PROJECT MANAGEMENT

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PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)

- **Project operates in a dynamic environment, the project manager at every level require information with speed, precision and economy.**
- **PMIS is a database for the project which is designed for processing and systematizing the massive data generated in a project and feeding it to every level. [9]**
- **PMIS collects, analyses, stores, retrieves and disseminates project information for making project decisions. [10]**
- **It is a prerequisite of project control and vital for managing stakeholder expectations.**

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS) (Cont'd…)

Requirements of PMIS

- **Project forms are filled – in periodically based on the measurement of progress of each activity.**
- **The forms are entered in the PMIS and analysed to prepare a report for dissemination to all the concerned project personnel.**
- **Corrective actions are taken by the project manager based on performance deviations identified by PMIS reports.**

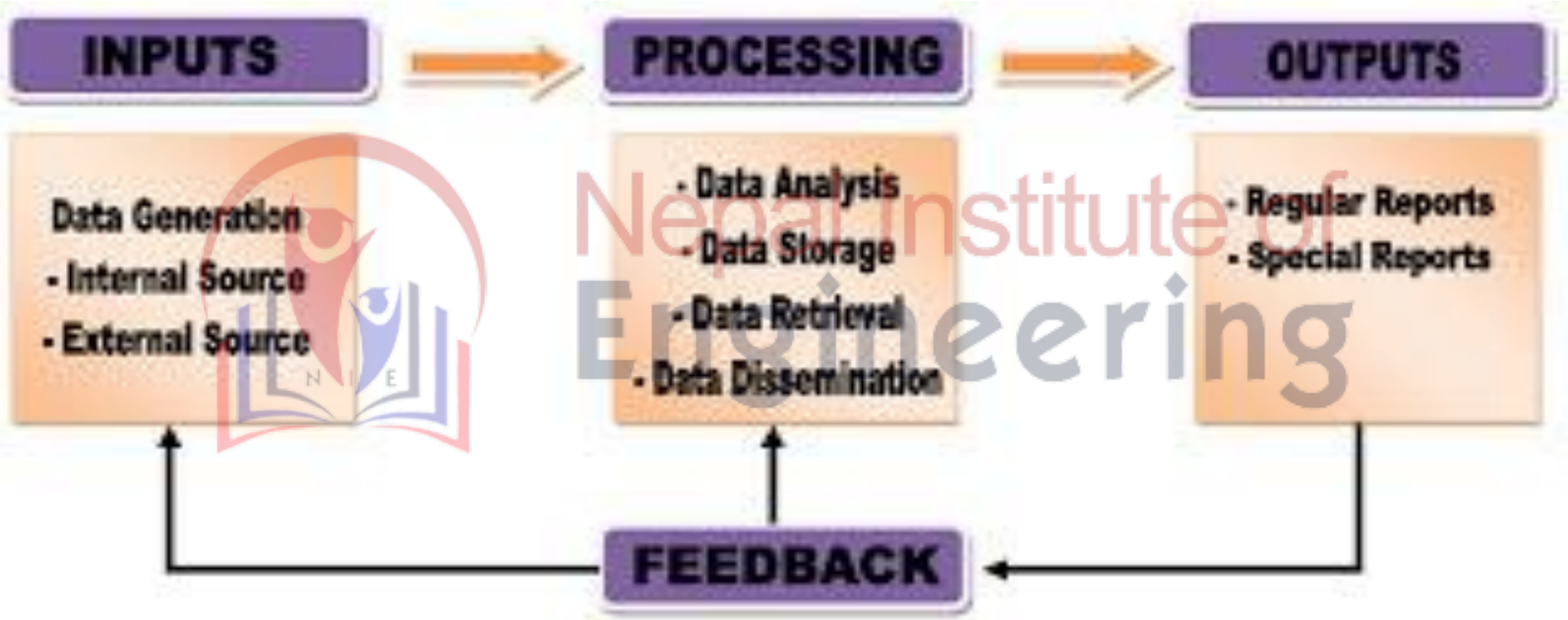
PMIS reports should identify critical points so that corrective actions can be taken.

OBJECTIVE OF PMIS

The main objective of the PMIS is to provide information to managers and supervisors of a firm in order to maximize its benefits through optimization of resources uses. Following are some of the specific objectives.

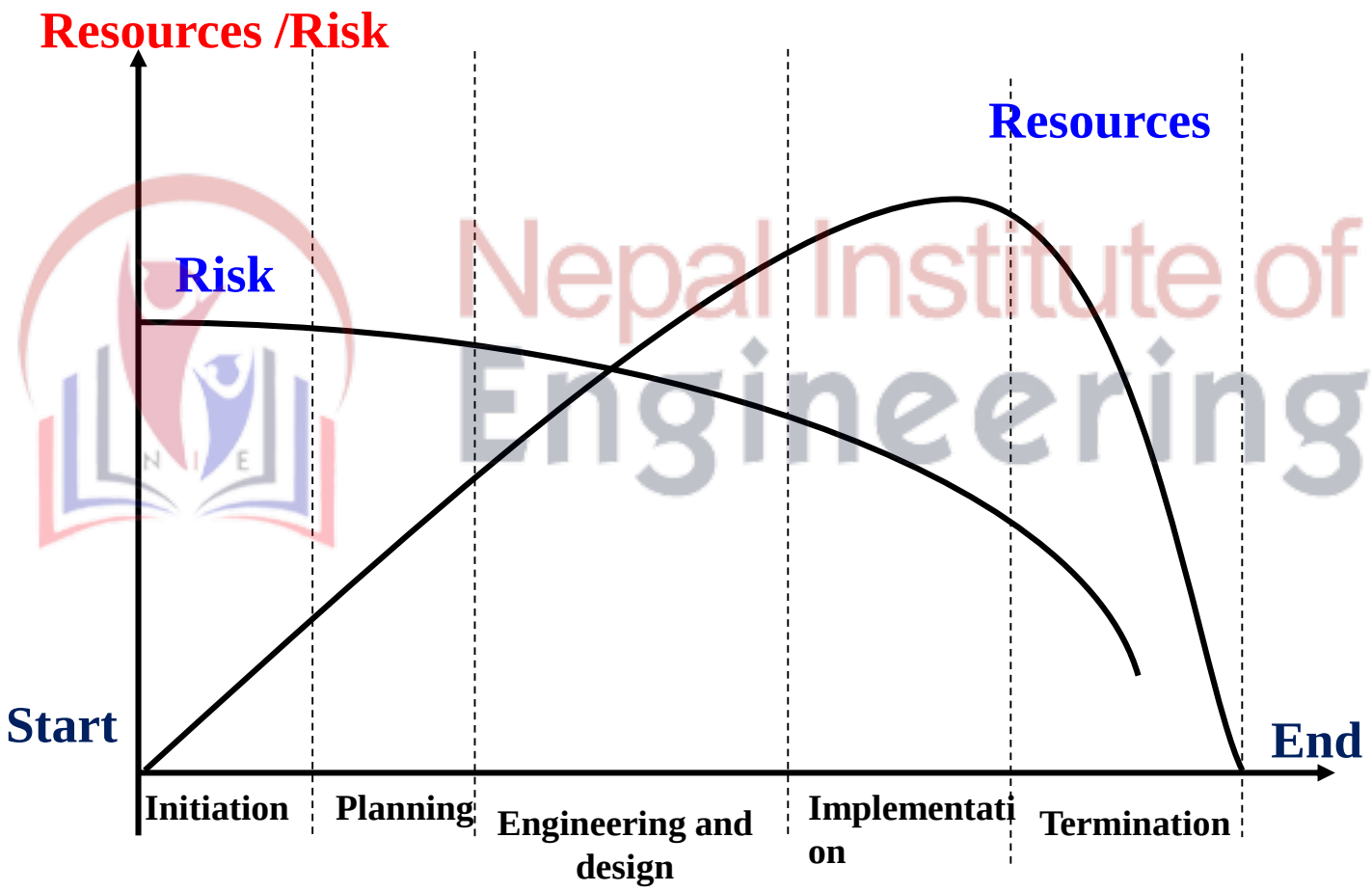
- **to reduce project duration**
- **to make better use of resources**
- **to increase resources productivity**
- **to decrease cost/price**
- **to bring the new facts to the knowledge**
- **to reduce uncertainty in decision making**

PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS) (Cont'd…)



Source:[11]

PROJECT RISK MANAGEMENT



INTRODUCTION TO PROJECT RISK (Cont'd…)

- Initially the risks and uncertainties level of the project are high.
- As project proceeds its phases the risk and uncertainties decreases.
- However, the project risk is never defined as zero. Effective Risk Management is essential in project to avoid failure.
- Every project is risky, meaning there is a chance things won't turn out exactly as planned.
- Project outcomes are determined by many things, some that are unpredictable and over which project managers have little control.

INTRODUCTION TO PROJECT RISK (Cont'd…)

- **Risk is a combination of the probability of a negative event and its consequences.**
- **If an event is inevitable but inconsequential, it does not represent a risk, because it has no impact.**
- **Alternatively, an improbable event with significant consequences may not be a high risk.**
- **These two factors are combined in what we experience as the possibility of loss, failure, danger, or peril.**
- $Project\ Risk = \sum(Events * Probabilities * Consequences$

INTRODUCTION TO PROJECT RISK (Cont'd…)

- **Project risk is an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective. [1]**
- **A risk has a cause and, if it occurs, an impact.**
- **For example, the cause may be having limited personnel assigned to the project.**
- **The risk event is that may take longer than planned or the personnel may not be adequate for the task.**
- **Project risk includes both threats to the project's objectives and opportunities to improve on those objectives.**

INTRODUCTION TO PROJECT RISK (Cont'd…)

- **The risk concept is broken down into two main criteria: [2]**

(a) the probability, which is the possibility of an undesirable occurrence, such as a cost overrun, and

(b) the impact, which is the degree of seriousness and the scale of the impact on other activities if the undesirable thing happens.

