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From Project Manager (PM) To "Technical" Project Manager (TPM) In the Journey to an Agile Organization

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Abstract: *This long paper discusses the importance of understanding the differences between the roles, duties, and responsibilities of an Information Technology (IT) Project Manager and that of a Technical Project Manager. It also outlines the intersections and commonalities between the two roles and how Project Managers can emulate those skills in a Technical Project Manager role. There is also a section in this paper that focuses on how Technical Project Managers are becoming more critical to the success of an Organization's Agile Transformation and highly technical initiatives. This article will also discuss an overview of the skills, competencies that companies look for in a 'Technical' Project Manager. There will also be a discussion in this paper on the roadmap for an IT Project Manager who is looking to transition him/herself to a Technical Project Manager role as organizations are creating an environment that embraces creativity and innovation, empowering employees and reducing unnecessary layers of management. The work in this paper serves as a guide and is beneficial for Functional Project Managers, Software Project Managers, Software Engineers, Software Programmers, Software Developers who are looking to take the next leap in their career at the management level by orienting their skills and competencies to handle important Organizational Agile Transformation initiatives like Digital Transformations, Advanced Data Analytics, Modern Data Architecture[1], Cloud Migration, Security, Payment Integrations just to name a few.*

Keywords: *Agile, Project Manager, Technical Project Manage (TPM), Business Agile Transformations, Initiatives, Software, Developer, Engineer, Programmer, Data, Analytics, Cloud, Hyrbid Cloud, Architecture, Security, SCRUM, Waterfall, Software Delivery Methodology, Process, Project Management, Software Development Life Cycle(SDLC).*

I. INTRODUCTION

Project Management is a critical practice that applies knowledge of process, skills, tools, methods, and experience to achieve specific project objectives according to the project acceptance criteria within the agreed parameters. Project Management has final deliverables that are constrained to a finite timescale and budget [3]. In IT, projects have become more intricate as technologies rapidly change, and end-users demand greater agility, self-servicing capabilities, and flexibility. Since the reach of IT spans across most of the business operations and functions of an enterprise, the scope of these projects can be very large and complex.

Project Managers are the men and women on the front-line of the projects, defending their teams and projects from miscommunications, missed deadlines, scope creep, and any other failures [4]. They champion the well-being of the people involved in their projects and look to make or facilitate strategic decisions that endorse the goals and objectives of their projects. The Project Manager (PM) does fine work in balancing and managing the administrative details of a project and its people. They are responsible for managing the different aspects of the project, with various teams reporting to them with updates, progress, status, issues, challenges, etc.

On the other hand, Technical Project Managers (TPM's) are expected to have the technical skill sets and capabilities so that they can understand the information presented to them by their technical leads and developers and deduce how this information affects their project-related aspects like dependencies, scope, schedules, budget and quality of the work(For ex: high-quality software) delivered. However, Technical Project Managers (TPM) are sometimes analogously also called Technical Program Managers in some organizations, though both of them necessarily do not mean the same. Technical Program Managers must keep consistency in standards between projects as they oversee multiple projects with a more strategic focus, while the Technical Project Manager only typically oversees one project at a tactical level and may also be responsible for delivery and managing timely releases. While some IT organizations do not have a TPM role explicitly defined and often consider the Sr. Technical Lead as their Technical Project Manager who is responsible for managing technical resources like software engineers/software developers to create technical outputs that meet the business requirements. Other organizations may synonymously use the TPM role to refer to a Scrum Master who has experience in an agile environment. There is a new role that is proliferating nowadays in Engineering Organizations, which is the

"Engineering Manager." This role is more focused on managing the people of the project/department rather than managing the work and content of the project, as in the case of a typical Project Manager role. This is a perfect segue to the next section as to how we are observing this paradigm shift in IT organizations which are merging all these roles into a single role ***'Technical Project Manager' (TPM)*** in order to reduce the unnecessary layers of management and avoid adding more complexity to the organizational structure.

II. COMMONALITIES AND DIFFERENCES BETWEEN ROLES AND DUTIES OF AN IT PROJECT MANAGER AND A TECHNICAL PROJECT MANAGER

Although we can draw a thin line between the job duties encompassing the two roles - Project Manager and a Technical Project Manager, there are some notable differences in the job duties and responsibilities of the two roles, which makes it worth a subject of discussion and the importance of understanding that difference between the two roles. Information Technology (IT) Project Management is the process of managing the plan, organization of the tasks, and accountability to achieve information technology goals. IT Project Managers are responsible for overseeing all aspects of any project in a company's IT department, which includes managing a team of employees/resources to ensure projects are completed on time and within their specified budgets [5]. This is a middle level to a senior level at an organization depending on the size of the company and requires interaction with a range of internal and external stakeholders, most often managing several moving project parts simultaneously[6].

