HOW WE LEARN TO STOP WORRYING AND LIVE WITH THE UNCERTAINTIES

CONTENT

How we learn to stop worrying and live with the uncertainties

The article describes how we changed a traditional functional silo-based telecom R&D center towards a Lean and Agile software development R&D center. This paper describes the major steps and methods utilized. Insights and lessons learned of the challenging transformation are also included.

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INTRODUCTION TO THE JOURNEY OF CHANGE IN 2008 - 2012

In 2008, we started adopting Lean and Agile in software development at Ericsson R&D Center Finland, Mobile Media Gateway. The first concrete step was taken in autumn 2009; starting with one isolated cross-functional team performing as pure Scrum as possible. In 2010, we extended the change to involve the whole organization. We realized early that this is a profound transformation of the way of working, the organization, our physical seating arrangements, our culture and our competence profile.

A multi-year journey towards the next level of continuous improvement has just started and a major change in the mindset has already happened. We have understood that we rather need "to act our way to a new way of thinking, than to think our way to a new way of acting". We need to learn off from the past where we thought we could plan and predict everything in detail. We are learning to take one step at a time, stop worrying and live with the uncertainties.

We realized early that this is a profound transformation of the way of working, the organization, our physical seating arrangements, our culture and our competence profile.

The development of Ericsson Mobile Media Gateway (M-MGw) is located in R&D Centers in Finland and in Hungary. We are 350 people developing and maintaining the software for the M-MGw. The product is ten years old and the responsibility of development has been in Finland from the start. We are utilizing RoseRT/RSA-RTE, C++ and Java as programming languages in our complex development environment.

Discovering Open Space with developers in 2009.

1. MOTIVATION BEHIND THE CHANGE

Traditionally the Telecom business has been standardization-driven and regulated on a national level. The development lead times have been long. Consequently the Telecom vendors have developed capabilities to influence standards, develop products and interact with the Telecom operators in a slow-moving industry. The business landscape has changed leaving the major slow-moving vendors to struggle with the pace of the newcomers.

The challenges to tackle were many folds. The slow-moving market fooled us to develop major multi-year projects. We became a predictable development machinery with extensive mechanisms to ensure predictability and control on the expense of flexibility and customer closeness.This, in turn, led to organizational setups focusing on the alignment with the project structures and deepening the competencies in narrow areas both in the product and the functional dimensions. The result was organizational silos with multiple, hand-over related challenges.

This gradually led to possessing less and less people with a broad systems understanding, which in turn slowed down both the organizational capability to handle broad technical challenges and the individual opportunities to learn and broaden the contribution. The feedback loops within the product development became longer and longer.

Only recently the Lean principles and the Agile development philosophy has been recognized as the source for solutions to these challenges.

Team members finding solutions together.

2. TRANSFORMATION APPROACH AT M-MGW IN 2009

2.1 Agile wake-up call

In early 2008, the management of M-MGw development and some experienced developers became aware of the concept of Agile in large scale telecom industry. External lecturers, external visitors, books and articles were the main source of inspiration. We did not face crises in our organization as a trigger for changing the way of working. Merely we were too satisfied with the status quo at the time and the atmosphere was serene.

However, what was written about the disadvantages of component teams, especially by Craig Larman and Bas Vodde in 2009 [1], was a touché. We were able to identify ourselves directly from their message; but it was challenging to realize in advance how we could change from a component-based technically-thinking organization into a customer-focused cross-functional and value-thinking organization.

We did not face crises in our organization as a trigger for changing the way of working. Merely we were too satisfied with the status quo at the time and the atmosphere was serene.

Even before the beginning of the change journey we were able to identify multiple obstacles ahead of us. However, the expected advantages were greater than the obstacles. Soon we realized that if we wanted to stay as a serious player in the fierce telecom industry, we needed to start the journey towards becoming an Agile SW company.

