TRIZ:
The Theory of Inventive Problem Solving -
Systematic Innovation for Technology and Business

David W. Conley

Modules

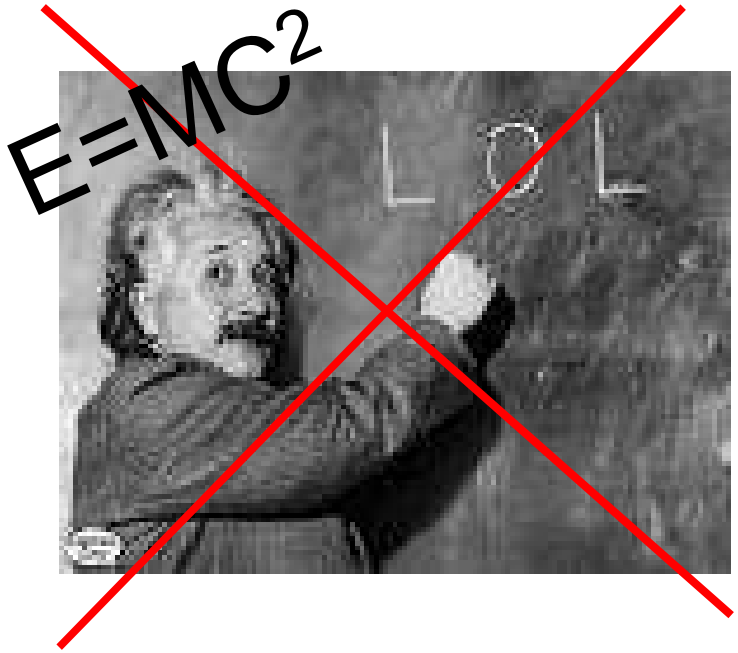
- Module One
  - What is Systematic Innovation?
  - Historical Evolution of Systematic Innovation
- Module Two
  - Fine Line Between Technology and Business Innovation & Problem Solving
- Module Three
  - Systematic Innovation Tools – Part 1
- Module Four
  - Systematic Innovation Tools – Part 2
- Module Five
  - Current Usage in Industry – overview
  - How Can You Use Systematic Innovation?
  - What are Your Next Steps?
  - Successful Organizational Implementation

Module One

- What is Systematic Innovation (SI)?
- Brief History - Evolution of Systematic Innovation (SI)

What is Systematic Innovation (SI)?

- Prevailing thought is that innovation comes from a gifted few or that it simply happens randomly and by luck.
- In fact, innovation can be systematic and predictable.



What is Systematic Innovation (SI)?

- In fact, innovation can now be systematic and purposeful.

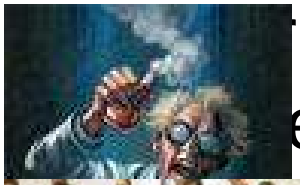
What is Systematic Innovation (SI)?

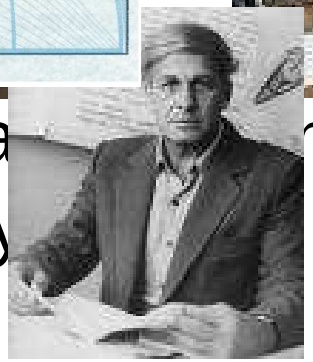
- SI for Technology
  - Built upon on the Theory of Inventive Problem Solving (TRIZ).
  - TRIZ is an international science of creativity.
  - TRIZ analyzes how innovation is used to solve difficult engineering problems.
- SI for Business
  - Utilizes analogous methodologies of some TRIZ tools.
  - Like TRIZ focuses on resolving contradictions but in the business environment.
  - Like TRIZ breaks mental inertia and guides innovative solutions to long standing problems.

What is Systematic Innovation?

Summary:

- Traditional view …on comes from a gifted few.
- …ging re… …inno… …n …ed.
- …Altshul… …ing… …tive sc… …rme…
- There now exists an innova… …nce that is being utilized internationally





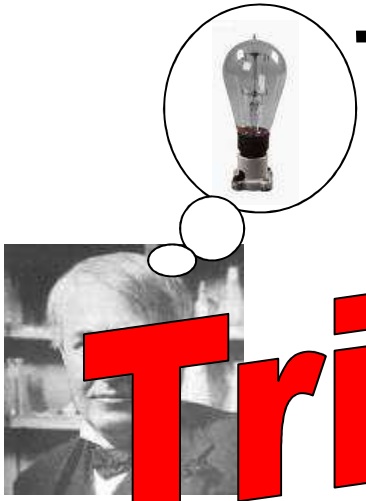
Module One

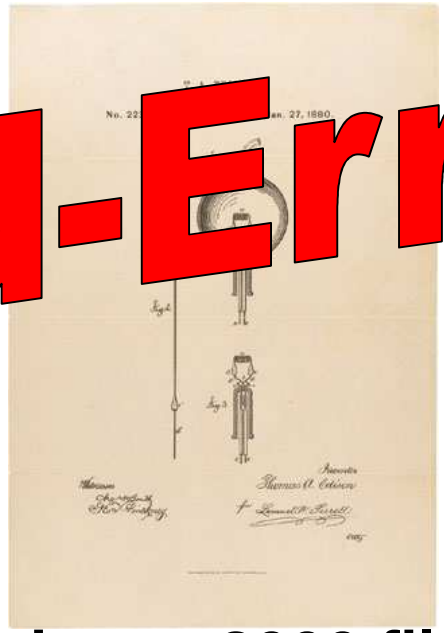
- What is Systematic Innovation (SI)?
- Brief History - Evolution of Systematic Innovation (SI)

Brief History - Evolution of SI

Thomas Edison averaged seven years of effort on each of his inventions before reaching a solution.[1]

7 years





Trial-and-Error

Edison's research team tested over 3000 filaments before he (they) designed a practical light bulb.

1. G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007). Page number

Brief History - Evolution of SI

N[illegible]e:

E[illegible]

While years of effort often accomplishes amazing results the predominant trail-and-error method is very inefficient.

knowing that just a little theoretical knowledge and a few calculations could save him at least 30% of his time." [1]

1. G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007) page 27.

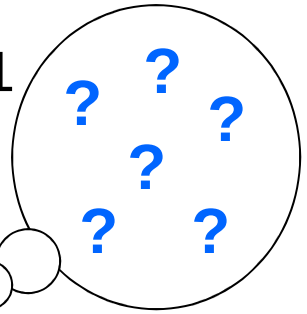
Brief History - Evolution of SI

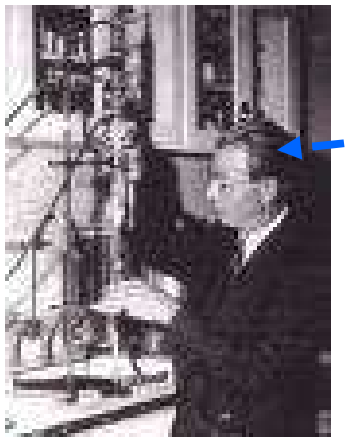
- Heuristics – A science for solving creative problems
  - First appeared in the work of Greek mathematician, Euclid of Alexandria (3rd Century A.D.)
  - Seventeen hu s later most are still uti al-a r method for solving cre ems

