SCRUMstudy
Targeting success

A Guide to the

SCRUM BODY OF KNOWLEDGE

(SBOK® Guide)

7. RISK

A Comprehensive Guide to Implementing and Scaling Scrum, with Practical Examples

(Includes insights into how Artificial Intelligence can enhance Scrum processes)

7. RISK

7.1 Introduction

The purpose of this chapter is to define risk, discuss the management of risks in a Scrum environment, and consider the tools that facilitate the management of risks. To ensure business viability, reduce the probability of project failure, and make more informed business decisions, it is important that risks are effectively managed through a well-organized and methodical approach.

In a Scrum environment, risks are minimized, due to the work being done in Sprints whereby a continuous series of deliverables is produced in short cycles, deliverables are compared to expectations, and the Product Owner is actively engaged in the project. However, even in the simplest of projects, things can go wrong, so it is important to have a strategy to identify and address risks.

Risk, as defined in *A Guide to the Scrum Body of Knowledge* (*SBOK® Guide*), is applicable to the following:

- Portfolios, programs, and/or projects in *any* industry
- Products, services, or any other results to be delivered to business stakeholders
- Projects of any size or complexity

The term "product" in the *SBOK® Guide* may refer to a product, service, or other deliverable. Scrum can be applied effectively to any project in any industry—from small projects or teams with as few as six team members to large, complex projects with up to several hundred members in several teams.

This chapter is divided into the following sections:

7.1.1 Roles Guide—This section provides guidance on which sections are relevant for each Scrum role: Product Owner, Scrum Master, and Scrum Team.

7.2 What is Risk?—This section defines risk and explains how it can affect the objectives of a project and contribute to the success or failure of a project.

7.3 Risk Management Procedure—This section presents key techniques of risk management and elaborates on developing strategies to identify, assess, and manage risks.

7.4 Minimizing Risks through Scrum—This section explains the key aspects of Scrum that make it an ideal management framework for effectively handling risks at various levels—portfolio, program, and project.

7.5 Summary of Responsibilities—This section describes the responsibilities for each person or role on a project relative to risk management.

7.6 Scrum vs. Traditional Project Management—This section discusses the benefits of managing risk using Scrum methods over the methods used in traditional project management models.

7.1.1 Roles Guide

1. Product Owner—The major responsibilities of handling risks in a project lie with the Product Owner; therefore, the entire chapter is most applicable to this role.

2. Scrum Master—The Scrum Master should be familiar with this entire chapter with primary focus on sections 7.3, 7.4, and 7.7.

3. Scrum Team—The Scrum Team should focus primarily on sections 7.3 and 7.7.

7.2 What is Risk?

Risk is defined as an uncertain event that can affect the objectives of a project and may contribute to its success or failure. Risks with a potential for positive impact on the project are called opportunities, whereas threats are risks that could negatively impact a project. Managing risk must be done proactively, and it is an iterative process that should begin at project inception and continue throughout the life of the project. The process of managing risk should follow some standardized steps to ensure that risks are identified, evaluated, and a proper course of action is determined and acted upon accordingly.

Risks should be identified, assessed, and responded to on the basis of two factors primarily: the probability of an occurrence and the probable impact in the event of the occurrence. Risks with high probability and high impact rating should be addressed before those with a lower rating. In general, once a risk is identified, it is important to understand the basic aspects of the risk with regard to the probable causes, the area of uncertainty, and the potential effects if the risk occurs.

7.2.1 Difference between Risks and Issues

Risks are the uncertainties related to a project that could significantly alter the outcome of the project in a positive or negative way. Since risks are future uncertainties, they have no current impact on the project but could have a potential impact on the future. The following are some examples of risks:

- Even after extensive training, the customer service representatives might not be ready to take orders on the go-live date.
- The painting crew might be delayed due to heavy rain, which could negatively impact the project schedule.

Issues are well-defined certainties that are currently happening on the project—so there is no need to conduct a probability assessment as would be done for a risk. Issues must be dealt with. Some examples of issues include the following:

- Funding is not approved.
- Requirements are unclear.

Risks, if not addressed in time, may become issues. The goal of risk management is to be prepared, with plans in place to deal with any risks that may occur.

