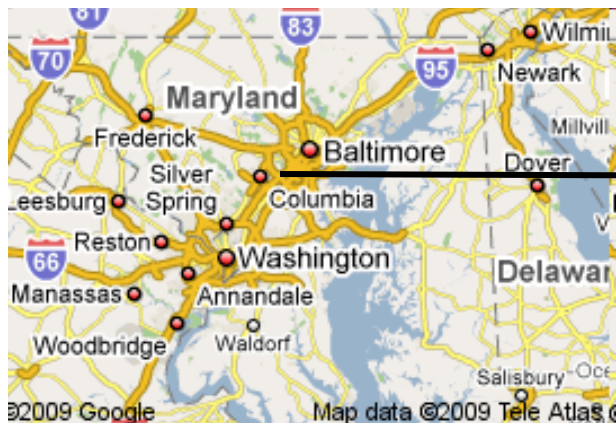


From Invention to Market – Making Your Technology Ready for Commercialization

Surya Raghu

Creating an Enabling Intellectual Property (IP) Environment
for Technology Development, Management and Commercialization

Osaka, December 13-15, 2017



Motivation for today's talk....

University researchers come up with many good ideas and invention disclosures....

Challenge for the TTO is to see how to evaluate and **fit it into the big picture** – identify who could be the potential buyers of the technology (Licensees).

Sometimes **“mix-n-match” inventions** for leveraging licensing (“solutions to problems” sell better than “technologies available”)

Sometimes, **feedback to inventors** on possible directions for research

OUTLINE

1. What is an invention?
2. Who needs your invention: Societal Needs, “Market Pull” vs. “Technology Push” - type of Inventions
3. Fitting the invention into the “big picture”
4. Technology Development after an invention
5. IP and Patenting Strategies for Licensing
6. Conclusions

An idea is not an invention

An invention is not a product

**Useful Invention = Successful Product *only* if
commercialized**

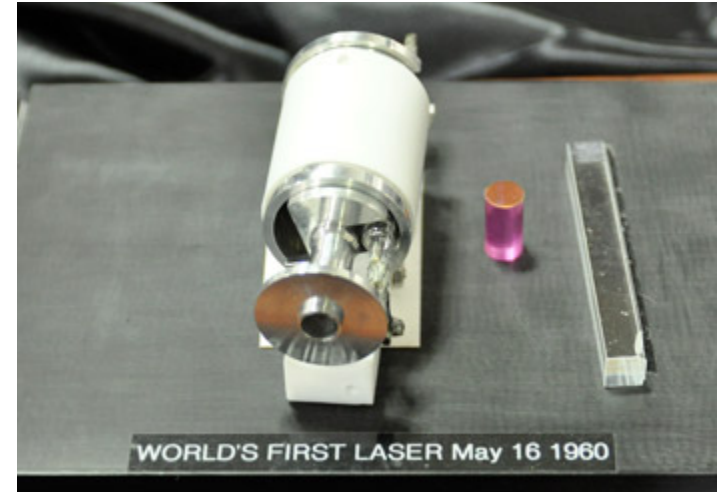
What are you inventing?

New Technology? (Method and Apparatus or Process)

“Technology is a capability that can be used in a product.”

Example: Laser – Ted Maiman (1960)

“a solution looking for a problem?”



(<http://spie.org/x39920.xml>)

OR

A New Product? (Apparatus)

“makes use of existing or new technologies”

Optical readers, scanners, laser pointer, laser-based eye surgery systems, golf trainer, laser machining,

A new product has a customer and a market in mind



**Laser
Cutting & Engraving**



Platform Technologies

Platform Technologies

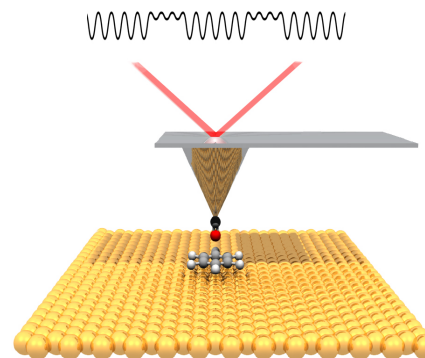
Tools, techniques and instruments that can be used in a variety of applications

Wireless communication



Polymerase Chain Reactions
CCD

Atomic Force Microscopy



Where is the Market for your Invention?

Market Pull and Technology Push

Market Pull

Identified societal/market needs

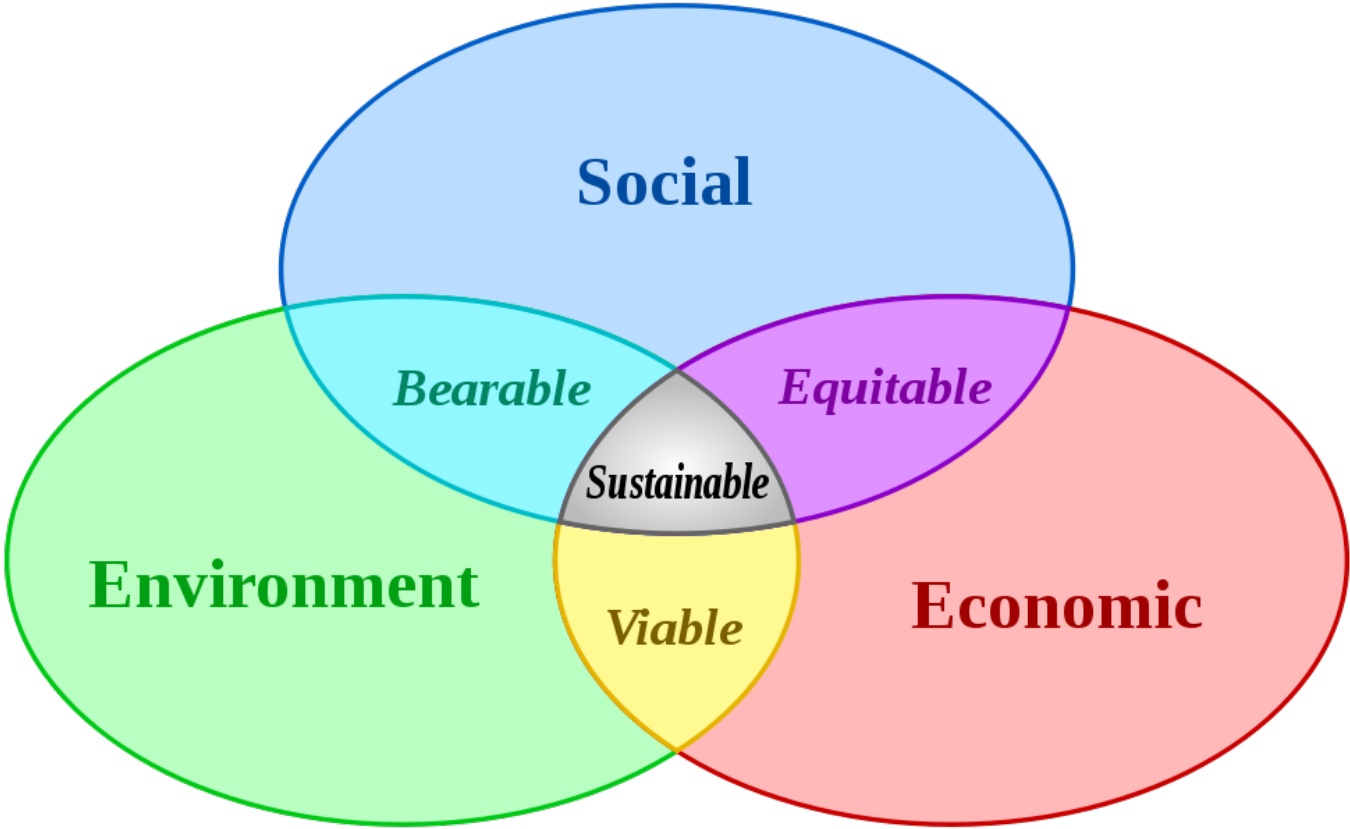
Examples: Water purification, pollution control, green economy, improved agriculture, etc.

Technology Push

New technologies that create paradigm shifts in use, convenience, social structure and behavior and even political systems

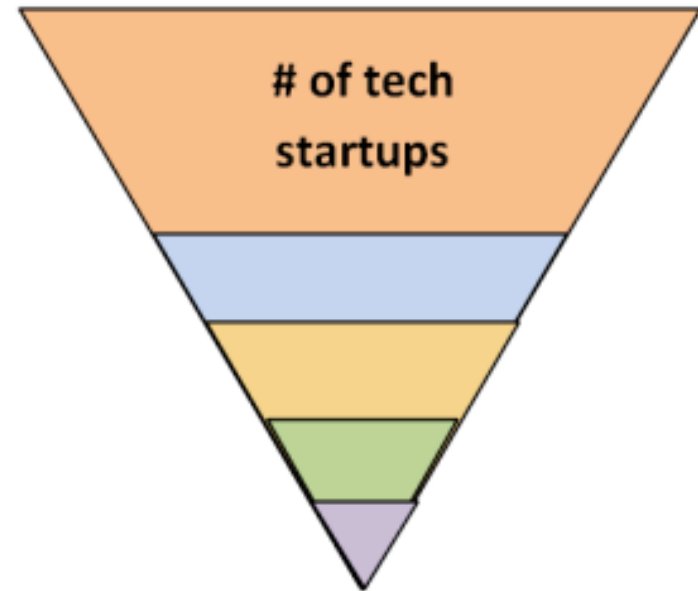
Examples: Mobile phones, Apps, social media, etc.

