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The Indian IT Industry's use of Software Project Management and its Tools

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ABSTRACT :

In this paper, the current state of software project management is analysed and evaluated, as well as its costs and benefits in the Indian IT sector. Due to access to a sizable talent pool, lower wages, and assistance from the National Association of Software Service Companies (NASSCOM), 85 percent of IT projects in India are outsourced, and numerous foreign businesses have established their off-shore IT companies in India. There is a considerable demand for local software project managers to oversee these projects because the majority of them are huge, complicated IT projects from industrialized countries. Due to this increasing demand, more institutions are opening up and starting to offer courses and certificates in software project management, which is how it became a crucial component of India's IT industry. However, in smaller businesses, the job of the project manager varies. This paper's introduction explains the significance, the fundamentals, the practical applications, and the traits of software project management tools. This paper discusses project implementation success, software project management expertise, reasons for project success and failure, trade-off choices, and software project managers' capacity and path to project management.

Index Terms—Software Project Management, Software Project Management in India, IT Companies in India

INTRODUCTION:

Building, executing and maintaining software or digital products while taking into account audience needs and life cycle factors is known as software product management. A product's discipline and business process must be followed from conception to market or customer delivery and service to maximize revenue. Producing software products with the desired quality, on schedule, and within budget requires a number of successful elements. Below are a few of the contributing elements.

1. Unambiguous objectives and goals
2. Clear Requirements and Specifications
3. A Realistic Schedule
4. Good Management
5. User Research and Testing
6. Continual Feedback, Reporting, and Monitoring
7. Experienced developers and the ideal team composition

In industrialized nations like the USA and the UK, the discipline of software project management has a clear definition and is well-established; but, in developing nations like India, it lacks a clear definition and is not as adaptable. The majority of IT projects in the 21st century are developed globally, which makes it difficult to manage those teams because they may be in different locations. Software project management offers a solution. One of the most popular study subjects is software project management, but more work has to be done. Due to the fact that the majority of projects are outsourced to India, there is a huge demand for software project managers to oversee the creation of new software and interact with many stakeholders. Because hardware, software, and networks are now used to generate projects, services, and results, IT projects are now exceedingly massive and complicated. IT businesses paid particular attention to software project management and its contemporary methodologies to ensure the success of IT projects. The production of high- quality software products on schedule, within budget, and with better-than-expected outcomes is made possible thanks to software project management, which plays a significant role in the IT sector. The tool used in practice is the fundamental aspect of software project management success. The software Project Management tools are standardized by three project management organizations (PMI, IPMA).The variety of software project management tools is expanding along with their use, although the majority of attention is focused on those that assist in

implementing the fundamental factors such as project objective scope, time, cost, and risk minimization. The most crucial tools today are those that can manage multiple tasks at once. Different countries use software project management tools in different ways.

LITERATURE REVIEW

Software project management (SPM) is the process of leading a team to deliver a software project on time, within budget, and to the satisfaction of stakeholders. The role of a software project manager (SPM) involves planning, organizing, and controlling the resources needed to complete a project. In the IT industry of India, SPM is a critical function that helps ensure the successful delivery of software projects. Agile Methodologies: Agile project management is a popular approach used in the Indian IT industry. Agile methodologies, such as Scrum and Kanban, are flexible and allow for rapid changes and adjustments during the project development process. Project Management Software: Tools such as Jira, Trello, and Asana are used to create and manage project tasks, assign responsibilities, track progress, and collaborate with the team members. Version Control Systems: Tools such as Git and SVN are used to manage the source code of a project and keep track of changes. Continuous Integration and Deployment Tools: Tools such as Jenkins and Travis CI are used to automate the process of building and deploying code changes, which helps to speed up the development process and reduce err-successful Time-tracking and Invoicing tools: Tools like Toggl, Har- vest, and FreshBooks are used for tracking time spent on a project and invoicing clients. Communication and Collaboration tools: tools like Slack, Microsoft teams, and Zoom are used to communicate and collaborate with team members and stakeholders.

