Industrial Innovation and Partnerships
Divisional Plan

Kesh Narayanan

Innovation through Partnerships

# Innovation Definition(s)

- Innovation is the complex process of introducing novel ideas into use or practice - **Lemelson/MIT**

- Innovation occurs at the intersection of invention and insight; it's about application of invention - **Council on Competitiveness**

- Knowledge applied to tasks that are new and different is Innovation – **Peter Drucker**

- Research is the transformation of money into knowledge;

    Innovation is the transformation of Knowledge into money – Geoff Nicholson (retired, **3M**)

Innovation through Partnerships

IIP Divisional Planning

- **Three Divisional Retreats**
  - **November '06 for 2 Days**
  - **December '06 for 1 Day**
  - **January '07 for 1 Day**
  - **Murali Nair, Coordinator**
- **Build on earlier OII Plan**
- **Organizational Alignment**
  - **ACI to NSF to ENG to IIP**

Innovation through Partnerships

American Competitiveness Initiative
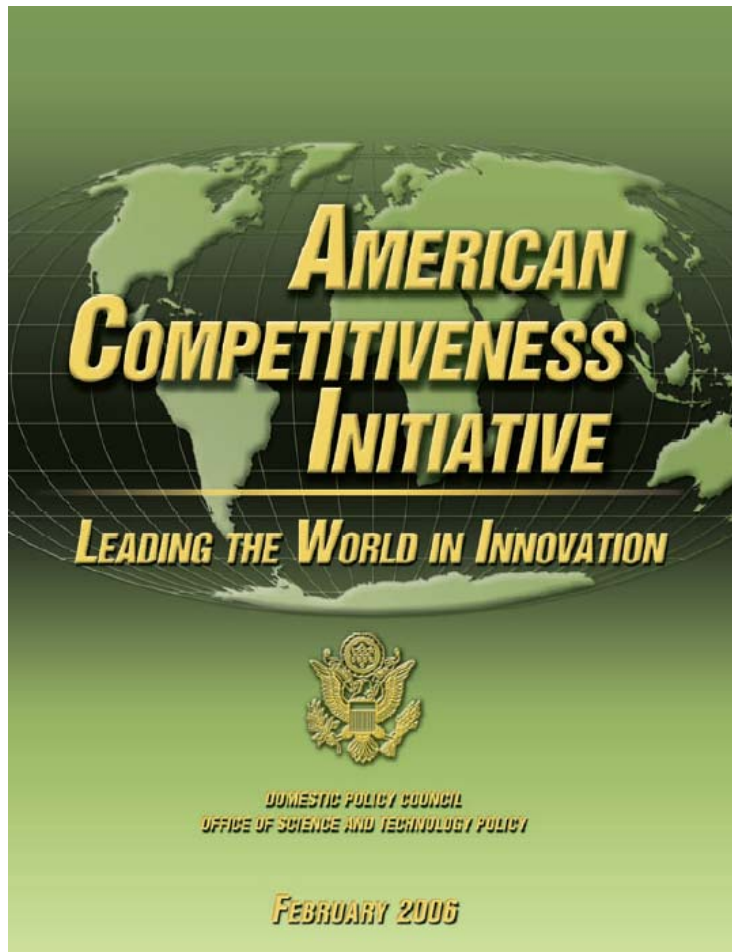
- "America's economic strength and global leadership depend in large measure on our Nation's ability to generate and **harness** the latest in scientific and technological developments and to apply these developments to **real world applications**."

