

# Management Credit risk assessments and financial analysis

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**Abstract:** Modern business environment is always affected by some sort of changes. These changes are unpredictable, volatile, and more complex every day. It is connected to various kinds of risks.

To ensure successful business performance risks are should be minimized or mitigate always at the lowest possible level.

The increased demand for transparency around risk has not always been provided and the poor quality of underlying assets significantly impacted the value of investments. In the current global economic environment, identifying, managing, and exploiting risk across an organization has become increasingly important to the success and sustainability of any business.

Today, banking regulators are demanding a shift from a credit review process contingent on the opinions of individuals to a systematic process based on objective inputs and understood internal rating models that best predict default events. This change, primarily driven by the need for more accurate, timely risk assessments, is critically dependent on standardized financial and non-financial risk inputs. At the same time, regulators are requiring banks to document the inputs and outputs of their internal ratings processes. The challenge of bringing this data together is further complicated by the fact that bank portfolios are diverse, operating across many different credit types and geographies.

The **goal** of the study is to explain the model for management credit assessment, and to show what conditions on the project should be fulfilled for credit approval.

**Methodology** approach to this research is the data collected from many previous studies, which are coming by the quantitative method, because of many considers of analysis process as: concerned with hypothesis testing, uses large sample, data is highly specific, reliability is high. This project intends to make use of both qualitative and quantitative tools of investigation. By adopting an action research platform allied with a case study approach which incorporates the participants into the research process it is hoped that an effective and workable solution to these problems can be devised.

**Hypothesis 1: Management** the credit risk assessment will highly influence the bank decision for credit approval to the project.

## Collecting and analysis of credit data

To collect necessary data for credit assessment it is requisite to obtain a comprehensive view of each customer across a wide-range of assets including company financials, real estate holdings, borrower financials and other pertinent data to one place. Financial templates and tools are recommended for minimizing errors in data entry. Also it is advisable to standardize way of spanning financial data.

The way of storing the data is very important, to avoid data loss and redundancy. Single source for all data considering credit decision process is saving time for managers, audit, and all inquires.

For better decision making about lending, saving time and reduce complexity it is recommendable to use standardized credit risk scorecards which outline rating decisions. It has to be made structured risk management framework for easier evaluation and perform scenario analysis. Reports should be clear and understandable for analysts and senior management.

### **The importance of accounting standards and reporting standards**

The process of preparing financial reports of transparency and integrity are more than just the application of accounting standards, which aims to provide consistency and comparability, and increase the possibility that members of boards of directors represent the interests of shareholders and owners of the company. Whereas countries all over the world still continue its efforts to develop economies, there is increased importance of following accounting standards and reporting standards of financial systems. Without these standards there is less ability of companies to attract various funds, due to the inability investors to evaluate the risks and rewards associated with these investments. Risk assessment as a job is not easy .

Proper standards of accounting and reporting helps to support accounting employability for responsibility, integrity and transparency, they also encourage the optimal use of resources, and working to attract capital more interest rates reasonable, as well as it supports their ability to organize projects and create new jobs, and help significantly on economic growth and the progress of democracy and economic reform. The proper accounting standards support efficient financial management, saluting the proper system of reporting is that provides vital information to creditors and equity investors, so as to create them to make investments safe and profitable.<sup>1</sup>

The making a choice of accounting standards is a matter for the state alone. However, companies that use accounting standards and reporting standards are not acceptable, and widely in the global capital markets will face higher transaction costs in access to capital and funding of these markets. Security problems may lead to capital development of private accountants to prepare financial reports so that they are better accepted by the investors. In this field have been achieved significant progress in the development of a set of international standards that can provide following instant credibility to a large part of the financial reporting system in any country.

The high quality of the financial reports depends on infrastructure assistance that works to ensure that the interpretation, translation and application of those standards in a precise way, and to identify issues and solve problems quickly, and include infrastructure:

- the presence of high quality standards for the audit process
- necessity of a professional companies specialized and independent audit with the development of effective national control of quality
- necessity of meet the requirements of quality control of all aspects of the audit profession
- necessity of supervision of the Securities and Exchange Commission on accounting standard mode
- necessity of supervision of the Securities and Exchange Commission on the operations of translation, interpretation and application of the standard through a process of review and comment by the corporate finance department to contribute.<sup>2</sup>

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<sup>1</sup>Nobes, C, and Parker, R, "Comparative International Accounting", 7th, ed, Prentice Hall, London,2002

<sup>2</sup> Saadani, Youssef, Zsofia Arvai, and Roberto Rocha , "A Review of Credit Guarantee Schemes in the Middle East and North Africa Region," Policy Research Working Paper 5612. World Bank, Washington, DC, 2011

### **Appropriate standards of information**

The accounting information must be characterized by appropriate feature, so as to increase its influence in the control the present and the internalization of the past to predict the future objectively make it easier for users to process that information and decision-making more accurate and highly efficient.

