

An overview of risk identification barriers with implementation of PMI standards in construction projects

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Abstract

Construction industry is full of uncertainty, this cause money losses and schedule slippage, that is why risk management is essential to deliver a successful project, even though some organizations implement risk management processes, but they are not able to deal effectively with risks, one of the reasons is because some risks not identified, risk identification is a difficult and complicated process, here the author reviews risk identification process purposes, inputs, weaknesses of tools and techniques, and some common barriers blocking successful identification of project risks. This article is an overview for organizations and practitioners to help them get over those barriers to successfully identify project risks.

Keywords: Risk management, Risk identification, Construction

1. Introduction

In construction field uncertainty is everywhere, especially nowadays when political and financial crisis is affecting the construction industry. Project management aims to apply skills and tools to successfully deliver the project and satisfy stakeholders, risk management deals with both negative and positive risks. Addressing risk is an important task, as the success of risk management depends heavily on early risk identification, risk management is not a choice it is the main step in the way to deliver a successful project. not taking risk is a business loss, to win you should play risk management effectively and promote an effective way to deal with risks, eliminating all threats or exploiting all opportunities is not an effective way as may cause great disastrous consequences on project objectives, when an organization understand the nature of risks and manage them effectively, it can avoid unforeseen risks and work with a tight budget, schedule, and few contingency limits.

What is a risk? Even this is a simple question it has more than an answer, here the author reviewed common definitions of risk. As per PMI, risk is “an uncertain event or condition that, if it occurs, has a positive or negative effect on one or more project objectives such as scope, schedule, cost, and quality”, Risk causes are defined in an iterative and cohesive manner as risk can have more than a cause, Risk is either positive known as opportunities or negative known as threat, many people think only negative risks only should be addressed and managed, by this behavior they are missing opportunities and business. ⁽¹⁾

As per W.D. Rowe, risk is an uncertain future event that if occurred positively or negatively affect the project, Risk is a way to look into the future to minimize negative effects and maximize positive impacts. Also defined as the probability for unwanted positive or negative impacts of an event ⁽²⁾. Also referred to expected hazardous situation or chances. Risk is the probability that a set of unknown events will cause some harm or gain over some time frame as defined by Jardine C.G. ⁽³⁾.

The goal of project risk management is to identify risks and separate them from issues earlier as soon as possible to give risk manager the chance to prioritize them and suggest actions to deal with those risks. Risks may or may not happen and are described based on the probability of occurrence and impact on project objectives.

Risk management is essential to success of projects, aims to minimize losses and enhance gains, dealing with politics, business, labors, economic crisis makes the construction industry with a high-risk levels, also long periods projects may reach years, schedule slippage and cost overruns attracted attention from clients, contractors and project managers, they started to think how to avoid these uncertain events, identify, evaluate and find plans to deal with them, this is the main goal of risk management.

Risk Management defined as a group of processes concerned with risk management planning, identification, analysis, planning responses and monitoring and controlling risks on a project ⁽¹⁾

Risk management is the most difficult portion of project management. Risk manager must identify the risk and their root causes and monitor these causes through the project. Furthermore, risk management mainly aims to achieve the project objectives ⁽⁶⁾ and he should start risk management as early as possible at project start, this will increase project success chances and achieving demands.

According to PMI ⁽¹⁾, Project Risk Management processes include:

- Risk management planning;
- Risk identification;
- Risk qualitative analysis;
- Risk quantitative analysis;
- Risk response planning;
- Risk monitoring and control.

Benefits of implementing risk management in construction projects:

- Help in determining achievable and realistic cost and time deadlines.
- Saves the project cost from undergoing unforeseen expenditure benefits
- Increase understanding of the project, which leads to more realistic plans in terms of cost estimates and construction periods.
- It gives increased understanding of the risk in a project and their possible impact, which minimize risk for a party in handling the problem
- Decisions are supported through analysis
- Prompt management, efficient and effective management

- It minimizes the liability of exposure
- Understanding the limitations of work measurement
- Understanding the variations in technical skill in how those variations can impact estimates

2. Risk Identification

Determining the upcoming uncertain events that may or may not exist, if happen they would affect the project objectives positively or negatively, this identification determines their characteristics, expected timing, duration, possible effects, potential response plans. These response plans should be documented and further detailed and refined in risk response plan process but may be used if those risks raised.

