Process Invention

Howard Smith

Author *Business Process Management: The Third Wave*

CTO, Office of Innovation, Computer Sciences Corporation

Co-Founder BPMI.org, Founder SouthbeachInc.com

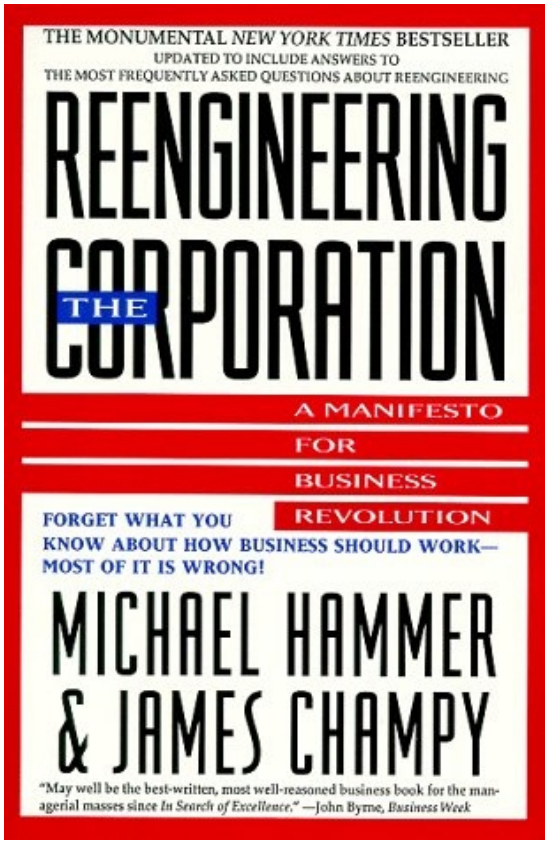
BPM and Innovation, Shared Insights, Boston, Nov 2006

CSC

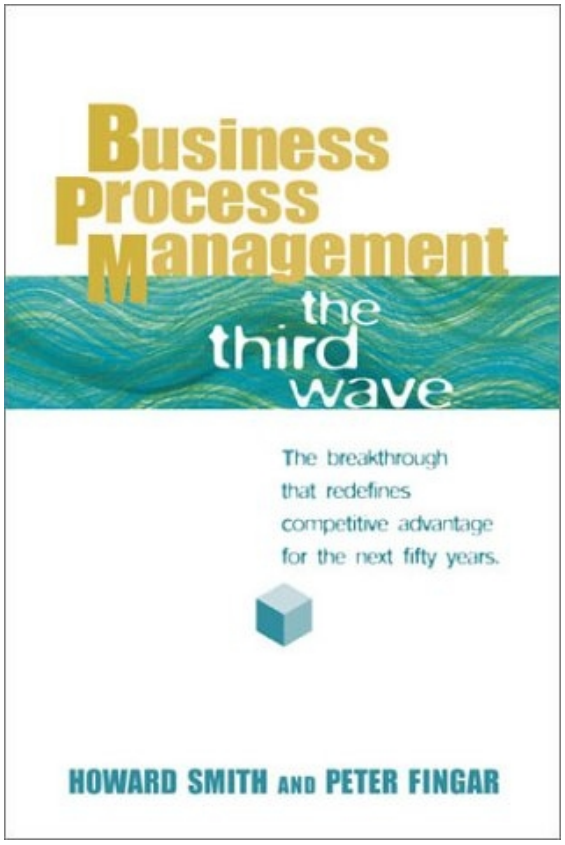
EXPERIENCE. RESULTS.

EXPERIENCE. RESULTS.