- **Using a mathematical description, a risk is described as follows:**

$$R = P \times I$$

- **Where R is the degree of risk, within [0,1] P is the probability of the risk occurring, within [0,1], I is the degree of impact of the risk, which is defined as being within [0,1]".**

INTRODUCTION TO PROJECT RISK (Cont'd…)

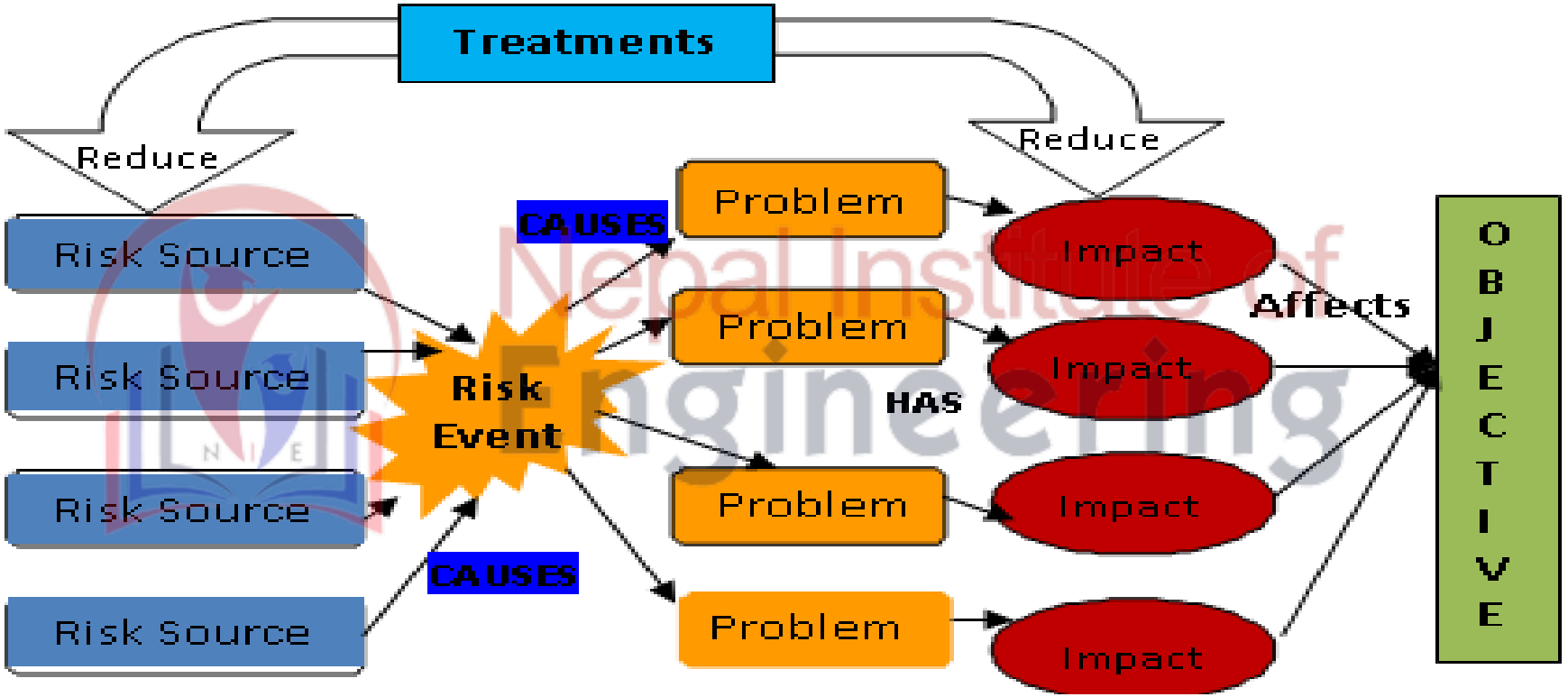


Fig: Risks have sources and impact objectives if untreated

Source: [3]

NATURE OF PROJECT RISK

1. Nation/Region

- ***Political situation-*** **war, revolution, civil disorders inconsistency of government policy.**
- ***Economical and Financial Situation*** **– GNP decreases, incompatible GNP, per capita, interest rate fluctuation, Inflati on rate increasing, Currency exchange rate fluctuation, tax rate increasing.**
- ***Social Environment-*** **Language barrier, Religious inconsistency, Culture tradition differences, insecurity and crime, Pestilence, Bribe and corruption, Popular in informal relationships, brotherhood.**

NATURE OF PROJECT RISK (Cont'd…)

2. Construction industry

- **Market fluctuations-** demanding decreasing structure changes.
- **Law and Regulations-** Incompatible arbitration system, complex planning approval and permit procedures, Import/export restrictions constraints on employment and materials availabilities, monetary restrictions.
- **Standards and codes-** inconsistencies in design/construction, Differences in safety and health care, Pollutions and nuisances.
- **Contract system-** Nonstandard contract form, difference in legal relationship between partners, Unfamiliar with contract conditions for claims and litigations, differences in defective liabilities, special local requirements.

NATURE OF PROJECT RISK (Cont'd…)

3. Company

- *Employer/Owner-* **Unclear requirements, funding shortages, disadvantaged contracts**
- *Architect-* **Unclear detail design or specifications, Unfamiliar with local standards and codes, Lack of interaction with construction method**
- *Labor and Sub contractors-* **Direct labor disturbances, Unfavorable sub contractors.**

NATURE OF PROJECT RISK (Cont'd…)

4. Internal

- Cash flow unbalance, Human resources shortages, affectin g other projects productivity decreases.

5. Materials and Equipment

- Unfavorable sub-suppliers, default supply of materials, equipment and plants.

6. Force Majeure

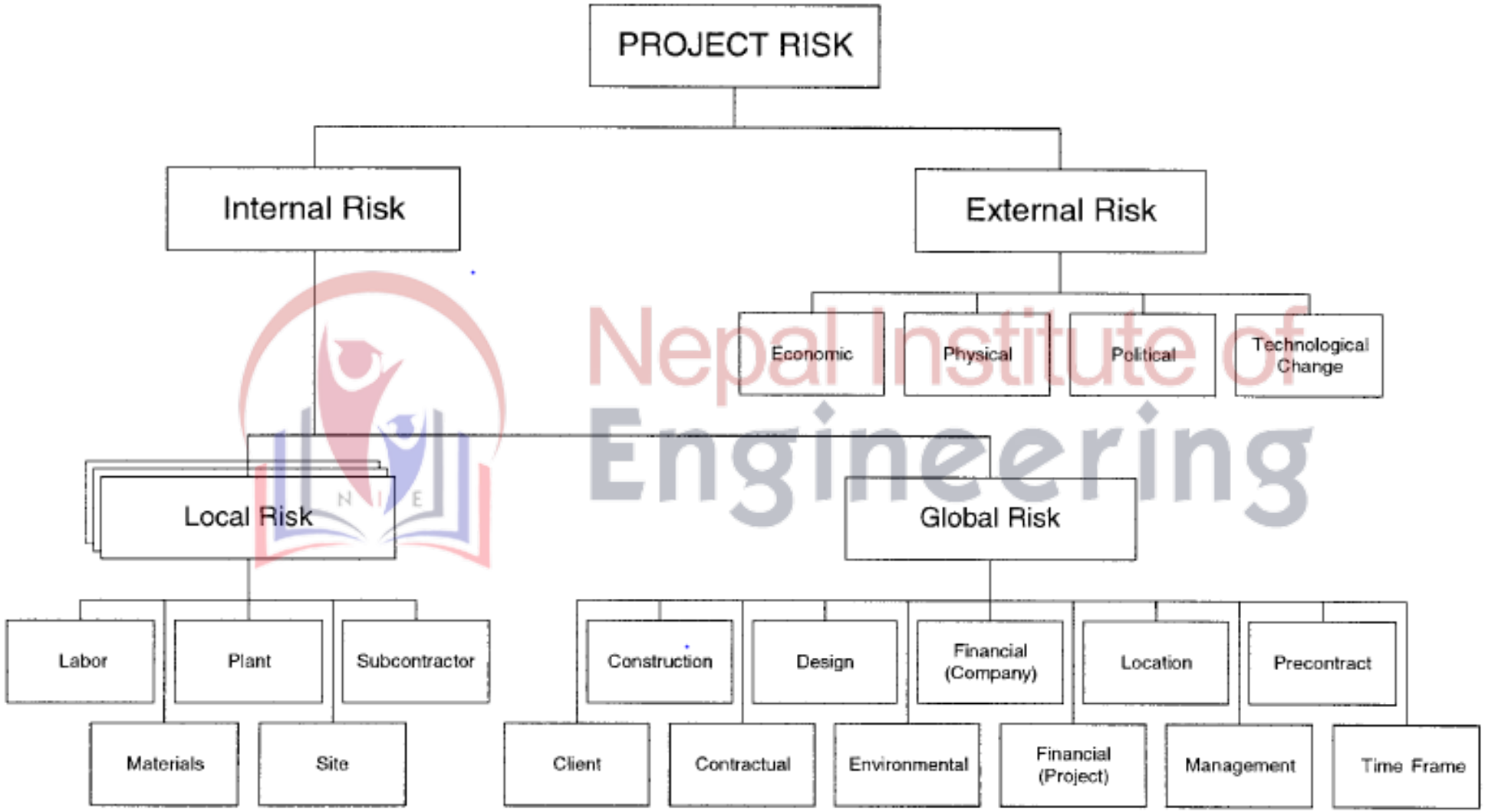
- Earthquake, fire, flood, bad weather and other events which are very difficult to predict.

NATURE OF PROJECT RISK (Cont'd…)

7. Project

- *Defective physical works* – **natural force, poor design, lack of proper construction techniques, damages by human errors, defective materials, difficulty in quality control.**
- *Schedule delay-* **incomplete design, late construction site posses sion, bad weather, unforeseen ground conditions, disturbances in labor, materials supplying, inefficient communications/ coordination.**
- *Cost Overrun-* - **unclear boundaries of works, inaccurate estimation, inadequate insurances, labor/materials/ price fluct uations.**

TYPES OF PROJECT RISKS



Source: [4]

TYPES OF PROJECT RISKS (Cont'd….)

- Every project is different and it is not possible to compile an exhaustive list of risks or to rank them in order of priority.
- What is a major risk for one project may be quite minor for another.
- In a vacuum, one can just discuss the risks that are common to most projects and possible avenues for minimizing them.
- However, it is helpful to categorize the risks according to the phases of the project within which they may arise:

(1) The design and construction phase;

(2) The operation phase; or

(3) Either phase.

TYPES OF PROJECT RISKS

1. Construction Phase Risk

Completion Risk

- **This phase carries the greatest risk for the financier.**
- **Construction carries the danger that the project will not be completed on time, on budget or at all because of technical, labor, and other construction difficulties.**
- **The elements which restricts project to be completed can be financial, contractual, operational, and environmental and can be caused by both internal and external sources.**

TYPES OF PROJECT RISKS (Cont'd….)

Common risks in completion include: [5]

- **Safety hazards that lead to worker accidents and injuries**
- **Managing change orders**
- **Incomplete drawings and poorly defined scope**
- **Unknown site conditions and poorly written contracts**
- **Unexpected increases in material costs**
- **Labor shortages and damage or theft to equipment and tools**
- **Natural disasters and issues with contractor and suppliers.**
- **Availability of building materials and poor project management**

TYPES OF PROJECT RISKS (Cont'd….)

