



RISK MANAGEMENT



LEARNING OUTCOMES

After going through the chapter student shall be able to understand

- Concept of Risk Management
- Objective and Process of Risk Management
- Importance of Risk Management
- Risk Management Techniques



1. CONCEPT OF RISK MANAGEMENT

The term “Risk” as a noun means a situation involving exposure or danger and as a verb means expose to danger, harm or loss. It is said that the word Risk is derived from the early Italian word “risco” which means danger or “risicare,” which means “to dare” or French word “risqué”. Risk is known or unknown but is always inherent in individual or business actions therefore it is more of a “choice” rather than a fate accompli.

Risk and reward are two sides of the same coin. Good Risk leaders select their actions well or take calculated risks. They evaluate risks carefully and take actions with full cognizance of consequences. They integrate decisions with corporate strategy, and strike a healthy balance between risk management as an opportunity and a protection shield.

According to "Risk Management: History, Definition, and Critique," the modern terms for managing risk rose after World War II, but the discipline mostly began as a study of using insurance to manage risk. Later, from the 1950s to the 1970s, risk managers began to realize that it was too expensive to manage every risk with insurance, so the discipline began to expand to alternatives to insurance. For example, training and safety programs might be considered insurance

alternatives. Regulators started recognising the relevance and significance of the subject of risk management and started prescribing advisories from 1980s; however, the awakening and intensity of detailed regulatory interventions came about greatly post the global financial crisis in the year 2007.

Each strategy and business action is accompanied with its expected risk and reward. Good risk management therefore does not imply avoiding all actions and associated, rather it implies making informed and coherent choices. The risks that the organization wants to take in pursuit of its objectives and in particular choices it makes to manage and mitigate those risks.

Let us study few important views on the subject of Risk and Risk Management:-

Source	Views
Warren Buffet	Risk comes from not knowing what you are doing
Theodore Roosevelt.	Risk management is about people and processes and not about models and technology
The Risk Management Standard, The Institute of Risk Management	<p>Risk management is a central part of any organisation's strategic management. It is the process whereby organizations methodically address the risks attaching to their activities with the goal of achieving sustained benefit within each activity and across the portfolio of all activities.</p> <p>Risk management should be a continuous and developing process which runs throughout the organisation's strategy and the implementation of that strategy. It should address methodically all the risks surrounding the organisation's activities past, present and in particular, future. It must be integrated into the culture of the organization with an effective policy and a programme led by the most senior management. It must translate the strategy into tactical and operational objectives, assigning responsibility throughout the organization with each manager and employee responsible for the management of risk as part of their job description. It supports accountability, performance measurement and reward, thus promoting operational efficiency at all levels.</p>
Thomas S. Coleman, Practical Guide Risk Management, CFA Institute	<p>Risk management is the art of using lessons from the past to mitigate misfortune and exploit future opportunities—in other words, the art of avoiding the stupid mistakes of yesterday while recognizing that nature can always create new ways for things to go wrong.</p> <p>We cannot lose sight of the most important aspect of risk management—managing risk. That means making the tactical and strategic decisions to control those risks that should be controlled and to exploit those opportunities that should be exploited. Managing risk cannot be divorced from managing profits; modern portfolio theory tells us that investment decisions are the result of trading off return for risk, and managing risk is simply part of managing returns and profits. Managing risk must be a core competence for any financial firm. The ability to effectively manage</p>

	<p>risk is the single most important characteristic separating financial firms that are successful and survive over the long run from firms that are not successful. At successful firms, managing risk always has been and continues to be the responsibility of line managers—from the board through the CEO and down to individual trading units or portfolio managers. Managers have always known that this is their role, and good managers take their responsibilities seriously. The only thing that has changed in the past 10–20 years is the development of more sophisticated analytical tools to measure and quantify risk. One result has been that the technical skills and knowledge required of line managers have gone up.</p>
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1.1 Risk Attitude, Appetite, and Tolerance

The terms risk attitude, appetite, and tolerance are often used similarly to describe an organization's or individual's attitude towards risk-taking. One's attitude may be described as risk-averse, risk-neutral, or risk-seeking. Risk tolerance in the context of investing is defined by Investopedia “as the degree of variability in investment returns that an investor is willing to withstand. Risk tolerance is an important component in investing. You should have a realistic understanding of your ability and willingness to stomach large swings in the value of your investments; if you take on too much risk, you might panic and sell at the wrong time”. Therefore, the subject of Risk Tolerance deals with understanding one's ability to accept or reject deviations from the expected results.

