Opportunity Assessment and Feasibility analysis

Workshop on Entrepreneurship for Scientists and Engineers Durban, South Africa

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About Me

Ph.D. Mechanical Engineering
Academics – State University of New York, Stony Brook
Industrial Scientist – Automotive and Consumer Products
6 Products: Invention to commercialization
Entrepreneur: Started Advanced Fluidics (Small Company)
in 2001

About Advanced Fluidics

Research and Product Development in

- 1. Aerospace Sciences Aerodynamics, combustion
- 2. Micro/Nanofluidics/nanotech-based biosensors
- 3. Medical Instrumentation
- 4. Technology Roadmap Development and Training

Opportunity Assessment and Feasibility Analysis

Outline

Technology Road Maps
Technology Mind Maps
Technology Intersect Maps
Technology Forecasting

Opportunity Assessment

Feasibility Analysis

Filtering your ideas

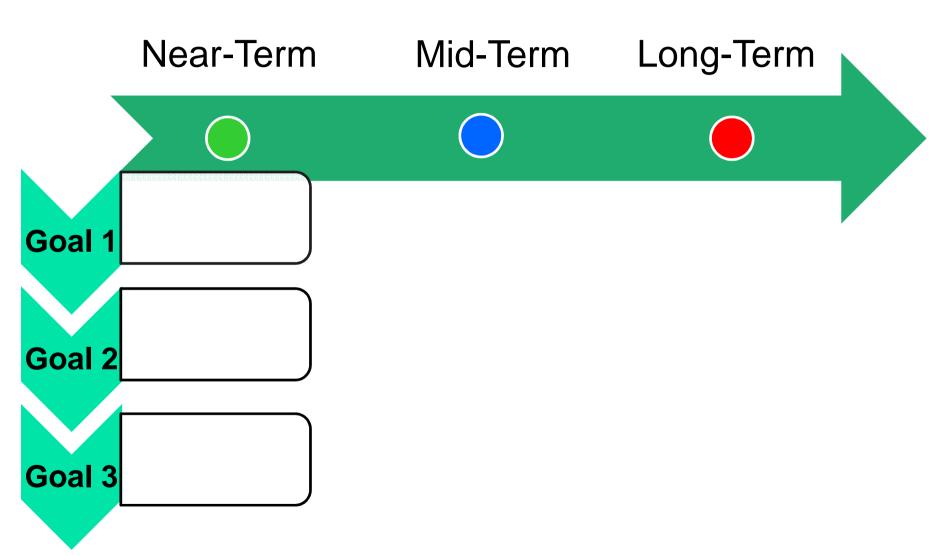
Conclusions

Technology Roadmaps

Technology Roadmap

- shows us opportunity for inventions.

Technology Road Map



Technology Road Map

http://www.climatetechnology.gov/library/2006/testimony20sep2006.htm

Near-Term

Mid-Term

Long-Term









- Hybrid Vehicles
- Plug-ins
- Hi-Performance integrated homes
- High-efficiency appliances
- High-efficiency boilers and combustion systems
- High-temperature superconductivity demonstrations

- Fuel cell vehicles and hydrogen fuels
- •Low emission aircraft
- Solid-State lighting
- •Ultra-efficient HVACR
- Smart buildings
- Transformational technologies for energy-intensive industries
- Energy storage for load leveling

- •Widespread use of engineered urban design and regional planning
- Energy managed communities
- •Integration of industrial heat, power, process and techniques
- Superconducting transmission and equipment

Your niche?