On the other hand, Agility is gaining a lot of traction, and there is a growing consensus of its transformational benefits. Many organizations are still on their path of embracing the agile operating model, which is characterized as a network of teams operating in rapid learning, incorporating business feedback, recommendations, and enhancements, and adapting to quick decision-making cycles [7]. Most organizations contemporarily are undergoing series of waves of agile transformations encompassing a stepwise approach involving systematic and more discreet convergence from their traditional static, siloed, structural hierarchy towards an agile organization. Typically, the IT Project Manager role can be seen in organizations undergoing a transformation to embrace enterprise agility. Some of the day to day job duties and responsibilities of an IT Project Manager would be but not limited to are:

- Appropriately utilizing project management methodologies and tools for either Waterfall and Agile methodologies to develop and maintain project documentation- a project charter/project plan – specifically addressing project scope, timelines, cost-tracking, and resource usage, to name a few.
- Setting project goals and coming up with plans to meet these goals.
- Overseeing the implementation of the project(s) daily with regards to timeframes, budget requirements, and quality.
- Coordinating with project team members and developing schedules and individual responsibilities.
- Implementing IT strategies and best practices wherever necessary to deliver the project(s) on schedule and within budget.
- Using project management tools like but not limited to CA Agile, Atlassian Jira, Microsoft Project Plan, Project Libre, Microsoft Imagine-formerly called as DreamSpark, Wrike Gantt Chart to track project performance and schedule adherence.
- Conducting risk assessment, evaluating project risks (business and operational) associated with business activities, and ensuring that they are effectively identified, measured, monitored, and controlled.
- Developing contingency plans and responding to change in risk as the project progresses.
- Effectively facilitating meetings with the project team and cross-functional teams to communicate efficiently in relation to the target audience and provide regular project reports and project status updates to management and stakeholders.
- Developing escalation process to channel issues and concerns to appropriate parties.
- Facilitating project scoping by avoiding scope creep [8], ensuring that issues are raised in a timely manner, necessary inputs are obtained from the appropriate group of stakeholders, and project work is outlined.
- Managing and obtaining approval(s) for any scope changes through clear documentation and explaining the implications of these changes so that they are clearly understood and recorded after the initial approval.
- Managing project budgets, ensuring expenses stay within established guidelines. Providing justification and obtaining necessary approvals for any changes to budgets.
- Possessing an in-depth understanding of the business operations to effectively manage multiple priorities, initiatives involving multiple lines of business, and integrations with other systems.
- Analyze business operations and methodology to develop best practices.
- Managing inter-dependencies of work within the project and engaging in identifying and removing obstacles and impediments to ensure the team objectives are met.
- Preparing adhoc reports, presentations for senior management, leadership to communicate project

milestones, status, and progress of the deliverables via project metrics.
- Ensuring adherence to the project master plan and schedules and develop workarounds and solutions to project problems and impediments.
- Documenting and archiving project activities, deliverables, tools, and findings for future projects.

Organizations who have successfully adopted the agile operating model can alleviate challenges which some of the traditional organizations are facing, like unclear accountabilities, problematic interfaces, or slow decision-making process. Basically, most organizations who launch the agile transformation initiative do not do it to address the pain points they are facing, but they do it to fundamentally transform the company to compete in the future[7]. Such organizations have a blueprint which is a Minimum Viable Product(MVP) developed in a fast-paced, iterative manner that gives enough direction for the organization to start testing the design. Most of the organizations who are already mature in their agile transformation journey seek out a Technical Project Manager who oversees the development of a new piece of technology or computer program and who would be working in a fast-paced environment, ensuring that customer and internal initiatives are completed on-time and on-budget.

