

!Innovation flow

*the Science of flowing Ideas and
Inventions into Innovation*

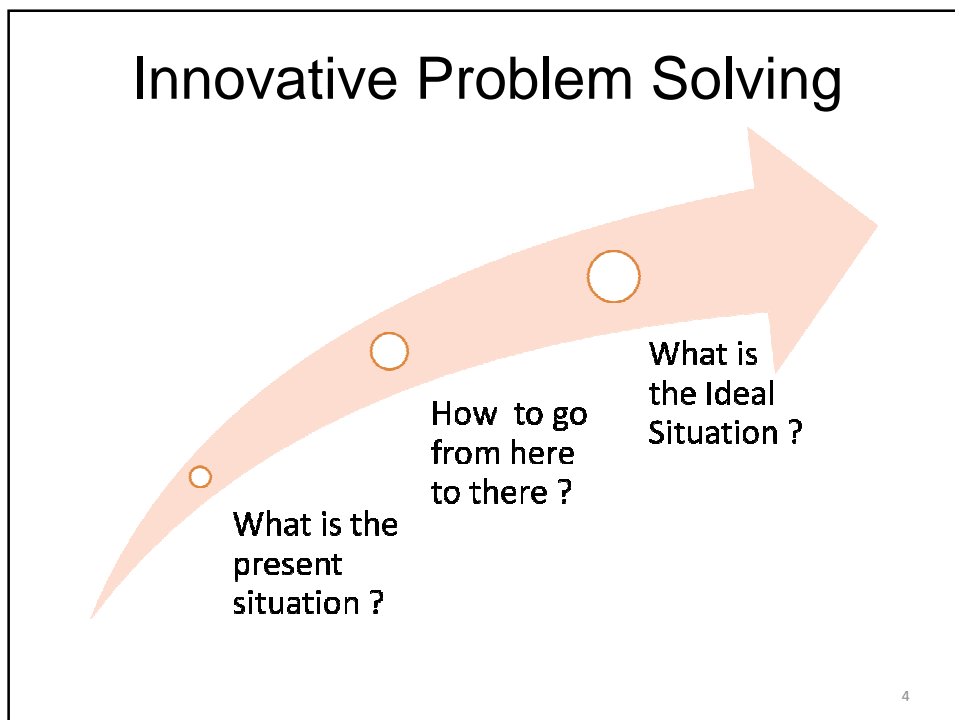
Dr Shankar MV

Pune, July 2010,
IPFACE, Venture Center
NCL Innovation

Hi, I'm Shankar

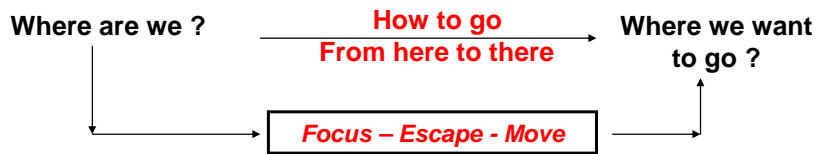
- Physicist turned Materials Scientist
- Principal Scientist at Dow R&D, Pune
- GE R&D – 8 Yrs, Materials Innovation
- Patented Inventions, New Products
- **Innovation Facilitator - TRIZ**





Plan for Innovative Problem Solving (IPS)

Innovation Flow



Innovation Workouts

- 5W + 1H
- Start with Why
- Reversal of Assumptions

Innovation Workouts

- Function Map
- TRIZ Contradictions
- TRIZ Ideation

Innovation Workouts

- Ideal Final Result
- TRIZ TET

Winning in Emerging Markets

through

Innovation



<http://www.sristi.org/cms/>



JUGAAD

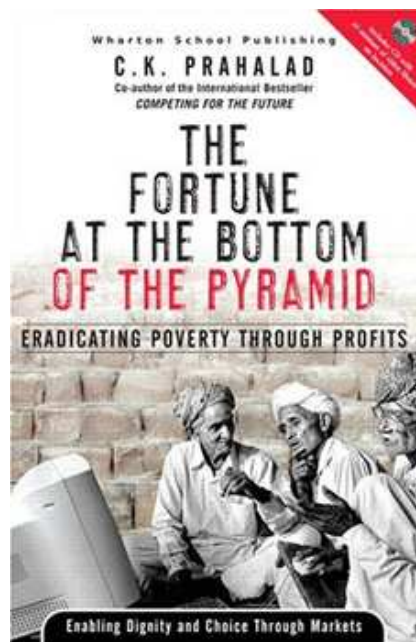


Jehangir Painter (49), a painter from north Maharashtra's Jalgaon town, put together a scooter-powered flour mill to relieve his wife from the tedium of blackout-induced three-hour waits for wheat to be ground.



The Indian ability to innovate is not new and is exemplified by the word jugaad.
- the ability to engineer a solution—mechanical or otherwise—to a problem.

***How to Innovate for Customers
at the Bottom of the Pyramid ?***



Portable Water Filter

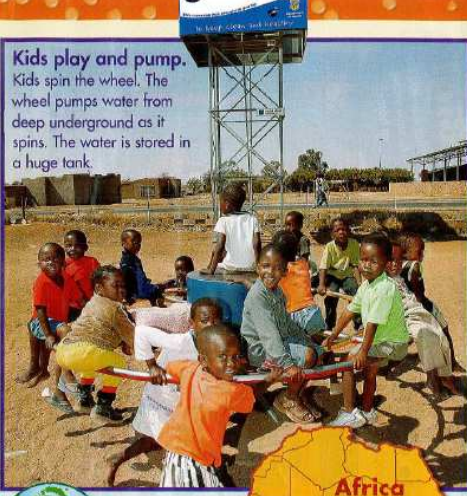


<http://www.vestergaard-frandsen.com/lifestraw-introduction.htm>


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Playpump

Kids play and pump.
Kids spin the wheel. The wheel pumps water from deep underground as it spins. The water is stored in a huge tank.



Where in the World?
Look at the map. It shows the countries in Africa that have PlayPumps. Soon, there will be PlayPumps in five more countries in Africa.



Africa
Atlantic Ocean
Mozambique
Zambia
Swaziland
Lesotho
South Africa

TIME FOR KIDS

Solving an Invisible Problem



Adaptive Eyeware

<http://hubpages.com/hub/INNOVATIVE-SPECTACLES>

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Reverse Innovation

GE Healthcare's compact electrocardiogram (ECG) for the Indian market is a case study in reverse innovation



In 18 months a team in India, working on a shoestring budget, developed a unique ECG machine that was one tenth the cost and one third the weight of previous units.

Having proven its success in rural India, GE's new MAC 400 ECG is now a candidate for use in all the other healthcare markets in the world. Reverse innovation is an idea whose time has come



How GE Is Disrupting Itself

The Idea in Brief

- The model that GE and other industrial manufacturers have followed for decades—developing high-end products at home and adapting them for other markets around the world—won't suffice as growth slows in rich nations.
- To tap opportunities in emerging markets and pioneer value segments in wealthy countries, companies must learn reverse innovation: developing products in countries like China and India and then distributing them globally.
- While multinationals need both approaches, there are deep conflicts between the two. But those conflicts can be overcome.



For decades, GE has sold modified Western products to emerging markets. Now, to preempt the emerging giants, it's trying the reverse.

How GE Is Disrupting Itself

by Jeffrey R. Immelt, Vijay Govindarajan, and Chris Trimble

Reverse Innovation in Practice

1 ORIGINAL PRODUCT

In the 1990s GE served the Chinese ultrasound market with machines developed in the U.S. and Japan.

CONVENTIONAL
ULTRASOUND
2002 PRICE

\$100K AND UP

TYPICAL CUSTOMERS

Sophisticated hospital
imaging centers

TYPICAL USES

- Cardiology (such as measuring the size of passages or blood flow in the heart)
- Obstetrics (monitoring fetal health)
- General radiology (assessing prostate health, for example)

But the expensive, bulky devices sold poorly in China.

2 THE EMERGING MARKET DISRUPTION

In 2002 a local team in China leveraged GE's global resources to develop a cheap, portable machine using a laptop computer enhanced with a probe and sophisticated software.

**PORTABLE
ULTRASOUND
2002 PRICE**
\$30K-\$40K

TYPICAL CUSTOMERS

- China: rural clinics
- U.S.: ambulance squads and emergency rooms

TYPICAL USES

- China: spotting enlarged livers and gallbladder stones
- U.S.: in emergency rooms to identify ectopic pregnancies; at accident sites to check for fluid around the heart; in operating rooms to place catheters for anesthesia

2007 PRICE
\$15K

In 2007 the team launched a dramatically cheaper model. Sales in China took off.

3 THE NEW GLOBAL MARKET

<p>PORTABLE ULTRASOUND GLOBAL REVENUES</p> <p>\$4M 2002</p>	<p>PORTABLE ULTRASOUND 2009 PRICE</p> <p>\$15K-\$100K</p>
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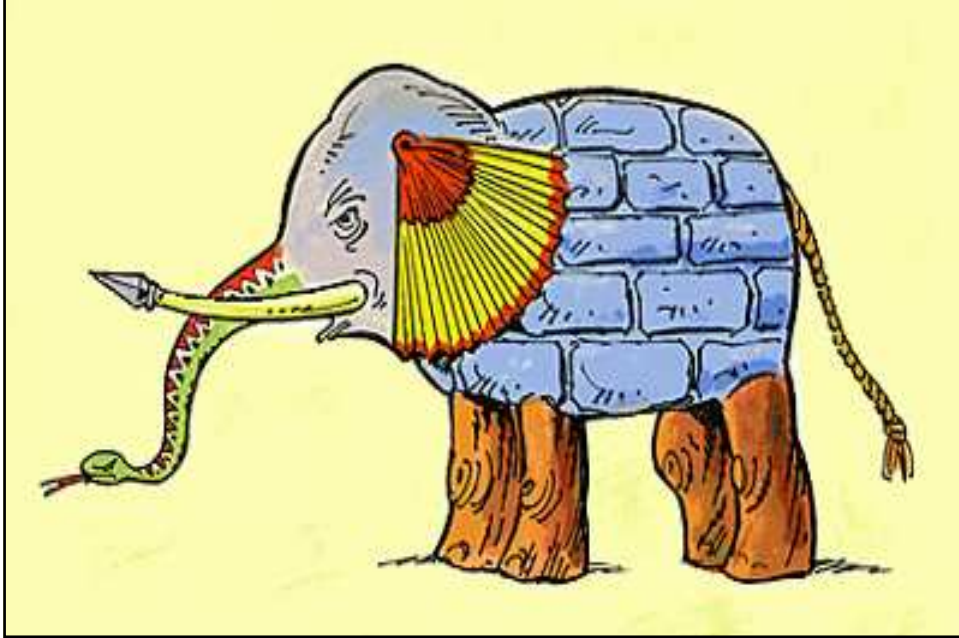
2008
\$278M

<p>CONVENTIONAL ULTRASOUND 2009 PRICE</p> <p>\$100K-\$350K</p>
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Thanks to technology advances, higher-priced PC-based models can now perform radiology and obstetrics functions that once required a conventional machine.

What is Innovation ?

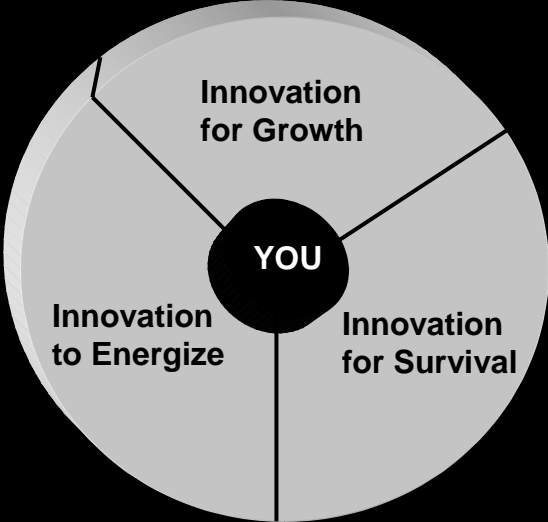
Current Models for Innovation



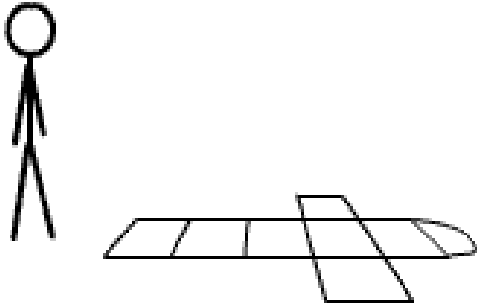
**INNOVATION IS
BRINGING AN INSIGHTFUL IDEA
SUCCESSFULLY TO THE MARKET**

Why Innovate ?