Risk appetite is the risk taking capacity and looks at how much risk one is willing to take. There can still be deviations that are within a risk appetite. For example, recent research finds that insured individuals are significantly likely to divest from risky asset holdings in response to a decline in health, controlling for variables such as income, age, and out-of-pocket medical expenses.

1.2 Determining Risk “Appetite”

The board of directors has the primary oversight responsibility for developing and implementing the organization's mission, values, strategy, and must carefully review corporate processes of risk identification, monitoring, and management. The board also originates risk philosophy, risk appetite, and risk tolerances. Specific reviews of financial objectives, plans, major capital expenditures, and other significant material transactions also typically fall within a board's responsibility. These responsibilities require broad and transparent reporting on the various organizational risks—strategic, operational, reporting, and compliance risks.

When the Board sets the organisation's vision, strategy, goals and targets into motion it is aware of the potential business risks the organisation is exposed to and thereby can broadly estimate the extent of potential losses that the business shall be exposed to in the event the plans and management actions don't bear the desired fruits. Risk capacity is the overall ability and financial boundary within which the Board can play their business bets; whereas Risk Appetite is the hard

stop limit within which the Board would like to restrict its business actions. For example an entity with a networth of ₹ 500 Crores may have a capacity of risk taking upto ₹ 500 Crores while the Board may still articulate a philosophy that the risk appetite of the entity would be limited to ₹ 100 Crores only or upto 20% of the networth of the entity. On account of such policy statement on the risk appetite, the Business managers would not be allowed to take decisions that have the potential to go beyond the risk appetite limits of the entity. Therefore, Business managers would have to drop choices that have the potential to impair the financial stability of the company beyond the boundary set up by the Board.

In determining the risk appetite of the company, the Board should engage with the executive/ management team and provide clear directions on the contours and definition of the risk capacity, appetite and tolerance levels. For example, when does a company become uncomfortable if the percentage of its revenues generated by just top four or five clients rises continually or even becomes dominant? Another example 'X' company which experiences 10% growth (and still growing) in product returns from customers. At what point does this become too big a risk to overall customer satisfaction, company costs or general reputation? In both of these cases, one company may have a completely different tolerance of risk to another but this needs to be explicitly understood and capable of change when circumstances require it to do so.

1.3 Risks Appetite – Principles and Approach

The key question for all companies is how much risk do they need to take? And yet taking risks without consciously managing those risks can lead to the downfall of organizations. This is the challenge that has been highlighted by the UK Corporate Governance Code issued by the Financial Reporting Council in 2010.

The following key principles have underpinned risk appetite:

1. *Risk appetite can be complex.* Excessive simplicity, while superficially attractive, leads to dangerous waters: far better to acknowledge the complexity and deal with it, rather than ignoring it.
2. *Risk appetite needs to be measurable.* Otherwise there is a risk that a statement may become empty and vacuous.
3. *Risk appetite is not a single, fixed concept.* There will be a range of appetites or ranges for different risks which need to be aligned and these appetites may vary over time. Like in sourcing decisions, the Board may set vendor business share limits as they would be make the entity dependent on few vendor companies that could eventually impact business continuity or range of quality defects.
4. Risk appetite should be developed in the context of an organization's risk management capability, which is a function of risk capacity and risk management maturity. Risk management remains an emerging discipline and some organizations, irrespective of size or complexity, do it much better than others. This is in part due to their risk management culture

(a subset of the overall culture), partly due to their systems and processes, and partly due to the nature of their business. However, until an organization has a clear view of both its risk capacity and its risk management maturity, it cannot be clear as to what approach would work or how it should be implemented.