A hybrid role encompassing both technology guru and inspiring leader, a Technical Project Manager is instrumental in the planning, scheduling, and management of IT and IT-related projects [9]. Interfacing with internal stakeholders and also directly with the customers, the Technical Project Manager is expected to take the lead on day-to-day project management for implementation tasks as well as Business As Usual (BAU) projects, helping to craft user stories, test cases, and things of such nature which we will discuss in detail in this section. The Technical Project Manager is also expected to serve as a partner with the technical resources of the team, business users, and stakeholders to create a schedule for the technical team to follow, identify important goals during the project, maintain the project plan, ensure that the project is delivered on-time, whilst also demonstrating an understating of the company's overall systems and data tasks. They must also maintain careful track of the team's progress and address any issues that may crop up during the development cycle. A Technical Project Manager often makes reports to stakeholders and other interested parties about the timetable of the project and informs them of any issues. They are also expected to help the company adapt to the new system or software that is being developed or implemented by co-creating the organization's communications and change management plan, manage business requirements appropriately, implement technical deliverables, serve as a Subject Matter Expert(SME) for training and job aid creation and documenting the progress through the testing phases. They are also often looked up to as having the ability to drive program release level and enterprise improvement and standardization activities using SAFe (Scaled Agile Framework).

A Technical Project Manager's day to day would by far be the ones listed below (but not limited to):

- In addition to being responsible for all project management functions, including project planning, scheduling, risk management, resource management, sequential status reports, the Technical Project Manager‘s role is an umbrella of the below functions as well:
- Overseeing the Joint Application Development Sessions (JAD's), Business Requirement gathering sessions (using various techniques like brainstorming, surveying, interviewing), and working closely with the Product Owner by converting the business requirements into features and user stories during release planning and adding them to the user story backlog.
- Leading and owning the meetings with the Technical Architect and Product Owner to prioritize the product/user story backlog for creating a Minimum Viable Product (MVP) for the release.
- Act as a single point of contact for the Development team for any project/technology-related discussion pertaining to business requirements.
- Assessing project and technical feasibility, dependencies, risks, and risk mitigation strategies.
- Working in close coordination with the Product Owner to break the larger user stories into smaller ones so that they can be taken up in the same sprint and to prioritize the sprint backlog depending on the team capacity bandwidth during the planning sessions.
- Overseeing the creation of test cases, show and tell sessions, and acceptance criteria for the user stories.
- Coordinating with the Product Owner to lead and document the testing efforts.
- Managing project scope by assessing requirements changes, determining and conveying impact on the budget, time, and risk.
- Managing stakeholder/client expectations, anticipating operational and technical risks, and tracking them effectively.
- Being a part of all scrum ceremonies like Sprint Planning, Daily Scrum, Sprint Review, and Sprint Retrospective sessions, as shown in Fig.1. Conduct daily stand-ups and retrospectives at the end of each sprint.
- Guiding technical teams in the execution of project plans and tracking team velocity, financials, and other KPI (Key Performance Indicators) in relation to project plans and progress reports.

- Also performing reviews of product backlogs (user story backlogs), designs, code, test scripts, results, and addressing delivery impediments or product quality issues.
- They are also expected to use their technical acumen to provide design alternatives and support the team in technical issue resolution.
- Maintaining dependency plans between planned sprints across engineering, infrastructure, and third parties.

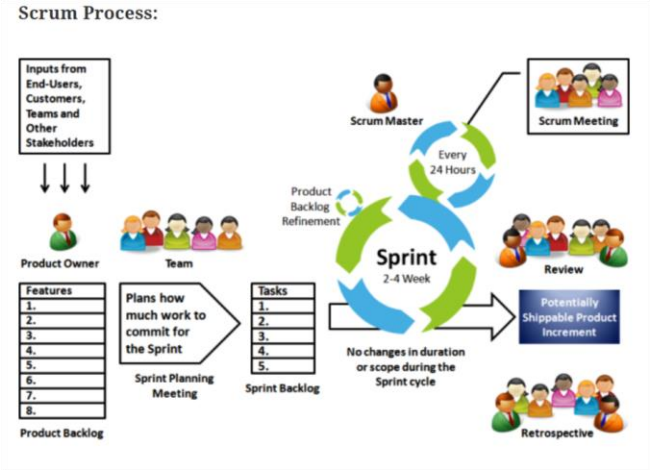

Fig. 1 Diagram illustrating Scrum Process based on iterative cycles called Sprints [10]

III. AGILE TRANSFORMATION: NEW PARADIGM POWERING THE SHIFT TO TECHNICAL PROJECT MANAGERS

Today, many organizations are on their Agile journey by becoming faster, more productive, more responsive, and embracing a set of working practices in software/product development that are really focused on ensuring that product development is done in a customer-focused way, end-user centric and heavily iterative[11]. Organizations are at that tipping point where these agile working practices are not just being scaled up in IT but are also being scaled up across the entire organization. And we are ending up with organizational constructs that look and feel quite different to what we have seen in most of the traditional organization machines.