Sustainable Development



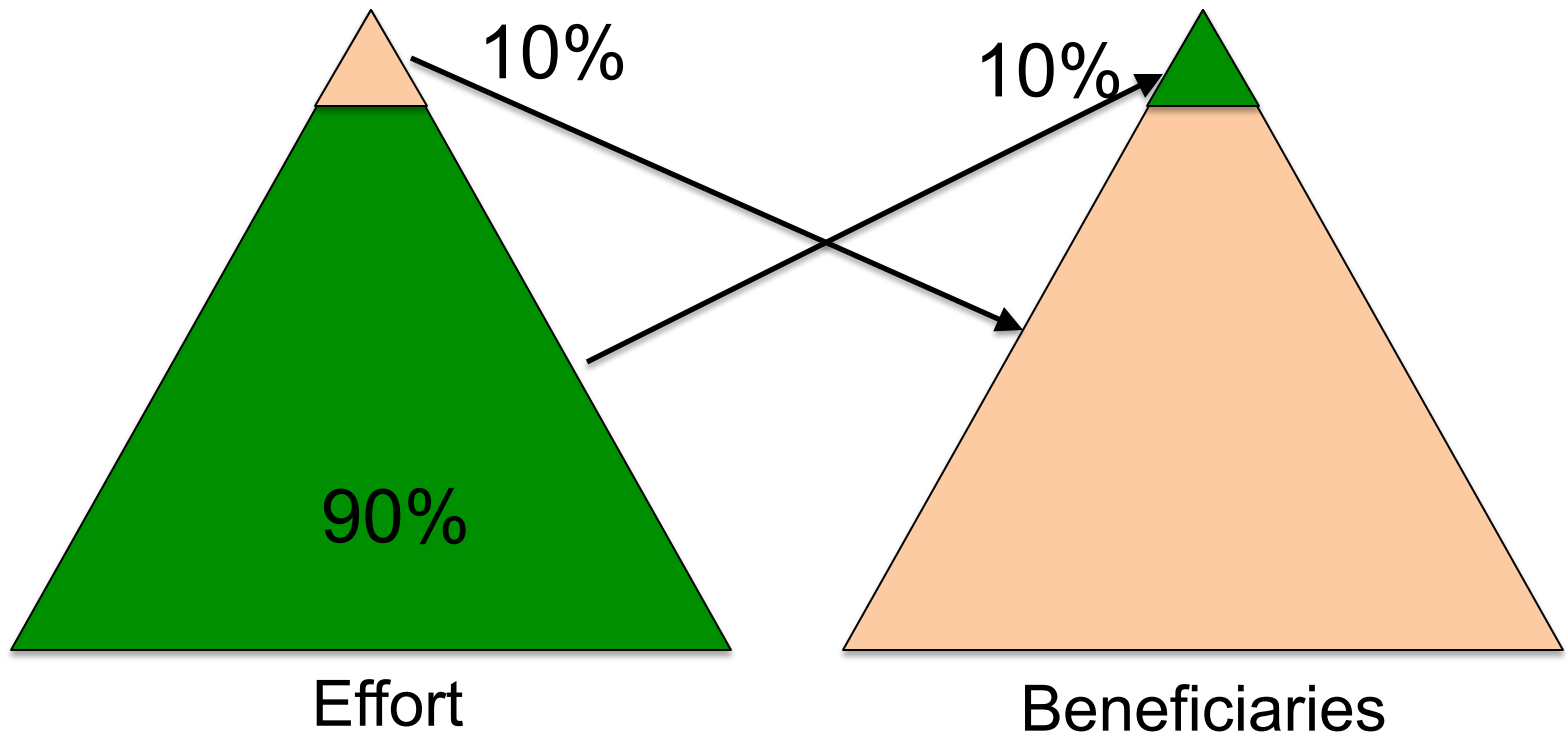
<http://www.humansandnature.org/>

The Neglected Bottom of the Pyramid



(<https://orghacking.com/2014/11/24/the-hole-at-the-bottom-of-the-pyramid/>)

The Neglected Bottom 90%



Technology Roadmap

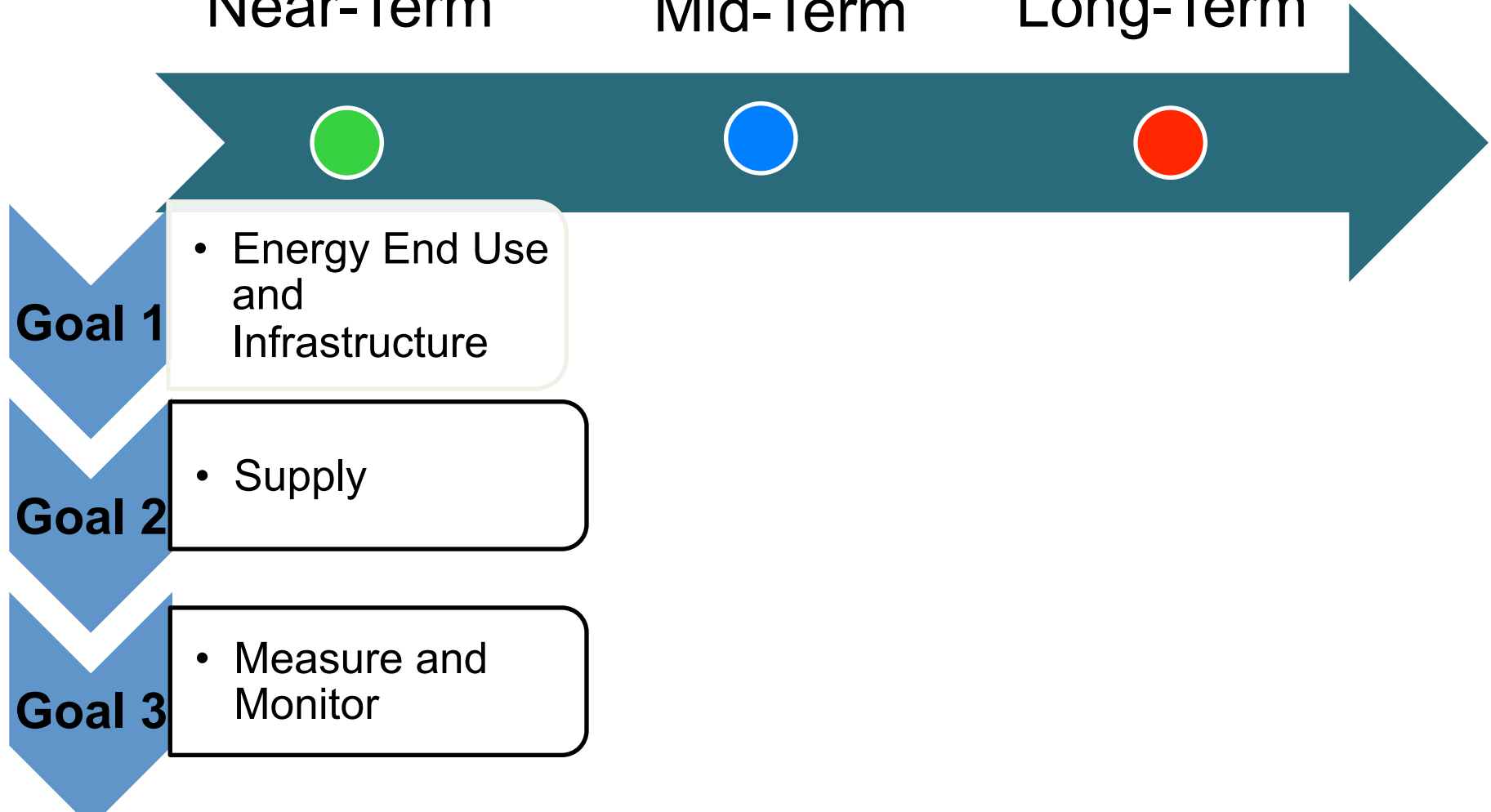
Shows where the invention “fits” in the “big picture”

Technology Road Map –Climate Change

Near-Term

Mid-Term

Long-Term



Goal 1

- Energy End Use and Infrastructure

Goal 2

- Supply

Goal 3

- Measure and Monitor

Technology Road Map

<http://www.climatechtechnology.gov/library/2006/testimony20sep2006.htm>

Near-Term

Mid-Term

Long-Term



GOAL 1 Energy End Use and Infrastructure

- 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

University invention?

Technology Road Map

<http://www.climate-technology.gov/library/2006/testimony20sep2006.htm>

Near-Term

Mid-Term

Long-Term



GOAL 4 Capture, storage and sequestration

- Post-combustion capture
- Oxy-fuel combustion
- Enhanced Hydrocarbon recovery
- Geologic reservoir characterization
- Soils Conservation