As if that information was inappropriate, but in order to achieve the appropriate recipe for that information must be provided with the following specific characteristics:

- Predictive capacity: information must be characterized by their ability to predict the future and increase confidence, so as to avoid potential losses and to increase the accuracy of the reserves to be configured for the future to meet the potential decrease in assets or increase liabilities, or both of them
- The possibility to validate expectations: requires user accounting information be able to take advantage of cryptographic ability to validate past expectations on the one hand, and guided the prediction of regarding future prospects on the other hand, this helps the decision maker in the correct expectations, especially when preparing budgets and specifically cash budget for both sides of the payments and receipts because the capacity of the information in the correct expectations assist in the implementation of budgets for the various activities.
- The appropriate timeliness: one of the most important characteristics of accounting information to provide to its users in a timely manner to take advantage of them to take appropriate decisions to address the imbalance and deficiencies in a timely manner, with less effort and the lowest level of costs and losses.
- Trust in information: to be the accounting information that has enough to rely on and trust in, this requires attention to the principle of disclosure, objectivity and impartiality of that information to reassure decision makers of confidence in this information, as reflecting a true reflection of real financial position of the Corporation and represent the results of our work are the best representation.
- Accounting information to be presented is useful for users to be available properties listed and also to achieve this requires that the professional organizations follow the method depends on the participation of all interested parties the criteria and instructions from professionals and users, academics.<sup>3</sup>

### **The role of accounting information in performance assessment**

To evaluate the performance different definitions of the performance appraisal system is which you can stand at the level of efficiency of the actual performance of all activities and put in front of those responsible for the management of the unit detailed picture of the results of this performance and detection abreast of decisions to treat the negatives and correct course of action in order to enhance performance and increase productivity.

The accounting information has essential role in the performance appraisal system. The performance of any organization cannot be done only through the availability of information with high quality specify how or value achievement to be achieved, and the information one of the pillars in the processes control and performance assessment and decision-making from the user's perspective the internal and external, where the outputs of the performance appraisal process and constitute control inputs to the decision-making processes both internally and externally and be useful and positive decisions if adopted on high-quality information, good a decision requires accurate and good information.

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<sup>3</sup> <http://www.isaca.org>

Through the difference of definitions prior to the accounting information systems, it a group of components or elements of human and machine working together within the organization, according to the procedures and specific rules for compile and run data on financial transactions and non-financial in order to provide information that management of the organization in planning and control, as well as external parties in make appropriate economic decision.

### **Risk assessment**

Risk assessment provides help to find out mechanism for identifying which risks represent potential opportunities and which could be pitfalls. Risk assessment gives organizations a clear view of variables to which they may be exposed, whether internal or external. Risk assessment process, helps management to better identify, evaluate, and exploit the right risks for their business, while maintaining the appropriate controls to ensure effective and efficient operations.

For risk assessments to yield meaningful results, certain key principles must be considered. A risk assessment should begin and end with specific business objectives that are anchored in key value drivers. These objectives provide the basis for measuring the impact and probability of risk ratings.

Risk assessment is a systematic process for identifying and evaluating events (i.e., possible risks and opportunities) that could affect the achievement of objectives, positively or negatively. Such events can be identified in the external environment (e.g., economic trends, regulatory landscape, and competition) and within an organization's internal environment (e.g., people, process, and infrastructure).<sup>4</sup>

While organizations have been conducting risk assessments for years, many still find it challenging to extract their real value. The linkage of risk assessment to drivers of shareholder value and key objectives has sometimes been lost. Risk assessments can be mandated by regulatory demands (Basel II) and focus on such processes as monitoring of client accounts, operational risk management, and internal control over financial reporting. Risk assessments can also be driven by an organization's own goals, such as business development, talent retention, and operational efficiency. Regardless of the scope or mandate, risk assessments must bring together the right parties to identify events that could affect the organization's ability to achieve its objectives, rate these risks, and determine adequate risk responses.