A bit of history - process thinking at CSC



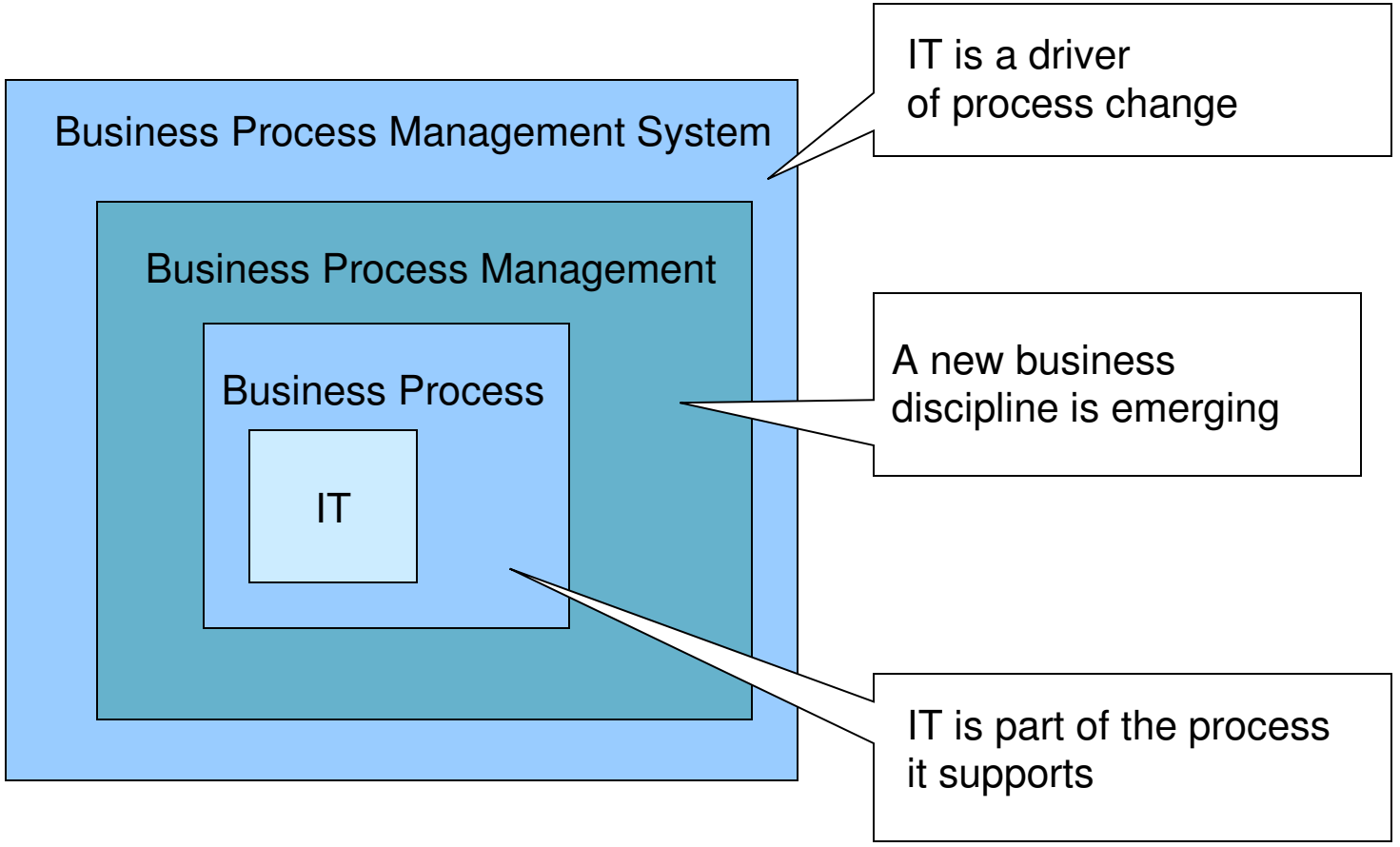
1993



2003

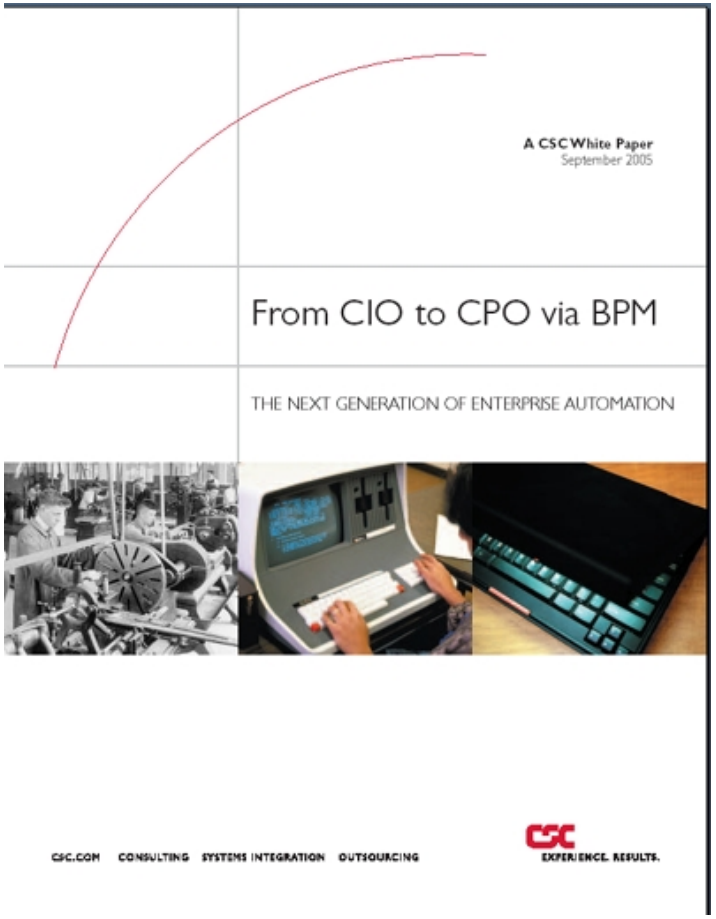
EXPERIENCE. RESULTS.

Business processes include information technology



EXPERIENCE. RESULTS.

It works! Case studies and commentary



From CIO to CPO via BPM:

The Next Generation of Enterprise Automation

http://www.csc.com/features/2005/51.shtml

EXPERIENCE. RESULTS.

The case studies

Level of ambition

Innovation

- New product development
- Service innovations
- Flexibility/agility
- Mass-customization
- Profit retention strategies
- Enabling innovation process
- Coping with complexity
- Coping with growth
- Scaling up operations
- Entry to new markets

Productivity

- Productive knowledge work
- Productive clerical work
- Economies of scale
- Cycle time reduction
- Enabling self-service
- Employee satisfaction
- Tighter coordination
- Tracking important events
- Coping with workload
- Just-in-time strategies

Lean

- Increased efficiency
- Reduced resource utilization
- Lower costs
- Reduction of waste
- Integration/migration
- Managing unpredictable work
- Eradication of duplication
- Automation of manual tasks
- Reconciliation
- Consolidation

Quality

- Increased reliability
- Greater compliance
- Reduction of exceptions
- Fewer errors
- Greater discipline
- Consistency
- Transparency
- Assurance/security

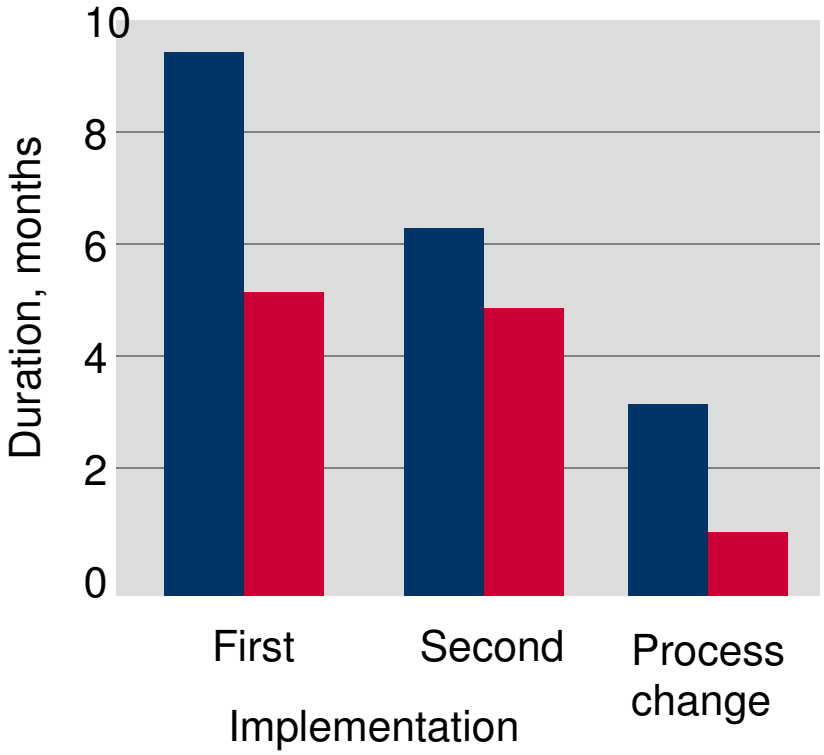
EXPERIENCE. RESULTS.

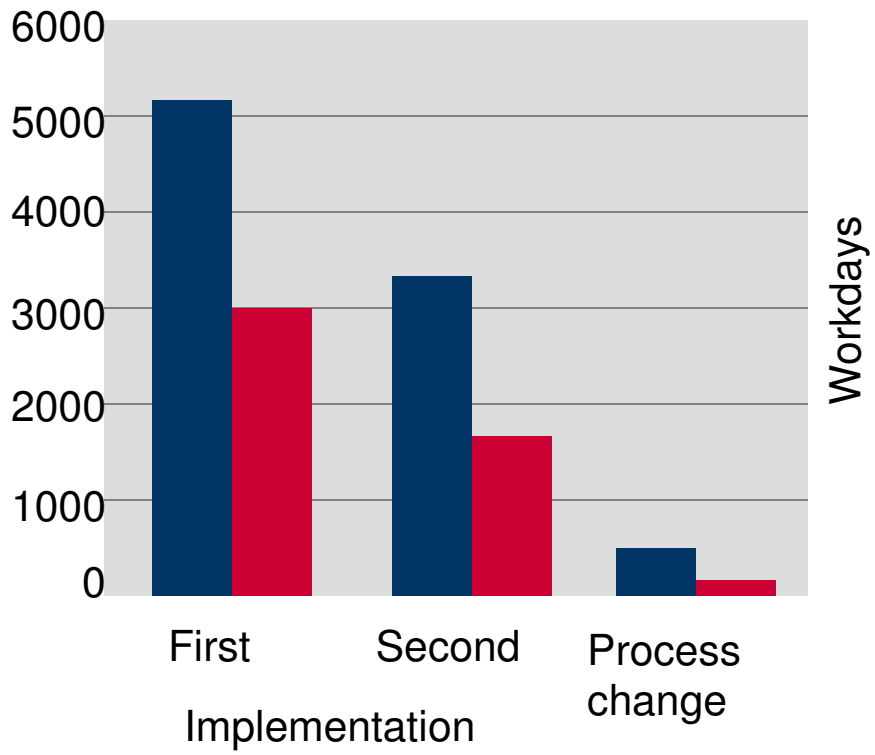
Fortune 50 Oil Industry case study

- History of acquisition and standardization
- Aging and fragmented architecture
- Preventing process change and customer oriented process design
- > 400 SAP instances
- Majority pre SAP R/3
- Heavily customized in all but a few cases
- Need to upgrade to SAP R/3
- Need to significantly reduce number of instances
- Need to maintain/extend existing processes
- Need to create new processes
- Need to create new end to end processes
- Need to preserve existing customizations and localizations
- Need to support customization and localization without proliferation
- Need to avoid disruption and risk
- Need to build in compliance, visibility control and accountability

EXPERIENCE. RESULTS.