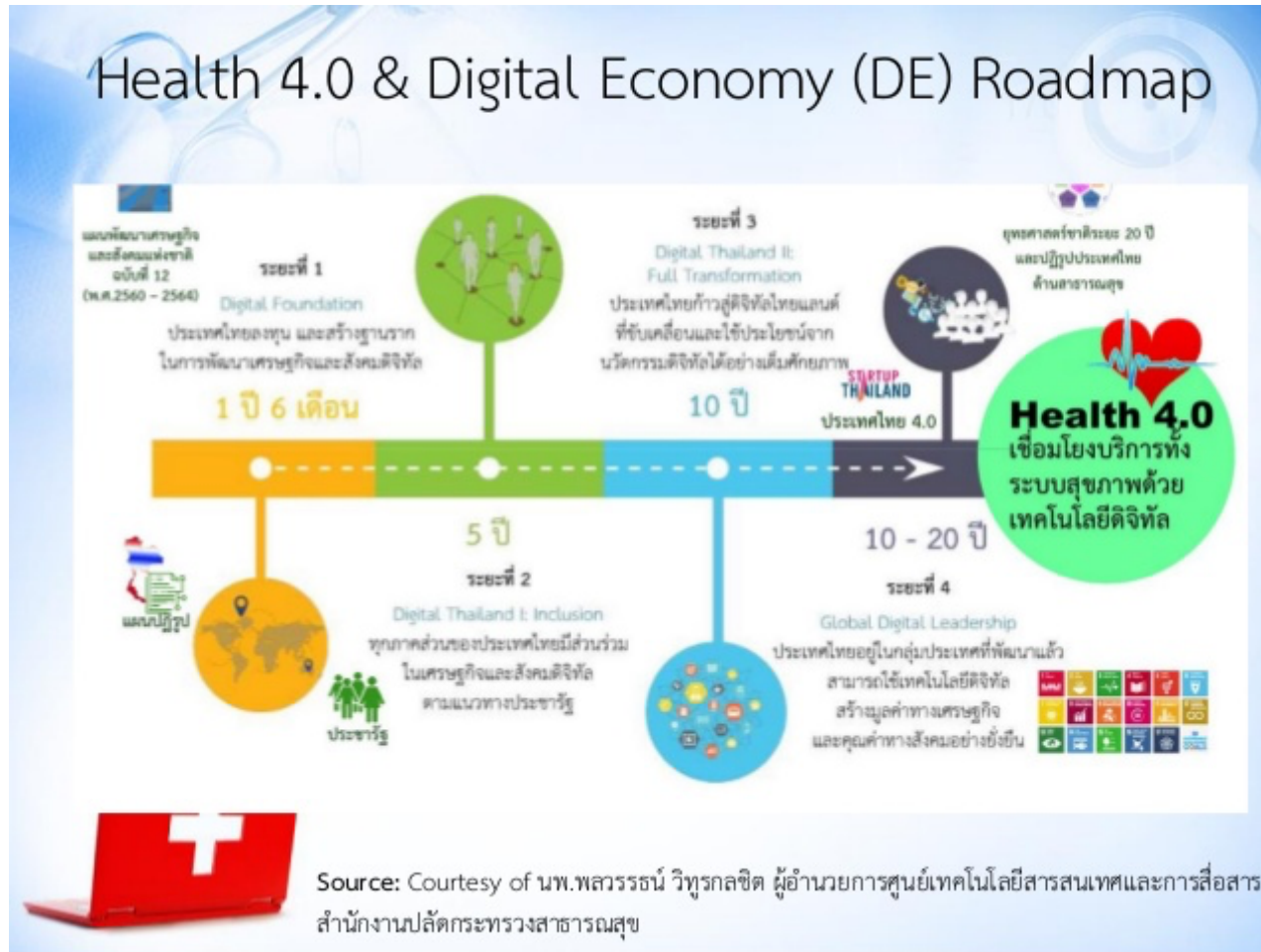
- Geologic storage proven safe
- CO₂ transport infrastructure
- Soils uptake and land use
- Ocean CO₂ biological impacts

- Track-record of successful CO₂ storage experience
- Large-scale sequestration
- Carbon and CO₂-based materials
- Safe long-term ocean storage

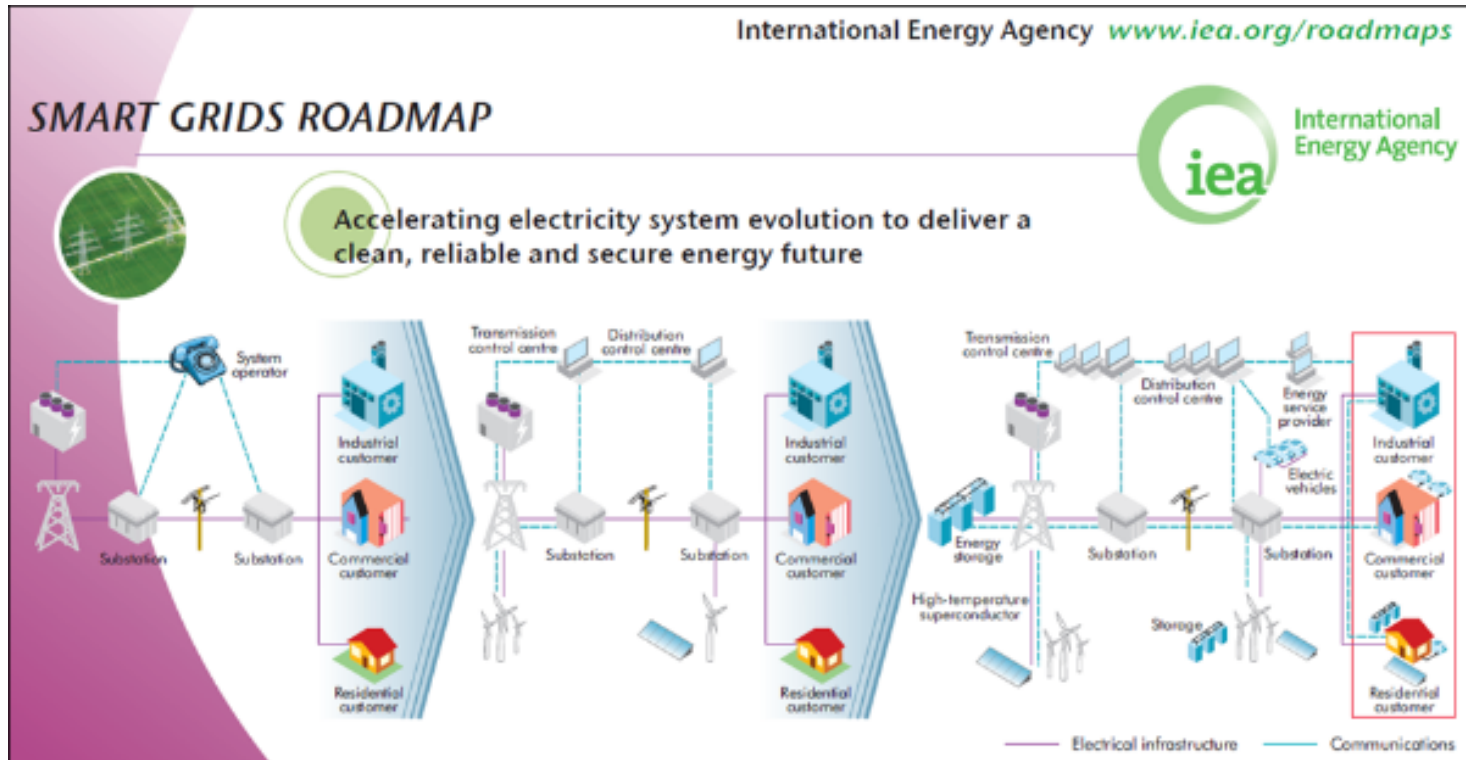
University invention?

Thailand Health 4.0

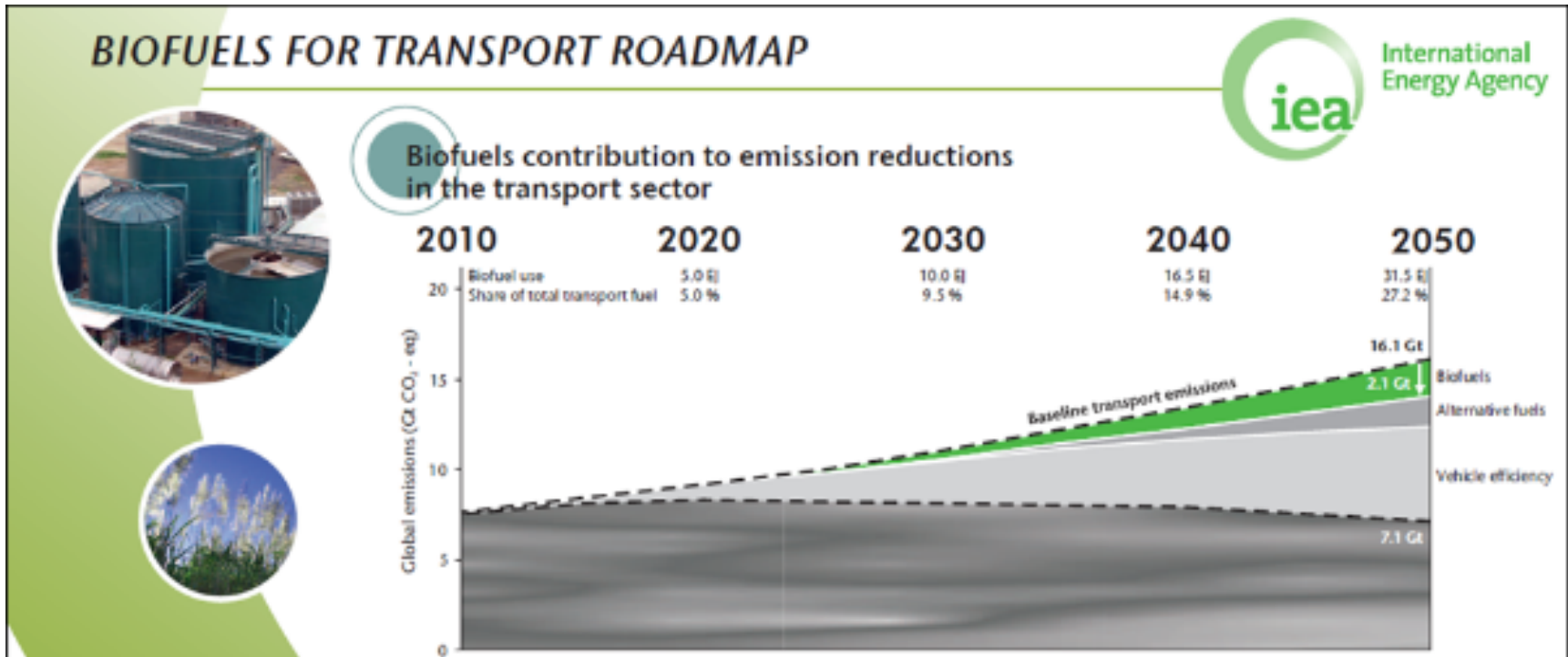
Health 4.0 & Digital Economy (DE) Roadmap



