Can We Educate An Engineering Entrepreneur?

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“this is an unteachable subject”

- Merrick Furst – Distinguished Professor CoC
- InVenture Prize
Why Engineering Entrepreneurship?

• Almost every new technology product comes from an engineer
• Takes an entrepreneur to bring to market
• Learn, and fail, in class first
Idea - academia

Is it feasible?

• Proof of Concept
• Characterization
• Publish
• Patent … Ends here
Need to know

I. What is the language of business?
II. When is this a company?
III. How do you start?
I. Principles of Mgmt

• ROI
• Sunk Costs
• Equity financing
• Dilution and anti-dilution
• Negotiations
I. Teach skills

• Course tailored for engineers
• Use example models and problems
• Talk to your acct - e.g. taxes
• Need soft skills
  – Negotiations
  – Team Building
  – Get others to do what they don’t want to
II. Why people buy

Greed
Fear
Sex
Altruism
II. Competitive Advantage

- Patents - monopoly
- Cheaper - Push
- Faster - Pull
- Better - Pull

Customer desire “Voice of the customer”
But disruptive technology is new
II. Market

- Who will buy?
- What will they pay?
- Market size
II. Opportunity evaluation

Potential for profit?
- Manufacturing costs
- Margins

Check-off list of 25+
Entrepreneurship examples

What is the opportunity?

Spine Tech
New “Molybolt” for Spine
Spine Tech, Inc

26 employees x 8 years
Sold for $595 million
Ex 2 Idea Stage - GT

- From grad student research
- MRI phantom
- Strong mechanics, hydrogel, biocompatible
- GT - Publish & patent
Possible products:

- MR Phantoms
- Vascular graft
- Encapsulation for diabetes
- Breast Implant
- Knee cartilage
- Spinal disk
Opportunity

MARKET:

<table>
<thead>
<tr>
<th>MR</th>
<th>Vasc</th>
<th>Knee Cart.</th>
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<tbody>
<tr>
<td>$20K</td>
<td>$100 mill.</td>
<td>$2 bill.</td>
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Manufacturing costs/item: $20
Sales/item: $1000

Profit Margin = \[ \frac{1000 - 20}{1000} \times 100\% = >90\% \]
SaluCartilage™

- Make cylinders
- Cartilage replacement
- Off-the-shelf

CE Marked
SaluCartilage™ in Patients

- 30 min outpatient operation
- Immediate recovery – walking the next day
- Success > 9 years
- 90% pain relief
SaluCartilage™ Patient Experience
Salubria™

- First new biomaterial cleared by FDA in 20 years
- Four companies make/sell products
- 1000+ smiling patients
Financing the venture

• How do you get it?
Financing

• Make a compelling story
Ex 3 Pneumonia

Infection of lungs

Major cause of death in US

Leading cause of death in children worldwide

- Harriet Tubman 93
- Jim Henson 53
- James Brown 73
- Brittany Murphy 32
Problem - Sampling

- Current diagnosis uses mouth and nose samples
- Half of people have pneumococcus bacteria
- Mouth specimens contaminated
Solution

PneumoniaCheck™ uses fluid mechanics to isolate lung pathogens onto filter.
Solution - PneumoniaCheck™

- = Upper airway particle
- = Lower airway particle
Benefits

- Gives specific pathogen
- Antibiotics for cure
- Prevents resistant bacteria and future hospitalization
Marketing & Sales Strategy

ESTABLISH CREDIBILITY AND VALUE

- CDC
- Patent
- Function test
- Clinical Trials
- FDA, CE

MARKET TO

- Large Hospitals
- Group Providers
Follow-on company

• Pneumonia kills 1000 children daily in rural India

• Limited availability and accessibility of diagnostics

• 80% missed diagnoses with current methods
Triple Bottom Line Company

1) Economic – profitable
2) Social Profit –
   • save 1 child every min
   • new jobs in country
3) Environmental – ingredients from recycled materials
No company makes this…

Should our engineers learn entrepreneurship?
We can teach Entrepreneurship

I. Business terms for communication and confidence
II. Opportunity recognition
   “Fail to succeed” experience
   • Plan – create compelling story
GT Program for Engineering Entrepreneurship

• Only Program providing systematic, comprehensive education on business, opportunity, and planning for tech entrepreneurs

• A “mini-MBA”; satisfies PhD Minor
  – Principles
  – Elective - Legal Issues
  – Elective – Prod Dev or Negotiations
  – Tech Ventures (Business Plan)
Impact Speaker – each week
Start-up café – 1-1 consultants
We can educate an engineering entrepreneur
Use all GT resources
Takes some time,
but worthwhile