2. Operation Phase Risk

(a) Resource/Reserve Risk

- **The risk that a firm or organization will be unable to operate at the same level of capacity and/or operate profitably in the future due to the decline (or exhausting) of the quantity and/or quality of the economic reserves of a core product or commodity. [6]**
- **This is the risk that for a mining project, rail project, power station or toll road there are inadequate inputs that can be processed or serviced to produce an adequate return.**

TYPES OF PROJECT RISKS (Cont'd….)

(b) Operating Risk

- Operational risk is the risk of loss resulting from ineffective or failed internal processes, people, systems, or external events that can disrupt the flow of business operations. The losses can be directly or indirectly financial. [7]
- These are general risks that may affect the cash-flow of the project by increasing the operating costs.
- Operating risks include, for example, the level of experience and resources of the operator, inefficiencies in operations or shortages in the supply of skilled labor.

TYPES OF PROJECT RISKS (Cont'd….)

(c) Market/Off-Take Risk

- **Market risk is the risk that a buyer cannot be found for the product at a price sufficient to provide adequate cash-flow to service the debt.**
- **The best mechanism for minimizing market risk before lending takes place is an acceptable forward sales contact entered into with a financially sound purchaser.**

TYPES OF PROJECT RISKS (Cont'd….)

3. Construction and Operation Phase Risk

(a) Participants /Credit Risk

- These are the risks associated with the sponsors or the borrowers themselves.
- The question is whether they have sufficient resources to manage the construction and operation of the project and to efficiently resolve any problems which may arise.
- To minimize these risks, the financiers need to satisfy themselves that the participants in the project have the necessary human resources, experience in past projects of this nature and are financially strong.

TYPES OF PROJECT RISKS (Cont'd….)

(b) Technical Risk

- **Technical risks are those events or issues associated with the scope definition, research and development (R&D), design, construction, and operation that could affect the actual level of performance vs. that specified in the project mission need and performance requirements documents. [8]**
- **Examples of technical risks include new and changing technology and changing regulatory requirements.**
- **Financiers usually minimize this risk by preferring tried and tested technologies to new unproven technologies.**

TYPES OF PROJECT RISKS (Cont'd….)

(c) Political Risk

- **This is the danger of political or financial instability in the host country caused by events such as insurrections, strikes, suspension of foreign exchange, creeping expropriation and outright nationalization.**

(d) Force Majeure Risk

- **This is the risk of events which render the construction or operation of the project impossible, either temporarily (eg. minor floods) or permanently (e.g. complete destruction by fire).**

ANALYSIS OF MAJOR SOURCE OF RISK

1. Change in project scope and requirements

- As a project progresses, a project team may later find that a planned project scope and requirements need to be revised due to changes in user requirements, more information gathered, and technical feasibility.
- As the project needs to be revised according to new scope and requirements, the impacts are typically in form of inefficiency, disruption, delay and increased cost.
- This source of project risk often occurs in later stage of the project.

ANALYSIS OF MAJOR SOURCE OF RISK (Cont'd….)

2. Design errors and omissions

- In any project, it is possible that someone does unintentional errors or omits to implement the project as planned.
- Due to the complex of the project and tight time frame, a project team may misunderstand due to ineffective communication.
- The examples of this source of risk are deficiency design document, improperly sized equipment, design calculation errors. Therefore, the impact includes delay of the project and additional costs.

ANALYSIS OF MAJOR SOURCE OF RISK (Cont'd….)

3. Inadequately defined roles and responsibilities

- This source of project risk is deemed a common source in any typical project because of changes in project management structure and ambiguous roles and responsibility.
- Inadequately defined roles and responsibilities can cause substantial and various project risks at any stage from the starting of the project to the ending of the project.
- The noticeable examples of this source of risk are ineffective project communication, different expectation, and lack of common direction. The impact includes overall project inefficiency, disruption and delay.

ANALYSIS OF MAJOR SOURCE OF RISK (Cont'd….)

4. Inaccurate cost and schedule estimates

- This source of risk results from ineffective project planning at the early stage of the project.
- If the cost and schedule of the project are not accurately planned and estimated, the entire project will be in the wrong direction and many issues will be escalated.
- The example of risk resulting from inaccurate cost and schedule estimates includes incorrect from project timeline and budget.
- The impact includes poor coordination, ineffective use of resources, delay of the project and increased project cost.

ANALYSIS OF MAJOR SOURCE OF RISK (Cont'd….)

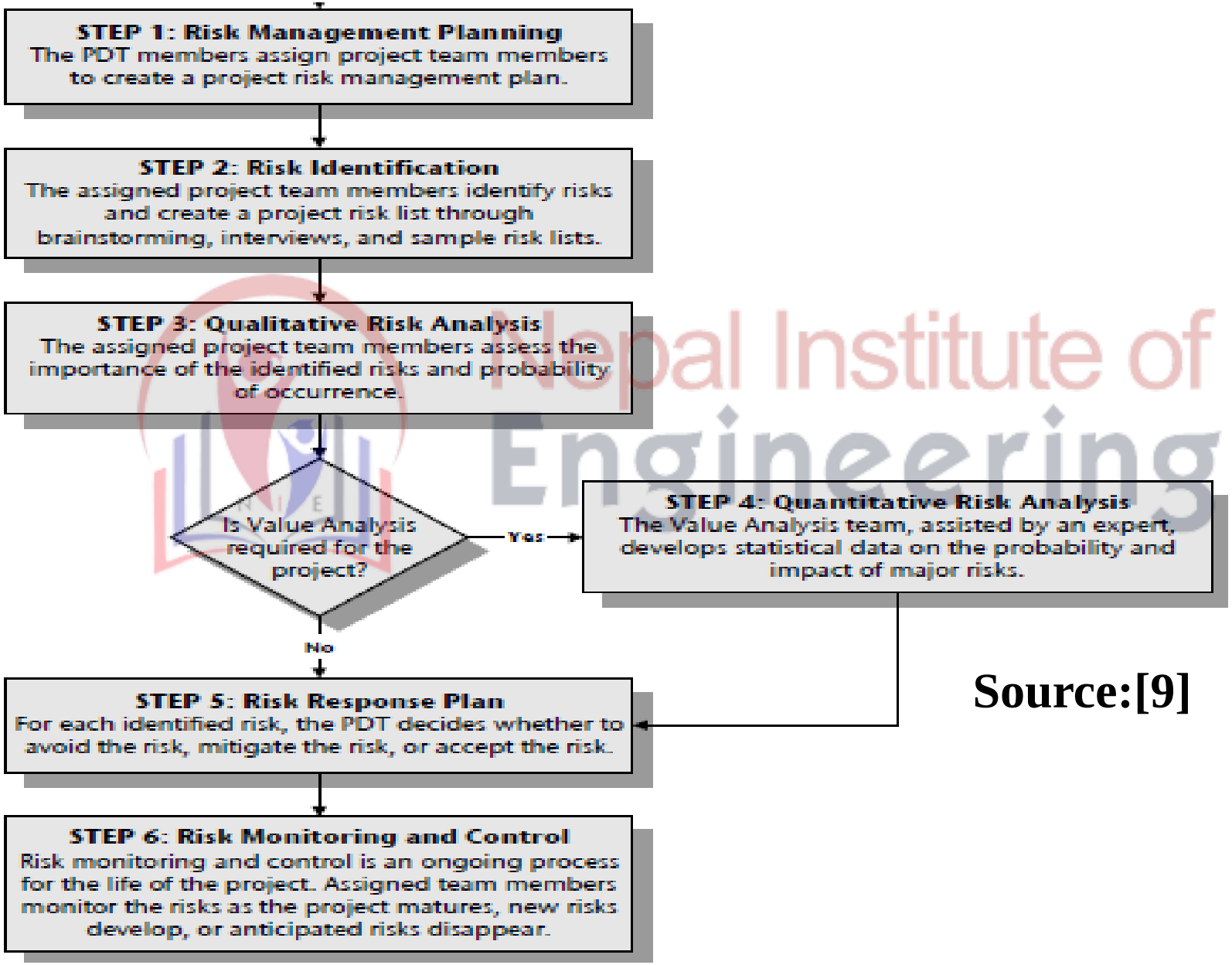
5. Force majeure

- This is the source of risk that is uncontrollable.
- Force majeure includes Acts of God, insurrection or civil disorder, war or military operations, national or local emergency, acts or omissions of Government or any competent authority, industrial disputes of any kind, fire, lightning, explosion, flood, subsidence, and inclement weather.
- All of these will adversely affect that project. In worst case, the impact is the complete stoppage of work.

EFFECTIVE MANAGEMENT OF PROJECT RISK

- ***Risk management*** **is the systematic process of planning for, identifying, analysing, responding to, and monitoring project risk. [1]**
- **It involves processes, tools, and techniques that will help the project manager maximize the probability and consequences of positive events and minimize the probability and consequences of adverse events.**
- **Project risk management is most effective when first performed early in the life of the project and is a continuing responsibility throughout the project.**

EFFECTIVE MANAGEMENT OF PROJECT RISK



Source:[9]

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

1. Risk Management Planning

- As part of work plan development, project development team (PDT) members assign project team members to create a project risk management plan.
- At this point, the assigned project team members begin to create the risk management plan.
- The risk management plan identifies and establishes in the project plan the activities of risk management for the project.
- To prepare the risk management plan, the assigned project team members use a spreadsheet that shows the risks and responses in an abbreviated form.

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

2. Risk Identification

- **Risk identification is identifying and defining potential risks that could impact the success of a project.**
- **The risk identification process includes defining the project scope, identifying potential risks, assessing the likelihood and impact of each risk, and developing mitigation plans for the most critical risks. [10]**
- **Risk management plan and risk break down structures are required for the risk identification process.**
- **The various sources are analyzed in order to identify the associated risk with the project through risk identification.**

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

- There are several techniques organizations can use to identify risks including brainstorming, root cause analysis, SWOT analysis, and expert judgment.