Smart Grids Roadmap



Roadmap for Biofuels



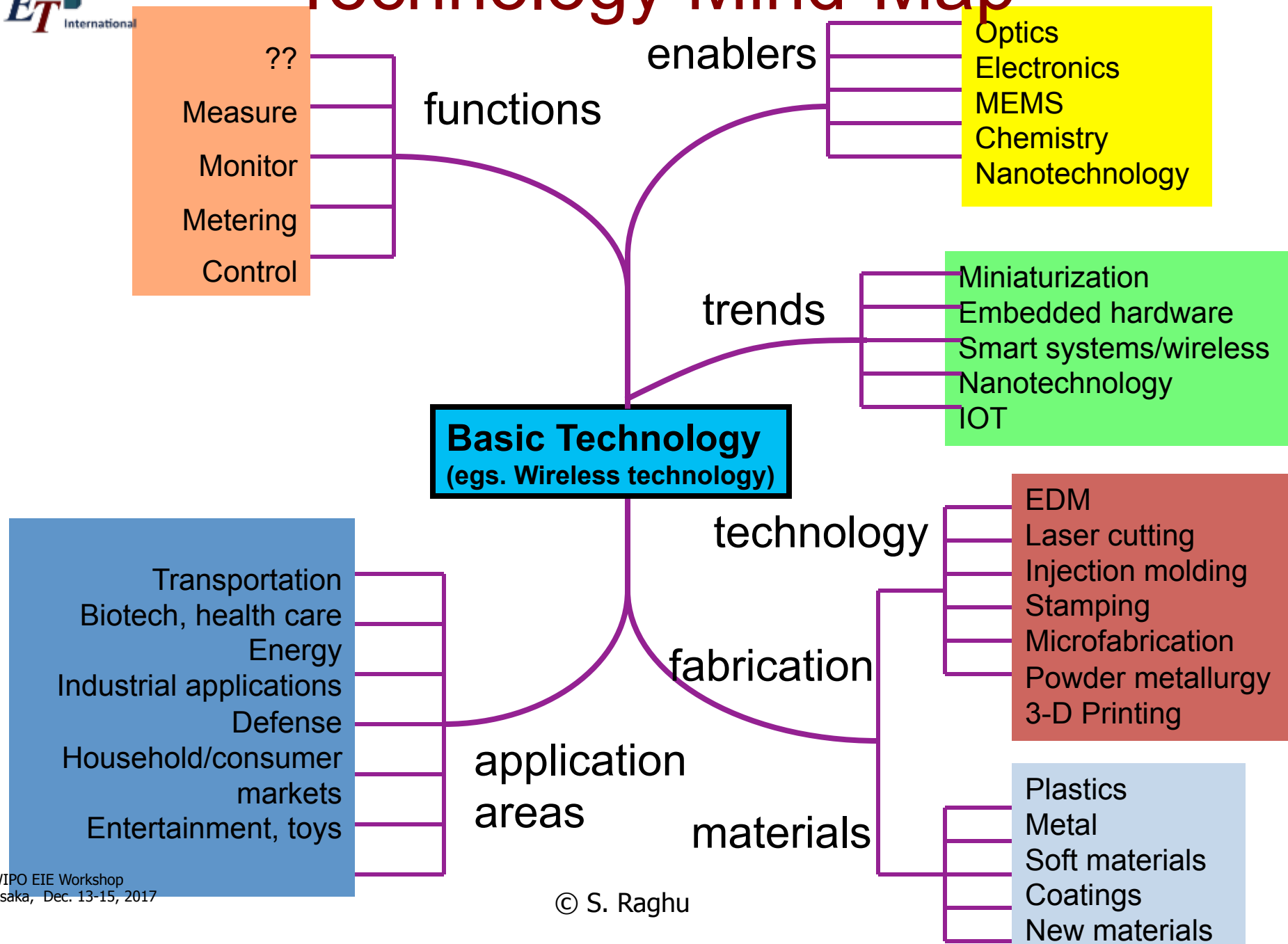
Technology Roadmaps In Your Countries

Healthcare?
Energy?
Water and Sanitation?
Agriculture?
Aquaculture
Food Security?

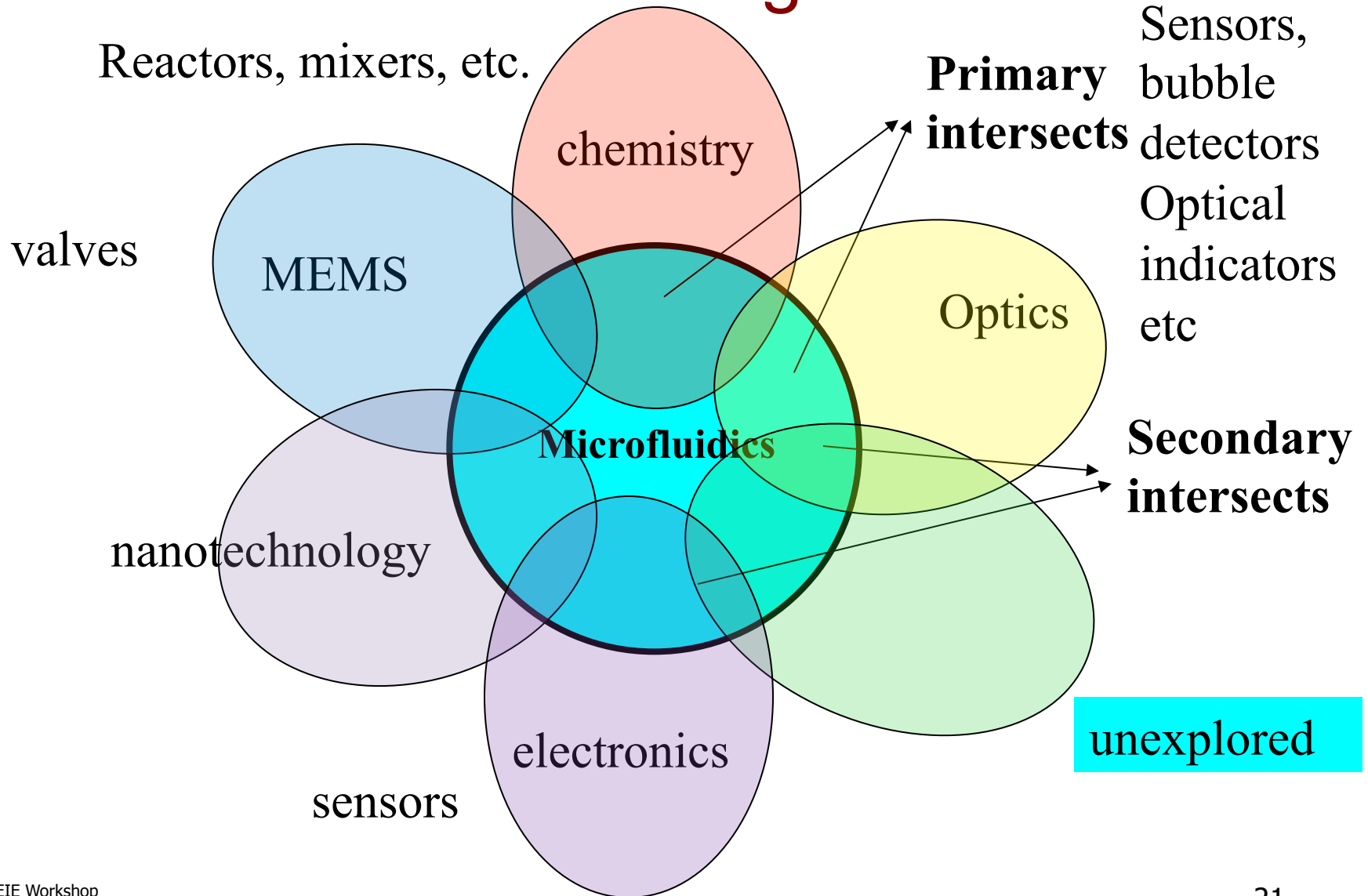
Where else can your invention be used?

