Challenges in Scaling up a Globally Distributed Legacy Product

A case study of a matrix organization

Rajeev Kumar Gupta
Siemens Healthcare Private Limited
Bangalore 560100, India
rajeevkumat.gupta@siemens-healthineers.com

Shivani Jain
Siemens Healthcare Private Limited
Bangalore 560100, India
shivani.jain@siemens-healthineers.com

Bharat Singh
Siemens Healthcare Private Limited
Bangalore 560100, India
bharat.singh@siemens-healthineers.com

ABSTRACT

This paper presents our experiences with a 120-person matrixed software engineering product team, spread across three countries that successfully scaled their adoption of Scrum. The product is a legacy, mission-critical software system that conforms to stringent healthcare regulatory standards. We are practicing Obeya wall that brings solution to our large team communication challenges and OYA day that helps solving challenges in fostering innovation, and learning culture and collaboration. We also are describing our experience of defining focus areas of project manager and product manager. These roles are not defined in scrum guide, however, is relevant in our experience in scaled up distributed scrum environment. The authors bring our experiences as a Scrum Master, Product Owner and an architect who have been integral part of the journey and establishing these practices over several years. These practices have helped in scaling as well as stabilizing the team to an extent where each product version is meeting milestones on time and taking strong steps towards shorter release cycles of quarterly releases. This paper also summaries our lessons learned, and recommendations.

CCS CONCEPTS

• Software and its engineering~Agile software development.

KEYWORDS

Obeya Wall, OYA Day, Matrix Organization, product owner, product manager, scrum master, project manager, roles

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1 BACKGROUND

Our product team is geographically distributed across multiple locations in India and Germany. We have a matrix organization with several function houses. A 'function house' is an organization unit responsible for people and competency development. The project teams are formed by getting people with the required competencies from all function houses. A project manager in our matrix organization is an individual contributor and has no direct reports from teams. We have at least five function houses that are involved in creating any scrum team. Hence any scrum team has multiple points of influence and interactions. The product is compliant to regulatory healthcare standards and has been available in the global market for 15 years. The product development follows product lifecycle management approach and used V model until it adopted scrum in 2012 and started scaling up to meet the market demands.

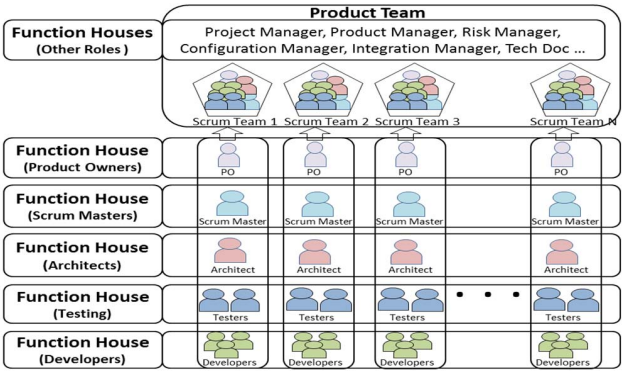

Figure 1: Project teams in Matrix Organization

The project has been complex in scaling up not only due to legacy software code base, but also due to matrix organization and several involved key roles. There was a time when product was slipping the milestones, with escalations from all stakeholders. It was considered the most complex and complicated project to work for in our business unit. Our matrix organization structure is shown in fig 1. Earlier, when we had a single small team, there was minimal dependency on function house as a team is unchanged until project completion. When we started scaling up scrum teams, it was

important that every single required function-house also look at big picture, value creation and scale up simultaneously and make sure that appropriate skills and competency are available at right time.

2 OUR CHALLENGES AND PRACTICES

2.1 Obeya Wall: A solution to our communications challenges

As the product team started scaling up, we were faced with the following three issues.

- Effective functioning of Scrum of Scrums (SoS).
- Providing Big Picture to team.
- Communication with global stakeholders.

This section summarizes our journey of evolving physical and digital Obeya wall and its major impacts.