5. Risk appetite must be integrated with the control culture of the organization. The Risk Management framework explores this by looking at both the propensity to take risk and the propensity to exercise control. The framework promotes the idea that the strategic level is proportionately more about risk taking than exercising control, while at the operational level the proportions are broadly reversed. Clearly the relative proportions will depend on the organization itself, the nature of the risks it faces and the regulatory environment within which it operates.



2. OBJECTIVES AND PROCESS OF RISK MANAGEMENT

2.1 Objective of risk management

The first step to defining risk management goals and risk management objectives is to define the organization's shared vision. Once the shared vision is articulated, overall risk management goals and objectives must be defined.

While a vision statement is often aspirational, the goals and objectives should ordinarily describe in simple terms what is to be accomplished. They should be actionable by the organization. They should be defined in the context of the organization's business strategy.

For example, some common risk management objectives chosen by companies to frame their risk management approach include the following:

- Develop a common understanding of risk across multiple functions and business units so as to manage risk cost-effectively on an enterprise wide basis.
- Achieve a better understanding of risk for competitive advantage.
- Build safeguards against earnings-related surprises.
- Build and improve capabilities to respond effectively to low probability, critical, catastrophic risks.
- Achieve cost savings through better management of internal resources.
- Allocate capital more efficiently.

The Risk Management Cycle

It is a process, involving the following steps:

- identifying business functions, assets, vulnerabilities and threats;
- assessing the risks;

- developing a risk management plan;
- implementing risk management actions, and
- re-evaluating the risks.

These steps are categorized into three primary functions -

- Risk Identification,
- Risk Assessment and
- Risk Mitigation.

In a nutshell, Risk Management is all about “Identifying, Measuring, and Managing Organizational Risks for Improving Organizational Performance”.

According to the standard ISO 31000 "Risk management – Principles and guidelines on implementation, the process of risk management consists of several steps as follows :—

This involves:

1. Identification of risk in a selected domain of interest.
2. Planning the remainder of the process.
3. Mapping out the following:
 - (i) the social scope of risk management.
 - (ii) the identity and objectives of stakeholders.
 - (iii) the basis upon which risks will be evaluated, constraints.
4. Defining a framework for the activity and an agenda for identification.
5. Developing an analysis of risks involved in the process.
6. Mitigation or solution of risks using available technological, human and organizational resource.

2.2 Step by Step Process of Risk Management

All risk management processes follow the same basic steps, although sometimes different description may be used to describe these steps. Together these 5 risk management process steps combine to deliver a simple and effective risk management process.

Steps	Action	Principles
Step 1: Identify the Risk	Uncover, recognize and describe risks that might affect your project or its outcomes. There are a number of techniques one can use to find	<i>Risk identification</i> – What can go wrong?

	business risks. During this step you start to prepare your Risk Register.	
Step 2: Analyze the risk.	Once risks are identified thereafter determine the likelihood and consequence of each risk. Develop an understanding of the nature of the risk and its potential to affect business goals and objectives. This information is also entered in the Risk Register.	<i>Risk analysis</i> – How will it affect us? (Consider probability and impact to operations – is it high or low?)
Step 3: Evaluate or Rank the Risk.	Evaluate or rank the risk by determining the risk magnitude, which is the combination of likelihood and consequence. Make decisions about whether the risk is acceptable or whether it is serious enough to warrant treatment. These risk rankings are also added to the Risk Register.	<i>Risk control</i> – What should we do? (to prevent the loss from occurring or to recover if the loss does occur)
Step 4: Treat the Risk.	This is also referred to as Risk Response Planning. During this step assess the highest ranked risks and set out a plan to treat or modify these risks to achieve acceptable risk levels. Minimize the probability of the negative risks as well as enhancing the opportunities by creating risk mitigation strategies, preventive plans and contingency plans.	<i>Risk treatment</i> – If something does happen, how will you pay for it? <ul style="list-style-type: none"> • Avoidance (eliminate, withdraw from or not become involved) • Reduction (optimize – mitigate) • Sharing (transfer – outsource or insure) • Retention (accept and budget)
Step 5: Monitor and Review the risk.	Review the Risk Register and use it to monitor, track and update risks.	<i>Risk Monitoring</i> – How can we continuously look at foresight and hindsight?

