Agile Project Management

Seminar on Current Trends in Software Industry

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Tiivistelmä̅ Referat̅ Abstract

This paper introduces agile project management, what is it and why we need it. This paper descripes also the necessary changes from traditional project management to agile project management.

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Contents

1. INTRODUCTION

The current trend is to find ways to be more agile also in project management.

The agile methods have generated a lot of interest in IT industry. Anyone who is committed to employing disciplined project management methods will have legitimate concerns about the effects that the agile methods will have his/her projects. Reasoning behind the agile project management is that consumer and business expectations have been increased. Customers today want and expect innovative products faster, cheaper and with better quality than those we've seen in the past. At the same time our business tools have improved our capability to be productive, raising work expectations, and work pressure. Instead of productivity driving customer value we usually get misalignment of value definitions or even orthogonal opposition to customer value. Traditional project management has been said to be too rigid and slow for this fast-paced business. The aim of the agile project management is to deliver customer value with speed, economy, and quality.

There has also been lots of discussion about the role of a project manager; whether a project manager is needed in the agile world or not. How much and which way a traditional project manager has to change his/her management style or way of working in order to be an agile project manager? The answers are that project managers are still needed but they have to put more focus on customer value and leading a team.

This paper describes differences between traditional and agile project management and necessary changes.

2. AGILE PROJECT MANAGEMENT

2.1 Theory of complex adaptive systems (CAS)

Traditional project management lies on the traditional management theory [AuW03], which assumes that:

- Rigid procedures are needed to regulate a change.

- Hierarchical organizational structures are means of establishing order.

- Increased control results in increased order.

- Organizations must be rigid, static hieararchies.

- Employees are interchangeable "parts" in the organizational "machine".

- Problems are solved primarily through reductionist task breakdown and allocation.

- Projects and risk are adequately predictable to be managed through complex up-front planning.

The theory of Complex Adaptive Systems (CAS) is behind the agile project management principles and practises. Agile projects can be considered to be CAS.The aim of implementing CAS principles to agile project management is to correct traditional management assumptions and practises about change, control, order, organizations, people and overall problem solving approach. [PSW05].

Complexity scientists have studied the collective behavior of living systems in nature such as the flocking of birds, schooling of fish, marching of ants and the swarming of bees. They have discovered that living systems are complex and in that they consist of a great many autonomous agents interacting with each other in many ways. The interaction of individual agents is governed by simple,

localized rules and characterized by constant feedback. Collective behavior is characterized by an overlaying order, self-organization, and a collective intelligence so unified that the group cannot be described as merely the sum of its parts. Complex order, known as emergent order, arises from the system itself, rather than from an external dominating force. These complexes, self-organizing Complex Adaptive Systems (CAS) are adaptive in that they react differently under different circumstances, and co-evolve with their environment. [AuS06].

Agents are the semi-autonomous building blocks in the CAS: they seek to maximize some measure of goodness, or fitness, by evolving over time. Simple, local rules guide the interaction between agents of a system and result in global, complex behavior. [PSW05].

Ant colonies are examples of CAS. Individually, ants have primitive brains, yet collectively they run surprisingly sophisticated and efficient operations. Without central direction, using a few simple rules of logic, they divide responsibilities among themselves, find food, build and maintain their nests, tend to their young, and respond to attacks. [PSW05]

2.2 Agile project management framework

2.2.1 Definition of agile project management and project success criteria

Traditional project management is the application of knowledge, skills, tools, and techniques to project activities to meet project requirements. Project management is accomplished the use of the processes such as: initiating, planning, executing, controlling, and closing. The project team manages the work of the projects, and the work typically involves competing demands for scope, time, cost, risk, and quality, stakeholders with different needs and expectations, and identified requirements. Succesful project is delivering result in time, in cost, in scope with quality and after which customer is satisfied. Succesful project management requires actively managing these interactions. [Pro00].

Agile project management is the work of energizing, empowering and enabling project teams to rapidly and reliably deliver customer value by engaging customers, and continuously learning and adapting to their changing needs and environments. Agile project management focuses on project throughput, teamwork, and leadership. [AuS06].