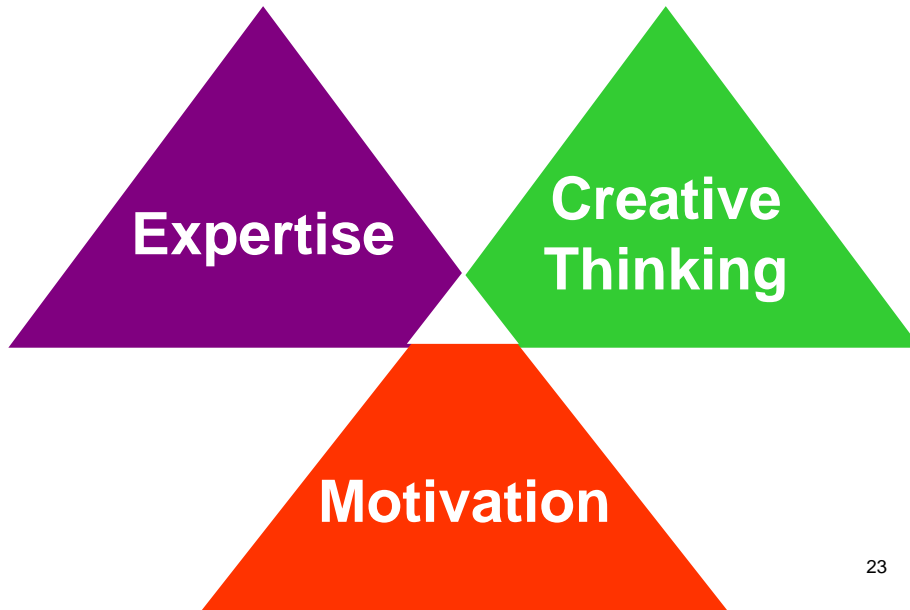
Change – Opportunity - Growth



The Innovator sees many Barriers

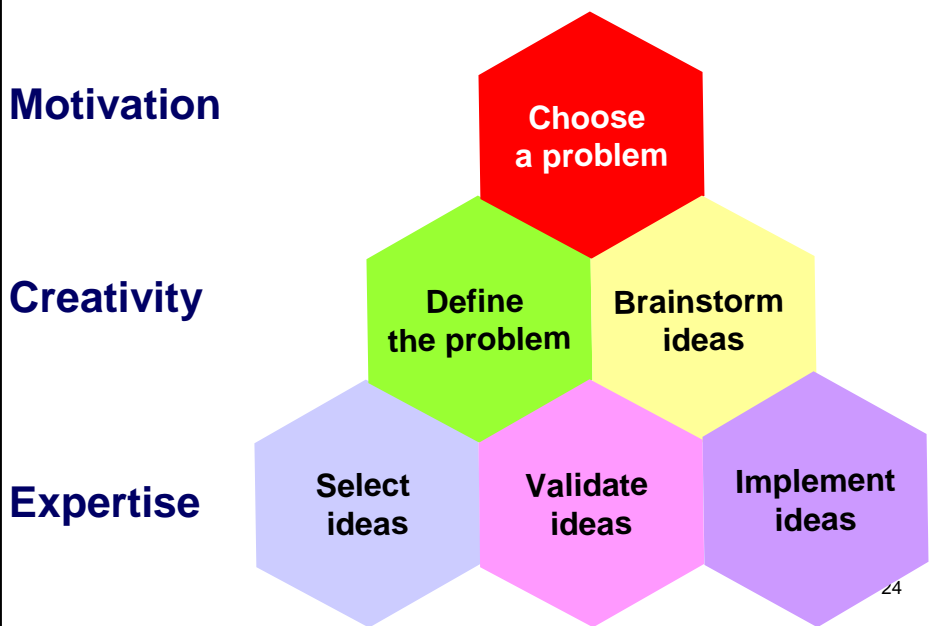


What do you need to Innovate

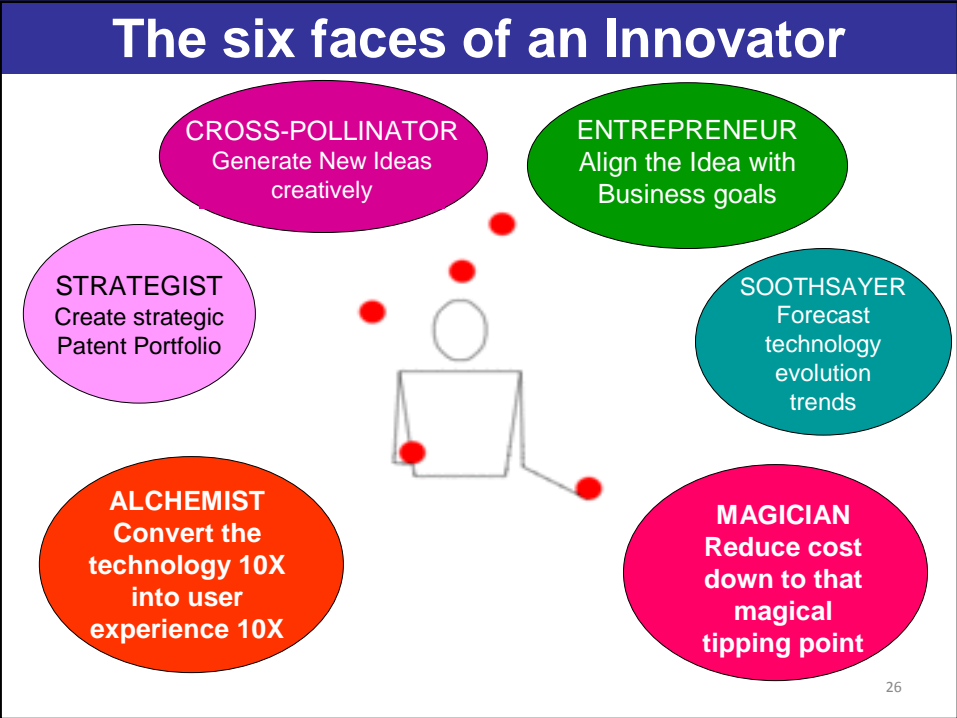
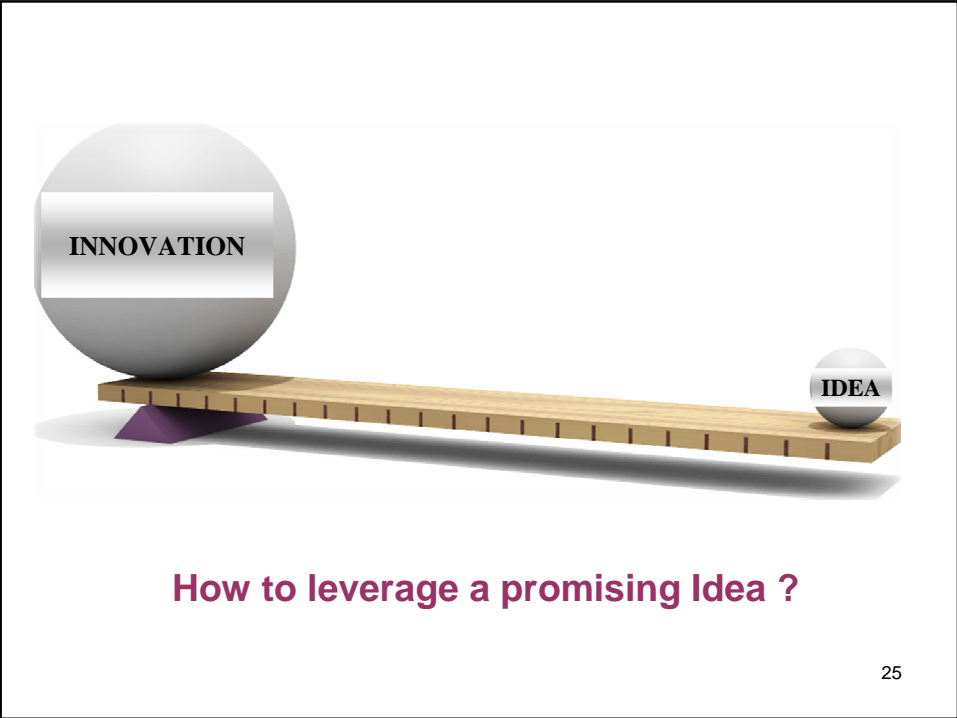


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Elements of Innovation



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Creativity & Ideas are not enough,
they need to be
structured, defined and directed
to result in Innovation

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**Structured Process to grow
the Innovative Potential of Ideas**



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How to Grow the Innovative Potential of Ideas ?

Innovative product
that wows the User



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Puzzle # 1 - Tree Vs Forest

Innovation flow



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Puzzle # 2 - Knowledge Vs Imagination

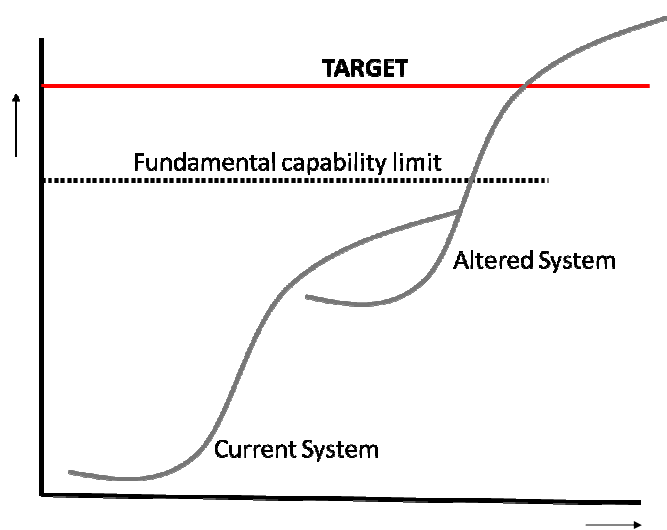
Innovation flow



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Puzzle # 3 Present Vs Next-gen Technology

Innovation flow


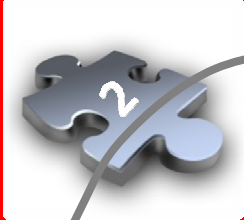
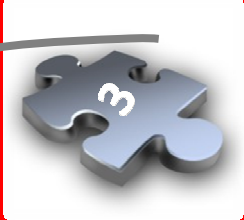


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 <p>How to focus on the opportunity ?</p>	 <p>How to escape from psychological inertia ?</p>	 <p>How to move to the next S-Curve ?</p>
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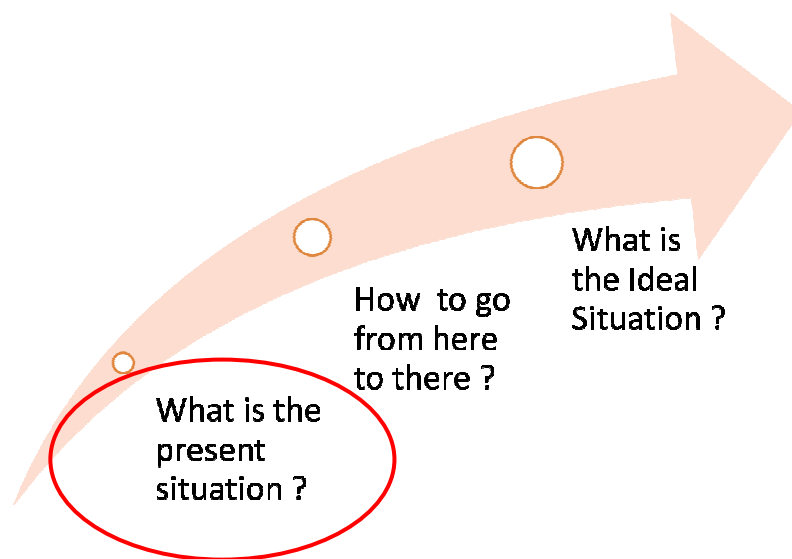
Mantra for Innovation flow

 <p>Focus</p>	 <p>Escape & Align</p>	 <p>Move</p>
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Innovative Problem Solving

Innovative Problem Solving



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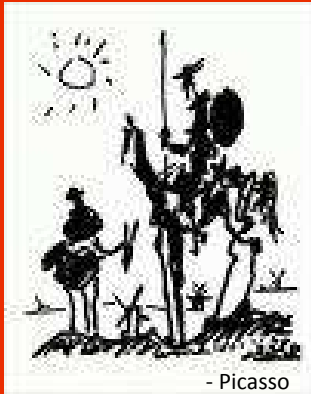
Mr. I. Opportunity

lives here :



**Knock
Knock
Knock
Knock
Knock**



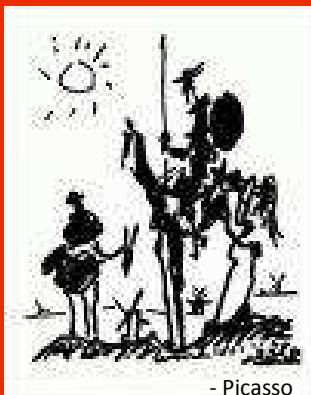


- Picasso

*The Kingdom
was lost
because
a nail was
missing*

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*The Kingdom was
lost because
a nail was missing*



- Picasso

1. Why was the Kingdom lost?

because the battle was lost.

2. Why was the battle lost ?

because the soldier could not fight well

3. Why could not the soldier fight well ?

because he lost his horse.

4. Why was the Horse lost ?

because it lost its shoe.

5, Why did the horse lose its shoe ?

because a nail was missing.