If one designs a framework around that uncertainty, then you effectively de-risk the business. And that means one can move much more confidently to achieve your goals. By identifying and managing a comprehensive list of business risks, unpleasant surprises and barriers can be reduced and golden opportunities discovered. The risk management process also helps to resolve problems when they occur, because those problems have been envisaged, and plans to treat them

have already been developed and agreed. One can avoid impulsive reactions and going into “fire-fighting” mode to rectify problems that could have been anticipated. This makes for happier, less stressed business teams and stakeholders. The end result is that we minimize the impacts of threats and capture the opportunities that occur.

Risk Management Checklist (ISO 31000)

Risk architecture
<ul style="list-style-type: none"> ● Statement produced that sets out risk responsibilities and lists the risk-based matters reserved for the Board
<ul style="list-style-type: none"> ● Risk management responsibilities allocated to an appropriate management committee
<ul style="list-style-type: none"> ● Arrangements are in place to ensure the availability of appropriate competent advice on risks and controls
<ul style="list-style-type: none"> ● Risk aware culture exists within the organization and actions are in hand to enhance the level of risk maturity
<ul style="list-style-type: none"> ● Sources of risk assurance for the Board have been identified and validated
Risk strategy
<ul style="list-style-type: none"> ● Risk management policy produced that describes risk appetite, risk culture and philosophy
<ul style="list-style-type: none"> ● Key dependencies for success identified, together with the matters that should be avoided
<ul style="list-style-type: none"> ● Business objectives validated and the assumptions underpinning those objectives tested
<ul style="list-style-type: none"> ● Significant risks faced by the organization identified, together with the critical controls required
<ul style="list-style-type: none"> ● Risk management action plan established that includes the use of key risk indicators, as appropriate
<ul style="list-style-type: none"> ● Necessary resources identified and provided to support the risk management activities
Risk protocols
<ul style="list-style-type: none"> ● Appropriate risk management framework identified and adopted, with modifications as appropriate
<ul style="list-style-type: none"> ● Suitable and sufficient risk assessments completed and the results recorded in an appropriate manner
<ul style="list-style-type: none"> ● Procedures to include risk as part of business decision-making established and implemented
<ul style="list-style-type: none"> ● Details of required risk responses recorded, together with arrangements to track risk improvement recommendations
<ul style="list-style-type: none"> ● Incident reporting procedures established to facilitate identification of risk trends, together with risk escalation procedures
<ul style="list-style-type: none"> ● Business continuity plans and disaster recovery plans established and regularly tested
<ul style="list-style-type: none"> ● Arrangements in place to audit the efficiency and effectiveness of the controls in place for

significant risks

- Arrangements in place for mandatory reporting on risk, including reports on at least the following:
 - Risk appetite, tolerance and constraints
 - Risk architecture and risk escalation procedures
 - Risk aware culture currently in place
 - Risk assessment arrangements and protocols
 - Significant risks and key risk indicators
 - Critical controls and control weaknesses
 - Sources of assurance available to the Board



3. IMPORTANCE OF RISK MANAGEMENT

Governance functions include planning and budgeting, performance measurement, assurance and auditing, procurement, hiring, assessing staff as well as control over all day-to-day operations. The management of an organization, enabled by its governance arrangements, can be described as “coordinated activities to direct and control an organization”. Risk management is defined as “coordinated activities to direct and control an organization with regard to risk”. The parallels between these two statements demonstrate how closely risk management and governance are linked.