7.2.2 Risk Attitude

Business stakeholders include all people or organizations impacted by the project as well as those that have the ability to impact the project. It is important to understand the risk attitude of the business stakeholders. Risk attitude is influenced by the following three factors:

1. Risk appetite: refers to how much uncertainty the stakeholder or organization is willing to take on.
2. Risk tolerance: indicates the degree, amount, or volume of risk business stakeholders will withstand.
3. Risk threshold: refers to the level at which a risk is acceptable to the stakeholder organization. A risk will fall above or below the risk threshold. If it is below, then the stakeholder or organization is more likely to accept the risk.

The risk attitude of the business stakeholders determines how much risk the business stakeholders consider acceptable and hence when they decide to take action to mitigate potential adverse impacts of risks. Therefore, it is important to understand the tolerance levels of the business stakeholders in relation to several factors including cost, quality, scope, and schedule.

Utility Function is a model used for measuring stakeholder risk preference or attitude toward risk. It defines the business stakeholders' level or willingness to accept risk. The three categories of Utility Function are the following:

1. Risk averse: Stakeholder is unwilling to accept a risk no matter what the anticipated benefit or opportunity.
2. Risk neutral: Stakeholder is neither risk averse nor risk seeking and any given decision is not affected by the level of uncertainty of the outcomes. When two scenarios carry the same level of benefit, the risk neutral stakeholder will not be concerned if one scenario is riskier than the other.
3. Risk seeking: Stakeholder is willing to accept risk even if it delivers a marginal increase in return or benefit to the project.

7.3 Risk Management Procedure

Risk Management consists of the following five steps, which should be done iteratively throughout the project:

1. Risk identification: Using various techniques to identify all potential risks.
2. Risk assessment: Evaluating and estimating the identified risks.
3. Risk prioritization: Prioritizing risk to be included in the Prioritized Product Backlog.
4. Risk mitigation: Developing an appropriate strategy to deal with the risk.
5. Risk communication: Communicating the findings from the first four steps to the appropriate business stakeholders and determining their perception regarding the uncertain events.

7.3.1 Risk Identification

The Scrum Team members should attempt to identify all risks that could potentially impact the project. Only by looking at the project from different perspectives, using a variety of techniques, can they do this job thoroughly. Risk Identification is done throughout the project and Identified Risks become inputs to several Scrum processes including *Create Prioritized Product Backlog, Refine Prioritized Product Backlog,* and *Demonstrate and Validate Sprint.* The following techniques are commonly used to identify risks:

1. **Review Lessons Learned from Retrospect Sprint or Retrospect Release Processes**

   Learning from similar projects and earlier Sprints in the same project and exploring the uncertainties that affected those projects and Sprints can be a useful way to identify risks.

2. **Risk Checklists**

   Risk checklists can include key points to be considered when identifying risks, common risks encountered in the Scrum project, or even categories of risks that should be addressed by the team. Checklists are a valuable tool to help ensure comprehensive risk identification.

3. **Risk Prompt Lists**

   Risk prompt lists are used in stimulating thoughts regarding the source from which risks may originate. Risk prompt lists for various industries and project types are available publicly.

4. **Brainstorming**

   Sessions where relevant business stakeholders and members in the Scrum Core Team openly share ideas through discussions and knowledge sharing sessions, which are normally conducted by a facilitator.

5. **Risk Breakdown Structure (RBS)**

   One of the key tools used in identifying risks is a risk breakdown structure. In this structure, risks are grouped based on their categories or commonalities. For example, risks may be categorized as financial, technical, or safety related. This allows the team to better plan for and address each risk.

6. **Interviews**

   Interviews and informal meetings with business or other stakeholders such as senior management, Scrum Team members, technical experts, customers, and end users can help identify project risks.

7.3.2   Risk Assessment

The assessment of risk helps in understanding the potential impact of a risk, how likely it is to occur, and when the risk could materialize. The overall effect on business value should be estimated; if that impact is significant enough to outweigh the business justification, a decision must be made whether to continue the project.

The assessment of risks is done with regard to probability, proximity, and impact. Probability of risks refers to the likelihood of the risks occurring, whereas proximity refers to when the risk might occur. Impact refers to the probable effect of the risks on the project or the organization.

In addition to probability, risk assessment also evaluates the potential net effect of risks on the project or organization. These effects can be estimated using techniques such as Risk Models and Expected Monetary Value.