Innovation through Partnerships

NSF's Vision*

Advancing Discovery, **Innovation** and

Education beyond the frontiers of

knowledge, and empowering future

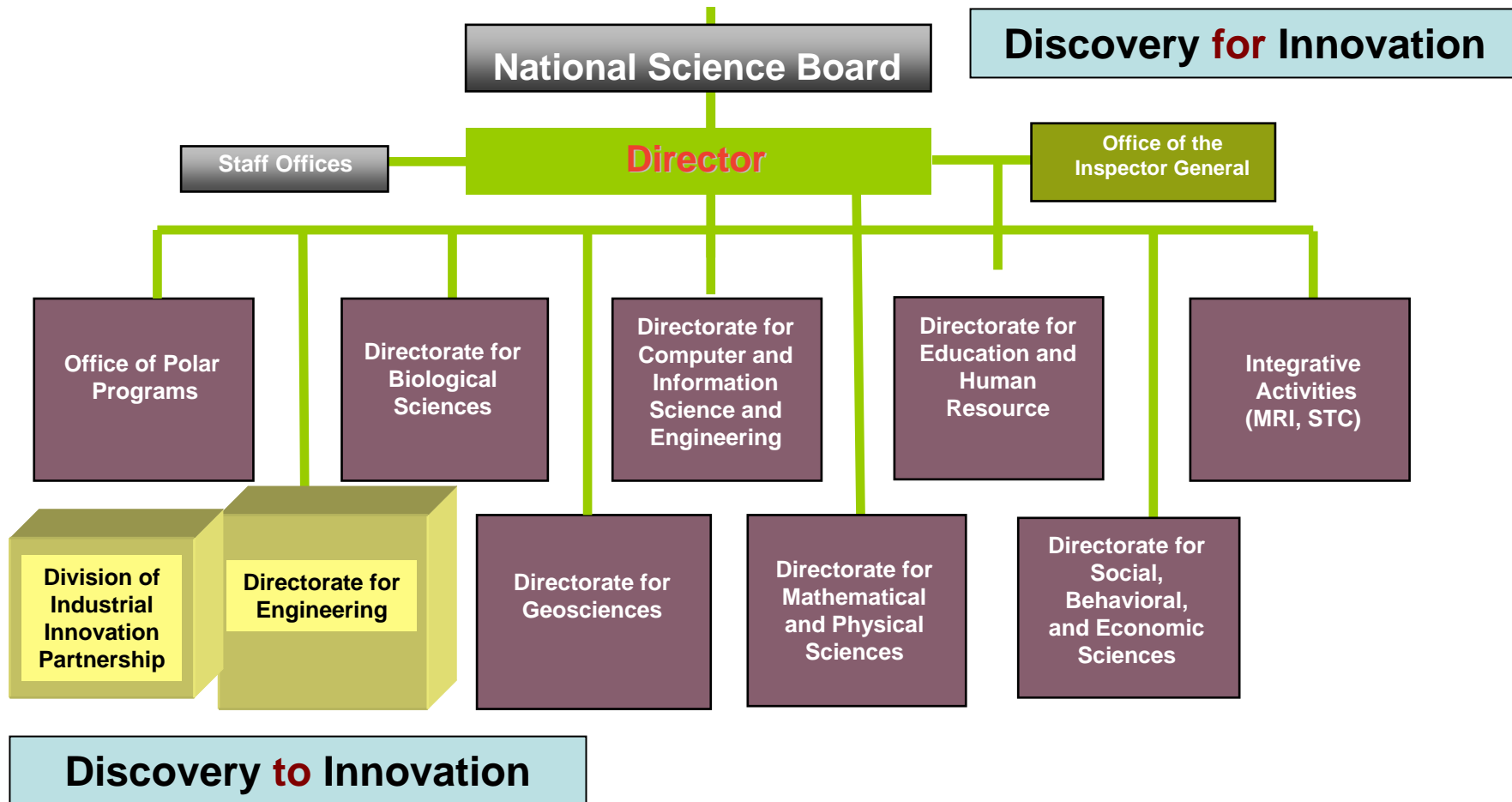generations in science and engineering.

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Discovery Research **for** Innovation*

- *To address priorities identified in the ACI and to promote research that will drive innovation, NSF will target programs in cyberinfrastructure, engineering, mathematics, and the computing and physical sciences, as well as programs that promise to have a substantial impact on quality of life.*

Innovation through Partnerships

National Science Foundation

Discovery for Innovation

National Science Board

Director

Staff Offices

Office of the Inspector General

Office of Polar Programs

Directorate for Biological Sciences

Directorate for Computer and Information Science and Engineering

Directorate for Education and Human Resource

Integrative Activities (MRI, STC)

