

Fitting Together Benefit/Cost Analysis (BCA) and Economic Impact Analysis (EIA)

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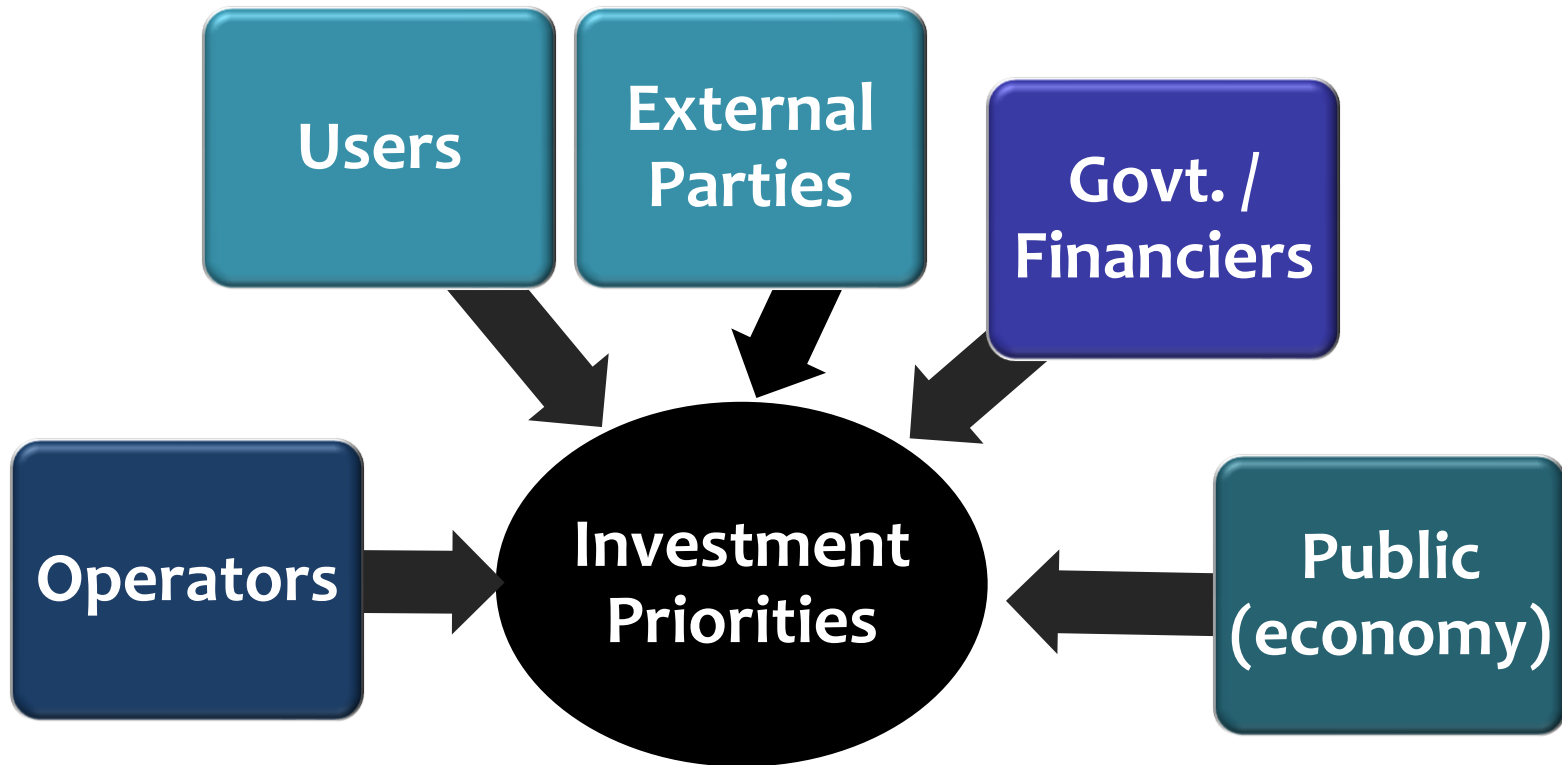
*Workshop on Benefit/Cost Analysis
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Topics

