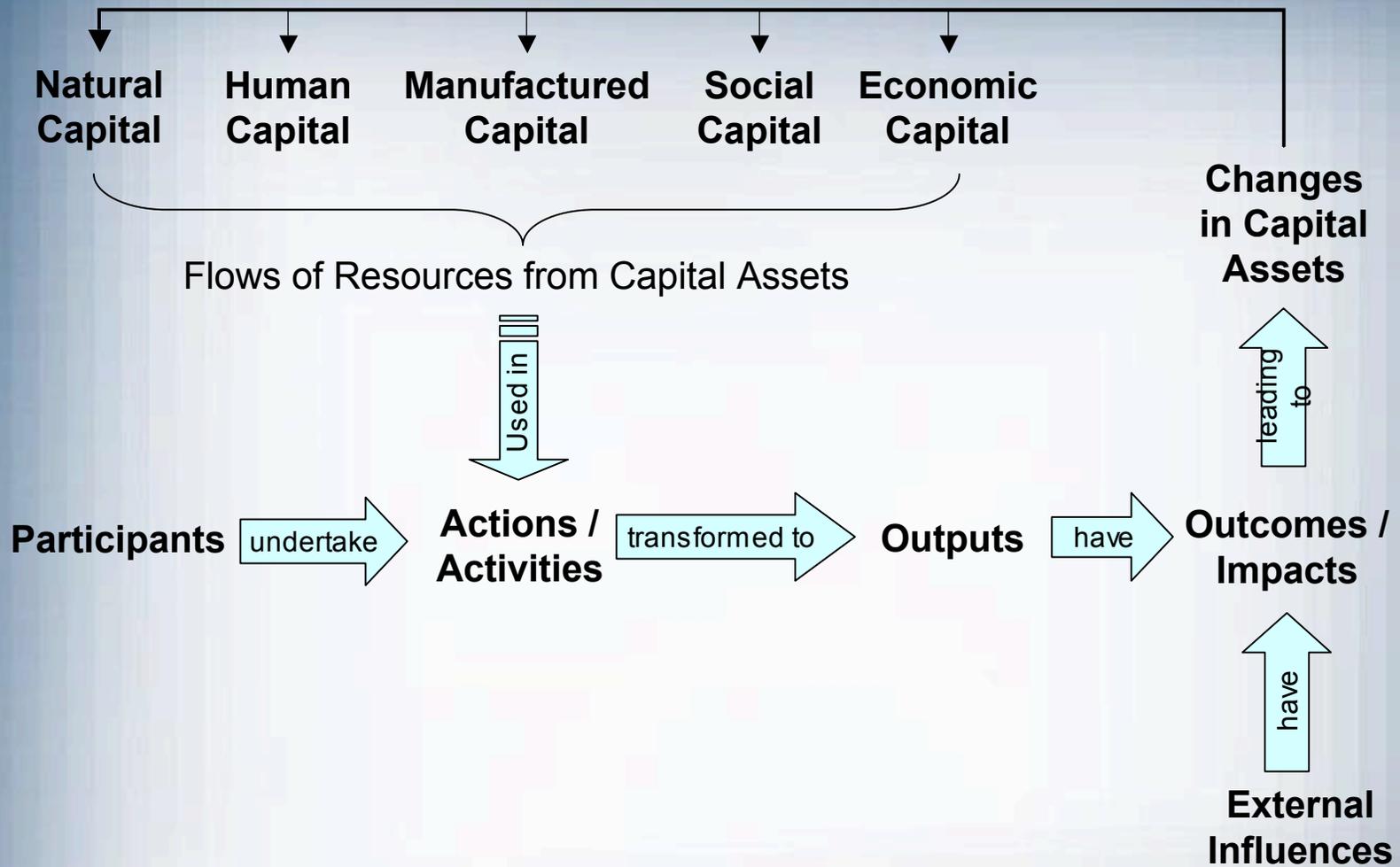


Tools for Assessing the Social and Economic Benefits of