Risk Assessment Techniques:

1. **Risk Meeting**

    Risks could be easily prioritized by the Product Owner by calling a meeting of the Scrum Core Team and optionally inviting relevant business stakeholders to the meeting. The team could meet and prioritize different risks based on their subjective assessment of the impact of the risks on project objectives.

2. **Probability Trees**

    Potential events are represented in a tree with a branch extended for each outcome of a risk event. The probability of each outcome is indicated on the appropriate branch and then multiplied by its assessed impact to get an expected value for each outcome possibility. The outcome values are then summed together to calculate the overall expected impact of a risk to a project (see Figure 7-1).

    Figure 7-1 explains a sample probability tree used in risk analysis. It presents outcomes and their likelihoods, supporting quantitative decision-making by visually mapping risk paths.
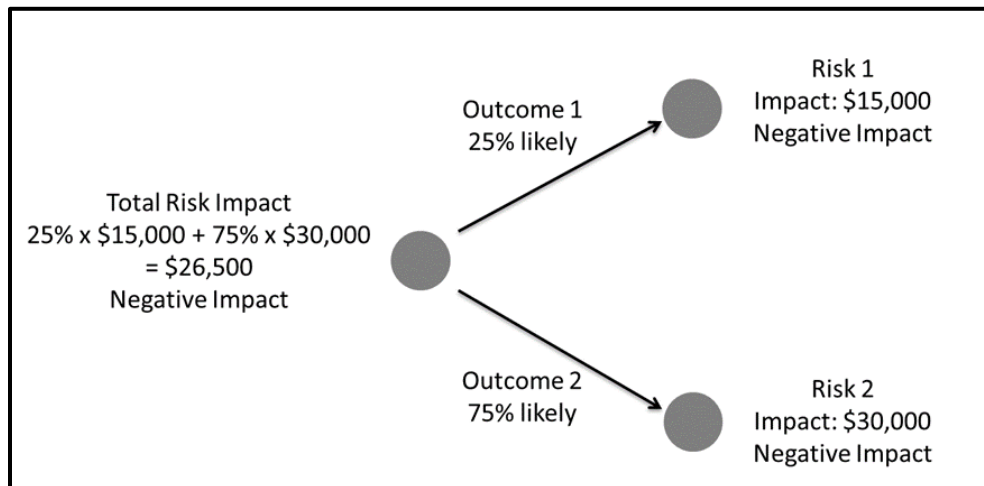

Figure 7-1: Sample Probability Tree

3. Pareto Analysis

This technique of assessing risk involves ranking risks by magnitude which helps the Scrum Team address the risks in the order of their potential impact on the project. For example, in Figure 7-2, Risk 1 has the highest impact and should preferably be addressed first.

Figure 7-2 shows a sample Pareto chart highlighting major contributors to problems. It helps teams prioritize issues based on frequency, aligning with the 80/20 rule in problem-solving.
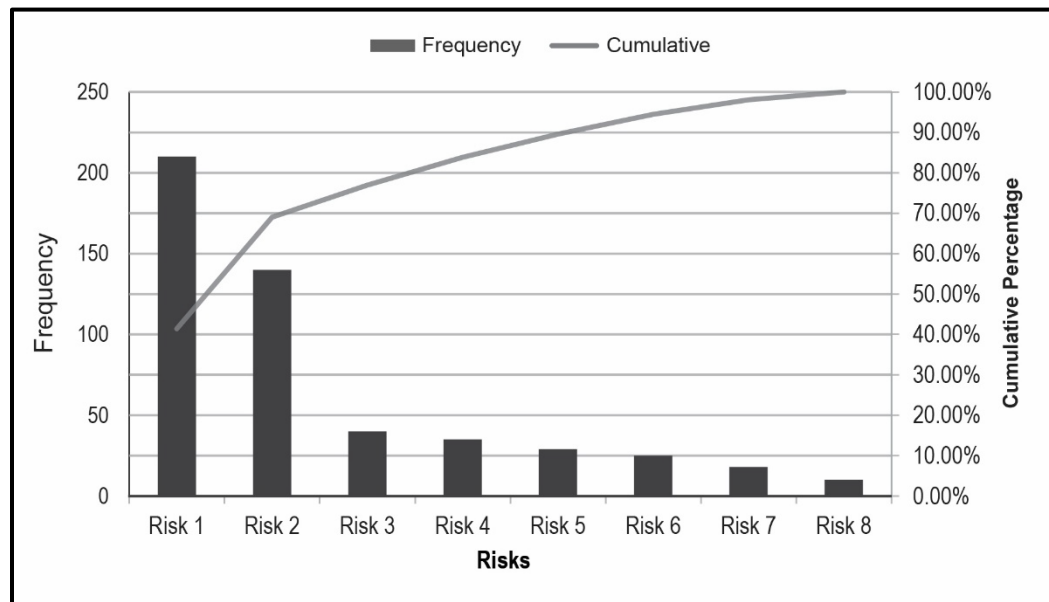