“Technology Stretch”

Technology Mind-Map



Technology Intersects with Emerging Technologies



Looking Beyond the Present: Horizon Scanning

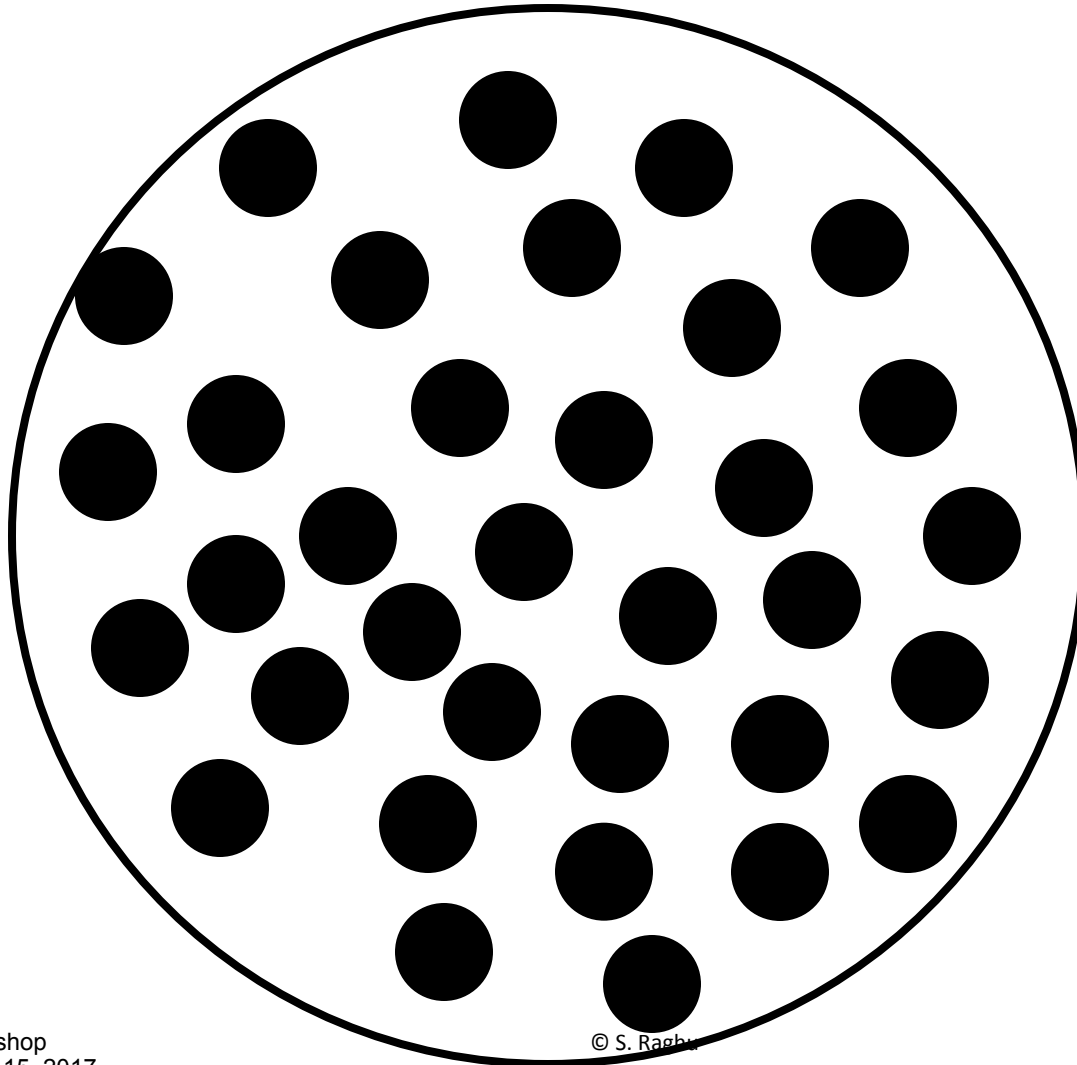
Points to consider for forecasting

- Observing/Studying Trends
(weak signals in high noise)
- Economic factors
- Societal factors
- Technological Advances
- Political Action/Regulatory
statutes
- Disruptive Market Models

