University – Industry – Government Collaboration: Next generation New Mexico energy empowerment

Advanced Technology Management

September 19, 2019

Today's Program

- **University- Based Collaboration Models**
- **The Growth and Development of a Consortium**
- **Jointly Creating Productive Partnerships**
- **Examples of University Based Partnerships**
  - Oregon Tech Renewable Energy and Smart Grid Consortium
  - MIT Leaders for Manufacturing Consortium
  - Harvard University multidisciplinary collaboration focused on innovation in low resource environments
  - University-government partnerships

Today's Program (2)

- **The Critical Role of Government Involvement**
- **Best Practices**
- **Key Success Factors**

Forming University- Based Collaborations

- Sponsored research
- Faculty exchange
- Partnerships with other educational institutions
- Technology transfer
  - Licensing as an individual company
  - Licensing as part of an alliance
- Consortium

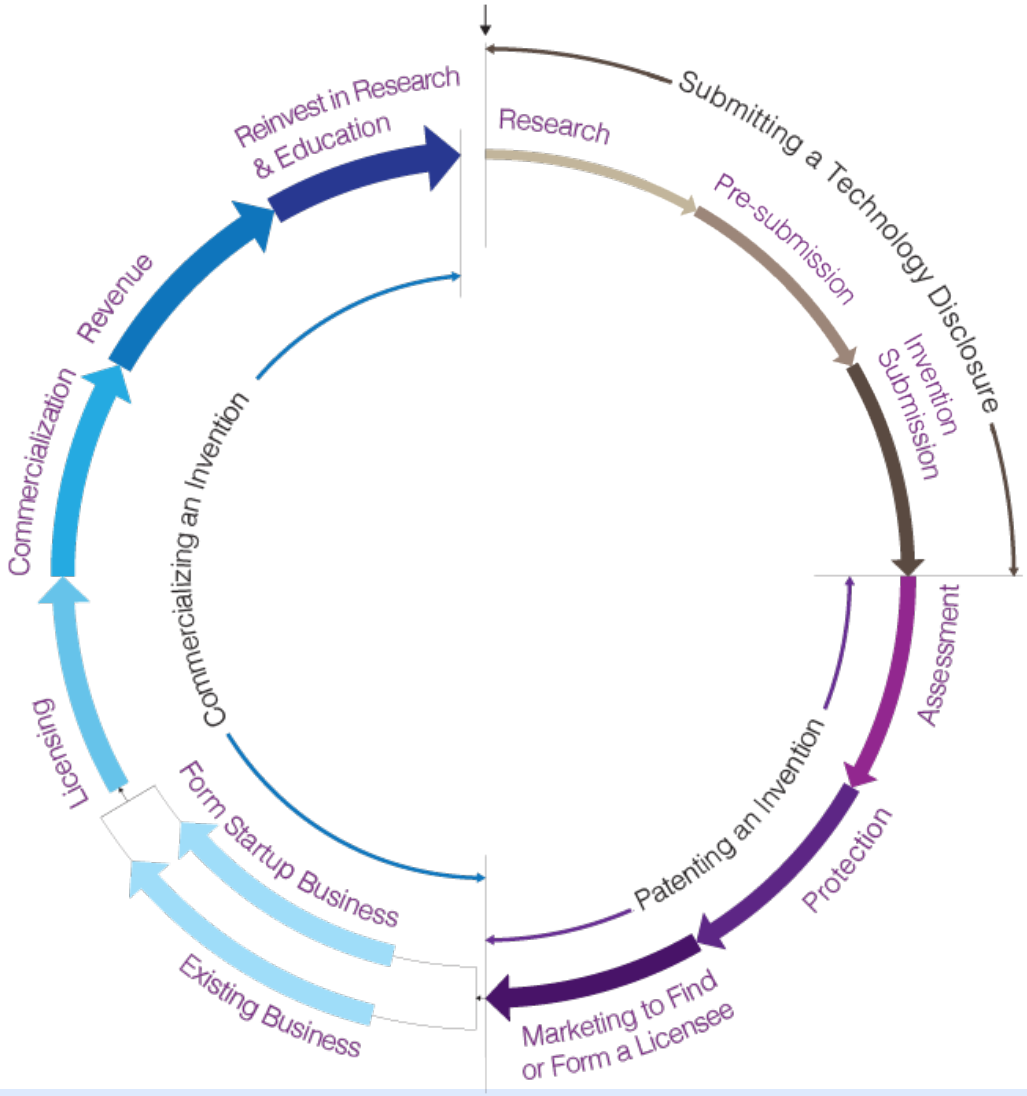
Growth and Development of a Consortium

- Values and priorities evolve over time
- Intellectual property and technology transfer are competitive priorities
- Small business participation
- Select activities
  - Solicitation of new members
  - Curriculum development for students
  - Technical and professional skills necessary to support and drive energy-related innovations
  - Updating the definition of the 21st century workforce that New Mexico organizations need for renewable energy innovations