[1] Larman,Vodde; Scaling Lean & Agile Development, 2009

2.2 Less detailed level planning

We used approximately half a year to spread the knowledge of Agile SW development methods internally. We asked several times the question: "Why are we doing this change because we are doing so well today?" The change was complex and thus we were not able to justify the change by utilizing the normal business case study procedure. At the end, we needed to rely on the positive messages from other companies and pure intuition.

In the beginning of the concrete change journey, we involved coaches from Reaktor Innovations Oy. The coaches had a strong lean thinking mindset with strong experience from the complex telecom industry. They utilized this mindset successfully to challenge us.

The coaches changed our approach more to "start implementing with a small scale and tackle the problems as they occur".

We wanted to form a detailed plan of a one year change project. We wanted to understand and solve all the major potential problems beforehand. We wanted to mould this plan into our yearly strategic planning process and have each organizational silo responsible for part of the change. The coaches changed our approach more to "start implementing with a small scale and tackle the problems as they occur". They said: "you need a well enough understood common vision on the direction you want to take; it is anyway impossible to foresee all challenges ahead, not to talk about making a detailed plan on how to mitigate them. Keep one thing in mind; the developers know best how to solve the technical challenges ahead."

2.2.1 Kick-off the new way of thinking

We started with one cross-functional development team and one Product Owner that had a task to implement a real customer feature into our product. We built a physical environment where the team was able to work according to Scrum as Deemer, Benefiled, Larman and Vodde had defined in the Scrum Primer.[2]

In the beginning, it was a constant struggle to grant room for the experiment and at the same time keep the customer promises for the ongoing project.

[2] Deemer, Benefiled, Larman, Vodde; The Scrum Primer, 2010

We formed a transformation reference group that consisted of the management team, Reaktor coaches, some project managers and key persons from the verification unit. Also representatives from the first team including Product Owner and Scrum Master were involved. The people working in the new way updated the reference group regarding the progress and problems. The reference group followed-up and acted on the change based on the team's input.

In the beginning, it was a constant struggle to grant room for the experiment and at the same time keep the customer promises for the ongoing project. It was explicitly discussed, understood and stated in the beginning that 'we need room for change'. We understood that the change will impact on our ongoing projects in the short term. Balancing with the change and customer promises was a difficult exercise.

The old organization was not ready to react fast enough to the new requirements that two-week Scrum sprints brought to surface.

There were clearly two different worlds that met. One world that we knew how it worked; it was predictable and had a slow but steady tempo. The new world had a greater tempo and many weekly and monthly meeting routines from the old world felt as road blockers on the way. The old organization was not ready to react fast enough to the new requirements that two-week Scrum sprints brought to surface.

It took a while for the organization to realize that the new way of working had different requirements on the tool base we had.

The team was encouraged to experiment with new tools and find better means of supporting faster feedback. The team soon realized that our development environment was not build for making fast and small end-to-end deliveries. Reaktor consultants justly called us as 'Galapagos Islands' because of our isolated and old development environment. The team encountered internal resistance when challenging the Ericsson rules even though encouraged by our own Head of R&D. It took a while for the organization to realize that the new way of working had different requirements on the tool base we had.

2.2.2 Mindset building factory

We created a separate office space for the first team where the team was able to build a good Lean mindset with the help of Reaktor coaches. The Pilot team, Product Owner and Scrum Master where able to experiment by doing real work and build their own understanding of what worked and why. The learning by doing was intensive - we started to call this area 'a mindset building factory'. People who wanted to understand the positive side of the new way of working took a short visit there in order to get input and inspiration to change their own mindset.

2.3 Continuously learning organization

2.3.1 Leadership challenge

Changing people's mindset starts from small, visible, actions that are repeated everyday. Management created a guideline to make clear what we wanted more in our everyday working environment.

We believe that removing the culture of strict quality gates gives room for better factory-floor-level everyday decisions.

We believe that fundamental changes needed in our minds to succeed with this journey are as follows:

More people initiative and less top down control; it has been challenging both for the managers to 'let go' and for the developers to take more initiative and responsibility. In order to succeed we clearly need both aspects.