Risk identification aims to identify maximum amount of unknown events that may cause possible impacts to project objectives. however, it is impossible to determine all uncertain events at the start of the project. The level of risk exposure increase over project time and project manager gain more understanding of the risks, knowing that some risks are emergent and require an immediate deal with them, that is why risk identification is an iterative process and repeated through the project.

Below the author reviews tools and technique recommended by PMI as a standard and best practice for risk identification process.

3. Risk identification inputs

Below the author will review input documents as they should be examined and analyzed in order to obtain as many risks as possible for the project: ⁽¹⁾

Risk Management Plan

Provide a basis for risk identification process, roles and responsibilities, budget and schedule for activities, and categories of risk.

Cost Management Plan

Provides processes and estimation basis where risks can hide.

Schedule Management Plan

Provides schedule estimation basis which may hide risks.

Quality Management Plan

Provides a baseline for quality measures and metrics.

Human Resource Management Plan

Provides a standard for defining, staffing, managing, and releasing project human resources, also provides roles and responsibilities and the required training.

Scope Baseline

Project Assumptions and constraints are found in the Scope Statement. project assumptions may or may not be true, so it contains risk and must be checked. WBS indicates the level of project understanding by the team so it contains probable risks.

Activity Cost Estimates

Provide a range of estimated costs to complete scheduled activities, this range indicates the level of risk.

Activity Duration Estimates

Provide useful information to risks related to activity time estimates, the estimate range width indicates the relative risk tolerance and thresholds.

Stakeholder Register

Risk manager has to involve all necessary stakeholders, sponsor, and customer in Identifying Risks process.

Project Documents

Any related document to the project can provide valuable information in identifying risks.

Procurement Documents

Procurements documents is a key input to the Identify Risks process. Also, can provide risks inside contracts and relationships with vendors.

Enterprise Environmental Factors

Any academic studies, commercial databases, published papers and industry standard help to identify risks.

Organizational Process Assets

Historical data, Organizational process, Risk statement formats or templates and Lessons learned can help while risk identification process.

4. Tools and techniques weaknesses and barriers

Here the author will discuss the weakness and barriers in tools and techniques which lead to inefficiently risk identification.⁽⁸⁾

1- Assumptions and Constraints Analysis

List the assumptions and constraints, analyze and test them if they were false or not and if they were false what will be the impact

Weakness: hidden assumptions or constraints may be missed.

2- Documentation Reviews

All project documentation should be reviewed for hidden risks inside, project documents such as (project charter, statement of work, contract terms and conditions, subcontracts, technical specifications, regulatory requirements, legal stipulations etc.)

Weakness: Only risks inside projects can be identified.

3- Checklists

Use previous project experience for similar projects.

Weakness: - Most of the time includes only threat and misses opportunities.
- Risks not in the list will be forgotten.
- Checklists can grow and contain not risks if not issued by experts.

4- Information Gathering Techniques

4.1. Brainstorming

Used in facilitation workshops to identify risks, a facilitator leads a group of experts or stakeholders, identified risks must be reviewed and evaluated to remove non-risks

Weakness: - Managing stakeholders can be difficult and waste the time.
- Attention should be paid to bias results mostly by high management.
- Requires filtering of risks.

4.2. Delphi Technique

Using a facilitated anonymous polling between experts to identify risks in their area of expertise. The facilitator collects the experts' responses and circulates them many times till consensus.

Weakness: - Limited to technical risks only.
- Mainly depend on the actual expertize of experts.
- As iterative process may take longer time than planned.

4.3. Interviews

Involving main stakeholders in risk identification is very useful and help to cover many hidden areas of the project and get their buy in. managed by an independently skilled interviewer using a structured agenda, in an atmosphere of confidentiality, honesty, and mutual trust.

Weakness: - Time consuming if not committed to agenda.
- Produces thoughts and non-risks and need to be filtered.