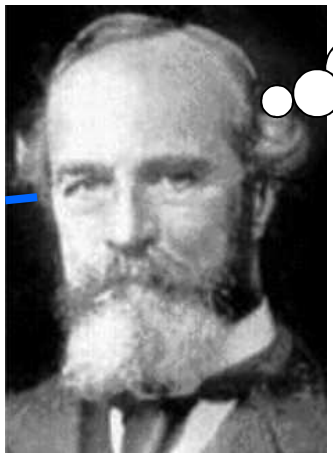
Brief History - Evolution of SI

- 1931 - American psychologist, Joseph Rossman wrote: "…we have practically no knowledge about the psychological process leading up to an invention." [1]

1. G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007) page 39.





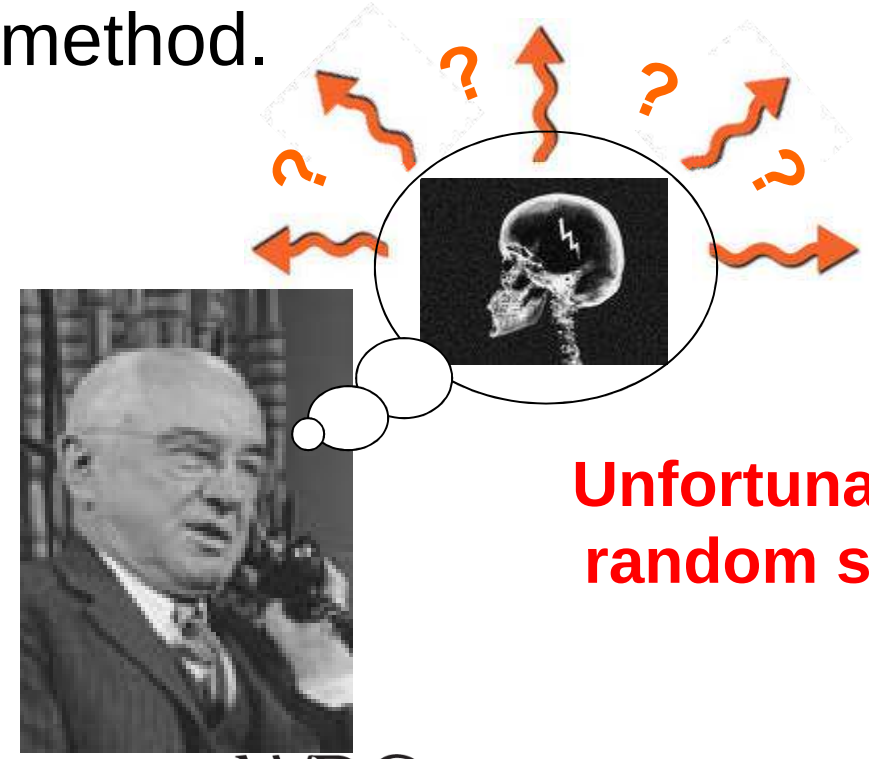


Brief History - Evolution of SI

- 1946 – Genrich Altshuller, who worked in the Patent Inspector's Office of the Soviet Navy, began developing the Theory of Inventive Problem Solving (TRIZ)
  - Inventing is based on understanding and resolving contradictions
  - Every method used to solve contradictions can be summarized into a set of Inventive Principles

Brief History - Evolution of SI

- 1953 - American psychologist Alex Osborn proposed a process called Brainstorming as an attempt to improve upon the trial-and-error method.



Unfortunately, the method makes random solution searching even more chaotic.

G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007).

Brief History - Evolution of SI

- The dawn of modern computing saw software that was based on the methodology of consecutively sorting through variants.
- End of the 1950's - It became clear that consecutive variant sorting could not be used to solve creative problems.

The limitation is with the human brain is what makes the trial-and-error method impractical.

Still an infinite variable combinations made searching feasible.

G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007).

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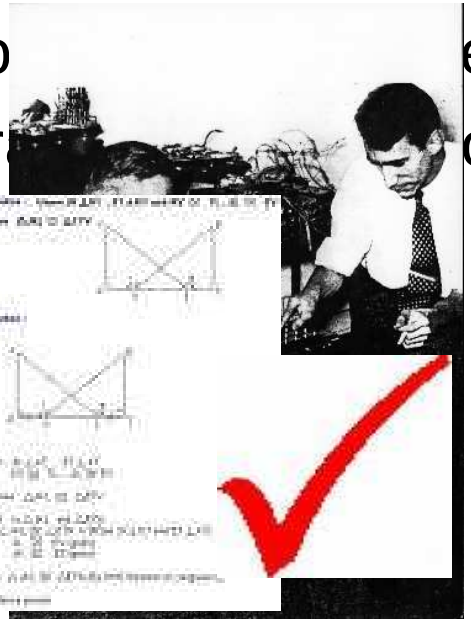
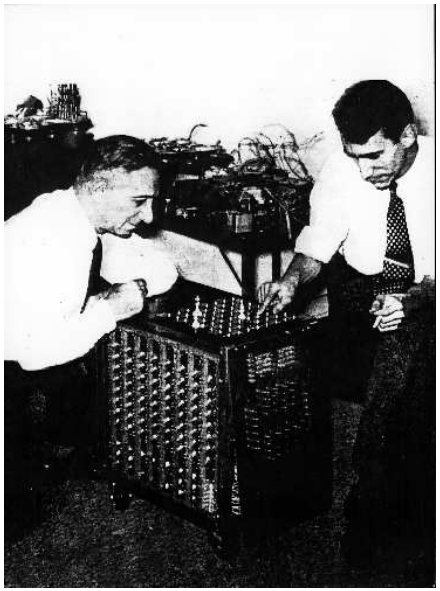
Brief History - Evolution of SI

- The idea of heuristic programming was born – let the computer sort through a small number of variants which have been chosen by certain rules.
- 1957 – American scientists Newell, Show, and Simon develop the heuristic program General Problem Solver.
  - They tried to ess with out success.
  - It was gener or proving mathematical theorems.



Brief History - Evolution of SI

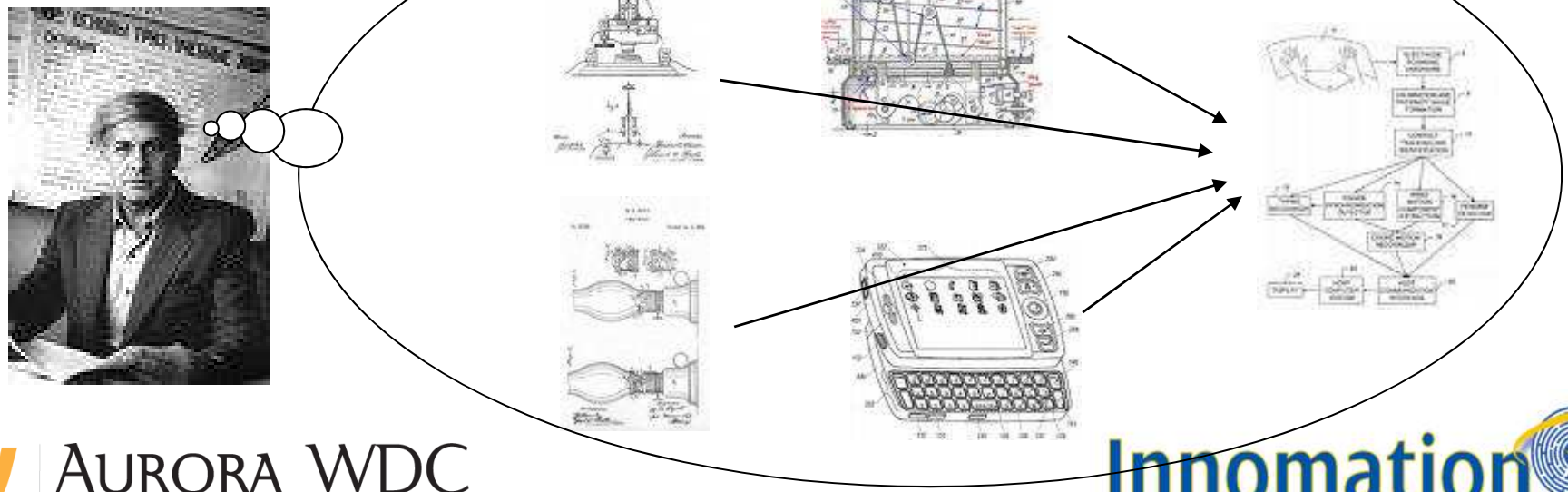
- Newell, Show and Simon then developed a chess playing program but gave up on traditional heuristic search rules.
  - Instead they used a set of objective laws for playing chess.