Figure 7-2: Sample Pareto Chart

4. Probability Impact Grid

Each risk is assessed for its probability of occurrence and for its potential impact on project objectives. A numerical rating is assigned to both probability and impact independently. The two values are then multiplied to derive a risk severity score (or PI value), which can be used to prioritize risks.

For example, the risk severity score for a risk with a probability of 50% and an impact rating of .6, where the impact is on a scale of 0 (low) to 1 (very high), would be calculated as follows:

$$0.5 \text{ (Probability) x } 0.6 \text{ (Impact)} = 0.3$$

The rating schemes used are determined within the organization or for the project. Often a decimal scale is used, from zero to one, where a 0.5 probability rating would indicate 50% likelihood. Other options include a scale of one to ten, or High (3), Medium (2), and Low (1).

Figure 7-3 illustrates a sample probability and impact matrix. It classifies risks based on their likelihood and severity, guiding prioritization and appropriate response planning for threats and opportunities.

Probability and Impact Matrix						
		Threats			**Opportunities**	
0.90	0.09	0.27	0.72	0.72	0.27	0.09
0.75	0.075	0.225	0.60	0.60	0.225	0.075
0.50	0.05	0.15	0.40	0.40	0.15	0.05
0.30	0.03	0.09	0.24	0.24	0.09	0.03
0.10	0.01	0.03	0.08	0.08	0.03	0.01
	Low 0.1	Medium 0.3	High 0.8	High 0.8	Medium 0.3	Low 0.1

(Probability — vertical axis label; Impact — horizontal axis label)

Low PI value — Moderate PI value — High PI value

Figure 7-3: Sample Probability and Impact Matrix

The method of assigning probability and impact values to risks varies depending on the project and number of risks being evaluated, as well as existing organizational processes and procedures. However, by applying the simple P x I formula, risk severity can be calculated on a numerical or categorical scale.

5. **Expected Monetary Value (EMV)**

The monetary value of the risk is based on its Expected Monetary Value (EMV). EMV is calculated by multiplying the monetary impact by the risk's probability, as approximated by the customer.

Expected Monetary Value = Risk Impact (in dollars) x Risk Probability (as percentage)

For example, a risk with an estimated negative impact of $1,000 and a 50% probability of occurring would result in an EMV as follows:

EMV = $1,000 x 0.50 = $500

7.3.3 Risk Prioritization

Scrum allows for quick identification and assessment of risks. Identified Risks are taken into account when creating a Prioritized Product Backlog during the *Create Prioritized Product Backlog* process, or when the Prioritized Product Backlog is updated during the *Refine Prioritized Product Backlog* process—so a Prioritized Product Backlog could also be referred to as a Risk Adjusted Prioritized Product Backlog.

The risks could be identified and assessed based on any of the Risk Identification and Risk Assessment techniques mentioned earlier.

In the *Create Prioritized Product Backlog* or *Refine Prioritized Product Backlog* processes, the prioritized User Stories from the existing Prioritized Product Backlog and the prioritized list of risks are then combined to create an updated Prioritized Product Backlog which includes the Identified Risks:

Steps for updating a Prioritized Product Backlog with Identified Risks:

1. Create a list of prioritized risks. (e.g., the risks can be prioritized by value using Expected Monetary Value technique).

2. Select those Identified Risks that can be mitigated; and for which the team decides to take specific risk action during the Sprint to mitigate such risks.

3. Add the Identified Risks that can be mitigated in step 2 to the Prioritized Product Backlog (as User Stories) and then prioritize them to arrive at the Rick Adjusted Prioritized Product Backlog.