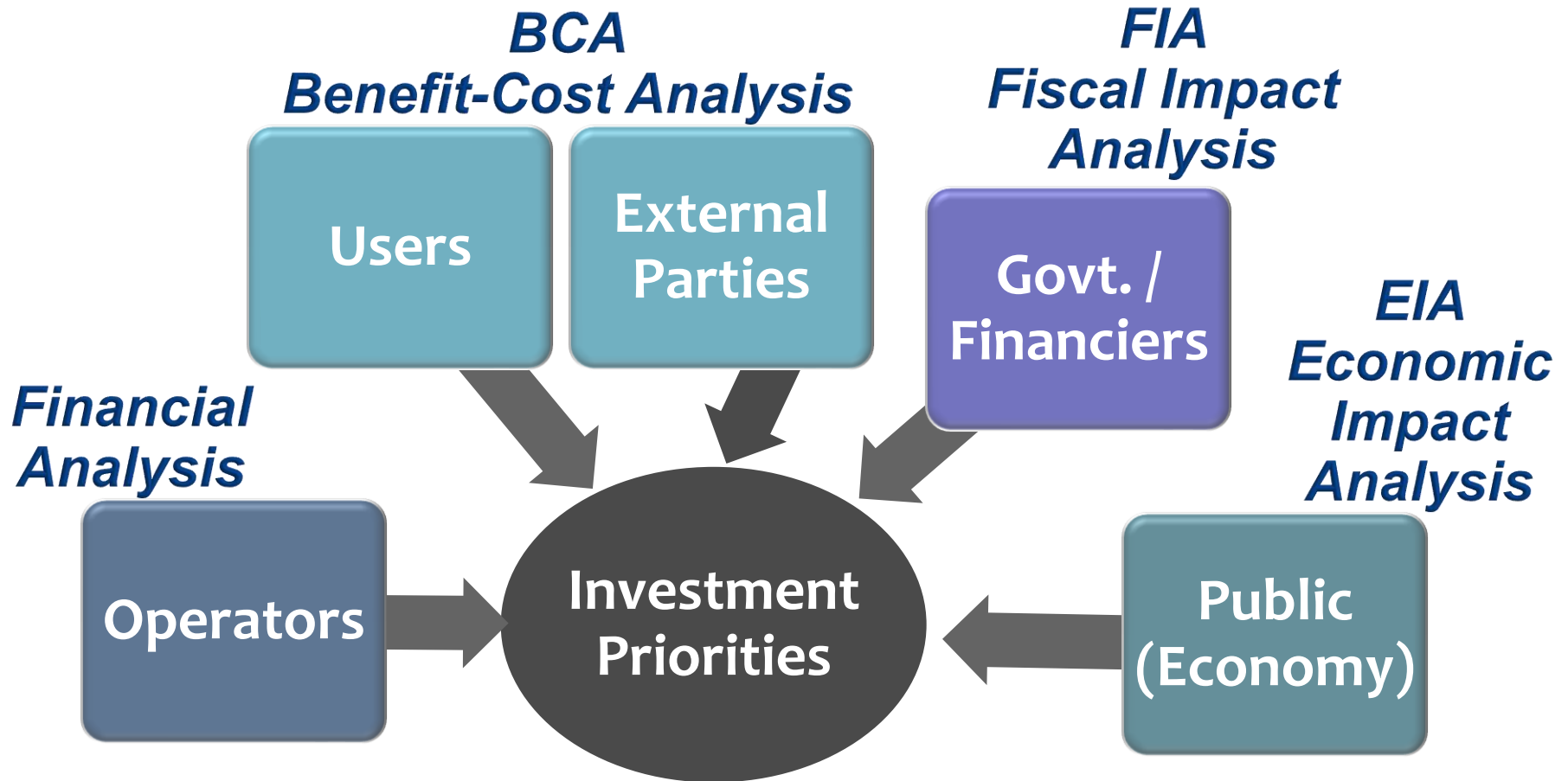
1. Benefit Perspectives for Decision Support
 - *Different parties involved*
2. Defining EIA and BCA Differences
 - *Need for clarity*
3. Matching Measures to Social Issues
 - *Separating efficiency, equity & other objectives*
4. Double Counting and Under-Counting
 - *How do we prevent them?*

Benefit Perspectives

Different Stakeholders



Different Analysis Measures



Measurement Elements

Fiscal / Financial

**Operators &
Government**

Revenues
Expenses
Profit-Loss
(Subsidy)

Benefit-Cost Analysis

Users

Time
Expense
Safety
Reliability
Quality
Cons Surplus

**External
Parties**

Environment
Health
Community
Mobility
Mkt. Access
Productivity

Econ Impact Analysis

**Public
(Economy)**

Jobs (quality)
Income (pay)
Competitiveness
Stability
Security
Econ Distress
Equity
Vulnerability

Definitions

Benefit-Cost Analysis compares alternative actions based on relative costs incurred and benefits gained.
→ *valuation of benefit & cost streams in monetary terms,*
→ *expressed as a discounted present value.*