Division of Industrial Innovation Partnership

Directorate for Engineering

Directorate for Geosciences

Directorate for Mathematical and Physical Sciences

Directorate for Social, Behavioral, and Economic Sciences

Discovery to Innovation

Innovation through Partnerships

Discovery **to** Innovation

Proposals to accelerate Innovation

- Longer Term
  – Discovery to Innovation Networks

- Shorter Term
  – Discovery to Innovation Partnerships
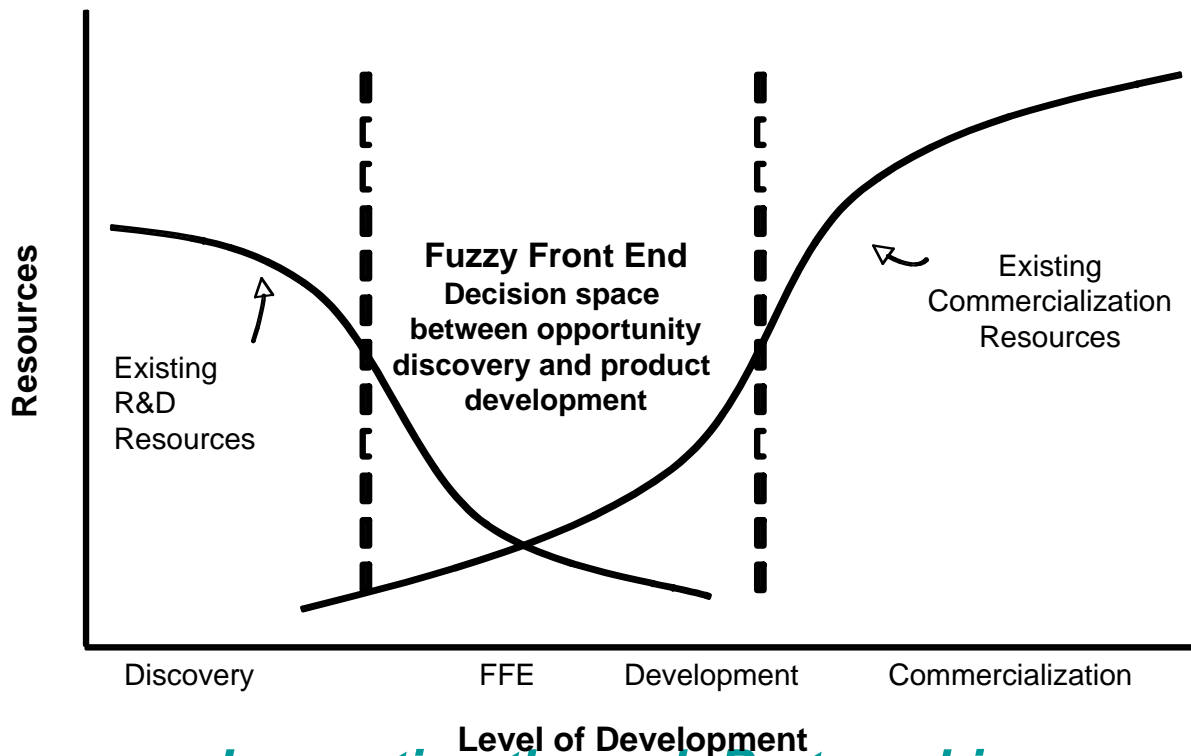
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The R&D perspective*

- The special case of new breakthrough products based upon new or disruptive technology

  *Angus Kingon N.C.State U.