Customer value is the right product, at the right time, for the right price. The right product is the product with exactly the features that the customer wants. The right price is the price that customer believes is a fair deal. The right time is when the customer wants it. [AuS06]

2.2.2 Agile project management practices

Key agile principles are:

- Focus on Customer Value: Employ business driven prioritization of features. It means aligning project, product, and team visions to deliver better product quality faster and cheaper.

- Iterative and Incremental Delivery: Create a flow of value to customers by "chunking" feature delivery into small increments, batches.

- Intense collaboration: face-to-face communication via collocation.

- Small, Integrated Teams: Intense collaboration via face-to-face communication and collocation; diversified roles on integrated.

- Self Organization: team members self-organize to fullfil a shared project vision; self-disciplined teams.

- Small, Continuous Improvements: Teams reflect, learn and adapt to change; work informs the plan.

Key agile practices include release planning, sprint planning, daily scrum/standup meetings, fixed-length sprints, sprint review, sprint retrospective. The aim is to identify top priority items and deliver them early and often. [AuS06].

Agile project management practices [AuS06] ***are:***

1. ***Guiding vision***

   The objective of guiding vision is to create a share vision or mental model for driving behavior on agile projects and continuously reinforcing it through words and actions. It recognizes and nurtures a shared project vision as an internal model translating it into a powerful influence on team behavior. The guiding vision is an aggregate of three component visions: team vision, project vision and product vision.

   Its key implications are evolving team vision to drive team behavior, create project vision to drive project behavior, and facilitate product vision to drive product evolution.

2. ***Organic teams (small, dynamic teams)***

   The objective is to structure and build self-organizing agile teams based on an organic CAS model. It includes empowered team members and integrating them effectively into the larger enterprise by facilitating collaboration and teamwork through relationships and community.

   Its key implications are view agile teams as organic CAS, recognize the difference between formal and informal team structures and structure agile teams accordingly, mold groups of individuals into high-performance agile teams, and integrate these teams into the larger agile enterprise.

   The aim is to encourage diversified roles by defining roles holistically so that team members can develop into generalizing specialists. "Generalizing Specialist" is someone with one or more specialties who actively seeks to gain new skills in existing specialties, as well as in other areas.

3. *Light touch*

Light touch is an intelligent control of teams, which requires a delicate mix of imposed and emergent order. The aim is to apply just enough control to foster emergent order. Its objective is to manage agile teams with a style that allows team autonomy and flexibility, and a customer value focus without sacrificing control.

Its key implications are to establish decentralized control that defers decision making for frequently occurring, less critical events to the team, manage the flow of customer value from one creative stage to another, recognize team members as whole-persons and treat them accordingly, focus on strengths, rather than weaknesses to leverage people's uniqueness.

Each person is unique and has unique strengths and weaknesses.Great managers recognize that trying to standardize human behavior is futile, and don't waste their time trying to change people dramatically. Rather than focus on weaknesses, they build on the personal strengths of their team members and help them become more of "who they already are".

4. *Simple rules*

The objective of simple rules are to implement a set of simple, adaptable methodology rules that allow agile teams to deliver business value rapidly and reliably, and establish and support the team's set of guiding practices and behavior.

The key implications are to assess the environment to determine its characteristics, identify and implement a simple set of methodology rules that is congruent with the environment, hone the discipline needed for continuous and consistent application of the simple rules.

5. *Open information*

The objective of open information is to provide access to information by creating an open flow and exchange of information among project team members, and among other associated external groups. It allows teams to adapt and react to changing conditions in the environment.

Its key implications are to reorganize team facilities and seating to institute agile information sharing practices, analyze the time taken to exchange information with external groups to identify and reduce the information cycle time, and structure conversations on the project team so as to generate transforming exchanges of information among project team members.

It needs collocating team members in order to have daily standup meeting, where each participant answers for three questions: What did you do yesterday, what you will do today, what's in your way. These are team member commitments in front of the team.