Risk Register (RR)

- Risk register is a record to document the results of the risk management process. It contains the following information.
  - List of identified risks with description
  - List of potential responses
  - Root causes of risk
  - Updated risk categories

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

3. Qualitative and Quantitative Risk Analysis

- **Qualitative risk analysis assesses the importance of the identified risks and develops prioritized lists of these risks for further analysis or direct mitigation.**
- **The team assesses each identified risk for its probability of occurring and its impact on project objectives.**
- **Team members sort the identified risks into high, moderate, and low risk categories for each project objective (time, cost, scope).**
- **Qualitative risk analysis is quick but subjective.**

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

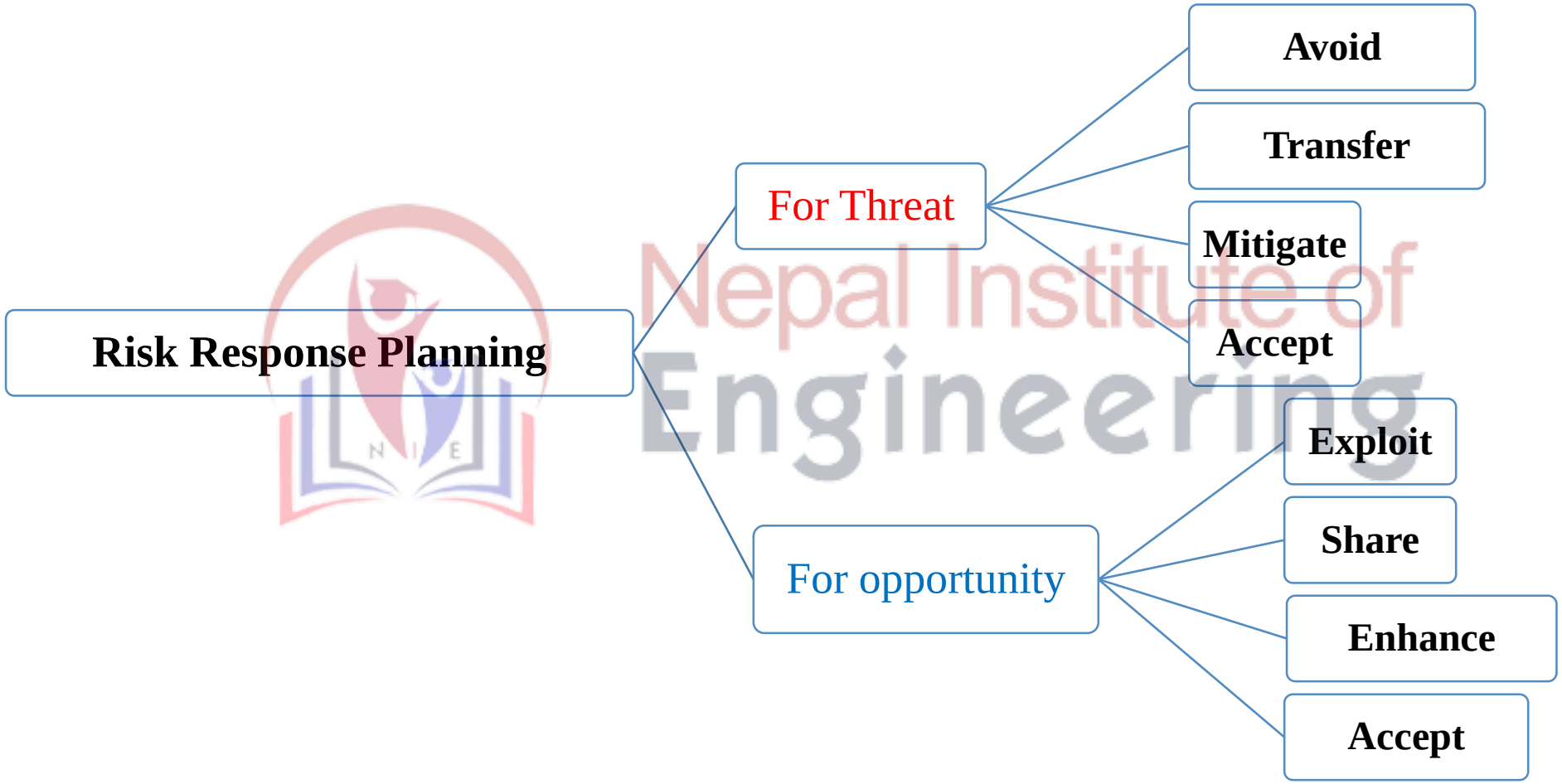
- On the other hand, Quantitative risk analysis is a way of numerically estimating the probability that a project will meet its cost and time objectives.
- Quantitative analysis is based on a simultaneous evaluation of the impact of all identified and quantified risks.
- Quantitative risk analysis involves statistical techniques that are most easily used with specialized software.
- Quantitative risk analysis is objective and has more detail, contingency reserves and go/no go decisions, but it takes more time and is more complex. [11]

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

4. Risk Response Planning

- Risk response planning addresses the matter of how to deal with risk.
- Risk response must be proportional to the severity of the risk, cost effective, timely, realistic and accepted as well as owned by all concerned parties of the risk management.
- Risk response planning focuses on the high-risk items evaluated in the qualitative and/or quantitative risk analysis.
- It identifies and assigns parties to take responsibility for each risk response.

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)



EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

Avoidance:

- **The team changes the project plan to eliminate the risk or to protect the project objectives from its impact.**
- **The team might achieve this by changing scope, adding time, or adding resources.**

Transference:

- **The team transfers the financial impact of risk by contracting out some aspect of the work.**
- **Transference reduces the risk only if the contractor is more capable of taking steps to reduce the risk and does so.**

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

Mitigation:

- **The team seeks to reduce the probability or consequences of a risk event to an acceptable threshold.**
- **They accomplish this via many different means that are specific to the project and the risk.**

Acceptance:

- **The project manager and the project team decide to accept certain risks.**
- **They do not change the project plan to deal with a risk, or identify any response strategy other than agreeing to address the risk if and when it occurs.**

EFFECTIVE MANAGEMENT OF PROJECT RISK (Cont'd….)

5. Risk Monitoring and Controlling

- **Risk monitoring and control keeps track of the identified risks, residual risks, and new risks.**
- **It also ensures the execution of risk response plans, and evaluates their effectiveness.**
- **Risk monitoring and control continues for the life of the project. The list of project risks changes as the project matures, new risks develop, or anticipated risks disappear.**
- **Risk monitoring and control is carried out by Risk Reassessment, Risk audits, Reserve Analysis and Status meetings.**

INTRODUCTION TO PROJECT FINANCE

- **In simple terms, money borrowed to finance a project can be called as project finance.**
- **Project finance is a method of raising long term debt financing for major projects through "financial engineering", based on lending against the cash flow generated by the project alone. [1]**
- **In other words, raising of funds required to finance an economically separable capital investment proposal in which the lenders mainly rely on the estimated cash flow from the project to service their loan. [2]**

INTRODUCTION TO PROJECT FINANCE (Cont'd..)

- **The structure of project financing relies on future cash flows for repayment of the project finances**
- **It is very much essential for all the stakeholders of a project to understand about project finance to manage the cash flow for ensuring profits so that it can be distributed among multiple parties.**
- **As the project proposal progresses through the stages of planning, analysis and selection, the contours of project financing become clearer. [3]**

INTRODUCTION TO PROJECT FINANCE (Cont'd..)

- **In practice, however, project financing is considered right from the time of the project conception.**
- **Project finance is especially attractive to the private sectors because they can fund major projects off balance sheet.**
- **It includes finance for natural resources projects (mining, oil, gas), independent power project, public infrastructure (road, transport, buildings etc.) and mobile telephone networks etc.**

FEATURES OF PROJECT FINANCE

- It is usually raised for new project rather than an established business.
- There is a high ratio of debt to equity, roughly project finance debt may cover 70-90% of the cost of a project. [1]
- Lenders rely on the future cash flow projected to be generated by the project for interest and debt repayment rather than value of its assets.
- The main security for lenders is the project company's contracts, ownership rights to natural resources.
- There are no guarantees from the investors in the project company (recourse finance) or only limited guarantees for the project finance debt.

INTRODUCTION TO PROJECT FINANCE (Cont'd..)

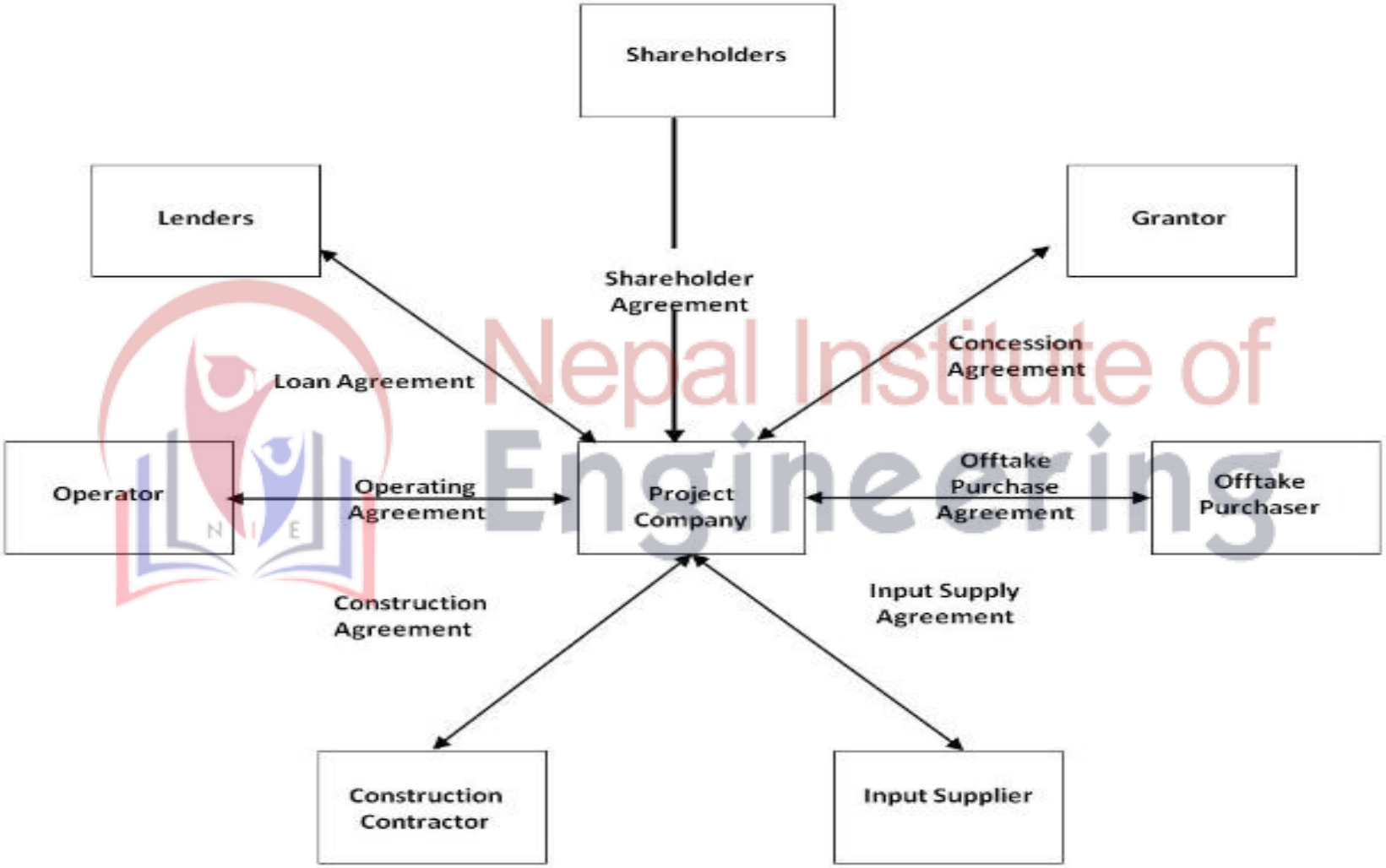


Fig: Model of Project Finance [4]

