online collaboration products are Gantt Project and OpenProj. Being open-source, these products provide additional functionality. Open-source products,

on the other hand, offer the flexibility to customize and enhance every aspect of a project management tool. Developers typically work with APIs (Application Programming Interfaces) in proprietary products. You can control, customize, and enhance any open-source product at any time [2].

By investing in enhancing this product with additional features, a manager will be more likely to be successful in managing his projects, since he will have acquired free software that will enhance his project management work. When selecting among all these tools, it is important to consider the features that are essential to the project. The comparison chart demonstrates that software packages differ in the number of features offered. Project managers should choose a tool with the best set of features to maximize utility within their projects since some packages or sets of features are subject to price

Table 1 A Brief Comparison of PM Tools [2]

Name	Platform based	Web based	Online	Earned value analysis	Gant chart	Critical path method	Milestones	Resource management	Time tracking	Tasks	Dependencies	Reports	Documents	Version control	Workspaces	User roles	Proprietary	Open sources
Gemini	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓			✓	✓	
JIRA		✓	✓				✓		✓	✓		✓	✓	✓		✓	✓	
Kplato	✓		✓	✓				✓	✓	✓	✓	✓						✓
Zoho Project			✓	✓		✓		✓	✓	✓	✓	✓	✓	✓				✓
Microsoft Project 2003	✓		✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓				✓
Planner	✓			✓				✓	✓	✓	✓							✓
Microsoft Project	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓
Gantt Project	✓				✓	✓	✓	✓	✓	✓	✓	✓						✓
Open Project	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓

changes. A project manager in the example above may not require a tool for collaboration between the client and supplier, since the service might be off-the-shelf rather than custom; therefore, he does not need a tool that offers a workspace for the client and supplier collaboration. The project manager should carefully evaluate all these aspects and other factors to pick the best tool to manage the project. Additionally, if the project is not too big, many of the items on the list may not be necessary right away [2].

Agile methods adoption

Iterative and incremental project development, as well as adaptive development, are tools used by Agile methodologies to control unpredictability. Agile methodologies are designed for problems associated with change and uncertainty and are adaptive instead of predictive. Incorporating agility into organizations can enable them to become more demand-driven and value-driven by incorporating agility over a broad spectrum of activities. The Agile methodology produces better software in a shorter period of time by using a flexible approach [3].

Agile methodology is one of the most popular projects management techniques. It uses a sprint approach where you can break a project in the form of sprints or cycles. As the word agile means the ability to move quickly and respond swiftly to changes, likewise, this methodology makes way for flexibility and collaboration. It is extensively used in software development and is best suited for small software projects that require frequent communication and the need to work together for working on innovative projects [6].

According to a recent study, while Project Managers in their 40s are learning to keep pace with Agile, the consequences can be profound for those who do not. Middle Managers have been downsized in the media recently due to automation and emerging technology. During their time, they were deemed cutting-edge technologies, but now that technology has surpassed them, they may

be viewed as less important and at a disadvantage. Because of this, many businesses are hiring Agile Coaches who will guide the Project Manager through the changeover to Agile and help them get the most from the process [7].

A Survey of Project Management Tools

Project managers representing a cross-section of the country, numerous industries, and companies of all sizes have been randomly selected from within the Project Management Institute (PMI) membership. In the first stage, demographic information was requested from the participants. A majority of respondents reported working for companies that focused on engineering or software development, while a smaller percentage worked for retailers or wholesalers. The majority worked for retailers or wholesalers, while a smaller percentage worked for retailers. The average time spent managing projects was 10.4 years and the average time spent managing information systems was 12.4 years. Several computerized project management tools were asked to be identified by the respondents that they were currently using or had used within the past three years. In order to rate the respondents' satisfaction with the tools, respondents were asked what they used the tools for and how often they used them [4].

