

Cost Benefit Analysis



Agenda

- **What is CBA?**
- **History**
- **Why CBA?**
- **Cost**
- **Benefit**
- **General steps for CBA**
- **Current State of the Art**
- **Potential use in UAE**
- **Conclusion**

What is CBA?

- A cost benefit analysis is done to determine how well, or how poorly, a planned action will turn out.
- The analysis relies on the addition of positive factors and the subtraction of negative ones to determine a net result.



History

- CBA can be traced back to the 19th century by Eng & Economist Jules Dupuit.



- In 1936, the US Congress passed the flood control act which contained the phrase which established CBA

"the Federal Government should improve or participate in the improvement of navigable waters or their tributaries, including watersheds thereof, for flood-control purposes if the benefits to whomsoever they may accrue are in excess of the estimated costs."

Why CBA?

Cost Benefit Analysis is used to determine:

- whether a solution/project is economically feasible
- which of two or more projects provides the best return on investment
- the optimal point in time to start a project (time-phasing).



Cost

- any negative effect on an organization resulting from the implementation of the project.
- Examples:
 - maintenance costs
 - environment
 - research and development costs
 - labor costs
 - Cost Time



Benefit

- A benefit is any positive effect on the organization resulting from the implementation of the project.
- Examples:
 - increase in productivity
 - reduction in costs
 - Saving Time
 - Decrease road congestion

Method

The General steps for Cost Benefit Analysis are:

- Identify the problem
- Clearly define and set the objective's of the project, Identify the Benefits
- Generate alternatives that would meet the stated objective's
- Identify the Cost (Time, Env impact, Stress ect)
- Eliminate alternatives that do not fall within the constraints.
- Compare Benefit to Cost associated

PHSC Impacts



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graph TD; A[PHSC Impacts] --> B[User Benefits]; A --> C[Non-User Benefits]; A --> D[Operating Impacts]; B --> E[Benefits to Rail Passengers]; B --> F[Benefits to Users of Other Modes]; E --> G["- Passenger travel time savings<br>- Service quality benefits"]; F --> H["- Travel time savings (cars)<br>- Accident cost savings<br>- Vehicle op. cost savings<br>- Time savings for freight rail and highway users<br>- Grade crossing accident cost savings"]; C --> I["- Environmental benefits<br>- Highway O&M savings<br>- Reduced rail O&M costs"]; D --> J["- Profits (losses) of passenger rail operators<br>- Profits (losses) of freight rail operators"];
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User Benefits

Benefits to Rail Passengers

- Passenger travel time savings
- Service quality benefits

Benefits to Users of Other Modes

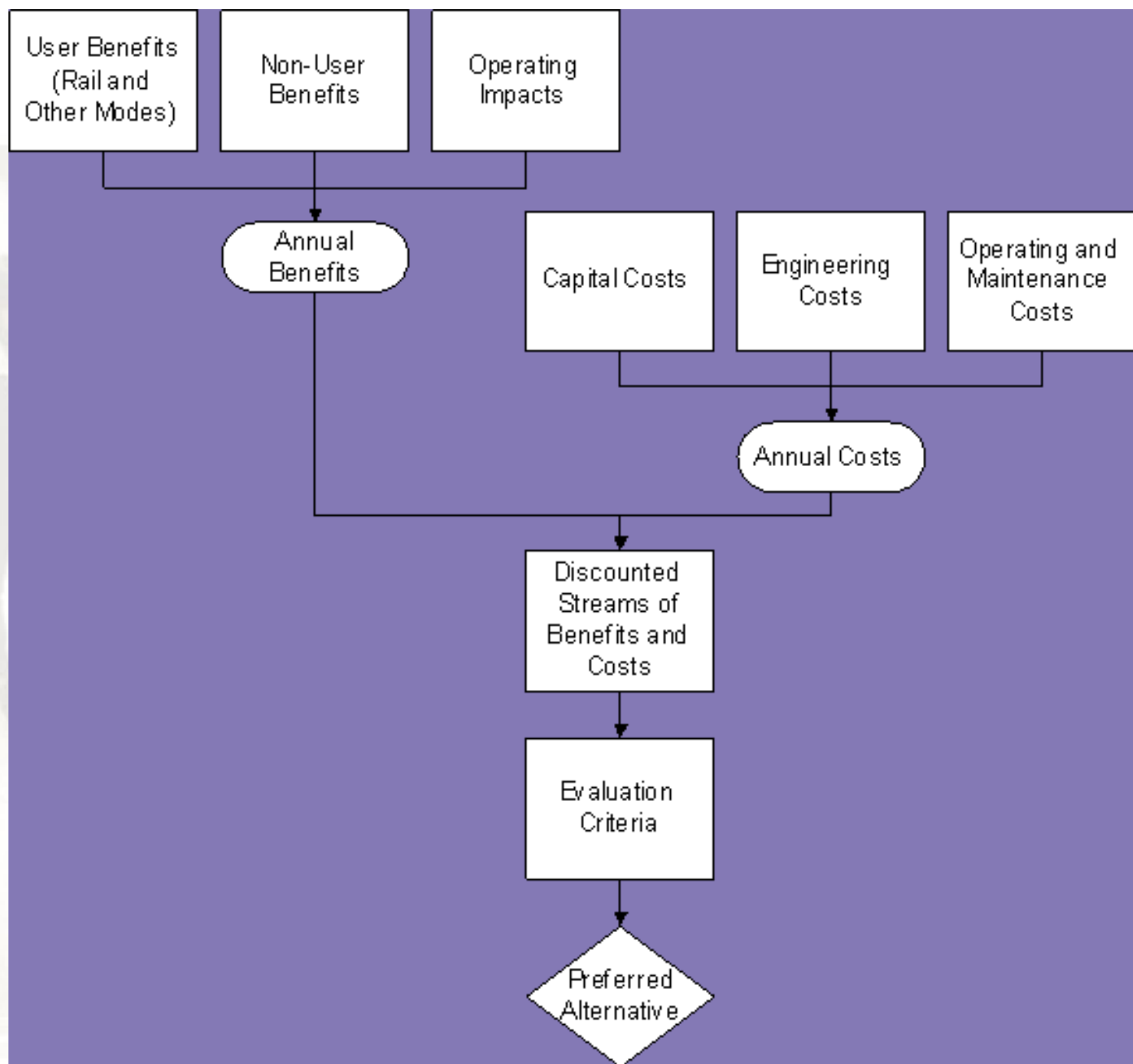
- Travel time savings (cars)
- Accident cost savings
- Vehicle op. cost savings
- Time savings for freight rail and highway users
- Grade crossing accident cost savings