  – *Fuzzy Front End*
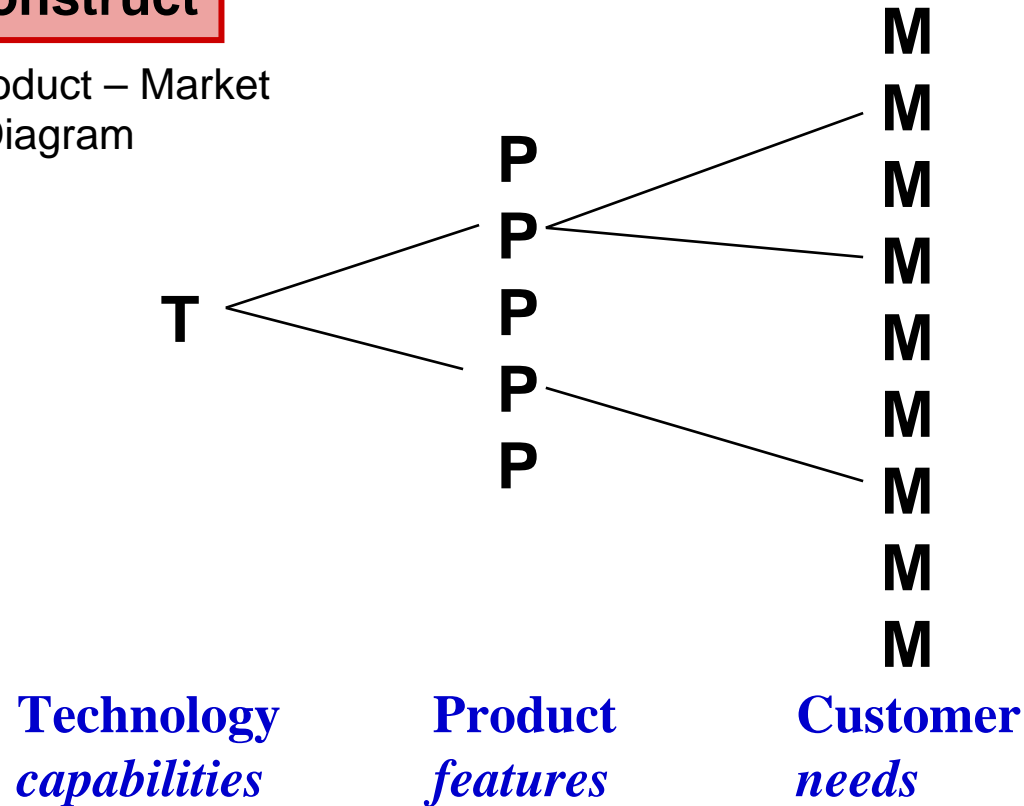
- The front end of innovation is the back end of R&D