Figure 7-4 depicts the process for risk prioritization. It outlines steps for evaluating and ranking project risks to focus efforts on the most impactful threats and opportunities.
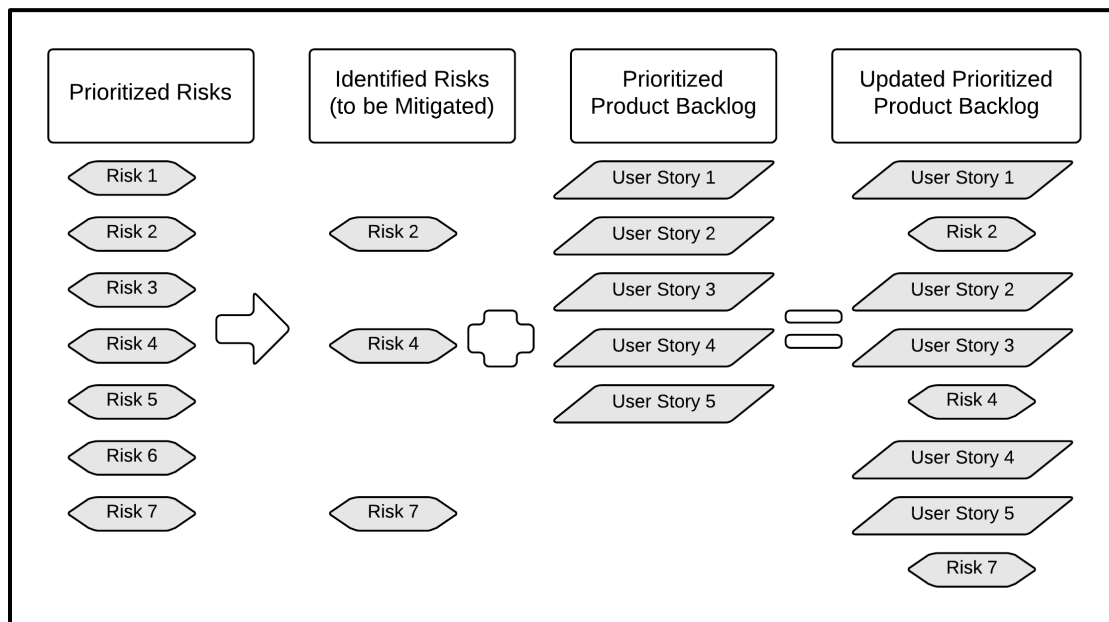
Figure 7-4: Process for Risk Prioritization

7.3.4 Risk Mitigation

The response to each risk will depend on the probability and impact of the risk. However, the iterative nature of Scrum with its rapid turnaround time and feedback cycles allows for early detection of failures; therefore, practically speaking, it has a natural mitigation feature built in.

Risk can be mitigated by implementing a number of responses. In most situations, responses are proactive or reactive. In the case of a risk, a plan B may be formulated, which can be used as a fall-back in case the risk materializes—such as plan B is a reactive response.

Sometimes risks are accepted and are an example of a risk response which is neither proactive nor reactive. Risks are accepted because of several reasons, as in a situation where the probability or impact of the risk is too low for a response.

Acceptance can also be the case in a situation where the apprehension of secondary risks may deter the product owner from taking any action. The effort made by the Product Owner to reduce the probability or impact—or both—of the risk is an example of a proactive response to mitigating risks.

Once Identified Risks are included as part of the Prioritized Product Backlog (see Figure 7-4), several risks get mitigated during the *Create Deliverables* process when the Tasks related to User Stories defined in the Prioritized Product Backlog process get completed.

In Scrum, the ownership of risk is clearly on the Product Owner for managing risks related to business aspects and on the Scrum Team for implementing risk responses during the course of a Sprint. The Scrum Guidance Body can be approached for advice on the way risk responses are implemented and whether the actions align with the guidelines of the organization as a whole. The Scrum Master keeps a close eye on the potential risks that could affect the project and keeps the Product Owner and Scrum Team informed.

Risk-based Spikes

A concept that can be useful in identifying risks is that of a risk-based spike. A spike is an experiment that involves research or prototyping to better understand potential risks. In a spike, an intense two to three-day exercise is conducted (preferably at the beginning of a project before the *Develop Epic(s)* or *Create Prioritized Product Backlog* processes) to help the team determine the uncertainties that could affect the project. Risk-based spikes are useful when the Scrum Team is working with and getting accustomed to modern technologies or tools, or when User Stories are lengthy. They also help in more accurately estimating time and effort.