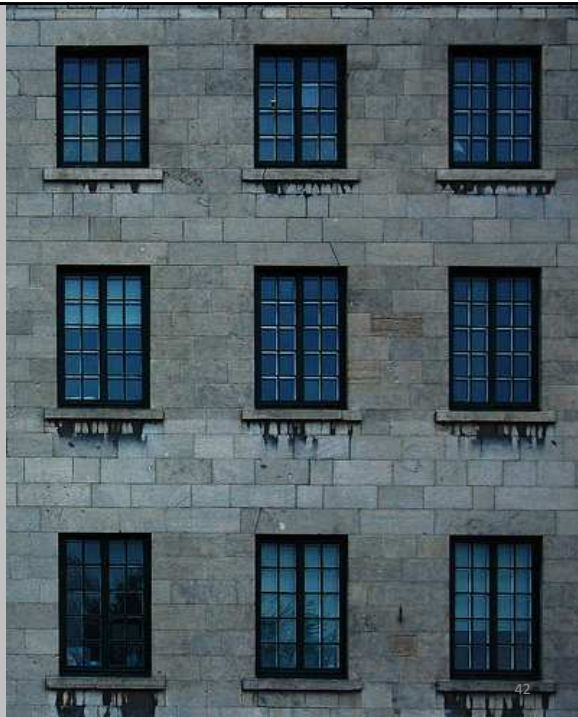
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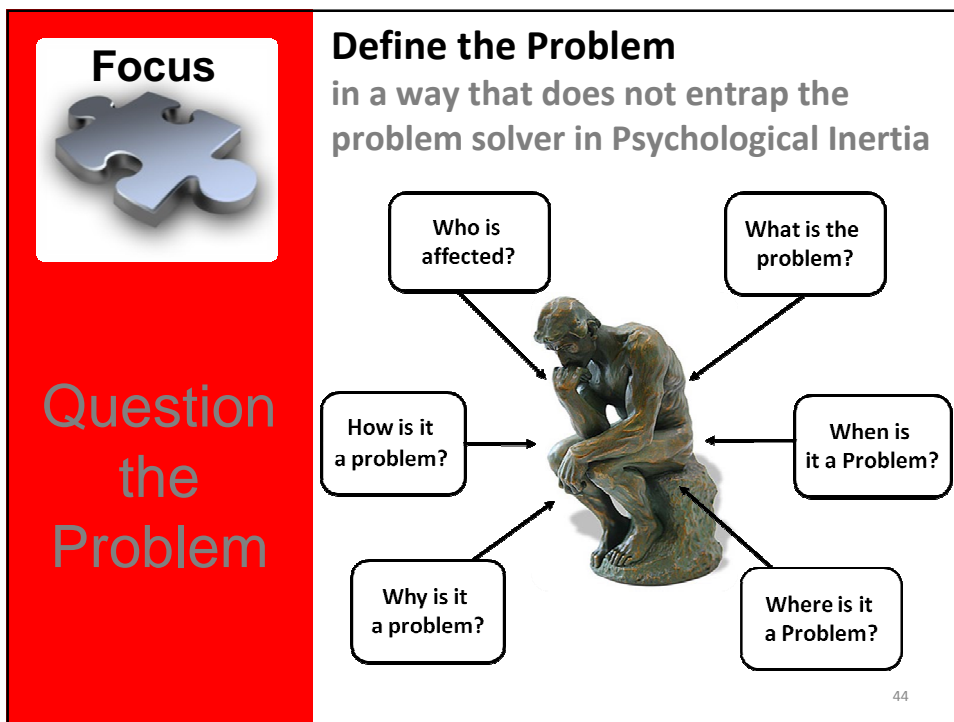
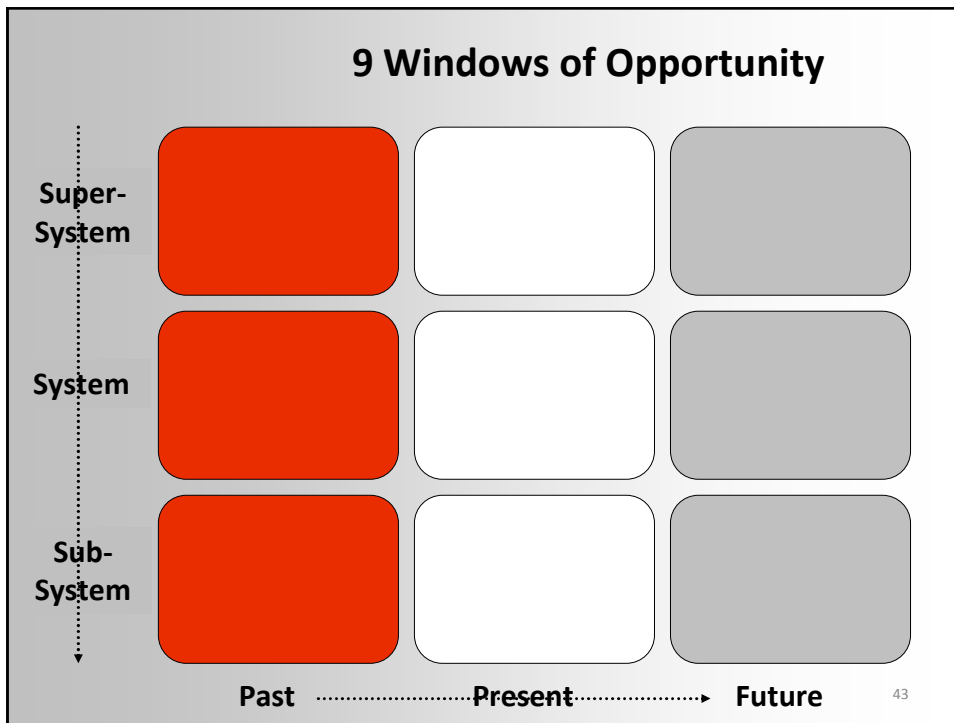
Why	because..	Idea Trigger
Why do we have a problem with UPD?	UPD is deforming on impact	
Why is it deforming?	it absorbs the energy from colliding car but is unable to transmit it anywhere	Can we convert the absorbed kinetic energy to other useful forms
Why is it unable to transmit energy?	the supports are rigid	Can we vary the rigidity of support?
Why are the supports made rigid?	otherwise impact is transmitted to truck	How can the truck take impact but not affected?
Why is impact transmitted to truck?	there is no alternative path	How can we provide an alternative path for flow of energy?

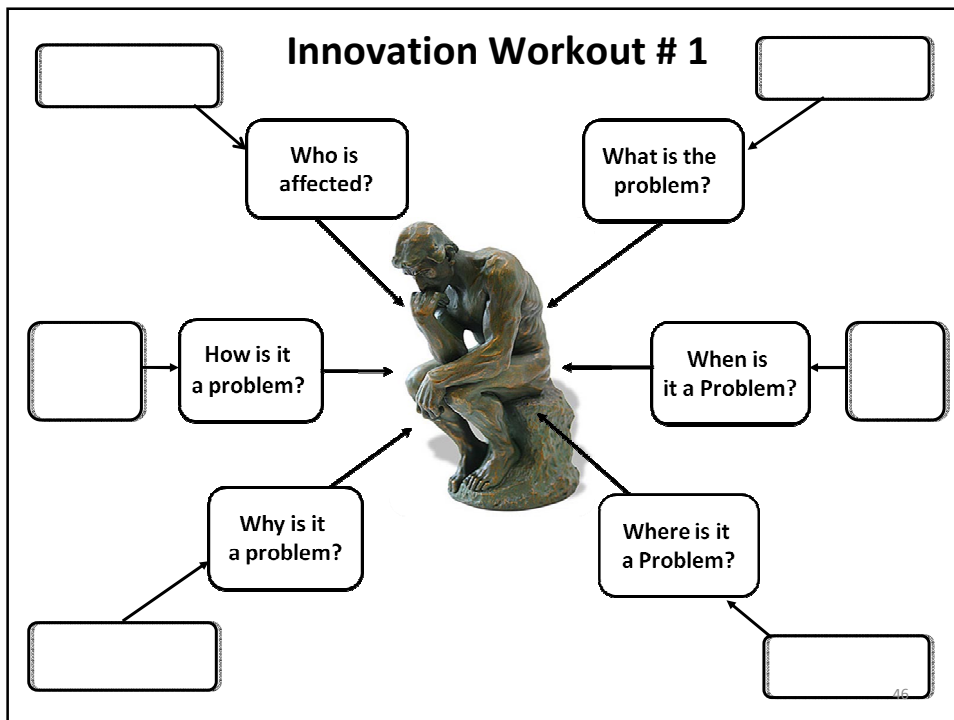
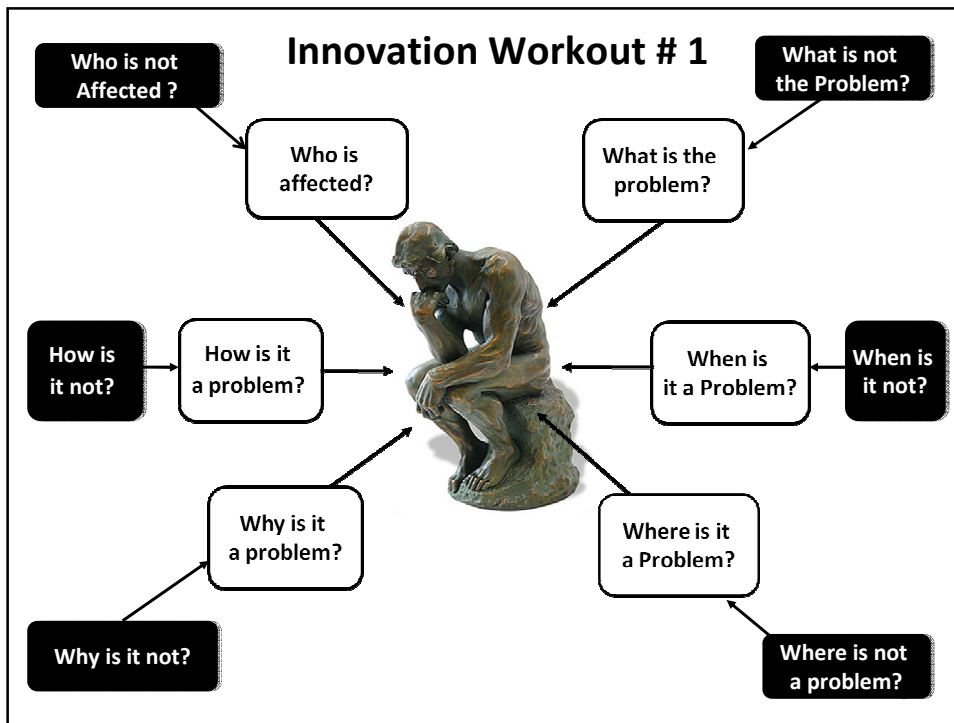
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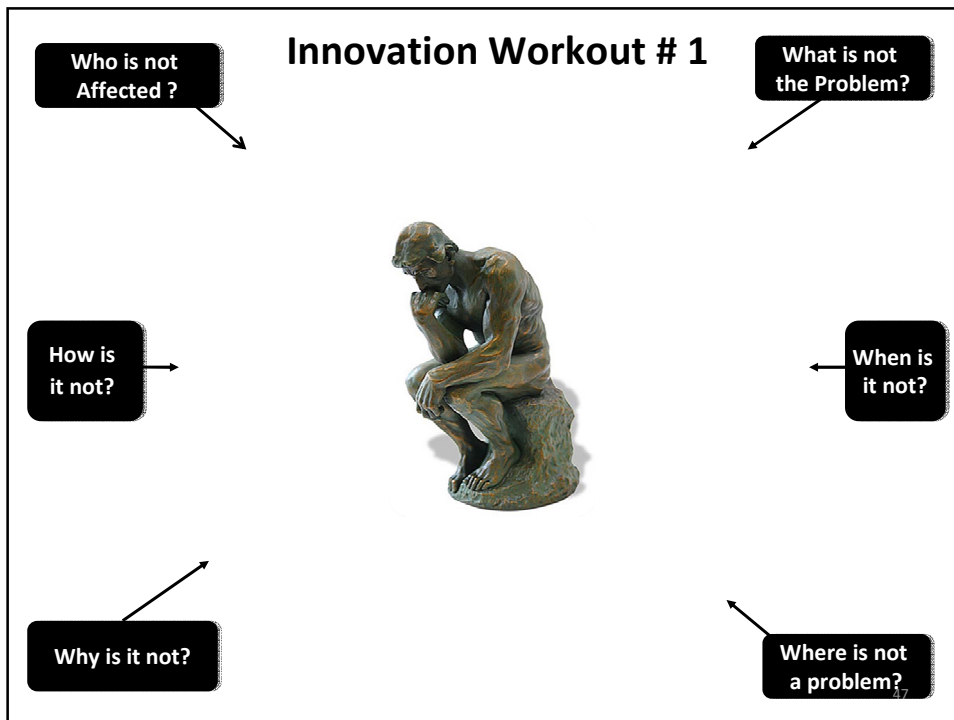
9 Windows



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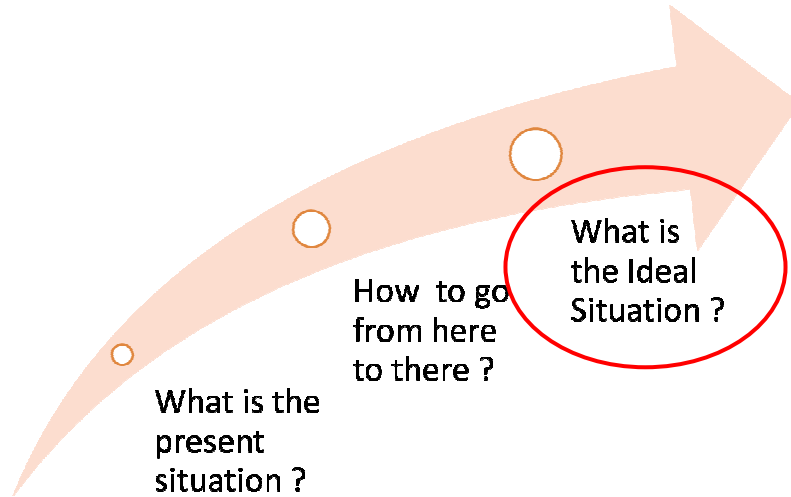