Impact of BPMS - Fortune 50 Case in Oil Industry
Customer data





Traditional approach

BPMS approach

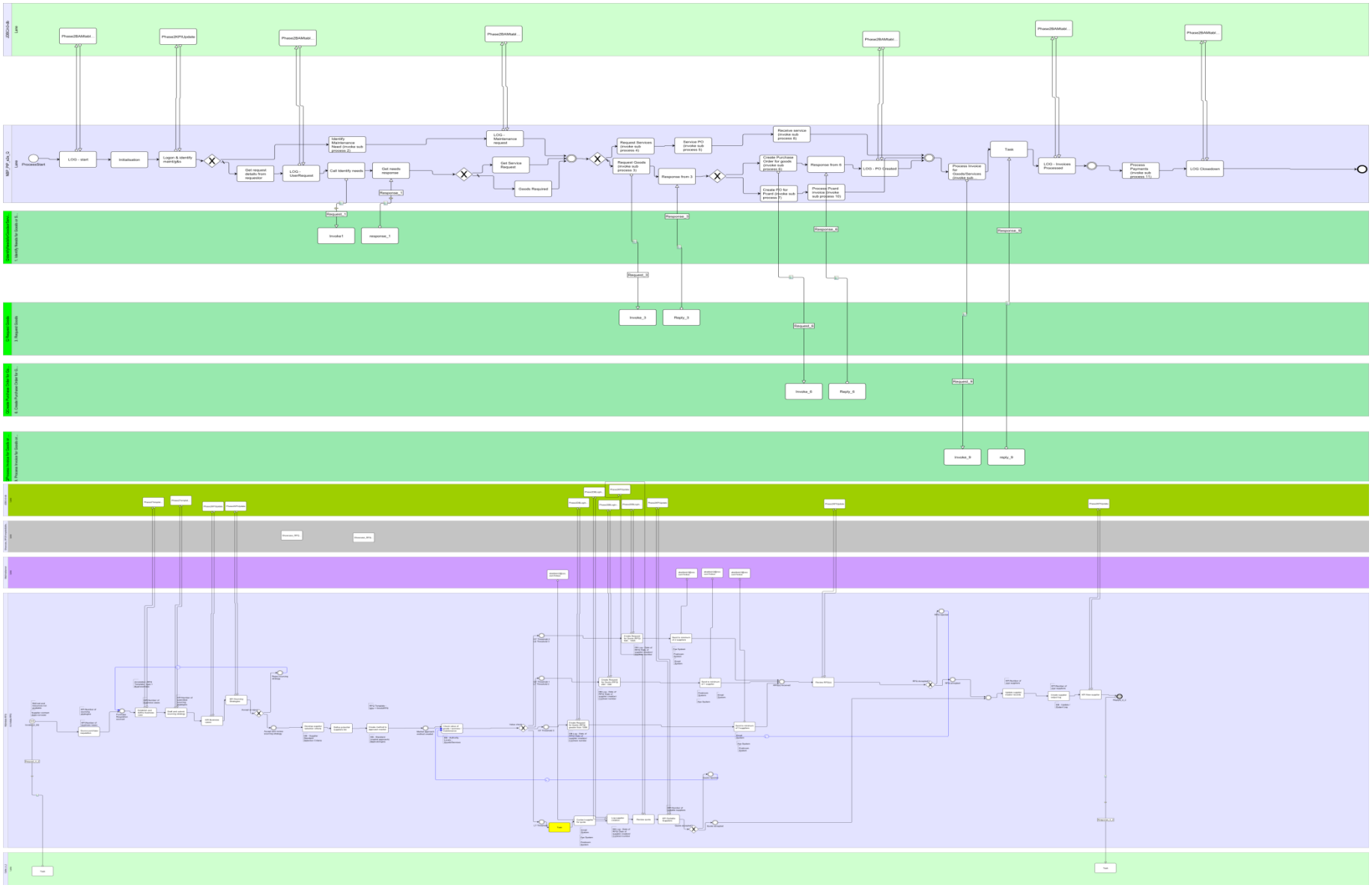
Second: Builds on generic base applying localization
Process change: Global template across multiple locals

EXPERIENCE. RESULTS.

Financial and qualitative benefits

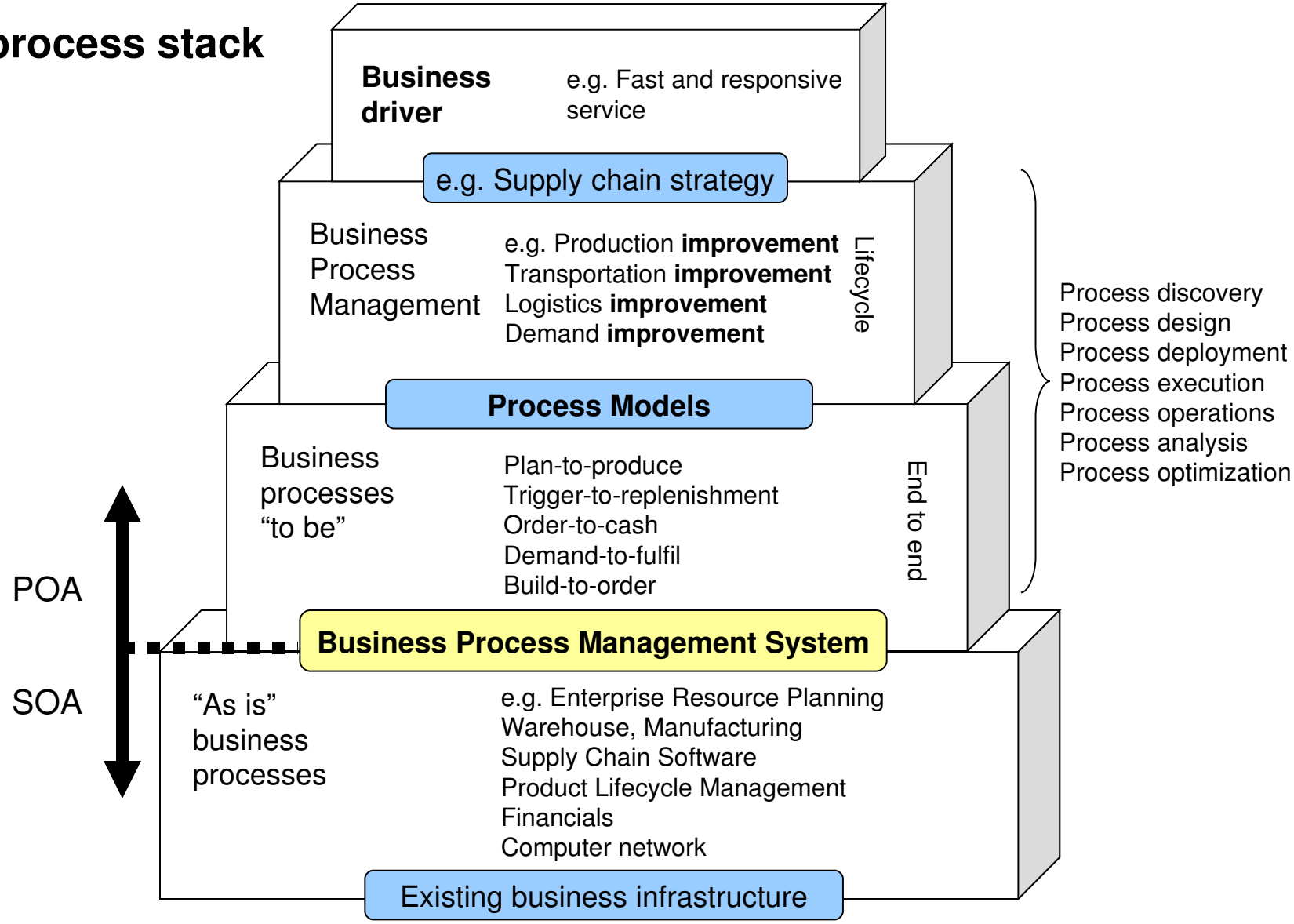
- Reductions in hardware and software costs
  - Reduced license and maintenance costs, upgrade expenses, interface development costs, third party support costs
- Simplification or application landscape
  - Controlled rationalization of complex application portfolio worldwide, reduced resource requirements for applications maintenance
- Agile process deployments
  - Reduced deployment timelines and costs, standardised process oriented utility on which to deploy “Process Fitness”, simplified process changes
- Business effectiveness
  - Reductions in business interruption, acquisition/divestment costs, transaction costs, improved process and asset reuse, economies of scale
- Business-focussed benefits
  - End to end Process Management
  - Regulatory Compliance
  - Improved Customer Satisfaction/Response Time
  - Automation of administrative tasks
  - Competitive advantage through better market responsiveness
  - Business alignment
  - Acquisition and divestment flexibility
  - Group leverage
  - Culture shift/continuous improvement – process centric thinking
- IT-focussed benefits
  - Managing complexity
  - Localized process variations projected from SAP
  - Standardization where required
  - Controlled instance retirement
  - Isolation and improved replacement of aging assets
  - Open standards/interoperability

EXPERIENCE. RESULTS.