More team players and less individual heroes; we often relied on a few specialist to solve problems. We want to use the collective knowledge that exists in the teams. Team needs to proactively seek support from the specialist when needed.

More courage and less risk avoidance; the aim is to encourage everyone to take controlled risks in order to conduct better and more clever everyday decisions. We believe that removing the culture of strict quality gates gives room for better factory-floor-level everyday decisions.

More conversations and less one way communication; we had had steady process culture were information was passed forward as written documentation. We use open space and community of practice to involve more opinions into discussions.

More personal growth and less comfort zone; both knowledge sharing and personal growth will be essential for succeeding with the change. We have taught our employees to specialize into one deep knowledge area. To be successful as a team everybody need to step outside his/her own comfort zone, support others to grow and broaden his/her competence.

2.3.2 Team competence build-up

The organizational set-up and responsibilities followed the product structure. History of individuals working long time in only one capsule resulted in a fragmented development environment. Because of the strict areas of ownership on a capsule level and narrow competence areas, it was a challenging task to start broadening knowledge areas.

Combining system, design and test competences into a team gave better possibility to mentor and share knowledge between the team members.

Teams are expected to learn in two dimensions. One is the functional dimension; system-design-testing. The other is the product dimension; different components in the system. In addition to the deep area knowledge, they need to understand the end-to-end functionality that goes through multiple components.

Combining system, design and test competences into a team gave better possibility to mentor and share knowledge between the team members. Visualizing tasks both in the Kanban and the sprint planning board was a valuable tool for the Team Coach to help the team members to broaden their competences.

A major leap in learning was seen in the Fault Handling Kanban teams where two cross-functional teams were established around the whole legacy product. In the beginning the teams said that it is too much of learning from both the product and the tool perspective. At the end they experienced the benefit of competence growth and seeing the whole.

Teams develop their competences differently. Motivated team members who want to expand their knowledge are needed for a successful team. With a help of skillful coaches the teams will more easily challenge the status quo and grow.

2.4 Innovation

The innovation is an integral part of everything we do and everyone's contribution is needed for successful innovation. Our innovation culture is putting value on empowerment of individuals, proactive experimenting, collaboration and challenging de facto. Our management has always been positive on innovation and the changing leadership mindset (Ref. Ch 2.3.1) is supporting the organization's innovation capability prospects.

We have seen that bringing people around the same table from the different backgrounds generates a spin of positive, innovative energy.

Breaking down the traditional silo structure and building up organization around cross functional teams is nurturing our diversity. Change from the silo-based R&D center towards the Agile development included intensive learning, facing new challenges and risk taking which are also typical parameters of innovations. The elements in Lean and Agile and our innovation environment are complementing each others.

In 2010 the teams burned off almost all their energy in adapting the new ways of working. The majority of the people felt that they had no time or energy for new business innovation or revolutionary product improvements. People showed innovativeness mainly on the new ways of working. Of course, there are always innovation change agents who are challenging the orthodoxies under all circumstances.

The innovation buffer zone was a great bottom up proposal in mid 2010. Management supported this idea and thus each Scrum team was allowed to have a half a day for its innovation activities during each two-week sprint. The teams specified themselves innovation policies describing how they would use the allocated time for innovation. Each team had a different innovation approach: some teams were having varying innovation sessions around different topics, e.g. guest speakers or brainstorming their own ideas further. In some teams, individual innovation activities were dominating. Some teams were focusing mostly on the way of working improvements. Some teams participated in occasional company level innovation activities but otherwise they were fully focusing on daily work.

We have seen that bringing people around the same table from the different backgrounds generates a spin of positive, innovative energy. The majority of the creativity is naturally directed towards the improvements around the ongoing work in the sprints. It is still a challenge how the Agile community will be able to support and contribute to the new business innovation community.

2.5 Agile practices

Development teams are using the Scrum as Deemer, Benefiled, Larman and Vodde define in their Scrum primer.[3] We have followed the principle that 'first you need to know how to cook by the recipe and then you can start to evolve and experiment'. We have followed the basic Scrum and tried out how it fits into our environment without judging something that we have not tried.

