A Multiple Criteria Decision Making Model for Road Investment Management

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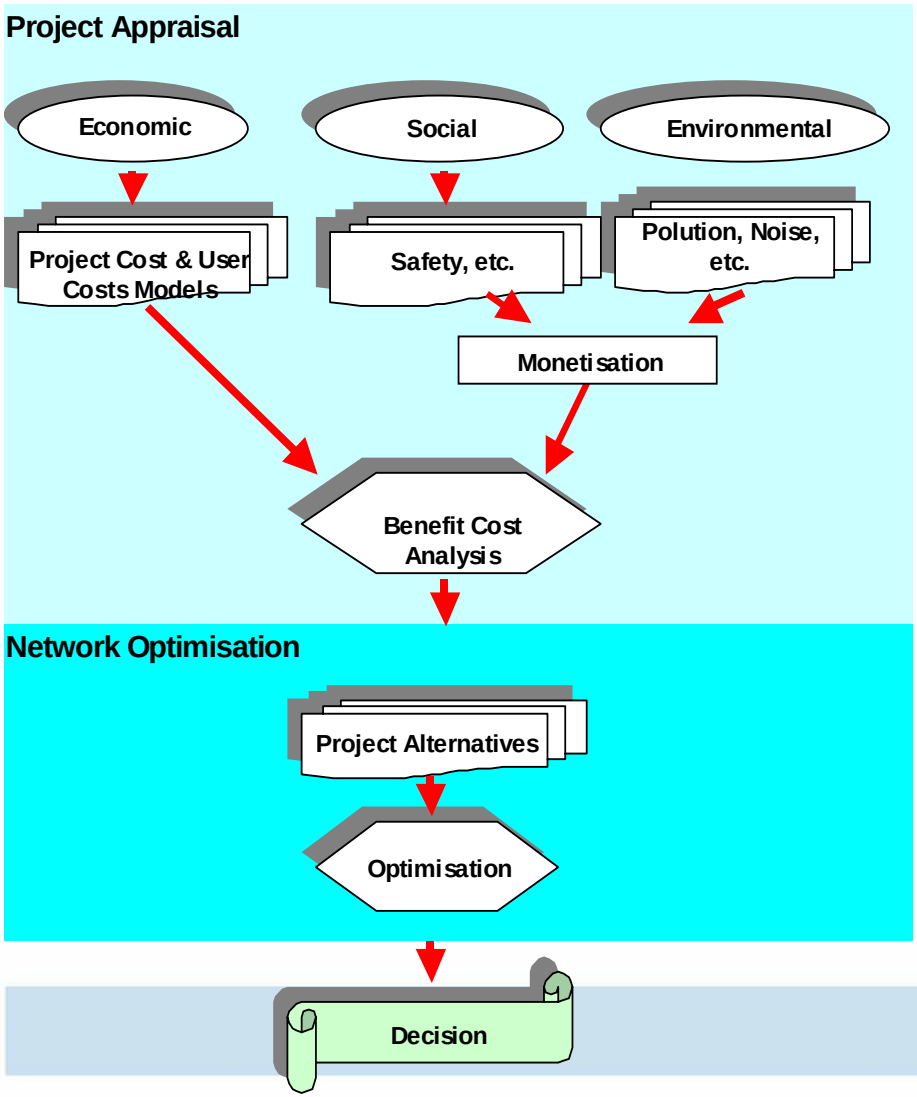
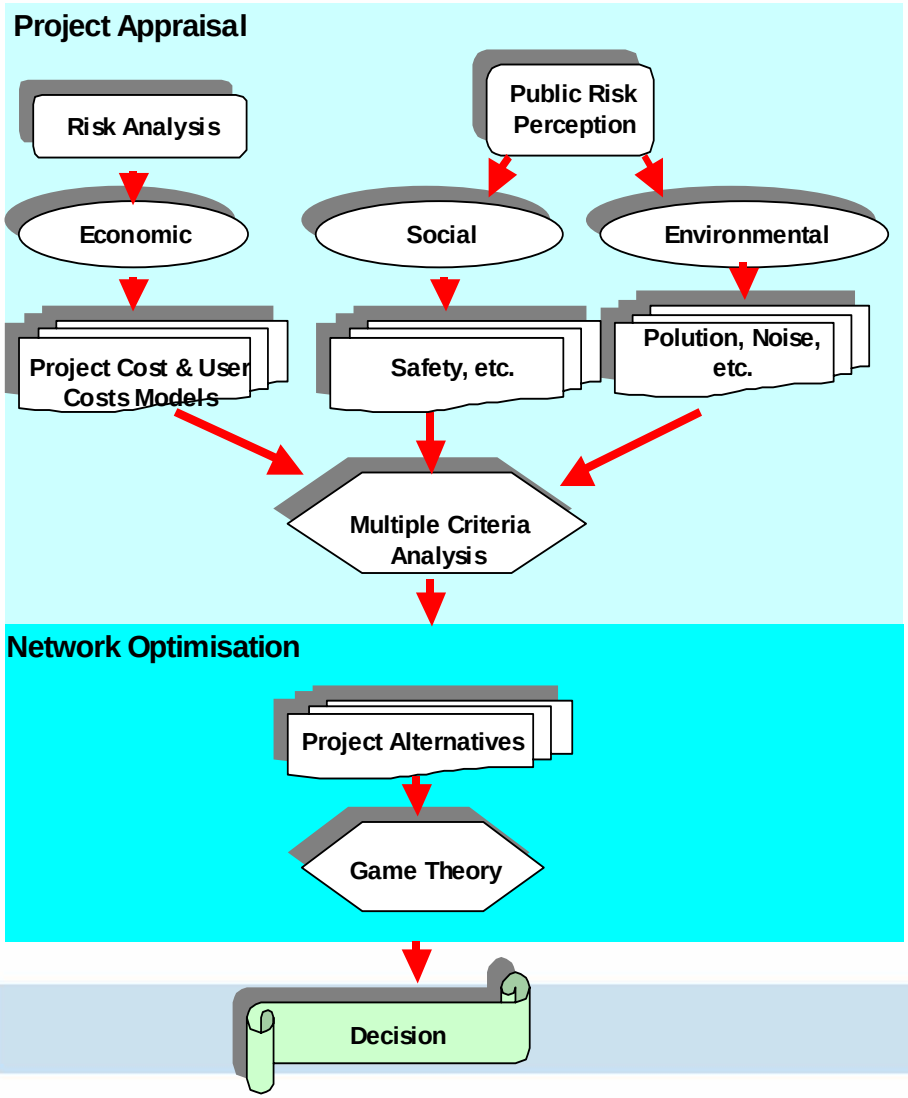
The Challenges