2.1.1 Initial scenarios. We used to have SoS inside a closed room with the leadership team, moderated by a project manager. Participants used to pick up 6-10 random topics. SoS was scheduled for 30 min, but would continue to discuss/escalate until all topics were covered. It usually ended up with multiple parallel discussions rather than decisions to address the impediments. Over a period of time, SoS took the shape of an event for escalation and finger pointing. Hence, the SoS was no longer an effective communication channel amongst the leadership team and contributed to the impression that it is difficult to scale up the product team.

2.1.2 Initial and Digital Obeya Wall. To begin to address this challenge, we moved the SoS to an open space. This step was taken to take emotions out of the SoS discussion. We started to focus on product topics - impediments to be precise - and review the progress of all teams. This is where the initial version of Obeya wall [1] was born. We planned to keep physical Obeya wall only in Bangalore to easy managing Obeya boards. All teams, including distributed teams, started to use the Obeya wall to track day-to-day progress and impediments. Since there were no topics outside the project, the SoS would end within stipulated time. Geographically distributed stakeholders were joining SoS via video conferencing with camera zoomed on Obeya wall so they too could easily view it.

Figure 2: Obeya wall: An effective communication tool

Obeya wall was then extended to provide a Big Picture, including product performance of previous releases, major customer pain areas, major technical debts, major feedback from service and application specialists, quality status, performance status, and overall project status with traffic light.

Figure 3: Digital Obeya Wall- A communication tool for distributed stakeholders.

Leadership team used to collect inputs from various sources and update the Obeya wall periodically. Obeya wall thus started giving a big picture to everyone involved. Obeya wall is located in public area corridor straight and is accessible to all team members. Obeya wall provides more than often, a walking spot for customers and higher management as well. One such Obeya wall is shown in fig 2. As function houses and stakeholders are distributed at multiple locations, we developed a digital Obeya (Fig 3) wall as well. Digital Obeya wall is having vast information, all automated and remained latest at any point. Thus our Obeya wall establishes communication among leadership team, product team, distributed stakeholders and management.

2.1.4 Impacts of Obeya wall. Over the last one and a half year, Obeya wall has been effective in aligning team focus on project goals and helped us enormously in meeting milestones after milestones by addressing team impediments and concerns at the earliest. As Product Owners, we realized the importance of bringing a customer view to the scrum teams. As the number of teams increased, it became difficult to provide this view to the teams on a regular basis. We used Obeya wall to list down topics in the order of requests received from different customers with count of requests. The PO is therefore able to showcase the increasing priorities of topics to all stakeholders and to the team that otherwise only specific Product Owners would have. Obeya Wall has led to several product and process improvements, appreciated by both global management team as well as Customers. Our Obeya wall is replicated in other product lines in the organization. Those teams have enjoyed similar successes.

2.2 OYA Day: Fostering innovation, learning and collaboration

In our experience, a cross functional and self-managed scrum team becomes so much self-sustained that it starts living in silos and sees no need for any collaboration with other teams. This is where we observed the need for synergy across teams to resolve two issues. First, each scrum team was too focused on scrum backlog to find any slack for self-improvement, product improvement, and collaboration across teams and socialize in organization. Second, POs, developers, testers, architects had their ideas that could benefit product, but never get those topic on priority due to number of different reasons.

2.2.1 OYA Day name coined. We conceptualized OYA Day (Out of Your Area), similar to 'Shipit day' by Atlassian [2]. Our sprint plans include an OYA day at the end of each 4-week sprint. We have three rules for OYA day:

1. It is mandatory for everyone to participate in OYA day.
2. Every team will present what they have achieved at the end of OYA day.
3. The topics must not be from the project backlog or part of their planned work.