Documentation: tools like Confluence, Google doc, etc. are used to document requirements, design, test cases, and any other information related to the project. These tools and methodologies help software project man- agers in India to better plan, organize, and execute their projects, which helps to increase efficiency and reduce the risk of project failure. It's important to note that, as software development evolves new tools, and methodologies are emerging and being adopted by the IT industry in India. India is regarded as a knowledge powerhouse and is at the center of global appeal in the information technology-driven 21st century. The IT sector has increased its contribution to India's GDP from 1.2% in 1998 to almost 10% in 2019[6].As a result, FY2022 was a stellar year for India's technology sector, which saw its highest-ever growth rate of 15.5% and a revenue peak of $227 Bn. Phantomization and XaaS were crucial in boosting tech adoption, and it was also the year of the start-ups when Tech start-ups jumped into scale-up mode. Digital and innovation combined were the industry's winning recipe. To address margin constraints, the industry increased its focus on operational efficiency and gained more penetration in the eCommerce sector.

A. *Tools for managing software projects*

Software Project Management solutions are created in order to deliver a successful software product within budget, on time, and with the highest quality possible while minimizing risks. These software management tools can be learned from resources for other management development, such as personnel management, change management, and risk management. There are many different methods for managing software projects, from straightforward task trackers to intricate project management platforms.

B. *Level of use of Software Project Management tools in India*

85 percent of IT projects in India are outsourced from the USA and Europe. So, in order to meet the pressure of completing projects on time and within budget, the Indian IT industry recognizes the importance and necessity of soft- ware project management. According to a report published in 2020, the project management labor force is expected to increase by around 33 percent by 2027. Project management is a very demanding discipline in India's private and foreign IT organizations.

METHODOLOGY

We interviewed project managers, program managers, and senior developers from different IT companies across India to perform statistical analysis on data we employ Data Descriptive and Inferential statistics. Many of these businesses had Capability Maturity Model Integration (CMMI) ratings. Emerging organizations and medium-sized businesses have provided extremely positive and satisfying replies. the inter- view consisted of questions based on four pillars.

1. Queries regarding the respondent's organization.
2. The benefits of software project management that they experience
3. Software tools for software project management and software project management tools
4. The respondent's training as a software project manager and their path toward becoming one

The Survey Analysis

This section presents the findings of the data analysis, using statistical tests, tables, and figures to illustrate the results in a logical and coherent manner.
- Project managers and their work experience.

Our research's initial phase focuses on project managers and software project management in India fig[1].

Over 86 percent of companies, according to the interview, assign software project managers. The company owner or senior developer does all of the work associated with managing software projects in the remaining 14 percent of companies instead of a designated person. 48 percent of the managers we spoke with have previous experience in software project management fig[2].

The remaining managers gave us a range of responses. Senior developers with more than five years of development expertise make up 63 percent of managers
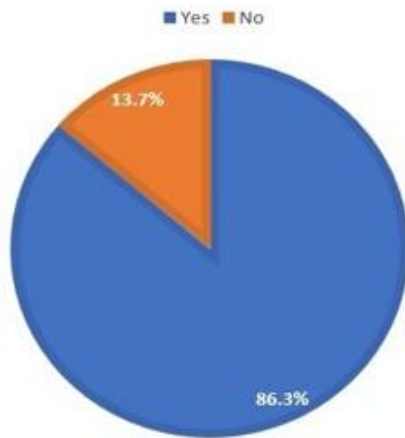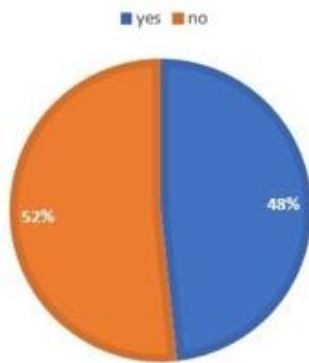
Fig. 1. Software Project Manager