There was a positive correlation between perceived adequacy of training, satisfaction with the tool, and general satisfaction with the tool in the overall survey responses. Trainees' perceptions of the suitability of the tools as well as their overall satisfaction with the tools were all positively impacted by training. Regularly verifying that the tools are meeting the professional's needs is important [4].

The use of Project Management Tools and Techniques

Throughout the study, four success measures were used: the time, cost, and specification internal criteria; the customer satisfaction criteria; and the outside criteria of time and cost. There were two results that were related to the business aspects. In the final group, there was a successful measure that measured the overall project success. Based on the stakeholder approach, these four groups of success measures represent both internal and external perspectives [5]

Table 2 PM Tools Success Measure and Notation [5]

Success Dimension	Success Measures	Notation
Internal Criteria	-Project came in on time or faster -Project came in under budget or on budget -Project met all specification requirements	S1 S2 S3
Customer	-The outcomes of the project were used by its intended customers -The intended customers of the project were satisfied with the outcomes of this project	S4 S5
Business	-Project created financial benefit your organisation -Project increased market competitiveness for your organisation	S6 S7
Overall	-Overall, this project can be considered a successful project	S8

To test the hypothesis, the authors conducted stepwise regression analysis by selecting the most frequently used PMTT in each phase. There are ten PMTTs commonly used in the conceptual phase, including analogous estimates, bar charts, brainstorming, checklists, customer visits, scope statements, stakeholder analysis, and business cases. PMTTs was chosen for the planning, execution, and termination phases for the later phases as 22, 23, and 14 frequently used PMTTs respectively [5]

Conceptual Phase	Planning phase	Execution phase	Termination phase
T01 Analogous estimate(S7) T07 Checklist (-S8) T08 Communication plan(S8)	T01 Analogous estimate(S7) T02 Bar chart(-S2) T03 Bottom-up estimate(-S2) T09 Contingency plan(S8) T10 Cost baseline(S2) T11 Critical path method (S1, S2, S3) T17 Hierarchical schedule (S4, S5, S8)	T02 Bar chart(-S2) T07 Checklist (S4) T08 Communication plan (S3, S5) T09 Contingency plan (S1, S2, S8) T10 Cost baseline(S2) T17 Hierarchical schedule (S5, S8) T19 Milestone analysis(S1) T27 Project change request (-S3) T31 Schedule crashing (-S1, -S2, -S8) T32 Scope statement (-S5, S8)	T10 Cost baseline(S2) T18 Lessons learned(S6) T19 Milestone analysis(S8) T27 Project change request (-S2,-S3, -S6, -S8) T39 Work breakdown structure (WBS)(S3)

Table 3 PMTT's success measure in different phases [5]