Marine Protected Areas

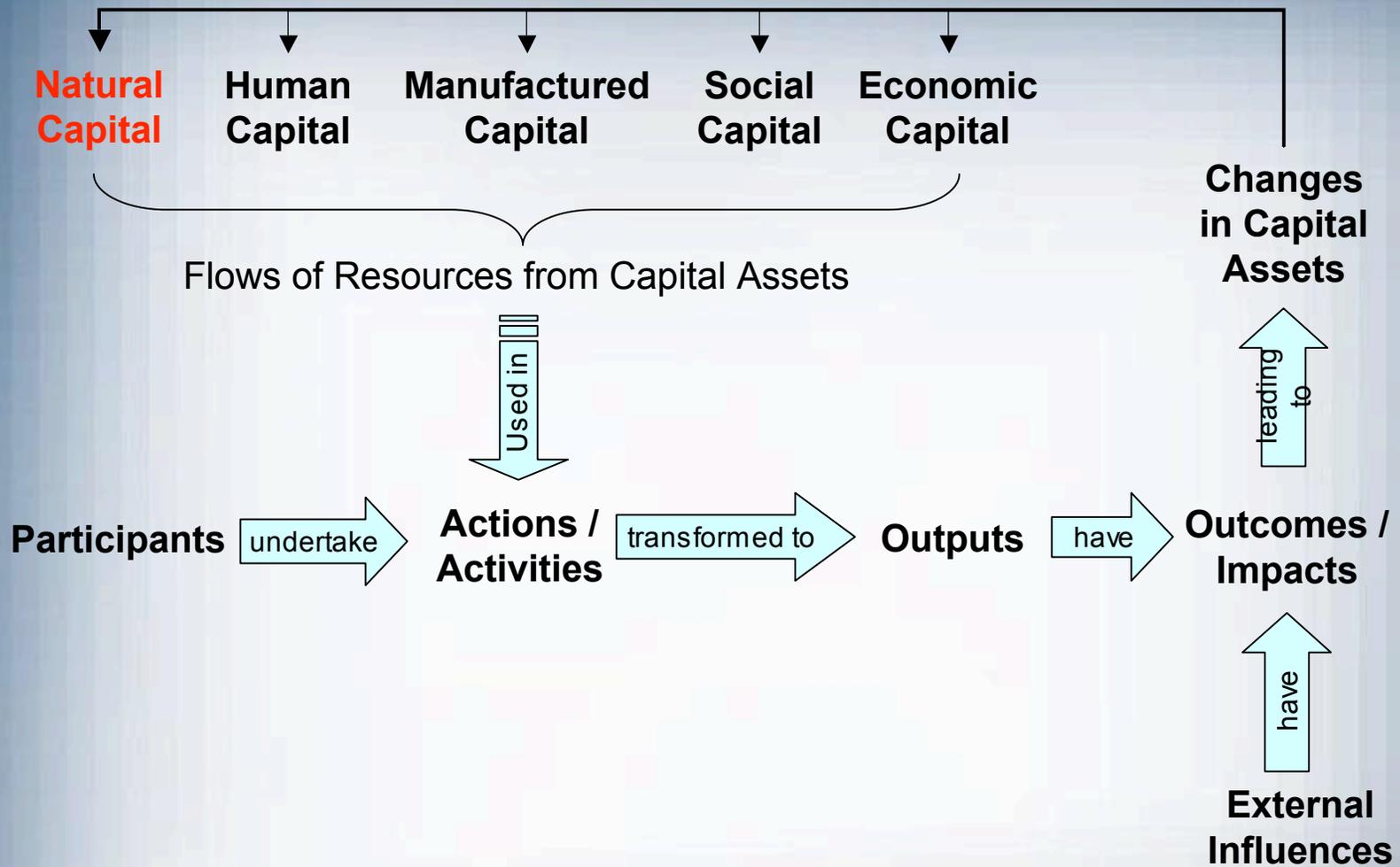
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