Economic Impact Analysis analyzes the effect of a program or project on the economy of a given area.
→ *viewed in terms of changes in the economy over time,*
→ *expressed as Δ activity (output), income (value added, wages) and associated jobs*
→ *composition of affected industries & occupations can be important.*

Benefit Coverage Differences

	Traveler Benefit	Full User Benefit	Societal Benefit	Economic Development Impact
\$ Passenger Time Savings - personal travel	Yes	Yes	Yes	--
\$ Passenger Time Savings - business travel	Yes	Yes	Yes	Yes
\$ Travel Vehicle Operating Expense Savings	Yes	Yes	Yes	Yes
\$ Travel Safety (Accident) Cost Savings	Yes	Yes	Yes	Yes
\$ Value of Consumer Surplus	--	Yes	Yes	--
\$ Shipper/Receiver Productivity Gain <i>(Reliability, Connectivity, Logistics, Supply Chain)</i>	--	Yes	Yes	Yes
\$ Market Access & Scale Productivity Gain <i>(Labor Mkt, Delivery Mkt Scale & Agglomeration)</i>	--	--	Yes	Yes
\$ Value of Environmental & Health Benefits	--	--	Yes	--
\$ Value of Community, Quality of Life, Mobility	--	--	Yes	--
\$ Income from Business Location Shifts	--	--	--	Yes
\$ Income from Suppliers, Consumer Spending	--	--	--	Yes

Cost Coverage Differences

	Benefit Cost Analysis	Short-term Econ Impact (<i>temporary jobs</i>)	Long-term Econ Impact (<i>permanent jobs</i>)
\$ Cost of Property Acquisition	cost	--	--
\$ Cost of Project Construction	cost	Yes	--
\$ Cost of Project O & M	cost	--	Yes
Fees, Tolls, Taxes	--	*	*

** Depends on jurisdiction (may be inflow of \$ to area or outflow of \$ from area)*

Matching Measures to Social Issues

BCA is designed to help:

- Ensure efficient use of scarce resources
- Minimize cost among alternatives that achieve needs
- Maximize performance results for given \$ available

EIA is designed to help:

- Stimulate & grow jobs and income where they are most needed (*e.g., distressed areas*)
- Attract “quality jobs” – well-paying, stable, secure, in growth industries where income can rise over time (*economic vitality, sustainability, competitiveness*)
- Ensure equity & assistance for vulnerable populations
- Reduce vulnerability risk from dependence on foreign suppliers (*import substitution*)

Multiple Interpretations of Terms

TERM	BCA (Economist view)	EIA (Economic Developer View)
Competitiveness	Reduce \$ Expense (Save Money)	Improve capability to operate business, thus retain & attract econ activity (jobs, income) in the area
Sustainability	Reduce air pollution -- quantity & hence \$ Value	Improve ability of a specific type of economic activity to remain financially viable in the area
Livability	Enhance accessibility & mobility measured through \$ property values	Improve attraction of the area as a place to work and live
Productivity Factors	Market imperfection affects generalized \$ cost; addressed separately	Factor differentially affecting income and cost competitiveness for different industries

Causal Relationships

danger of adding multiple outcomes

INPUTS
(Decisions)

Investment

- Funding Level
- Mix of Projects
- Timing
- Location

INTERMEDIATE
OUTCOMES
(Measurable)

Transport Changes

- Service Level
- Vol. - Quality
- Performance measures

FINAL
RESULTS
(Estimated)

Economic Outcomes

- Jobs
- Income
- Financial Return

Danger of Double-Counting in EIA

Cannot add multiple measures that reflect the same underlying changes

- Cannot add travel impact measures (*e.g., value of time savings*) and econ measures (*e.g., income generated*)
- Cannot add multiple econ measures (*business output, value added or GRP, income or wages*)
- Cannot add property value appreciation (*wealth measure*) to income measures
- Cannot add transfer payments (*fees, property sales*) that do not grow the economy

Context Matters

- Goals to address economic distress and support economic competitiveness can lead to different investment priorities than reliance on measure of either travel efficiency or broader environmental and land use factors.
- There is a clear need to balance goals and recognize tradeoffs, which also requires an ability to distinguish and measure differential impacts.