Brief History - Evolution of SI

- It was now clear that high-level inventive problem solving required a heuristic based on a foundation of objective laws.
- Unknown outside of the Soviet Union at the time, Altshuller had already begun the objective law development necessary for a technical innovation heuristic.

40,000 patents analyzed initially



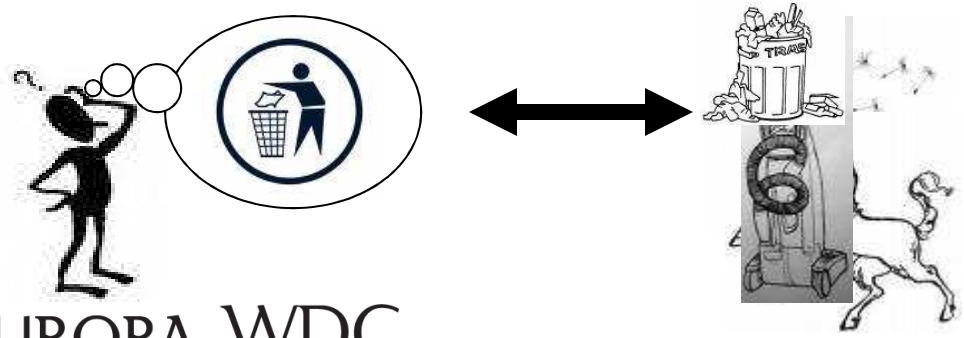
G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007).

Brief History - Evolution of SI

Elsewhere:

- 1960 - American researcher William Gordon developed Synetics
  - In Greek, Synetics means – a combination of different elements
  - Synetics is based on brainstorming organized into groups.
  - Unfamiliar problem to customary analogy to unfamiliar solution using:
    - Direct Analogy – compare subject to familiar system
    - Personal Analogy – also called empathy
    - Symbolic Analogy – generalization and abstraction
    - Imaginary Analogy – imaginary creatures suffice problem

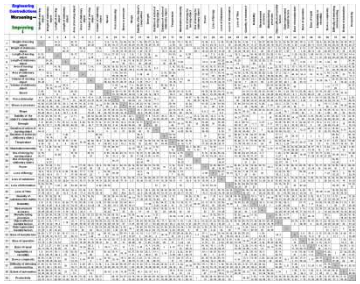
- 1973 - Synetics was the most powerful inventive methodology that existed outside of the Soviet Union

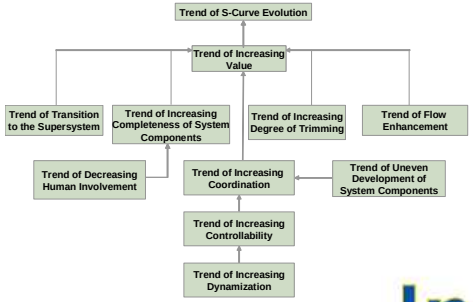


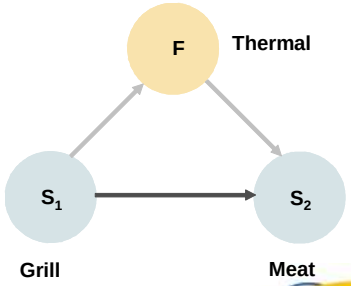
G. Altshuller, *The Innovation Algorithm - Second Edition* (Technical Innovation Center, 2007).

Brief History - Evolution of SI

- 1975 - Altshuller's R&D had resulted in all of the major components of Classical TRIZ being conceptualized or developed.
  - Created & validated through patent analysis:
    - 40 Inventive Principles
    - Engineering Contradiction Matrix
    - Trends of Engineering System Evolution
    - Substance-Fields and Standard Inventive Solutions







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Brief History - Evolution of SI

- Systematic Innovation for Technology –
  - Classical TRIZ tools have been refined.
  - New methodologies have been developed and utilized with Classical TRIZ.
- Systematic Innovation for Business –
  - Some TRIZ tools have been modified for use in business problem solving.
  - Non-TRIZ tools are also utilized.
  - Greatly improves the ability to understand the contradictions restricting business advancement.
  - Helps to remove the metal inertia in solving those contradictions.

Module Two

- Fine Line Between Technology and Business Innovation (I) and Problem Solving (PS)

Fine Line Between Technology and Business I & PS

- B
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  - node
  - – in
  - , too
  - – Etc.
- Te
  - es
  - pro
  - HR,
  - uctio
  - uling
  - seare
  - –

Fine Line Between Technology and Business I & PS

- Technology solutions often require business process changes

solutio inco
y
and B sol

Is this a technical or business solution?

Fine Line Between Technology and Business I & PS

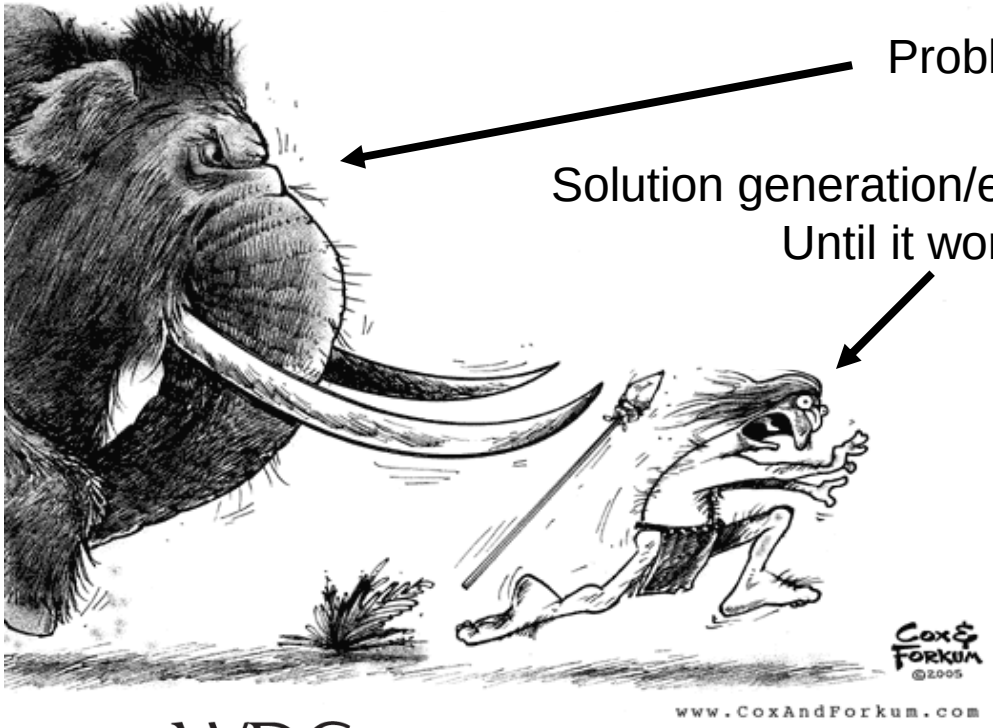
- Both Technology and Business problems are most effectively solved when the underlying problems is well understood before trying to solve it

However, most people jump to a solution before they really understand the problem.