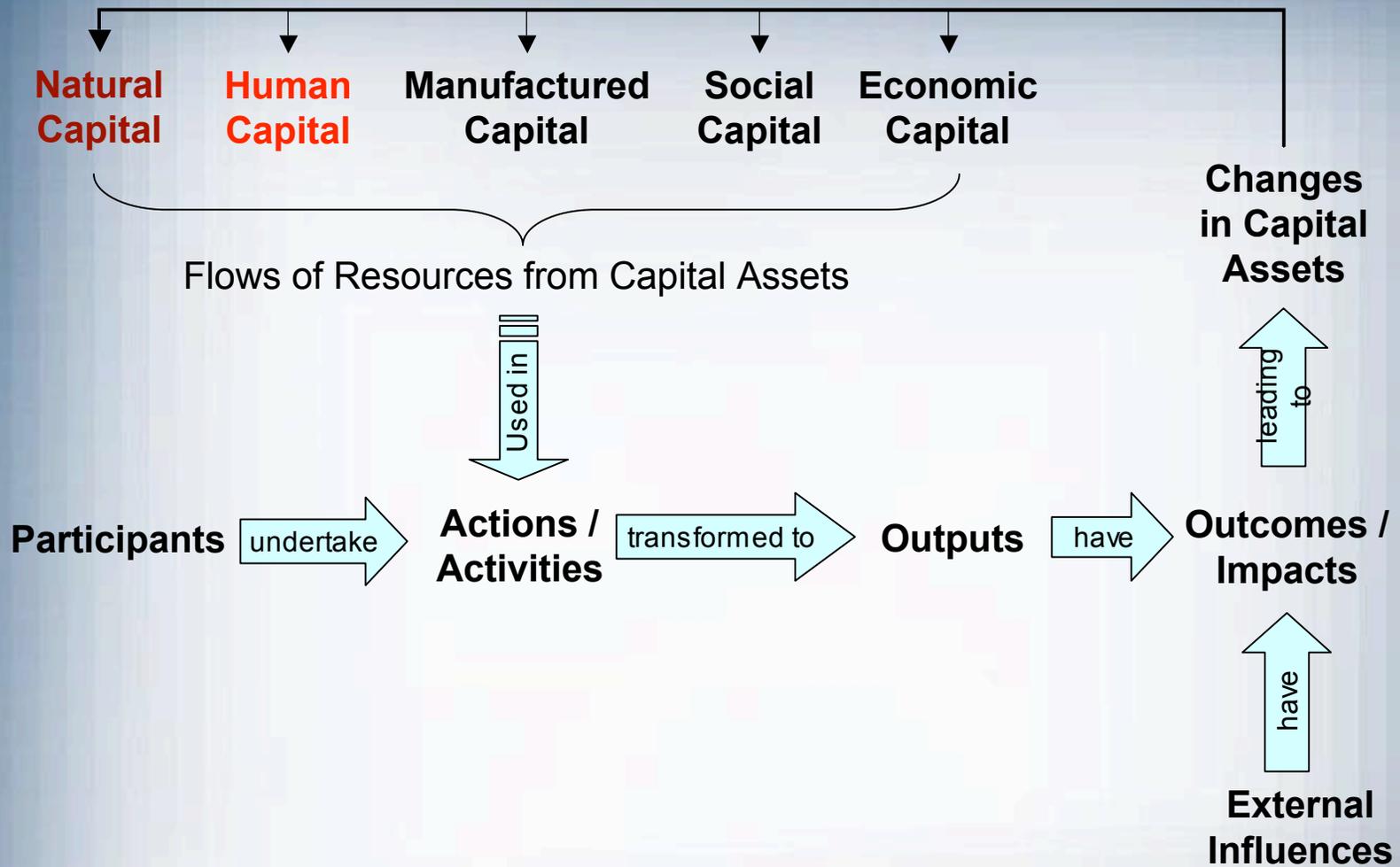
Capital Assets / Resource Flows