Risk-based spikes can also be ongoing throughout the duration of the project and can be incorporated during any Sprint. Such spikes need to be added to the Prioritized Product Backlog. Risk-based spikes exploration are used to mitigate any future potential threats.

7.3.5   Risk Communication

Because business stakeholders have an interest in the project, it is important to communicate with them regarding risks. Information provided to business stakeholders related to risk should include potential impact and the plans for responding to each risk. This communication is ongoing and should occur in parallel with the four sequential steps discussed thus far—risk identification, assessment, prioritization, and mitigation. The Scrum Team may also discuss specific risks related to their Tasks with the Scrum Master during Daily Standup Meetings. The Product Owner is responsible for the prioritization of risks and for communicating the prioritized list to the Scrum Team.

A valuable tool which can be used for communicating information related to risks is the Risk Burndown Chart.

Risk Burndown Chart: Risk management is integral to ensuring value creation; therefore, risk management activities are performed throughout the project lifecycle and not just during project initiation. Each risk could be assessed using different Risk Assessment tools. However, the preferred tool for assessing risks to create a Risk Burndown Chart is Expected Monetary Value (EMV) as described in section 7.4.2.5.

The information gathered during risk assessment may be used to create a Risk Burndown Chart. This depicts cumulative project risk severity over time. The likelihoods of the various Risks are plotted on top of each other to show cumulative risk on the *y*-axis. The initial identification and evaluation of risks on the project and the creation of the Risk Burndown Chart are done initially. Then, at predetermined time intervals, new risks may be identified and assessed, and remaining risks should be re-evaluated and updated accordingly on the chart. An appropriate time to do this is during the Sprint Planning Meeting. Tracking risks in this manner allows the team to recognize trends in risk exposure and take appropriate action, as necessary.

Figure 7-5 shows a sample risk burndown chart that visualizes how identified risks decrease over time. It helps track the progress of risk mitigation efforts throughout a project.
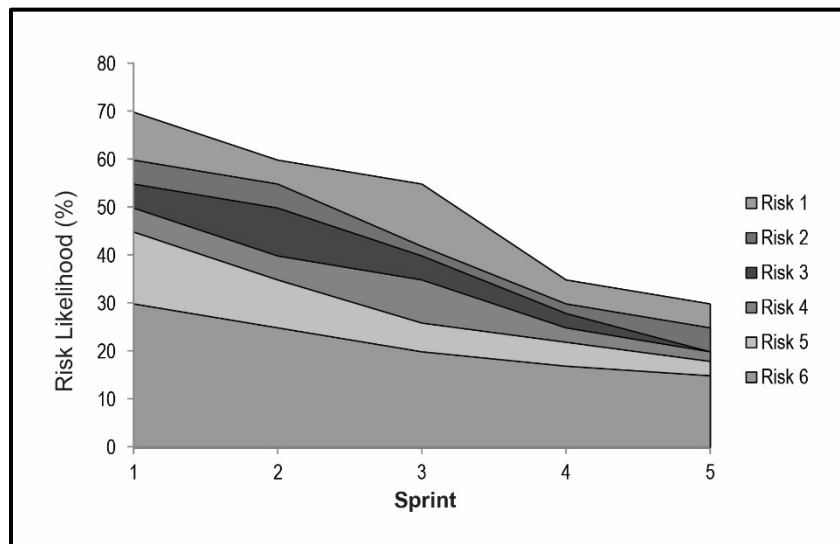

Figure 7-5: Sample Risk Burndown Chart

7.4 Minimizing Risks through Scrum

Being an Agile, iterative process, the Scrum framework inherently minimizes risk. The following Scrum practices facilitate the effective management of risk:

1. **Flexibility reduces business-environment-related risk**
   Risk is minimized in Scrum due to the flexibility in adding or modifying requirements at any time in the project lifecycle. This enables the organization to respond to threats or opportunities from the business environment and unforeseen requirements whenever they arise, with low cost of managing such risks.

2. **Regular feedback reduces expectations-related risk**
   Being iterative, the Scrum framework gives many opportunities to obtain feedback and set expectations throughout the project lifecycle. This ensures that the project business stakeholders, as well as the team, are not caught off guard by miscommunicated requirements.