6. *Agile vigilance (adaptive leadership)*

Visionary leadership requires continuous monitoring, learning and adaptation to the environment. The objectives of adaptive leadership are track and monitor the project for timely and relevant feedback, institute systemic procedures for learning and adaptation help the agile manager maintain a leadership presence that animates the team.

The key implications are to track and monitor agile project management practices to ensure their proper application and desired outcomes, learn and adapt continuously according to the feedback obtained, embody leadership that inspires and energizes the team.

As agile projects can be considered to be CAS, also project management practices are based on this theory. The first three (guiding vision, organic teams, light touch) practices are based on the following CAS principles of *autonomous agents*:

- Agents maintain internal models that direct their behavior.

- Skill diversity among agents contributes to innovation and self-organization.

- Tagging enables easy identification and organization.

- Strategy dictates cooperation over competition.

- Building blocks provide necessary abstractions to organize the environment.

The last three (simple rules, open information, adaptive leadership) practices are based on the following CAS principles of *agent interactions*:

- Local, strategic rules support aggregation and emergence in a team environment.

- Emergent order is a bottom-up manifestation of order, while imposed order is a top-down manifestation.

- Feedback enables change and adaption.

- Non-linear dynamical systems are continuously adapting when they reach a state of dynamic equilibrium termed the edge of chaos.

3. TRANSITIONING FROM TRADITIONAL TO AGILE PROJECT MANAGEMENT

Many traditional project management practices still apply to agile projects with some adaptation and a strong dose of leadership [AuS06]:

- Focus should be moved from plans and artifacts to customer satisfaction and interaction.

- Create an integrated team including core project team (7 plus or minus 2 people) and peripheral project team instead of traditional silos.

- Focus should be on the project context, not content. This need to look upward and outward toward stakeholders and sponsor to find out project end goals or desirable outcomes, objectives, scope, relates to other projects, factors, value it brings to organization, contribution towards achieving the organization's strategic goals, and strategy to deal with external changes.

- Practise continuous improvement by moving lessons learned to project reflections by conducting reflections/retrospectives after iterations to analyze, adapt and improve processes and practices.

- Manage the flow of value, not activities. Manage throughput, reduce work in progress, and manage constraints by identifying bottlenecks.

- Responde to change should be happen via adaptive action instead controlling it via corrective action.

- Move from up-front planning to rolling-wave planning with progressive elaboration.

- Customer prioritized time-boxed delivery instead of manager negotiated scope-based delivery.

- Manage commitment via feature breakdown structure instead of managing activities via work breakdown structure.

- Move from top-down control to collaboration on self-disciplined and self-organizing teams. Coordinate execution through commitments, not commands.

- Use minimal set of context-sensitive, generative practices intead of prescriptive heavyweigh methods.

- Use essential value-focused metrics instead of traditional project metrics based on time, budget, and scope.

The traditional project manager is often seen as an unispired taskmaster who develops and controls the master plan that documents the tasks, dependencies, and resources required to deliver the end product. The project manager then monitors the status of tasks and adjusts the plan as necessary.

So, if the project no longer needs a detailed master project plan, why does it need a project manager? Because every project needs a leader. Agile methodologies free the project manager being a taskmaster enabling the project manager focus on being a leader – someone who keeps the spotlight on the vision, who inspires the team, who promotes teamwork and collaboration, who champions the project and removes obstacles to progress. Rather than being an operational controller, the project manager can become an adaptive visionary leader.

The best project managers are not just organizers – they combine business vision, communication skills, soft management skills and technical savvy with the ability to plan, coordinate, and execute. In essence, they are leaders.While this has always been the case, agile project management places a higher premium on the leadership skills than ever before.

The basic phases of an agile project are really no differents from those of any other project. You still must define and initiate the project, plan for the project, execute the plan, and monitor and control the results. But, the manner in which these steps are accomplishes are different and required project manager to a new way of thinking – the thinking of complex adaptive systems. [AuW03], [HaK07].

4. BENEFITS AND CHALLENGES

The problems which agile project management practices and principles try to address have been known already a long time. In that sense benefits are obvious for those who have worked in IT.