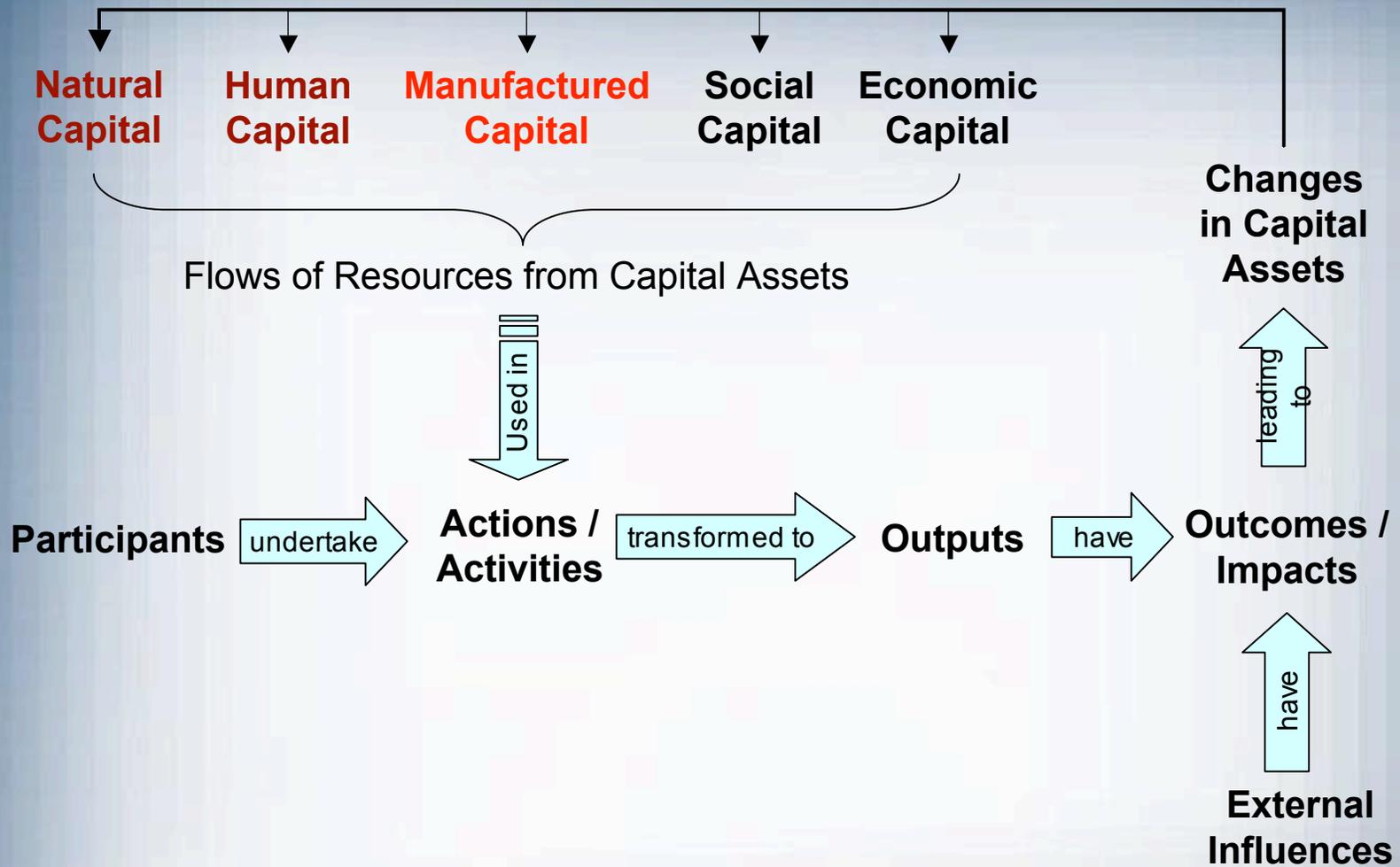
Capital Assets / Resource Flows



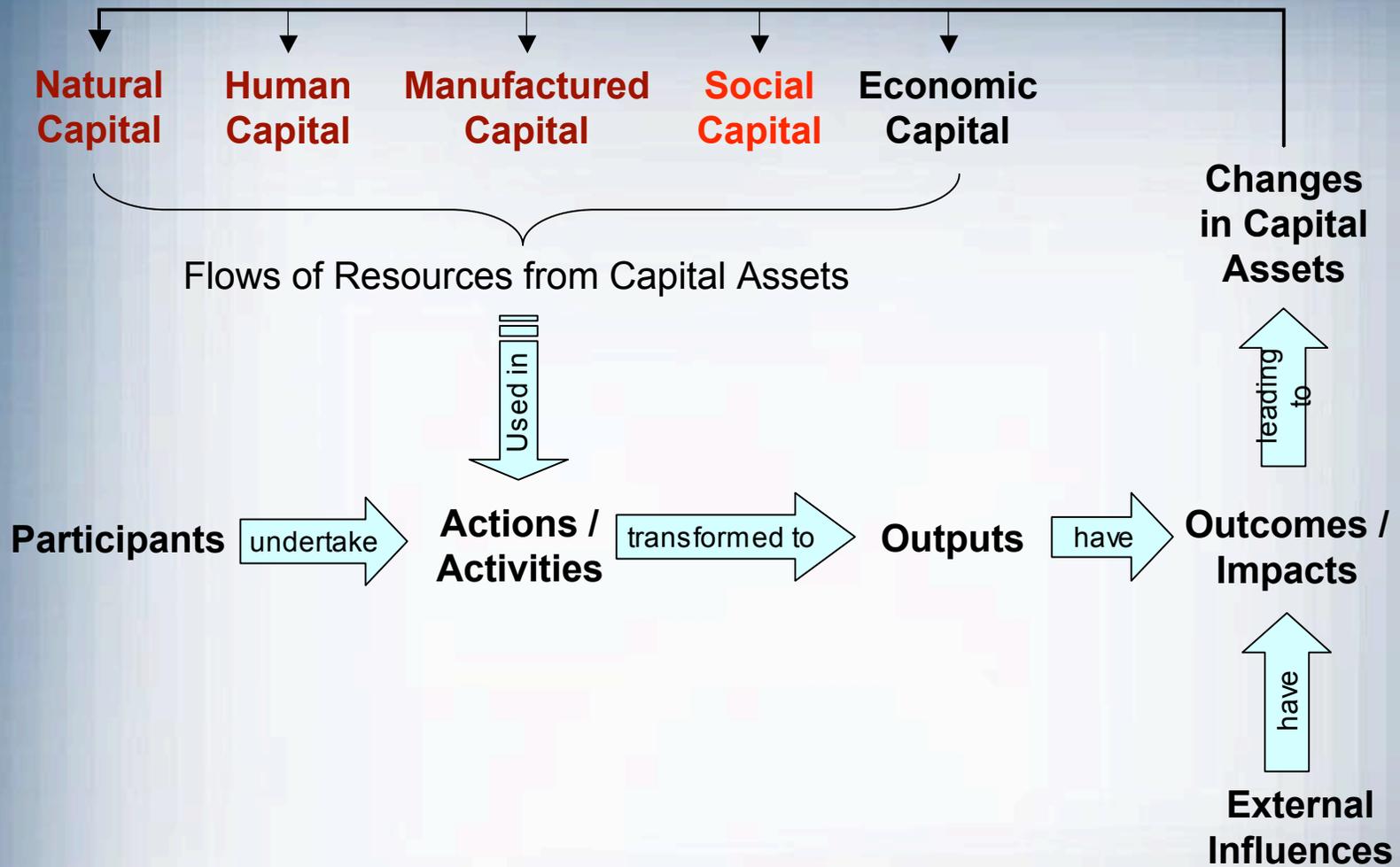
Capital Assets / Resource Flows



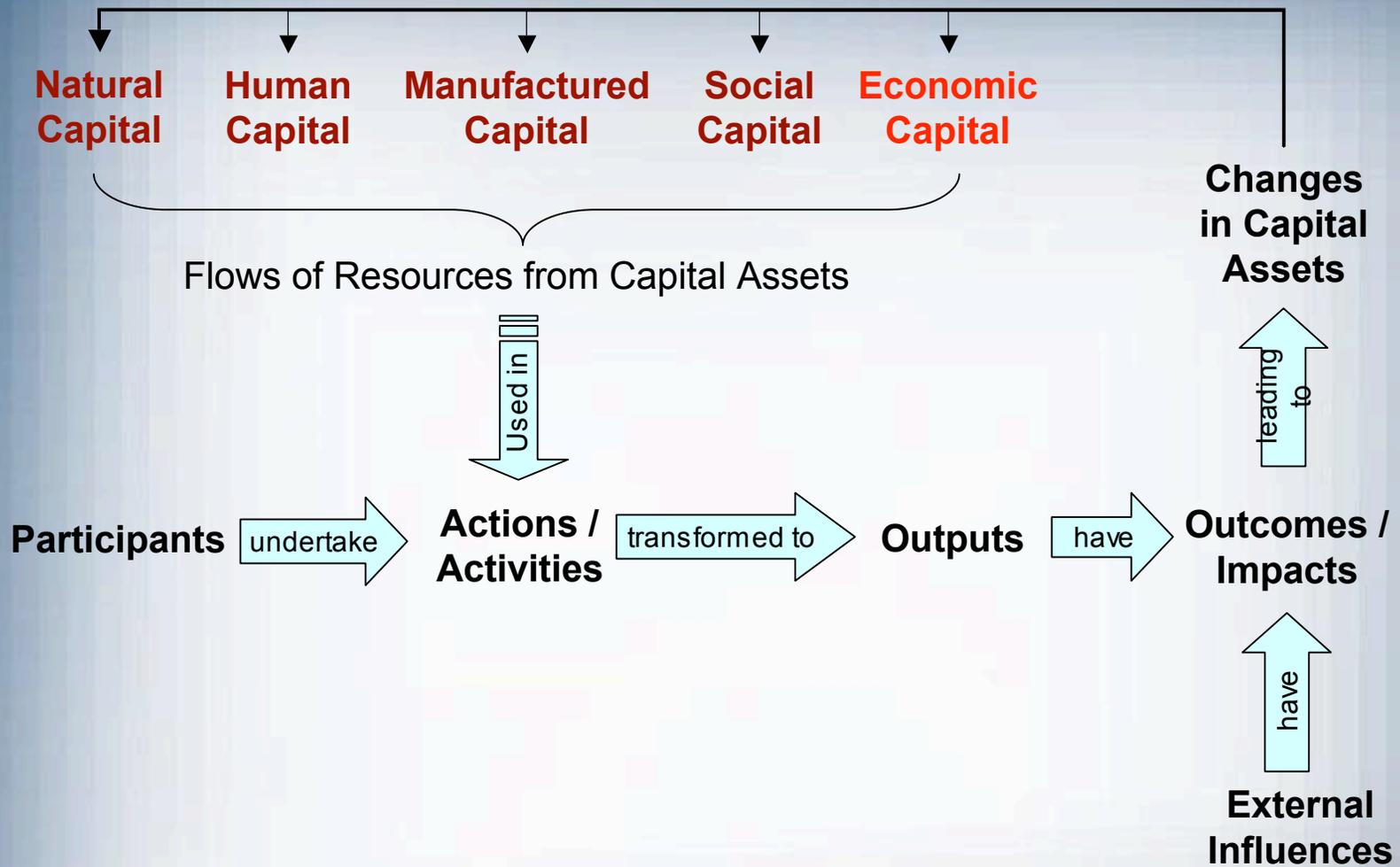