Fig. 3. project management without experience
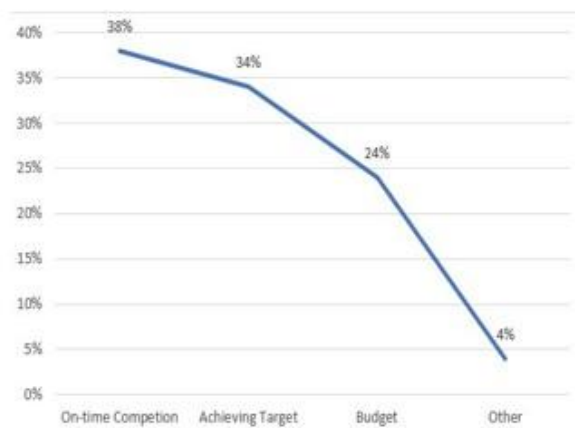

Fig. 2. Management Background

Fig. 4. Life Cycle Model

without prior experience, and they obtained their position via self-training. For management roles, 12 percent of them signed up for their own project management training and certification. 15 percent of them are the business's owners, and they are in charge of all project management-related tasks. This is the pattern that we observe in small to medium-sized businesses fig[3].

- **Project Completion Barriers**

While interviewing the delegates of various companies we found three main barriers to project completion.
- Achieving the target
- On-time completion
- Budget

38 percent of the officials answered that on-time completion of a project is difficult and it sometimes exceeds the project completion time. 34 percent of the officials answered sometimes they do not achieve the desired goal for the project and 24 percent of officials said that sometimes they exceed the budget of the project. Rest 4 percent stated other reasons for hindrance in project completion fig[4].

- **Software Development Life Cycle Model**

47 percent of the companies follow the scrum model for project management. Scrum is generally used in small and medium organizations in the Indian IT sectors. 23 percent of the companies use waterfall and spiral models. Both the waterfall and spiral model is mostly used in big government organizations. 16 percent of the companies follow RAD. 12 percent use agile. and the rest 3 percent of companies use other models for software development fig[5].

- **Project Planning**

38 percent of the companies use the WBS methodology for project planning. 27 percent of companies use PERT. 29 percent of companies use Wideband Delphi Technique and the rest 6 percent use the UCP method fig[6].

- **Project Communication Plan**

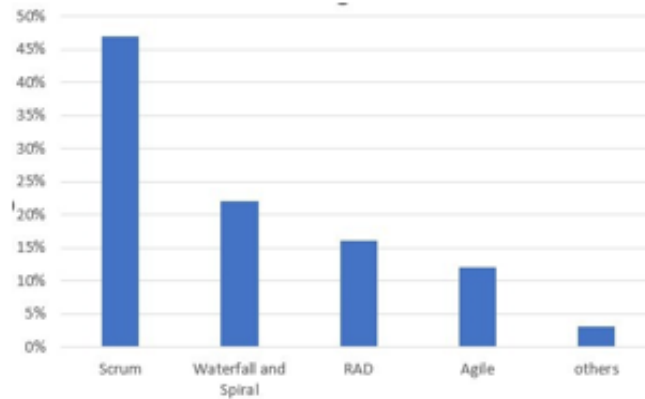The majority of companies follow a project communication plan.
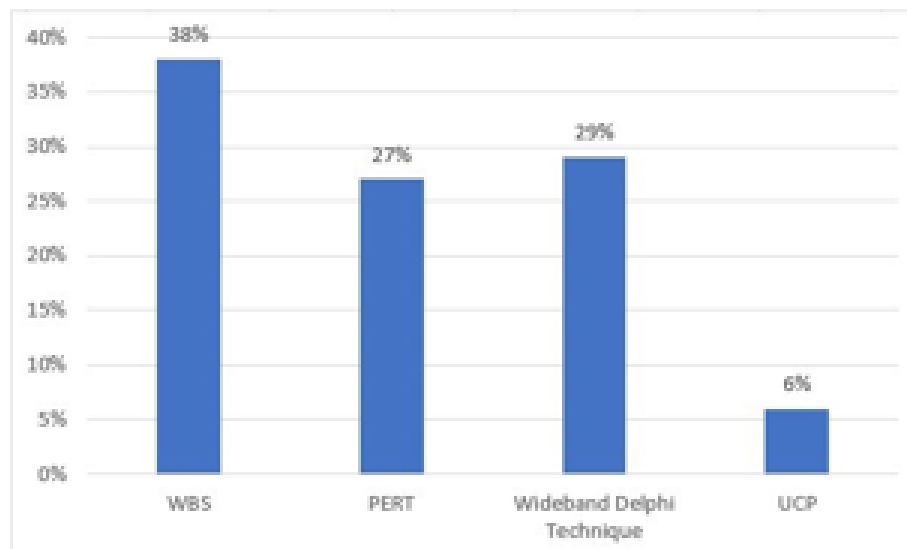