Fine Line Between Technology and Business I & PS

Why do we always want to jump right to solution space?

- Humans have evolved to "understand" problems very quickly – we naturally recognize, not innovate

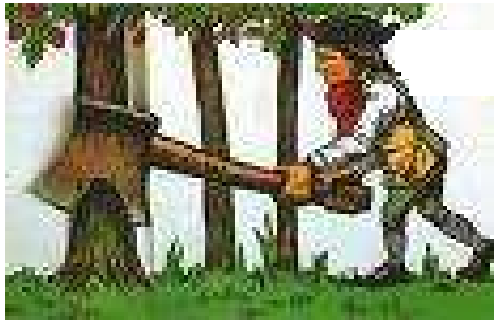


Fine Line Between Technology and Business I & PS

- The most important step (and the most overlooked) in problem solving is fully understanding the problem.

TRIZ was developed to systematically keep us in problem modeling space for longer periods so that solution generation is quick, targeted and effective.

Abraham Lincoln – "If I had 8 hours to cut down a tree I would spend 6 hours sharpening my axe."

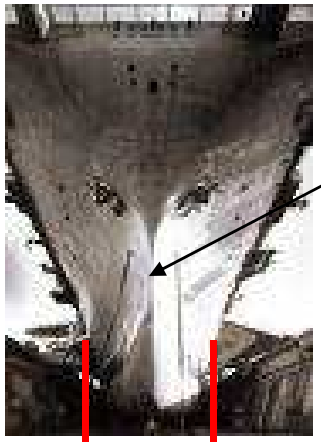


Fine Line Between Technology and Business I & PS

- Both Technology and Business problems are resolved when their underlying contradictions are addressed.

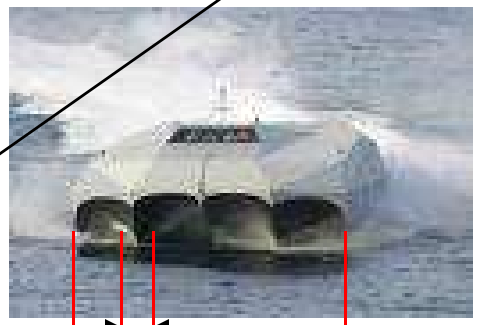
Technological Contradiction – A narrow hulled ship is fast but is also unstable

One solution – narrow and wide hull



good

bad



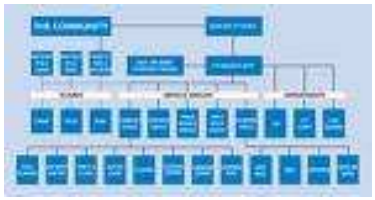
Narrow
(to the water)

Wide
(to the ship)

Fine Line Between Technology and Business I & PS

- Both Technology and Business problems are resolved when their underlying contradictions are addressed

Business Contradiction – A large org. is stable but can not change products quickly



good

bad

One Solution – organize by product line

Nimble (to products)

Stable (to industry)

Fine Line Between Technology and Business I & PS

- Contradictions can be defined on three concentric levels that move the problem from a broad Business to a narrow Technical focus
  - Administrative Contradiction – "our customers want smaller and smaller personal electronics devices (PEDs) but they are hard to manufacture consistently."
  - Technical Contradiction – "if we manufacture very small PEDs then our customers are happy but our manufacturing processes are very difficult"
  - Physical Contradiction – "We want small PEDs for our customers but we want large PEDs to simplify our manufacturing process."

Fine Line Between Technology and Business I & PS

- Many tools and concepts that have been developed for, or used with, Systematic Innovation for Technology (TRIZ based) can also be used for SI for Business

Systematic Innovation Tool Applicability				
Problem Modeling	**Technical Score**	***notes***	**Business Score**	***notes***

Fine Line Between Technology and Business I & PS

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Systematic Innovation Tool Applicability

Problem Modeling	Technical Score	*notes*	Business Score	*notes*
Cause and Effect Chain (CEC)				

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Systematic Innovation Tool Applicability

Problem Modeling	Technical Score	*notes*	Business Score	*notes*
Cause and Effect Chain (CEC)	A	*identifies root causes*		

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Systematic Innovation Tool Applicability				
Problem Modeling	**Technical Score**	***notes***	**Business Score**	***notes***
Cause and Effect Chain (CEC)	A	*identifies root causes*	A	*identifies root causes*

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Systematic Innovation Tool Applicability				
Problem Modeling	**Technical Score**	***notes***	**Business Score**	***notes***
Cause and Effect Chain (CEC)	A	*identifies root causes*	A	*identifies root causes*
Functional Modeling				

Fine Line Between Technology and Business I & PS

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Systematic Innovation Tool Applicability				
Problem Modeling	**Technical Score**	***notes***	**Business Score**	***notes***
Cause and Effect Chain (CEC)	A	*identifies root causes*	A	*identifies root causes*
Functional Modeling	A	*removes mental inertia by focusing on functions rather than components*		

Fine Line Between Technology and Business I & PS

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Systematic Innovation Tool Applicability

Problem Modeling	Technical Score	*notes*	Business Score	*notes*
Cause and Effect Chain (CEC)	A	*identifies root causes*	A	*identifies root causes*
Functional Modeling	A	*removes mental inertia by focusing on functions rather than components*	B	*can get complicated especially when capturing harmful, excessive and insufficient actions*

Fine Line Between Technology and Business I & PS

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Systematic Innovation Tool Applicability

Problem Modeling	Technical Score	*notes*	Business Score	*notes*
Cause and Effect Chain (CEC)	A	*identifies root causes*	A	*identifies root causes*
Functional Modeling	A	*removes mental inertia by focusing on functions rather than components*	B	*can get complicated especially when capturing harmful, excessive and insufficient actions*
Process Function Analysis	A	*chronological series of functional models*	B	*can get complicated capturing all of the process steps*
Perception Mapping	-	*not effective for tech systems problem ID*	B	*points to correct problem to work on*
Perception Mapping + CEC	-	*not effective for tech systems problem ID*	A	*adds Root Cause Analysis*
Su-Field Analysis	A	*Possibly most effective tool set*	B	*analogy - excellent for breaking mental inertia*
Technical Contradiction	B	*easier to solve than Phy Con but less robust solutions*	B	*easier to solve than Phy Con but less robust solutions*
Physical Contradiction	A	*harder to solve than Tech Con but more robust solutions*	A	*harder to solve than Tech Con but more robust solutions*
Patent Analysis	A	*much more effective than simple legal maneuvering*	n/a	*no patents in business systems*
Contradiction Matrix - parameter focus	A	*creates clear understanding of improvement requirements*	B	*parameters are not universally accepted but great at focusing on requirements for effective resolution*

Fine Line Between Technology and Business I & PS

- TRIZ has attributes that set it apart from every other "innovation process," three are:
  - Understanding systems by way of contradiction analysis
  - Classification of innovation into 40 Inventive Principles
  - Trends of Engineering System Evolution.
- The mental inertia often restricting innovative solution for business problems also benefit from:
  - Contradiction Modeling
  - A list of principles by which contradictions can be solved
  - Study of the trends of evolution governing business development.