In product maintenance, where the nature of work is a constant flow of customer service requests, we have utilized Kanban combined with practices from the Scrum framework. Some of the teams focused on fixing the faults (having a common backlog), and some teams focused on the support requests (having also a common backlog).

It has been a constant learning opportunity e.g. to tailor the Kanban board. At the early stage of agile transformation the board was revised several times. The teams decided to split the columns so that the board would simulate their actual workflow. The work in process (WIP) limits have also been adjusted multiple times.

Decision of using Scrum and Kanban was based on a profound discussion and consideration. As a large R&D center developing a complex product, we felt the need to have a common approach for the teams. At Ericsson we have a strong history of tailor-making own tools and methods. This time we did not see the benefit of developing an Ericsson-specific Agile process. We decided to rely on existing external enterprise experience, Scrum communities, Scrum Master training packages and extensive literature studies about Scrum and Kanban methods.

Kanban coaches at product line maintenance sharing information.

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[3] Deemer, Benefiled, Larman, Vodde; The Scrum Primer, 2010

3. CHALLENGING LARGE SCALE TRANSFORMATION IN 2010

In 2010 we understood the challenges of transforming a large scale operation. Many purely technical challenges needed to be solved when transforming a traditional "silo and project" organization to Agile and Lean. The biggest gains are achieved when the 'collective thinking', of the organization changes. Forming of the collective thinking takes time and requires good leadership and coaching skills.

We have cross-functional Scrum teams at Feature Development. Customer Service Request Handling, Fault Handling, Feature Integration and System Integration activities are performed by Kanban teams. The first release project with the new way of working was established in 2010.

The Continuous Integration thinking and capabilities were developed in 2010. However, there is still work for further improvement. Build times have reduced over ten times and the number of commits per day has increased roughly five times.

3.1 Ghosts before the journey
We saw fictive problems when introducing the team-based way of working. Many of those remain as ghosts that vanished when our understanding grew. Some of those are still valid and need special attention from us to succeed.

GHOST #1: "Code cannot be effectively shared and integrated between cross-functional teams"
Broad and proactive information sharing is needed in between the teams. We have unsolved environmental challenges with the code modeling tools.

GHOST #2: "Individual's capacity of changing from narrow area of expertise into a specialized generalist is too limited."
The message was initially misunderstood in a way that everyone should become a generalist. Every body has capacity to learn in small steps at a time.

GHOST #3: "Line and project manager roles are non-existent in the new setup"
The Line manager role was essential during the transformation. In future, they will focus more on individual coaching. Project manager role is nearly non existent.

GHOST #4: "How much freedom can we give for the teams?"
This is more a question of the level of freedom the teams are willing to accept and the level of responsibility they are able to carry by themselves.

3.2 Real obstacles during the journey

- Technical environmental impediments

- Transition period (What is the "point of no return" when the old component-based teams will become too weak and everybody needs to transform into the new way of working)

- High pressure to deliver to the customer and simultaneously have time for learning

- Keeping the systems thinking in mind when teams concentrate on one sprint at a time

- Keeping the code healthy while multiple cross-functional teams commit to changes at the same time

- High pressure to adapt to the new ways of working while keeping up the spirit of innovativeness

- Tendency in the Agile teams to limit collaboration to the Agile needs only

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The biggest gains are achieved when the 'collective thinking', of the organization changes.

3.3 Positive effects from the new set up

- Faster response for faults and service requests from the customer

- Increased amount of face-to-face discussions

- Strong Community of Practices and coaching capabilities

- Solving impediments with the proper scope and timing; not overdoing major improvements upfront

- The whole organization is blowing into the same direction

- Faster feedback loops

- People are having more fun at work

- Utilization of the wiki-tool in information sharing

- More flexible structure compared to old silos gives a better ability to serve multiple stakeholders

4. A TRUE LEARNING ORGANIZATION IN 2011

4.1 Have the Ghosts in 2010 disappeared?

We do not see ghosts anymore because we know now that every challenge can be solved in one way or another.