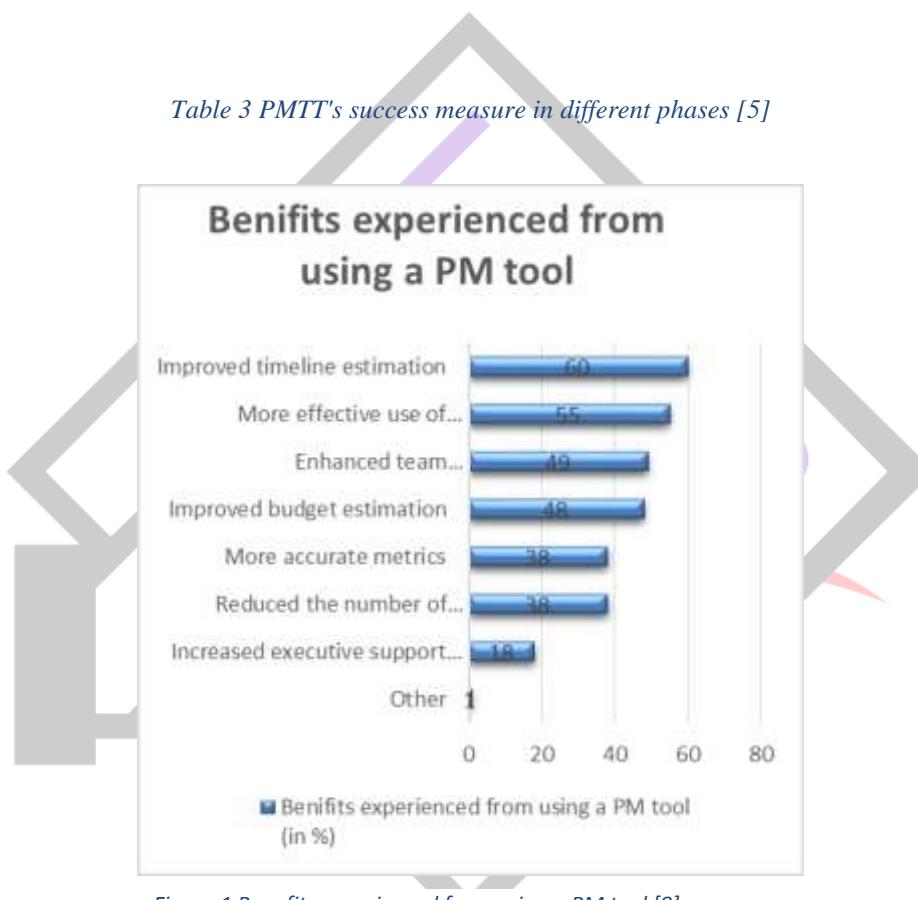


Figure 1 Benefits experienced from using a PM tool [8]

In different phases of the project life cycle, there are correlations between PMTT and various measures of project success. Thus, PMTTs contribute to project success measures in various ways based on the project phases. According to these studies, the cost baseline and CPM significantly contribute to project success based on cost S2, while CPM significantly contributes to the time indicated by S1, cost indicated by S2, and quality indicated by S3 success measures, while hierarchical scheduling significantly contributes to customer satisfaction indicated by S4 and indicated by S5, and to overall success indicated by S8 [5].

CAPTURE Project Management User survey 2021

According to the Capterra project management survey 2021 report, one of the biggest benefits of using project management tools is improved estimation of project dates (60%) and more efficient use of resources (55%).

PM tools have the benefit of making work scheduling and assignment more efficient. The survey asked over 400 project managers what tools they use in their organization to manage projects. Based on size of business, this is how respondents' demographics break down by whether they use PM tools or manual methods. Start-ups and very small businesses are the ones least likely to use PM tools. For example, 25% of small firms do not use software to manage projects, compared with only 5% in large firms. 16% of one to ten person firms don't use PM software, compared with 2% of large firms. This clearly reveals that with consistent use of PM software provides a clear return on investment and numbers of benefits to organizations. The PM survey found that functionality,

price, ease of use, and customer support were considered most important factors when it came to buying a product. However, only 29% of buyers considered more than two products when they made a final decision.[8]

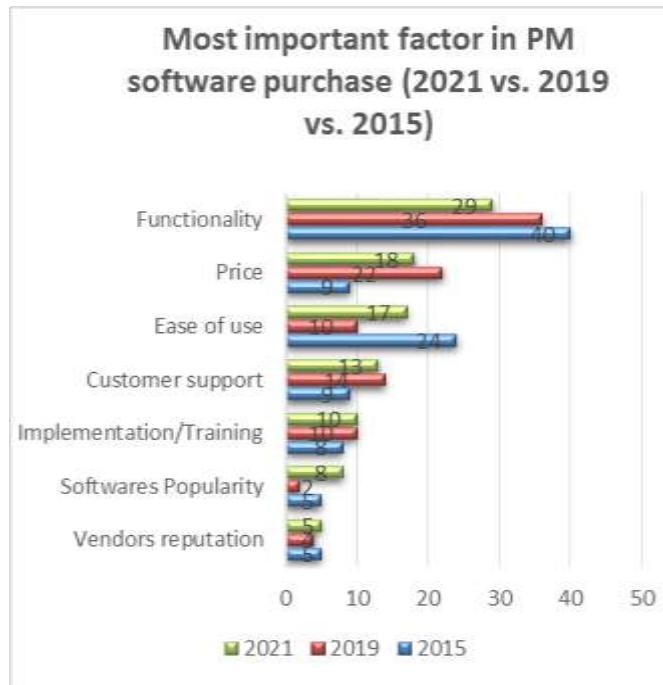


Figure 2 Most important factor in PM software purchase [8]