Risk Management is one of the important pillars of Governance and arguably the only tool to deal with business uncertainty. Risk Management is used most successfully by Fortune 500 and other large companies to sustain and grow their businesses. Risk management is recognised as an integral component of good management and governance. It is an iterative process consisting of steps, which, when undertaken in sequence, enable continual improvement in decision making.

Risk management is the term applied to a logical and systematic method of establishing the context, identifying, analysing, evaluating, treating, monitoring and communicating risks associated with any activity, function or process in a way that will enable organisations to minimise losses and maximize opportunities.

Risk management is as much about identifying opportunities as avoiding or mitigating losses.

Risk consequences can be fatal to any business. The expenditure of fixing damage and/or the loss of valued assets or even customers to competition after a catastrophe can have a significant impact on the bottom line of a business. By identifying and managing risks entities are able to actively protect value from any potential catastrophes and save valuable time and money. A risk management plan and system is there to do more than identify risk, a good system should also quantify the risk, predict the impact, and put procedures in place to mitigate the risk, or even eliminate it to the extent possible.

The benefits of risk management plan

What are the benefits of a risk management plan?

- Saving valuable resources: time, income, assets, people and property can be saved if fewer claims occur
- Creating a safe and secure environment for staff, visitors, and customers
- Reducing legal liability and increasing the stability of your operations
- Protecting people and assets from harm
- Protecting the environment
- Reducing your threat of possible litigation
- Defining your insurance needs to save on unnecessary premiums

The absence of effective risk management participation at the Board level encourages herd mentality and the acceptance of status quo. Effectively defining and managing risks that matter is a key element for survival and sustained growth. It empowers the Boards to build business resilience and the maturity to manage risk priorities. This ultimately results in greater predictability of performance and higher value creation for shareholders. A holistic risk management framework would empower Boards to:

- Identify top threats to entity and asset protection measures.
- Link risks to more efficient capital allocations and business strategy.
- Develop a common language in the organisation for problem solving.
- Effectively respond to an evolving business environment.

It is wise to learn from history and risk scenarios than experience business catastrophe. Boards may be better prepared by reviewing the risk profit & loss statement along with the financial profit & loss statement to determine the health of their entities.

Insurance and risk management systems

Purchasing the appropriate insurance coverage for the business is an important element of the risk management plan, but it's not enough by itself. Organisation must have policies and procedures in place to reduce risks to ensure your assets, reputation, financial security and operations can continue without interruption.

Insurance companies may view an organization more favourably if there is a stable risk management plan in place to minimize the impact of potential claims. It could even help in qualifying for reduced insurance premiums.

Risk management is an essential business activity for enterprises of all sizes. Enterprises that manage risks effectively will thrive and produce high quality products or services.



4. RISK MANAGEMENT TECHNIQUES

Enterprises both small and large need to identify, understand and manage the uncertainties of risks that are critical to achieving success.

Risk treatment is the activity of selecting and implementing appropriate control measures to treat or modify the risk. Risk treatment includes as its major element, risk control (or mitigation), but extends further to, for example, risk avoidance, risk transfer and risk financing. Any system of risk treatment should provide efficient and effective internal controls. Effectiveness of internal control is the degree to which the risk will either be eliminated or reduced by the proposed control measures. The cost effectiveness of internal control relates to the cost of implementing the control compared to the risk reduction benefits achieved.

Risk Management techniques and options include:-

- (i) **Tolerate:** The exposure may be tolerable without any further action being taken. Even if it is not tolerable, ability to do anything about some risks may be limited, or the cost of taking any action may be disproportionate to the potential benefit gained.

In these cases, the response may be to tolerate the existing level of risk. This option, of course, may be supplemented by contingency planning for handling the impact that will arise if the risk actually takes place in future.

- (ii) **Transfer:** For some risks, the best response may be to transfer them. This might be done by conventional insurance or by paying a third party to take the risk.

This option is particularly good for mitigating financial risks or risks to assets. The transfer of risks may be considered to either reduce the exposure of the organization or because some other organization is more capable of effectively managing the risk.