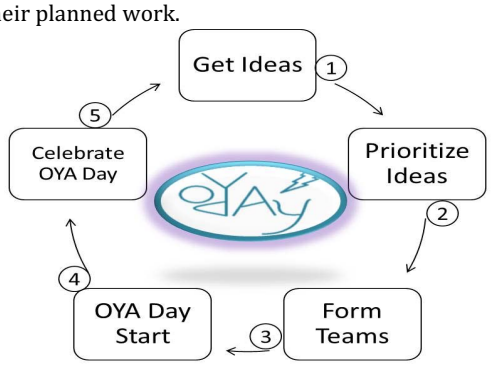

Figure 4: Sequence of OYA Day events

The sequence of events for OYA day is summarizing in fig 4.

2.2.2 Preparation of OYA day event. OYA day preparation starts as early as first week of the sprint where all scrum team ideas are consolidated and discussed together. Product Owners and architects guide teams in brainstorming and shaping their ideas into goals that can be solved in a day. We group similar ideas and categories them based on effort required to implement vs product/customer benefit. It is important to prioritize only those ideas that can be finished in a day. We would slice the big ideas into smaller ideas and work on these ideas in an OYA day. The next step is to get an idea owner (usually an architect or a Product Owner) for every selected idea by the end of second week of the sprint. Idea owner drives to build a short-lived virtual team of self-nominated and interested peoples from all scrum teams. In our experience, like-minded team members from different scrum teams formed OYA day teams. Scrum Masters, project manager and function house heads involve in motivating teams and arranging whatever support team needs. Team member who are not active contributors join one of the OYA day team for learning and providing support. Distributed team members join teams via conferencing tools like Circuit or Communicator.

2.2.3 OYA day and Celebration. OYA day is scheduled on a day once sprint review and retrospective are completed. OYA day starts in morning at 7:30 AM and goes up till 4:30 PM in the evening followed by OYA day celebration with five-minute presentations of the objectives and achievements. The audience in OYA day celebration includes product team, higher management and other key stakeholders. After OYA day presentation, reading club session starts where team members share their learnings. The learnings can be, but not limited to, from books, blogs, video, trainings, workshops etc. The OYA day celebrations end with exchanging of Kudos cards appreciating and thanking for support, outstanding achievement and contributions throughout the sprint.

2.2.4 OYA day event topics. OYA Day topics are selected from customer and product pain areas. This includes topics taken directly from the Obeya wall like one that could possibly offer small usability improvements and one that could help in bidding for new projects to day-to-day developer pain areas like reducing compilation time for more than millions lines of code or improving the quality of logs to help in troubleshooting customer issues. We also took quality improvement topics like static code errors, removing redundant test cases, decoupling component and libraries. Overall, we select topics where we can contribute and make a difference, howsoever big or small, but will take us a long way forward.

2.2.5 OYA day impact. We have had couple of successful OYA days. Each one contributed to bring a big change. The achievements are shared with stakeholders and higher management during management reviews. Our demos to the Product Management and Customers received accolades. To name a few, OYA day helped us in aligning the legacy code with system architecture e.g. refactoring the modules to remove dependencies, increase re-usability, reduced the compilation time. OYA day provides us flexibility to take up these topics that otherwise require lots of complex steps for planning approval.

2.2.6 OYA day event success repeated. In a nutshell, Like Obeya wall, OYA day has been picked up as a best practice and is being followed and practiced in other product lines in the organization and have been greatly appreciated. All this appreciation and accolades have motivated the scrum teams to bring the best out. Teams are energized and we now see a lot of cross team collaboration, even in every day working of the teams. OYA Day provided much needed reason for learning something new and thinking out of the box. OYA day provided a platform to collaborate with other teams, share their knowledge and learn from each other. Overall, OYA day is resulting in a healthy organization and in our experience; the success of OYA day brought stakeholder's confidence in team and helped significantly to scale up product team.

2.3 Project Manager vs Scrum Master Roles

In our experience, a Scrum Master and a project manager, both have similar skill sets. Both are expected to deliver a quality product on time, resolving impediments and developing empowered and self-managed teams. However, the focus areas of project manager and Scrum Masters in our organization are quite different.

