

INTEGRATED RISK MANAGEMENT FRAMEWORK (~4700) APPLICATION OF INTEGRATED RISK MANAGEMENT IN FINANCE DOMAIN

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ABSTRACT

In an increasingly complex world where projects operate under stringent scrutiny and are subject to varied factors, a strong need for a holistic approach to risk management has arisen. This paper seeks to establish the need for such an Integrated Risk Management Framework by reviewing evaluation models and providing a framework for managing risks at a Corporate or Enterprise level.

Keywords: Project Management, Risk Management, Risk Evaluation, Risk Strategy, Holistic Risk Management, Enterprise Risk Management

INTRODUCTION

“Success is more often a function of consistent common sense than it is of genius” – An Wang, founder of Wang Laboratories. The essence of this statement lies in assiduous application of the techniques of monitoring progress in an identified task /project coupled with intense scrutiny of all associated factors impacting a given process. Juxtaposing that statement along with the context of Risk Management, one can easily derive the import of the quote above in managing risks.

The Project Management Institute (PMI) defines risk as “an uncertain event or condition that, if it occurs, has a positive or negative effect on a project’s objectives”. Incorrect or inadequate risk management is listed at 6 of 10 causes leading to project failure. An investigation into other causes listed higher reveal that those could have been mitigated though proper risk management. Therefore, an integrated risk management approach can definitively help the project achieve a successful conclusion, rather than otherwise. Results of risk management techniques are as varied as the risks and their context themselves. Risk arises because of the inability or inadequacy of the decision maker to make perfect or useful forecasts. Forecasts cannot be made with perfection or certainty since the future events in a project on which its success are depending are uncertain. Any stake holder on a risk must differentiate between risk and uncertainty. Risk is referred to a situation where probability distribution of the outcomes in a project including cash flows of an investment proposal is known, or simply stated - where risk, probability and impact can be determined. On the other hand, if no information is available to determine the outcome the situation is termed as

uncertainty. Handling risk and uncertainty in large investment projects requires thorough conceptualization, applying appropriate methodologies and employing the best techniques.

The first part of this paper describes major techniques of risk analysis used contemporarily and brings in the assessment of these techniques in the context of projects undertaken. The second part presents the holistic risk management policy and framework for risk analysis, monitoring and review would be evolved in the context of business corporations. The third part would discuss Integrated Risk Management Framework in detail, wherein readers can become cognizant of the processes essential towards managing risks arising out of changes/variations in the project. Thus a superior risk management process is evolved by continual improvement and enhancement.

RISK ANALYSIS METHODS

Quantitative Models

Quantitative Models use either statistical techniques or financial analysis for measuring the risk and its aspects when it is viewed in isolation. It must be emphasized that these techniques predominantly consider objectivity and precision in their methodology, process of calculation and results.

Contextual Models

Contextual Models relate to a context when a single firm/business organization is visualized in the competitive market/industry of an economy and it gets affected by unanticipated actions of the competitors/regulatory bodies. It must be emphasized that these techniques predominantly get based on subjectivity and political situations and thus results gets belied.

Generally, the discussions on risk analysis begin with quantitative models and later intensified with the application of the contextual models. Measuring a project's stand alone risk is easier than measuring its corporate risk or market risk. However, it must be highlighted that, in most cases stand alone risk, corporate risk, market risk are highly correlated. As the overall economy does well in an uptrend, the firms operating in that economy also do well. Most of its projects would do well and contribute to its high profits. As a corollary, in adverse conditions of the economy, the opposite happens with low profits or losses and even bankruptcies

Quantitative Models

Stand alone risks in a project mostly occur in specific phases of a project, and are impacted by factors that can be deterministic and/or controllable. As such scenarios can be modeled mathematically; they yield favorably towards Quantitative Models.

Few of the most common quantitative models are discussed below.