Module Three

- Systematic Innovation Tools – Part 1
  - Contradiction Analysis
  - Functional Analysis
  - Cause and Effect Chains
  - Trends of Evolution

Systematic Innovation for Technology & Business

- Contradiction Analysis – what in my technology or business system is limiting my ability to improve or grow?

  Technology - "If I install larger pumps then I can move more fluid but I use more energy"

  - "I want larger pumps, I do not want larger pumps"

  Business - "If I have a large sales force then I can reach more customers but I have more expenses"

  - I want a large sales force, I do not want a large sales force

- How can I eliminate the contradictions?

Module Three

- Systematic Innovation Tools – Part 1
  - Contradiction Analysis
  - Functional Analysis
  - Cause and Effect Chains
  - Trends of Evolution

Systematic Innovation for Technology & Business

- Functional Analysis – what are the functions of the various components of my technology or business system?

  Technology - Pump moves fluid

  - Are there other ways to move fluid?
    - Gravity, evaporation, condensation, etc.

  Business - Sales Force communicates with customers

  - Are there other ways to communicate with customers?
    - Web site, brochures, catalogues, word of mouth, press releases, advertising, etc.

Functional Analysis

- Functional Analysis results in system evolution

Components: thermostat, burner, valve *System:* cup heater, solar oven

System: oven

old

System: improved oven

System: oven

functi ts food

Systen e, solar heating bag

Module Three

- Systematic Innovation Tools – Part 1
  - Contradiction Analysis
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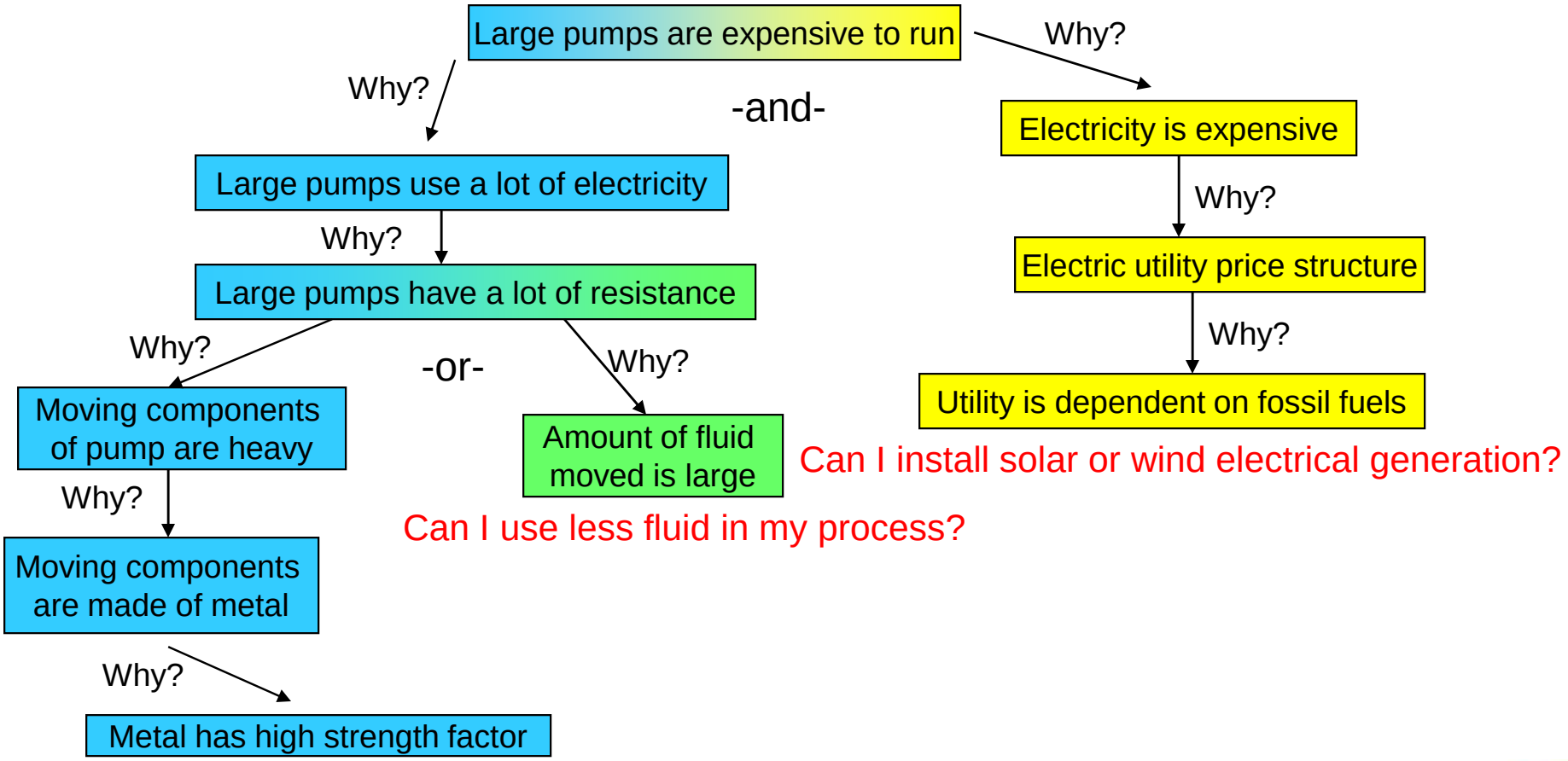
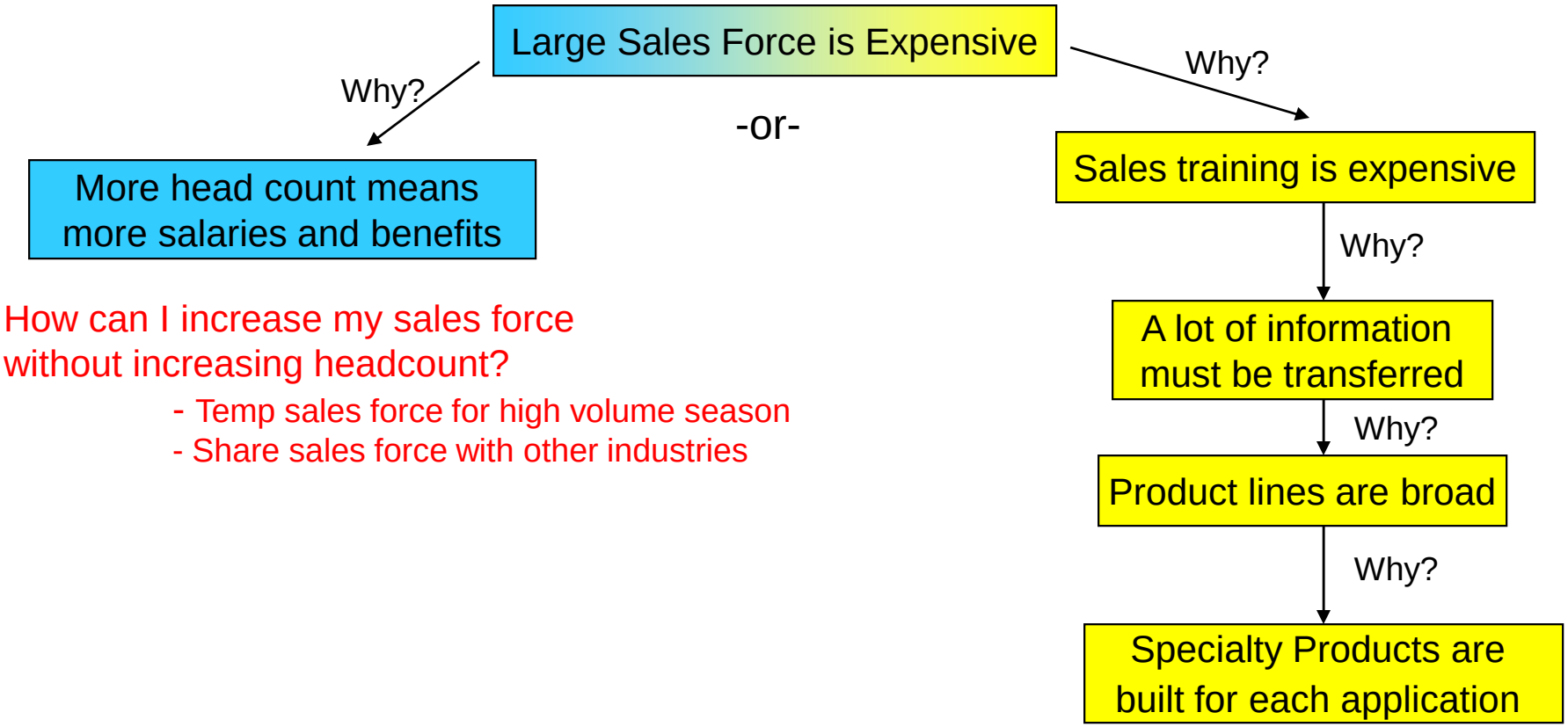
Systematic Innovation for Technology & Business