Capital Assets / Resource Flows



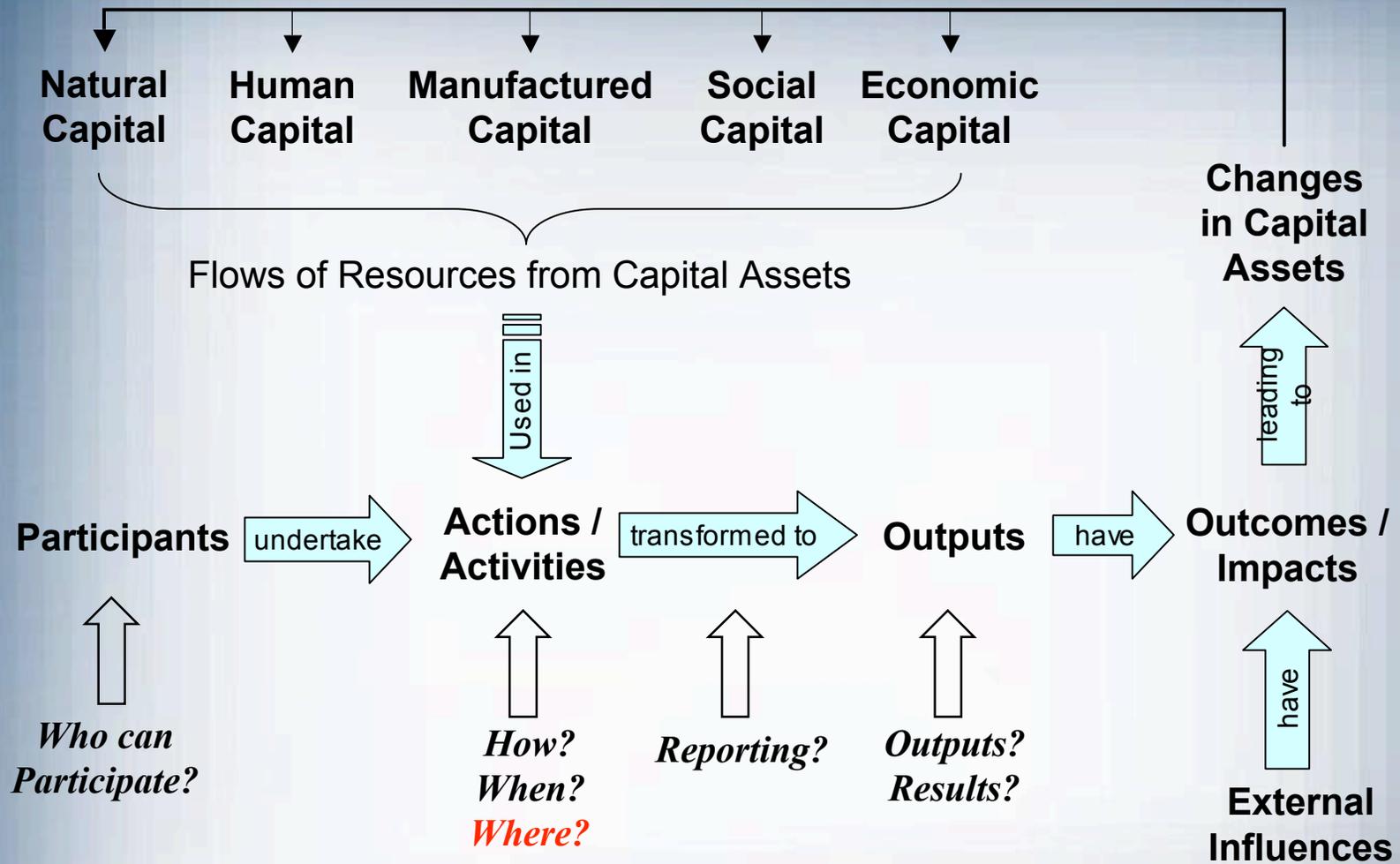
Capital Assets / Resource Flows



Capital Assets / Resource Flows

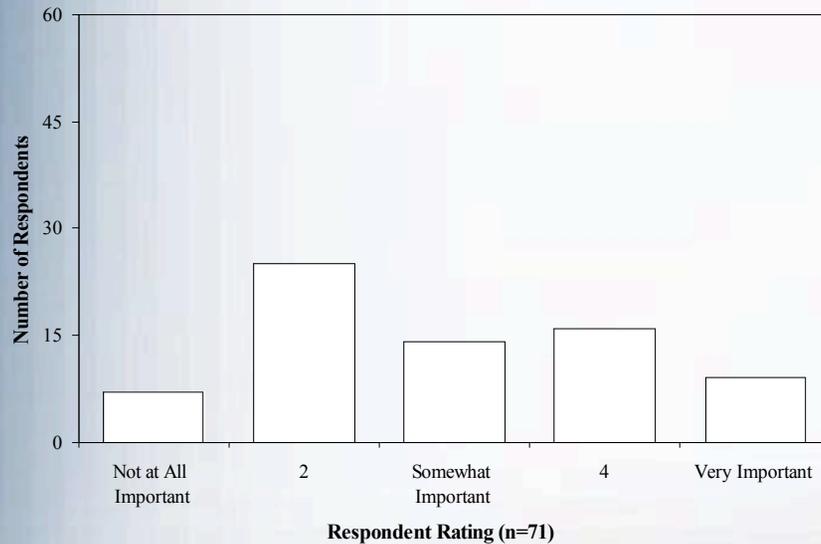