Sensitivity Analysis

Since the project outcome including cash flows depend on a variety of variables which are uncertain and risky, Sensitivity analysis is applied. Sensitivity analysis, sometimes called 'what if' analysis would be useful in finding answers like,

- What will happen to net present value (or some other criterion of merit) if sales are only 50,000 units rather than the expected 75,000 units?

- What will happen to NPV if the economic life of the project is only 5 years, rather than 8 years as expected?

As this model works best with high risk or high uncertainty, projects in initial phases often employ sensitivity analysis to evaluate future risks.

A step wise procedure for using the sensitivity analysis would be as follows:

1. Set up the relationship between the basic underlying factors (e.g., quantity sold, unit selling price, life of the project etc.) and the NPV (or some other criterion of merit).
2. Estimate the range of variation and the most likely variation and the most likely value of each of the basic underlying factors.
3. Study the effect of NPV of variations in the basic variations (typically, one factor is varied at a time)

A scatter plot is often used to explain the results of this analysis. These plots help the investigator assess interrelationship between underlying factors and how often they deviate from the mean.

Advantages:

- It persuades the management to identify the underlying variables and their interrelationships.
- It shows how robust or vulnerable a project is to changes in the underlying variables.
- It indicates the need for further work. If the NPV or internal rate of return is highly sensitive to changes in some other variable, it is desirable to gather information about the variable.
- Disadvantages:
- It may fail to provide the leads – if sensitivity analysis merely presents a complicated set of switching values it may not shed light on the risk characteristics of the project.
- The study of the impact of the variation in one factor at a time, holding other factors constant, may not be very meaningful when the underlying factors are likely to be interrelated – What sense does it make to consider the effect of variation in price while holding quantity (which is closely related to the price) constant /unchanged?
- The interpretations of results tend to be subjective and might vary with decision makers.

Scenario Analysis

With a view to upgrade the analysis and study the interrelationships between various underlying factors, it is useful to look at some possible scenarios; each scenario representing a consistent combination of variables. For example, a project may be evaluated under three different scenarios:

- The base case where the demand and the price are expected to be normal.
- The scenario where the demand is high ,but the price is low

- The scenario where the demand is low, but the price is high
- The firms often do a different kind of scenario analysis in which the following situations are considered:
- Optimistic scenario –high demand, high selling price, low variable cost and so on
- Normal scenario - Average demand, average selling price, average variable cost and so on.
- Pessimistic scenario – Low demand, low selling price, high variable cost and so on.

The objective of such scenario analysis would be to be getting a feel of what happens under the most favorable or most adverse configuration of variables/key factors, without bothering much about the internal consistency of such configurations.

It is based on the assumption that there are few well delineated scenarios. This may not be true in many cases. E.g., the economy does not necessarily lie in discrete states, like, recession, recovery, stability and boom. It can lie anywhere on the continuum between the extremes. When a continuum is converted into discrete states, some information is lost.

Given the nature of this analysis to provide three possible outlooks, scenario analysis is often employed during planning phase of a project, however with progressively more information that can be obtained through sensitivity analysis. Additionally, Scenario Analysis may also be employed to assess the impact of change on a project. PERT (Program Evaluation and Review Technique) computations are performed to assess changes to existing project schedule and identify the expected time to incorporate a change.

Break Even Analysis

While in sensitivity analysis, we ask what will happen, if sales or cost increase or something else happens, as a financial manager, the question might extend naturally to how much should be produced and sold at a minimum price to ensure that the project does not lose money. Such an exercise is called Break Even Analysis (BEA) and the minimum quantity (output) at which loss is avoided is called the ‘breakeven point’ (BEP).