Cause and Effect Chains – What are the root causes of issues effecting my technology or business systems?



Systematic Innovation for Technology & Business

Cause and Effect Chains – What are the root causes of issues effecting my technology or business systems?



How can I increase my sales force without increasing headcount?

- Temp sales force for high volume season
- Share sales force with other industries

Can I build a narrower product line that still meets the market's requirements?

Module Three

- Systematic Innovation Tools – Part 1
  - Contradiction Analysis
  - Functional Analysis
  - Cause and Effect Chains
  - Trends of Evolution

Systematic Innovation for Technology & Business

B.J.Pine & J.H.Gilomore, *The Experience Economy* (Harvard Business Scholl Press, 1999).

- Trends of Evolution (11 Technology and 25+ Business Trends) – What are the trends of evolution governing my technology or business systems and how can I leverage them for improvement?

Definition: Over time the expectations of the customer increase.

Trend of Customer Expectations

commodity

product

customer service

customer experience

service transformation

Business

Systematic Innovation for Technology & Business

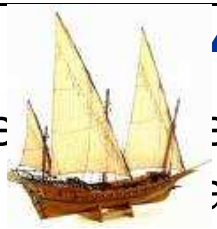
- Trends of Evolution (11 Technology and 25+ Business Trends) – What are the trends of evolution governing my technology or business systems and how can I leverage them for improvement?

Trends of S-Curve Evolution

Trends of S-Curve Evolution

Stage 4

Stage 3



Definition:

As a syste es, the evolution of its effectiveness describes aped curve in time.

Stage 2

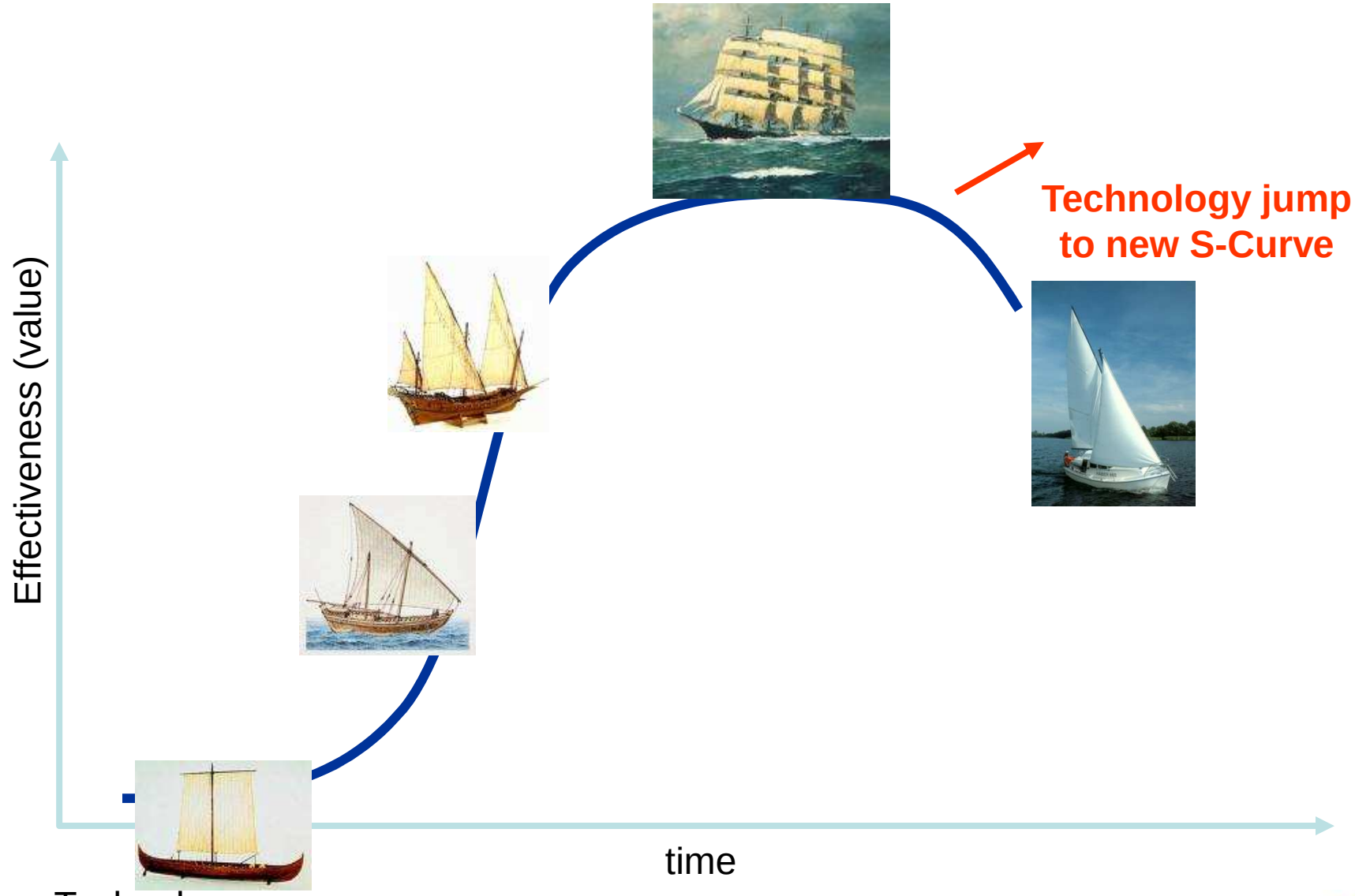
Stage 1

Effectiveness (value)