### **Risk analysis**

Risk analysis in a broad sense is the act of identifying and analyzing risk factors and finding it root cause. Risk analysis on the other hand consists of: identification of hazard in an organization. Risk analysis can be divided into two broad methods; these methods can be qualitative and quantitative. The qualitative risk analysis method is made for improving an organizations attention toward potential problems and this can be assist through analyzing this type of risk. However, quantitative risk analysis is made so that assurance can be implemented and so that it can be allowed to develop cost which can be implemented as well. This quantitative risk analysis is the simplest one to use and more often than not many organizations use it.<sup>5</sup>

Qualitative risk analysis is very beneficial because it can help companies to identify lots of hidden risk as well as valuable resources which are sensitive to these risks. Qualitative risk analysis does not only provide safety measures to be implemented but also

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<sup>4</sup>Bessis, J (2002). "Risk management in banking", John Wiley & Sons Ltd

<sup>5</sup> McNeil, A.J., Rüdiger Frey, Paul Embrechts, (2010), Quantitative Risk Management: Concepts, Techniques, and Tools

provide to those that could be effective if they are implemented. It is the main aim of the qualitative risk analysis to gain a level which can protect risk in pleasant ways and one which can improve upon the awareness among most of the organizations.

The base of this analysis is often calculation bases and it is not very important to know the value or assets involve. The quantitative risk analysis more or less does the same things does by qualitative risk analysis, it is also able to easily identify cases which are safeguarded. Quantitative is base highly instinctive which uses metrics that requires a higher level of effect provided to it. Risk analysis requires identification and documentation of all risks. Having identified each of the risk activities relevant to practice, there is a need to list them in order of severity and frequency. This is a difficult process as one risk activity may carry a high severity factor but the likelihood of something going wrong may be remote.

Risk analysis results and management plans should be updated periodically. There are two primary reasons for this:

- to evaluate whether the previously selected security controls are still applicable and effective
- to evaluate the possible risk level changes in the business environment. For example, information risks are a good example of rapidly changing business environment.<sup>6</sup>

### **Basel principles**

The Basel Committee on Banking Supervision (BCBS) is a committee of banking supervisory authorities that was established by the central bank governors of the Group of Ten countries in 1974. It provides a forum for regular cooperation on banking supervisory matters. Its objective is to enhance understanding of key supervisory issues and improve the quality of banking supervision worldwide. The committee also frames guidelines and standards in different areas, among them, are the international standards on capital adequacy, the Core Principles for Effective Banking Supervision and the Principles for the Management of Credit Risk.

The Basel Committee recognizes that each bank's specific disclosures will vary in scope and content according to its level and type of activities. Therefore, it may not be necessary for a bank to provide all the disclosures discussed in the paper, if particular information is not material for an external assessment of the bank. Nevertheless, all banks are expected to provide sufficient, timely, and detailed information that allows market participants to make meaningful assessments of the bank's credit risk profile. Apart from providing best practices for credit risk disclosure, the paper also discusses related supervisory information needs and the types of information supervisors collect on credit risk.

Basel II, initially published in June 2004, was intended to create an international standard for banking regulators to control how much capital that banks need to put aside to guard against the types of financial and operational risks that banks (and the whole economy) face. Basel II Framework is based on a forward-looking approach that enables improvements and adjustments of time to time. This is to ensure that the Basel II framework may follow changes in the market and developments in management risk. The Basel II calculate capital requirements in accordance with the bank's risk profile, as well as providing incentives for improvement in

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<sup>6</sup> Chapman, C, Ward.. S, (2007), Project Risk Management: Processes, Techniques and Insights, John Wiley & Sons

the quality of risk management practices in banking. By using a variety of alternative approaches (approaches) to measure credit risk (credit risk), market risk (market risk) and operational risk (operational risk), then the result is the calculation of bank capital which is more sensitive to risk (risk sensitive capital allocation).

In Basel II, bank capital calculations are contained in Pillar 1 -Minimum Capital Requirement. Various alternative approaches basically can be grouped into two major groups, namely the standard approach applied to all banks (standardized models) and the model of developed internal business activities in accordance with the characteristics and risk profiles of individual banks (internal models) making it more sophisticated. In the Principles for the Management of Credit Risk published in July 1999, the Principle 10 also stated that bank should develop and utilize internal risk rating systems in managing credit risk. The rating system should be consistent with the nature, size and complexity of a bank's activities.

Internal risk ratings are an important tool in monitoring and controlling credit risk. With the use of internal rating system, it will allow more accurate determination of the overall characteristics of the credit portfolio, concentrations, credits problem, and the adequacy of loan loss reserves. Internal risk rating system categorizes credits into various classes ranging from satisfactory to unsatisfactory designed to take into account the gradations in risk.

The Basel Committee has identified the following five broad areas in which banks should provide comprehensive and accurate disclosures:

- Accounting policies and practices;
- Credit risk management;
- Credit exposures;
- Credit quality;
- Earnings.