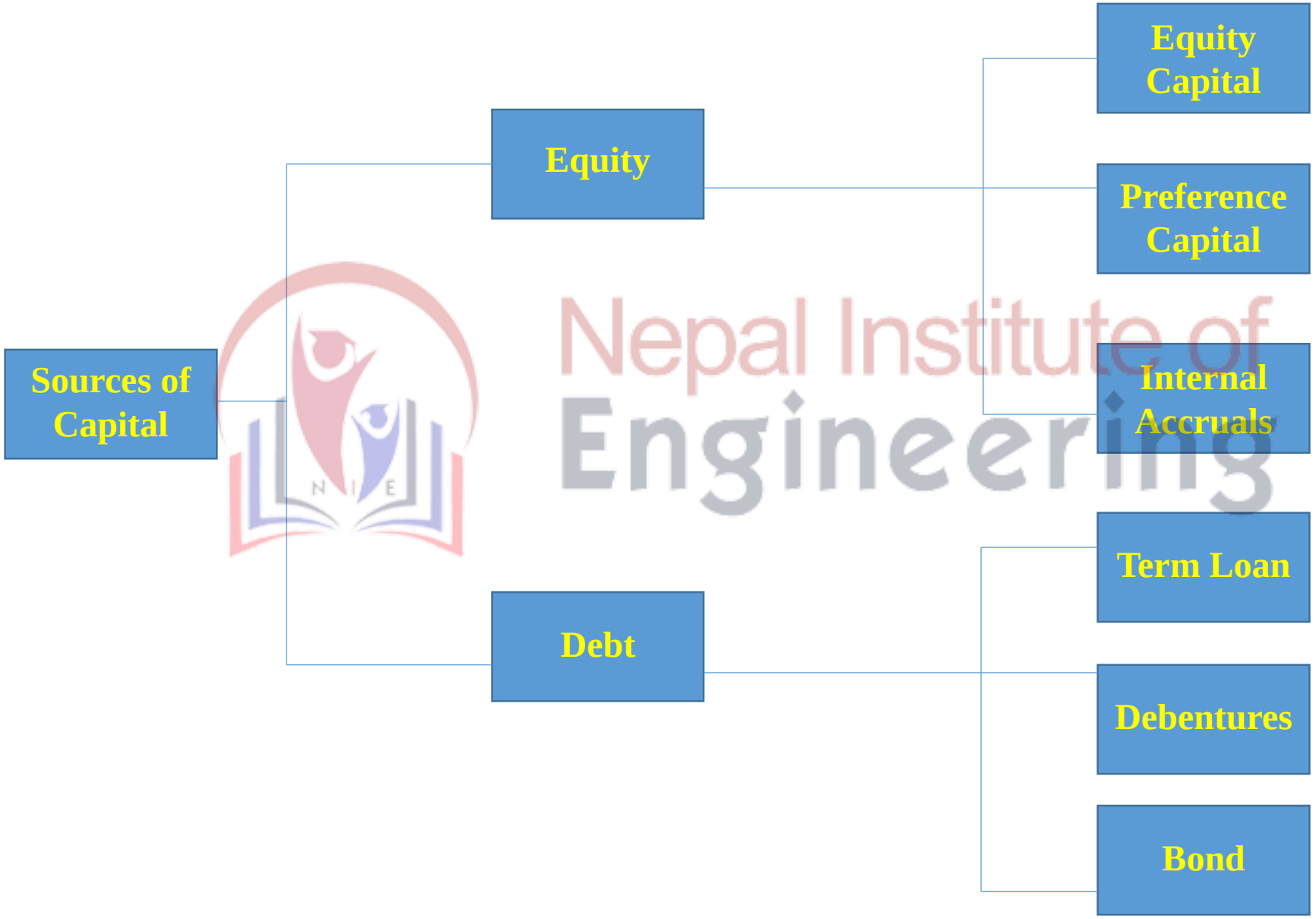
DIFFERENCE BETWEEN CONVENTIONAL AND PROJECT FINANCING

CONVENTIONAL FINANCING	PROJECT FINANCING
➢ A creditor makes an assessment of repayment of his loan by looking all the cash flows and resources of the borrower	➢ Cash flow from the project related assets alone are considered for assessing the repaying capacity.
➢ End use of the borrowed funds is not strictly monitored by the lenders	➢ The creditors ensure proper utilization of funds and creation of assets as envisaged in the project proposal.
➢ The creditors are not interested in monitoring the performance of the enterprise and they are interested only in their money getting repaid in one way or the other	➢ Project financiers are keen to watch the performance of the enterprise and suggest/take remedial measures as and when required to ensure that project repays the debt out of its cash generations.

DIFFERENCE BETWEEN CONVENTIONAL AND PROJECT FINANCING (Cont'd…)

- **Project finance is different from traditional finance because the credit risk associated with the borrower is non-recourse.[5]**
- **Unlike the traditional borrowing method, where the borrower bears the entire risk of repayment, in project finance, the borrower's liability to repay is limited.**
- **This is because the debt funding is non-recourse or limited recourse in nature.**
- **That being said, the lenders can not claim the personal assets of the project owner in case the latter defaults on repayment or the project fails.**

SOURCES OF PROJECT FINANCE



SOURCES OF PROJECT FINANCE (Cont'd..)

1. Equity

- Equity is simply the value of an investor's stake in a company. It is represented by the value of shares an investor owns.
- Stock ownership gives shareholders access to potential capital gains and dividends.

(a) Equity capital

- It represents ownership capital as equity shareholders collectively own the company.
- They enjoy the rewards and bear the risks of ownership.

SOURCES OF PROJECT FINANCE (Cont'd..)

(b) Preference capital

- It represents hybrid form of financing: some characteristics of equity and some attributes of debentures. [3]
- It resembles equity as preference dividend is payable only out of distributable profits.
- It represents debentures as the dividend rate of preference capital is usually fixed.

(c) Internal accruals

- It consist of depreciation charges and retained earnings.
- It is non cash charge and considered an internal source of finance.

SOURCES OF PROJECT FINANCE (Cont'd..)

2. Debt

- When a company borrows money to be paid back at a future date with interest it is known as debt financing.
- Debt financing is essentially the act of raising capital by borrowing money from a lender or a bank, to be repaid at a future date.

(a) Term Loan

- A term loan provides borrowers with a lump sum of cash upfront in exchange for specific borrowing terms.
- Borrowers agree to pay their lenders a fixed amount over a certain repayment schedule with either a fixed or floating interest rate. [6]

SOURCES OF PROJECT FINANCE (Cont'd..)

(b) Debentures

- A debenture is a bond issued without any collateral. It is also known as unsecured bond.
- Thus, debenture holders are the general creditor of the company.
- A company having strong credit position and highly profitable investment, and high amount of assets issue debenture.

(c) Bond

- A bond is essentially a long-term note given to the lender by the borrower, stipulating the terms of re-payment and other conditions.

CAPITAL BUDGETING

- **Capital budgeting is a process that businesses use to evaluate potential major projects or investments.**
- **It may be defined as the firms' decision to invest its current funds most efficiently in long term activities in anticipation of an expected flow of future benefit over a series of years.**
- **The long term activities are those activities which affects firms' operations beyond the one year period.**
- **Capital Budgeting consists in planning development of available capital for the purpose of maximizing the long term profitability of the concern. [7]**

FEATURES OF CAPITAL BUDGETING

1. The exchange of current funds for future benefit (i.e. funds are invested only for future benefit)
2. Potentially large anticipated benefits.
3. A relatively high degree of risk.
4. The future benefits will occur to the firms over a series of years (i.e. funds are invested only if future benefits occur over a series of years)
5. Relatively long time period between the initial outlay and the anticipated return.
6. They are irreversible decisions.
7. They are among the most difficult decision to make.

PROCESS OF CAPITAL BUDGETING

1. Project Generation

- Any project needs a written material - proposal – to initiate dialogue on funding.
- So, project generation is development of proposal for investment decision.
- The proposal may focus in adding new equipment for increasing the rate of production, or it may focus to reduce the cost of production.
- The healthy firm is one in which there is a continuous flow of profitable investment proposals.

PROCESS OF CAPITAL BUDGETING (Cont'd…)

2. Project Evaluation

- **While evaluating a project, following point should be considered:**
  - **(a)Estimate on cash flow, which is difficult, as future is uncertain,**
  - **(b)Selection criteria to judge the project viability**
  - **(c)Estimated benefit over cost**
- **Project evalution is done by expert groups. It involves two steps:**

(a) estimation of benefit and costs, the benefits and costs must be measure in terms of cash flow, and

(b) selection of appropriate criterion to judge the viability of the project

PROCESS OF CAPITAL BUDGETING (Cont'd…)

3. Project Selection

- The screening and selection procedure may vary from firm to firm.
- Since the capital budgeting decisions are of considerable significance for several reasons, the final approval of the project may generally rest on top management.
- However, projects are screened at multiple levels.
- Sometimes the top management may delegate authority to approve certain type of investment proposals.

PROCESS OF CAPITAL BUDGETING (Cont'd…)

4. Project Execution

- After the final selection of the investment proposal, the funds are appropriated for capital expenditure.
- The formal plan for appropriation of funds is called capital budget.
- Such plans are prepared or approved by the project execution committee or the top management.