PM software users continue to place the highest importance on functionality, as they have been since the 2015 user report. Easy-to-use software fell in importance to the study's 2019 findings, but customer support was now the most important consideration, followed by price. However, the rise in software's popularity shows that marketing is more important than ever [8].

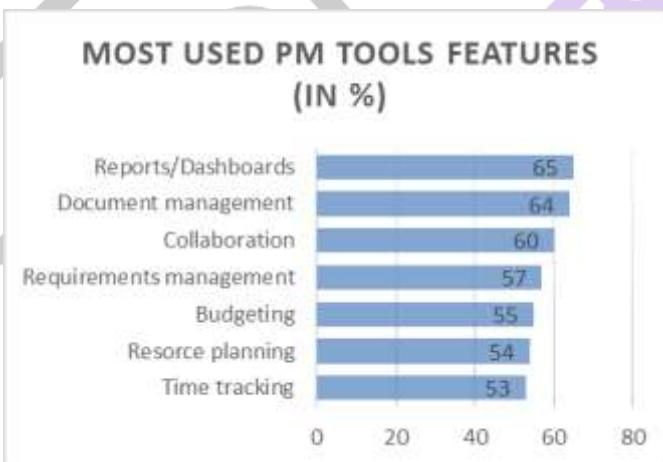


Figure 3 Most used PM tools features [8]

A report/dashboard, document management, and collaboration feature are among the most-used features of PM software. However, burndown charts and Gantt charts are surprisingly both in the list of most-ignored and most-desired PM software features. Among the most-used software features, report and dashboard creation and document management are the most used ones. Among the most-ignored software features, velocity charts, Gantt charts, and burndown charts are the most desired. A Difference between project managers and project management solutions can be seen in these results. Gantt charts and burndown charts are at the top of both the most ignored and most desired lists. This focuses on the need of choosing the right tool [8].

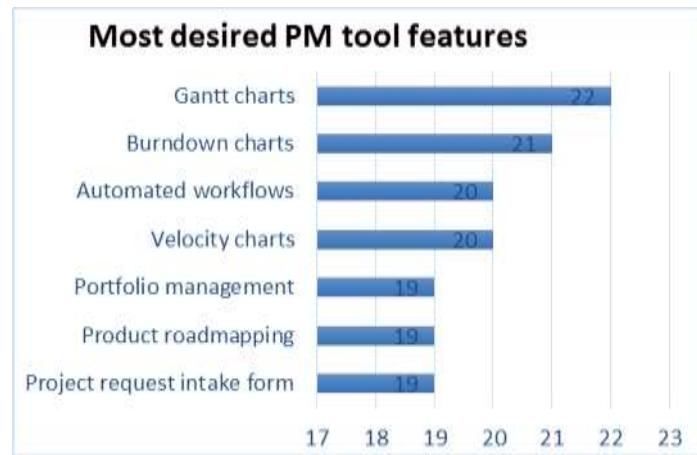


Figure 4 Most desired PM tool features [8]

Project management tools are a top challenge reported by respondents (43%) because of the total complexity and/or steep learning curve. Cross-functional teams generally work with multiple systems and have a steep learning curve. Adding yet another tool can complicate things or slow down the project. Also included among the top challenges are challenges integrating the PM tool with other systems (38%) and a lack of personnel to successfully use the tool (36%), which are also associated with a cross-functional design as evidenced by most project teams. The majority of businesses provide peer-to-peer workshops (52%) to facilitate the learning process. Even though many people still work remotely, this is a low-cost, low-risk and a high-reward way for team members to build relationships, learn from each other, and acquire knowledge. It also contributes to the ongoing theme of cross-functional project teams, which is addressed directly here in the second measure being taken: improving cross-functional collaboration (51%) [8].