### **Bank loans**

Modern economies depend on credit to finance all forms of activity, from large commercial credits to retail credit such as mortgages and credit cards. Managing credit and understanding associated risks are as important to consumers as they are to bankers and investors. Commercial banks have a great influence on the growth of a nation's economy. The profitability of commercial banks is largely attributed to the interest charged on loans they advance to their customers. If these loans are defaulted, banks face the risk of collapsing and the entire economy will be threatened. Banks use credit derivatives to protect themselves against credit risk arising from loan defaulters. Loan defaulting has been and continues to be a cause of financial distress in the banking sector locally as well as globally.<sup>7</sup>

There are many reasons for giving and taking loans. The bank should have a detailed understanding of a loan's purpose in order to assess risk and be able to structure financing to the benefit of both the client and the bank. Loans that have a legitimate purpose in accordance with the policies of the bank serve to provide liquidity to the economy and financial support to the commercial and industrial sectors in support of economic growth.<sup>8</sup>

Main reasons for bank's loans:

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<sup>7</sup> Diamond, D W and Dybvig, P H, 'Bank Runs, Deposit Insurance, and Liquidity', Journal of Political Economy, Vol. 91(3), June, 1983

<sup>8</sup> Bank of England, 'The Measurement of Liquidity', Notice to Institutions Authorized under the Banking Act 1987, July, 1982

- Support or expand the productive capacity of businesses
- Utilize domestic inputs and suppliers which help forge strong integration of the economy
- Create the potential for exports and the development of foreign exchange
- Support private sector development
- Support the development and growth of individual firms
- Maximize the opportunity for employment growth
- Reduce import dependency

### **Evaluation of credit risk**

Within the regulatory restrictions bank determines future borrowers, loan types, forms the loan portfolio and sets interest rates. In forming the bank's loan portfolio follows the general principles for investors: a combination of high-and fairly risky investments with less profitable but less risky, and areas of lending. An important component of credit and investment strategy of the bank is the interest strategy. Demand for credit is related to the ability of investors to invest in the real economy, with a level of profitability of other ways of investment (investments in foreign currency, securities), the purpose and conditions of the loan, the degree of risk.

If a positive decision on granting a loan agreement is signed. Pre-agreed amount of credit can be further adjusted by the parties. In case of early repayment or partial use of his bank by the borrower loses a part of interest income. Credit portfolio is under constant control of the bank. Payments of interest the bank loses income, with non-return of principal bank writes off bad loans at cost and has a loss on the loan agreement. To determine the amount of credit risk the probability of its occurrence based on statistical data are calculated possible outcome of the credit transaction. Given the known distribution of the results of the credit agreement, determined by the expected return and standard deviation of the mean income and projected its sum.

Ways to minimize credit risk is to diversify the loan portfolio, a preliminary analysis of the creditworthiness and solvency of the borrower, the application of methods to ensure repayment of the loan (for example, collateral, guarantees) the formation of reserves to cover possible losses on loans. Credit risk mitigation is one of the tasks of the bank credit portfolio management. Methods of assessing credit risk are determined by the relevant standards.

Credit risk can be predicted on the basis of the method "liquidation period", according to which the loan or lending model driven by a specific time interval and coincides with the maturity of the debt obligation, or with the time needed for final payment on it. In the event the borrower defaults credit losses are the difference between the potential losses in default on a loan (the amount owed at the time of default) and the present value of future net consideration (payment the borrower minus the cost of providing compensation).

Methodology of credit and investment bank's strategy includes definitions of basic principles.

- The first principle is determined by the need of effective governance of banks in the context of globalization, high financial risks and uncertainty.
- The second principle is the need to adapt international experience to the domestic banking system, the specificity of which is to "chronic" crisis of the financial system, the formation of the banking sector in a fragile state of the industry and the drop in production.

Credit and lending operations are directly related and necessary to analyze the factors that determine the impact of the credit strategy of the bank. The basic principles of lending are the repayment, maturity, payment, security, targeted. It does not matter if the bank or the client acts as a lender. Credit components of the strategy are: the general rules for granting loans, loan classification, specific areas of credit strategy, quality control, credit committees. Banking power is measured by total funds available to the credit institution (intangible assets). This can be: skilled personnel loan officers; best forms and methods of credit, lending and investing experience, information technology in the field of lending.

Bank lending volumes are funds that the bank plans to invest in lending operations. In the development of credit and investment strategies of banks is the main task of understanding the global trends of social development and their role in this development. Mission -this is what the bank called and can carry over the entire period of its existence on the chosen path of activity; is what ultimately determines the bank's activities and distinguishes it from other financial institutions.

The basis of banking strategy is to predict the best alternatives for its development, the main factors of influence on the development strategy are uncertain, and profitability. Another factor in the credit and investment bank's strategy is to manage the interest rate mechanism. It needs to especially pay attention to inflation risk, which is divided on expected inflation risk and the risk of unexpected inflation (interest rate risk). It is therefore proposed to review the structure of interest rates using a linear model that takes into account the different types of risks through appropriate indices.