EXPERIENCE. RESULTS.

The process stack



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Processes

Examples

- Incident/Insurance claim
- Life history/Health record
- Logistics/Lost parcel
- Support/Trouble ticket
- Goal/Project
- Emergency response/Incident
- Customer/Service request
- Procurement/Order
- Management/Initiative
- Farm animal certification/Tag
- Provisioning/Service
- On-boarding/Employee
- Publishing/Book
- Change Mgt/Change request
- Public health/Campaign
- Criminal/Case file

EXPERIENCE. RESULTS.

Business Process Reengineering

IT implementation

Change disruptor

Requirements definition

Operational utilization

Reengineering gap (Business-IT divide)

Business Process Management

Process modeling

Business-IT alignment

Adaptation enabler

Operational utilization

Process time-to-production advantage

EXPERIENCE. RESULTS.

Process innovation: the next step in process thinking

1990	**Business process reengineering (BPR)**	**Process lateral thinking** **Reengineering techniques**
2000	**Business process management (BPMS)**	**Executable processes** **Direct path to implementation** **Mgt of the process lifecycle** **Process modeling languages**
2005	**Business process innovation (P-TRIZ)**	**Exhaustive generation of re-design options - Systematically solve problems in processes**
2010	**Business process realization**	**Automatically realize ideal process models along selected innovation pathways**

Process articulation & creativity

↓

Creativity in process technology

↓

Process methodological creativity

↓

EXPERIENCE. RESULTS.

Computers: glorified adding machines?

“Don’t let that Mr. Skinner hear you say that. He says a computer is an instrument of the imagination. He says that with another computer, me and Miss Glazier he could run Credit and Settlement single-handed.”

– Miss Prothero, from Alan Bennett’s, Office Suite

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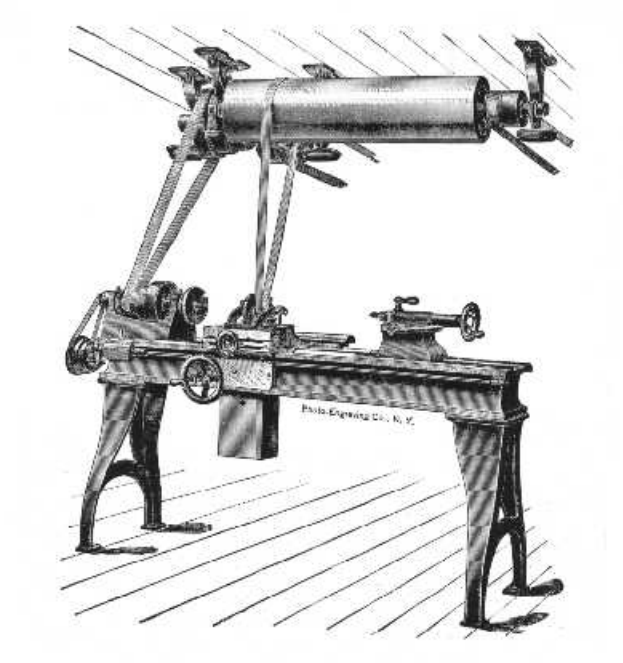
1900 - Frederick W. Taylor



Innovative business practice plus new technology

Carl Barth

EXPERIENCE. RESULTS.

1950 - W. Edwards Deming

Walter Shewhart

Innovative business practice
plus new technology

EXPERIENCE. RESULTS.

Tools = productivity + complexity buster

Can a person extract the cube root of 98347523456245634 76?

1000 years ago	Nobody
500 years ago	Only a genius
50 years ago	A long and difficult calculation
Today	Use a calculator, push a button

EXPERIENCE. RESULTS.

Do you have problems?

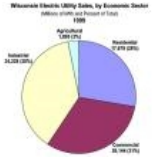
Known Problems
you must solve and for which you have no known solution

Unknown Problems
preventing progress that must be revealed, and subsequently solved

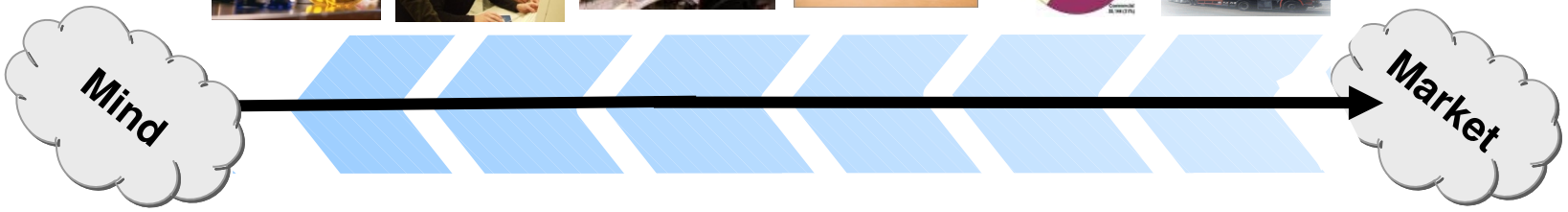
New concepts








Business coming in



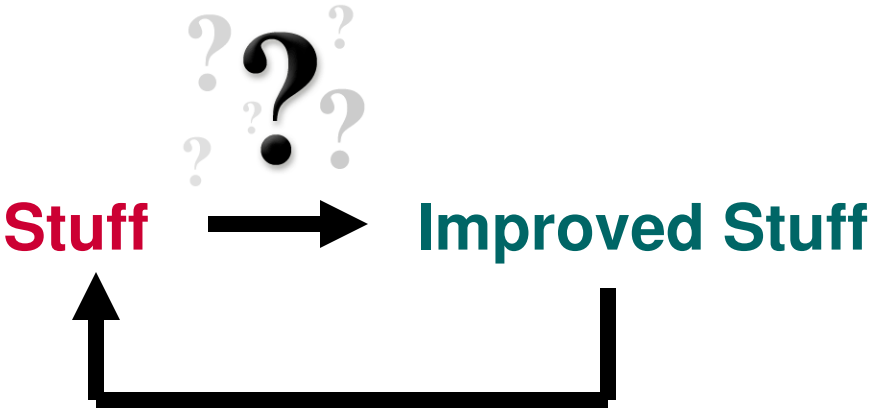
Barriers, obstacles, contradictions, inertia

Research … Development … Operations … Marketing … Sales … Distribution

EXPERIENCE. RESULTS.

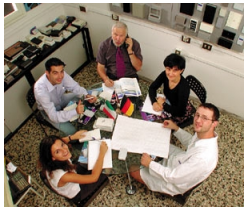
What Innovation Is

Innovation is the reliable business process by which firms create significant value from all sources of creativity and knowledge

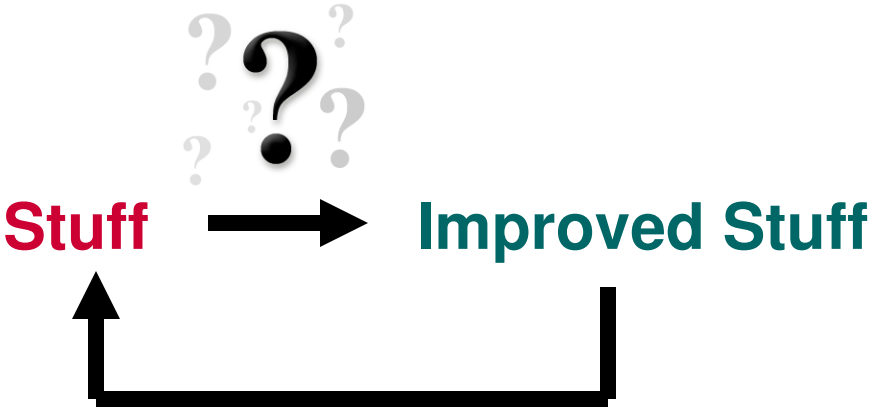


EXPERIENCE. RESULTS.

