
The Art of Agile Risk Management¹

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ABSTRACT

In today's world of fast paced technology and continually changing requirements and project scope, the need for Agile Project Management has greatly increased. Responding to this demand, the PMI[®] (Project Management Institute) launched a new certification, the PMI Agile Certified Practitioner (PMI-ACP)SM. The result of this fast growing certification is the creation of a new space where Project Management and Agile Practices for Software Development meet. This calls us to ask how do standard critical project management methodologies like Risk Management fit into Agile Practices.

This paper details the methodology of Risk Management as it applies to Agile Project Management. It engages in the steps of Risk Management including: identifying, assessing and managing risks, while mapping these to Agile Practices. Most Project Managers are familiar with Risk Management and Agile, but how do these methodologies relate, and how can we use them to manage resources and do more with less on our projects?

What is Agile Project Management and when does it make sense to use it? How Risk Management relates to Agile and how it is incorporated into Agile Practices will be evaluated. Recommendations for implementing Agile Risk Management will be provided along with best practices and how organizations are applying this into practice.

Risk Management is not only a practice and discipline, it is an Art. Knowing the tools or techniques is not sufficient for success. The nuances of how Risk management is incorporated into agile practices are what generate project success. When requirements and environmental conditions are in flux, our ability to anticipate Risk and plan for it, is critical to managing projects with agility.

OVERVIEW

The objectives of this paper on the Art of Agile Risk Management are to first provide an overview of Project Risk Management (including defining Risk) and Agile Projects. After

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providing this foundation, Agile Risk Management will be discussed using the analogy of flight. A view of how this will look for Agile projects will be provided. Finally, recommendations on how to implement Agile Risk Management will be provided.

The goal of this paper is to provide the current landscape of Project Risk Management and Agile project management. Then detail what Agile Risk Management entails and how to implement it for Agile projects.

PURPOSE

The work of a Project Manager (PM) is akin to jugglers, constantly keeping the plates spinning, and juggling the project constraints of time, cost, scope, a quality. How do they do all of this? Projects have much uncertainty, from start to finish. In particular projects have the most uncertainty at the beginning of the project. This is one of the main reasons that planning is critical for projects. One of the significant methods, which supports PMs in keeping a project on time, within budget, and delivering on scope and quality requirements, is Risk Management. Risk Management is how PMs are able to almost magically keep all of the plates of project management spinning!

Now how does one implement Risk Management in an Agile project environment, where there is much less up front planning and short iterations of development? There is certainly an art to it and in this paper Agile Project Management will be compared to flight, both require knowledge, tools and technique. How we apply these is the Art of Agile Risk Management.

In order to further engage in this topic, foundations are necessary.

FOUNDATIONS OF FLIGHT

What are the foundations of flight? The first powered flight was on the 12 December 1903 in Kill Devil Hills, NC (the Outer Banks). The flight was 12 seconds and was at a maximum height of 120 feet. The pilot was Orville Wright, of the famed Wright Brothers. You can learn more about this and actually walk the flight path at the Wright Brother National Memorial (part of the National Parks Services (NPS), US Department of the Interior). (NPS, 2014)

What made the Outer Banks a great place for the first power flight also makes it a great place for Hang Gliding. The sport of Hang Gliding started in the 1880's. In 1951 Francis Rogallo invented the flexible wing, which is responsible for the design of the current hang gliders. It is non powered flight, in a foot launch-able aircraft. (Hang Gliders can also be launched via a tow by a powered ultra-light or other small powered aircraft; however they are designed to be foot launched.) (Martin, 2009) Hang Gliders are made of aluminum alloy or composite frames with a wing made of a canvas or other fabric (called a sail), akin to the material used for boating. In a hang glider, the pilot hangs from a harness hanging from the airframe of the hang glider. The pilot uses their body weight to steer the aircraft by shifting their weight.

FUNDAMENTALS OF RISK MANAGEMENT AND AGILE

In order to discuss Agile Risk Management, background and a common taxonomy are provided here. Firstly, it is important to inquire about project management in general. From there, Risk and Risk Management can be defined and their processes summarized.

