Triple Helix Innovation Summit

“Things to think about”

Michael Brown

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GE – Over a Century of Innovative Heritage

• 115-Year-Old, High-Tech, Growth Company

• $163 Billion in Annual Revenues

• Only Company Listed in Dow Jones Index Today That Was in Original List in 1896

• 315,000+ Employees Worldwide
Global Research
Global research: market-focused R&D

- First US industrial lab
- Began 1900 in Schenectady, NY
- Founding principle … improve businesses through technology
- One of the world’s most diverse industrial labs

Cornerstone of GE’s commitment to technology
Global brains

- 2,600 research employees (nearly 1,000 PhDs)
- Diverse group from 55 nations
- 26,000 GE technologists worldwide

Global Research Center
Niskayuna, NY

John F. Welch Technology Center
Bangalore, India

China Technology Center
Shanghai, China

Global Research – Europe
Munich, Germany
A History of Innovation

1909  Ductile Tungsten
1913  Medical X-Ray
1932  Langmuir Nobel Prize in Chemistry
1942  First US Jet Engine
1953  LEXAN™ Polycarbonate
1955  Man-Made Diamonds
1973  Giaever Nobel Prize in Physics
1983  Magnetic Resonance Imaging
1995  GE90® Composite Fan Blade
1999  Digital X-Ray
2003  H Turbine
2004  Lightspeed VCT
GRC’s External Collaboration Process

Key...find, leverage or create win-win intersections to stimulate GE strategic technology development aimed at business growth
Biz & GRC team to develop innovative products

Collaborations Partnerships

Idea/Discovery Feasibility Tech Transfer New Product Introd. Product Maturity
GE’s overall strategy for partnering:

• When?
  • A technology gap exists at GE
  • Makes sense for all partners (IP, Interest, Timing)

• How?
  • Use six sigma for partner selection
  • Method (JV, government funding, direct funding, etc.) Is on case-by-case basis

• What works?
  • It’s a win-win for everyone
  • Roles and goals are well defined
  • Monitor the program

• What doesn’t work?
  • Force fit
  • Lack of synergy between partners
Partner Selection Process

• Utilize 6σ Tools (QFD)

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<th>Partner Selection Criteria</th>
<th>Importance</th>
<th>Partner A</th>
<th>Partner B</th>
<th>Partner C</th>
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**Partner Selection Pareto**

- Existing Collaborations
  - Customers
  - Existing Collaborators
  - GE Businesses
- Internal Research Team
- Consultants
- Conferences/Brokerage Events
Benefits and Challenges

- Accelerated development of technology
- Sharing of risk
- Faster path to market
- New business opportunities
- Spin-off technologies/products
- Exchange of scientific ideas and resources
  - Introduction of new processes
  - Entrepreneurial spirits
- With a large company—
  - focus/priorities can change quickly
  - sometimes difficult to get complete picture across company
  - bureaucracy can slow progress/prevent quick changes
- With a small business—
  - long-term vitality can be a risk
  - lack of resources (personnel and funds)
- With a University—
  - timeline and goals often different from corporations
  - intellectual property issues
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GE Digital Detectors

ARPA Digital Detector Mammo MGH/GE

NIST Apollo Mfg. GE/Perkin Elmer

NIH Full Field Digital Mammo MGH/GE

NIH Full Field Digital Mammo MGH/GE

 NIH Full Field Digital Mammo MGH/GE

NIH U/S Mammo Fusion GE/Umich/Stanford

Portable Apollo DoD DoD GE

Portable Apollo DoD USUHS/GE

Digital Detectors

Tomosynthesis Wireless Portable Apollo GE/Emory
imagination at work