Non-User Benefits

- Environmental benefits
- Highway O&M savings
- Reduced rail O&M costs

Operating Impacts

- Profits (losses) of passenger rail operators
- Profits (losses) of freight rail operators



Current State of the Art

- *Investment-type or yes/no decisions*
 - whether or not a single project or course of action will be undertaken
- *design-type or either/or decisions*
 - which of the several possible projects should be implemented, or the choice between two or more alternative
- *least-cost or minimum-cost*
 - all the competing courses of action produce the same benefits. Being common to all, the benefits are not evaluated, however, the cost is only analysed.
- *Cost-effectiveness analysis*
 - often used in fields where the benefits are difficult to value economically, like health care or education.

Current State of the Art

analyses are also distinguished according to the identity of the group of people; on whose behalf they are carried out:

- *Financial CBA*: A financial analysis concerns the financial position of a person, firm or organization, so that both costs and benefits are measured in term of money spent or received by that party
- *Economic CBA*: An economic CBA concerns the welfare of a defined group of people, usually a nation.
- *Social CBA* : the analyst goes further and adjusts the prices by which costs and benefits are valued so as to reflect priorities and policies to certain population groups like the rural poor.

Potential use in UAE

The case of “Traffic Congestion in Sh. Zayed Rd”



Potential use in UAE

CBA analysis type: *least-cost or minimum-cost*

- **Cost?**
 - Air Pollution
 - Noise Pollution
 - Stress
 - Increased Travel Time
 - Health effects
 - Increases fuel consumption
 - Ect
- **Alternatives?**
 - Policy implementation
 - Add road capacity (flyovers, tunnels, interchanges)
 - Introduce Toll
 - Stagger working hours
 - Enhance Public Transport Options
 - Transit Oriented Developments
 - Ect
- **Benefit**
 - Improved travel time
 - Lower fuel consumption
 - Decrease pollution
 - Enhance Quality of life

CBA in the UK

- CBA was gradually introduced through the New Approach to Appraisal (NATA) for roads projects in 1998
- CBA in Business
- CBA in Non-Business Entities
 - Benefit: Reducing the level of illiteracy among rural low income community
 - Cost:
 - Extent to which the program will attract illiterates
 - A facility is available at low cost but far-away.
 - Considerations on Transportation should be in mind

Conclusion

- it gives planners a method to try and “put all relevant costs and benefits on a common temporal footing” in order to help people make informed decisions.
- It provides people with an understanding as to the economic costs of decisions, and allows arguments to be made for or against a change based upon economic considerations.
- It is a decision-making process that forces the decision maker to compare all direct and indirect positive and negative effects of the proposed decision on an objective basis.