2.3.1 Role of Scrum Master. Scrum Master focused more with a scrum team. He/she is like project manager, empowered to take decision for his/her own scrum team, while removing impediments. Focus remains on internal activities and scrum delivery for the features

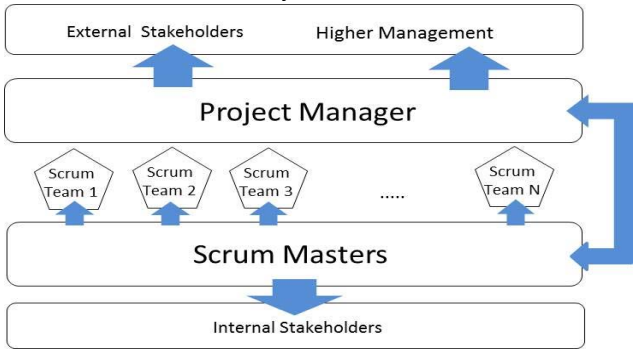

Figure 5: Focus areas of SM and Project Manager

He/She is also empowered to nominate a scrum representative into the scrum of scrums, take scrum level decision and bring best practices in his/her team. Scrum Master focus on managing the expectations on internal stakeholders like automation team, DevOps team, other support teams and like ways. A scrum master is team facing role, ensures that negative guards team from influence of product management and function house and team is protected from disturbances. He/she is responsible to deliver quality product on time. Scrum master monitors the team progress in daily stand up, protect sprint backlog from modification. Scrum master is also face of scrum team in SoS and status reporting to product management and higher management.

2.3.2 Role of Project Manager. The Project Manager is focused on external stakeholders and overall delivery of the project, working in close coordination with Scrum Masters. The highlighted responsibilities of project manager can be summarized as below:

- As a part of steering group – define an overall Release plan, Quarterly Scoping Process, Governance topics, Conceptual cornerstones, Project organization, Working model, Common tools, metrics etc.
- He/she works like "glue" keeping the entire project team together, creates an appropriate amount of consistency across different teams and helps establish and support communities of practice, within project. Coach teams to work towards a common project goal.
- Key contributor for organization wide continuous improvements. Listen to teams problems, and remove blockers at the project level. Continuously drive for process improvements.
- Interface with Management, Business Lines and Business Consumers, aligning project priorities to business goals.

Hence as shown in fig 5 in our project, project manager and SMs, both roles were clearly defined. Clear focus area and smooth coordination helps us in scaling up project teams and adding more scrum teams. This also enables us locating project manager in most business suited locations globally.

2.4 Product Manager vs Product Owner Roles

Both Product Owner and Product Manager have similar skill sets. However, both operate on different levels. While, the Product Owner is responsible for the definition and delivery of a part of a product that belong to their Scrum team, the Product Manager is overall responsible for product and its success. In this case as well, the focus areas of product manager and product owners are quite different.

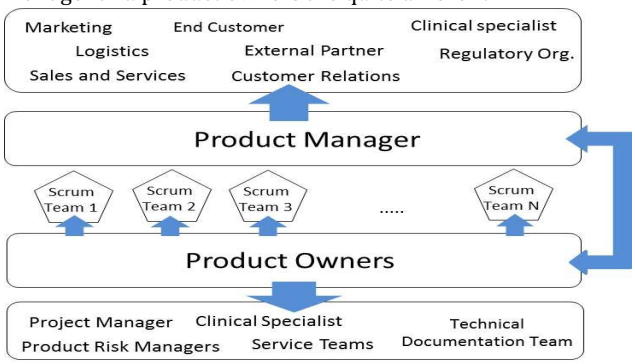

Figure 6: Focus areas of PO and Product Manager

2.4.1 Role of Product Manager. Product Manager is responsible for business success of the product, feeding business and market requirements to the Project. Product manager draws business plans based on various stakeholders e.g. end customers, service organization, country organizations and regulatory standards. Product Manager works in close collaboration with the various Product Owners bringing the market aspects and any priority adjustments that may be necessary. He/she does not get involved in the day to day working of the individual scrum teams. But keeps themselves abreast with progress in the product, while maintaining a broad view of the complete eco system.