Organizations are facing challenges brought by 'disruptive technology,'' information overload,' 'availability of data' and 'digital revolution' that is transforming industries, economies, and societies. Most organizations to balance stability and dynamism are dramatically changing how organizations and employees work. Agile organizations are both stable and dynamic at the same time. They design stable backbone elements that evolve slowly and support dynamic capabilities that can adapt quickly to new challenges and opportunities. Agile organizations mobilize quickly, are nimble, empowered to act, and make it easy to act. In short, agile organizations respond like living organisms [12].

Most hefty digital transformation initiatives start with Agile Pilots (Minimum Viable Product-MVPs), which provides them a way to demonstrate the value of agile ways of working through tangible business outcomes [11]. This way, IT is able to satisfy their internal and external stakeholders through early and continuous delivery of valuable working software/product/application. Agile transformations acknowledge that not everything can be known and planned for and that the ideal way to implement the same would be to adjust through the project implementation by obtaining continuous feedback, enhancement requests from the customer/stakeholders[11], implement improvements and continue with this feedback cycle as shown in Fig 2.

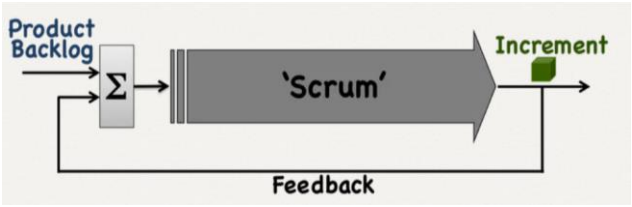

Fig. 2 Diagram illustrating feedback received from the customer being incorporated into the Product Backlog by the Product Owner [13]

With the realm of 'digital revolution' and 'digital transformation initiatives in the road map of many companies, most organizations are now looking for project managers who not only possess a great deal of organizational effectiveness, leadership qualities, and communication skills but also adding technical knowledge and expertise to the formula. In addition to having a sound understanding of the context of the project, which can be quite technical, they must also handle all the duties ascribed to Project Managers, which we discussed in the previous section.

Organizations have begun to understand that for the success of highly technical projects like 'digital transformation,'' modern data architecture[1], building hybrid cloud platform [8], 'advanced data analytics,'' legacy applications and systems modernization, 'Enterprise Resource Platform (ERP) transformation, balancing the technical prowess required for the role of Technical Project Manager along with the soft skills necessary for management and leadership is no small feat. Organizations realize that TPM's are those competent individuals who grew up through the technical ranks and rose up to this level through their profound technical knowledge of various programming languages, the stack of technologies that have

gone into the development of the application, combined with their ability to convey the information in plain English to non-technical audiences[14].

Most of the organizations also comprehend that Technical Project Managers, through their unique combination of hard and soft skills, are able to get straight answers and quality work out of their technical team members as compared to the non-technical project managers who would have had a daunting task in front of them to try to understand the technical issues behind the complex code change impacts, their underlying impediments, and the IT – PM, in this case, would have been often classified as despairing and uncooperative. On the contrary, Technical Project Managers can get a clear perspective of the technical issues in hand and what it needs to get from point A to point B. For instance: when a developer in the team gives an estimate that a code change along with its unit testing, regression testing would take about two-week-long effort, a Technical Project Manager would know right off the bat and can question the developer, putting forth his points if the estimate is a hidebound one or a realistic one. Such scenarios may prove unfavorable to a non-technical project manager. Based on years of technical experience gained by a TPM through the technical ranks, within their own technical areas, they can estimate project timelines to within hours of actual work, and outside of their technical expertise, they can make accurate guesstimates [14]. It also helps the development team to stay focused on delivering business values without being pulled into many meetings like project status meetings, the scrum of scrums, risk assessment meetings, to name a few where TPMs can represent the development team effectively.

TPM's also have the capability to assess the technical perils, assist with technical problem solving by recommending alternative solutions, mitigation strategies, and best practices, and cut through the fringes surrounding any given technical project to determine what is really going on. A Technical Project Manager can also help his team prioritize the latest set of technical issues, assist his team in conducting the root cause analysis for various technical issues within his realm of technology expertise, also be able to pull one of his developers from a cleft – stick - also known as an unrelated technical problem [14]. Given these unique skills of TPM, these individuals can play a pivotal role in helping, maneuvering, and addressing the organizational challenges brought by 'digital revolution' like quickly evolving stakeholder demand patterns, the constant introduction of innovative and disruptive technologies (For instance: machine learning, Internet of Things(IoT), robotics), accelerating digitalization and democratization of information and a new war of talent.