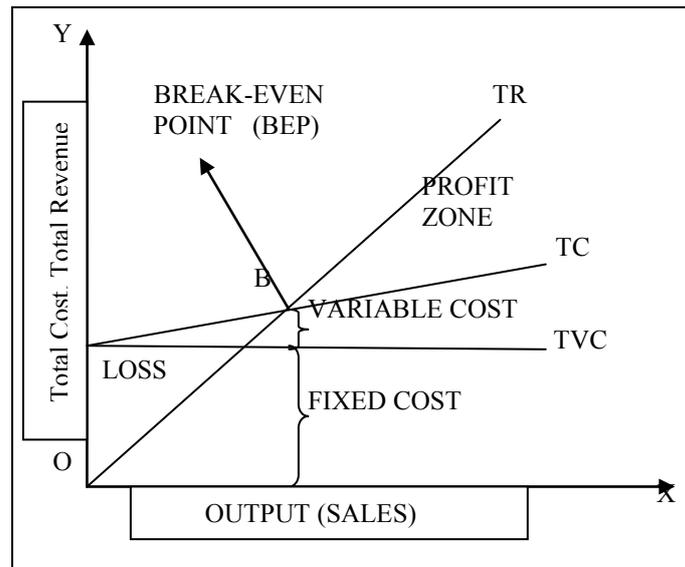


Figure 1. The Break-Even Chart

The BEC graphically shows cost and revenue relation to the volume of output .For the sake of simplicity, assuming constant factors,a linear revenue function and total cost function is assumed. The BEP(B) is the point at which total revenue equals total cost ,so net profit is zero at OQ level of output. There are cited cases ,where a BEA is performed after PERT computation to further drill-down on the chosen change option and assess its viability and impact on the project.The BEP is a proven instrument panel for guidance to project managers and entrepreneurs alike in determining the ideal project scenario.

Simulation Analysis

While the sensitivity analysis indicates the sensitivity of the criterion of merit (NPV, IRR, or any other) to variations in basic factors and provides the information of the following type -- if the quantity produced and sold decreases by 1 %, other things being equal, the NPV falls by 6 %. Such information though useful, may not be adequate for decision making. The decision maker would also like to know the likelihood of such occurrences. This information can be generated from Monte Carlo Simulation which may be used for developing the probability profile of a criterion of merit by randomly combining values of variables which have a bearing on the chosen criterion.

Procedure:

1. Model of the project shows how the NPV is related to the parameters and the exogenous variables
2. Specify the values of the parameters and the probability distributions of the exogenous variables
3. Select a value, at random, from the probability distributions from each of the exogenous variables.

4. Determine the NPV corresponding to the randomly generated values of the exogenous variables and pre –specified parameter values.
5. Repeat steps (3) and (4) a number of times to get a large number of simulated NPV
6. Plot the frequency distributions of the NPV.

Defining the probability distribution of basic variables is an important step in simulation. In defining these distributions, it must be borne in mind that often it is impossible to find the true distributions. The distributions that are defined in practice are based on the judgments by experts into the probability distributions. The two approaches popularly used for obtaining the true distributions the “portrait approach” and the “building block approach”. Often, these approaches may mislead the project executive to accept a smooth normal distribution or complicated formulae which may be beguiling. Hence the solution to the problem lies in finding out the factors which are correlated and estimation method can be used. Then the choice of aggregation or disaggregation can be taken up by the expert.

Certain issues may arise in applying the Monte Carlo Simulation as follows:

- What the output should be?
- Is project variability enough?
- How the extreme values be interpreted?
- How the results of simulation be used?

Advantages:

- Versatility – It can handle problems characterized by numerous exogenous variables following any kind of distribution and complex interrelationships among parameters, exogenous and endogenous variables.
- It compels the decision maker to explicitly consider the interdependencies and uncertainties characterizing the project.
- However, these limitations make the analysis controversial,
- It is difficult to model the project and specify the probability distributions of exogenous variables.
- Simulation is inherently imprecise. It provides a rough approximation of the probability distributions of the project criteria under merit. A realistic simulation model is likely to be complex and needs to be undertaken by a management scientist, rather as often done by a decision maker on the site of the project.