Innovation through Partnerships

The role* of Industry 'Champions'
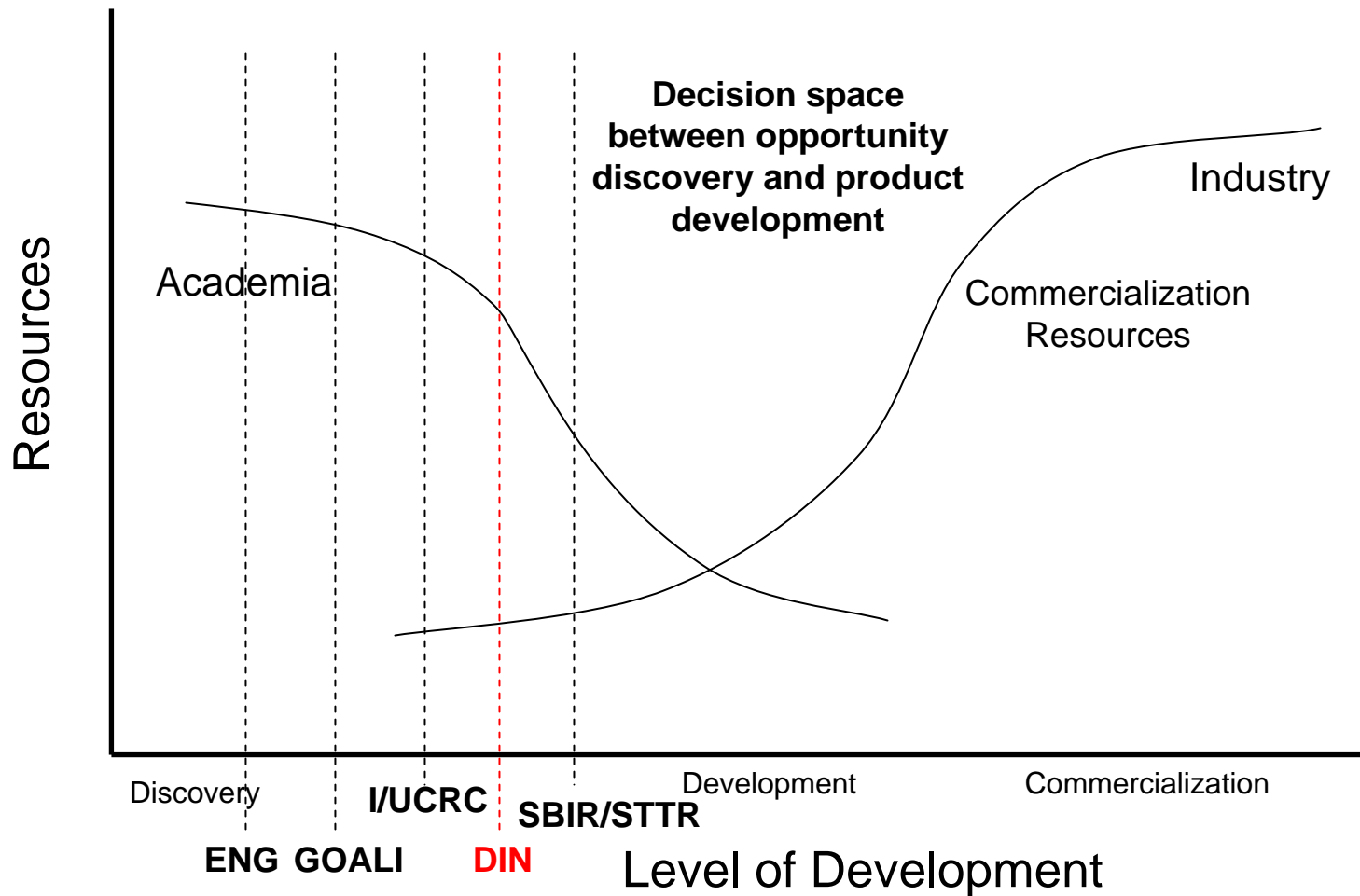
The T-P-M construct