4.4. Root-Cause Analysis

A root-cause analysis seeks to identify basic causes of risks that may be visible symptoms - indication- of more fundamental forces.

Weakness: - Can be over simplifying and hide other causes.

5- SWOT Analysis

Analyzing threats that overcome organization weakness and opportunities that arise from organization strength.

Weakness: - Produces high-level risks.
 - Focus on organization internally generated risks.

6- WBS Review

The work breakdown structure can form a framework for other risk identification techniques, such as brainstorming, risk interviews, checklists or prompt lists.

Weakness: - Excludes risks not related to WBS.

7- Questionnaire

A Risk Identification questionnaire can be shown in question format with multiple choices or asking questions with no answer to be filled and be analyzed later.

Weakness: - Depends heavily on the quality of the questions.
 - Only limited to mentioned risks in the questionnaire.
 - Simply can be considered as a checklist.

8- Risk Breakdown Structure (RBS)

The Risk Breakdown Structure can provide hierarchy representation of sources of risks.

9- Prompt Lists

A prompt list is a set of high-level risk categories which can be used to guide risk identification.

Weakness: - Risk categories are too high level.

PESTLE	TECOP	SPECTRUM
<ul style="list-style-type: none"> •Political •Economic •Social •Technological •Legal •Environmental 	<ul style="list-style-type: none"> •Technical •Environmental •Commercial •Operational •Political 	<ul style="list-style-type: none"> • Socio-cultural • Political • Economic • Competitive • Technology • Regulatory/legal • Uncertainty/risk • Market

10- Nominal Group Technique

It is a type brainstorming where participants share and discuss all issues before evaluation.

Weakness: - As the process is moving slowly, so members can feel frustrated.

11- Diagramming Techniques

11.1. Cause and Effect (Ishikawa) Diagrams

As risk leads to an effect on project objectives, this effect can be analyzed into causes and divided to sub causes to make the risk easy to understand and find an effective way to deal with causes.

Weakness: - Diagram can be over complex.

11.2. System Dynamics (process flowchart)

It is a particular application of Influence Diagrams and can be used to identify risks within a project situation. A model to be built, analyses of changes in the model can indicate the system's sensitivity to specific events, some of which may be risks

Weakness: - Requires specialist software and experts to build the model.
- It is difficult to consider probability.

11.3. Influence diagrams

It is a graphical and mathematical representation of a project situation, showing the (influences) between them.

Weakness: - Requires discipline thinking.
- Not always easy to determine the appropriate structure.

12- Failure Modes and Effects Analysis (FMEA) or Fault Tree Analysis

To determine and review system components that may cause failure, their causes, and effects.

Weakness: - Focus on threats, not useful for opportunities.
- Requires expert tools.

13- Force Field Analysis

Force Field Analysis is used by identifying forces driving change and forces against change which currently affect achievement of project objectives.

Weakness: - Time consuming and complex technique.
- Applied for one objective, not useful for the project as a whole.

4. Common Risk identification barriers

In addition to above barriers in tools and techniques identified by PMI, through literature review of some sources, the author defined some common barriers among practitioners as below: ^{(9),(10)}

1- Human Barriers

1- Imagination

Stakeholders have to think forward in time, those who cannot imagine future events cannot identify risks.

2- Short-Term Focus

Some people focus on short-term risks, people who focus on the short-term can be blind to catastrophic risks may happen later in the project.

3- Silos

Some departments within the organization do not want to share knowledge with other departments or individuals within the same organization, this leads to not identifying some proper risks.

4- Lack of Knowledge

Stakeholders experience and knowledge level is an important factor to successfully identified risks, as this activity heavily depends on predicting the future, Lack of knowledge is a limit to a successful risk identification, Project managers should choose the right persons with the right level of experience.

5- Bias

Risk identification is subjected to two types of bias: motivational and cognitive, motivational when someone (especially management) is trying to push for their point of view for personal purposes, but cognitive when someone based on his experience pushing for his point of view.

6- Risk management culture between stakeholders

Suddenly you discover that someone is asking you: why we have to identify risks? You as a project manager will be shocked, you have to expect this.