Simulation Analysis is typically employed during Solution Approach phase under Planning to identify a set of feasible options which can be further analyzed using mathematical models like BEA. As the analysis needs a detailed understanding all impacting factors and their associated probabilities, historical data is often necessary to produce meaningful results.

Hillier Model

Under certain circumstances, as H. S. Hillier showed, the expected NPV and the standard deviation of the NPV may be obtained through analytical derivation. The results would vary if there is no correlation among out comes including cash flows or when there is correlation among the outcomes/cash flows. Such analyses are useful while considering the varied projects and their outcomes in reality.

Decision Tree Analysis

To analyze sequential decision making and risks involved in projects, Decision Tree Analysis is employed.

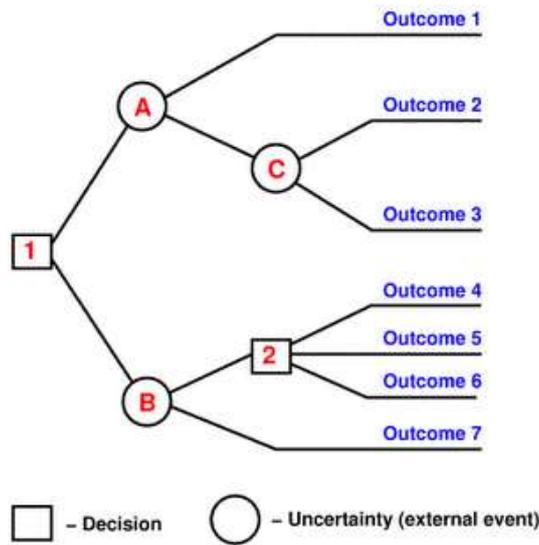


Figure 2. Typical Decision Tree Structure

Steps in decision tree analysis are as follows:

1. Identifying the problem and alternatives
2. Delineating the decision tree
3. Specifying the probabilities and outcomes
4. Evaluating various decision alternatives

The decision tree reflects in a diagrammatic form the nature of the decision situation in the alternative courses of action and chance outcomes are identified with probabilities. In assessing the decision tree analysis and its utility in projects ,it has to be borne in mind that decision tree can easily become complex and cumbersome, if the varied outcomes are to be considered with future events and their probabilities. One must remember the advice of Brealey and Myers: “Decision trees are like grapevines; they are productive, only if vigorously pruned”.

Contextual models

Contextual Models provide a means for an organization/program/project to evaluate their risks by comparing with similar risks identified in the past projects/programs/organizations. In layman terms, it would be comparing apples to apples. When potential risks and their impacts are increasingly indeterminate, establishing priorities amongst risks would become difficult. In such cases, using a comparative methodology yields faster results for a decision making board to review and come to a conclusion.

Market Study

In order to get a “feel” for the relationship between the product and its market, the project analyst may informally talk to customers, competitors, middlemen, and others in the industry. Wherever possible, he may look at the experience of the company to learn about the preferences and purchasing power of customers, actions and strategies of competitors and practices of middlemen. The information on various aspects of the market study may be obtained from secondary and /or primary sources. Secondary information is information that has been gathered in some context and is already available from published sources. Primary information, on the other hand, represents information that is collected for the first time to meet the specific purpose and objectives on hand. Secondary information provides the base/background data and often is the starting point for the market and demand analysis. It indicates what is known and often provides leads and cues for gathering primary information to be collected from surveys. Further, the project analyst seeks the support of demand forecasting techniques to estimate the future demand. However, it may be borne in mind that the demand forecasts are subject to error and uncertainty about market conditions in the future. Technological innovations, shifts in government policy, developments in international scene /trade policies and events, vagaries of monsoon affect market conditions severely and make the forecasts unreliable.