S. Raghu

Technology Roadmap Example: Climate Change

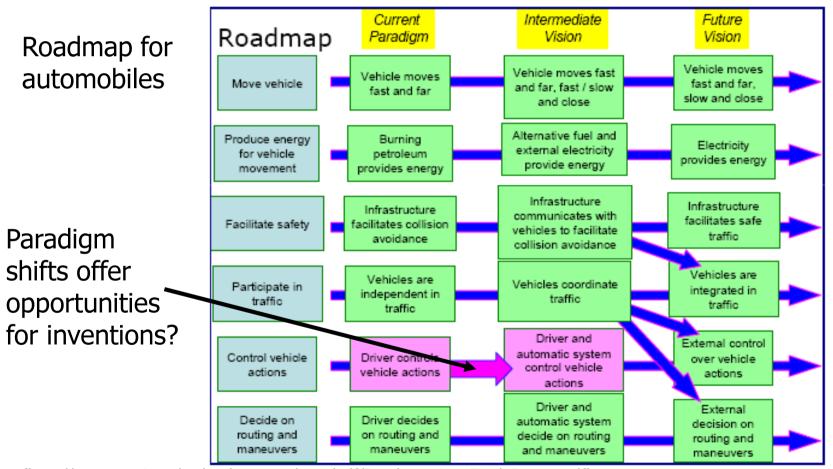
Near-Term Mid-Term Long-Term Hybrid & Plug-In Hybrid Electric · Fuel Cell Vehicles and H. Fuels · Widespread Use of Engineered Urban Designs & Regional Planning Low Emission Aircraft Energy End-Use Solid-State Lighting Energy Managed Communities Engineered Urban Designs 8 Infrastructure Ultra-Efficient HVACR High-Performance Integrated Homes Integration of Industrial Heat, Power, High Efficiency Appliances · "Smart" Bolldings Process, and Techniques High Efficiency Boilers & Transformational Technologies for Superconducting Transmission and Combustion Systems Emergy-Intensive Industries Equipment High-Temperature Superconductivity Energy Storage for Load Leveling Demonstrations Your Goal #2 IGCC Commercialization FutureGen Scale-Up Zero-Emission Fossil Energy Stationary H. Fuel Cells H. Co-Production from Coal Biomass. . H. & Electric Economy Energy Cost-Competitive Solar PV Low Wind Speed Turbines Widespread Renewable Energy Supply niche? Demonstrations of Cellulosic Advanced Bioretineries Bio-inspired Energy & Fuets · Community-Scale Solar Ethanol Widespread Nuclear Power Distributed Electric Generation. Gen IV Nuclear Plants. · Fusion Power Plants Advanced Fission Reactor and Fuel Fusion Pilot Plant Demonstration Cycle Technology Good #3 CSLF & CSRP. Track Record of Successful CO, Storage Geologic Storage Proven Sate Post Combustion Capture CO₂ Transport Infrastructure Experience Capture. Oxy-Fuel Combustion Solls Uptake & Land Use Large Scale Sequestration Storage & + Carbon & CO, Based Products & Materials Enhanced Hydrocarbon Recovery Ocean CO, Biological Impacts equestration Safe Long-Term Ocean Storage Geologic Reservoir Characterization Addressed Soils Conservation Dilution of Direct Injected CO. Advanced Landfill Gas Utilization Goal #4 Methane to Markets. Integrated Waste Management System with Soil Microbial Processes Precision Agriculture Advanced Refrigeration Automated Sorting, Processing & Recycle Other Gases Substitutes for SF, Zero-Emission Agriculture · Catalysts That Reduce N-O to Technologies Solid-State Refrigeration:AC Systems PM Control Technologies for **Elemental Nitrogen in Diesel Engines** Vehicles. Large Scale, Secure Data Storage Fully Operational Integrated MM Systems. Goot #5 Low-Cost Sensors and System Architecture (Sensors, Indicators, Data Communications. Measure & Monitor Direct Measurement to Replace Visualization and Storage, Models) Proxies and Estimators