Last but not the least, Technical Project Managers in many organizations, which are on their agile transformation journey look up to these individuals also as Agile Coaches who are responsible for creating, improving Agile processes within a team or a company [15], drive projects to victory line by focusing on tactical organization, process enhancements, communication, and situational awareness. Some large organizations also do hire external agile coaches and often set up an academy to consolidate and formalize these functions. Technical Project Managers inherently are part of such efforts and ensure formal/in-formal mentoring of new in-house staff, product, and business teams.

IV. SKILLS AND COMPETENCIES REQUIRED FOR A TECHNICAL PROJECT MANAGER

Most of the organizations for the role of a Technical Project Manager seek a bachelor's degree in computer science, computer engineering, information management systems, or related technical discipline, though a master's degree is preferred by many for their core technical projects.

An ideal Technical Project Manager is also expected to have experience with algorithms, data structures, system design principles, and design patterns, HTML, object-oriented programming experience like Java, C Sharp, and the like across a variety of platforms. They are also expected to have progressively responsible experience with technical delivery and IT project management using Agile methodologies, Scrum, Kanban, Lean-Agile, or other rapid application development teams to delivering technology solutions on time, within the specified budget, and incorporating all specifications envisioned by the end-user/customer. They are contemplated to deliver complex software features iteratively and expertly with a strong understanding of SAFe (Scaled Agile Framework) or iterative development process, including quality and testing practices. They must possess a high degree of technical savvy, with a keen ability to learn to adapt to new technologies and learn these technologies quickly and easily.

V. ROADMAP FOR TRANSITIONING FROM IT PROJECT MANAGER TO TECHNICAL PROJECT MANAGER

An individual with a bachelor's degree in computer science, computer engineering, or another related technical field with about 5 to 7 years of handling progressive technical ranks would be an ideal candidate for a Technical Project Manager role. Candidates with a bachelor's degree other than the computer engineering field could pursue masters in information management systems, which would give them an overview of certain critical information management concepts like Business Processes and Workflow Analysis, Strategic Value of IT and Digital transformation, Database and Data warehousing concepts, Information Security and Risk Controls, Artificial Intelligence and Business, Managing Enterprise Systems, Business Analytics, Information Enabled Business Modelling, Advanced SQL (Structured Query Language), exposure and hands-on working knowledge of web programming language Python

and BI (Business Intelligence) and visualization tools like Tableau, PowerBI, Qlik Sense, Looker to name a few.

Common areas of improvement in the realm of soft skills would be the area of communication, which can be achieved by coming up with a consistent communication plan for the project by identifying all those stakeholders who need to stay informed about the status and progress updates and by using various methods to reach out to them via group meetings, one-on-one meetings, emails, status reports [16], etc. Other notable soft skills worth working on are leadership skills, time management skills, decision-making ability through consensus and influencing change, conflict resolution skills, nurturing working relationships with external and internal stakeholders. Investing in the right project management tool like but not limited to CA Agile(Rally), Jira, Microsoft Project Plan, Wrike Gantt Chart to track project performance, schedule adherence and helping them gain visibility through status reports, saving time, and managing workflows could pay a long way and contribute to an individual being triumphant in the role of a TPM.

Also, it would be worth pursuing certifications like Professional Scrum Master (PSM-1), SAFe4 Certified Scrum Master Certification, SAFe 4 Certified Agilist Certification, Certified Scrum Master (CSM), PMI-ACP, Certified Associate in Project Management, to name a few. These industry-recognized credentials validate your confidence, capability, and knowledge in the area of software development lifecycle methodologies using the Agile framework, which most organizations are embracing as part of their enterprise-wide transformation to an Agile operating model.

VI. CONCLUSIONS

The journey to an Agile organization and the challenges organizations are facing with the outburst of information and data availability, digitization, and democratization of tools and technologies are increasingly pressing the organizations to hire more technocrats like Technical Project Managers. Organizations consider TPM's as Information Technology (IT) specialists who are responsible for overseeing projects involving building innovative and complex applications and solutions, driving the strategy and execution along with providing technical direction for the stakeholders and the team, working in tandem with business leaders and the team to define and establish system roadmap, design, develop, test and implement solutions often with high quality, on time and within budget. They are undoubtedly considered leaders and advocates who institutionalize best practices of IT applications development and project management to ensure consistent and continuous delivery of workable, valuable, and high-quality software and solutions.

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