Stuff can be …



Products **Services** **Solutions** **Processes** **Organizations** **Ideas**



EXPERIENCE. RESULTS.

To improve stuff, we must decompose

Stuff

CSC
EXPERIENCE. RESULTS.

Everything is useful and harmful

Personal transport

Freedom of movement

Pollution

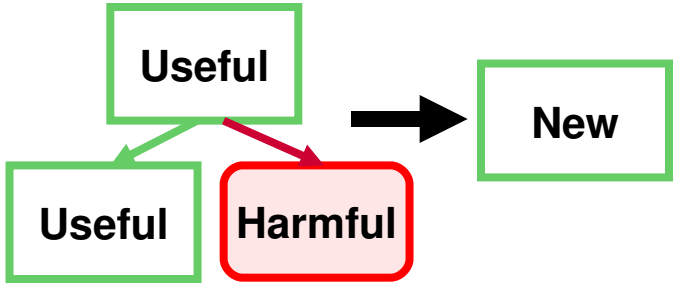
Useful

Harmful

Is it useful or harmful

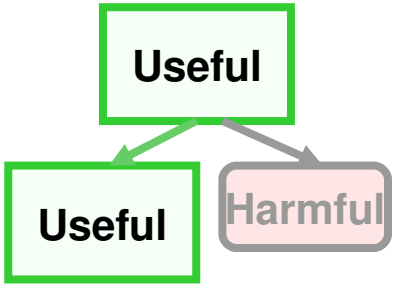
EXPERIENCE. RESULTS.

Decomposition opens pathways to improvement



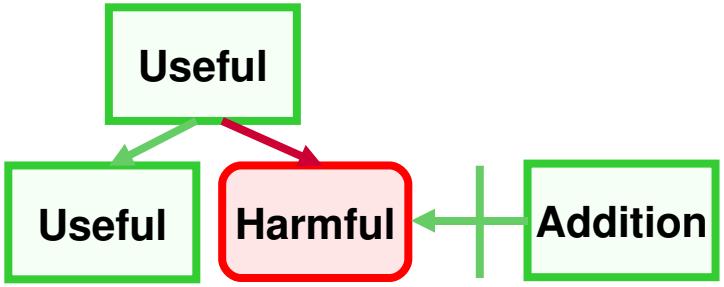
Example 1

Replace the system with a new system that does not exhibit the harmful function



Example 2

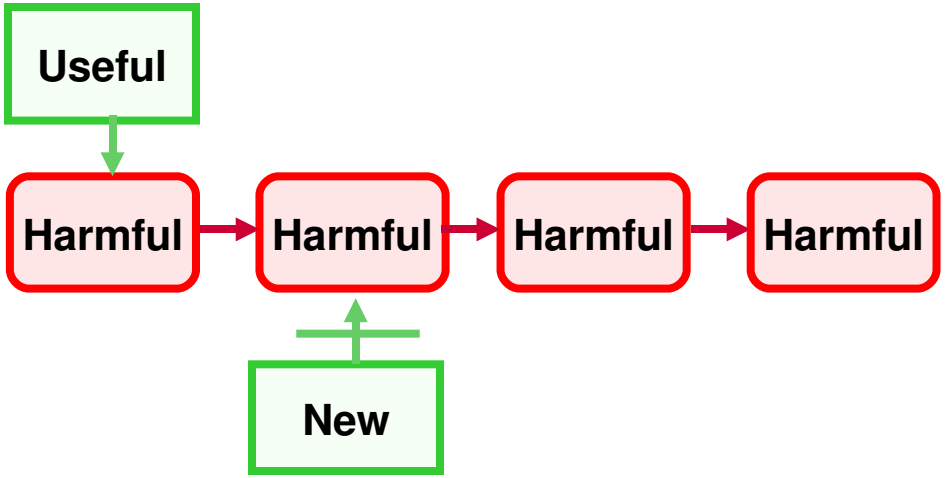
Find a way to eliminate or reduce the harmful function



Example 3

Add a compensating function to limit the impact of the harmful function

More examples of innovation



Example 4

Compensate a harmful side effect to break a chain of harmful knock on effects

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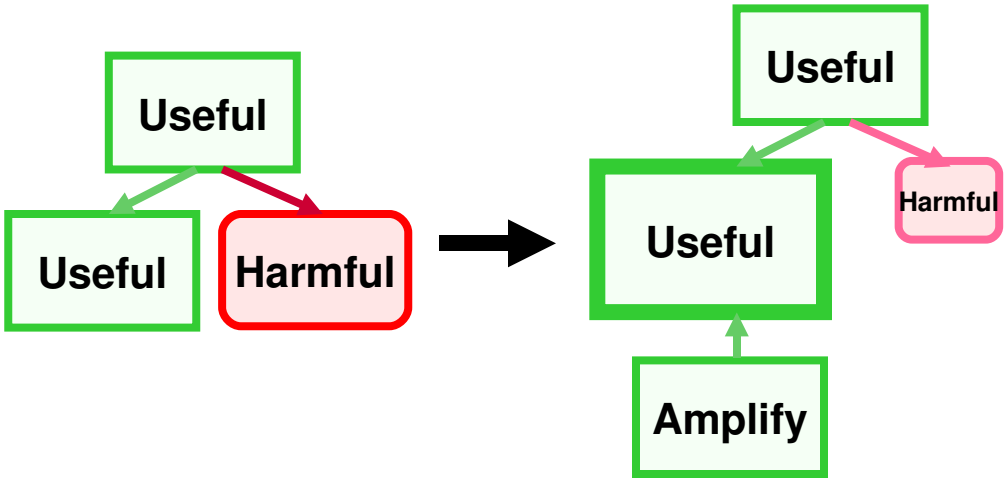
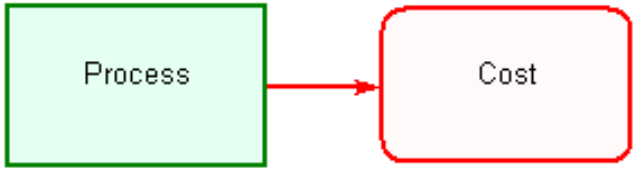
Example 5

Amplify the useful output, to the extent that the harmful function becomes insignificant

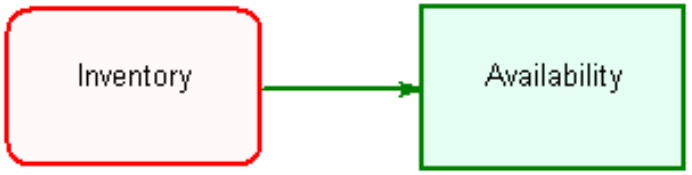


EXPERIENCE. RESULTS.

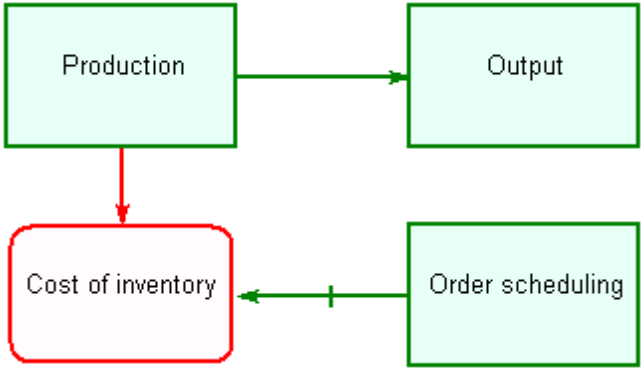
Modeling processes for innovation (P-TRIZ)



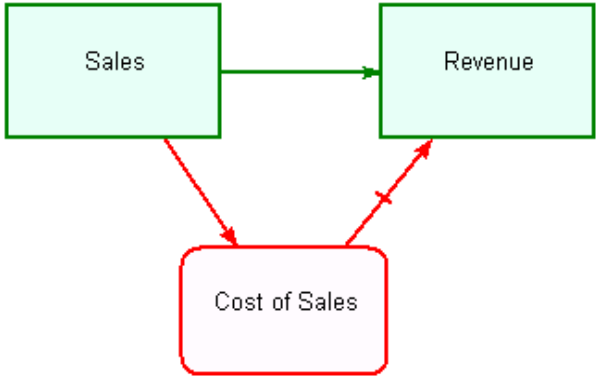
All processes have costs



Harmful functions have useful functions



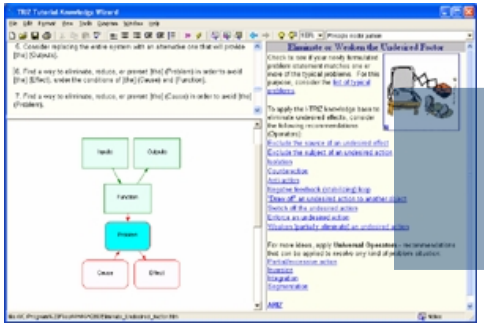
Functions are added to systems to counteract harm



Harmful side effects counteract primary objectives

EXPERIENCE. RESULTS.