Environmental Analysis

Certain industrial projects like mining, cement, steel, paper, chemicals and refineries convert the natural endowments into saleable and exchangeable products. These projects inflict a large number of physical changes and disruptions on environment and cause environmental and ecological imbalances. Detailed environmental studies are carried out to study the unintended consequences of a project. Its purpose is to identify and examine the likely impact of the proposed project on environment and thereby work out the remedial action plans to minimize the adverse impacts. Its goal is development with least damage.

A case in point would be the Lavasa project, undertaken by Engineering Construction Company (ECC), a subsidiary of Larsen & Toubro. ECC had to put on hold its luxury urban development project after incurring several crores of rupees, primarily due to non clearance by the Ministry of Environment & Forests, Government of India (October 2010).

Risk Management – A Holistic Approach

Increasing global presence of corporations has resulted in a situation where corporations have to review their strategy with shifting perspectives based on local policies. Risks today are broad ranging and interdependent. Therefore, a holistic risk management policy has to be evolved in the strategies that are to be implemented in the domestic and international markets

to derive the best results. Such a policy would consider prevalent price fluctuations and volatility in commodity and financial markets within the RBI/SEBI/Government regulatory scenario and framework. This policy would warn the corporation about impending business crises that might lead to disasters. The internal risks that are to be encountered in the corporation are internal controls and organizational codes compliance. Corporate reputation and business values are to be maintained and business decisions are to be communicated within the organization and to the external environment and public. A suitable organizational culture has to be evolved in changing times by the Corporation to maintain corporate governance and add value to the shareholders / stakeholders.



Figure 3. Holistic Approach to Risk Management

Risk Management Framework In Corporate Sector

Risks, especially strategic risks, which arise from long term investments in projects, are to be incorporated in the risk management framework of a company. In this context, the uncertainties of impacts of long term projects assume importance. These affect the company either positively or negatively. While the positive effects would be attractive and beneficial, the negative effects damage not only the current situation but also the future prospects. In fact, after the collapse of Enron Corporation, the SEC in the USA introduced Sarbanes-Oxley (SOX) 409 which was a declaration of all perceived risks, in the annual report of a company. In India, since 2004, SEBI has introduced Clause 49 of the Listing Agreement wherein every Indian listed company has to disclose its risks and the handling methodology to the shareholders in the paragraph titled “Areas of risks and concerns” which constitutes a mandatory part of the Chairman’s Speech to the shareholders. However, it is seen from the analysis of annual reports, several leading companies cover in brief the strategic plans in their Chairman’s statements. Till now, only few companies disclose their operational risks.

Most other companies have not ventured to disclose their strategic risks or projects in the pipeline and they cite confidentiality and competitors as reasons to the public.

Tata Motors highly publicized its small car project in Singur, West Bengal and when the location was shifted to the State government policy changes, it caused heavy damages to the tune of Rs.1500 Crores to the company. Hence it has become imperative and need based for the companies to have a careful look at all their strategic investments including the long term projects, be it expansion or diversification or rehabilitation in nature.

One of the holistic risk management processes is called Enterprise Risk Management (ERM). ERM assists policy makers, strategists and executives in the strategic decision making process by providing for an exhaustive risk management mechanism. Under the ERM model, 4 broad categories of risks are evaluated – Strategy, Operations, Financial Reporting and Compliance. ERM is the answer that corporations are increasingly adapting to address the increased scrutiny from regulators and debt rating agencies.

Scope of Risk

The scope of risk elements involved in translating strategies into industrial projects has to encompass all kinds of risks and how they can be mitigated to result in desirable outcomes in the short term as well as long term future, leading to realization of the long term goals and ultimately the corporate vision to all the stakeholders. Thus, a strategic risk policy has to be made in this context covering all the risks which are categorized as follows:

- Political
- Technological obsolescence
- Market
- Reputational (Goodwill, brand etc)
- Economic
- Financial
- Legislation (governmental policy)
- Business relationship (mergers and restructuring)

As defined earlier, risk arises due to the possibility that the actual outcome could be different from the expected outcome. The probability of an outcome is governed by the availability of certain information. Due to information asymmetry, the most up-to-date information is available only with certain economic players. Further, the outcome is dependent on several other drivers. These interrelationships are not necessarily known or determinable. In spite of the best efforts, it may not be always possible to ascertain the exact result.