As part of the evaluation process, credit management also calls for determining the total credit line that will be extended to a given customer. Several factors are used as part of the credit management process to evaluate and qualify a customer for the receipt of some form of commercial credit. This includes gathering data on the potential customers' current financial condition, including the current credit score. The current ratio between income and outstanding financial obligations will also be taken into consideration.

It is well known that an inaccurate estimation of risk parameters leads to a loss of income that may arise from a lender and credited. In this case one party gains additional revenue equal to the sum of foregone profit partner of the credit transaction. Since the bank is always in a situation of a creditor (credit market) and credited (in the deposit market), the correct assignment rate of interest is a prerequisite for loss-free activity.

The revaluation process is complicated by the credit risk of loan default, which reduces the profitability of the bank. Bank deposit market is the subject of credit. The situation shows a mirror: the underestimation of a factor in the deposit rate the bank receives income and the revaluation-a loss. Based on assessment of the factors lending, we can conclude that the underestimation of the value of inflation in the credit interest rate, like the re-evaluation of its deposit rate to negatively affect the bank's activities.

A bank shall regularly analyze the structure and quality of its credit portfolio, including the assessment of concentration risk and residual risk, as well as assessment of future changes of this portfolio. The evaluation of credit rating continues to be an imprecise process. Over time, this approach needs to be standardized across institutions and across borrowers. In addition, its rating procedures need to be made compatible with rating systems elsewhere in the capital market. Credit losses, currently vaguely related to credit rating, need to be closely tracked. As in the bond market, credit pricing, credit rating and expected loss ought to be demonstrably closer. However, the industry currently does not have a sufficiently broad data base on which to perform the migration analysis that has been studied in the bond market.

The issue of optimal credit portfolio structure warrants further study. In short, analysis is needed to evaluate the diversification gains associated with careful portfolio design. At this time, banks appear to be too concentrated in idiosyncratic areas, and not sufficiently managing their credit concentrations by either industrial or geographic areas. Competent credit management seeks to not only protect the vendor from possible losses, but also protect the customer from creating more debt obligations that cannot be settled in a timely manner. Loans have become increasingly packaged for resale, meaning that an investor buys the loan (debt) from a bank or directly from a corporation. Bonds are debt instruments sold to investors for organizations such as companies, governments or



charities. The investor can then hold the debt and collect the interest or sell the debt on a secondary market. Banks are the main facilitators of funding through the provision of credit, although private equity, mutual funds, hedge funds, and other organizations have become important as they invest in various forms of debt. Financial assets, known as investments, are financially managed with careful attention to financial risk management to control financial risk. Financial instruments allow many forms of securitized assets to be traded on securities exchanges such as stock exchanges, including debt such as bonds as well as equity in publicly traded corporations.

Credit management analysis is the process of determining the operating and financial characteristics of the firm from accounting data, profit and loss account and balance sheet. The goal of credit analysis is to determine the efficiency and performance of the firm's management as reflected in the financial records and reports. The financial analysis is a starting point for making plans before using any sophisticated, forecasting and planning procedure. Hence the main objective of financial analysis is to make a detailed study about the cause and effect of the profitability and financial condition of the firm.

Financial statements generally refer to four basic statements the income statements, the balance sheet, the statement of retained earnings and the sources and uses of funds statements. The financial statements, taken together, give the accounting picture of the firm's operations and financial position. Sound financial health of a bank is the guarantee not only to its depositors but is equally significant for the shareholders, employees and whole economy as well. As a sequel to this maxim, efforts have been made from time to time, to measure the financial position of each bank and manage it efficiently and effectively.

Financial performance analyses assess the banks' profitability, solvency, liquidity and stability. Profitability is its ability to earn income and sustain growth in both short-term and long-term. A company's degree of profitability is usually based on the income statement. Solvency is its ability to pay its obligation to creditors and third parties in the long term. Liquidity is its ability to maintain positive cash flow, while satisfying immediate obligations. Stability is the firm's ability to remain in business in the long run, without having to sustain significant losses in the conduct of its business. Assessing a company's stability requires the use of both the income statement and the balance sheet.

### **Assessment of credit risk management**

The independent risk management assessment function shall ensure that the credit granting function is being properly managed and that credit exposures are consistent with official standards and the internal limits of the supervised entity that the management information systems provide correct and adequate data on the supervised entity's aggregate credit exposures and changes in these over time that internal controls have been designed in such a way that exceptions to policies, procedures and limits are reported in a timely manner to the appropriate level of management for action that the supervised entity has adopted procedures for changing over to more frequent customer monitoring in case of impaired payment capacity as well as procedures for managing problem credits. The independent risk management assessment function shall report directly to the board of directors and senior management.