INVESTMENT DECISION CRITERIA (Cont'd…)

A. Traditional criteria

a. Payback period

i. Simple Payback period and

ii. Discounted payback period

b. Accounting rate of return (ARR)

B. Discounted Cash Flow (DCF) criteria

a. Net present value/Net future value /Net annual value

b. Internal Rate of Return (IRR)

c. Profitability index or B/C ratio

METHOD OF WORK EXECUTION

- **Work execution is a procurement of any goods, consultancy services or carrying out any construction work.**
- **A project can be executed by the department (owner), by contracting and by the local user committee.**
- **Construction methodology or project execution methodology is the planned method of construction, taking into account all contractual and legal requirement, constraints, risks and opportunities. [1]**
- **Construction work can be done for the supply of goods, construction works itself and services.**
- **Work can executed through contract with either through sealed bidding, sealed quotation or any other method.**

METHOD OF WORK EXECUTION (Cont'd..)

1. Sealed Competitive Bidding

(a) National Competitive bidding (NCB)

- It is sometimes called as local competitive bidding which is normally used for public procurement in a country.
- In this process all the domestic eligible bidders are invited to participate in bidding .
- For NCB in Nepal, tender notice is to be published in national newspaper and a period of at least 30 days shall be given. [2]

METHOD OF WORK EXECUTION (Cont'd..)

(b) International Competitive bidding (ICB)

- If the amount of work is a large and national/domestic contractors cannot perform the job, eligible bidders are invited from all over the world.
- This provides an executing agency with a wide choice in selecting the best bid from competing suppliers and contractors.
- It gives prospective bidders from eligible source countries equal opportunity to bid on goods and works that are being procured. [3]
- The objective of ICB is to provide all eligible bidders a timely and adequate notification about a buyer's requirements.
- ICB is the most appropriate procurement method that provides a level-playing field for eligible bidders.

METHOD OF WORK EXECUTION (Cont'd..)

2. Sealed Quotation

- **Sealed quotation means the description along with quoted price submitted in a sealed envelope by a person, firm, company or organization willing to carry out any construction work or make available goods or other services.**
- **A notice shall be published in a national or local level newspaper by giving a period at least of fifteen days.**
- **The sealed quotation, once submitted, cannot be withdrawn or amended.**

METHOD OF WORK EXECUTION (Cont'd..)

3. Direct Procurement [2]

- Direct procurement can be done.
- If only one supplier or consultant or service provider has the efficiency to fulfil the procurement requirements.
- If only one supplier has the exclusive right to supply the goods to be procured and no other appropriate alternative is available.
- If the service of a particular consultant with his unique qualifications is immediately needed for the concerned work.

CONSTRUCTION DELIVERY METHODS

- **Delivery method means the approach used to organize the project team so as to manage the entire designing and building (design-build) process. [4]**
- **Owner needs to decide which designers and construction professional to hire, when to hire them, and under which contract.**
- **Which organization gets hired first? Only one company is hired to manage the process?**
- **There are number of strategies that can be used to manage the process, each offering advantages and disadvantages.**

CONSTRUCTION DELIVERY METHODS (Cont'd…)

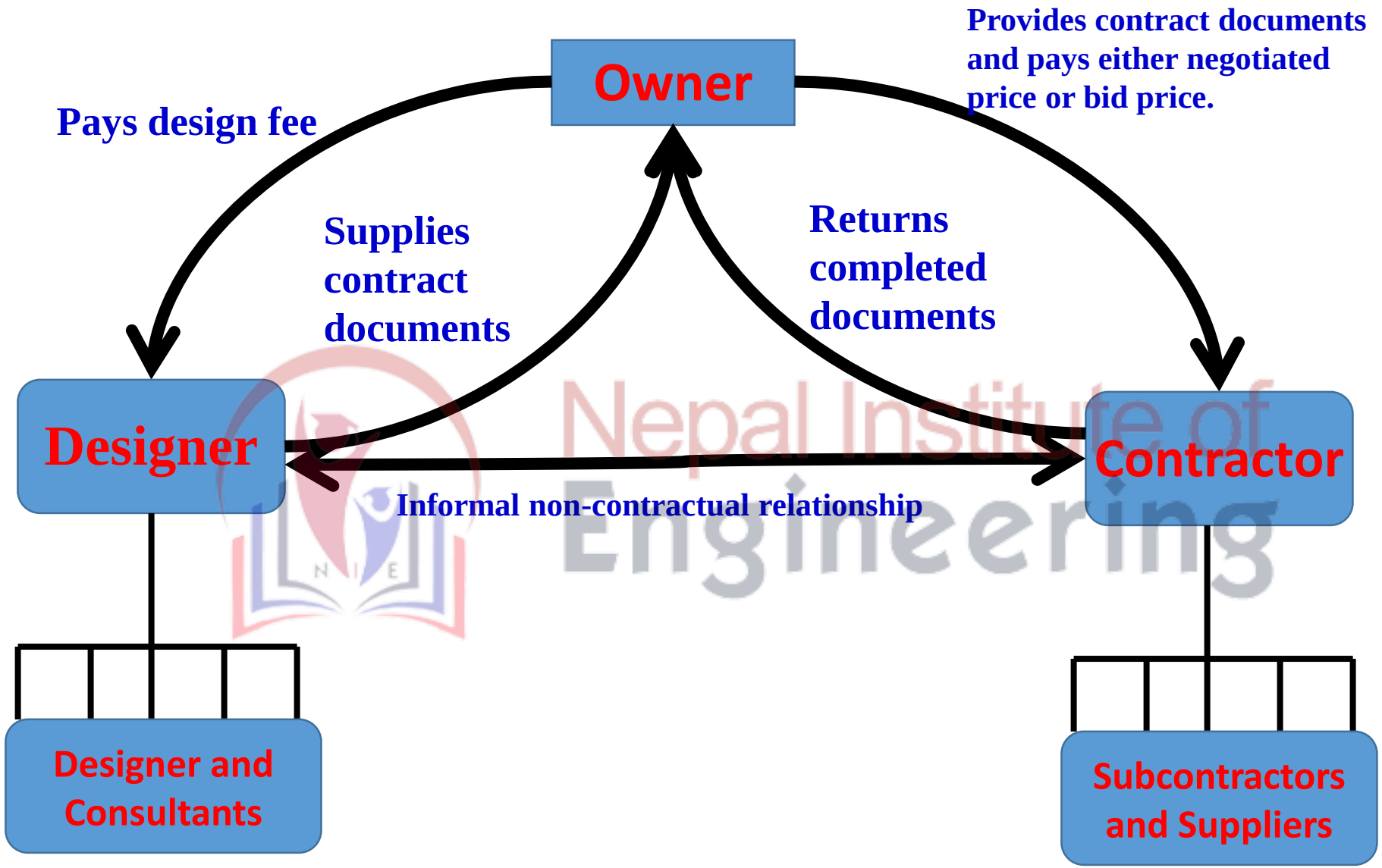
- **The most popular three approaches are:**

1. **Traditional Method**
2. **Design-Build Method**
3. **Construction Project Management**

CONSTRUCTION DELIVERY METHODS (Cont'd…)

1. Traditional Method

- In this, the owner hires a design professional who prepares a complete set of contract documents for the owner for a design fee.
- With complete set of documents in hand, the owner either negotiates a price with a general contractor or bids out the work.
- The general contractor is totally responsible for delivering the completed project as spelled out in contract documents.
- The designer may be involved in overseeing the construction work in the field.
- No direct formal relationship exists between the designer and builder.



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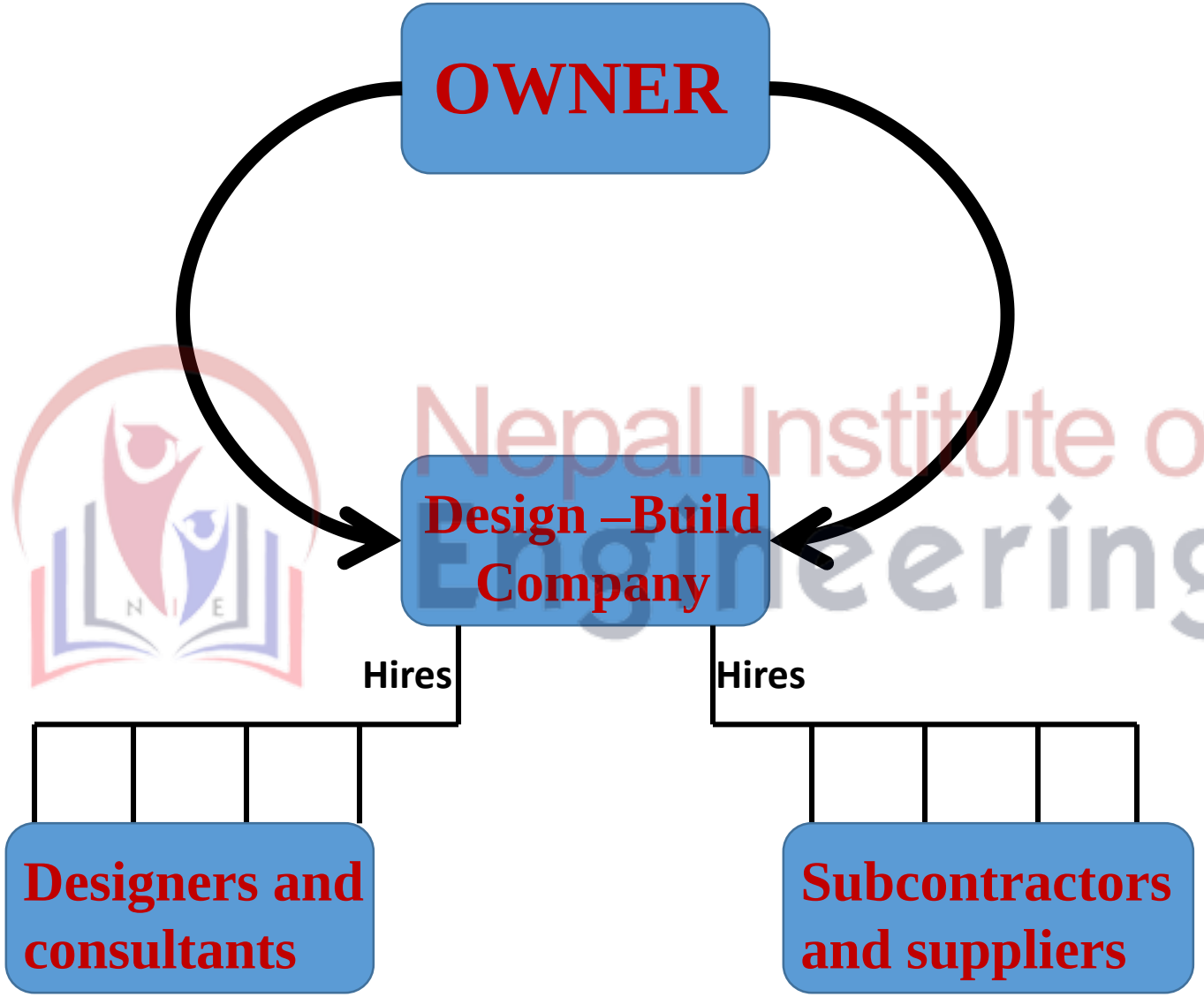
CONSTRUCTION DELIVERY METHODS (Cont'd…)

2. Design-Build Method

- In this arrangement, the designer and the construction professionals are either from the same company or through joint venture form a single company for the duration of the project.
- The owner contracts with a single company early in the pre construction stage, and this company takes the project from conceptual design right through construction.
- The term "Turn-Key" is also used to describe this approach.
- It has been used on large, privately funded industrial sector project, commercial building project.