- Innovation Workout # 2**
What if ...?
- What are your basic assumptions about the system ?
 - What if you reverse each one of these basic assumptions ?
 - Now brainstorm around the reversed assumptions
 - Take the ideas back to the original system

Innovative Problem Solving



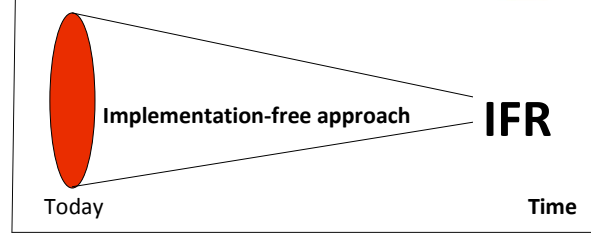
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Focus



Begin with
the End in
Mind

Ideality



$$\text{Ideality} = \frac{\text{Useful Functions}}{\text{Harmful Functions} + \text{Cost}}$$

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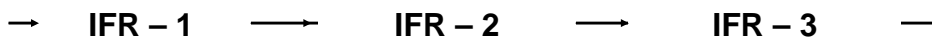


Problem: Cleaning the exterior of the windows of tall buildings

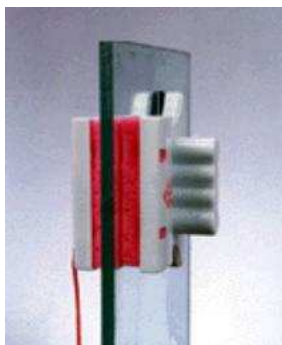
Ideality = Cleaning / (Injury + Cost)

- **IFR -1**
Introduce an element that will clean the exterior from inside – without complicating the design
- **IFR-2**
No new substance or parts
System itself will do the useful function
- **IFR-3**
Zone of Contradiction itself performs the function

Source: Kraev's Korner – System Ideality, TRIZ Journal
<http://www.triz-journal.com/archives/2007/02/08/>



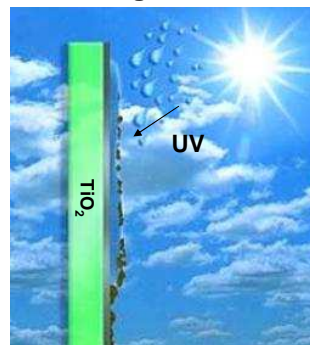
Cleaning Tool with a Magnet



Sliding Windows with a cleaning brush



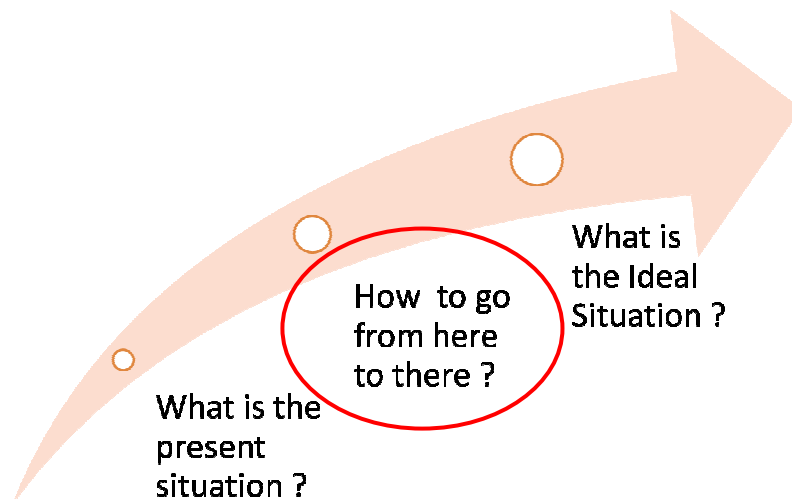
Self-Cleaning Glass Nano Titania Pilkington Active



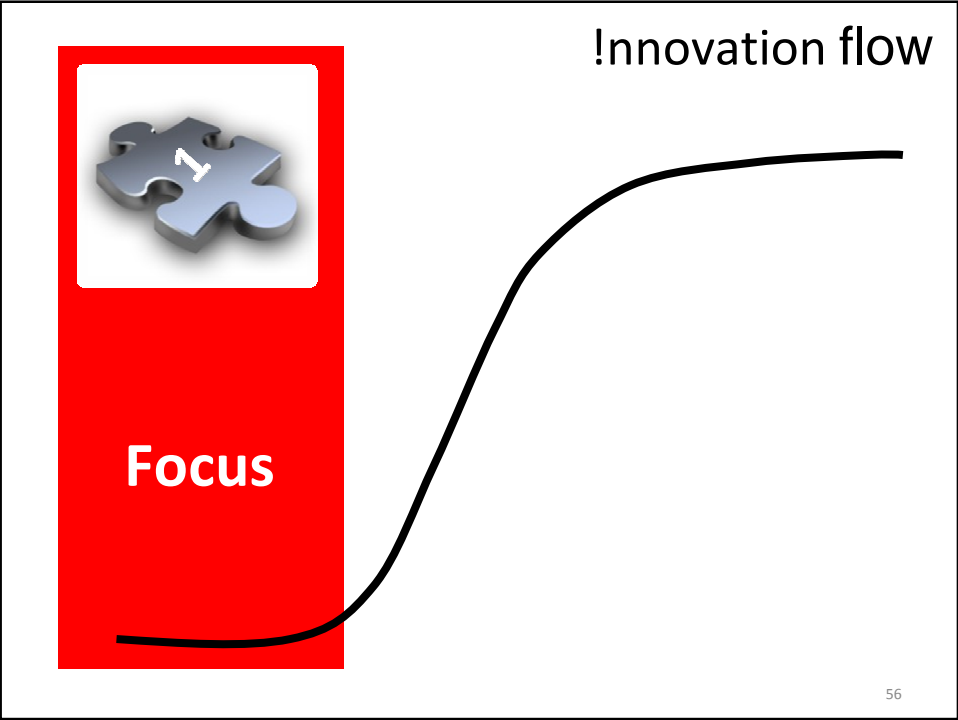
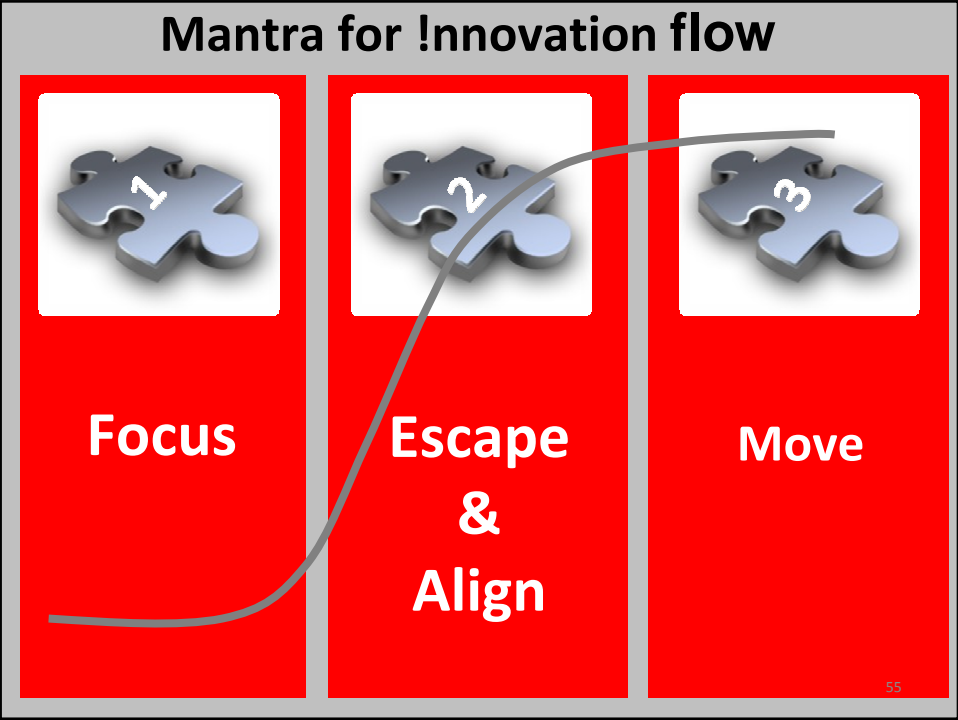
Innovation Workout # 3

Ideal Final Result

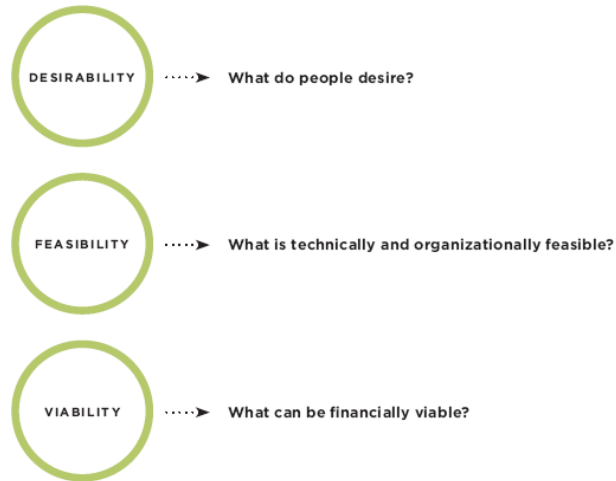
Innovative Problem Solving



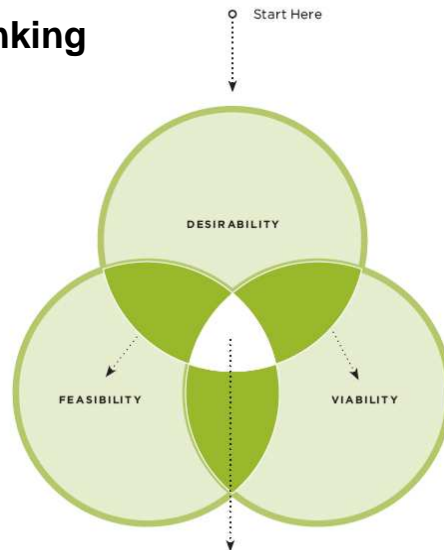
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Design Thinking – Three Lenses - IDEO



Design Thinking



The solutions that emerge at the end of the Human-Centered Design should hit the overlap of these three lenses; they need to be **Desirable, Feasible, and Viable**.

Design Thinking – IDEO’s HCD Model



HEAR

During the Hear phase, your Design Team will collect stories and inspiration from people. You will prepare for and conduct field research.



CREATE

In the Create phase, you will work together in a workshop format to translate what you heard from people into frameworks, opportunities, solutions, and prototypes. During this phase you will move together from concrete to more abstract thinking in identifying themes and opportunities, and then back to the concrete with solutions and prototypes.



DELIVER

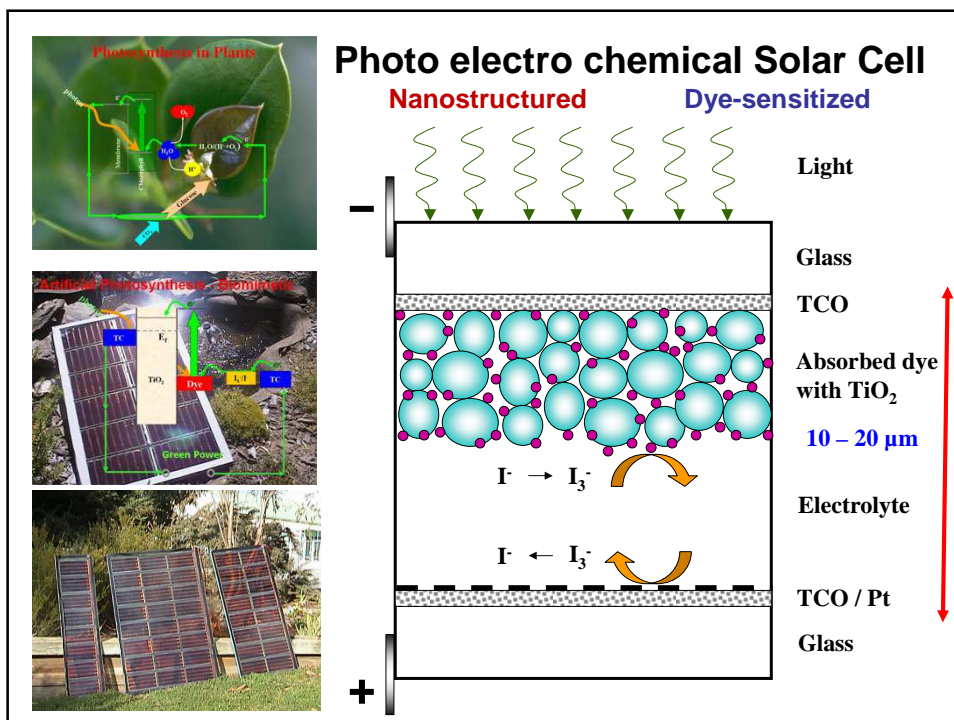
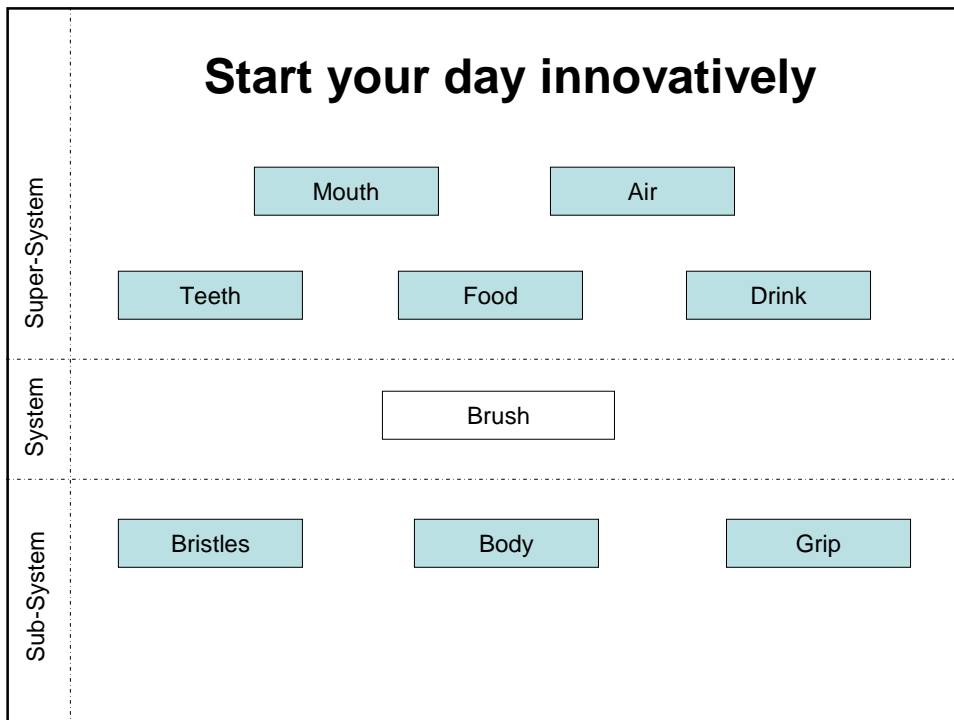
The Deliver phase will begin to realize your solutions through rapid revenue and cost modeling, capability assessment, and implementation planning. This will help you launch new solutions into the world.