Assessing credit risk requires us to model the probability of a counterparty defaulting in full, or in part, on its obligation. We can picture the credit decision in terms of the basic risk management model. This involves a decision either

- to extend credit, which provides a reward but entails a risk,
- or to refuse credit.

The requirement is to balance the gain from taking the credit risk by extending credit against the potential loss. In the decision problem the alternative is to refuse credit and not obtain any reward. The credit risk decision facing a firm relates to

- the gain if no default happens against
- the potential loss from extending credit based on the likelihood that default takes place and the amount that is lost if default occurs.

There are only two possible outcomes: the credit performs according to expectations or the credit defaults. If the credit defaults the cost to the credit manager will be the cost or the replacement value for what has not been provided.

For instance, in deciding whether to provide trade credit a firm faces a decision as to which applications to proceed with; what limit to set on the amount of credit extended and whether this needs to be modified over time; what action should be taken if there is a delay in repayment; and, which counterparties should be actively solicited for business.

Although the nature of the credit analysis decision can be readily described, the steps required to effectively manage the process are more complicated. In essence, the problem relates to the risk that counterparties will not honor their obligations when the moment comes for them to perform under their contract. Determining which counterparty may default is the art of credit risk management. Different approaches use judgment, deterministic, or relationship models, or make use of statistical modeling in order to classify credit quality and predict likely default frequency.

### **Financing the large scale project**

Project finance is a term used to describe the financing of any large capital investment that involves a longer time horizon with long run benefits. A significant part of project finance is arranged through credit. Usually projects are funded through a mix of debt and equity because it is nearly impossible for the promoters to raise sufficient equity for large projects. Project finance is different from other types of financing. Project financing is mainly of two types: non-recourse and limited recourse. A financial appraisal of any project finance has three main stages — cash flow forecasts, estimation of the economic worth of the project, and assessing the creditworthiness of the project. The project credit risk mitigants differ depending upon the project in hand in an ideal situation all risks arising from the project study should be covered.<sup>9</sup>

Projects like power plants, toll roads or airports share a number of characteristics that make their financing particularly challenging.

- First, they require large indivisible investments in a single-purpose asset. In most industrial sectors where project finance is used, such as oil and gas and petrochemicals, over 50% of the total value of projects consists of investments exceeding \$1 billion.
- Second, projects usually undergo two main phases (construction and operation) characterized by quite different risks and cash flow patterns. Most of the capital expenditures are concentrated in the initial construction phase, with revenues instead starting to accrue only after the project has begun operation.
- Third, the success of large projects depends on the joint effort of several related parties so that coordination failures, conflicts of interest and free-riding of any project participant can have significant costs. Moreover, managers have

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<sup>9</sup>Cooper, D., Grey, S., Raymond, G., and Walker, P., (2005). Project Risk Management Guidelines: Managing Risk in Large Projects and Complex Procurements. Chichester: John Wiley & Sons, Ltd

substantial discretion in allocating the usually large free cash flows generated by the project operation, which can potentially lead to opportunistic behavior and inefficient investments.<sup>10</sup>

### **Constructing the project cost model**

The project cost model includes all capital and operating costs associated with the project and also includes a costing for all the risks associated with project.

Key characteristics of the project cost model

- Expressed as the net present value (NPV) of a projected cash flow based on an appropriate discount rate for the public sector
- Based on the costs for the most recent, similar, public sector project, or a best estimate
- Costs expressed as nominal costs
- Depreciation not included, as it is a cash-flow model.

#### **Step 1: Provide a technical definition of the project**

What norms and standards will be applied in the project? What maintenance cycles are expected?

#### **Step 2: Calculate direct costs**

Direct costs are those that can be allocated to a particular service. These costs must be based on the most recent public sector project to deliver similar infrastructure or services (including any foreseeable efficiencies, for example regular life-cycle maintenance), or a best estimate where there is no recent comparable public sector project.

- Capital costs-Direct capital costs are specifically associated with the delivery of new services, including, but not limited to, the costs of design, land and development, raw materials, construction, and plant and equipment (including IT infrastructure). Direct capital costs should also account for the projects' labor, management and training costs, including financial, legal, procurement, technical and project management services. It is also important to include the costs of replacing assets over time.
- Maintenance costs-Direct maintenance costs will include the costs over the full project cycle of maintaining the assets in the condition required to deliver the specified outputs, and may include the costs of raw materials, tools and equipment, and labor associated with maintenance. The level of maintenance assumed must be consistent with the capital costs and the operating cost forecasts.
- Operating costs-Direct operating costs are associated with the daily functioning of the service and will include full costs of staff (including wages and salaries, employee benefits, accruing pension liabilities, contributions to insurance, training and development, annual leave, travel and any expected redundancy costs), raw materials and consumables, direct management and insurance.