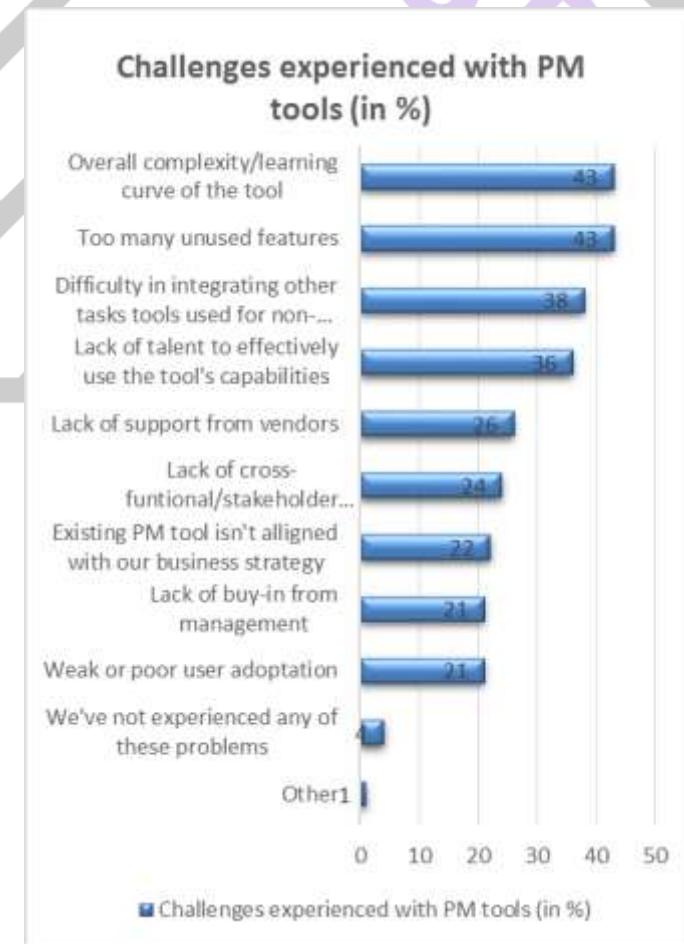


Figure 5 Challenges experienced with PM tools [8]



Figure 6 Measures taken to improve PM tool effectiveness [8]

The creation of comprehensive process documentation comes in second as the most widely used improvement tool. With clear, up-to-date how-to guides and videos, it is easier for every team member, especially those working jointly. It is very common for project team members to only work on the project team part of the year, and taking a few weeks or months off from the software system will affect you negatively unless you have someone ready to help.[8]

PROPOSED SYSTEM

The Proposed system works in the following phases:

- Registering the user
- Planning and organization
- Managing the process

Registering the user:

In its initial stage, the project management tool, a web application registers different users. There are two users of the system firstly clients (external stakeholder) and the Internal stakeholder who are affected by every process of the project. They are the Project manager, Developers, Tester, etc. The Internal stakeholder can register to the system. The external stakeholders access the system through the credentials provided to them by the respective Project manager. The project manager Can edit permissions and controls to manage client access. After entering valid credentials, the users will be given access to the system. Based on the priority given to each user such as the Client and the project team members, the access will be given accordingly. The next part is the planning and organization which includes five Initial phases of the system.