It is important to note that some risks are not (fully) transferable in particular; it is generally not possible to transfer reputation risk even if the delivery of a service is contracted out.

- (iii) **Terminate:** Some risks can only be treatable, or containable to acceptable levels, by terminating the activity itself. This option can be particularly important in project management if it becomes clear that the projected cost-benefit relationship is in jeopardy as the cost of treating the risk does not make the activity viable. For example, land acquisition for a project whose feasibility is based on that particular land may be risky and the cost of treating it in terms of legal fees is so high, that it may be better to terminate the project.

- (iv) **Treat:** By far, a large number of risks will be addressed in this way. The purpose of treatment is to continue with the activity giving rise to the risk and action (internal control) is taken to contain the risk to an acceptable level.

Some of the Risk Enabled and Managed organisations used the following techniques.

<i>Technique</i>	<i>Description</i>
Risk Questionnaires	Designed to identify the relevant risks and create risk history
Flow Charts with Risk Flags	Designed to identify operational risks embedded in the processes
Identify Controls to manage risks	Recognize controls and test their adequacy and operative effectiveness
Risk Event Maps	Identify potential events that can have a significant impact on business to avoid negative surprises
Risk Scorecards	A Monitoring tool to track progress of risk management
Capital Budgeting	A financial analysis tool to evaluate the future cash flow benefits arising from risk management actions against the costs of risk consequences
Value at Risk	A financial analysis tool to evaluate the impact of the worst case scenario of a risk event
Risk Heat Maps	A Monitoring tool to track progress of risk management using qualitative assessment of probability and impact of risk



5. RISK MANAGEMENT CASE STUDIES

Case Study 1

An inappropriate risk culture isn't always about taking too much risk. Eastman Kodak was a trusted leading brand for over a hundred years. But its strategic failure to reinvent itself and exploit digital technology led to a descent into Chapter 11 bankruptcy.

Its culture meant that Kodak avoided risky decisions, and instead developed procedures and policies to maintain the status quo rather than adapting to the changing external environment.

(Mendes, 2007)

Case Study 2

In May 2012 JP Morgan Chase disclosed a multi-billion-dollar trading loss on its "synthetic trading portfolio". By its own admission the events that led to the company's losses included inadequate understanding by the traders of the risks they were taking; ineffective challenge of the traders' judgment by risk control functions; weak risk governance and inadequate scrutiny (Dimon, 2012). According to the New York Times, individuals amassing huge trading positions were not effectively challenged, there were regular shouting matches and difficult personality issues.

(New York Times, 2012)

Case Study 3

Staff at Barclays repeatedly filed misleading figures for interbank borrowings. First, between 2005 and 2008 – and sometimes working with traders at other banks - they tried to influence the Libor rate, in order to boost their profits. Then between 2007 and 2009, at the peak of the global banking crisis, Barclays filed artificially low figures. This tactic sought to hide the level to which Barclays was under financial stress at a point where their peers were being forced to accept state funding. When the scandal came to light it led to the resignation of the bank's chief executive Bob Diamond, along with Barclays chairman Marcus Agius. Barclays was fined €290m by UK and US regulators for rigging Libor and investigations are continuing. Barclays have set up an independent review to assess the bank's current values, principles and standard of operation and determine to what extent those need to change. It will also test how well current decision-making processes incorporate the bank's values, standard and principles and outline any changes required.

(BCC Website, 2012) (Barclays Press Release, 2012)

Case Study 4

Improving Cross Organizational Processes through Risk Management Working Group – A Carrier Team One Case Study

An aircraft carrier is a floating city with power plants, satellite telecommunications, convenience stores, and medical, dental, and hotel facilities. Maintaining and modernizing these ships can involve up to fifty different organizations simultaneously conducting all sorts of work, from painting to structural repair to electronic, electrical, and mechanical system upgrades. As an added project management challenge, the ship's crew typically lives on board during a major overhaul, which means that work cannot be conducted day and night, and services such as telecommunications, heating, ventilation, air conditioning, electricity, sanitation, and fresh water supply must remain intact as much as possible. With up to 500,000 man-days of work scheduled during an eleven-month dry docking period, you can imagine the tremendous amount of activity that must be carried out in a confined space and on a tight schedule.