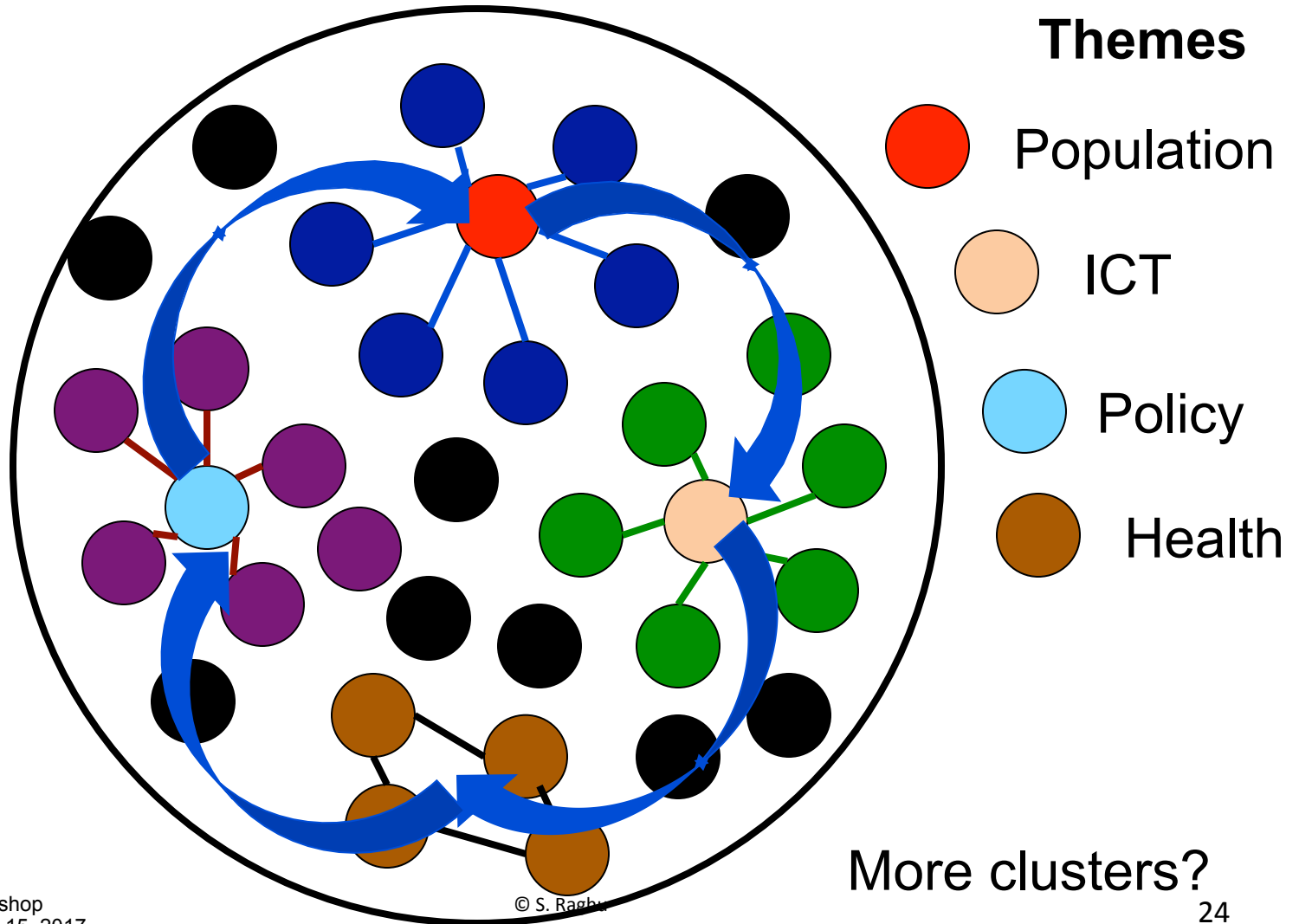


Horizon Scanning

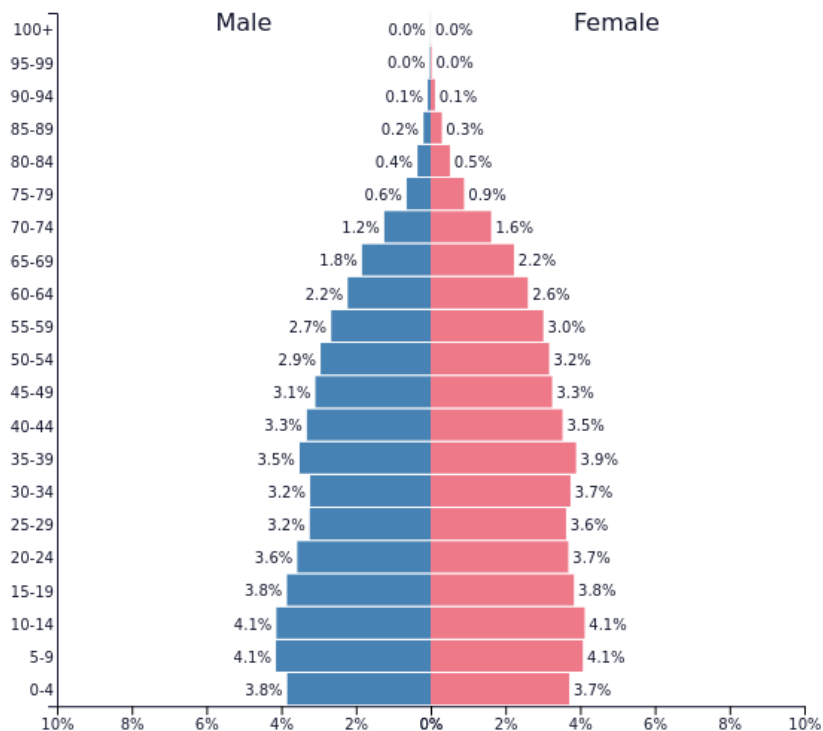
Random
factors



Horizon Scanning

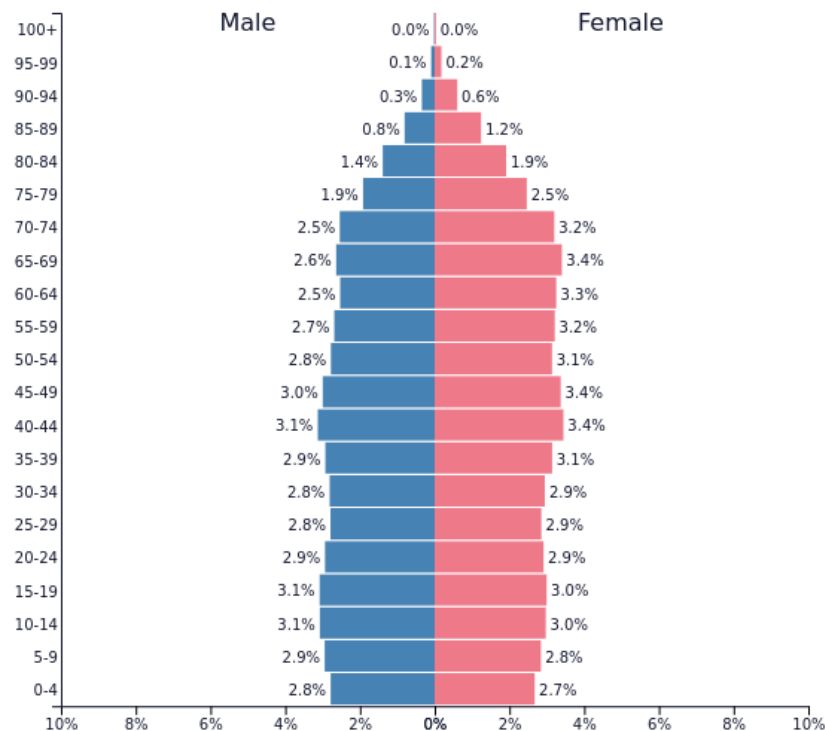


Demographic Trends



PopulationPyramid.net

Sri Lanka - 2017
Population: 20,905,335



PopulationPyramid.net

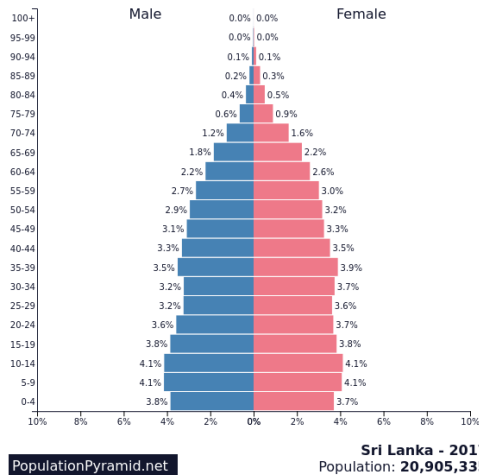
Sri Lanka - 2050
Population: 20,835,658

Population Projections



<https://i.imgur.com/b5aepOU.mp4>

Technology Forecasting



Micro-sensors



<http://www.i-micronews.com/>

Health Monitoring

Generation-3 Internet

24-hour medical care

Infrastructure Health Monitoring



Wireless
Sensors

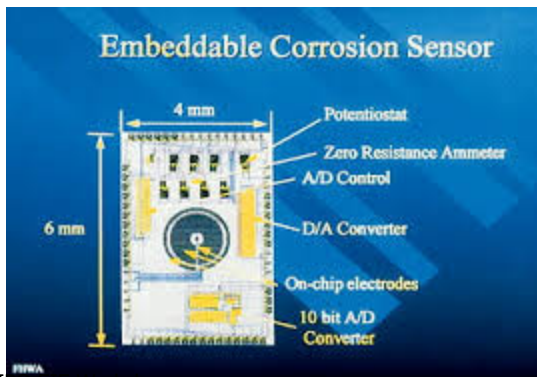


Drones



Continuous
Monitoring

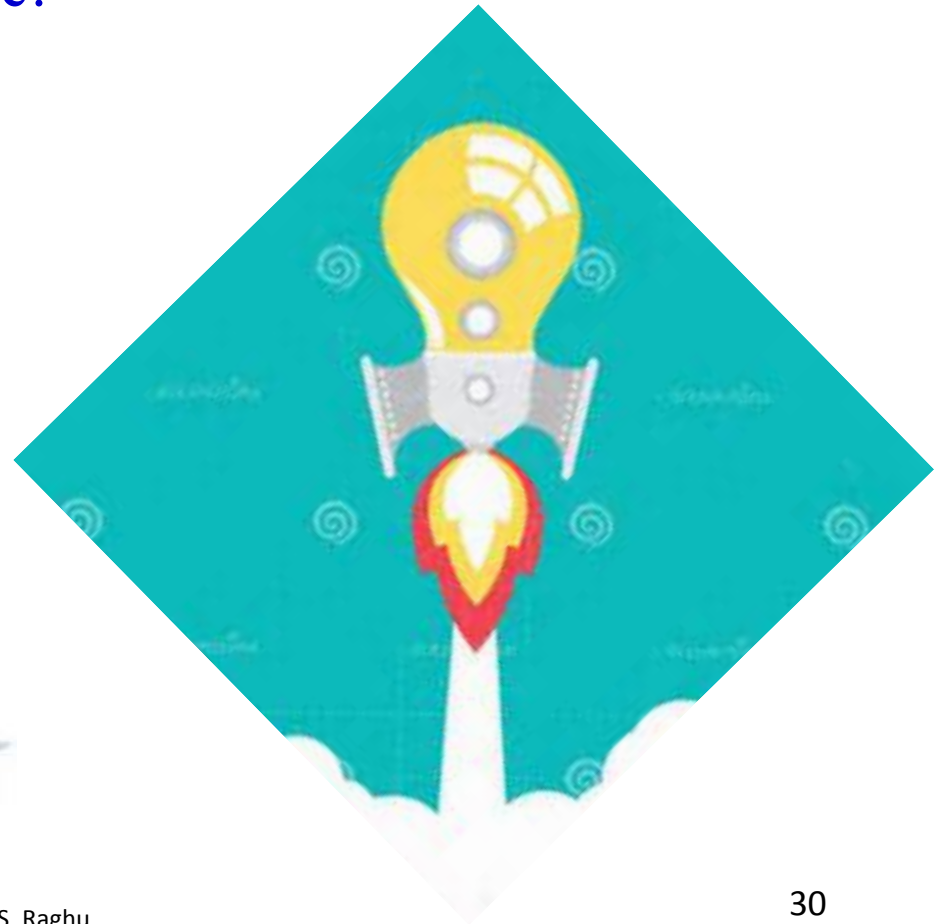
Generation-3
Internet



Technology Development after the Invention

The path from invention to a product

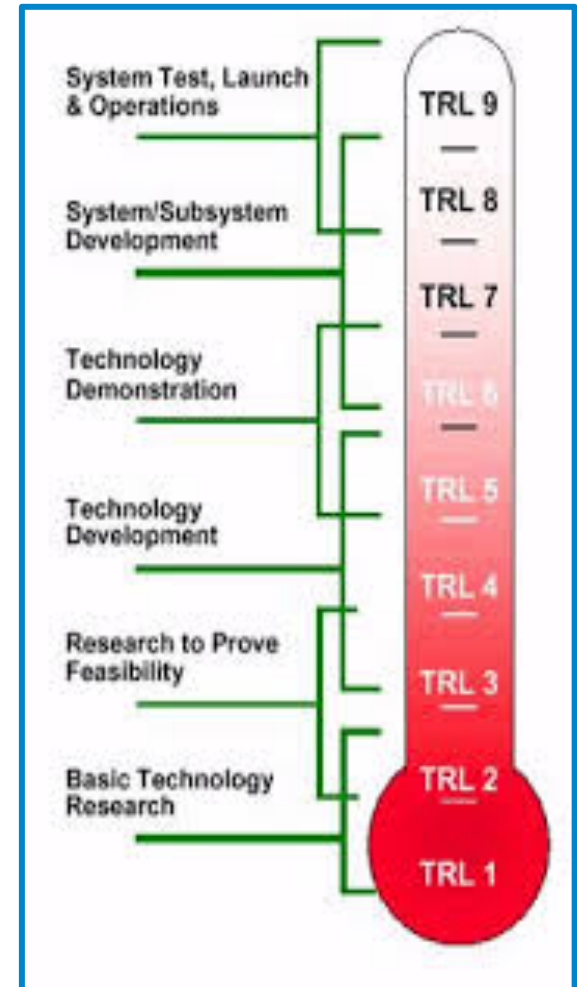
It is important to understand that there are **quite a few things to be done** in taking an invention to a product – and **it takes some time** to accomplish all these!



Moving up the Technology Level

Invest seed funding to advance the technology to a stage where it can be marketed – industry “needs solutions not technologies”

Encourage start-ups from University – they can act as technology developers from external funding and be bought out by large companies down the road.