Focus	Old paradigm	New paradigm
Accountability	Financial only	Multiple Dimensions
Decision Criteria	Quantitative	Quantitative&Qualitative
Life-Cycle Analysis	Product	Function
Integration	Internal	Cross Work Categories
Transparency	Close	Public Participation
Funds	Public only	Public-Private Partnerships

Current Decision-making Process



Proposed Decision-making Process



Research Objectives

- Investment impact identification
- Budget allocation across portfolio (Routine Maintenance, Programmed Maintenance, Rehabilitation, and Capital Works (Improvement)).
- Budget allocation across sub-networks

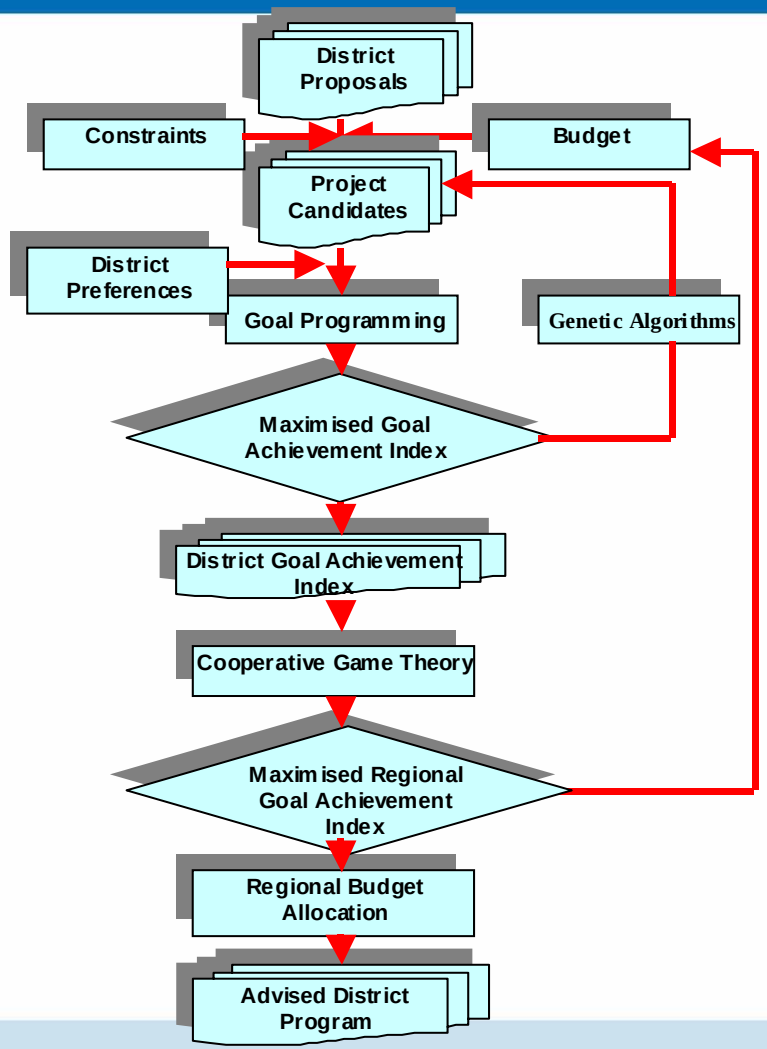
What are to be Considered

		Economic	Environmental	Social
Interanl Considerations	Management	Construction Costs Maintenance Costs Operational Costs Asset Condition Budget Constraints Investment Efficiency Land Take Technology Innovation	Risk Management	Political Commitment Social Image
	Employee	Employment	Working Environment	Work Safety Pride
External Considerations	Government	Budget Optimisation Land Development Tax Revenue Portfilio Integration Private Involvement	Environmental Regulations	Social Equity Governance
	Public	Travel Time Saving Vehicle Operating Costs Property Value Employment Growth	Health Noise	Travel Safety Creation Severance Service Quality
	Regional Interests	Business Growth Transport Efficiency	Local Air Condition Water Pollution Landscape Land Amenity	Assessibility
	Global Interests	International Traffic	Greenhouse Gas Emmission	

Methodology

- Choice Model: identify public perception and formulate investment goals.
- Goal Programming: representing decision preferences at sub-network level.
- Genetic Algorithms: searching the optimal solutions.
- Cooperative Game players: budget allocation across sub-networks.

Network Optimisation



Thank You