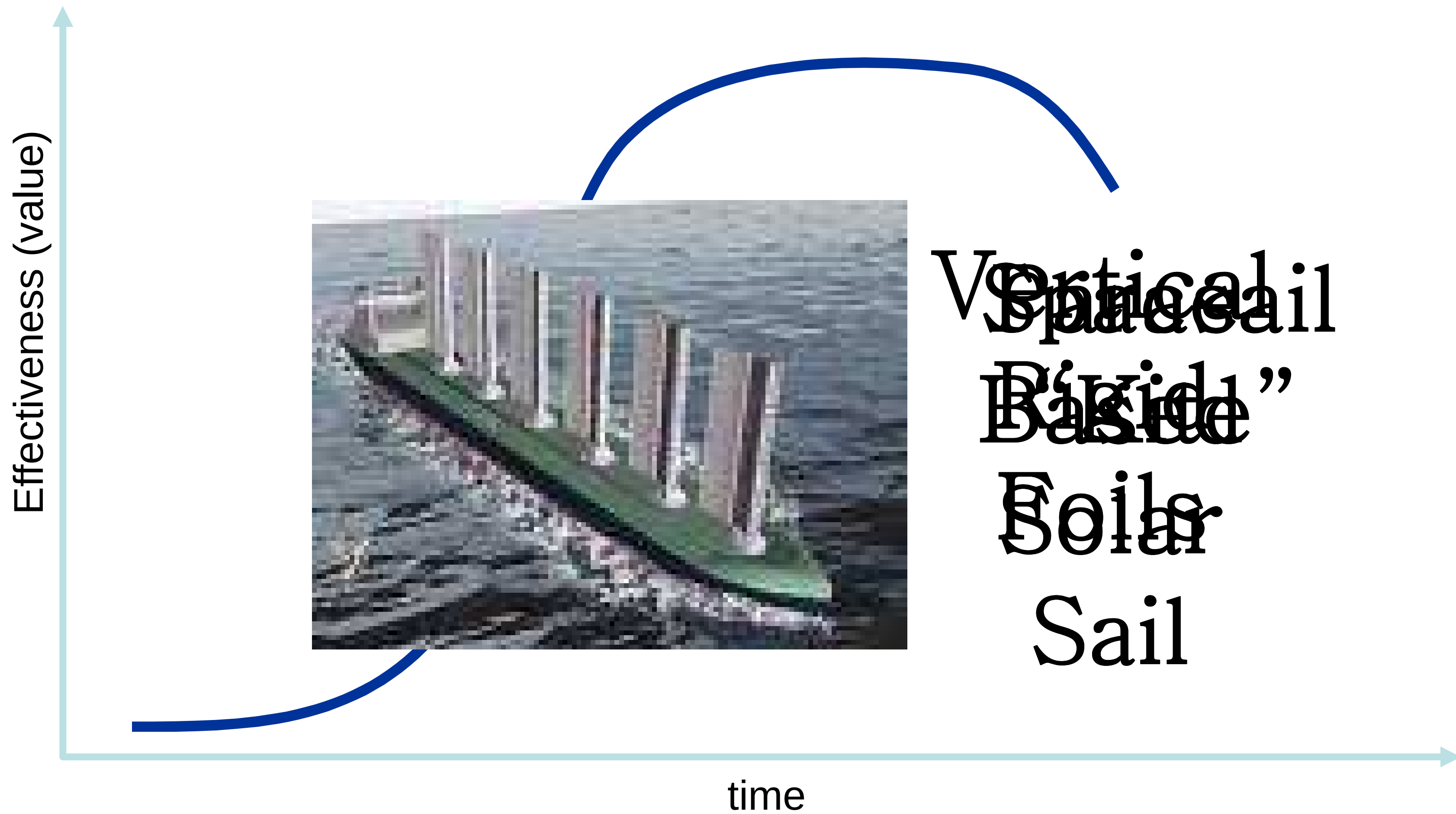
time

Technology

Trends of S-Curve Evolution



Trends of S-Curve Evolution



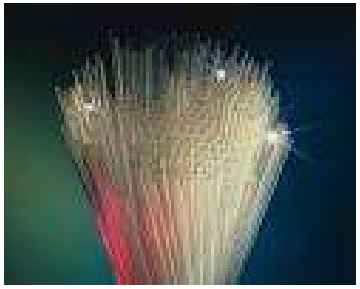
Technology

Module Four

- Systematic Innovation Tools – Part 2
  - Knowledge and Effects
  - Ideal Final Results
  - Resource Analysis
  - System Trimming
  - Patent Analysis

Systematic Innovation for Technology & Business

- Knowledge and Effects – what information from other businesses, industries, or disciplines can I utilize to solve my problems?
  - Fluid Pumping – use capillary process through massive bundle of micro tubes to raise fluid to a higher head pressure



  - Sales Force – Use existing technical support team for sales support and a smaller direct sales force for customer interfacing

Module Four

- Systematic Innovation Tools – Part 2
  - Knowledge and Effects
  - Ideal Final Results
  - Resource Analysis
  - System Trimming
  - Patent Analysis

Systematic Innovation for Technology & Business

- Ideal Final Result (IFR) – What would be the ideal outcome from an improvement program?

  Helps to establish and achieve improvement goals

  – Fluid Pumping IFR – move as much fluid as needed at the time needed with no operational expense

  – Sales Force IFR – provide customers with all the information they desire while not incurring any sales force expenses

Module Four

- Systematic Innovation Tools – Part 2
  - Knowledge and Effects
  - Ideal Final Results
  - Resource Analysis
  - System Trimming
  - Patent Analysis

Systematic Innovation for Technology & Business

- Resource analysis – what local and inexpensive resources are available to solve my problems or apply towards the solution?
  - Fluid Pumping – gravity, plumbing system, facility air handling system, electrical system, sewage pumping system, etc.
  - Sales Force – technical support group, web services, 3rd party contractors, marketing brochures, wikipedia.com, customer training, etc.

Module Four

- Systematic Innovation Tools – Part 2
  - Knowledge and Effects
  - Ideal Final Results
  - Resource Analysis
  - System Trimming
  - Patent Analysis

Systematic Innovation for Technology & Business

- System Trimming – what in my system can be trimmed to reduce failure points & cost and simplify my operations?
  - Fluid Pumping – Trim one motor from two pumps and drive both with the remaining motor.


  - Sales Force – Trim internal sales training and replace with technical product training and 3rd party general sales training.



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Module Four

- Systematic Innovation Tools – Part 2
  - Knowledge and Effects
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  - Patent Analysis

Patent Analysis and Circumvention

Patent Criteria[1]:

a.) Novelty – new, does not exist, must be novel worldwide

b.) Usefulness – can not patent useless stuff

c.) Non-obviousness – the idea must not be obvious to an average specialist in the related discipline

- Patents focus on Components not Functionality
- To invent around, change the components but retain the Functionality

1.) Patent Analysis/Circumvention information is based on material from Dr. Sergei Ikovenko

Patent Analysis and Circumvention

- To make a patent novel, change the Components but retain the Functionality

1.) Patent Analysis/Circumvention information is based on material from Dr. Sergei Ikovenko

Patent Circumvention Example

Trimming

- 2007 TomTom Patent - GPS with built in video camera

Component:	GPS	Windshield w/ plasma tech.		Video GPS
		+		=
Function:	information	live images		information overlay on live image

- To make a patent novel, change the Components but retain the Functionality

1.) Trim a component

2.) Replace the functionality

Module Five

- Current Usage in Industry – overview
- How Can You Use SI?
- What are Your Next Steps?
- Successful Organizational Implementation

Current Usage in Industry - overview

- Systematic Innovation for Technology (TRIZ)
  - Product Development / Improvement / Revolution
  - Engineering Problem Resolution
  - Competitive Analysis and Positioning
  - Wide Spread Usage:
    - Kodak, GE, Airbus, Samsung, Intel, Ford, NASA, many Chinese companies, P&G, Rolls-Royce, Telekom Malaysia, Hilti, ……
- Systematic Innovation for Business
  - Business Model Development
  - Business Process Improvement / Evolution / Revolution
  - Competitive Analysis and Positioning
  - Industry Usage is Growing:
    - Intel, Jet Propulsion Laboratory, Kyocera, DuPont, ING Bank, LG Electronics, Philips, Siemens, Unilever, ……

Module Five

- Current Usage in Industry – overview
- How Can You Use SI?
- What are Your Next Steps?
- Successful Organizational Implementation

How Can You Use SI?