In March 2004, the University of Southern California Center for Software Engineering Affiliates Annual Research Review held a workshop to identify as many of barriers managers face when they bring agile approaches into traditional organizations. They identified three areas that they believe are critical challenges to software managers of large organizations: development process conflicts, business process conflicts, and people conflicts. [BoT05].

Development process conflicts

This is the first and most obvious area of difficulty. How do you merge agile, lightweight processes with standard industrial processes without either killing agility or undermining the years you've spent defining and refining your systems and software process assets?

Managing variability in subsystems and teams has proven difficult. If both agile and traditional teams are developing software for the same product, they can develop radically different artifacts that might not integrate easily.

Agile processes focus on immediately delivering functionality, while traditional methods focus on optimizing development over a longer period. The traditional longer life cycles require adjustment to the agile processes.

Legacy systems generally are not easy to refactor or disassemble to accommodate agile replacements that need to build capability in increments.

Agile requirements tend to be primarily functional and reasonably informal. This might or might not work in your systems engineering verification and validation approach.

Business process conflicts

Our business processes and infrastructure require near-perfect predictions of difficult-to-estimate tasks rather than encouraging experimentation and evolution with knowable short-term results but accepting of long-term haziness.

Organizations must learn to accommodate human-resource issues such as timekeeping, position descriptions, team-oriented versus individual rewards, and required skills. Agile development team members require significantly more skills and experience to adequately perform.

Traditional contracts, milestones, and progress measurement techniques might be inadequate to support agile processes' rapid pace.

One area of conflict for mature organization will be in how agile processes will affect their ratings with respect to CMMI, ISO, or other process standards. Agile don't support the degree of documentation and infrastructure required.

People conflicts

People issues are by far the most critical in improving management and development personnel. Addressing them is vital to the adoption and integration of agile methods and practices into your processes.

Large-scaled management processes tend to cast employees as interchangeable parts. Managers also tend to associate employees with specific roles that might cause difficulty in the multitasking characteristiscs of agile team members.

Agile teams must nearly always be collocated. The typical agile workspace requires pair-programming stations, walls for status charts and assignments, a layout that allows team members to easily converse to share information.

There might be a problem of dealing with employees who simply refuse to use new methods. Stakeholders, particularly customers, might need to play

significantly different roles. Agile requires onsite customers, significant customer interaction and feedback, and customer input for acceptance testing.

5. CONCLUSION

Project management, whether you are doing traditional or agile has very similar principles. It's about doing a good job for the customer, leading a team, and delivering measurable business results.

Agility is based on the admission that we don't know everything at the start of a project. Even the things we think we know are subject to revision as the project moves forward and the world changes around us. The agile methodology is elegant in its simplicity. It teaches us that when processes are not stable, and outcomes cannot be predicted within sufficient tolerance, we cannot use planning techniques that rely on predictability. We must rely on observation. We must adjust the processes as we go and guide them to create our desired outcomes.

People like simple messages and agile delivers in spades. But the simplicity of agile can be deceiving. That simple, straightforward message comes at a cost. If we are fortunate enough to have a group of really great team members, a fully engaged product owner, and a team that can operate with some degree of independence from the rest of the organization; the simple messages of agile is a great way to lead a project. The quality of the team allows you to get away with a barely sufficient methodology. Agile assumes that there is an extensive pool of multi-skilled, self-organized, and self-disciplided employees and project manager just go and pick the best for his/her project team. In the real life you get people for your project team who happens to be available at the moment.

What about when our context is not so simple? What about when we have to develop complex systems architectures or work with a tightly coupled legacy system? What about when we have multiple teams distributed across the globe?

What about when our product is an integration of several different products, each with their own product owner? What about when we have to deal with procurement or complex human resource concerns? Agile is silent on these issues.

While we are beginning to answer some of these questions, agile doesn't really give us much guidance on how to pull it all together. There is clearly more to the story than agile is prepared to address.

I believe we have a long way to go with agile project management.

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