Growth and Development of a Consortium (2)

- Certification and branding- market awareness
- Standards
- Access to student interns
  - Design a quality placement program
  - Monitoring and evaluating the competences acquired by the students
- Other deliverables such as white papers, tools and internal consortium shared software, developed as part of the research program, written critique of product specifications
- Seminars and Workshops

Technology Transfer Process



Technology Transfer Process

- The **technology transfer** process involves the initial submission of a new technology to the TLO which has arisen from research or activity undertaken by MIT employees.
- The next step moves to evaluation, potential patenting, marketing and licensing the intellectual property to third parties.
- The TLO maintains a database that's lists MIT technologies that are available for licensing. MIT Technology Disclosures and IP Protection
- Faculty, staff or students are asked to disclose an invention to the **TLO** if they believe their research could be commercialized for public use and benefit.

Examples of University Based Partnerships

- Oregon Renewable Energy and Smart Grids University Industry Government
- LFM University-Industry Consortium
- Harvard School of Engineering University–University
- Government-University

Oregon Tech Renewable Energy and Smart Grid Consortium

- Early access to IP created by members of the collaboration
- Member organizations include: Oregon Tech faculty, industry and government labs and student researchers.
- Goals: Create renewable energy solutions that help members develop and test processes, devices, and technologies.
- Their focus is applied performance testing, development and deployment

Oregon Tech Renewable Energy and Smart Grid Consortium (2)

- Target: Within three years create a network of at least 5 five companies that are working on focused, collaborative applied research
- Conduct at least 3 demonstration projects with member companies; generate proof of concept testing of emerging technologies
- Generate jointly-owned strategic IP
- Develop an immediate, relevant workforce by supporting OIT's engineering educational programs and providing students with real-world opportunities
- Gain valued-partner status for OIT with consortium members and industries

Oregon Tech Renewable Energy and Smart Grid Consortium (3)

- Examples of companies that could benefit from this consortium include:
  - Large and small power utility companies
  - Semiconductor manufacturers
  - Petrochemical producers
  - Oil and gas distributors;
  - Automotive suppliers
  - Battery, fuel cell, and super-capacitor developers
  - Turbine and generator manufacturers
  - Electronic component manufacturers
  - Catalyst, polymer, material, and chemical producers

MIT Leaders for Manufacturing (LFM) Consortium

Created by the MIT Sloan School and MIT School of Engineering in partnership with 11 leading American manufacturers.

Impetus: US manufacturing infrastructure was eroding

- This lack of competitiveness was a large US societal problem
- Program goals: Create Leaders for Global Operations, with extensive experience in several sectors -energy, automobile, pharmaceuticals, supply chain management etc.
- Over the duration of the program, competitors became collaborators
- The selection of a facilitator was critical to the success of the program
- This was a novel approach with industrial members included competitors

LFM (2)

- Students in this program had an undergraduate degree in engineering or science-considered critical to manufacturing excellence
- This program generated cutting-edge manufacturing knowledge to address the world's most challenging manufacturing operations and high-tech problems
- Internship or "Action Learning" was a core part of the success of this program;
- Students were working on real world problems; corporate experience reinforced academic achievement and vice versa

Harvard University Alliance in Bangalore

- Institution–wide multidisciplinary collaboration
- Focused in the area of medical technologies
- Design and development of innovative medical devices for low resource environments
- Process translated critical needs in the field into design problems
- Created a year long Fellows Program in Innovation and bio-design

Harvard University Alliance in Bangalore (2)

- Establish partnerships and long term relationships between universities, key medical professionals, government and non–governmental organizations
- Demonstrated impact between Harvard Students and students in Bangalore
- Links to Harvard Labs for local students and clinicians
- Use of local manufacturers and suppliers during product realization
- Nurturing local innovators

Critical Role of Government in Partnerships

- Three-quarters of Federal investment in clean energy innovation in FY 2016 was administered by the DOE.
- Other agencies with significant clean energy innovation budgets include the Department of Defense (DOD), the Department of Transportation (DOT), and the Department of Agriculture (USDA).
- Implementation processes for the Government Performance and Results Act (GPRA) impose rigid strictures on the way R&D program offices establish performance measures.
- The funding available for federal energy R&D programs after 2020 is currently a matter of great uncertainty.

Small & Medium Sized Businesses

- SMEs are central to clean energy innovation, providing entrepreneurial vision, and connecting innovation to the rest of the energy system and economy
- Renewable energy requires financial support as well as the ability to demonstrate feasibility, develop prototypes, and demonstrate scalability
- Over the past several years, venture capital has reduced its engagement in clean energy innovation, therefore belonging to a consortium is beneficial
- Renewable energy systems have a long cycle of adoption; so SMEs have an important role in technology development and adoption.

Consortia Key Success Factors

- Mission and goals statements
- Leadership
- Financial resources
- Long term suitable facilities and technologies to support mission and goals
- Internal and external relations
- Human resources and legal counsel