Elements of Risk

While initiating a risk management framework in a corporation, it is to be remembered that Risk management is a journey, and not an event as normally thought. A formal risk management framework would seek to contiguously plan, assess, handle and monitor and report to the Board in a systematic way and not in a “Fire fighting” process as generally done

in many organizations. The four elements of a risk management frame work are presented in figure 4.

Elements of Risk themselves can be viewed as consisting of 2 broad components – Risk Assessment and Risk Control. Risk Assessment consists of Identifying and Assessing the Risk. Risk Control seeks to address Mitigation and Monitoring of the Risk.

Risk Assessment will ensure all risks are identified by looking at sources as identified under sub-section C, and prioritized for action using classification described sub-section D.

Risk Control then seeks to handle/manage those risks using strategies outlined under sub-section E. Finally, monitor and control by periodically reviewing the progress under a Risk Management Forum.

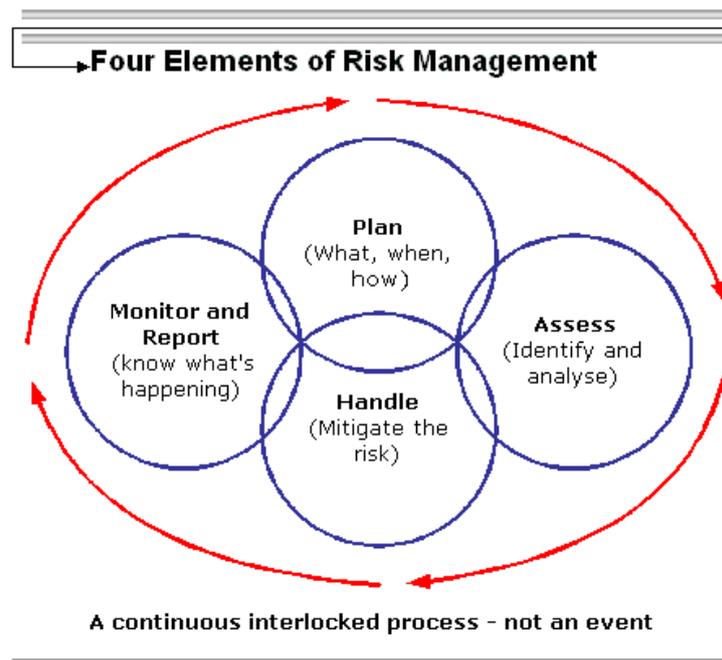


Figure 4. Elements of Risk Management

Sources of Risk

Sources of Risk can be broadly categorized as External Sources and Internal Sources. Internal Sources are those that are intrinsic to the operations of the organization and therefore find impacts to Process, Mitigations identified and Control mechanisms put in place. External Sources are those that are extraneous to the operations of the organization, and originate from the market, environmental impacts including disasters, and/or legal regulations.

As shown in Figure 5, just about any factor can pose a risk to a project.



Figure 5. Sources of Risk

Some factors, that can expose any corporation to various risks, are briefly discussed below:

1. Economic policies of governments and resultant budget deficits or surpluses; Changes in money supply, levels of inflation, and interest rates as well as capital formation that takes place concomitantly in the economy. All these in turn influence the movement of capital in and out of the country; they have an impact on the relative value of currencies and also the values of debt instruments used by the corporations.
2. Political, social, ethnic issues that impact the availability of or demand for particular commodity and thus result in upheavals in various commodity markets.
3. Technological factors that bring in new products (making other products obsolete /redundant in the process) and thus having an effect on the fortunes of the corporation manufacturing and marketing them and result in losses.
4. Governance of corporations and their financial performance (which is a result of competitive factors in various markets), as well as the financial structures opted for by the various companies.