We can automate the generation of solution pathways



Personal transport

Freedom of movement

Pollution

Useful

Harmful

1. Find an alternative way to obtain [the] (Personal transport) that offers the following: provides or enhances [the] (Freedom of movement), does not cause [the] (Pollution).

2. Try to resolve the following contradiction: The useful factor [the] (Personal transport) should be in place in order to provide or enhance [the] (Freedom of movement), and should not exist in order to avoid [the] (Pollution).

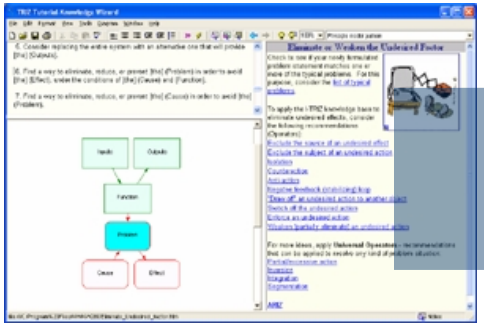
3. Find a way to eliminate, reduce, or prevent [the] (Pollution) under the conditions of [the] (Personal transport).

4. Find an alternative way to obtain [the] (Freedom of movement) that does not require [the] (Personal transport).

5. Consider replacing the entire system with an alternative one that will provide [the] (Freedom of movement).

EXPERIENCE. RESULTS.

Systematic process opens exhaustive solution options



Personal transport

Freedom of movement

Pollution

Useful

Harmful

3.1. Find a way to benefit from [the] (Pollution).

3.2. Try to cope with [the] (Pollution).

3.3. Consider ways to compensate for the harmful results of [the] (Pollution).

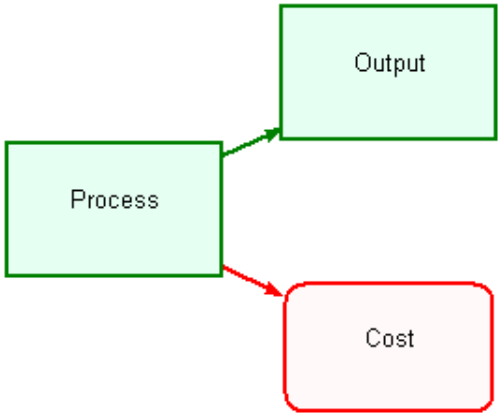
3.4. Consider creating a situation that makes [the] (Pollution) insignificant or unimportant.

5.1. Consider transition to the next generation of the system that provides [the] (Freedom of movement), but which will not have the existing problem.

5.2. Consider enhancing the current means by which the primary useful function is achieved, to the extent that the benefits will override the primary problem.

EXPERIENCE. RESULTS.

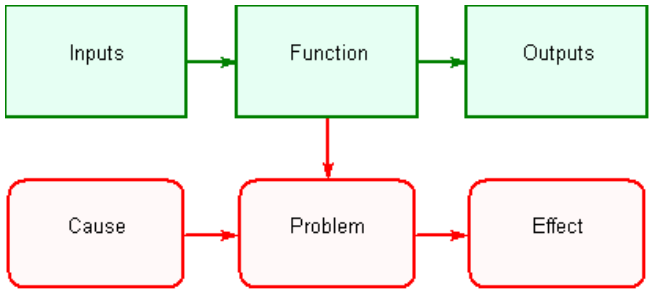
P-TRIZ formulation



1. Find an alternative way to obtain [the] (Process) that offers the following: provides or enhances [the] (Output), does not cause [the] (Cost).
2. Try to resolve the following contradiction: The useful factor [the] (Process) should be in place in order to provide or enhance [the] (Output), and should not exist in order to avoid [the] (Cost).
3. Find an alternative way to obtain [the] (Output) that does not require [the] (Process).
4. Consider replacing the entire system with an alternative one that will provide [the] (Output).
5. Find a way to eliminate, reduce, or prevent [the] (Cost) under the conditions of [the] (Process).

EXPERIENCE. RESULTS.

P-TRIZ exposes abstract process patterns

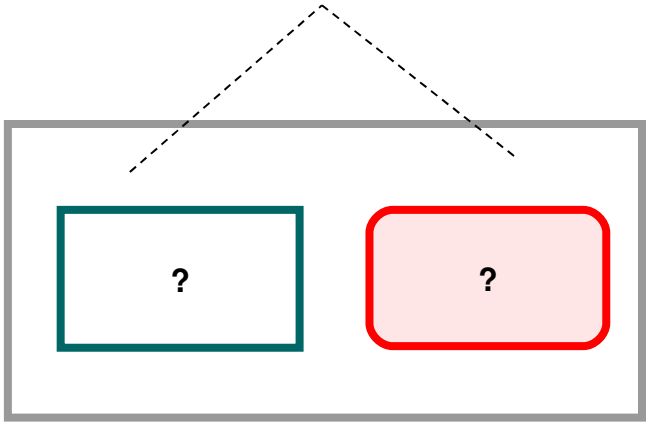


1. Find an alternative way to obtain [the] (Function) that offers the following: provides or enhances [the] (Outputs), does not cause [the] (Problem), does not require [the] (Inputs).
2. Try to resolve the following contradiction: The useful factor [the] (Function) should be in place in order to provide or enhance [the] (Outputs), and should not exist in order to avoid [the] (Problem).
3. Find an alternative way to obtain [the] (Inputs) that provides or enhances [the] (Function).
4. Find an alternative way to obtain [the] (Outputs) that does not require [the] (Function).
5. Consider replacing the entire system with an alternative one that will provide [the] (Outputs).
6. Find a way to eliminate, reduce, or prevent [the] (Problem) in order to avoid [the] (Effect), under the conditions of [the] (Cause) and (Function).
7. Find a way to eliminate, reduce, or prevent [the] (Cause) in order to avoid [the] (Problem).
8. Find a way to eliminate, reduce, or prevent [the] (Effect) under the conditions of [the] (Problem).

EXPERIENCE. RESULTS.

To whom are things useful and harmful?

Customer
Supplier
Citizen
Government
Child



To you To me

Useful or harmful?

EXPERIENCE. RESULTS.

Everything is useful and harmful from many perspectives

Loss of rural environment

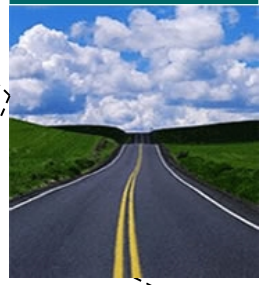
Harmful

High speed economy

Useful

Freedom of movement

Useful



Pollution

Harmful

Oil profits

Useful

Environmental damage

Harmful

EXPERIENCE. RESULTS.

Selected pathways create the innovation manifesto

1.3. Find a way to obtain [the] (Freedom of movement) without the use of [the] (Personal transport).

1.4. Find a way to decrease the ability of [the] (Personal transport) to cause [the] (Pollution).

3.2. Find a way to obtain [the] (Oil profits) without the use of [the] (Pollution).

3.3. Find a way to decrease the ability of [the] (Pollution) to cause [the] (Environmental damage).

5.3. Find a way to obtain [the] (High speed economy) without the use of [the] (Freedom of movement).

5.4. Find a way to decrease the ability of [the] (Freedom of movement) to cause [the] (Loss of rural environment).

8.1. Consider transition to the next generation of the system that provides [the] (High speed economy), but which will not have the existing problem.