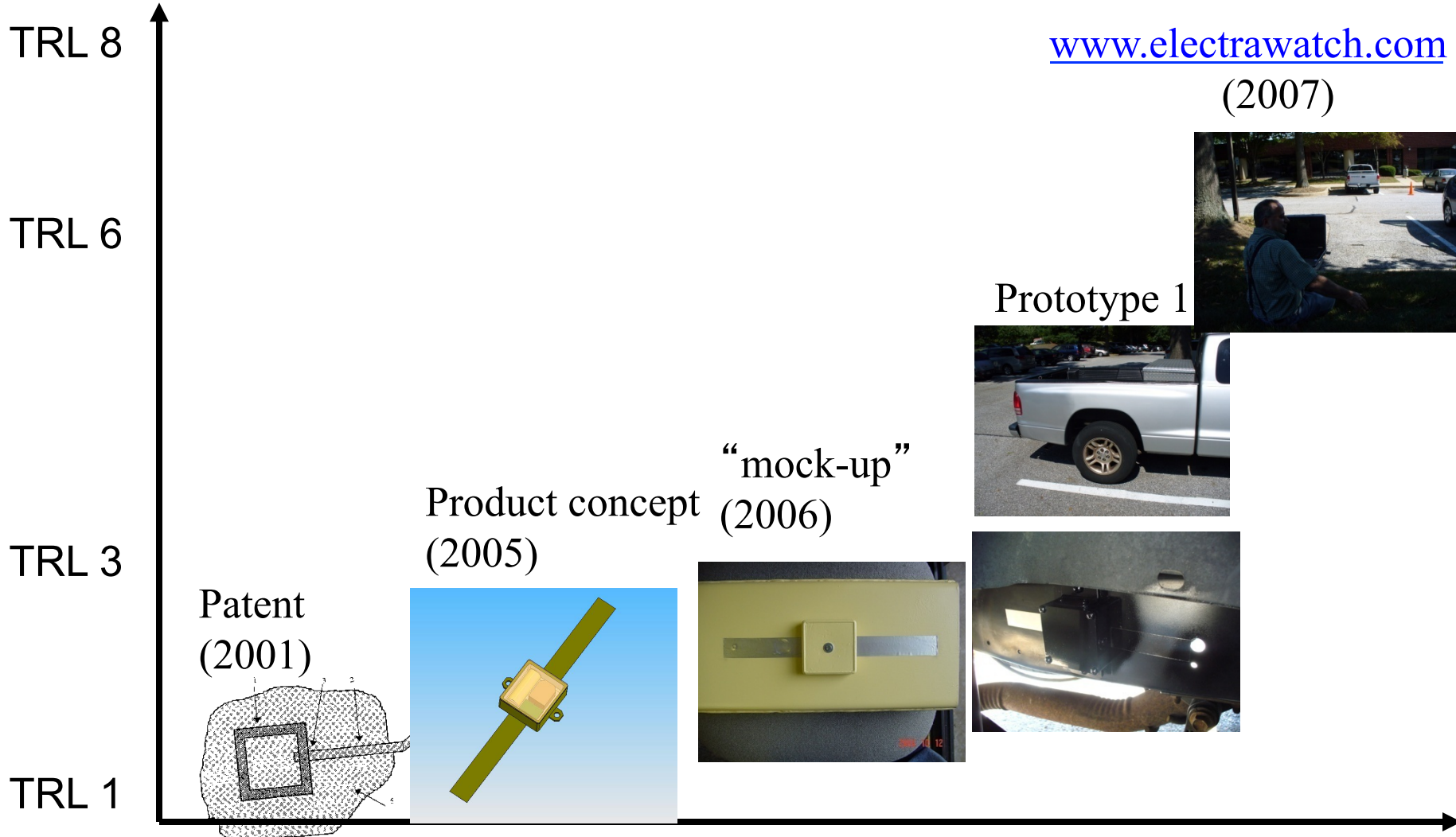


Corrosion Health Monitor

Product (2008)

www.electrawatch.com

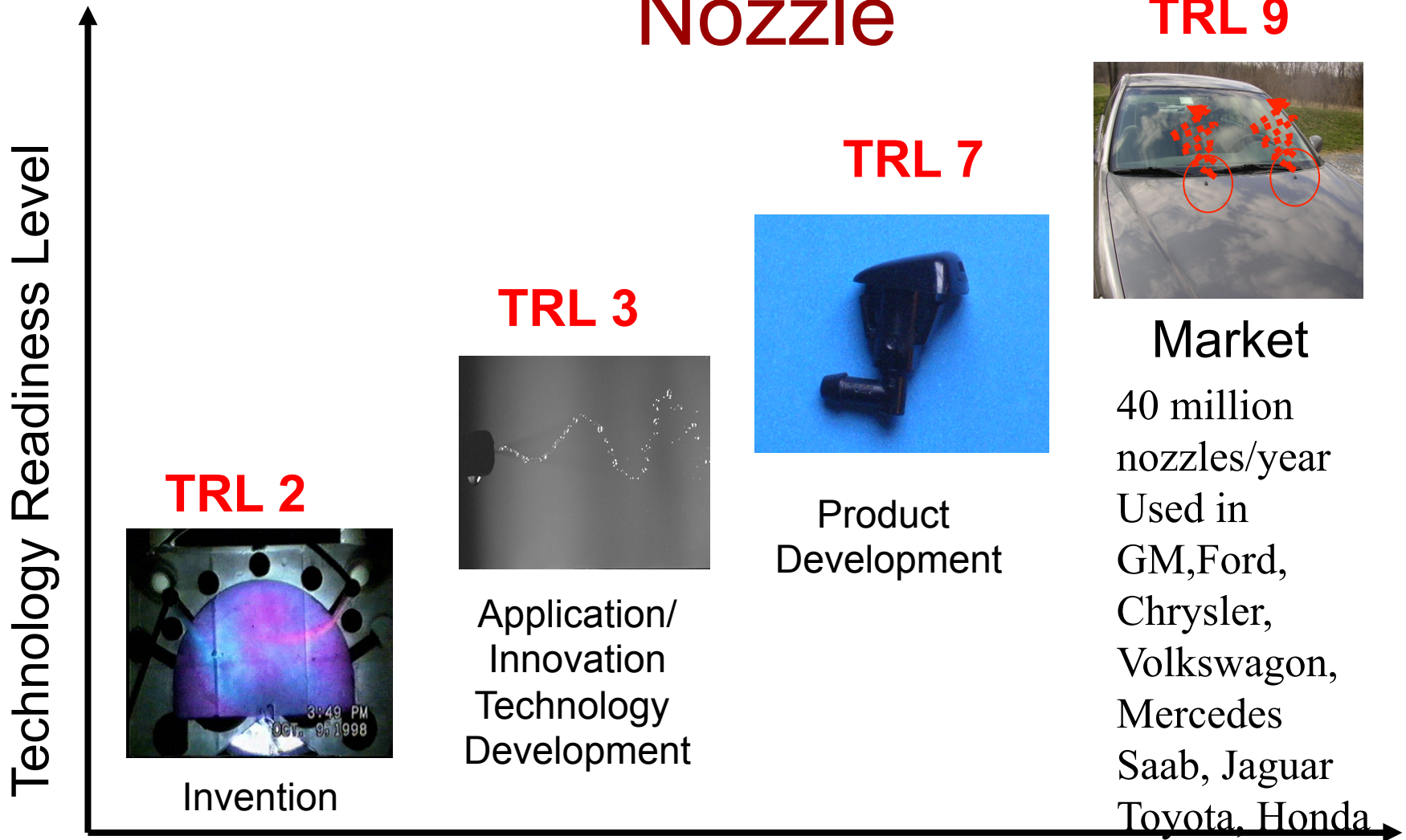
(2007)



Windshield Washer Nozzle



Automotive Windshield Washer Nozzle



New Trends in Technology/Product Development

1. Plan for future functionality in present product design
2. Consumers are demanding responsibility in product design
3. 3D printing plays a crucial role in any product design
4. Outsourcing is viable for product design
5. Knowledge base with documentations for customers
6. Globalization vs. Customization

New Trends in Product Development (contd)

7. Smart Products – Hardware + Software

8. Connectivity with customers

Some Advanced Strategies for TTOs

Creating a Patent Portfolio

Creating a **portfolio of related patents** will provide a better package for marketing

Example: Chemical compound + method of extraction + optimized processing technology + process control methods + possible reactions + catalysts + applications + software algorithms (?)

May need lot of interdisciplinary work

Patent Portfolio Mapping



Patent portfolio map of Franhauffer Institute (<https://heronscientific.com>)