7- Idea of being a fire fighter

In some organizations you will get bonus when you solve many issues and fight them, not if you protect them from happening, this will cause project managers even if they identify risks to hide them to get the bonus, this is not ethical and not good for project success, Project managers should fight this behavior and act in the right way.

8- Risk Attitude

There is a great influence of stakeholders' risk attitude (averse, tolerant and seeker) and its effect on risk identification. Risk-averse stakeholders will try to uncover more risks and explore the details as they are discomfort with the project and always trying to find weak points, on the other hand, Risk-seeker stakeholders will identify fewer risks as they are supporting the project and its

objectives. But risk tolerant stakeholders are sometimes neutral to the project and will think in a positive manner, they will identify risks and try to deal with them logically.

9- Risks vs Issues

Stakeholders should know the difference between risk and issue, Risk is an unknown event may or may not happen in future, while the issue is an existing problem or knowing to happen in future. Any risk with probability more than 90% is an issue and this percentage or any other one must be clarified in the risk management plan.

10- Team Issues

Teams consist of members from different backgrounds and the cultural differences lead to communication problems and argue, conflicts with team members about priorities and failure to get team members share their knowledge within the team are all barriers to risk identification process.

2- Project Management Barriers

11- Identification Quality

The required accuracy, precision, applicability and reliability level of identified risks as stated in the Risk management plan.

12- Inadequate Planning

Well prepared risk management and project management plans will provide the framework for the risk identification, also scheduling identification activities in the suitable time helps the team to bring more risks, the time allowed must be enough and sufficient to allow relevant stakeholders to identify as many risks as they can. Thus, project manager while planning identification events should estimate the required level of effort to effectively identify risks, also calculate an appropriate budget for the activities, so stakeholders will not forget some risks or try to rush the identification to stay in budget and time constraints.

13- Improper stakeholders' identification

As stakeholders are the main persons who will participate in identification including team, client, customer, etc..., it is very important to define them, absence of one stakeholder may cause future troubles and losses to project, Project manager has to make sure all stakeholders defined and their roles and responsibilities are clear and understood.

14- Level of Detail

Achieving the appropriate level of detail is a challenge, Project manager has to follow the required level of details—not too much and not too little— as stated in the risk management plan to get a reliable and manageable information

15- Incomplete scope

Incomplete scope is a barrier to risk identification as it leads to misunderstanding the project among stakeholders, also leads to missing requirements which may arise later in the project and then badly affect the project objectives.

16- Too Many Assumptions

The number of assumptions while risk identification greatly affects the project and may cause bias to the results, assumptions may be false and testing them depends on the level of information available, any assumption must be documented and tested continuously as more information will be discovered in the project lifecycle.

17- Depending on a single tool and technique while identification

As explained before, each tool and technique have weakness and attention should be paid to these weaknesses as this can affect the reliability and level of identified information, and stakeholders' ability to identify risks.

18- Poor Communication

Poor communication leads to misunderstanding, especially when performing an interview and the interviewer is not able to understand what others are trying to explain.

3- Higher Management and Organization Barriers

19- Lack of Management Support

Lack of management support is one of the most critical barriers, as management role is very important to support, provide clarifications if needed, cooperate with the team, provide standard among running projects and lessons learned. The project manager has to gain management buy-in and cooperation as early as possible and establish roles and responsibilities for them.

20- Afraid of management

Many senior managers do not want to hear bad news about projects especially in the project start, that causes project manager to hide risks or avoid this activity which leads to un predictable consequences.

21- Improper Risk Systems and Processes

Improper risk management systems can cause teams members to be flawed and dispersed or the lack of understanding of risk management systems can cause the same results.

22- Risk management practices among organization projects

When an organization has a long history of risk management practices and knowledge, it will be easy for relevant stakeholders to identify risks, on the other hand, if an organization does not have any experience in risk management, then stakeholders will face difficulty to understand and discover risks.

5. Conclusion

Risk identification process is being blocked by many barriers, above the author reviewed some of them and divided into three main groups: Human Barriers, Project Management Barriers, Higher Management and Organization Barriers, it is recommended for future work to analyze deeply those barriers and find a way to overcome them to help guide organizations and practitioners successfully identify risks in their projects.

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