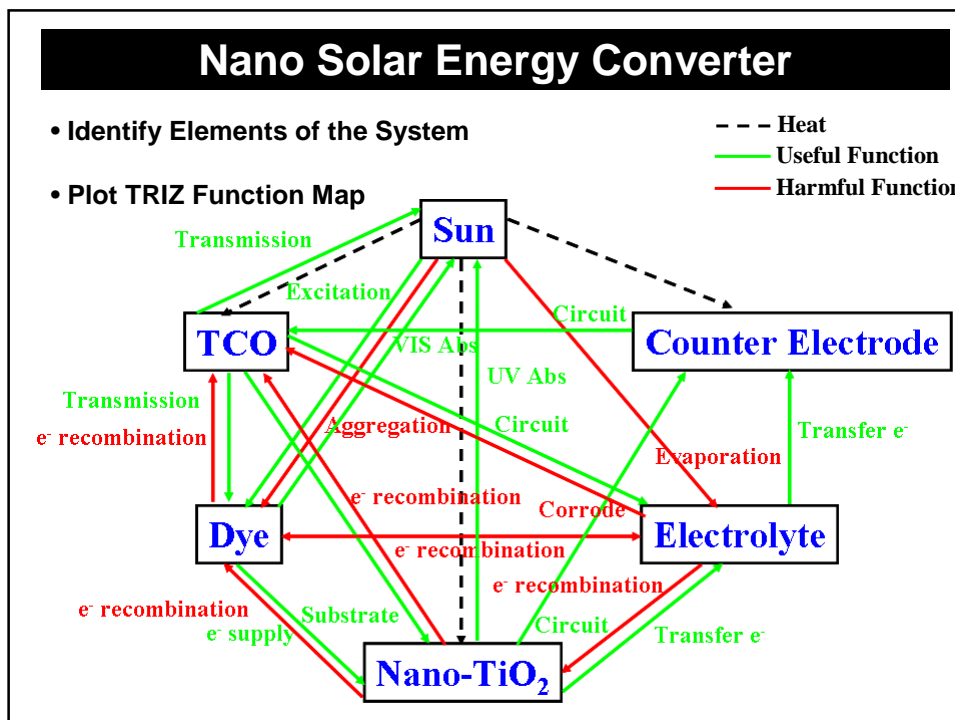
Innovation Workout # 4

Functional Mapping

to focus on the

Innovation Opportunity






What is holding you back ?

Element	Present	What is desired?	What is to be improved?	What is holding us back?
TCO	ITO	High transmittivity & electrical conductivity	Light transmittivity Electrical conductivity	low conductivity loss in transmittivity due to light scattering
Light harvester (Dye)	Organic molecules (Ru-based)	absorb entire spectrum of incident radiation	# Absorbed photons	Aggregation, selective absorption
		convert all absorbed photon energy into excitons	# Excitons generated	Recombination
Nanoporous photoelectrode	Nano TiO₂	conduct electron away immediately	Electron mobility	Transfer of e from dye to TiO ₂
Electrolyte	Iodine based redox couple	conduct hole away immediately	Hole mobility (liquid electrolyte)	volatility, leakage
Counter electrode	Pt on glass/TCO	supply electrons continuously, not react with electrolytes	Chemical stability, electron donating ability	corrosive nature of electrolytes and cost

Innovation flow




Focus

- Ask Questions
- Look at all the Zones
- Begin with the End in Mind

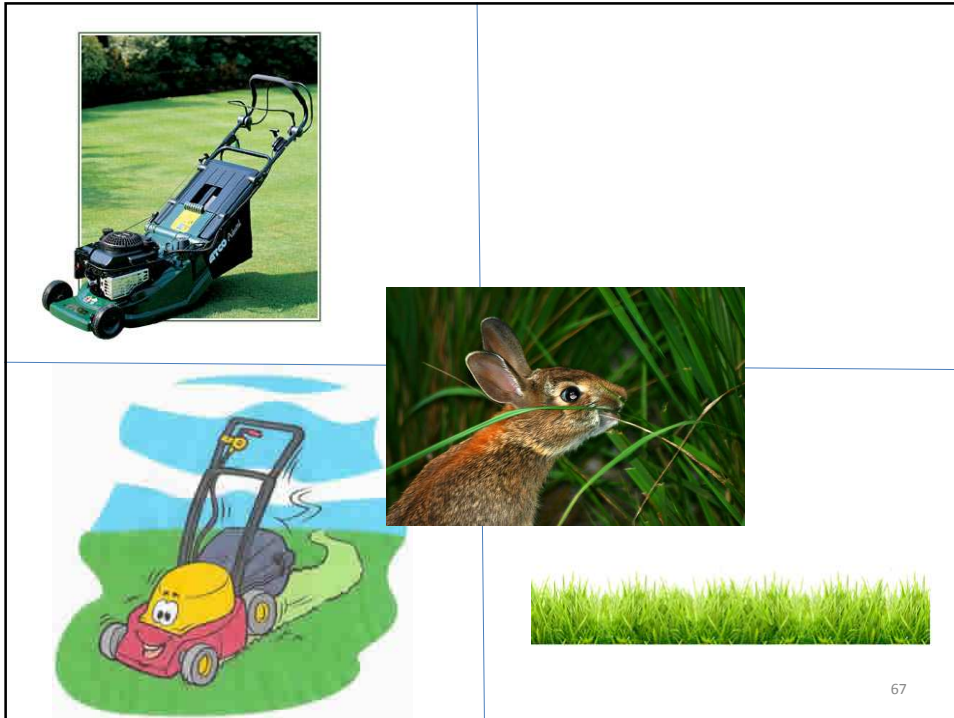
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Innovation flow

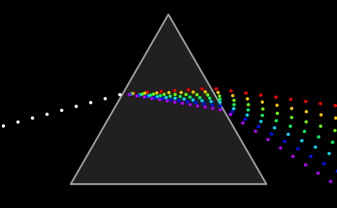


Escape & Align



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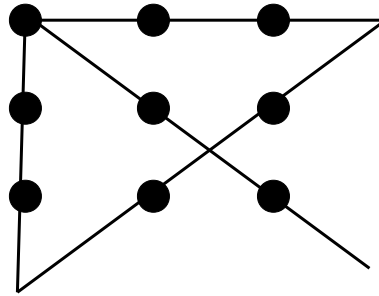


Divergent Thinking

<p>Same Noun, Same Verb</p> <p>Pencil, Write</p>	<p>Same Noun, Different Verb</p> <p>Write, Pencil Pointer Drum stick Missile Lubricator, Electrical connector,</p>
 <p>Different Noun, Same Verb</p> <p>Pen, Write Marker Chalk Coal, brick, .. Finger</p>	<p>Different Noun, Different Verb</p> <p>Its not a Pencil, It doesn't Write</p> <p>Phone - Voice message Email</p> 

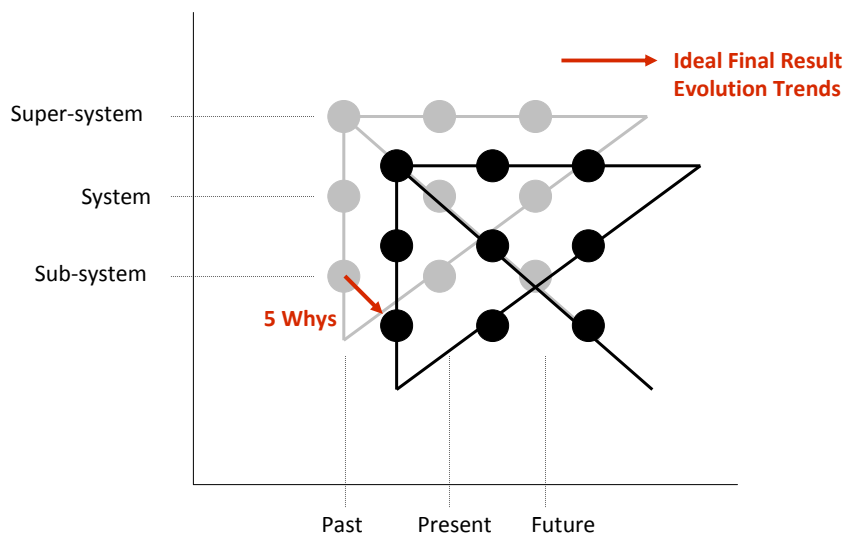
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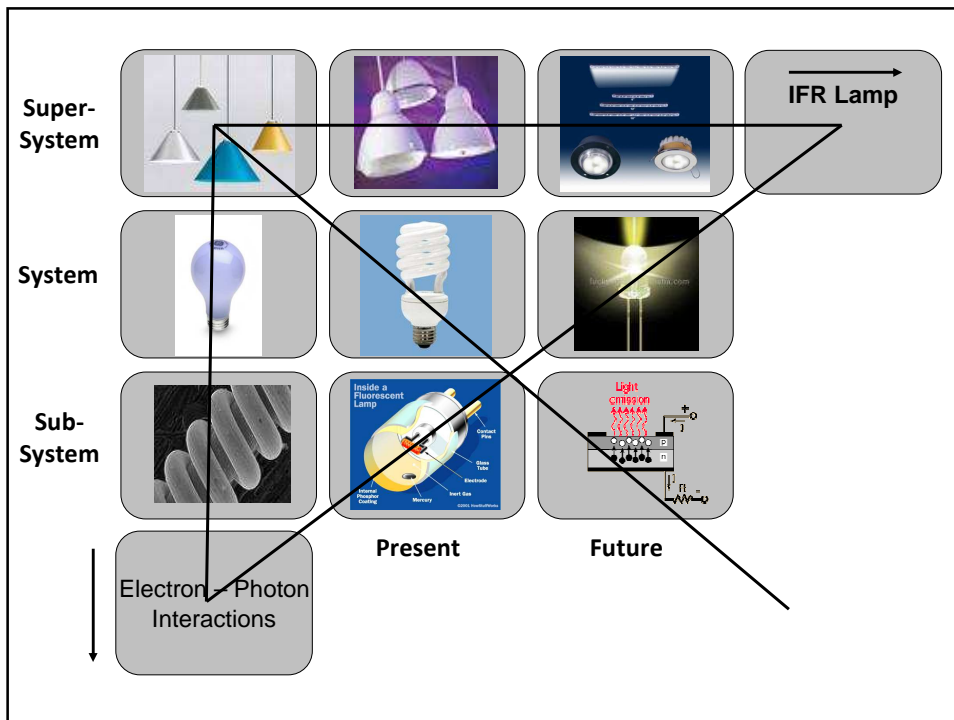
Solving the Nine Dots Puzzle



Think out-of-the-Box

Systematic Approach to Out-of-the-box Ideas





Innovation by standing on the shoulders of Giants

TRIZ

None of us is as good as all of us

Someone somewhere has already solved a problem similar to yours

TRIZ (pronounced “trees”)

Russian: Теория решения изобретательских задач
(Teoriya Resheniya Izobretatelskikh Zadatch)

“The theory of solving inventor's problems“

- a systematic problem-solving methodology based on collective inventive knowledge
- Altshuller et al (1948 – 1998) studied patented inventions and identified recurrent principles and patterns characterizing inventive thinking

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BusinessWeek
MAY 31, 2006
INNOVATION
By Reena Jana

The World According to TRIZ
Blue-chip American companies are embracing a 60-year-old innovation theory pioneered by a Russian inventor