Fig. 5. Life Cycle Model

Fig. 6. Project Planning Methodology

According to the officials, a project communication plan is crucial because it can help you keep your project on schedule, under budget, and on track. A strong project communication strategy makes sure that all stakeholders are updated on the project's status, which boosts client satisfaction fig[7].
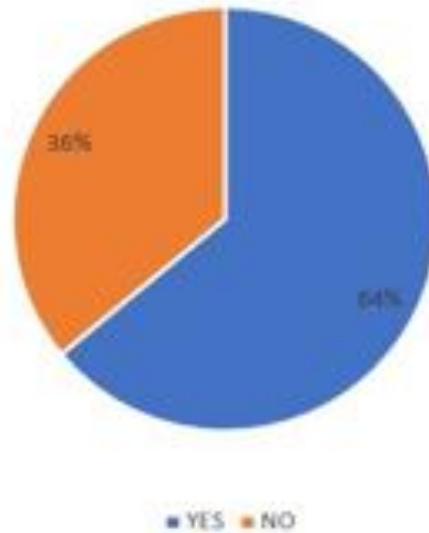
Fig. 7. Project Communication Plan

- **Risk Analysis**

A risk analysis can assist organizations in deciding whether to move forward with a project or approve a funding request as well as what steps may be necessary to safeguard their interests. When it comes to risk analysis companies prefer to use more than one method of risk
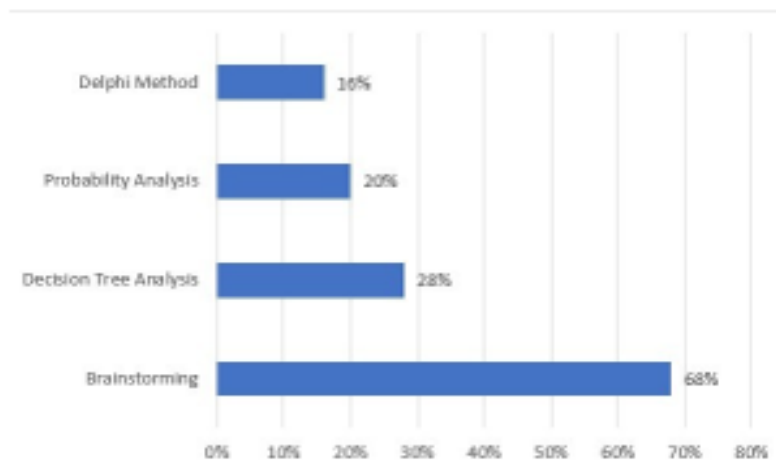

Fig. 8. Risk Analysis

analysis.[8] 68% of companies use the Brainstorming method for risk analysis. 28 percent of the companies use Decision Tree Analysis. 20 percent use Probability Analysis. 16 percent use Delphi Method.