GHOST #1 in 2010

We have decided to move away from model based development to pure C++ coding as much as possible (taking our big legacy into account), merge is no longer seen as any bigger obstacle.

GHOST #2 in 2010

The deep expertise is still highly needed and valued. We have seen a good growth in people's knowledge. Direct quotation from a developer: "I have learned more during the last 6 months than during my whole carrier". The team concept supports the learning well, but we have also put effort on organizing training in many areas.

GHOST #3 in 2010

The line manager role has stayed almost unchanged. Project Manager or Technical Coordinator roles do not exist anymore. They have become technical experts in teams, Product Owners or Scrum Masters/Coaches. We have found a new role for each person in the new set-up.

GHOST #4 in 2010

The more freedom we give the teams the more responsibility they are prepared to take. When team members have responsibility they can make decisions faster. Clear alignment of intent, direction and vision is an enabler for allowing big freedom on action level.

4.2 Positive swing in 2011

The momentum for the change was high in 2011. We were learning by experimenting with different practices and taking the best ones in use.

Based on an extensive study made by Aalto University and our own insights the following positive impacts were highlighted:

- "Work is intensive, but rewarding. No waiting and wondering what to do. Not too much context switching. Less bureaucracy and less unnecessary work phases" (team member quotations).

- Focus has changed clearly from document based info sharing to face-to-face communication.This was enabled by new seating arrangements and high quality video conferencing equipment.

- High focus on growing system knowledge in the teams.

- External blogs, twitter and conferences have become a major source of inspiration

- One of the major learning has been how to deal with technical dependencies. We have consciously experimented with different setups and finally found the current best way of handling technical dependencies.

- Successful implementation of continuous integration has tremendously improved the feedback loop between feature/system level testing and coding.

- We have learned the power of timely communication by using information Radiators. We have Radiators at team level, product level and Radiators that show status of key performance indicators.

4.3 Challenges still remain

Major eye opening for the remaining challenges was the Value Stream Mapping session lead by Michael Cox from Netobjectives.

Thus, we need to:

- have a comprehensive alignment in vision so that we can allow freedom of action on team level

- develop existing decision points to support readiness and enable flow

- have customer value visible in all our work items

- decrease work in progress and optimize for high flow rather than utilization

- reach pull based on customer value

- reduce the large work items starting from customer deliveries to team tasks

- remove organizational budget boundaries that prevent the cooperation. A seamless organization is needed to reach the end-to-end benefits.

5. CONCLUSIONS

This is a profound change of both culture and way of thinking. The change goes beyond the processes and tools into the people's minds. Changing the mindsets permanently is not an easy task. To implement successfully an organizational-wide change requires extra time and high energy level from the whole organization.

In 2010 we took a major leap into the Agile and Lean world. We started an interesting journey in the ever-changing world. We reached many positive effects, yet we saw unsolved challenges ahead. In 2011 we exposed more people to Agile and witnessed further advantages of Agile.

Our starting point was a rather stable world. We were developing a mature product with a large installed base. We did not face a crisis pushing us to change; on the contrary, we were doing well. Still we felt that we could do much more. We had a very good starting point with a stable product and a long experience of development and product competence.

First-hand experience from the Scrum teams, how the inter team cooperation works and how the Scrum framework scales, is the real source of learning. Only through large scale experience it is possible to form an understanding of how well the new way of working is tuned into our situation. Kanban and Scrum are good methods if supported by the right thinking and understanding of the unique context.

The whole organization needs to accept moving from upfront planning to living with the pulse of the teams. Learning to stop worrying and to live with the uncertainties is a challenge that we face everyday. We have managed to challenge our status quo. The change is evident and clearly visible in our organization! As long as the whole organization keeps the ability to experiment and learn from its own actions we are sure that our future looks bright.

Moment of instant feedback session during the first Ericsson Agile conference at R&D center Finland, 2011.