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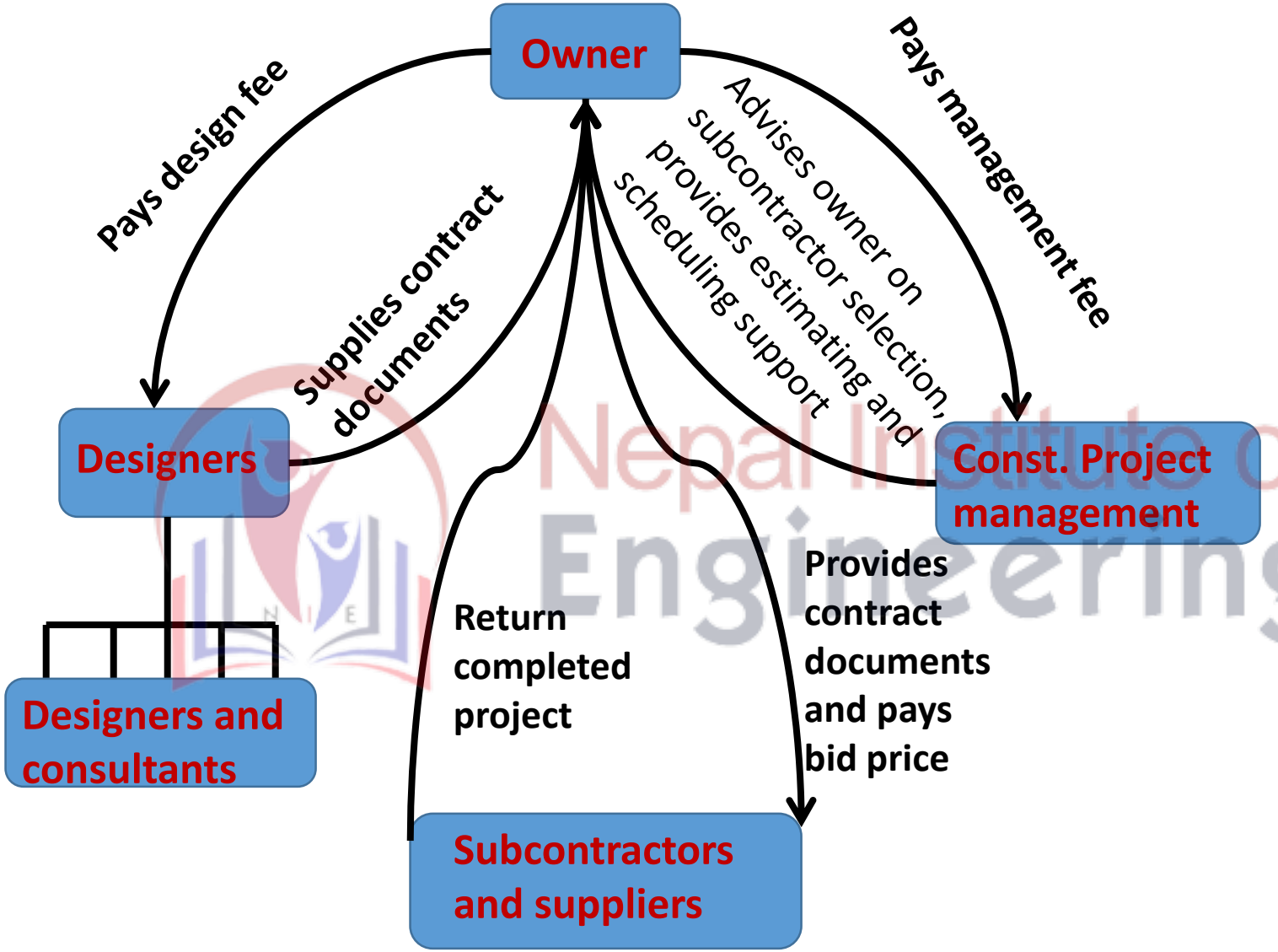
CONSTRUCTION DELIVERY METHODS (Cont'd…)

3. Construction Project Management

- It treats the project planning, design, and construction phases as integrated task.
- This approach unites three parties team consisting of owner, designer, and construction manager.
- The team works together from the beginning of design to project completion, with common objective of best serving the owner's interest.
- This delivery has a number of variations such as program management, professional management, construction management.
- This method is commonly used by real estate developers in the commercial building industry.


Owner
Pays design fee
Pays management fee
Supplies contract documents
Advises owner on subcontractor selection, provides estimating and scheduling support
Designers
Const. Project management
Designers and consultants
Return completed project
Provides contract documents and pays bid price
Subcontractors and suppliers

Source: [4]

CONSTRUCTION CONTRACTS

- **Construction contracts are the written agreements signed by the contracting parties (mainly an owner and a contractor), which bind them, defining relationships and obligations. [5]**
- **Contract is an agreement between two or more than two persons to do or not to do something, which can be enforceable by law.**

Legal Definition

- **Mutually binding agreement that obligates the seller to provide the specified product or services and obligates buyer to pay for the same.**
- **An agreement that affects the legal relationship between the two or more parties.**

CONSTRUCTION CONTRACTS (Cont'd..)

- ***"All contracts are agreements but all agreements are not contracts."***

Agreement + legality = Contract

- **Agreement is the acceptance of the offer (proposal) with or without any condition. It may not have legal obligation.**
- **But contract is an agreement concluded between two or more parties for performing or not performing any work enforced by law.**

CONSTRUCTION CONTRACTS (Cont'd..)

WHY USE CONTRACTS IN CONSTRUCTION?

- Describe Scope of work.
- Establish timeframe.
- Establish cost and payment provision.
- Set forth obligations and relationships.
- Manage multiple risks.
- Establish control mechanism
- Minimize disputes.
- Improve economic return on investment.

CONSTRUCTION CONTRACTS (Cont'd..)

Elements of a Contract

- Offer and acceptance
- Free consent (offer should be accepted freely without coercion)
- Legal relationship
- Written (verbal agreement cannot be a contract)
- Competent parties (age below 18 years or out of self control cannot enter into a contract)
- Lawful purpose (both parties agree to perform against country law, contract is invalid)
- Possibility of performance
- Certainty (should not be ambitious vague)
- Consideration (both parties should be benefited)

CONSTRUCTION CONTRACTS (Cont'd..)

Factors to be Considered in Preparing Contract Document

- **The contract must be fair and clear**
- **Contract language must be consistent**
- **No repetition (say it once, say it in proper place)**
- **Use each part of contract for its proper purpose**
- **Contract information must be retrievable**
- **Use foresight (try to foresee any possible area of confusion and clear them up in advance)**
- **If you want to it, get it in the contract.**

TYPES OF CONTRACT

A. Contract as per enforceability

1. Valid Contract - **If all the elements of contract are present, the contract is valid.**

2. Voidable Contract - **As per contract act, following contracts are voidable, i.e. if the party desire to make it void (invalid).**

- **Forceful contract or contract against free consent or contract involving fraud.**
- **Entered due to undue influence**
- **Contract involving fraud or misstatement.**

3. Void Contract - **As per contract act the following contracts become null and void.**

- **Contrary to statutory law**
- **Not possibility of performance**
- **Contrary to public policy and welfare.**
- **Signed by incompetent parties.**

TYPES OF CONTRACT (Cont'd…)

B. As per method of payment

1. Lump Sum / Fixed Price Contract

- Contractor are free to use any method & means to complete a project.
- Contractor is responsible for proper work performance.
- Project scope and limits are defined prior to the start of construction.
- Before the start of construction, the total construction cost is defined and a definite contractual commitment between the owner and contractor is established.
- Contractor has greater ability to earn profit.

TYPES OF CONTRACT (Cont'd…)

- **2. Item rate Contract**
- **Require sufficient design definition to estimate quantities of unit.**
- **Contractors bid on unit of works.**
- **Payment is made of the contractor by detail measurement of the work actually executed by the contractor.**
- **Final contract price is not known until the last item of work is measured and invoiced by the contractor.**
- **The risk for the owner is if estimated quantities are significantly different from the reality of the situation, the financial commitment of the owner may be greater than planned. [4]**

TYPES OF CONTRACT (Cont'd…)

C. Reimbursable or Cost Plus Contract

- **Final cost is owner responsibility and Less design definition is required.**
- **Can contract in early stages of project.**
- **Can mix fixed cost with reimbursable cost**
  - **Overhead & Profit at fixed rate**
  - **Reimburse labor, material and equipment at cost.**
- **Owner has more control over contractor and Contractor has little risk and no incentive to control costs.**

Reimbursable Contract

- **Cost + Fixed Fee**
- **Cost + percent of cost Fee**
- **Cost + Fixed Fee +Profit Sharing**
- **Cost + sliding Fee**

TYPES OF CONTRACT (Cont'd…)

D. As per method of selecting contractor

1. **Competitively tendered contract**
2. **Negotiated contract**

E. As per traditional approach

1. **Owner – Builder approach (owner performs own design and construction with own forces)**
2. **Design Build (DB) contract (main contractor is responsible for both design and construction for agreed lump sum price)**
3. **EPC (engineering procurement and construction) contract**
4. **Turnkey contract (real state)**

TYPES OF CONTRACT (Cont'd…)

F. As per project finance [6]

BOOT (Build Own Operate Transfer)

- **Project company constructs the project.**
- **Owns and operates it for a set period of time.**
- **During ownership earns revenues from the project.**
- **At the end ownership is transferred back to the public sector.**
- **Example: the project company builds hydropower plant, own it for 20 years during which time the power is generated is sold to an off-taker (Electricity office) , and at the end of that time ownership is transferred to the Public sector.**

TYPES OF CONTRACT (Cont'd…)

BOT (Build Operate Transfer)

- Also called design-build-finance-operate (DBFO)
- Project Company never owns the assets used to provide the project service.
- Project company constructs the project and has right to earn revenues from operation.
- It is also known as "Build-Lease- Transfer" (BLT) or "Build- Lease- Operate-Transfer" (BLOT)
- Ownership remains with the public sector.
- Example: a road, bridge, or tunnel.

