“Leveraging Advanced Research Universities for Innovation in Industrial Era Regions: Pennsylvania’s I-99 Corridor”

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Brief Project Overview:
Through engagements between Penn State and over a dozen central Pennsylvania manufacturers, the project identified and explored barriers to effective leveraging of a major public research university for economic revitalization of a traditional legacy manufacturing region. Direct engagements with faculty and student teams resulted in significant economic benefit to the companies and educational benefit to the students. In addition, these engagements provided an opportunity to study the dynamics of the university-business interaction.

Program Activities:
1. Engage 3 test-bed companies in research with Penn State Faculty
   TRS Technologies, Inc. - development of high frequency piezoelectric composite ultrasound transducer technology for medical applications.
   Appleton Papers, Inc. - development of paper having a significantly improved strength to weight ratio and improved resistance to water.
   Creative Pultrusions, Inc. - development of a process and material to alleviate ultra-violet (UV) degradation of pultruded composite products.

2. Link additional small companies in the region with undergraduate student projects through the Penn State Learning Factory
3. Conduct research to identify and understand barriers to leveraging Penn State research for revitalization of the I-99 Corridor legacy industrial era region
4. Establish an infrastructure for coordinating Technology and business development resources of regional partners to develop business-Penn State partnerships. Notably, college of engineering partnership with Norfolk Southern Corporation, Juniata Locomotive Shop, Altoona, resulting in development of 1st all-electric locomotive, NS 999

Top Contributions/Outcomes:
1. Breakthroughs made with test-bed companies have the potential to have a positive impact on new product development within their corresponding companies.
2. Social Exchange Theory’s (SET) four factors: reciprocity, balance, cohesion, and power were found to be most suitable to guide the research in understanding the barriers to leveraging research intensive universities for revitalization of legacy industrial era regions.
3. Through the Penn State Learning Factory, a senior capstone project program within the College of Engineering, demonstrated that a low cost ($3,000), student –led could have a major impact on small manufacturers and startup companies in the region.

Key Attributes of our Innovation Ecosystem:

Questioning & Curiosity:
What are the barriers to leveraging a research university for economic development?
Can short, narrowly focused student projects have significant impact on small manufacturers?

Risk Taking:
Companies may be hesitant to interact with a major university
Company partners may be hesitant to share information regarding their products, processes, etc.
Student projects may not yield usable results

Openness:
As required, standard NDA’s were executed
Many projects moved forward without NDA’s

Collaboration Across Fields:
Interdisciplinary student teams
Some projects linked engineering and materials faculty
Involvement of social science faculty and graduate students in study of engineering projects

Placing Partners in “New Environments” & “Playgrounds”:
First engagement of small manufacturers with a major research university
First engagement of some university faculty with small manufacturers
In some cases, economic development partners became engaged as liaison between companies and the university

Leading/Inspiring of Surprising or Unexpected Results
Small companies were surprised and impressed at the quality and depth of project results – several have returned with additional needs

Partners:
• Altoona Blair Country Development Corporation
• Appleton Papers, Inc.
• Ben Franklin Technology Partners
• Bedford County Development Corporation
• Centre County Industrial Development Corporation
• Creative Pultrusions, Inc.
• Pennsylvania Department of Community and Economic Development
• Pennsylvania Industrial Resource Center (IRC) Network
• The Pennsylvania State University
• TRS Technologies, Inc.