8.2. Consider enhancing the current means by which the primary useful function is achieved, to the extent that the benefits will override the primary problem.

9.2. Try to cope with [the] (Loss of rural environment).

9.3. Consider ways to compensate for the harmful results of [the] (Loss of rural environment).

9.4. Consider creating a situation that makes [the] (Loss of rural environment) insignificant or unimportant.

10.2. Try to cope with [the] (Environmental damage).

10.3. Consider ways to compensate for the harmful results of [the] (Environmental damage).

10.4. Consider creating a situation that makes [the] (Environmental damage) insignificant or unimportant.

11.2. Find additional benefits from [the] (Oil profits).

12.1. Consider transition to the next generation of the system that provides [the] (Oil profits), but which will not have the existing problem.

EXPERIENCE. RESULTS.

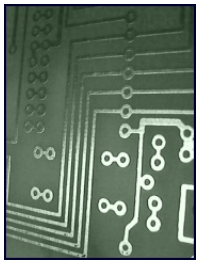
Aspects

Brand

Experience

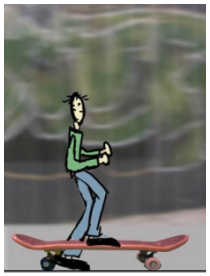
Usability

Design



Technology

Performance

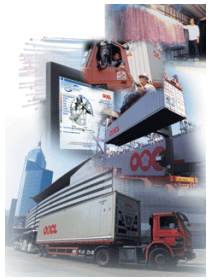


Function

Market

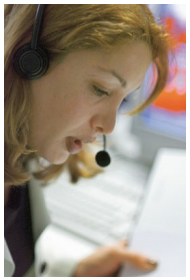
Business model

Manufacture



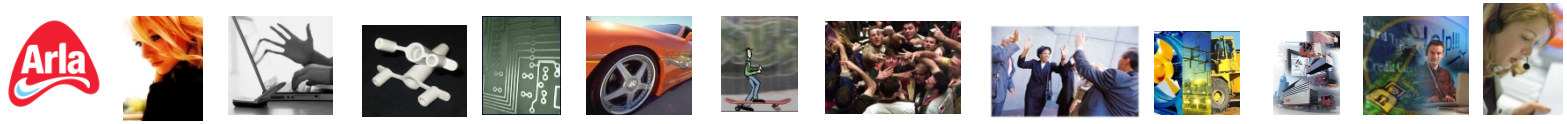
Delivery

Service



Support

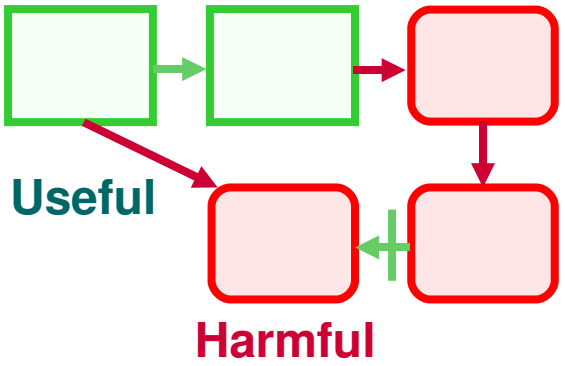
To improve, we must decompose in many ways



Aspects

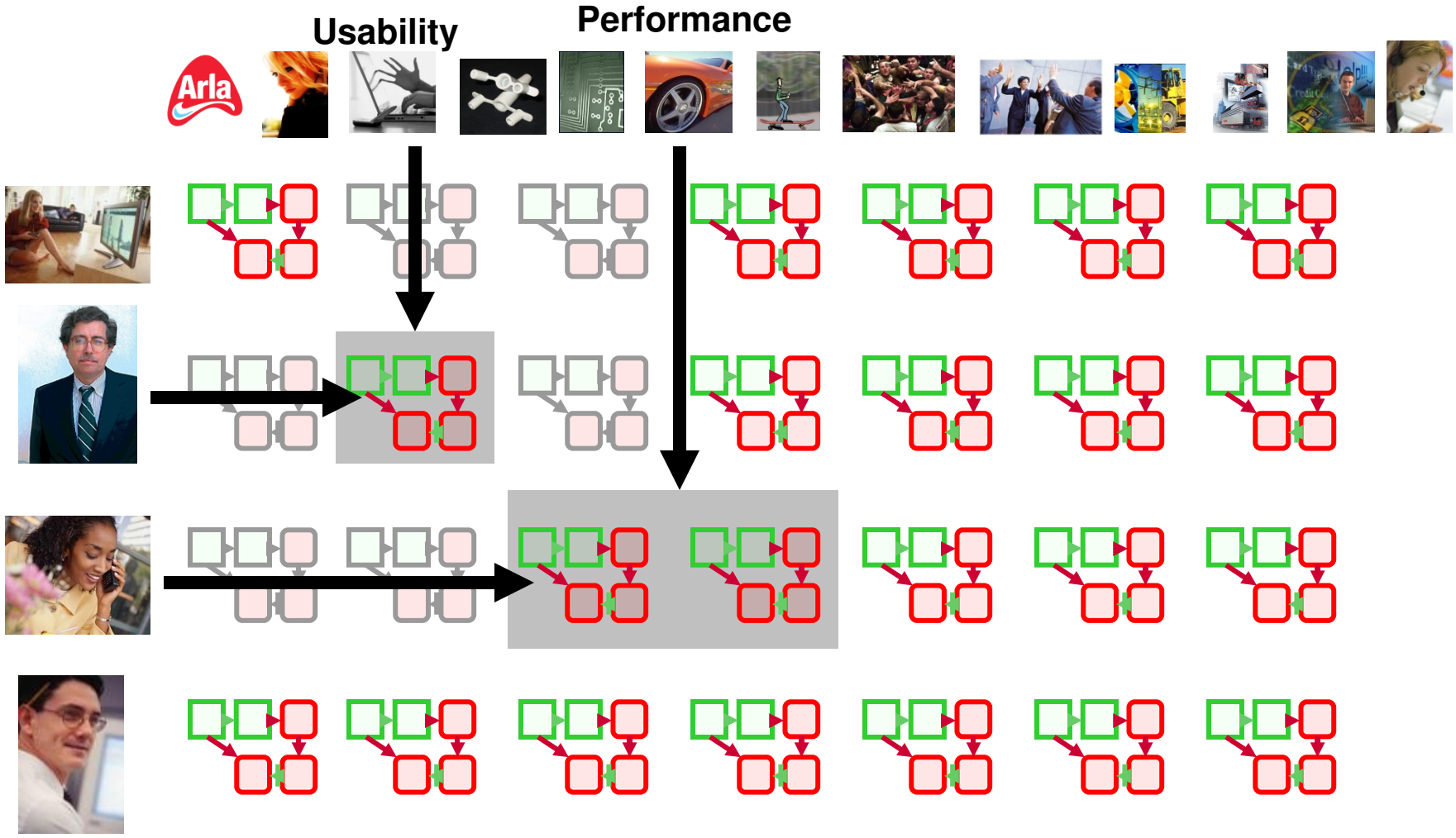
Perspectives

Functions



EXPERIENCE. RESULTS.

Many models are needed – expect contradictions



EXPERIENCE. RESULTS.

The more cars the better?

2. Try to resolve the following contradiction: The useful factor [the] (Personal transport) should be in place in order to provide or enhance [the] (Freedom of movement), and should not exist in order to avoid [the] (Pollution).