TYPES OF CONTRACT (Cont'd…)

BTO (Build Transfer Operate)

- These are similar to a BOT project, except that the public sector does not take over the ownership of the project until construction is completed.

BOO (Build Own Operate)

- These are the projects whose ownership remains with the Project Company throughout its life.
- Example : mobile phone network.

CONTRACT CHANGES

Contract changes occur for three main reasons:

1. **Because of changes in owner requirements, the scope of the project changes.**
2. **Because of conditions at the time the contract is signed, the work must be performed differently.**
3. **Due to omissions or design features that cannot be built as specified, the design must be adjusted.**

TENDERING

- Tender is a written offer presented before an owner (or department) showing interest to perform the specified works within the specified time under agreed condition. [7]
- Tender is an offer in written form by the tenderer (who offers the tender) to execute same specified work or to supply some specified goods at a certain rate/amount within a fixed time frame under certain conduction of agreement.
- It is the first step in the formulation of contract.
- Tender notice is a means of an expression through which contractors know where they have to bid a tender.

TENDERING (Cont'd..)

- Tender notice is published widely in important daily newspaper.
- Tender notice should include:

1. The name and address of the public entity inviting bids.
2. Nature of work and its location
3. The place of delivery of the goods to be supplied, services to be delivered.
4. The amount of bid security, validity period of bid.
5. Date time and place, where and when the tender document is available.
6. Cost of tender document
7. The place, manner and deadline for the submission of bidding document
8. Provision of e-bidding process and its process.
9. The place and time for opening the bids.
10. Expected date of acceptance of successful bids.

TENDERING (Cont'd..)

WHY TENDERING ?

- To select best contractor
- To get quality work
- To get work at competitive price
- To maintain transparency
- Public Private Partnership (encourage contracting procedure)

Preparation Before Inviting Tenders

- Project Preparation
- Estimation of Quantities
- Cost Estimate
- Approval of estimate
- Resource Planning
- Tender document Preparation

TENDERING (Cont'd..)

Bidding Stages

- **Bidding refers to the process of submitting a proposal or offer to provide goods or services at a certain price.**

1.Single Stage Single Envelope Bidding Procedure

- **In this procedure, bidders submit bids in one envelope containing both the Financial Proposal and Technical Proposal .**

2.Single Stage Double Envelope Bidding Procedure

- **In this procedure, bidders submit two sealed envelopes simultaneously, one containing the Technical Proposal and the other the Financial Proposal, enclosed together in an outer single envelope.**

TENDERING (Cont'd..)

Bidding/Tender Document

- It is a document prepared by the concerned firm making invitation to bid for submission by bidders by filling up the price or rate.

Earnest Money/Bid Bond/Bid Security

- It is the amount of money deposited while bidding a tender as a guarantee of the party's willingness of carrying out the work awarded to him.
- Bidder shall have to submit the bid along with bid security of 2 to 3% of the estimated amount of the bid in cash or a bid security of equivalent to that amount in a commercial bank.

TENDERING (Cont'd..)

E bidding

- Electronic bidding is a process using an electronic procurement tool to view, build, respond and submit and evaluate public tenders.
- It saves time and money by eliminating the need drop off paper copies to the procurement office and also reduces the influence of third parties while evaluating.

Liquidated Damages

- It is a remedies available to any contracting party to compensate for the financial loss suffered as the result of a proven breach of contract.
- It may also be known as contractual penalties designated during the formation of contract for the injured party to collect as compensation upon a specific breach. [2]

QUALIFICATION OF BIDDERS

Pre Qualification

- It is a kind of short listing of eligible bidder to avoid crowding of bidder. Contractors are required to undergo some form of pre-qualification in order to be selected for inclusion on a tender list. [8]
- It ensures that the invitation to bids extended only to those perspective bidders who have adequate capability and resources to perform the particular contract satisfactory taking in to account their-

- Experience and past performance on similar contract
- Capabilities w.r.t. personnel, equipment and construction facilities
- Financial position
- Litigation history

QUALIFICATION OF BIDDERS (Cont'd..)

Post Qualification

- In this process, no pre-qualification is adopted and all the eligible bidders participate in the bidding process.
- It may include:

(a) **Single envelope system** (Financial and Technical proposal in a single envelope)

(b) **Double envelope system** (Financial and technical proposal in separate envelope)

- In Double envelope system, bidders are selected by adopting

- Short list from technical proposal
- Select the lower bidder first and check technical proposal.
- Giving weightage to both technical and financial proposal.

OPENING AND EVALUATION OF BIDS

Opening of Bid

- A Public Entity shall have to open a bid in the presence of the bidder or his/her representative.
- Bids shall be opened immediately after the deadline for submission of bids and in public.
- The bid opening process starts after the receipt of bids and concludes when the bids are collected for further evaluation.
- Before opening competitive bids, make certain the place designated for the bid opening is ready and available.

OPENING AND EVALUATION OF BIDS (Cont'd..)

1. Preliminary Examinations of Bids

- **The purpose is to identify and reject bids that are incomplete as required by the bidding documents before further detailed evaluation. The principal areas to be covered are:**
- **Verification of signature, registration, J/V agreement; Eligibility of bidders; Bid Security; Completeness and qualifications.**
- **The bid evaluation committee established by the implementing agency shall evaluate bids.**

OPENING AND EVALUATION OF BIDS (Cont'd..)

2. Determination of Substantial Responsiveness of Bids

The purpose is to reject bids which are not substantially responsive to major commercial and technical requirements.

Commercial reason for rejecting bids are:

- **Bid security/validity not in accordance with bidding documents.**
- **Inability to meet critical work schedule.**
- **Failure to comply with minimum experience or financial capability.**
- **Conditional bids.**

OPENING AND EVALUATION OF BIDS (Cont'd..)

Technical reason for rejecting bids are

- **Failure to bid for the required scope of work.**
- **Failure to quote for each item in Bill of Quantity.**
- **Failure to satisfy major requirements in the specification.**

3. Detail evaluations of Bids

- **The detailed evaluation shall be based on the evaluation criteria as specified in the bidding documents.**
- **The purpose is to determine the evaluated cost of each bid.**

OPENING AND EVALUATION OF BIDS (Cont'd..)

- **The basis for award of contract shall be the bidder with the lowest evaluated substantially responsive bid subject to:**
  - **If bidders are pre-qualified,**
  - **If the bid contains no substantial deviations from the specifications (Technical Responsiveness),**
  - **If the lowest evaluated cost is well within the cost estimate**
  - **If rate analysis submitted by the bidder is logical and realistic.**

AWARD OF CONTRACT

- **Contract award is a process whereby an entity procures goods or services from a supplier.**
- **The contract can be awarded to the lowest bidder, as determined by a competitive bidding process, or it may be granted to the most qualified bidder.**
- **Contract award helps ensure that the best possible product or service is provided at the best possible price.**
- **Awarding a contract refers to the process of notifying a tenderer that they have been formally chosen as the supplier for a particular contract upon acceptance of their bid or proposal. [9]**

AWARD OF CONTRACT (Cont'd..)

Letter of Intent

- **Within 7 days of the approval of the recommendation of the bid evaluation committee, the employer issues the letter of intent to accept lowest evaluated responsive bidder.**
- **This information is to be given to all bidders through public notice in newspaper.**
- **If no other bidders / concerned persons submitted any complain about this selection, the contract is awarded to the selected bidder and called for agreement with required performance bond within 15 days.**

AWARD OF CONTRACT (Cont'd..)

Performance Security

- It is the amount of money deposited by a successful bidder as a security for satisfactory performance.
- In Nepal, security deposit is equal to 5% of contract amount for Nepalese firm where as it is 10% of contract amount for foreign contractor.
- This is refunded after completion of Defect Liability Period (maintenance period). If the work is unsatisfactory or contractor fails to perform his duty, this fund is forfeited.

AWARD OF CONTRACT (Cont'd..)

There are various steps that must be followed in order to award a contract properly. These steps include: [10]

1. **Conducting due diligence on all potential bidders.**
2. **Screening potential bids based on price, quality and other factors.**
3. **Evaluating proposals against established criteria.**
4. **Focusing on key objectives and goals of the project.**

OBJECTIVE QUESTIONS

1. Risk in a project is defined as

(a) Uncertain event, that if it occurs, has a positive effect on the project objective.

(b) Uncertain event, that if it occurs, has a negative effect on the project objective.

(c) Uncertain event, that if it occurs, has a positive and negative effect on the project objective.

(d) Uncertain event, that if it occurs, do not have any effect on the project objective.

2. The practice of assigning the part of the obligation and task under a contract to another party is known as

(a) Sub contracting (b) joint venture (c) contract agreement (d) both (a) and (b)

3. The bid evaluation committee shall prepare a bid evaluation report within

(a) 10 days of starting of starting a bid evaluation

(b) 15 days of starting of starting a bid evaluation *

(c) 20 days of starting of starting a bid evaluation

(d) 25 days of starting of starting a bid evaluation

4. Remedies available to any contracting party to compensate for the financial loss suffered as the result of a proven breach of contract is

(a) Breach bond (b) liquidated damage (c) price adjustment (d) compensation fund.

5. Which of the following is not the cost plus contract?

(a) Cost + percent of cost (b) cost + fixed fee

(c) Cost +fixed fee + profit sharing (d) cost + fixed assets.

6. capital budgeting decisions are

(a) Uncertain (b) irreversible (c) reversible (d) depends on scope of project

7. Which of the following is also known as unsecured bond?

(a) Debt capital (b) equity capital (c) debentures (d) preference share.

8. The assessment of importance of the identified risk and development of prioritized list of these risks in subjective manner for further analysis or direct mitigation is

(a) Qualitative risk analysis (b) quantitative risk analysis

(c) Risk impact analysis (d) risk response planning

9. Risk where the sufficient amount of resources are not available for the generation of revenue of the project like roads, railways etc is called

(a) Market risk (b) reserve risk (c) credit risk (d) resource risk.

10. The risk common to both construction and operation phase is

(a) Reserve risk (b) market risk (c) technical risk (d) completion risk

11. In Project financing lenders rely on the …… Of repayment of loan

(a) Repayment of the loan from the project cash flow and assets and borrower's property.

(b) Repayment of the loan from the borrowers property only.

(c) Repayment of the loan from the outside of the project assets.

(d) Repayment of the loan from project assets and cash flow only.

12. Project financing of hydropower project is Nepal are developed under

(a) BOT model (b) BTO model (c) BOOT model (d) BOO model