

How to think through the potential Economics and identify Broader Application Potential of research projects

Purpose: Teach students to

- understand and articulate tangible economic benefits of their project to sponsors and other stakeholders.
- identify and communicate how the basic findings of their work could be more broadly applied to other industry sectors.

Session outline:

- Greg Spontak: To briefly present his thoughts about how to address the above items along with relevant specific examples. (20-25 minutes)
- Industry members to provide written feedback (35-40 minutes).
 - Write on post it notes direct economic impact of one or more projects aspects on their company operations. Suggest changes to projects that might make them more meaningful to them.
 - Outline thoughts how a specific project might be changed to of interest to their vendors/customers/other divisions of their company's operations or another industry.
 - Company members to suggest specific ideas for new projects or add on to the current ones.
- Company members to post their notes on the easels provided for each CPaSS funded project.

Economic Evaluation Considerations

Objectives:

- Teach CPaSS students to think through the potential economics of their projects and how it may impact Industrial Applications.
- Provide relevant economic information in their presentations and posters

Economic Measures to Consider: *(note: not all measures are relevant to each project)*

Total System Cost: *(Think through all the costs associated with your project)*

- Raw Materials *(Chemicals, water, etc.)*
- Packaging Materials *(Spray bottles, labels, cartons, cases, pallets, etc.)*
- Manufacturing Cost *(Batch / continuous process, labor, energy, equipment, etc.)*
- Distribution / Inventory Cost *(Rail / truck freight, inventory, storage, etc.)*

Capital Investment: *(How will you deliver this project, will you need an investment?)*

- New plant process required
- Modify existing plant facilities
- Produce at contractor facility
- Fund via government grant or other means

Potential Savings: *(Will this save money for the industrial partners business?)*

- Water / recycle savings
- Energy savings *(steam, kwhr, Btu, etc.)*
- Material savings
- Freight / distributions savings

Potential Revenue: *(How will this make money for industry, CPaSS, other stakeholders?)*

- Sales of new products
- Patent Royalty

Economic Attractiveness: *(Does this look like a good deal? Would you invest your money?)*

- Profit / Rate of Return (ROR) / Return On Investment (ROI)/Net Present Value

Broader Application Potential

Objectives:

- Teach students to brainstorm broader potential industrial applications for their projects.
Consider diversity of industrial sectors / business to identify potential.
- Include section in students presentations / posters on broader potential applications

Example: (Anti Microbial Project: kill bacteria / virus / microbes to improve sanitation / health)

Sector / Industry:

Household Products

Beauty Care

Pet Care / Animal Care

Medical / Hospital

Food / Agriculture

Government / Military

Analytical Equipment

Oil / Petroleum

Mining

Automotive

Potential Applications:

Consumer spray in homes/kitchens/bathrooms

Makeup / beauty products

Shampoos / bath gels

Kitty Litter

Pet Boarding Facilities

Animal Hospitals

Veterinarian's offices

Hospital rooms / operating rooms

Nursing homes

Senior living facilities

Restaurants / kitchens

Food manufacturing facilities

Food Catering preparations

Military facilities / barracks/Field offices / installations

Mess Halls

New equipment to analyze efficacy

Oil Platform / off shore facilities

Underground mining facilities

Car products for interiors

Typical Example using Economic Measures (not necessarily a real project proposal)

Industry Project Basis: Proposal to produce and sell a CPaSS developed anti-microbial product for multiple consumer use for \$1.00/spray bottle. Sell 5MM cases / year, in 16 oz spray bottles, 10 bottles / case. Requires a new 50,000 lb. batch making process and single packing line. Product formula is 1oz. Fullerene, 1 oz. Ingredient X, and 14 oz. distilled water. Ship to retailers in trucks @ 5000 cases/truckload).

Total System Cost: (Think through all the costs associated with your project)

-Raw Materials : (Fullerene @ \$10 / lb., Ingrid. X @ \$1/lb., water @ \$0.01/14 oz.)

-Packaging Materials : (\$0.10/spray bottle & sprayer, \$1.00/reshipper case)

-Manufacturing Cost : (3 making operators, 3 packing operators, 100kw energy / batch)

-Distribution / Inventory Cost (\$1000 / truck load)

TOTAL System Cost: (Fullerene: 5MMcs./yr.x10 bottle/cs.x\$10/16oz.x1oz./bottle=\$31.25M/yr.)

(Ingrid.X: 5MMcs./yr.x10 bottle/cs.x\$1/16oz.x1oz./bottle=\$3MM/yr.)

(Water: 5MMcs.yr.x10 bottle/cs.x\$0.01/14oz.x14oz./bottle=\$0.5MM/yr.)

(Spray Bottles: 5MMcs.yr.x10bottles/cs.x\$0.10/bottle=\$5MM/yr.)

(Cases: 5MMcs./yr.x\$1.00/case)=\$5MM/yr.)

(Mfg.: 6 operatorsx\$50,000/yr.+100kw/batchx1000batches/yr.x\$.05/kw=\$305,000/yr.)

(Truck Loads: 5MMcs./yr.x\$1000/5000cs.= \$1MM/yr.)

Total: \$46.05MM/yr.

Capital Investment: (How will you deliver this project, will you need an investment?)

-New plant process required (Capital investment of \$5MM making & \$5MM packing)

TOTAL Investment: \$10MM

Potential Savings: (Will this save money for the industrial partners business?)

-Water / recycle savings N/A

-Energy savings

-Material savings

-Freight / distributions savings

Potential Revenue: (How will this make money for industry, CPaSS, other stakeholders?)

-Sales of new products (Sell 5MM cases / year x 10 bottles/case x \$1.00/bottle)= \$50MM/year

-Patent Royalty

Economic Attractiveness: (Does this look like a good deal? Would you invest your money?)

-Profit: Revenue - Total System Cost (\$50MM/yr. - \$46.05MM/yr. = \$3.95MM/yr.)

-Rate of Return / Return On Investment (ROI) (Profit / Investment: \$3.95MM/\$10MM=39.5%)/Net Present Value