Honeywell **Raytheon**

BOEING **hp** **IBM**

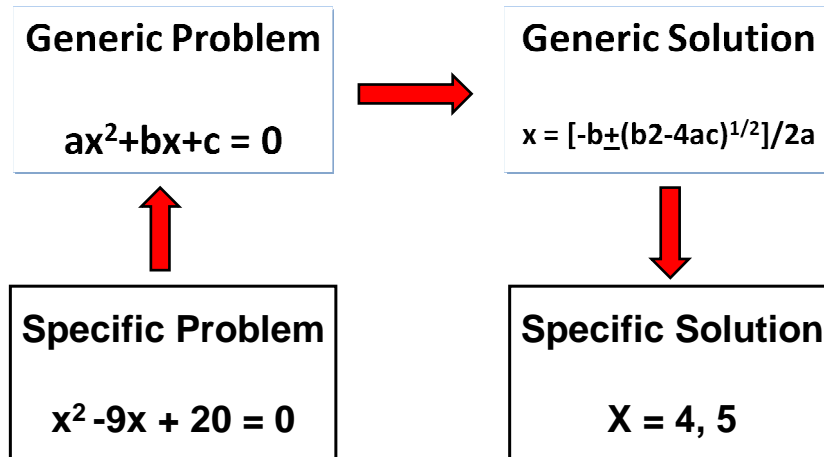
xerox **intel** **MOTOROLA**

My TRIZ experience:

GE imagination at work **TATA** Leadership with trust **DOW**

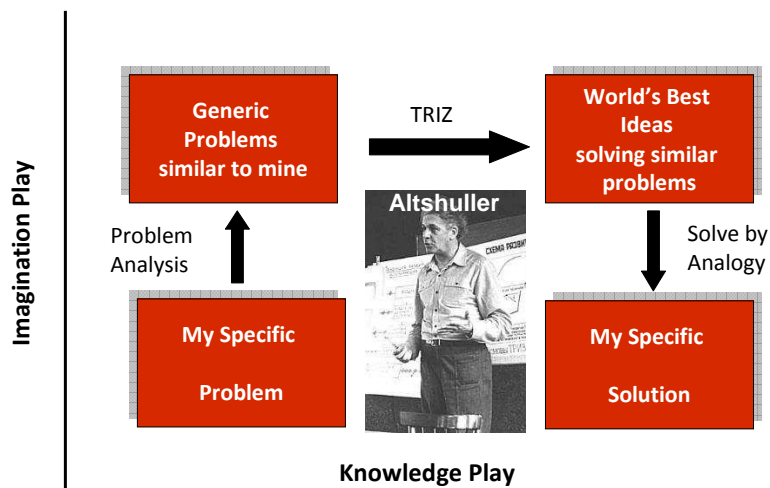
Problem Solving

Specific Vs Generic



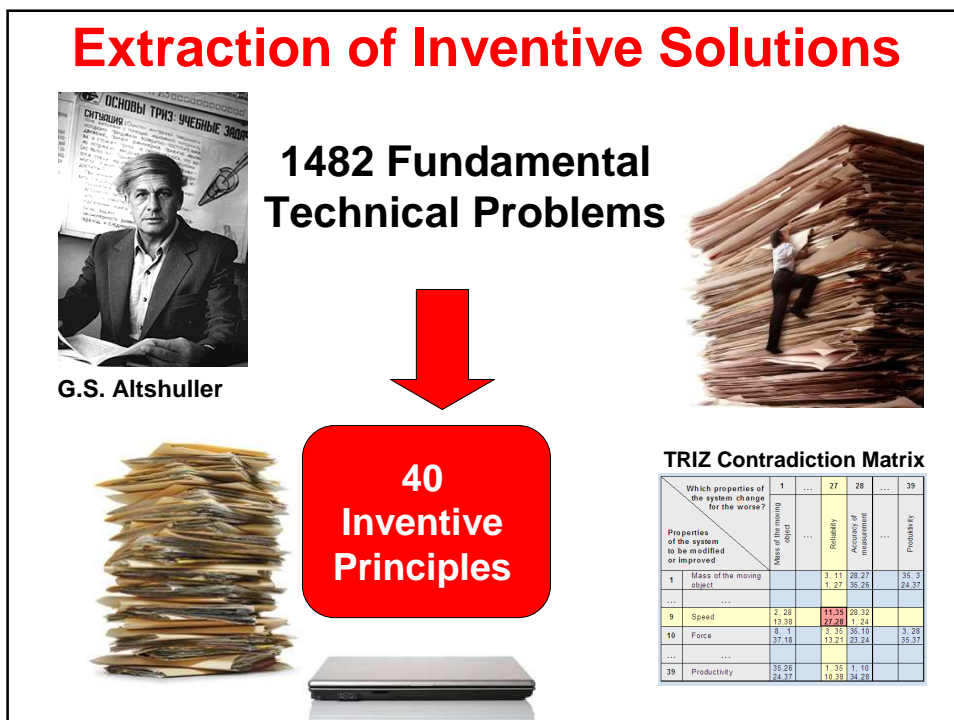
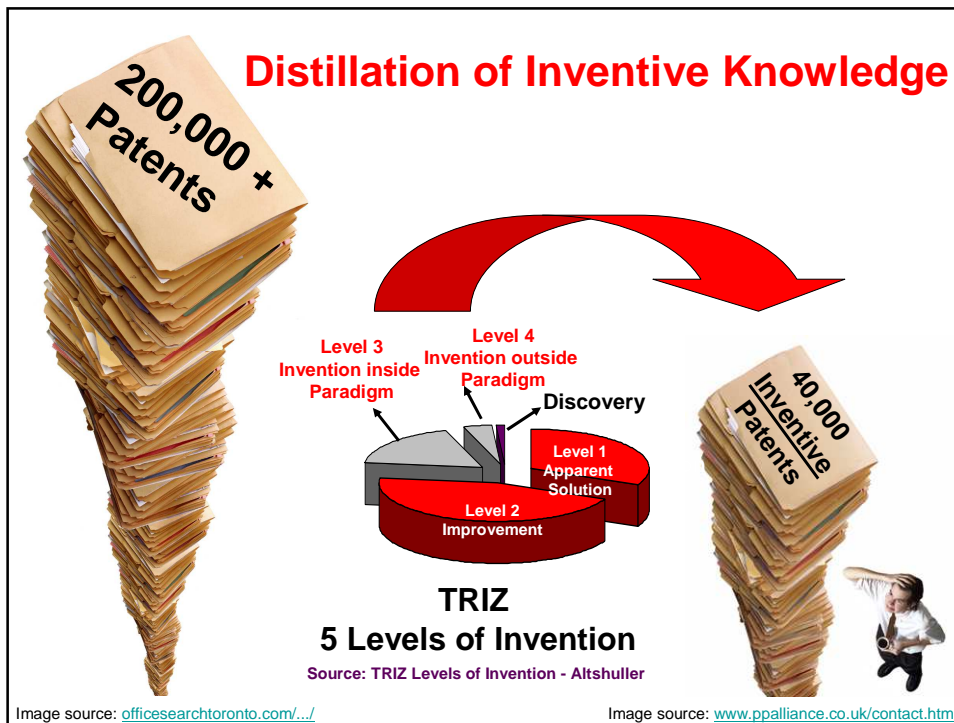
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TRIZ Approach



Teoriya Resheniya Izobreatatelskikh Zadatch

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TRIZ SUCCESS CASES

New Refueling system
Extra sales
1.5 Bn \$

130 MM \$ sales
1st Yr
45% market share

New DVD pick-up
> 1 Bn \$

Boeing 767 refueling system by Boeing

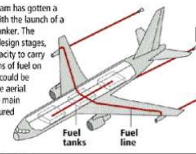
TRIZ helped to develop a new refueling system for Boeing 767 aircraft, which resulted in extra sales of 1.5 billion US dollars.

"A TRIZ workshop solution was developed for the 767 Tanker (air-to-air refueling) aircraft project. As a result of that TRIZ solution, the program was successfully launched with a customer who preferred the TRIZ solution over the competitions solution for the same system, thereby ordering aircraft from Boeing."

Don Masingale
Advanced Research Engineering Program Manager,
Boeing, USA

BOEING'S PROPOSED 767 TANKER

Boeing's 767 program has gotten a significant boost with the launch of a new air refueling tanker. The tanker, still in the design stages, could have the capacity to carry up to 32,000 gallons of fuel on its lower deck and could be equipped with three aerial refueling pods. The main deck will be configured to transport both passengers and cargo.



Source: The Boeing Co. P4

Crest Whitestrips by Procter & Gamble

"TRIZ was used to develop Crest Whitestrips™ for Procter & Gamble (P&G). From a TRIZ perspective, the key problem was that tooth whitener should be on the teeth to bleach, and it should not be on the teeth to avoid contact with saliva. A TRIZ concept, a thin flexible film saturated with whitener that selectively adhered to teeth, proved to be the answer. Whitestrips was P&G's most successful product launch ever, generating \$130 million dollars of sales in the first year of operation while capturing over 45% of the whitening market."

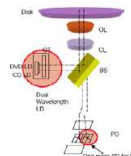


Larry R. Smith
President, Altshuler Institute for TRIZ Studies, Inc, USA

Decreasing costs of DVD pick-up system by Samsung

A new DVD pick-up system was developed by Samsung which saves 100 million Euro annually.

"During last 3 years, our TRIZ team did successful consulting activities. The economic benefit after applying TRIZ ideas is impossible to count (more than 1 billion US\$)"



Hyo June Kim
Samsung Advanced Institute of Technology, Korea

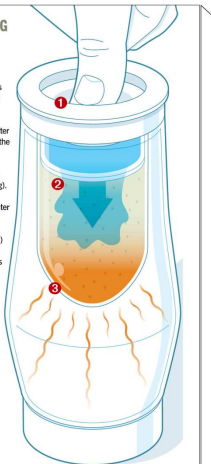
<http://www.xtriz.com/publications/TRIZSuccessCases.pdf>

25 BREAKOUT COMPANIES

Packaging

HOW IT WORKS

Custom-built molding machines join an inner cone holding calcium oxide (quicklime) with a six-layer outer vessel containing the beverage (coffee, right now, cocoa, soups, and mac & cheese are coming). Push a plastic button (1) and water (shown in blue) is released into the quicklime (orange) (2), starting a reaction that heats the contents to 145 degrees in six to eight minutes (3).



ONTECH, San Diego, ontech.com

In an on-demand world, why not have on-demand hot coffee at your desk? That's the promise of OnTech, whose self-heating, shelf-stable lattes—sold under the Wolfgang Puck brand at Kroger, RF's Wholesale Club, and Kmart—have finally made it to retail shelves after nearly a decade of R&D. (A four-pack at Kroger costs \$8.99.) CEO Jonathan Weisz partnered with Puck, packaging giant Sevens, and Lakeside Foods to launch the insta-hot era. A Kroger rep says, "There's nothing like it" in stores today. OnTech's market may just be heating up. — Matthew Boyle

25 BREAKOUT COMPANIES

Our 13th annual playlist of upstarts changing the game.

As seen in Fortune Magazine...

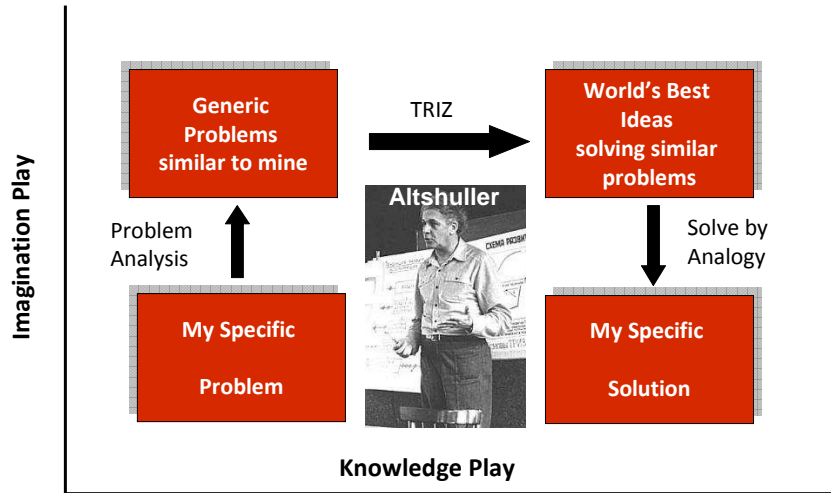
OnTech was listed as one of Fortune Magazine's Top 25 "Breakout Companies" for 2005, in its May, 2005 issue.

The product highlighted was OnTech's self-heating, shelf stable containers, now displayed nationwide on grocery store shelves through a partnership with Wolfgang Puck.

OnTech used TRIZ, Quality Function Deployment (QFD) as well as Six Sigma to design the product, solve problems along the way and bring it to market.

Dr. Michael Slocum, co-author of *Insourcing Innovation*, was the chief scientist behind more than 400 innovation problems that were solved to commercialize the beverage container.

