DECISION SUPPORT FOR BROWNFIELD DEVELOPMENT

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MULTI ATTRIBUTE DECISION MAKING PROCESS

Multi-attribute decision making

• Diagram problem
• Consider options and available information
• Allows for relative decisions

Decision support, not decision making

• Collecting and verifying information
• Assessing the problem
• Identifying alternatives
• Making logical decisions based available information
• Evaluating decisions and their consequences
• Informing others of the decision and its rationale
THE PLAYERS

The Facilitator

The Decision Maker (funder)

The Information Provider

The Site Owner
THE PROCESS

Data Collection (via questionnaire)

Weights (reflect priorities of decision maker)

Ranking of Preferred Sites
Multi-page questionnaire organized by the following CATEGORIES helps to define the ‘site:’

- Development Driver/Champion
- Development Potential
- Infrastructure
- Real Estate Market Information
Development Driver/Champion

- An entity, preferably an individual, who organizes, instigates, and connects
- For example, private sector developer, local government official, community-based organization, or local redevelopment authority
Development Potential

- Likelihood of redevelopment
- Indicators
  - End use
  - Funding
  - Time
  - Labor market
  - Property ownership
  - Community support
  - Quality of life
Infrastructure

- Availability of infrastructure adjacent to a site
  - Infrastructure can be a strength or weakness
- Indicators
  - Public utilities
  - Transportation systems
Understanding of the surrounding community in which the brownfield site is located

Allows for the comparison of the site with other (non-brownfield) properties in the area with respect to indicators:

- Property values
- Potential tax revenues
Questionnaire responses assigned a numeric value

‘Values’ entered into spreadsheet

‘Values’ are ‘weighted’ given priorities of decision maker
FINAL SCORE FOR A SITE

\[ \text{Score} = \sum_c \left[ W_c \times \sum_i W_i \times I_i \right] \]

- C = Category
- i = Indicator
- I = Vector that defines the responses to questions in Indicator I
- W = Weight
THE STEPS TO DEFINE AND WEIGH PRIORITIES

**Decision Makers**
- Assemble as a group
- Develop common understanding of indicators
- Assign weights

**Facilitator**
- Collect data from Decision makers
- Conduct discussion to result in consensus

**Optional**
- Pair-wise comparison to validate results
Statewide community development organization
17 Communities, 79 Sites
Screened via ‘Profile’ – reduced to 30 Sites
23 Questionnaires submitted
Weights (based on facilitated discussion with Board members)
- Champion – 30%
- Development Potential – 48%
- Infrastructure – 17%
- Real Estate Market Information – 5%
### EXPECTED OUTCOMES

| Ability to compare similar properties | • Size  
| | • Level of environmental contamination  
| | • Local demographics  
| Ability to look at individual indicators | • Champion  
| | • Development Potential  
| | • Infrastructure  
| | • Real Estate Market Information  
| Compare calculated ‘rankings’ to ‘intuitive’ rankings | • Calculations cannot capture all ‘intangibles’  
| | • Results will get you in the ‘ballpark’  
| Decision support | • Rational  
| | • Transparent  

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LESSONS LEARNED

MADM tool is effective if more than 10 sites are to be compared

MADM process forces decision makers to clarify their objectives

Decision makers might see value in tool, but community participation requires incentives: “what is in it for me?”

• Grants
• In-kind support

If calculated results are not similar to intuitive results, then

• Questions might be ambiguous
• List of questions might need to be modified
THANK YOU

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  - Graduate Students in Civil and Environmental Engineering and Engineering and Public Policy
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    - Yeganeh Mashayekh

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