Beyond the Linear Model: 
Introducing 
Pasteur’s Quadrant

Elizabeth McNie
Center for Science and Technology Policy Research
Environmental Studies Program
February 25, 2005
What is the Linear Model?

- Assumption about the process of scientific research and science’s relationship with society
- Basic research is performed without consideration of any practical applications or products
- “Basic research is the pacemaker of technological progress” - Bush
- ‘Postwar paradigm’
Government Invests in ‘Basic Research’

Basic Research Inspired by curiosity…adds to ‘pool of knowledge’

Applied research and development...

Society benefits with cool technologies and sometimes…information for decision makers
Culture of the Linear Model

- “Basic”/“Pure” vs. “Applied”/“Practical” dichotomy
- **Bohr vs. Edison**
- Government should keep a “hands off” approach to basic science
- Fund basic research and the ROI will be worth it for society
- Embedded belief among scientists that they are the ‘elite’, and separate from society
Shortcomings of Linear Model

- Progress from science to technology to society is not one way
- Technological advances can be independent from scientific advances (Japan)
- ‘Faith’ in linear model unrealistic today, economically, environmentally, complexity, etc.
- Basic/Applied dichotomy excludes many disciplines (nano, biomedical, etc.)
- Inhibits reconciliation of the supply and demand of information for decisionmaking
Beyond the Linear Model

• Growing support for new model that reconciles supply and demand of scientific information
  • ‘mission oriented’
  • ‘policy relevant’
  • ‘use inspired’
  • ‘purposive basic research’
  • ‘directed research’
• ‘Use-inspired Basic Research’ - Stokes
The Linear Model

Bohr Basic Edison Applied
What Inspires Research?

Considerations of use?

<table>
<thead>
<tr>
<th>Quest for fundamental understanding?</th>
<th>Consideration of use?</th>
<th>Pure Basic Research (Bohr)</th>
<th>Use-inspired basic research (Pasteur)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>Yes</td>
<td>Exploration of particular phenomena but without having quest for fundamental understanding or consideration of use.</td>
<td>Pure Applied Research (Edison)</td>
</tr>
<tr>
<td>No</td>
<td>Yes</td>
<td>Pure Basic Research (Bohr)</td>
<td>Use-inspired basic research (Pasteur)</td>
</tr>
<tr>
<td>No</td>
<td>No</td>
<td>Exploration of particular phenomena but without having quest for fundamental understanding or consideration of use.</td>
<td>Pure Applied Research (Edison)</td>
</tr>
</tbody>
</table>

= “Pasteur’s Quadrant”
So What?

• Creates an arena in which science and society can engage each other actively
• More effective linkages between scientific promise and societal values
• Enhances cross-fertilization of research and ideas across ‘boundary’ between applied and basic research
• Lays foundation for enhanced linkages between science and decision making...
Questions?