The Triple Constraint. The project management triple constraint (iron triangle) is: scope, time and cost (denoting the management of these project aspects). Often quality is shown in the middle of this triangle and Risk may be shown as a cloud around the triangle, or in the background, as it is shown in figure 1 below.



Figure 1. The Triple Constraint.

Fundamentally, only 2 of the 3 aspects of the triad can be selected (or detailed). The third is then determined by the aspects which are selected. This is particular critical when changes occur to the project. The project performance baseline includes the baselines for these 3 project objectives: the scope baseline, the schedule baseline and the cost baseline. If any aspect of the approved project performance baseline is modified (through a change request, or otherwise), then at least one of the other 2 baselines will be effected. For example, if the project schedule is reduced by a month, either the budget must be increased or the scope of work schedule must be adjusted or the scope of the work must be decreased to meet the project objectives.

The other project objective of quality (also known as customer satisfaction) must be met but as a best practice is never changed to accommodate a change to time, scope or cost. What a customer requires to be satisfied is what they require. A customer will not generally agree to less than their interpretation of good project quality, even if the budget or schedule is reduced, or the project scope is increased.

Risk Defined. A Risk is an uncertain event or condition, which if it occurs, has a positive or negative effect on at least one objective. A Risk is denoted using the properties of probability and impact. Probability is the likelihood of a Risk occurring. It is the possibility of a project objective not being met using the current project plan. Impact is the consequence of a Risk occurring. It details the penalty incurred, if the project objective, associated with the Risk, is not obtained.

Risk exposure is calculated by multiplying a Risk's probability of occurring times the impact (usually denoted in days or dollars).

Probability x Impact = Risk Exposure

As shown in figure 2 below, increased probability and/ or impact increase the exposure of a Risk.

It is important to understand the distinction between a Risk and a problem/ issue. A Risk is an event that may occur in the future. A Problem or Issue is something which has already occurred and is being dealt with or has been resolved.

Project Risk Management Defined. Risk Management is an organized, systematic decision-making process that efficiently plans, assesses, handles, monitors, and documents Risk to increase the likelihood of achieving project goals and decrease the likelihood that a Risk would become a future problem

Project Risk Management has one inquire in uncertainty within their project: What are our project unknowns; what are the project's known unknowns; or what are the project's unknown unknowns? Risk Management provides a capability to quickly and effectively communicate Risk information up and down the management chain.

The Risk Management Process. The Risk management process includes the following: identification, assessment, response planning, execution, and planning, monitoring, documentation and communication. See figure 2 below for how these steps of the Risk management process work together.



Figure 2. The Risk Management Process.

The focus of Risk identification is the discovery of potential risks (or uncertainties) to the project. In particular, it includes distinguishing any uncertain event which may positively (opportunities) or negatively (threats) affect the obtainment of project objectives. The process of Risk assessment includes the review, analysis, and prioritization of project risks. This may include qualitative and/ or quantitative Risk analysis. Qualitative Risk Analysis uses a subjective assessment; while quantitative Risk analysis uses values for Risk impacts, usually days or dollars.

After identified risks are prioritized, response planning can be developed for risks. As a best practice this is completed for higher exposure risks first. Since there are generally limited resources for Risk Management, it is important to focus on risks which are most urgent (could potential occur sooner) and highest (due to a high level of probability and/ or impact). Threat Risk response strategies include: mitigate, avoid, transfer or accept. Opportunity Risk response strategies include: enhance, exploit, share, and accept. After these response strategies have been planned, they are executed, while continuing to monitor and control these risks and identify an emergent risks (new risks which have appeared which were not initially identified. Throughout the Project Risk Management process, planning, monitoring, documentation and communication of risk also occur. These are foundational to the risk management process and are essential to repeat iteratively throughout the project. They are also part of continuous process improvement for the project's Risk Management Plan.

The Agile Manifesto.

The following is the Agile Manifesto.

“We are uncovering better ways of developing software by doing it and helping others do it.