#### **Step 3: Identify indirect costs**

The project's indirect costs are a portion of the institution's overhead costs, and will include the costs of: senior management's time and effort, personnel, accounting, billing, legal services, rent, communications and other institutional resources used by the project. The portion can be determined by using an appropriate method of allocation, including but not limited to:

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<sup>10</sup>Cooper, D., Grey, S., Raymond, G., and Walker, P., (2005). Project Risk Management Guidelines: Managing Risk in Large Projects and Complex Procurements. Chichester: John Wiley & Sons, Ltd

- number of project employees to total institutional employees for personnel costs
- project costs to total institutional costs for accounting costs
- number of project customers to total institutional customers for billing costs.

#### **Step 4: Identify any revenue**

The total cost of delivering the service should be offset by any revenues that may be collected.

Project revenue may be generated where:

- users pay for the service or a part thereof
- the use of the institution's assets generates revenue
- service capacity exists above the institution's requirement
- the institution allows third parties to use the service.

Any revenue collected must reflect the institution's ability to invoice and collect revenue.

#### **Step 5: Explain assumptions**

Explain in detail all assumptions the model makes about the inflation rate, the discount rate, depreciation, treatment of assets, available budget(s), and the government's Medium-Term Expenditure Framework (MTEF).

- Inflation-The model should be developed using nominal values. In other words, all costs should be expressed with the effects of expected future inflation included. Nominal figures reflect the true nature of costs, as not all costs are inflated at the same rates. This also allows for easy comparison with the institution's budget, which is expressed using nominal values.
- The discount rate-For practical purposes the discount rate is assumed to be the same as the risk-adjusted cost of capital to government.
- Depreciation-Since the PROJECT FINANCIAL MODEL is calculated on cash flow, not on accrual, non-cash items such as depreciation should not be included.

### **Project financial model**

In conventional public sector procurement, risk is the potential for additional costs above the project cost model. Historically, conventional public sector procurement has tended not to take risk into account adequately. Budgets for major procurement projects have been prone to optimism bias – a tendency to budget for the best possible (often lowest cost) outcome rather than the most likely. This has led to frequent cost overruns. Optimism bias has also meant that inaccurate prices have been used to assess options. Using biased price information early in the budget process can result in real economic costs resulting from an inefficient allocation of resources.

Much of the public sector does not use commercial insurers, nor does it self-insure (through a captive insurance company). Commercial insurance would not provide value for money for government, because the size and range of its business is so large that it does not need to spread its risk, and the value of claims is unlikely to exceed its premium payments. However, government still bears the costs arising from uninsured risks and there are many examples of projects where the public sector has been poor at managing insurable (but uninsured) risk.

#### **Step 1: Identify the risks**

Explore each risk category in detail. It is important to identify and evaluate all material risks. Even if a risk is unquantifiable, it should be included in the list. When identifying risks by referring to an established list, there is the possibility that in the list

generated for the project, a risk not listed may have been left out by mistake (as opposed to simply not being a risk for this specific project).

It may be difficult to compile a comprehensive and accurate list of all the types of risks. The following can be helpful sources of information:

- similar projects (information can be gathered from the original bid documents, risk matrices, audits and project evaluation reports)
- specialist advisors with particular expertise in particular sectors or disciplines.

### **Step 2: Identify the impacts of each risk**

The impacts of a risk may be influenced by:

- **Effect:** If a risk occurs, its effect on the project may result, for example, in an increase in costs, a reduction in revenues, or in a delay, which in turn may also have cost implications. The severity of the effect of the risk also plays a role in the financial impact.
- **Timing:** Different risks may affect the project at different times in the life of the project. For example construction risk will generally affect the project in the early stages. The effect of inflation must also be borne in mind.

It is essential to specify all the direct impacts for each category of risk. For example, construction risk is a broad risk category, but there could be four direct impacts, or sub-risks:

- cost of raw material is higher than assumed
- cost of labor is higher than assumed
- delay in construction results in increased construction costs
- delay in construction results in increased costs as an interim solution needs to be found while construction is not complete.

### **Step 3: Estimate the likelihood of the risks occurring**

Estimating probabilities is not an exact science, and assumptions have to be made. Ensure that assumptions are reasonable and fully documented, as they may be open to being challenged in the procurement process or be subject to an audit. There are some risks whose probability is low, but the risk cannot be dismissed as negligible because the impact will be high (for example the collapse of a bridge). In this case a small change in the assumed probability can have a major effect on the expected value of the risks. If there is doubt about making meaningful estimates of probability, it is best practice to itemize the risk using a subjective estimate of probability rather than to ignore it. Institutions should also be prepared to revisit initial estimates, if they learn something new that affects the initial estimate. Together with estimating the probability of a risk occurring, it is also necessary to estimate whether the probability is likely to change over the term of the project.