Classification of Risk

The risks that are encountered by an organization can be classified in four categories as illustrated in a diagram given below:

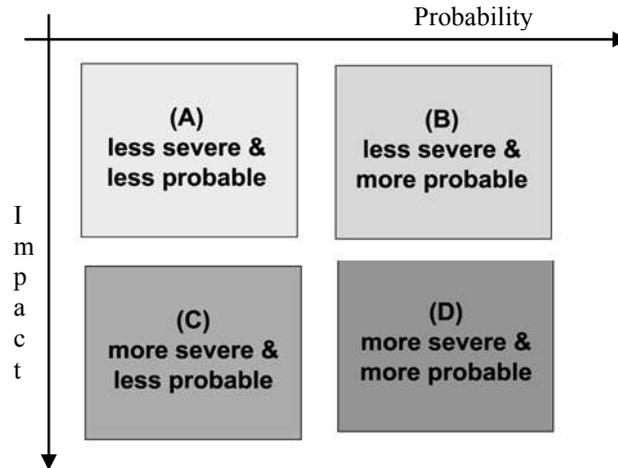


Figure 6. Classification of Risk

A whimsical method to describe the above categories was proposed by Coblands Consulting in Aug 1996. According to their method:

- Kittens – Type A; A large cat can rarely be the source of trouble, despite lot of effort wasted to train it.
- Puppies – Type B; A large dog has potential to be damaging, but training ensures it is not a trouble.
- Alligators – Type C; Dangerous and to be “avoided” with care.
- Tigers – Type D; Most dangerous and must be neutralized at all costs!

Risk Mitigation Strategies

Every risk identified must have a risk mitigation strategy associated with it. These strategies fall under 4 major categories:

- Avoidance: Eliminate, withdraw
- Acceptance: Retain, budget for it
- Mitigate: Optimize, Workaround
- Transfer: Outsource, Insure, Shared Risks

The US Department of Defense uses ACAT to refer to these categories: ACAT for Avoid, Control, Accept or Transfer.

A special reference must be made to Shared Risks. Increasingly in many projects where there are multiple vendors involved, PMO (Project Management Office) have instituted the use of Shared Risks to provide a formal platform wherein clients and vendors have equal opportunity to discuss risks impacting the projects and to establish a shared commitment to mitigate those risks or accept those risks as a joint responsibility.

Benefits of Risk Management Framework

The benefits that accrue on account of setting up a risk management framework in a corporation are described here:

- Brings order and system to the process risk quantification and measurement
- Clarity about measurement of impact
- Enables assigning values to the various risks to be managed
- Alerts /flags extreme risky situations for necessary mitigative actions by Management
- Improves risk awareness when risks are to be faced in reality
- Reduces cost of capital and results in better valuation to shareholders

CONCLUSION

- Risk simulation models, Sensitivity analysis, and other superior techniques have to be used now to measure various kinds of risk and impacts as described above. Although the listing regulations insist that risks have to be disclosed to all the stakeholders, currently many a company do not effectively perform an exhaustive risk assessment exercise and disclose such risks to its stakeholders .Regulatory bodies have been empowered by the Government to demand higher commitment, transparency and governance standards of companies in meeting the satisfaction of stakeholders. In this context, these bodies demand internal controls and audit in facing risks and evolving appropriate risk management policies. Indian Corporate at large has to be made aware of the risk management concepts, techniques of risk analysis and the necessity of adhering to a holistic risk management policy.
- Risk Management techniques have to be integrated with management control systems operating in the company. Management Control Systems set the pace to watch and warn the company in times of risks followed by crisis as discussed above. Understanding strategies to overcome the criticalities in the functional areas and take new steps to improve the corporate performance are urgently needed.
- Risk management techniques and implementation with a holistic approach in business organizations as described above, has to be given high priority in business school education.

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