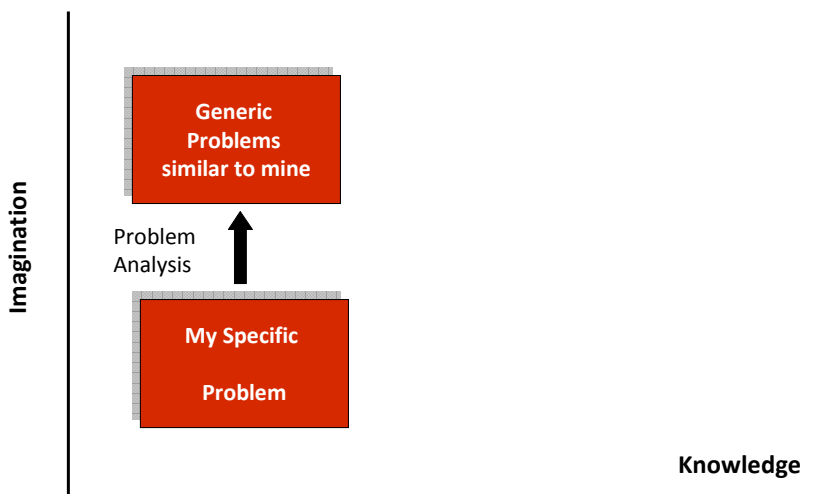
TRIZ Approach



Teoriya Resheniya Izobreatatelskikh Zadatch

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Imaginatively Generalizing the Problem



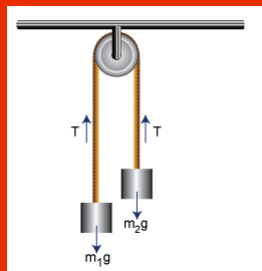
Idea in brief
82

TRIZ Engineering Parameters

- | | | |
|-------------------------------|--------------------------------------|--------------------------------------|
| 1. Weight of moving object | 15. Durability of moving object | 29. Accuracy of manufacturing |
| 2. Weight of nonmoving object | 16. Durability of nonmoving object | 30. Harmful factors acting on object |
| 3. Length of moving object | 17. Temperature | 31. Harmful side effects |
| 4. Length of nonmoving object | 18. Brightness | 32. Manufacturability |
| 5. Area of moving object | 19. Energy spent by moving object | 33. Convenience of use |
| 6. Area of nonmoving object | 20. Energy spent by nonmoving object | 34. Repairability |
| 7. Volume of moving object | 21. Power | 35. Adaptability |
| 8. Volume of nonmoving object | 22. Waste of energy | 36. Complexity of device |
| 9. Speed | 23. Waste of substance | 37. Complexity of control |
| 10. Force | 24. Loss of information | 38. Level of automation |
| 11. Tension, pressure, stress | 25. Waste of time | 39. Productivity |
| 12. Shape | 26. Amount of substance | |
| 13. Stability of object | 27. Reliability | |
| 14. Strength | 28. Accuracy of measurement | |

TRIZ

Contradiction



To solve an Inventive Problem,

Inventor needs to find & remove Contradictions.

The TRIZ technical contradiction is that when Parameter A is improved, Parameter B worsens.

Fundamental Technical Problems

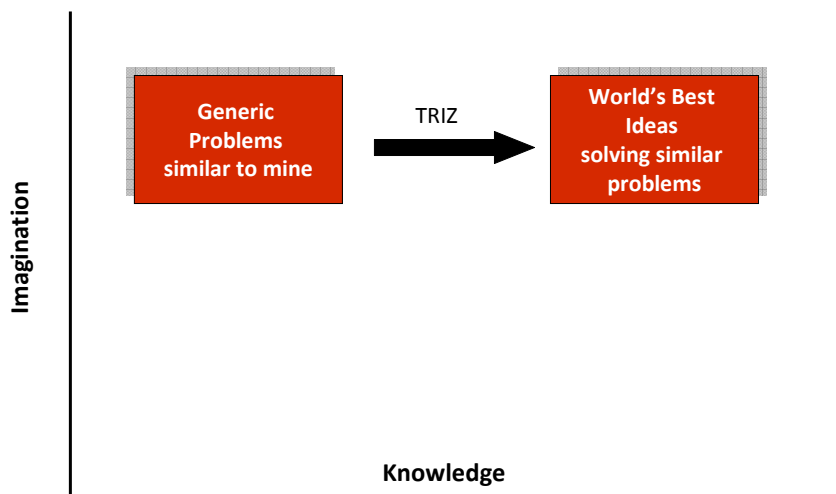
1482

(39 X 38)

Identify which Parameter is improving and which parameter is worsening as a result?

Which properties of the system change for the worse?		1	...	27	28	...	39
		Mass of the moving object	...	Reliability	Accuracy of measurement	...	Productivity
Properties of the system to be modified or improved	1						
		...					
	9						
	10						
	...						
	39						

Distilled Knowledge on Inventive Ideas

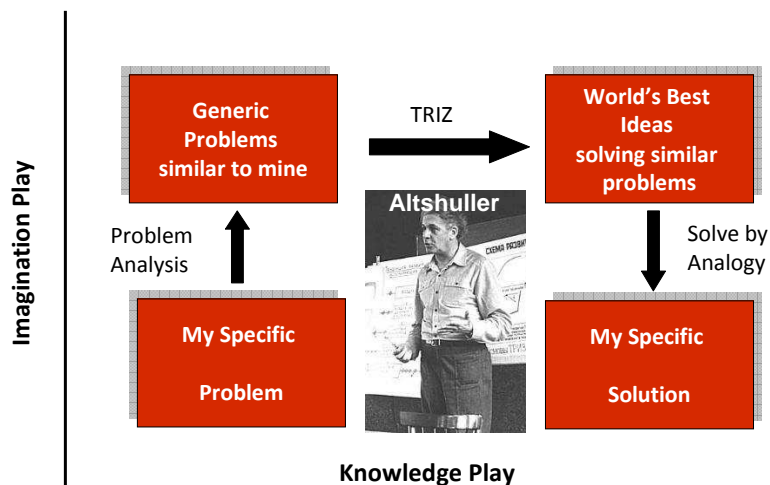


Idea in brief
86

TRIZ Inventive Principles

- | | | |
|-------------------------------|----------------------------------|------------------------------------|
| 1. Segmentation | 15. Dynamics | 29. Pneumatics and hydraulics |
| 2. Taking out | 16. Partial or excessive actions | 30. Flexible shells and thin films |
| 3. Local quality | 17. Another dimension | 31. Porous materials |
| 4. Asymmetry | 18. Mechanical vibration | 32. Color changes |
| 5. Merging | 19. Periodic action | 33. Homogeneity . |
| 6. Universality | 20. Continuity of useful action | 34. Discarding and recovering |
| 7. "Nested doll" | 21. Skipping | 35. Parameter changes |
| 8. Anti-weight | 22. "Turn Lemons into Lemonade" | 36. Phase transitions |
| 9. Preliminary anti-action | 23. Feedback | 37. Thermal expansion |
| 10. Preliminary action | 24. 'Intermediary' | 38. Strong oxidants |
| 11. Beforehand cushioning | 25. Self-service | 39. Inert atmosphere |
| 12. Equipotentiality | 26. Copying | 40. Composite materials |
| 13. 'The other way round' | 27. Cheap short-living objects | |
| 14. Spheroidality - Curvature | 28. Mechanics substitution | |

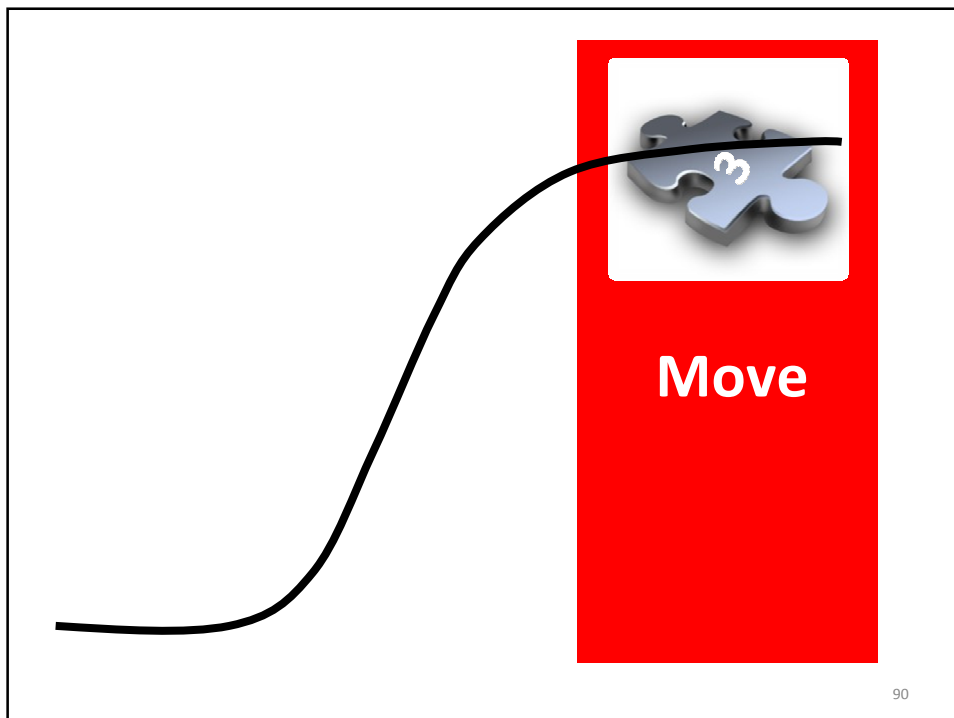
TRIZ Approach



Teoriya Resheniya Izobreatatelskikh Zadatch

Innovation Workout # 5

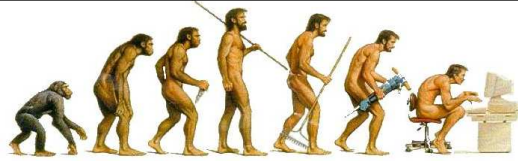
Ideation using TRIZ Triggers



Move



Study
Technology
Evolution



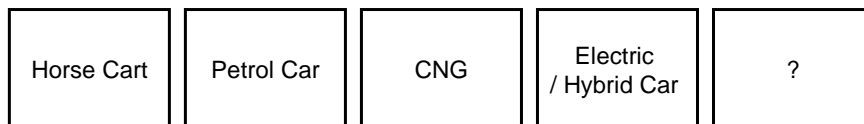
91

Cooking Stoves :

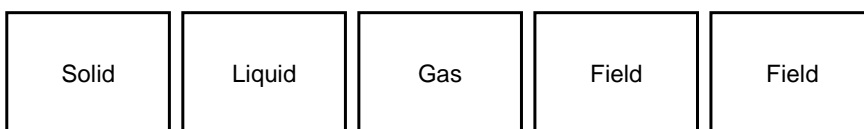


Time →

Transportation :

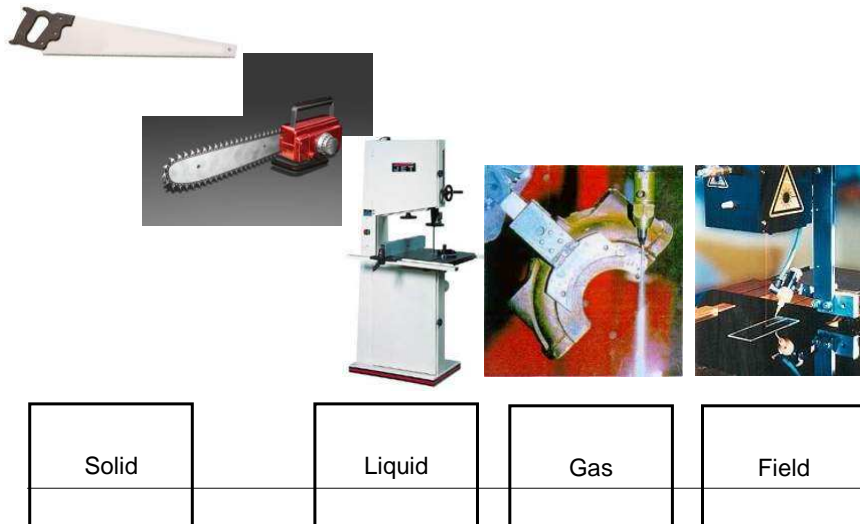


Trend :



Time →

Cutting Technology



93

Laws governing Trends of Evolution

Static Laws:

1. **Completeness** of parts of the engineering system. Every technical system consists of engine, transmission, limbs and controls. Evolution will take place to all these parts.
2. **Energy Conductivity** of the system- The better the transfer of energy inside the system, the better the system.
3. **Harmony** of the parts of the system- Better harmony in timing, frequency etc. improves performance of the system.

Dynamic Laws:

4. Transition from **Microlevel to Macrolevel** which improves miniaturization.
5. **Dynamization** - that moves the evolution from a rigid structure to a flexible one.