The Naval Sea Systems Command (NAVSEA) established Carrier Team One (CT1) in 1997 to define, champion, and improve cross-organizational processes for planning and executing these complex aircraft carrier overhauls, known as "availabilities." CT1 provides the structure for managing and systematically improving cost, schedule, and quality performance by focusing on key planning and execution processes. They also integrate the efforts of numerous contributing organizations into an effective total-maintenance process.

CT1 took notice when two aircraft carrier availabilities were completed a number of weeks late in 2006. The team identified many factors that contributed to the delays, including large work packages with a number of high-risk items, critical path work with minimal margin, significant new and expanded work, and project team inexperience and turnover. All these issues affected both projects, yet project managers lacked an effective means of identifying, assessing, mitigating, and communicating the risks they posed to their project's timely completion. As a result, the carrier

maintenance community was unaware that help was needed until it was too late to take steps to avoid or limit delays. In response to the problems encountered on those projects, CT1's Executive Steering Committee formed a Risk Management Working Group (RMWG) and tasked them to (1) develop a standard process for comprehensive availability of risk management that could be applied consistently across all aircraft carrier shipyards and (2) support and monitor a risk management pilot project to be implemented on nine carrier availabilities at five different locations. CT1 used the existing Northrop Grumman Shipbuilding Newport News Operations (NGSB-NN) Risk Management Program (already in compliance with Department of Defence guidance) to develop a formal process for all aircraft carrier availabilities.

NGSB-NN based their 1998 risk program on a NASA-proven practice. NASA's Goddard Space Flight Center conducted a number of risk management training sessions at NGSB-NN and provided copies of their risk management procedures. Building on this knowledge transfer from NASA, NGSB-NN developed a risk management process designed specifically for ship construction and repair. This process included the development of a risk management strategy; developing and conducting risk management training; identifying program risks; analysing potential technical, quality, cost, schedule, and human-capital impacts; determining likelihood of problem occurrence; developing plans to mitigate risks; developing and maintaining a risk tool for capturing and updating project and shipyard risks; capturing risk management lessons learned; and continually improving the process to reflect customer feedback. To indicate the probability and impact of risks, the process uses the red/yellow/green risk cube described in the Defence Acquisition University Risk Management Guide for Department of Defence Acquisition. It adds environmental and safety risks to cost, schedule, and technical /quality risks. Proving its value over time, NGSB-NN's risk management program is now used company wide.

The CT1 risk management pilot project focused on the cultural journey required to convince naval shipyard aircraft carrier project teams of the value of a formal risk management process and to actively engage in it. That journey included the following essential elements.

Catalyst: As in any cultural journey, a catalyst for change is essential. In this case, the catalyst was the late completion of the two 2006 aircraft carrier overhauls in an environment that lacked a formal risk management process.

Infrastructure: The Executive Steering Committee formed the RMWG to establish a formal risk management program and associated training tools.

Initial Buy-In: Once the infrastructure was in place, the RMWG leader met with key stakeholders to share risk management background and procedures and develop their implementation plan and customer expectations.

Launch: As Executive Steering Committee chairman, Captain Daniel Seigenthaler, United State Navy (assistant chief of staff for carrier maintenance at Commander, Naval Air Forces Pacific Fleet), signed a letter directing the implementation of a risk management pilot program for nine aircraft carrier availabilities over a one-year period. This was followed by the RMWG leader

meeting with project leaders at the headquarters of all three aircraft carrier shipyards to discuss ideas for implementation.

During the pilot project, the RMWG leader provided peer assistance and training for each project's assigned risk manager to support skills development and team acceptance.

