Analysis of Program Goals and Objectives

• Program has evolved over 30-plus years
• Goals and objectives have tended to be emergent and/or high-level impacts
• Evaluation has also been ongoing and emergent
• Program solicitation emphasizes “means” and “ends” with little in between
• Little guidance on the mechanism(s) that help translate means into ends
• Little guidance on all the intermediate steps that come between means and ends
NSF 13-594
Means and Ends

Means
• Leverage NSF funds with industry to support graduate students performing industrially relevant research;
• Integrate research and education, and facilitate technology transfer
• Promote research programs of mutual interest
• Active engagement with academic and industrial leaders throughout the world
• Develop long term partnerships among industry, academe and government

Ends
• Contribute to the nation's research infrastructure base
• Enhance the intellectual capacity of the engineering or science workforce
• Expanding the innovation capacity of our nation's competitive workforce
• Encouraging the nation's research enterprise to remain competitive

Enhanced Innovation Ecosystem
Project Goals

• Shine a light on ...
  • Program Mechanism(s)
  • Program Logic Model: activities, outputs, outcomes, impacts for various stakeholder groups and indicators for each
  • Identify data that has been collected to support program effectiveness and identify opportunities for additional assessment
Project Team

- Teri Behrens
- Alexandra Medina-Borja
- Craig Boardman
- Connie Chang
- Denis Gray
- Shannon Griswold
- Larry A Hornak
- Lindsey McGowen
- Craig Scott
- Eric Sundstrom
  - With additional feedback from the Evaluator Group
Process

- In-person workshop – generated many ideas
- Drafted LM
- Reviewed over 4 conference calls
- Presented to Evaluator Group in June 2014
- Feedback incorporated
- Revised (Final?) LM review in January 2015
- Logic modeling is an iterative process – should be a living document
IUCRCs: BUILDING AN ENHANCED RESEARCH AND INNOVATION ECOSYSTEM

Trust-based Partnership Cycle

- Collaborative execution of agenda
- Development of shared research agenda
- Quality and relevance of research
- Mutual understanding between industry and university
- Mutual benefit

System Interventions

University resources and facilities
NSF Funding, Prestige and Technical assistance (Best practices in center management)
Industry intellectual and financial support

Students
- Increased opportunities for internships/employment
- Ideas / funding for thesis / dissertation research
- Industry network
- Skills in bridging industry / academy

Faculty: Short-term
- Increased:
  - Scholarly productivity & reputation
  - Advances in knowledge
  - Skills in collaborative research
  - Consulting / contract opportunities
  - Ability to attract / support students
  - Understanding of industry needs and opportunities
  - Industry network

Faculty: Long-term
- Funding from diversified sources
- New / enhanced relationships with industry (social capital)
- Opportunities for scientific leadership

Industry: Short-term
- Access to potential employees
- Amplified R&D
- Broader scientific network
- Access to IP

Industry: Long-term
- More efficient research
- Better prepared employees
- Ability to capitalize on university research
- New / improved products, processes, know-how and/or services
- Broader scientific network (social capital)

IUCRCs are a SYSTEM level intervention – targeted support creates a self-reinforcing network of relationships.
**Inputs**
- NSF Funding, Prestige and Technical assistance
- Industry intellectual and financial support

**Activities**
- Manage center according to best practices
- Conduct industrially relevant research
- Partnering / boundary spanning

**Outputs** (Immediate results of activities – first year)
- Leadership
- Research results
- Human capital - Faculty and students with skills relevant to industry
- Social capital – trust among university and industry

**Short-term Outcomes** (What is different after 1-2 years?)
- Faculty Increased:
  - Scholarly productivity & reputation
  - Advances in knowledge
  - Skills in collaborative research
  - Consulting / contract opportunities
  - Ability to attract / support students
  - Understanding of industry needs and opportunities
  - Industry network
- Students
  - Increased opportunities for internships/employment
  - Research achievements
  - Ideas / funding for thesis / dissertation research
  - Industry network
- Industry
  - Access to potential employees
  - Amplified R&D
  - Broader scientific network
  - Access to IP

**Intermediate - Long-term Outcomes** (3 – 10 years)
- Center / University
  - Self-sustained partnership with industry
  - Increased ability to attract faculty, students, and external research support
  - Deeper and increased interactions with industry
  - Enhanced reputation
  - More entrepreneurial culture
- Faculty
  - Funding from diversified sources
  - New / enhanced relationships with industry (social capital)
  - Opportunities for scientific leadership
- Students
  - Skills in bridging between university and industry contexts
  - Enhanced social capital
- Industry
  - More efficient research
  - Better prepared employees
  - Ability to capitalize on university research
  - New / improved products, processes, know-how and/or services
  - Broader scientific network (social capital)

**Impacts / Externalities**
- Center Operations
  - NSF On-going Technical Assistance
  - Center Growth: Award of supplemental funds / contracts -- New members added -- New research sites added

**Enhanced research and innovation ecosystem**

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**Leadership**
- NSF On-going Technical Assistance
- Center Growth: Award of supplemental funds / contracts -- New members added -- New research sites added
Inputs

Activities

Outputs
(Immediate results of activities – first year)

Short-term Outcomes
(What is different after 1-2 years?)

Intermediate - Long-term Outcomes
(3 – 10 years)

Impacts / Externalities

University
- Human resources (faculty, researchers, students)
- Equip. & facilities
- Research accomplishments
- Financial support (reduced indirect, support for admin and student)
- Social capital (Existing collaborations, networks)
- Organizational capital (policies, mission, culture)

NSF
- Funding & Prestige
- Evaluation
- Best practices and technical assistance
- Program requirements
- Organizational capital

Industry
- Financial support
- Technical insight and direction
- Research accomplishments
- Specialized equipment and materials
- Time
- Human capital
- Social capital

Center

Center Structure
- Center Growth & Recruitment
- Award of supplemental funds / contracts
- New members added
- New research sites added

NSF On-going TA

Faculty
Increased:
- Scholarly productivity & reputation
- Advances in knowledge
- Skills in collaborative research
- Consulting / contract opportunities
- Ability to attract / support students
- Understanding of industry needs and opportunities
- Industry network

Students [Alumni]
- Increased opportunities for internships/employment
- Research achievements
- Industry network (social capital)

Industry
- Access to potential employees
- Amplified & efficient R&D
- Broader scientific network
- Access to IP

Center / Dept. / University
- Self-sustained partnership with industry
- Increased ability to attract faculty, students, and external research support
- Deeper and increased interactions with industry
- Enhanced reputation
- More entrepreneurial culture

Students [Alumni]
- Increased opportunities for internships/employment
- Research achievements
- Industry network (social capital)

Industry
- More efficient research
- Better prepared employees
- Ability to capitalize on university research
- New / improved products, processes, know-how and/or services
- Broader scientific network

Enhanced research and innovation ecosystem
- Strengthened connections and feedback among parts of the system
- Enhanced economic competitiveness
- Expanded innovation capacity
- Increased / enhanced scientific and technical human and social capital

Key:
Red text – no research to date
Underline – previous research may need to be updated
Black text – sufficient current research
Next Steps

• Feedback from team and NSF
• Build link between measurement LM and data source
• Identify and fill gaps in evaluation / research