Kinematic Laws

6. Moving towards **increasing ideality**. Every stage of evolution will move closer to the ideal system.
7. Moving from complicated system to **simplified system**.
8. Elimination of redundant stages and **Transition towards the super-system**

Source: <http://www.trizsite.com/triztools/evolutiontrends.asp>

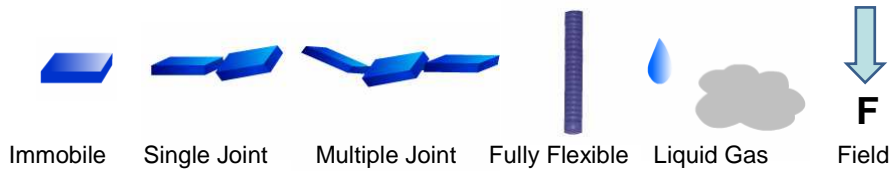
Move



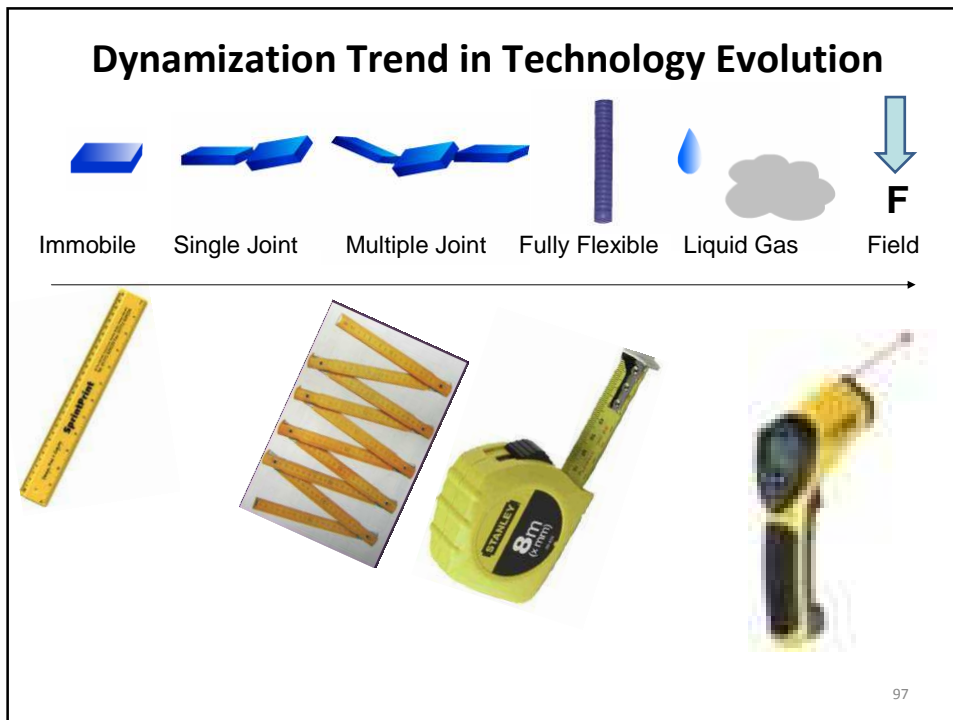
Predict the
Trend

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Dynamization Trend in Technology Evolution



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Trends in Technology Evolution

- **Transition from single to double to multiple**

Monolithic items are split into multiple components for efficiency and convenience. Single purpose products are made multi-purpose products. For example, pen with single color ink to pen with different color ink.
- **The transition from rigid to flexible to wave technologies.**

According to this trend the products are moving from rigidity to flexibility. The future stages of the product will be more and more flexible. For example, fixed gates to collapsible gates, fixed tables to openable and adjustable tables etc.
- **The transition from mechanical to thermal to electronic energy application.**

Machines are becoming more automated. Human operated machines are converted to petrol operated to battery operated machines. Many are converted to solar and atomic energy operated. For example, bicycle to motor-cycle, mechanical watch to battery operated watch, electric lights to solar lights, steam engine trains to diesel engine to electric engine etc.

Trends in Technology Evolution

- **Transition from large to small**

Products are moving from large size to small size. For example, Old generation computers were large, which were replaced by small personal computers. Current age laptops and palmtops are still smaller. This shows a trend towards future computers of even smaller size. Another example, Large clocks to small wrist watches to macro clocks.

- **Straight lines to curves**

Flat surfaces are made curved surfaces for convenience of use. For example, rectangular tv-remotes are made curved to fit better with the shape of human palms. Flat rests are made curved rests to give better support to the back.

- **Manual to automatic, or moving towards decreasing human involvement**

Products move towards reduced human involvements. As human time is precious products intend to work automatically without being operated by human beings. For example, thermostats in car engine fans, tv-timer to switch of tv automatically after some time.

- **Transition towards controllability**

Products become more and more controllable. Better products have higher controllability. For example, electronic equipments, space shuttles.

Technology Evolution Potential

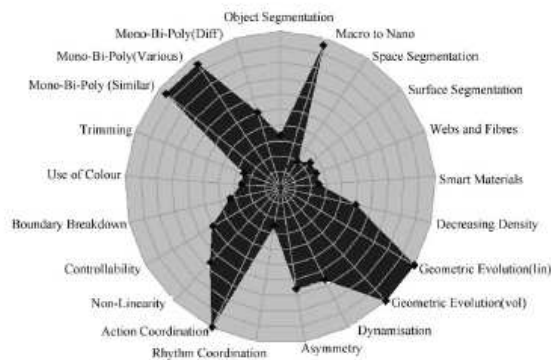
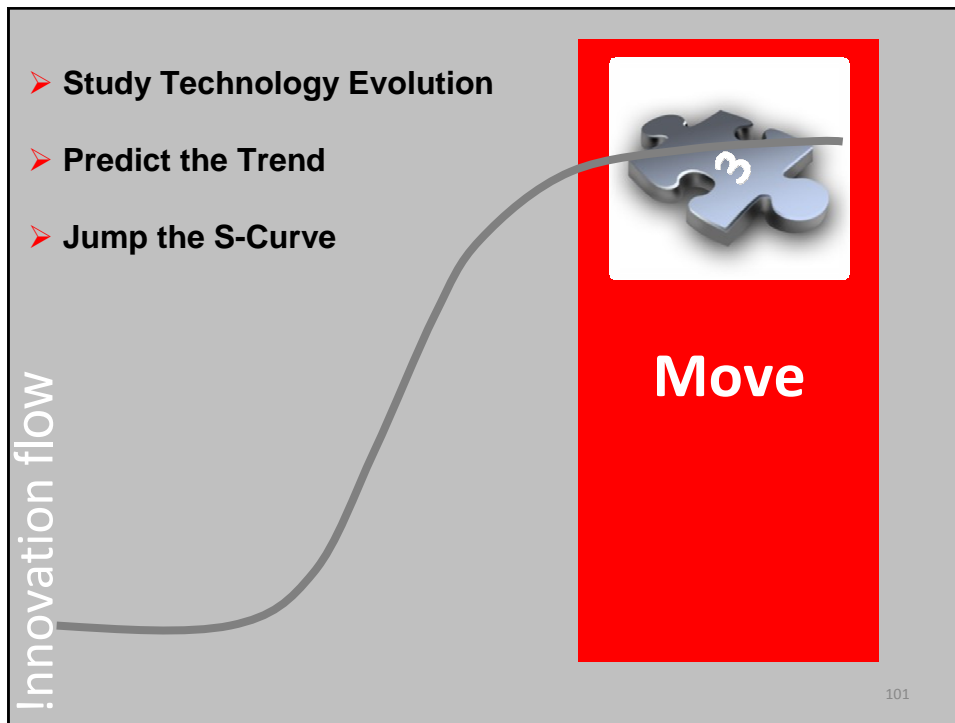


Fig. 11. Evolutionary potential radar plot for US 4,174,358.

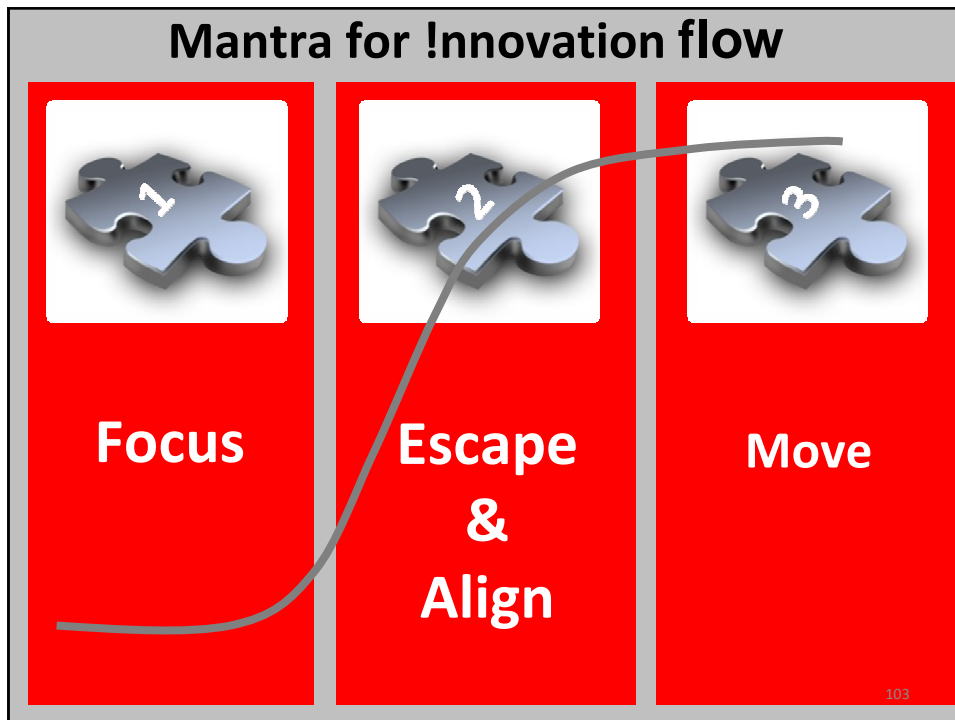
Better technology forecasting using systematic innovation methods

Darrell L. Mann*

Technological Forecasting & Social Change
70 (2003) 779–795



- ## Innovation flow
- ***Focus on the Innovation Opportunity***
 - *balance depth Vs breadth*
 - ***Escape from Psychological Inertia***
 - *stretch the Paradigms*
 - ***Align the creative solutions to critical problems***
 - *resolve all contradictions*
 - ***Move constantly towards Ideality***
 - *transcend to next-gen technologies*



Innovation flow

Don't aim at Innovation –
the more you aim at it
the more you are going to miss it.

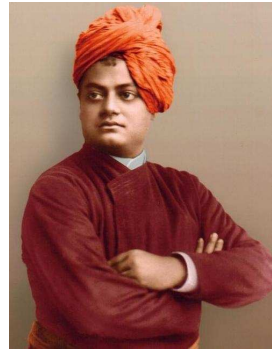
For Innovation cannot be pursued;
it must ensue
...as the unintended effect of
one's personal dedication to
an Idea greater than oneself

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Take up one idea.

Make that one idea your life
- think of it, dream of it, live on that idea.

Swami Vivekananda



TRIZ Resources

- <http://trizindia.ning.com/>
- TRIZ Books
 - Altshuller, Genrich (1973). Innovation Algorithm. Worcester, MA: Technical Innovation Center. ISBN 0-9640740-2-8.
 - Altshuller, Genrich (1984). Creativity as an Exact Science. New York, NY: Gordon & Breach. ISBN 0-677-21230-5.
 - Altshuller, Genrich (1994). And Suddenly the Inventor Appeared. translated by Lev Shulyak. Worcester, MA: Technical Innovation Center. ISBN 0-9640740-1-X.
- TRIZ Journal : <http://www.triz-journal.com/> - excellent articles - archives from 1996 available
- TRIZ Opensource: <http://www.opensourcetriz.com/> - Excellent collection of TRIZ problem solving illustrations & case studies, eBooks - free downloads – Larry Ball et al
- Other TRIZ Resources
 - The Altshuller Institute for TRIZ Studies
 - http://www.aitriz.org/index.php?option=com_frontpage&Itemid=1
- TRIZ site - <http://www.trizsite.com/startup/default.asp?menuno=999001TM>
- TRIZ-learning platform <http://triz.it/eng/> - good collection of examples of the 40 Inventive principles
- TRIZ Overview articles: <http://en.wikipedia.org/wiki/TRIZ> , <http://www.mazur.net/triz/>

Suggested Reading

- Managing Creativity & Innovation – Harvard Business Essentials, Harvard Business School Press
- Innovation & Entrepreneurship – Peter F. Drucker, A Harper Business Book
- The New Business Road Test – John W. Mullins, Pearson Power
- Payback – Reaping the Rewards of Innovation – James P. Andrew and Harold L. Sirkin, Harvard Business School Press
- The Innovator's Solution – Clayton M. Christensen & Michael E. Raynor, Harvard Business School Press
- Ten Rules for Strategic Innovators – Vijay Govindarajan & Chris Trimble, Harvard Business School Press
- Managing Technology and Innovation for Competitive Advantage, V.K. Narayanan, Pearson Education
- Innovation Management, Shlomo Maital and D.V.R. Seshadri, Response Books
- Lateral Thinking, Edward De Bono, Penguin Books
- Hands on Systematic Innovation, Darrell Mann, IFR Press
- Innovation on Demand, Victor Fey & Eugene Rivin, Cambridge University Press
- Managing Innovation, Joe Tidd, John Bessant and Keith Pavitt, Wiley India Edition.
- Open Business Models, Henry Chesbrough, Harvard Business School Press
- The Myths of Innovation, Scott Berkun, O'Reilly.
- Return on Ideas, David Nichols, Wiley India Pvt Ltd.
- The Ten Faces of Innovation, Tom Kelley, Profile Books.
- Innovation Tournaments, Christian Terwiesch and Karl T. Ulrich, Harvard Business Press.
- A Whole New Mind, Daniel H. Pink, Marshall Cavendish Business.
- Drive – Dan Pink
- The Riddle, Andrew Razeghi, Times Group Books.
- The Art of the Start, Guy Kawasaki, Portfolio.
- How to get Ideas – Jack Foster
- Borrowing Brilliance – David Kord Murray
- A Whack on the side of the head – Roger von Oech

..let the innovation flow

Dr. Shankar M.V

Shankar.Venugopal07@gmail.com