3. **Team ownership reduces estimation risk**
   The Scrum Team estimates and takes ownership of the Sprint Backlog Items, which leads to more accurate estimation and timely delivery of product increments

4. **Transparency reduces non-detection risk**
   The Scrum principle of transparency around which the framework is built ensures that risks are detected and communicated early, leading to better risk handling and mitigation. Moreover, when conducting Scrum of Scrums Meetings, Impediments that one team is currently facing may be deemed a risk for other Scrum Teams in the future. This should be recognized in the Updated Impediment Log.

5. **Iterative delivery reduces investment risk**
   Continuous delivery of value throughout the Scrum project lifecycle, as potentially shippable deliverables are created after every Sprint, reduces investment risk for the customer.

7.5 Risks in Portfolios and Programs

While few risks are specifically related to individual projects, others may originate in programs or portfolios and will be managed at the respective level. However, risks related to a portfolio or program will also impact projects that are part of the respective portfolio or program. During risk assessment in portfolios and programs, if it is determined that a risk may affect an individual project, relevant information about the risk must be communicated to the Product Owner and Scrum Team.

Depending on the severity or priority, when the program or portfolio team communicates a risk that will impact an individual project, the Scrum Team may have to stop and re-plan the current Sprint to address the risk. For less urgent risks, the team can continue the current Sprint and address the risk in a subsequent Sprint.

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7.5.1 In Portfolios

1. When risks in Portfolio are identified, the Portfolio Product Owner will need to capture them and assess the proximity, probability, and impact of each identified risk in order to prioritize it and determine the appropriate response for the portfolio.

2. The Portfolio Product Owner will also need to communicate the risks to the relevant business stakeholders, the program teams, and the project teams. In some cases, the portfolio team may have to assume the ownership of specific risks.

7.5.2 In Programs

1. When program risks are identified, the Program Product Owner should enter them in the program Risk Adjusted Prioritized Product Backlog, assess the proximity, probability, and impact of each identified risk in order to prioritize it and determine the appropriate responses for programs.

2. The Program Product Owner will also need to communicate the risks to relevant business stakeholders and the project teams. In some cases, the program team would have to assume ownership of specific risks.

Figure 7-6 explains the approach to handling risks in portfolios and programs. It integrates governance structures and escalation mechanisms for risk tracking at higher organizational levels.
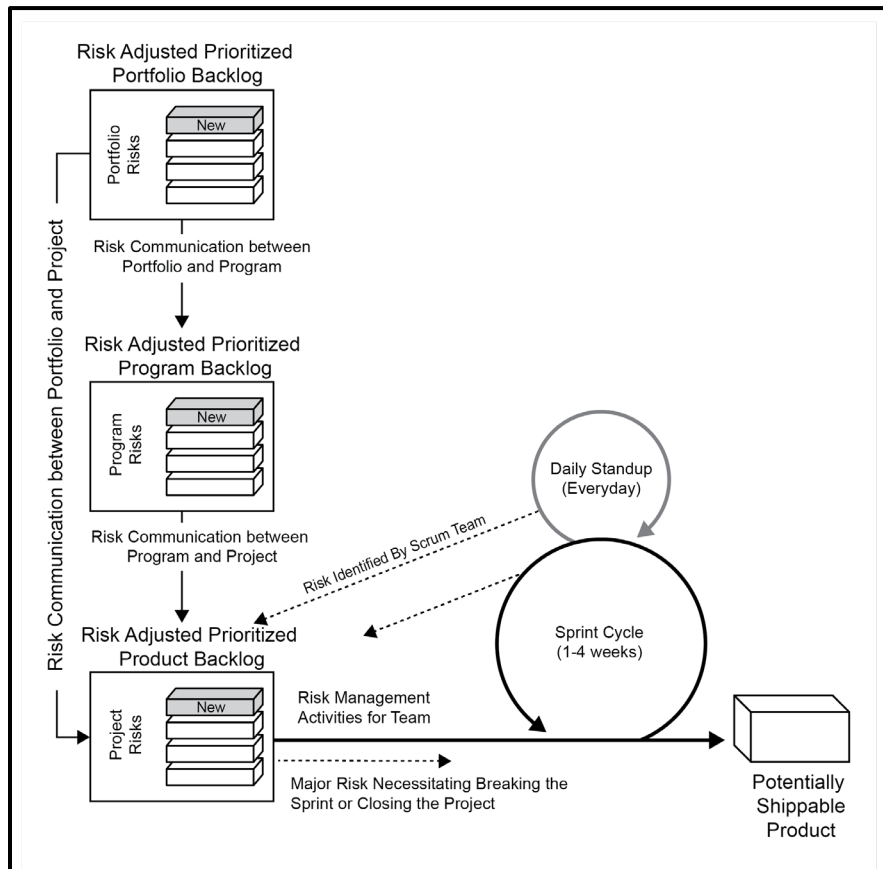

Figure 7-6: Handling Risks in Portfolios and Programs

7.6 Summary of Responsibilities

In Scrum, the risk management activities are divided among various roles with some responsibility resting with everyone in the Scrum Team and the Scrum Master facilitating the process.