### **Step 4: Estimate the cost of each risk**

- Estimate the cost of each sub-risk individually by multiplying the cost and the likelihood.
- Assess the timing of each sub-risk.
- Cost the sub-risk for each period of the project term.
- Construct a nominal cash flow for each risk to arrive at its net present value.

### **Step 5: Identify strategies for mitigating the risks**

A risk can be mitigated either by changing the circumstance under which the risk can occur or by providing insurance for it. Indicate what the risk mitigation strategy for dealing with each particular risk will be, and the attendant cost of such mitigation. This is the most important part of the risk assessment and should identify specific steps taken or to be taken to mitigate risks.

### **Step 6: Construct the risk-adjusted project cost model**

Once costs have been established for all identified risks, the base project cost model must be risk-adjusted. This is done using the following simple formula:

### **Risk-adjusted cost= Base cost+ Risk**

#### **Step 7: Preliminary analysis to test affordability**

As a preliminary assessment of the project's affordability, compare the risk-adjusted project cost model with the institution's budget for the project as estimated during the solution options analysis. If the project looks unaffordable by a wide margin, it may be necessary to revisit the options analysis.

#### **Conclusion**

A cost-benefit analysis is a common type of business decision-making tool that involves quantitative reasoning. In a cost benefit analysis, managers decide the best course of action out of two or more possible courses of action by attributing values to the expected benefits of different courses of action and comparing those values. For example, if a company is trying to decide whether to spend its money on launching a new product or spending more toward advertising current products, it might conduct a cost-benefit analysis to estimate how much profit it could expect from each course of action and then choose the course that is expected to produce more profit.

A cost benefit analysis is used to evaluate the total anticipated cost of a project compared to the total expected benefits in order to determine whether the proposed implementation is worthwhile for a company or project team. If the results of this comparative evaluation method suggest that the overall benefits associated with a proposed action outweigh the incurred costs, then a business or project manager will most likely choose to follow through with the implementation.

Generally speaking, a cost-benefit analysis has three parts. First, all potential costs that will be incurred by implementing a proposed action must be identified. Second, one must record all anticipated benefits associated with the potential action. And finally, subtract all identified costs from the expected benefits to determine whether the positive benefits outweigh the negative costs.

- **Identifying Costs** The first step is to identify and quantify all costs associated with a proposed action. In order to successfully identify all potential costs of a project, one must follow the subsequent steps.
  - ✓ Make a list of all monetary costs that will be incurred upon implementation and throughout the life of the project. These include start-up fees, licenses, production materials, payroll expenses, user acceptance processes, training, and travel expenses, among others.
  - ✓ Make a list of all non-monetary costs that are likely to be absorbed. These include time, lost production on other tasks, imperfect processes, potential risks, market saturation or penetration uncertainties, and influences on one's reputation.
  - ✓ Assign monetary values to the costs identified in steps one and two. To ensure equality across time, monetary values are stated in present value terms. If realistic cost values cannot be readily evaluated, consult with market trends and industry surveys for comparable implementation costs in similar businesses.
  - ✓ Add all anticipated costs together to get a total costs value.

- **Identifying Benefits** The next step is to identify and quantify all benefits anticipated as a result of successful implementation of the proposed action. To do so, complete the following steps.
  - ✓ Make a list of all monetary benefits that will be experienced upon implementation and thereafter. These benefits include direct profits from products and/or services, increased contributions from investors, decreased production costs due to improved and standardized processes, and increased production capabilities, among others.
  - ✓ Make a list of all non-monetary benefit that one is likely to experience. These include decreased production times, increased reliability and durability, greater customer base, greater market saturation, greater customer satisfaction, and improved company or project reputation, among others.
  - ✓ Assign monetary values to the benefits identified in steps one and two. Be sure to state these monetary values in present value terms as well.
  - ✓ Add all anticipated benefits together to get a total benefits value.
- **Evaluate Costs and Benefits** The final step when creating a cost benefit analysis is to weigh the costs and benefits to determine if the proposed action is worthwhile. To properly do so, follow the subsequent steps.
  - ✓ Compare the total costs and total benefits values. If the total costs are much greater than the total benefits, one can conclude that the project is not a worthwhile investment of company time and resources.
  - ✓ If total costs and total benefits are roughly equal to one another, it is best to reevaluate the costs and benefits identified and revise the cost benefit analysis. Often times, items are missed or incorrectly quantified, which are common errors in a cost benefit analysis.
  - ✓ If the total benefits are much greater than the total costs, one can conclude that the proposed action is potentially a worthwhile investment and should be further evaluated as a realistic opportunity.

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