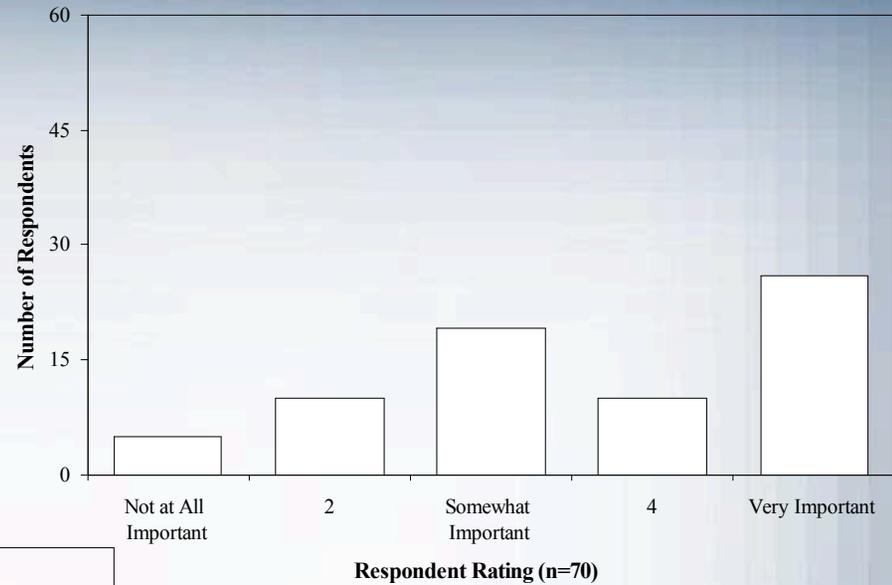


Capital Assets / Resource Flows



Assessing Beliefs / Opinions

Respondent ratings of the Importance of Global Warming in Influencing the Quality of Dive Sites in the Pacific Islands