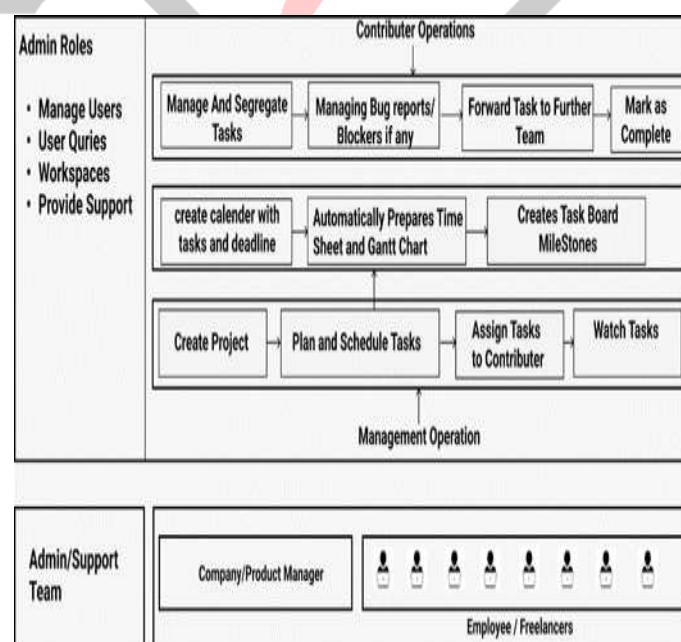


Figure 7 System Architecture

Planning and organization:

The work is initiated by gathering the requirements of the Project which has been considered by the project team. Assuming and considering this the project managers analyses the requirements of the system, review the proposed budget by the client, and starts with the creation of a new project followed by creating milestones. The system has an effective dashboard to graphically represent all the tasks and projects created. Feasibility in finding tasks and projects with a search tab on the top. Milestones enable to bifurcate the project to manageable phases which also helps the manager to do prioritization so that Vital and Important processes that are crucial to the stakeholders are prioritized in their respective phases.

The tool is integrated with an additional feature to get the best hire. The Project manager might need an individual from a particular domain as project management is not just limited to the engineering domain. In order to select the best hire using the Individual's skills as parameters, we used the Jaccard Index coefficient.

$$J(A, B) = \frac{|A \cap B|}{|A \cup B|} = \frac{|A \cap B|}{|A| + |B| - |A \cap B|}$$

With a larger Jaccard coefficient, we can discover the best hire by comparing the intersection of finite sample sets divided by the union of those sets. Furthermore, this function can be used to calculate the dissimilarity between two sets.

Managing the process:

Planning is followed by the creation of tasks according to the different project phases. The Project manager after task creation adds them to respective milestones with deadlines to further propel the activities. The next thing is the delegation of tasks. The delegation must be supervised by the project manager as per the abilities of the Openproof Team members who can best perform the tasks assigned to them. Once the task is delegated successfully management can be more effectively performed using Gantt-charts enables the team to manage their working hours for completing the tasks in the given timeline. The Timesheets keep on updating the team about the task achieved thus aiding in keeping a track of the whole work. To manage the tasks more effectively Kanban boards, an agile methodology helps the project team to visually process and manage the task.

When encountered with a bug a tester can report the bug which can be reviewed by the respective team member of the phase where the bug occurred and can be managed. Invoices are generated as per the modules generated for the projects and services delivered to the client.

The system also enables to upload of the necessary files to the project which can be accessed by project team members working on it. For better collaboration and communication, the tool provides personalized notes so that nothing remains forgotten. In the daily ups and downs of business, some things might run out of your mind.

CONCLUSION

In this paper, various important project management surveys are studied and analysed. Based on the findings of the research and analysis, Projectify was proposed as a project management tool. The work describes the system that a project manager can adapt to efficiently manage the project activities. In addition, the project manager who enhances this product is more likely to succeed as they now have a software package that helps them manage their projects along with meeting freelancers at a common point in time. Project management software is a crucial tool in developing a project and thus every company should implement it in their system. Project managers also need to take advantage of the effectiveness of project management software to ensure that the project they are carrying out becomes successful. To accomplish tasks on time and within the deadlines, the employees and other stakeholders assigned to these tasks should also utilize the software.

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