– Stand Alone SI Program and Projects – Execute individual analyses and solution generation based on specific goals of organization:
  - Innovation / Problem Solving
  - Strategic Planning
  - Patent Circumvention
  - Etc.

How Can You Use SI?

SI Orchestration with Other Programs/Tools

- **Theory of Constraints (TOC)** - seeks to identify the constraint and restructure the rest of the organization around it.
  - Drives to **make the best** out of what you've got
  - TRIZ and SI helps you identify your constraints (contradictions) and then transcend them to make them irrelevant
    - You are then operating in an new and innovative space

How Can You Use SI?

SI Orchestration with Other Programs/Tools

- **Disruptive technology** or **disruptive innovation** is an innovation that improves a product or service in ways that the market does not expect.
  - Drives to deliver a function in a new and better way
  - TRIZ and SI help you differentiate your functions from the components that deliver them so that you can innovate in both your technology and business
    - You are now operating in a new and innovative space

How Can You Use SI?

SI Orchestration with Other Programs/Tools

- **Blue Ocean Strategy** is a business strategy that promotes creating new market space or "Blue Ocean" rather than competing in an existing industry.
  - Suggest that you innovate in your technology and business opposed to competing against others
  - TRIZ and SI shows you how to innovate, not just suggests that you innovate
    - You are now operating in a new and innovative space

How Can You Use SI?

SI Orchestration with Other Programs/Tools

- **6 Sigma** seeks to fine tune the contradictions that are limiting your operations.
  - Drives to **make the best** out of what you've got
  - TRIZ and SI helps you identify your constraints (contradictions) and then transcend them to make them irrelevant
    - You are then operating in an new and innovative space

How Can You Use SI?

SI Orchestration with Other Programs/Tools

- **Lean** seeks to improves operations by eliminating waste.
  - Identifies the waste in your operations that if eliminated leaves your systems more efficient.
  - TRIZ and SI shows you how to eliminate the waste that Lean identifies
    - You are now operating in a new and innovative space

Module Five

- Current Usage in Industry – overview
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What Are Your Next Steps?

Paths to Innovation (various ways to explore and utilize Systematic Innovation)

- Entry Level (short term)
  - Informal Training (Self – Study) – see InnomationLLC.com / About Us / Articles, Presentations and Materials / Suggested Readings
- Mid-Level (mid-term)
  - Project Consultation – consultant driven programs or projects in your organization
  - Project Mentoring – consultant mentored programs or projects in your organization
- Top Tier (long-term)
  - Build an internal competency
    - Formal TRIZ and/or SI for Business Training
    - Systematic Innovation Program Development within Your Organization

Module Five

- Current Usage in Industry – overview
- How Can You Use SI?
- What are Your Next Steps?
- Successful Organizational Implementation

Successful Organizational Implementation

- Project Support
  - Hire consultant to address specific technical or organizational problem
  - Develop internal expertise to address technical and organizational issues
- Strategic Planning Support
  - Hire consultant to create specific technical or organizational roadmap
  - Develop internal expertise to develop technical and organizational direction

Successful Organizational Implementation

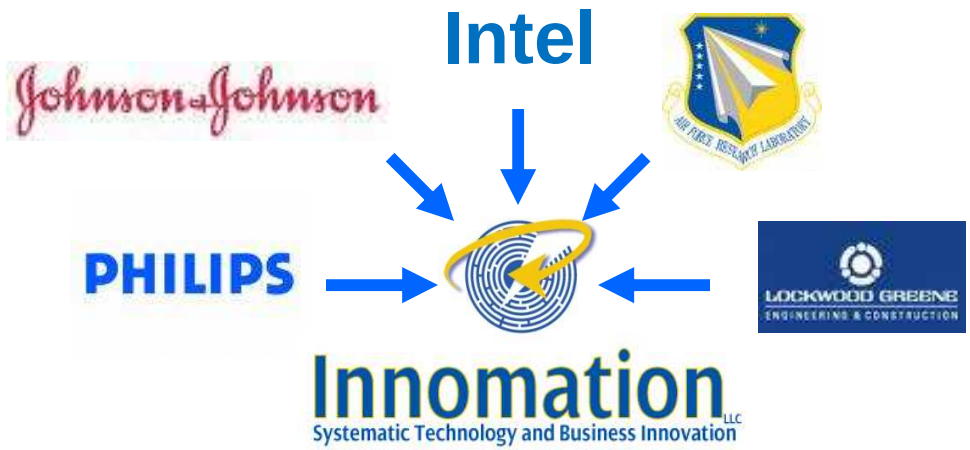
- Developing Internal Expertise
  - Systematic Innovation for Technology (TRIZ based)
    - L1-L3 Training Programs
    - Develop Internal TRIZ Program
      - Users Group
      - Steering Committee
      - Etc.
  - Systematic Innovation for Business (TRIZ based)
    - L1-L2 Training Programs
    - Develop Internal SI for Business Program
      - Users Group
      - Steering Committee
      - Etc.

Innomation, LLC
David Conley - Principal

- Education – BS Nuclear Engineering, MBA Finance, TRIZ L4
- Work Experience
  - USAF Philips Lab – R&D Officer
    - Plasma Physical
    - Space Based Nuclear Propulsion
  - Johnson and Johnson – Process Engineer
  - Phillips – Facilities Engineer
  - Lockwood Greene – Engineering Consulting
  - Intel Corporation – Engineering, Automation, Manufacturing, Finance, Management
  - Innomation LLC – Technical and Business Innovation Consulting
- Go to InnomationLLC.com for more information

Innomation, LLC
David Conley - Principal

Experience and knowledge converge into consultation services



Innomation, LLC
David Conley - Principal

- TRIZ and Systematic Innovation Experience:
  - International TRIZ Association L4 Professional – only L4 at world's largest semi-conductor manufacture out of thousands trained (as of Q2, 2009)
  - Technical Problem Solving
    - Hundreds of Innovative Solutions
      - Semiconductor Industry
      - Automotive Industry
      - Fuel Cell Manufacturer
      - Food Products Manufacturing
    - Multiple Patent Applications
  - Business Problem Solving
    - Hundreds of Innovative Solutions
      - Semiconductor Industry
      - Major Hospital Chain
      - Food Products Manufacturing
      - Automotive Industry

Innomation, LLC
David Conley - Principle

- TRIZ and Systematic Innovation Experience:
  - TRIZ Training
    - Training Program Development
    - Training
    - Post Training Technical Mentorship
  - TRIZ and Systematic Innovation Programming
    - Integration with Lean
    - TRIZ for Business Process Improvement (6 Sigma integration)
    - TRIZ Coordination Team Lead – world's largest semi-conductor manufacturer
  - Organizational
    - Executive Committee – US Based Altshuller Institute for TRIZ Studies
    - TRIZ Con Conference Organization – Altshuller Institute for TRIZ Studies
    - TRIZ Summit Conference Organization – world's largest semi-conductor manufacturer TRIZ Conference
  - Publications
    - See InnomationLLC.com / About Us / Articles, Presentations and Materials

FORBES MAGAZINE DATED MAY 11, 2009

Craig Barrett (Intel Chairman of the Board) –
Retired May 20th, 2009

"The message we have been giving the U.S. government is exactly the discussion I am having with every government--the government needs … to make sure that the U.S. is a great environment to promote **investment in innovation**."