http://www.climatetechnology.gov/library/2006/testimony20sep2006.htm

Technology Roadmap Example: Intelligent Vehicles

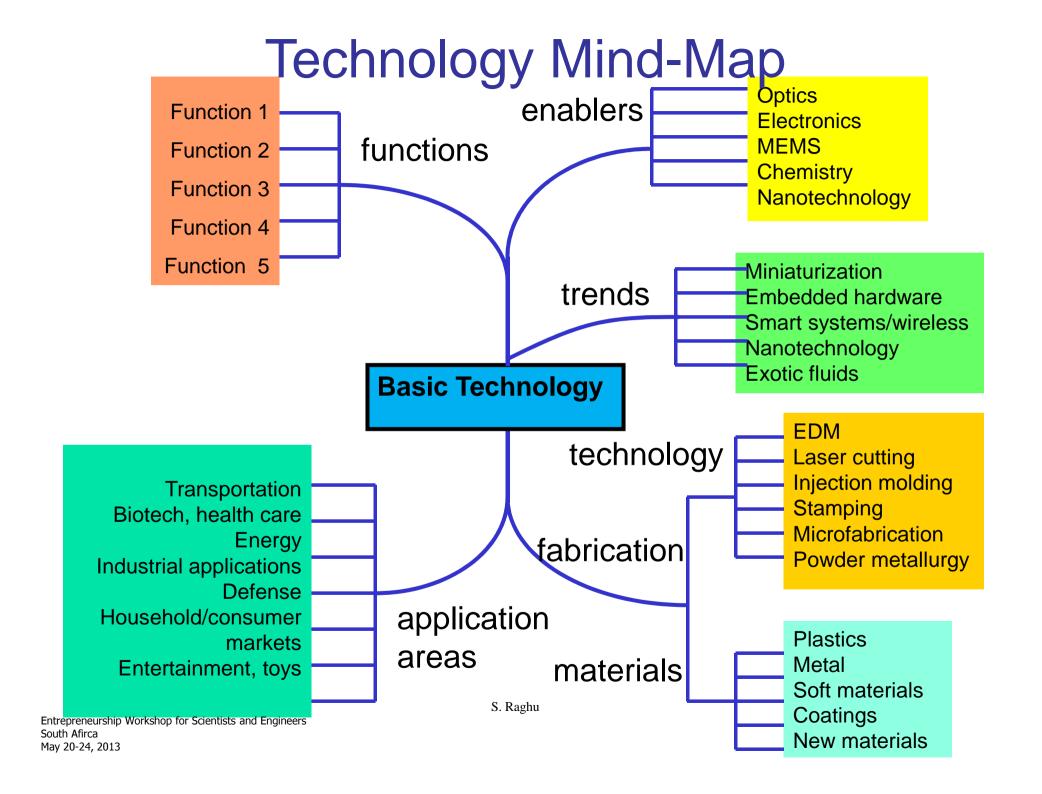


Technology Roadmaps

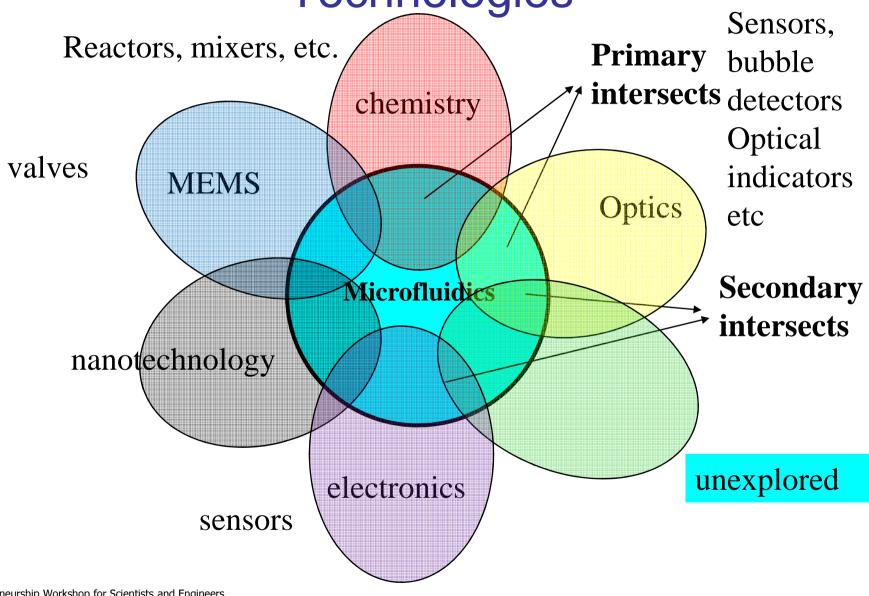


Your niche?

(http://www.ceeti.org/technology_roadmap/pdf/Roadmapping_Final_Report.pdf)



Technology Intersects with Emerging Technologies



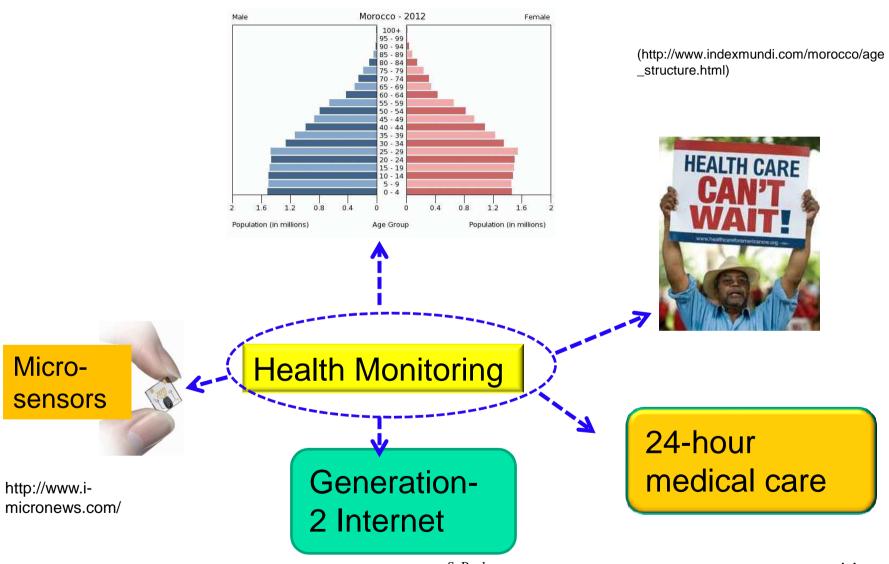
Technology Forecasting

Points to consider for forecasting

- Observing/Studying Trends
- Economic factors
- Societal factors
- Technological Advances
- Political Action/Regulatory statutes



Technology Forecasting



S. Raghu

Micro-

http://www.i-

Feasibility Analysis

Feasibility Analysis: The process to determine if an idea is viable and worth pursuing for commercialization