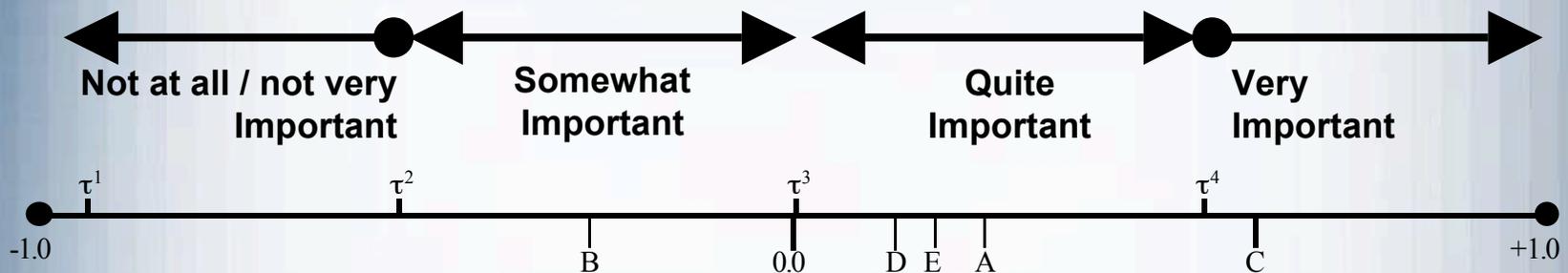


Respondent ratings of the Importance of Scuba Diving and Snorkeling in Influencing the Quality of Dive Sites in the Pacific Islands