- **Agile Development**

The Agile Model is an incremental and iterative process of software development. It defines each iteration's number, duration, and scope in advance. Every iteration is considered a short "frame" in the Agile process model, which mostly lasts from two to four weeks. The majority of companies use agile (Scrum, extreme Programming, Feature Driven Development, Dynamic Systems Development Method, etc.) for development fig[9] [10]

Software Project Management Tool Use

Project management tools are specially designed to assist   an individual or teams in organizing and managing their projects and tasks effectively. 78 percent of the companies we interviewed told that they use Project Management Tools. The remaining 22 percent of companies do not use Management Tools. Most of the businesses are small or a startup that does not use Software project management tools fig[11]. MS Project is the most popular tool as it is widely used and is a Microsoft product followed by JIRA, WRIKE, and others.
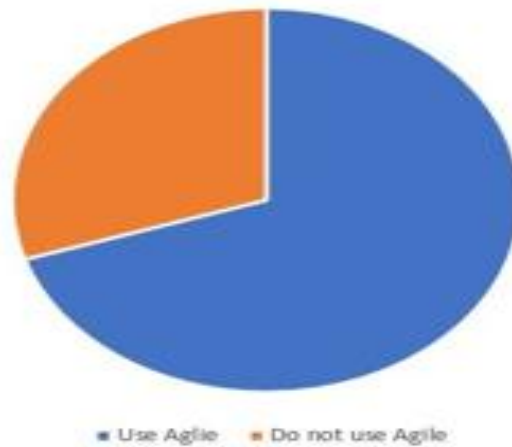

■ Use Agile   ■ Do not use Agile

Fig. 9. Agile Model

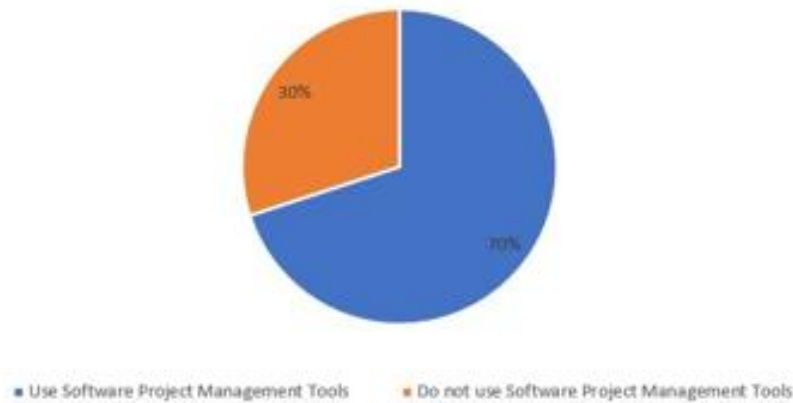■ Use Software Project Management Tools   ■ Do not use Software Project Management Tools

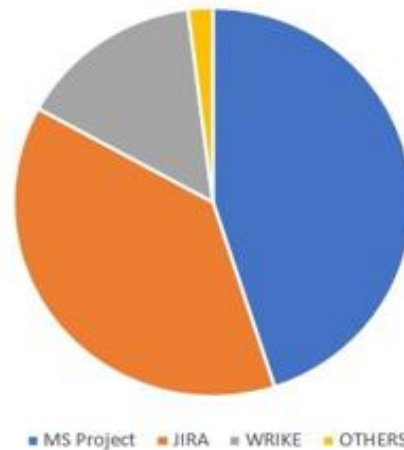Fig. 10. Use of Software Project Management Tools

Fig. 11. Software Project Management Tools

CONCLUSION

This paper provides an examination of the implementation of Software Project Management and its associated tools within the Indian IT sector, as revealed by a survey conducted within the industry. Our survey reveals a trend where a majority of organizations in India are now hiring a Software Project Manager for their company. We anticipate that this trend will continue to rise as foreign investment in the country increases. The survey results showed that more than 90% of the respondents were familiar with Software Project Management tools. Both large and medium-sized companies were found to be utilizing (SPM) Software Project Management tools and taking them seriously in their operations. The survey found that the widespread adoption of agile methodology was highly encouraging, and it is believed that this trend is driven by the increasing number of outsourced projects. Almost all businesses utilize software tools like MS Project for managing software projects. In the Indian IT sector, scope management and time management are the two most challenging aspects of management. In most of scenarios, time management directly impacts price in the market. Our survey uncovers a vibrant and optimistic trend in the Indian IT industry, and we have high hopes that this trend will continue to flourish, propelling India to the forefront as a premier destination for outsourced software development in the future.

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