Product/service feasibility analysis

Customer interest, desirability and purchase interest

Industry/market feasibility

Industry attractiveness

Market timeliness example: (Handwash tissues)

Identification of niche market

Feasibility Analysis

Organizational feasibility

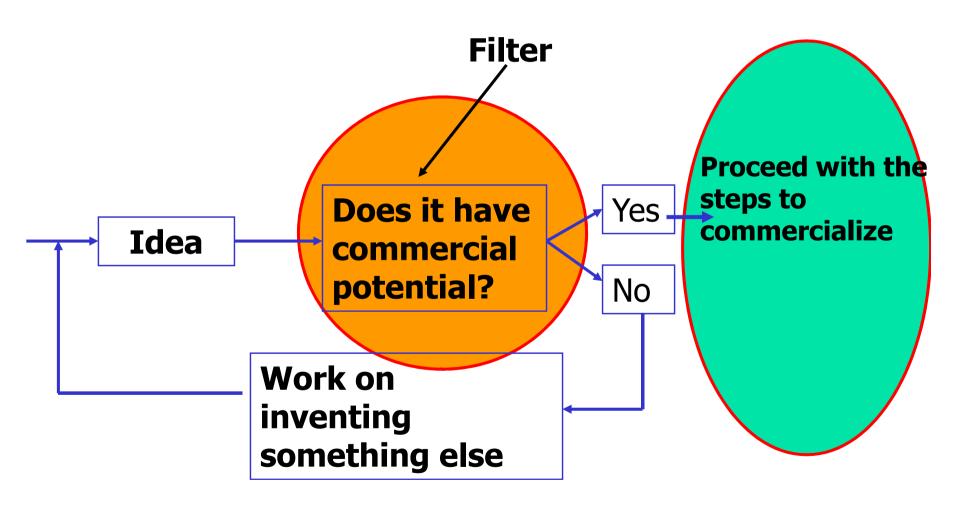
Sufficient management expertise, organizational competence & resources to successfully launch a business

- Management ability
- Resource sufficiency

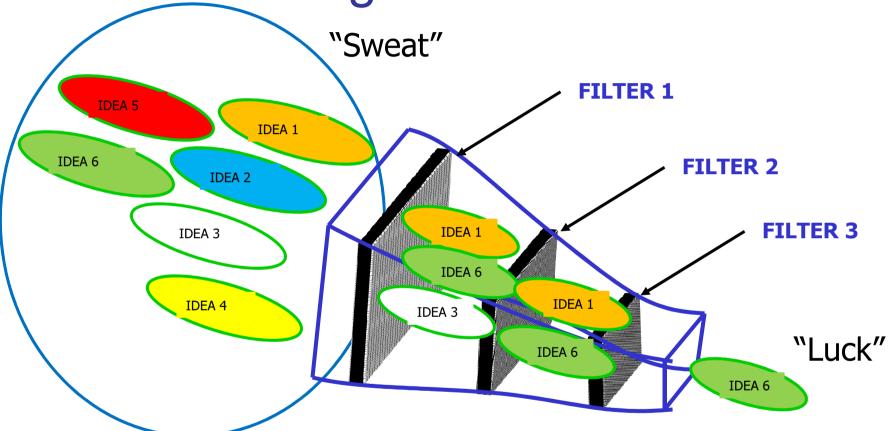
Financial feasibility

Total start-up cash needed (example)
Financial performance of similar businesses
Overall Financial Attractiveness of the proposed
venture

Filtering Your Ideas



Filtering of Technical Ideas



Just one idea at a time at the end helps focus

Filters

Filters: Can be used to sort out feasible ideas right at the very beginning.

Examples of filters:

- 1. Market Opportunity and Market Attractiveness
- 2. Do you have the background to proceed with this product
- 3. Sustainability of market (seasonal or year-round), time scales of sustainability of market interest and technology. Give examples
- 4. Regional and international competition

What are the other factors that can be used as filters?

Possible Filters

Cost

Weight

Size

Safety/Health

Speed

Ease of Use

Ease of Production

Durabililty

Repairability

Novelty

Convenience

Social Benefit

Reliability

Saleability

Appearance

Noise

Odor

Trend of Demand

Seasonal Demand

Market penetration

Market size

Competition

Quality

Life cycle

Legality

Obsolescence

Product Liability

Service

requirements

Profitability

Learning &

unlearning

required

Summary

- Opportunity Assessment
 Technology Forecasting
 Technology mapping (Roadmaps,
 Mind-map, Intersects)
- Feasibility analysisFiltering your ideas

Points to consider

- 1. Talk to some local entrepreneurs if they used filters and gating for developing their products/services. What would they do if they were to do it all over again?
- 2. Prepare a roadmap for the technology you are developing for your project?
- 3. Prepare a technology mind-map for your project?

THANK YOU

Opportunities Based on Extending Existing Technologies