2.4.2 Role of Product Owner. A Product Owner, while understanding customer needs, is a team facing role. Product Owner provides priorities and expertise to the associated scrum teams, while ensuring completeness and consistency of

the derived requirements. The highlighted responsibilities of Product Owners in our context can be summarized as:

- Prioritizes and defines the scope of requirements and change requests of the Scrum Team. It is a continuous activity and responsibility of the Product Owner to keep the backlog in order and transparent. He/she coaches and supports scrum team's queries, while resolving conflicts regarding requested improvements and enhancements.
- Periodically defines and performs acceptance tests to evaluate completeness and consistency of the derived requirements within the part of the product, the Product Owner is responsible for.
- Showcases and gathers feedback from various external stakeholders, ranging from Service personnel to end users and customers. Provide use-cases and workflows as well as insights into the usage of the system at the customer location, to the teams.
- Interfaces with Product Manager, Service teams, end users ensuring correctness and completeness of their part of the product.

Hence as shown in fig 6 our project, expectations from these roles are clearly separated and well defined. That's the reason, now, product managers are working in close proximity to customers distributed globally, whereas Product Owners are mostly collocated with scrum teams. This clearly helps us in scaling up project teams and adding more teams, while reducing dependency on a single point of contact.

3 LESSONS LEARNED

The lesson learned by our SM can be summarized as:

- Scaling to large number of scrum teams is not smooth, as long as a scrum team is influenced by function house in a matrix organization. Scrum team must be self-managed.
- Once our function houses could sync with product priorities, the entire product team scaled up smoothly and allowed scrum teams to work with autonomy.
- In our large distributed team, we found that a project manager (alias chief Scrum Master) and a product manager (alias chief Product Owner) are essential and have a positive impact on scaling of the teams.

The lesson learned by our PO can be summarized as:

- Our experience shows, with a dedicated Product Owner per scrum team, along with smaller feature-based teams having T shaped competency, additional teams can easily be added. A shared Product Owner and large scrum teams (> 20 people) are a blocker for scaling a product team.
- Product Owner cannot work effectively, in case of external influences (e.g. from a function house).

The lesson learned by our architect can be summarized as:

- With feature based scrum team, the Architect as a complete picture of the feature helping in effectively guiding the scrum team.
- Regular sync among architects and chief architect helps in aligning towards simpler and suitable design adaption for the project.

These are combined lesson learned from all three authors:

- Setting up of the Obeya wall and digital dashboards enhanced the transparency among our stakeholders, and enabled effective communication as the number of teams scaled up and got distributed geographically.
- We provided several continuous learning platforms like OYA day, Reading club, focused communities of practices and ecosystem for implicit learning and growing. We strongly believe that continuous learning is essential in improving teams' effectiveness.

4 RECOMMANDATIONS

This section summarizes our recommendations, based on our experience, for teams trying to scale Scrum across global organizations.

- If you find yourself facing challenges with keeping the Big Picture to team members and stakeholders or having effective SoS or aligning team with project goals, then trying creating an Obeya wall in close proximity to team and accessible to all stakeholders.
- If you are a PO or an architect and find challenging to prioritize customer pain areas or technical debts, then visualize these topics in Obeya wall.
- If you have product managers and project managers and scaling scrum team then try to define clear roles, responsibilities and focus areas.
- If you are a scrum master or project manager and find challenge in motivating team members, fostering innovating, continuous learning or collaborating working environment, then try OYA day events, reading clubs and exchanging kudos cards.
- If you are scaling to multiple teams, then do have project manager who align teams towards overall project delivery as well as manage needs of external stakeholders and higher management.
- If you have globally distributed stakeholders and customers, then place a Product Manager close to customer, market and region-specific operation.

REFERENCES

[1] Jill Jusko, Obeya: The Brain of the Lean Enterprise, http://www.industryweek.com/print/lean-six-sigma/obeya-brain-lean-enterprise

[2] Ship It day. 20 hours to innovate. https://www.atlassian.com/company/shipit