Through this work we have come to value:

- *Individuals & interactions* over *processes and tools*
- *Working software* over *comprehensive documentation*
- *Customer collaboration* over *contract negotiation*
- *Responding to change* over *following a plan*

That is, while there is value in the items on the right, we value the items on the left more.”(Beck, et. al., 2001)

Agile Project. What makes a project an Agile Project versus a traditional project? Many people this Agile is Agile SCRUM. SCRUM is one type of Agile methodology. There are others including: eXtreme Programming (XP), Lean, Kanban, and Test-Driven Development (TDD). An Agile project is a project which has any iterative or incremental delivery. A project can use rolling wave planning or any method in which work is delivered to the customer in small and frequent releases or packages. To do this, open communication is needed, particularly with the

customer who will benefit from the objectives of the project being met. Agile project management provides rapid and flexible response to change and actually welcomes change, as it will benefit the customer by providing them what they need and want.

Why use Agile Project Management? Agile Project Management is a great methodology when it is needed, but it isn't the most efficient or effective methodology for all projects. It is best to use Agile for project with a high degree of uncertainty or complexity. This includes project where the scope is likely to change throughout the project, due to new technologies, or outside influences, which are not controllable by the project. Agile Project Management is also valuable to use when there is an immediate need for results/ deliverables. In traditional project management, delivery of results usually occurs after all planning is complete and the work of the project begins. This means that results may occur much later in the project life cycle and might be later than desirable to meet business requirements or organization needs.

The Art of Agile Risk Management. The long title for this paper is “The Art and Practice of Agile Risk Management: Your project as a successful flight from takeoff to landing...” The dictionary defines Art (a noun) as “9a. the principles or methods governing any craft or branch of learning,” (Dictionary.com, 2014) for example, the art of project management; the art of Risk Management. It also defines it as “9b. the craft, trade, or profession using these principles or methods”. (Dictionary.com, 2014) Synonyms for ‘Art’ are “craft, technique, skill; procedure, method, way; fine points, and subtleties”. (Dictionary.com, 2014)

Agility is our ability to respond to the changing environment. Agile Risk Management is not just a tool or technique it is a practice. It is not the same each time we do it, as projects are not the same. Agile Risk Management is situational, much like flying is. We don't have a steady head wind that we fly into. We have gusts and changes of direction, which we need to plan for, anticipate and account for in our flight (in our management of our project). Agile Project Management and Risk Management are a discipline and craft first and then they extend into an art form.

Going through the stages of flight, here they are related to Agile Risk Management.

The Art and Practice of Agile Risk Management: Your project as a successful flight from takeoff to landing... The following are the steps which will be detailed, comparing Agile Risk Management to flight:

- Training/ Certification → *Project Planning*
- Pre-flight: equipment inspection, objectives, conditions (enterprise environmental factors) → *Iteration Planning*
- Take off ✈
- Flight → *Executing on Response Plans while Controlling Risk and adapting to new plan*

- Landing (a process, not a moment) → *the later part of execution*
- Post Flight Assessment (lessons learned) → *Capture of Lessons Learn and Closing (retrospective)*

Training/ Certification → Project Planning, including Risk Management

In the sport of Hang Gliding there are training manuals and certifications (Hang 1, Hang 2, etc.). In the field of project management there are manuals (like The PMBOK, and the Practice Standard for Project Risk Management). These are important parts of project pre-planning and Risk Management in the field itself.

Preflight: equipment inspection, objectives, conditions (enterprise environmental factors) → Iteration Planning

Pre-flight is also focused on Risk Management. Here equipment is inspected, along with an assessment of flight objectives and an assessment of current conditions (which are constantly changing, as they are in an Agile project). These are akin to enterprise environmental factors and relate to iteration planning which occurs in Agile Projects. This is where Risk Management also occurs. It is not a global part of the Agile project planning, but instead it is a part of each iteration, as other planning is. In Agile projects planning is done in small frequently pieces, and only the minimum amount of planning to complete the work is done. This includes Risk identification, assessment, response planning, and controlling of project risks.

Takeoff and Flight → Executing on Response Plans, while Controlling Risk and adapting to a new Plan

During the flight, or during a project, we are executing on Risk response plans, while controlling Risk and adapting to a new project plan. During flight or during a project, we want to relax and look ahead. We want to look for potential issues (risks) and find where there is uncertainty (Risk) in the project plan.