Integration into the Organization's Culture: From the outset, each project team's leadership needed to perceive the value of risk management to encourage their engagement. The initial direction and expectations set by CT1 provided the "push;" the challenge was to create a "pull" from the project teams. This was done by integrating risk management into command briefings, progress briefings, meeting agendas, team training, awards and recognition, newsletter articles, project strategies, retrospects, and the "hot wash" meeting at project completion. ("Hot wash" is a military term for a meeting used to capture learning and develop related recommendations at the end of a major activity or engagement.) CT1 thinks of a hot wash as a carrier-overhaul project team's "gift" to future project teams. Establishing a cross-project risk manager community of practice for knowledge sharing and comparison was the key to the pilot's accelerated adoption. This community provides a peer-assist environment for the risk managers to communicate and collaborate. It is also a forum for risk managers to discuss their challenges and share experiences and learning.

Retrospect and Process Maturity: The one-year pilot involved eight different overhaul projects that were either planned and less than a year from starting or in the process of executing four- to six-month-long repair projects. The pilot work proved to be process easy, but the implementation was hard. Early in the project, team leaders wanted to see value before engaging, but the best way to see risk management's value for their project team was to engage in it. At the conclusion of the risk management pilot, project leadership interviews captured what went well and what could be improved. A risk management process retrospect was held to capture lessons learned and recommendations from the one carrier project whose risk implementation extended from the start of planning to availability completion. Resistance occurred on all projects, but the quickest adoption came from the one that was furthest from their start date (ten months of planning remaining). As one would expect, the team that was a month into their six-month overhaul and focused on executing the work that was already under way saw the least value in the risk program. Data gathered during the pilot showed that project teams who embraced the formal risk management process quickly achieved risk-exposure reductions similar to those NGSB-NN teams that had been using it for years. These metrics helped convince other project teams of the value of the process and encouraged their engagement. Captured risks were shared via CT1's portal. The commonality of risks gave valuable insights to shipyard and program leadership personnel. Some examples of frequent risk categories were material availability, work package size and changes, constraints from shipyards or naval bases, planning performance, key event management, unidentified work and weather impacts, scheduling conflicts, worker availability, funding, ship's crew readiness, and project team turnover.

Following the pilot project, feedback from leadership showed that they were all fully engaged and appreciative of this tool's ability to help communicate and mitigate their biggest concerns. Matt Durkin, Norfolk Naval Shipyard's project superintendent for United State Ship Harry S. Truman's (CVN 75) 2009 overhaul, commented, "Risk management provided me with more visibility of our project's key issues. I'm not sure we would have completed our last availability on time without the Risk Management process." And Tim Ferguson, Puget Sound Naval Shipyard and Intermediate Maintenance Facility's project superintendent for USS Abraham Lincoln's (CVN 72) 2009 overhaul, said, "Our project team leveraged the risk management program to support open and honest discussion of issues that could have impacted delivering the ship on time." Pilot participant suggestions for taking the risk management program to the next level included:

- Adapting the process to address potential problems that were beyond the program manager's scope of influence.
- Using the risk management process to identify and communicate potential shipyard and ship's crew work distribution conflicts.
- Integrating risk management into a work package's development process during planning.

Captain Kevin Terry, USN, CT1's chairman, summed up the work so far: "The Risk Management Working Group has been a true success story. The pilot project was a home run. Aircraft carrier public and private shipyards are using the same language and risk cube to mitigate and communicate their issues." The U.S. Navy's Ship Maintenance Enterprise is currently building on the success of CT1's risk management pilot project. A NAVSEA instruction is being issued to formalize the process for all the U.S. Navy's ship and submarine overhauls. Over the next few years, NAVSEA will expand from individual project teams to the entire shipyard enterprise. As Cleve Butts, NAVSEA's director for Carrier Support, notes, "It is absolutely essential that we complete our maintenance periods on time and within cost, not only for aircraft carriers but for all our ships. Risk management is a great communication and management tool for ensuring that the right actions are being applied effectively and early. The RM [risk management] process has now been successfully implemented at all aircraft carrier shipyards.