Assessing Beliefs / Opinions

Compacting Opinion Ratings into a Single Indicator

- A number of ordination techniques available
- This example – Dual Scaling (Nishihato, 1994)
- Use all available information to set boundaries and scale opinions
- Example – scuba divers' perceptions of threat from 5 factors



$$T^1 = -0.9365$$

$$T^1 = -0.5241$$

$$T^1 = 0.0017$$

$$T^1 = 0.5456$$

$$A = 0.2524 \text{ (commercial fishing)}$$

$$B = -0.2712 \text{ (scuba and snorkeling)}$$

$$C = 0.6124 \text{ (upland development and pollution)}$$

$$D = 0.1334 \text{ (storms)}$$

$$E = 0.1863 \text{ (global warming)}$$

Assessing Preferences

- Trade-offs may not be captured by opinion assessments / surveys
- Next step – how do people compare options?
- Many possible tools
 - Paired comparisons
 - Adaptive conjoint analysis
- Simple indicator – “Relative Importance” of an Attribute
- Example – Palau scuba diver survey paired comparisons

Average Relative Importance

	Total
Number of Divers	24.78
Overall Fish Diversity	19.01
Number of Napoleon Wrasse	9.72
Average Size of Napoleon Wrasse	8.04
Icon Species	16.89
Conservation Fee	21.56

Assessing Economic Value

- Random utility theory allows calculation of willingness to pay
- Stated preference surveys
 - CVM
 - Discrete choice modeling (choice experiments)
- The price of conservation is an attribute of a policy or management scenario
- Marginal trade-off's between attributes can be calculated
- Welfare measures can be used in cost-benefit



If these were the only alternatives available, which would you choose?

	Option A	Option B	Option C	Option D
<u>Target species</u>	<u>Porbeagle Shark</u>	<u>Inner Bay of Fundy Atlantic Salmon</u>	<u>Leatherback Turtle</u>	<p>NONE: If these programs were my only choices, I would not be willing to support any of them.</p>
<u>Change in abundance and listing status</u>	200% increase in abundance and listing remains Endangered	200% increase in abundance and listing remains Endangered	100% increase in abundance and listing improves to Threatened	
<u>Probability of success</u>	100% probability (for sure)	50% probability (50/50 odds)	75% probability (somewhat risky)	
<u>Annual cost to household</u>	\$10.00 per year	\$10.00 per year	\$3.00 per year	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

Click the button below your preferred choice.

Next

Assessing Economic Value

- Palau pilot survey – scuba divers' WTP
 - **US \$10.20** per dive for a site with somewhat or very high **fish diversity**
 - **\$14.07** for a dive site with **Manta Rays**
 - **\$10.37** for a dive site with **Sea Turtles**
 - **\$6.76** for a dive site with **Reef Sharks**
 - **\$3.00** for a dive site with **Large Napoleon Wrasse**
 - **\$1.20** for a dive site with **Giant Clams**
- Palau pilot survey – elasticities
 - 10% increase in number of divers on charter – leads to 11.2% reduction in divers choosing that option
 - 10% increase in dive site access fee – leads to 6.5% decrease in divers choosing that dive site
- Future – full scale survey
 - Refine WTP estimates
 - Pricing strategy as tool to control congestion / maximize government or dive industry revenue

Assessing Economic Value

- Species at Risk in Canada
 - Survey under development
 - Survey attributes include
 - 9 different endangered or potentially endangered aquatic species
 - 9 combinations of change in population abundance and listing status
 - 3 different probabilities of conservation program success (over 20 yrs)
 - 9 different cost levels to Maritime households
 - Internet version in place
 - Mailout version to match, ready for April distribution
- Species include:
 - Atlantic salmon (Inner Bay of Fundy)
 - Atlantic whitefish
 - Blue whale
 - Leatherback turtle
 - North Atlantic right whale
 - Northern bottlenose whale
 - Porbeagle shark
 - Shortnose sturgeon
 - Winter skate
- Challenges
 - Information – how much?

<http://starfish.mar.dfo-mpo.gc.ca:41000/ce5r/ce5rlogn.htm>

Email for passwords: RuddM@dfo-mpo.gc.ca

Assessing Economic Value

- Is it necessary to assess economic value?
 - Theory-based 'numbers' needed for cost-benefit analysis
 - But, 'Blue Ribbon Panel' guidelines for CVM – cut WTP in half as starting point for negotiation / litigation
- Can we get away with indices of 'importance'?
 - Relative benefits – of various types – used to create an index of importance
 - Use cost-effectiveness analysis instead of cost-benefit
 - Common in health economics field
 - Rank species and program packages – allocate resources according to a plan (e.g., max efficiency, max benefits s.t. budget, max utility, spread the dollars, 'tow the line', downlisting success, 'crown jewel')

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