Technology – Product – Market
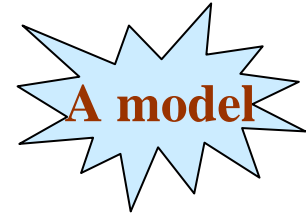Linkage Diagram

*Angus Kingon
N.C.State U.

Technology
capabilities

Product
features

Customer
needs

Innovation through Partnerships

Discovery to Innovation (DIN)

Resources

Academia

Decision space between opportunity discovery and product development

Industry

Commercialization Resources

Discovery

I/UCRC

SBIR/STTR

Development

Commercialization

ENG GOALI   **DIN**
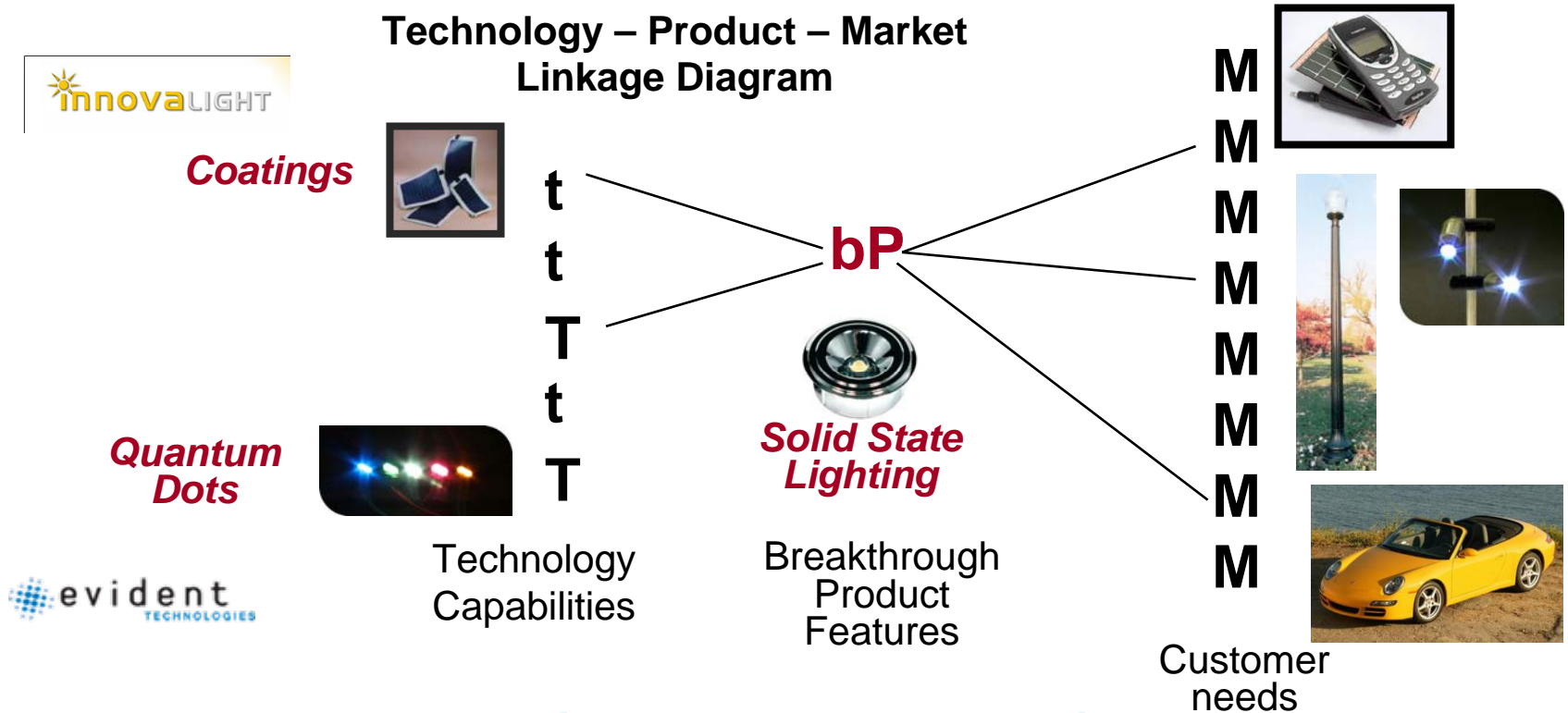
Level of Development

Innovation through Partnerships

Discovery **to** Innovation Networks

– Contrasts with Discovery Centered Networks

– Brings together Emerging Technologies **(T)** (NSF investment) and incremental technologies **(t)** (industry support) in to launching 'Breakthrough Products'

Technology – Product – Market Linkage Diagram

Coatings

Quantum Dots

t
t
T
t
T

M
M
M
M
M
M
M
M
M

bP

Solid State Lighting

Technology Capabilities

Breakthrough Product Features

Customer needs

Innovation through Partnerships

Discovery **to** Innovation Partnerships

Supplement discovery research
'Ready' for Innovation

– Third Party Commitments

– Commercial Reviewers

– Examples:
- NSF-SIA model on nano-electronics
- SBIR/academic centers

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Proposal

Innovation Partnerships

- **'Industry' supports transformational research**
  - Innovate America
  - Rising Above Gathering Storm
- **Industry also seeks innovation 'ready' research**
  - Technology Insertion Index
  - Venture Readiness
- **National Academies**
  - **Grand Challenges for Engineering**
  - **GUIRR – UIDP 'turbo-negotiator'**
- **ENG AdCom sub-committee on university – industry partnerships**
  - Sponsored Research Opportunities
  - Proactive matching

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Innovation Partnerships

- **2007 ERC Solicitation**
  - Build a culture of innovation in academe
    - partnership with industry/practitioners
    - engage small innovative firms
- **New Partnerships**
  - I/UCRC Membership for SBIR/STTR Grantees
  - ERC & SBIR/STTR
  - **Supplement innovation 'ready' research with breakthrough potential**
  - **Discovery to Innovation Networks**

Innovation through Partnerships

IIP Divisional Plan

Vision

To be the pre-eminent federal resource driving the expansion of our nation's innovation capacity by stimulating partnerships among industry, academe, investors, government and other stakeholders.

Mission

IIP will enhance our nation's economic competitiveness by catalyzing the transformation of discovery into societal benefits through stimulating partnerships and promoting learning environments for innovators.

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