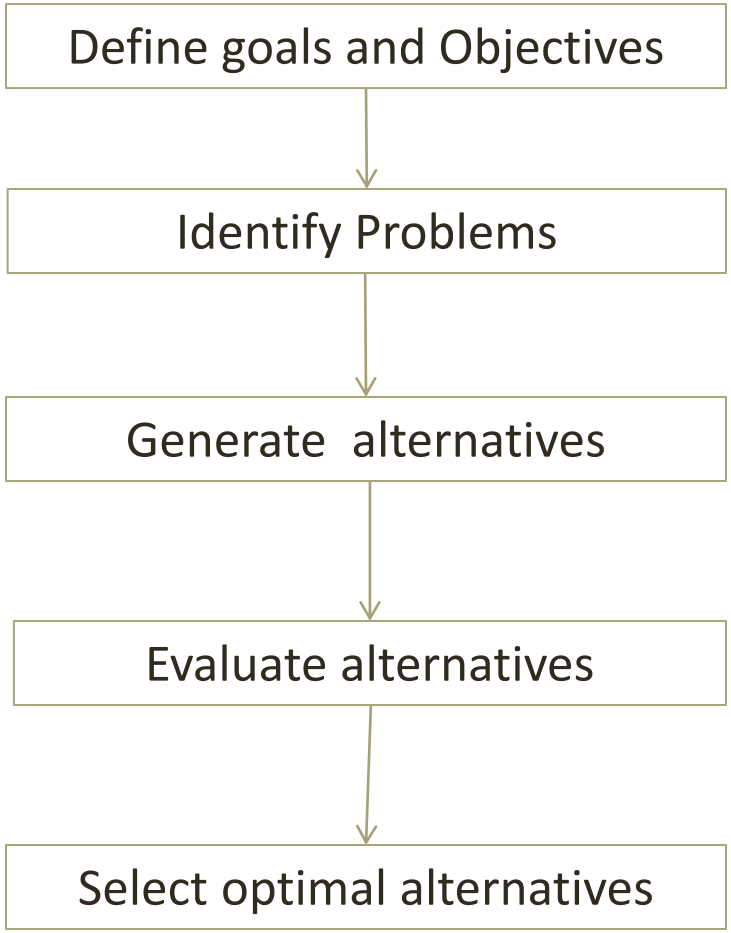
Chapter 4 Transportation system analysis

4.1. Generation of alternatives

Principles for developing a set of alternatives are given below:

- Alternative should be defined in terms of their design concept and scope.
- Alternative should be compatible with need/purpose of improvement i.e. it must be compatible with community values, goal and objective.
- Should be developed through a process of considering all reasonable options.
- Pros and Cons of each alternative has to be developed for future trade off which includes cost, impacts and benefits.
- Set of alternatives should be structured to provide a range of option to decision makers.
- Alternatives should be identified and refined in an open, well documented process.

The rational approach



4.2 Evaluation of alternative and criteria

Project Evaluation

- It is the process of determining relative importance of individual alternatives i.e. different courses of action and desirability over other alternatives and of presenting information to decision makers in a comprehensive and useful form for decision maker. Decision makers has two choice: Do it or Do nothing
- Determining desirability requirements:
  - Defining how value is to be measured.
  - Estimating the source and timing of the benefits and cost of the proposed actions.
  - Comparing these benefits and costs to determine a level of effectiveness for that alternative.

Major Question during Evaluation Process

- How evaluation technique be selected?
- How intangible impacts are to be quantified?
- How can equity be considered in evaluation?
- How concept of time be treated in evaluation?
- How can discount rated be estimated?

Characteristics of Evaluation Process

- Proper consideration of issues or problems.
- Consideration of Uncertainties
- Evaluation of alternative considering goal and objective.
- It should be oriented towards the decision.
- Should access financial feasibility.
- Should determine how different groups are affected by each alternatives.
- Provide information regarding community value in understandable form.
- Should analyze implementation requirement of each alternatives.
- Should be sensitive to time frame in which the project impact is likely to occur.
- Evaluation should produce information on the likely impacts of alternatives at a level of aggregation that permits level of assessment
- Evaluation should provide information to decision makers on the value of alternatives in a readily understandable form and in a timely fashion.

Criteria/Bases for Project Evaluation

1. Appropriateness

- Does alternative satisfy community value, goal and objective?
- What information required on impacts and trade offs is required for the decisions that need to be made?

2. Equity:

- Is there proportionate distribution of benefits and cost among different groups of community?
- What is the impact of project on the non-user of the project?

3. Effectiveness

- Can alternative likely to produce the desired results and to what extent community goals are attained?

4. Adequacy

- Are all alternatives considered?
- Does the alternative correspond to the scale of the problem and to the level of expectation of problem solution?

5. Efficiency

- Does the alternative provide sufficient benefits to justify the cost?
- Does additional benefits is worth the extra cost.

6. Implementation feasibility

- Is funds are available to implement the alternative on schedule.
- Consideration administration or legal barriers to alternative implementation.
- Margin of safety for financial feasibility.
- What adjustment is necessary if this margin of safety is exceeded?

7. Sensitivity Analysis

- How are the predicted impacts modified when analysis assumptions are changed?
- What is the probability of occurrence of these changes?

Evaluation criteria for Major Investment studies or Stages of Evaluation

1. Prescreening Criteria

Decision will be taken as Yes or No, answering following question

- Is the alternative consistent with regional goals and objectives?
- Is alternative affordable?
- Does the alternative have irresolvable environmental impact?
- Does the alternative have an irresolvable community or agency opposition?
- Is the technology available?