Finding what Industries to Approach

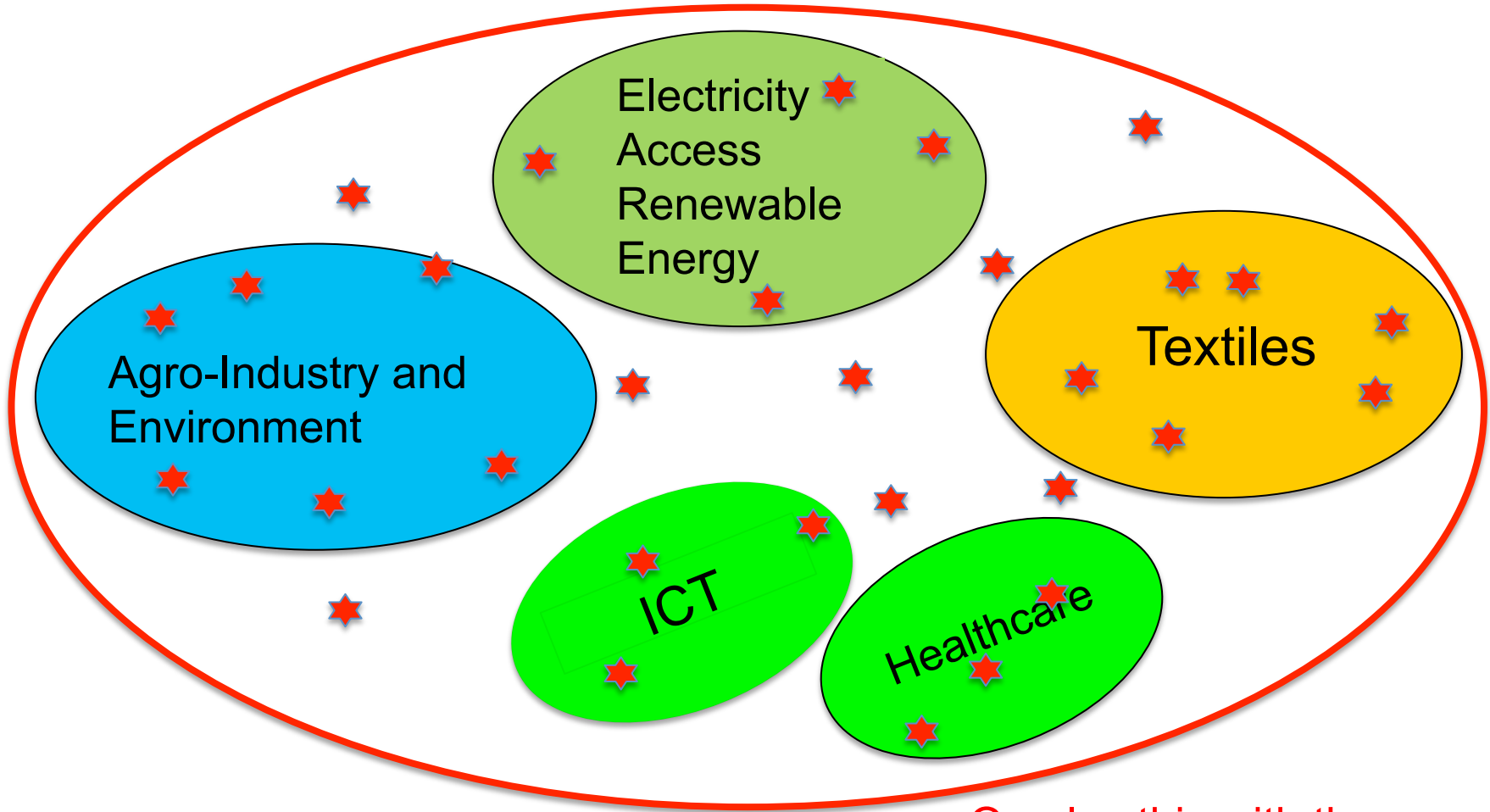


<https://www.innography.com/>

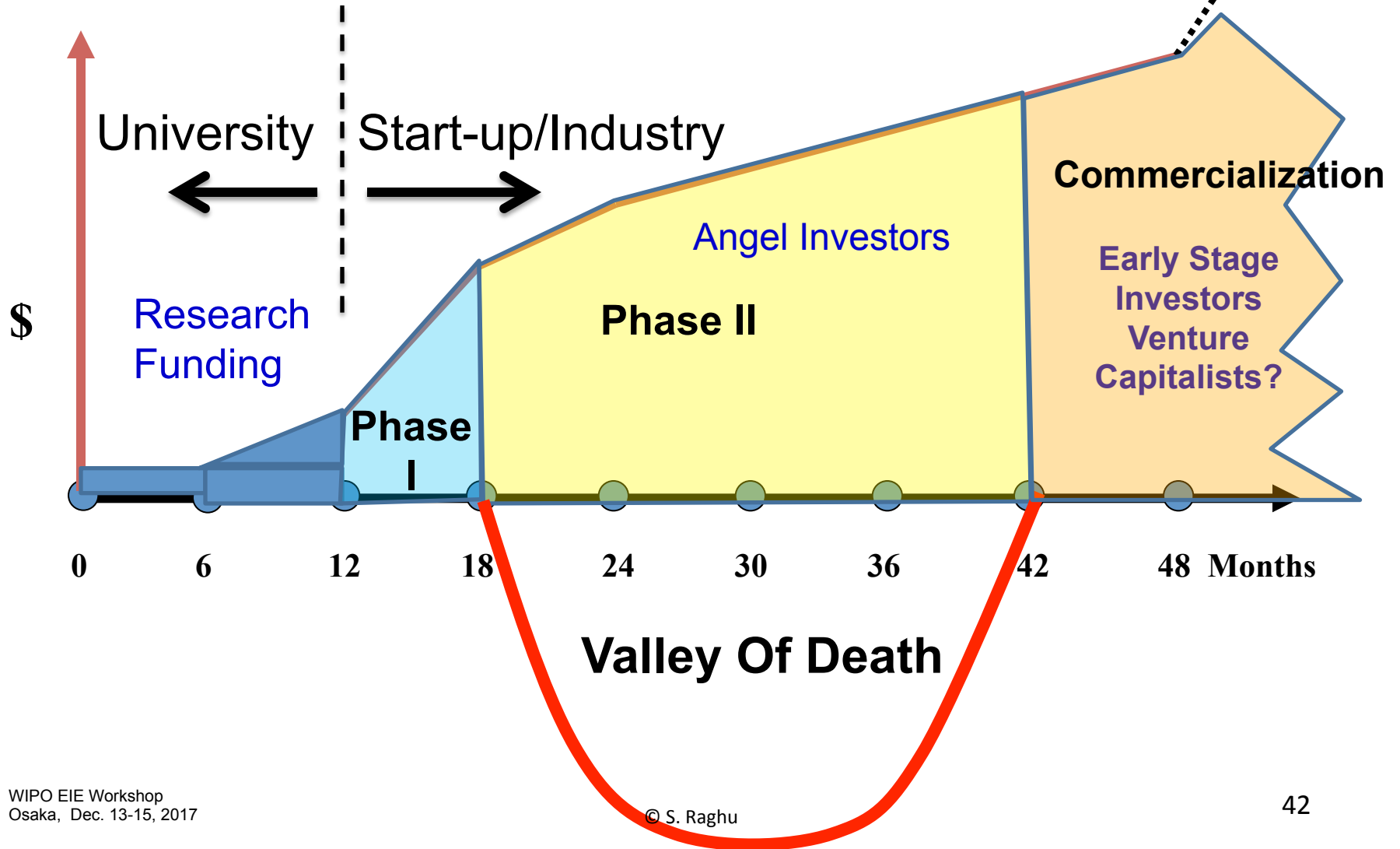
For inventions related to these areas – the TTOs can approach these industries for marketing the IP – similar “patent-scaping” can be done for other areas

Mapping Technology Needs and IP Portfolio

★ Invention



Cost & Time of Taking the Product to Market



New Trends in Tech Transfer

Pro-active Tech Transfer

Intellectual Property as an active catalyst
for transformation of local economies

Transformative Regional Engagement
(TRE) – Tech Transfer Office must be
actively connected to the Ecosystem

Take-Home Message

1. An Invention needs a Market, Technology Development into a Product and introduction to the market

2.

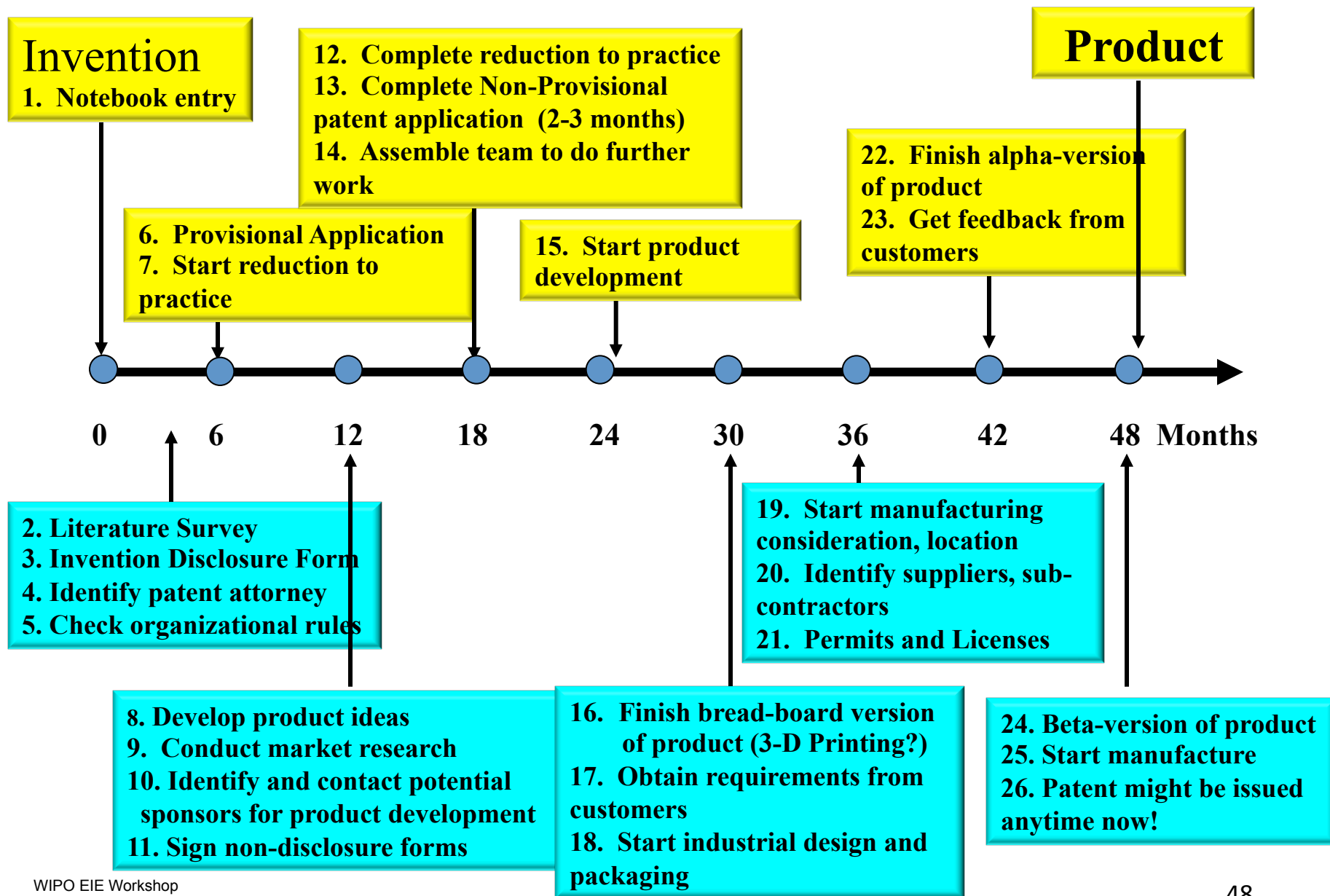


THANK YOU

Back-up Slides

Examples of Timelines for Products

Invention to Product: Steps and Time-Line



Notes:

1. Some of the product developments discussed were done a few years ago – and development cycles are probably a little shorter now – because of accelerated customer/consumer surveys, market studies and prototype development by virtual reality, simulation, conferencing and 3-D printing technologies...
2. Software product cycles are much shorter.
3. Medical products still have a long time to market because of clinical studies and approval processes.

Lessons Learned

Best ideas are not necessarily successful
in the market

Mistakes/failures happen!