Risk awareness built into Agile practices. One could say that the reason Agile methodologies exist is to counteract scope Risk. Or the uncertainty which exists with the project scope for innovative or high technology projects, where conditions are frequently changing (much like flying in the wind). For this reason, the theory being noted here is that Risk Management (RM) is integrated in Agile, but it is not transparent. Risk is constantly reviewed throughout Agile projects. When there is a daily stand up meeting, one question is ‘What are the barriers to completing the work you have?’. A main objective of this question is to uncover uncertainties in achieving that daily goal.

Another place where Risk Management can occur in Agile project is in our evaluation of value added to the customer. Risk relates to value, so we should evaluate these together. One way of doing this is to view and adjust the Backlog based on Risk. Also, one could use a Risk Burn-Down Chart as a tool to continually evaluate Risk throughout the project. As the project

progresses risk decreases, because project uncertainty decreases. The Burn-Down Chart is a tool which can show this relationship between Risk and the project timeline.

Landing (a process, not a moment) → the later part of execution

For Agile Projects, progress is measured by what is being delivered and what is working, so the desire is to focus on quality. This means testing first and testing frequently. This also means engaging with owners (Product Owner, Team, Team Facilitator).

During the project life cycle meeting are a necessary touch point. This may include iteration planning meetings, daily meetings, and iteration reviews (which may be called retrospectives). These are all places where Risk should be discussed and Risk response planning should occur.

There are also a number of artefacts in Agile Project which should embrace Risk Management, including the: Product Backlog, Iteration Backlog, Project Burndown Chart, and Release Plan.

Post Flight Assessment (lessons learned) → Capture of Lessons Learn and Closing (retrospective)

Lessons Learned should be captured at the end of the project and they should also be captured throughout the project life cycle. Best practices include regular and iterative capturing of lessons learned.

Another key review is the completion of a team assessment of the team and by the team. This is a valuable part of project team learning and it is also empowering for teams to review their achievements, strengths, and weaknesses. Evaluation of the team's throughput is also important as it will lead to better estimates for future iterations. Estimates are where most of the project uncertainty, therefore Risk, occurs.

Agile Principles and Practices are used to: Manage Change, Improve Communication, Reduce Cost, increase Efficiency, Provide Value to Customers and Stakeholders, and Decrease Project Risk.

Agile Risk Management Implementation

Implementing Agile Risk Management means that Risk identification is done by everyone on the team, not just the project manager. It means being conscious of Risk and being intentional about Risk planning, for each iteration and for the project as a whole. It is important to complete Risk assessment separate from Risk identification and after Risk identification. Risk assessment is also iterative, as the exposure of each Risk changes over time. Remember that Risk exposure is the likelihood or a Risk event occurring (probability) times the consequences should the Risk event occur (impact).

For Risk planning in Agile projects, use iterative planning meetings to manage iteration risks. The team should communicate with the Customer, managing risks at their level, when possible,

and escalating high risks as appropriate. The team works with the Customer to identify concerns and reduce project and iteration Risk.

For each iteration, risks should be evaluated (as they will change over time), much like the weather conditions will change during flight. Risk planning activities should also be done for the next 2-3 iterations.

Other places where Risk Management can be incorporated into Agile projects are in daily stand up meetings. Response planning should emerge out of the barriers to completing work which is denoted during daily team meetings. If additional information is needed about an area of project uncertainty, a quick experiment or investigation (in Agile SCRUM this is called a Spike) can be completed to further assess the Risk and plan for Risk response(s).

At the end of the iteration (throughout the project) Risk Management is incorporated into iteration reviews. The following questions could be asked:

- How were Risk successful handled?
- What risks were not identified?
- What Risk responses, or process could be used in the future?

CONCLUSION

Risk Management is an organized, systematic decision-making process that efficiently *plans, assesses, handles, monitors, and documents* Risk, to increase the likelihood of achieving project goals, and decrease the likelihood that a Risk would become a future problem.

Agile Risk Management is focused on incorporating Risk management into the Agile framework as part of the iterative process to increase the likelihood of achieving product goals and decrease the likelihood that a Risk would become a future problem.

Risk Management is everyone's job! 'That means me!' Yes, Risk Management starts with the Project Manager, as they are the one who embodies risk management into the management of Agile Projects. In closing, remember, "If You Haven't Identified Your Risks, You're Already Taking Them." (author unknown)

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