2. Screening Criteria

Detailing of those passed from Prescreening criteria

- How consistent is the alternative with regional goals/policies?
- How affordable is the alternative?
- What are the primary environmental impact?
- How well does the alternative address the corridor's mobility problem?

3. Detail Criteria

a. Performance criteria

- Travel time, delay, Reliability, User, Corridor congestion, capacity, link utilization, Impacts to goods movement.

b. Impact criteria

- Displacement , Endangered species, neighborhood disruption, hazardous material, air quality, Direct User benefit, environmental justice, Increased land value etc.

Various Benefit and Cost in Transportation Project Evaluation

1. Real and pecuniary (financial) impacts

- Real benefits are realized by consumers or that add to a community's overall welfare.
- Pecuniary benefits are gained at the expense of other individuals or group. Increase in Land values resulting from improved transportation facility.

2. Direct and Indirect Impacts

- Direct impact related to objective of investment.(Reduction in travel time)
- Indirect are by product (Increased demand for trade near airport, buspark)

3. Tangible and Intangible

- Tangible can be assigned any monetary value.
- Intangible can't be easily measurable (Aesthetic beauty gained/destroyed by road construction)

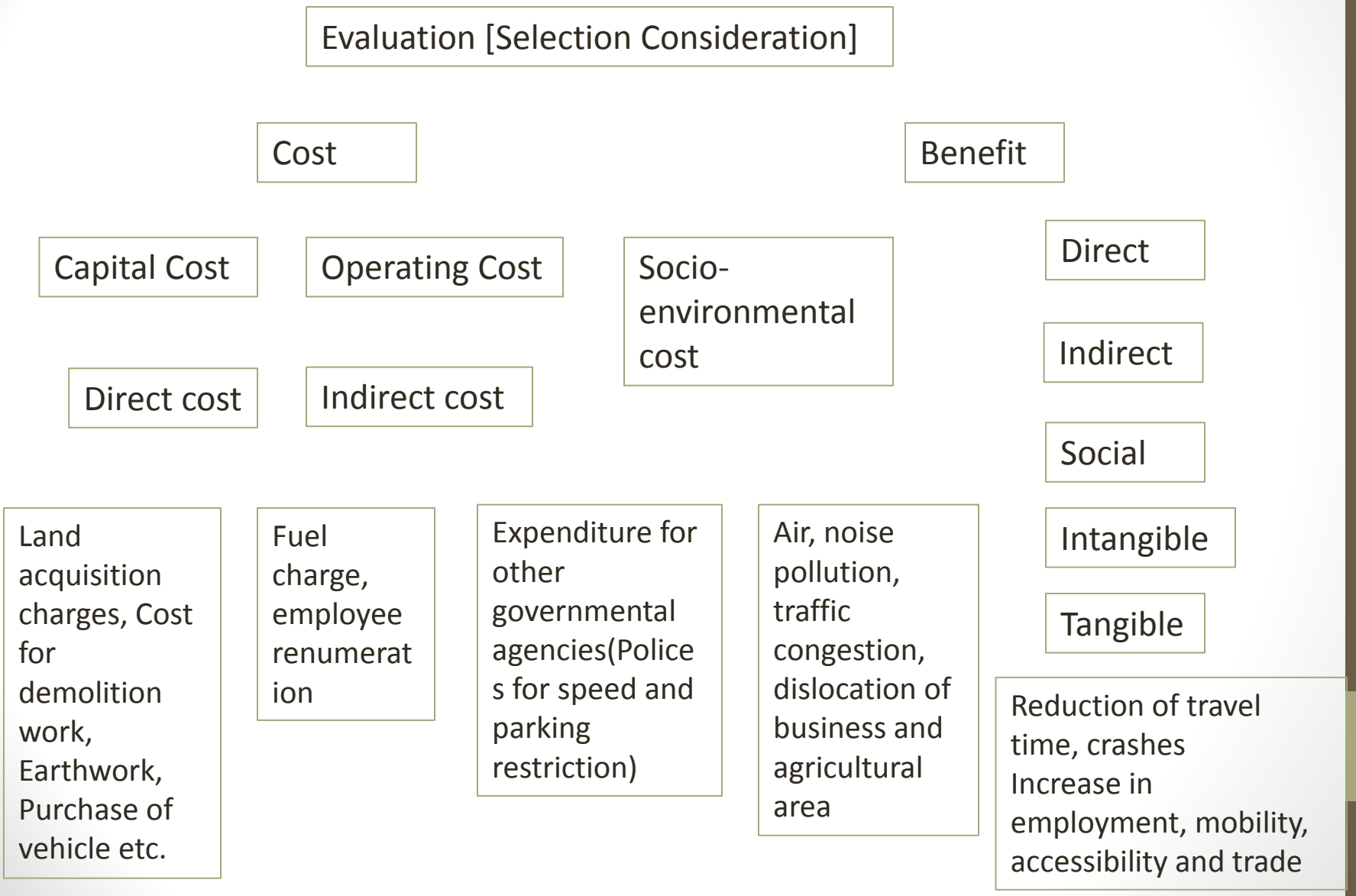
4. External and Internal

- Impacts within or outside of study area.
- Pollution of Vehicle within Kathmandu valley is internal impact and outside is external.

5. User and Non-User Cost/Benefit

- Fare of transit is User cost whereas increased tax imposed on private vehicle to promote public transportation is the example of non-user cost.

4.3 Selection consideration: Capital and Operating expenditure etc.



Project selection process