Example of BCA Calculation

Present Value of Benefit Stream (\$m 2008 Const dollars)								
Mode	(A) Traveler Benefits (\$)		(B) Traveler Benefits (non-\$)			(C) Shipper/Logistics Benefit (\$)	(D) Market Access Productivity (\$)	(E) Social/ Environ. (non-\$)
	Vehicle Operating Costs	Time & Reliability Costs	Value of Personal Time & Reliability	Safety Cost	Additional Consumer Surplus			
Pass Car - OTC	10.8	217.7	0	0.9	0.1	0	--	--
Pass Car - Commute	46.2	445.4	445.4	1.6	0.6	0	--	--
Pass Car - Pers/Rec	23.1	0	399.4	0.4	0.4	0	--	--
Truck - Freight	36	265.4	0	2.7	0	195.3	--	--
Project Totals	116.1	928.5	844.9	5.6	1.1	195.3	75.9	5.7

Benefit Measure	Benefit Definition	Present Value of Benefit Stream	Present Value of Cost Stream	Net Present Value (Benefits - Costs)	Benefit/Cost Ratio
Traveler Benefit	A+B	1,896	626	1,270	3.03
Full User Benefit	A+B+C	2,092	626	1,466	3.34
Total Societal Benefit	A+B+C+D+E	2,173	626	1,547	3.47

Example of EIA Results

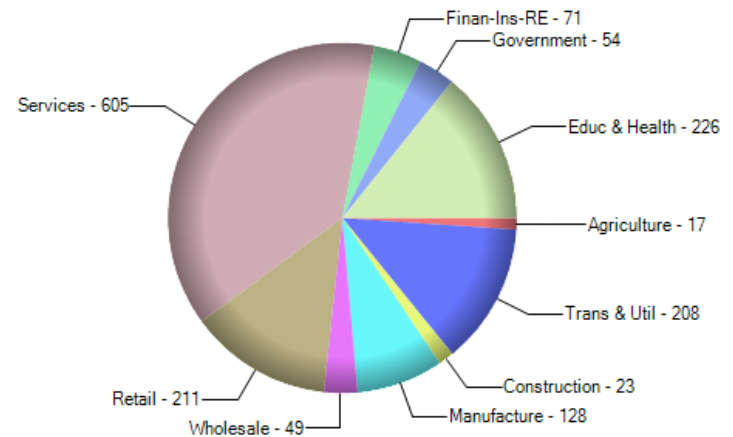
Economic Impact for Year 2030, by Industry

Industry	Business Output (\$ mil.)	Value Added (\$ mil.)	Jobs	Wages (\$ mil.)
Crop Production	0.811	0.480	11	0.158
Animal Production	0.308	0.029	5	0.019
Forestry & Logging	0.477	0.112	1	0.054
Fishing, Hunting & Trapping	0.005	0.001	0	0.000
Support for Agriculture	0.000	0.000	0	0.000
Oil & Gas Extraction	0.000	0.000	0	0.000
Mining & Support Activities	0.000	0.000	0	0.000

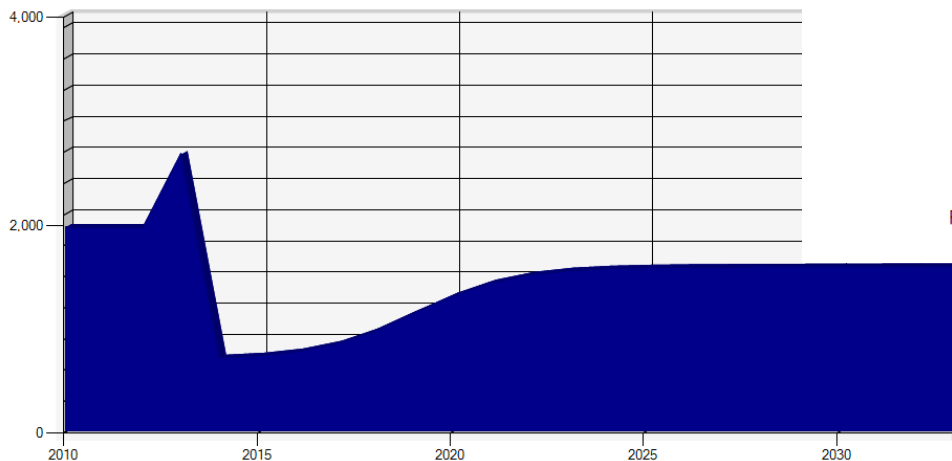
Economic Impact for All Industries, by Year

Year	Business Output (\$ mil.)	Value Added (\$ mil.)	Jobs	Wage Income (\$ mil.)
2010	286.116	157.400		
2011	286.116	157.400		
2012	286.116	157.400		
2013	384.376	207.887		
2014	99.576	51.238		
2015	102.299	52.800		
2016	107.854	55.991		
2017	118.469	62.096		
2018	136.182	72.286		
2019	159.840	85.898		

Long Term Economic Impact - Jobs All Regions - 2030



Change in Employment Overall Economic Impact



References

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Thank You