Role	Responsibilities
Scrum Team	• Identifies risks during development of the product during the *Create Deliverables* process • Implements risk management activities as advised by the Product Owner
Product Owner/ Chief Product Owner	• Captures and assesses risks for project • Prioritizes and communicates risks to relevant business stakeholders, program, and portfolio teams • Ensures project risk levels are within acceptable limits
Scrum Master/ Chief Scrum Master	• Facilitates identification and escalation of risks by the Scrum Team
Program Product Owner	• Captures and assesses risks for programs • Prioritizes and communicates risks to relevant business stakeholders and project teams
Program Scrum Master	• Facilitates identification, assessment, and escalation of risks for programs
Portfolio Product Owner	• Captures and assesses risks for portfolios • Prioritizes and communicates risks to relevant business stakeholders, program, and project teams
Portfolio Scrum Master	• Facilitates identification, assessment, and communication of risks portfolios
Business Stakeholder(s)	• Interfaces with the Scrum Core Team to provide them inputs on management of risks that affect the achievement of expected outcomes and benefits from the project
Scrum Guidance Body	• Provides overall guidance for the risk management procedure to be followed throughout the project

Table 7-1: Summary of Responsibilities Relevant to Risk

7.7　Scrum vs. Traditional Project Management

Scrum and most of the traditional project management methods define risk as 'uncertain event(s) that could positively or negatively affect the achievement of project objectives.' Also, risks are identified, assessed, planned for, and communicated continually.

In Traditional project management models, there is an emphasis on detailed upfront planning to identify, assess, and determine risk responses for all project risks. During project execution, any project team member can identify risks and the project manager, or the project management office or project support staff can update them in the Risk Log or Risk Register. The project manager regularly monitors and controls all risks and usually identifies specific individuals in the team to take responsibility for various aspects of risks.

In Scrum, any Scrum Team member can identify risks, and the Product Owner can update the identified risks in the Risk Adjusted Prioritized Product Backlog. The Scrum principles of Empirical Process Control and Iterative Development enable the Scrum Team to constantly keep identifying risks and adding them to the Prioritized Product Backlog, where such risks are prioritized with other existing User Stories, to be mitigated in subsequent Sprints. The Scrum Team has collective responsibilities for managing all risks for the Sprint.

The Essential Guide to Successfully Deliver Projects using Scrum

A Guide to the Scrum Body of Knowledge (SBOK® Guide) provides comprehensive guidelines for the successful implementation of Scrum—the most popular Agile product development and project delivery approach. Defined in the SBOK® Guide as a flexible framework, Scrum can be applied to portfolios, programs, or projects of any size or complexity across industries to deliver products, services, or other results.

This Fifth Edition is based on the collective knowledge gained from thousands of projects across diverse organizations and industries. It reflects contributions from a large number of experts in Scrum and project delivery. Feedback from the global Scrum community played a vital role in shaping improvements and additions, making the SBOK® Guide a truly collaborative effort.

Unlike other Scrum references, the SBOK® Guide is available for free on Scrumstudy.com, along with free certifications, webinars, videos, and study guides. It is ideal for professionals seeking a foundational understanding of Business Analysis or exploring careers in related fields. The Guide addresses real-life challenges faced by Scrum practitioners and explains how to solve them using modern tools and Artificial Intelligence (AI).

Designed to be accessible and engaging, the SBOK® Guide follows the 80-20 rule—80% of key concepts can be learned by reading just 20% of the content, with the remainder available for deeper reference. It is more readable than most Scrum books, which are often either too simplistic or overly detailed.

The SBOK® Guide serves as a reference for both experienced practitioners and those with no prior knowledge of Scrum or project delivery methods. Organized for easy navigation, the SBOK® Guide aims to inform, support, and inspire all readers through its rich, collaborative content.

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