Contradiction

Freedom of movement

Useful

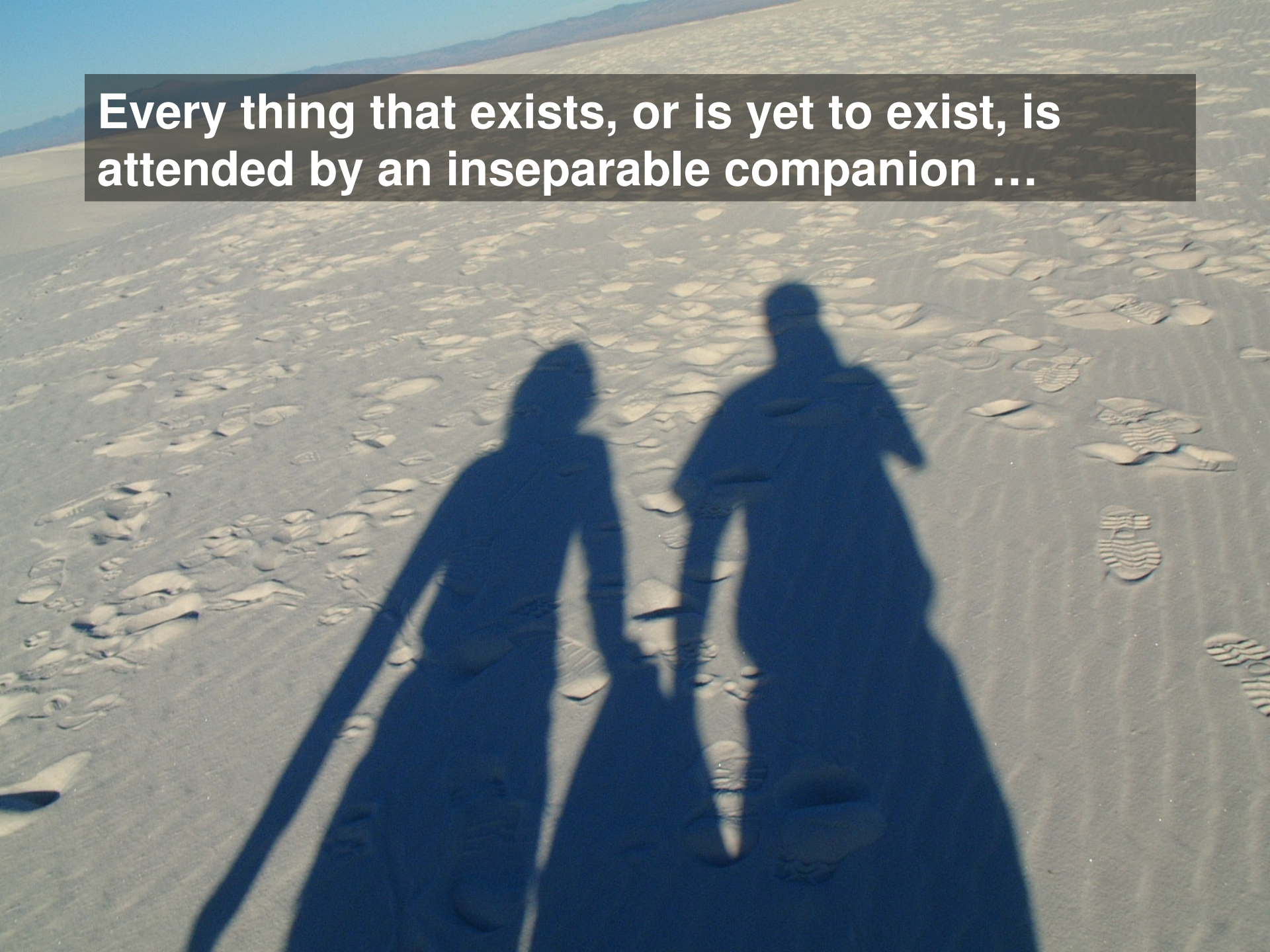
Pollution

Harmful

Hydrogen Internal Combustion

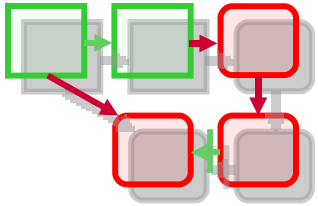
"Air leaving the tailpipe could actually be cleaner than the air coming into the engine"

http://www.ford.com/en/innovation/engineFuelTechnology/hydrogenInternalCombustion.htm


Every thing that exists, or is yet to exist, is attended by an inseparable companion …

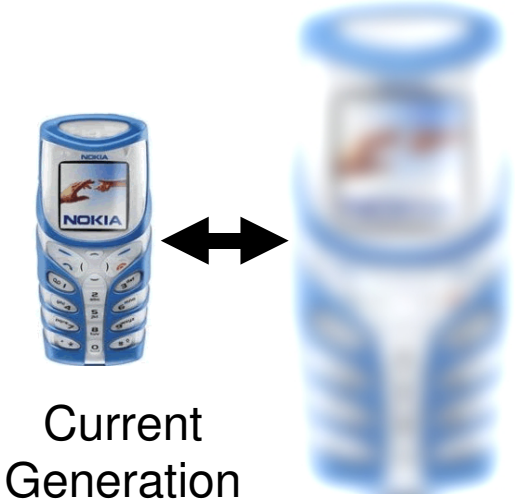
EXPERIENCE. RESULTS.

The innovation shadow-self



Innovation Models

Formulated Evolved Possibilities



Current Generation

Improvement

Next Generation

CSC
EXPERIENCE. RESULTS.

Our options expand as we add knowledge

Stuff

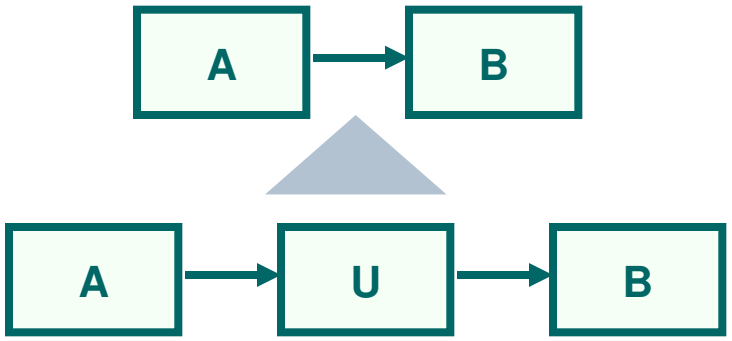
Innovation enriches intellectual property

Functions	Pathways
1	7
3	19
7	40
15	91

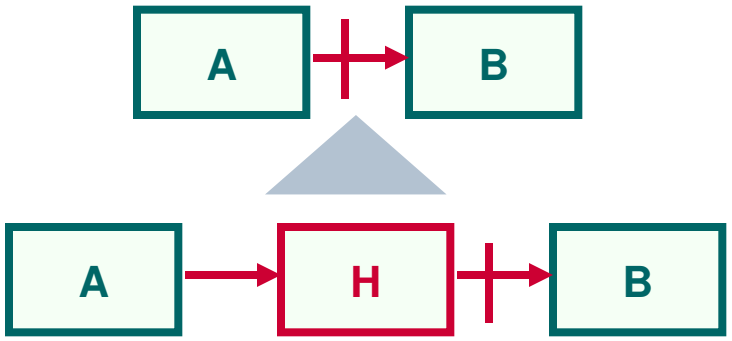
CSC
EXPERIENCE. RESULTS.

Innovation expands by asking questions, e.g.

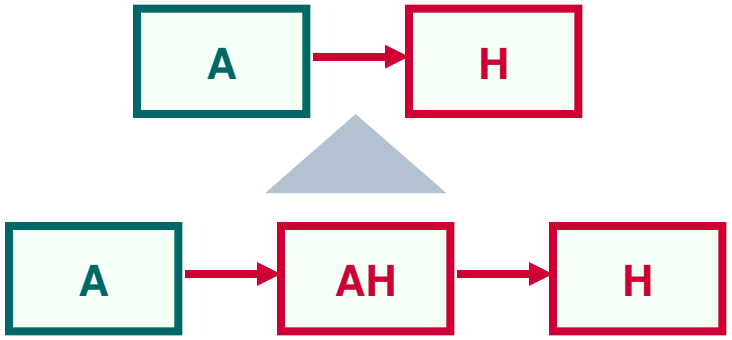
Does A really produce B directly?



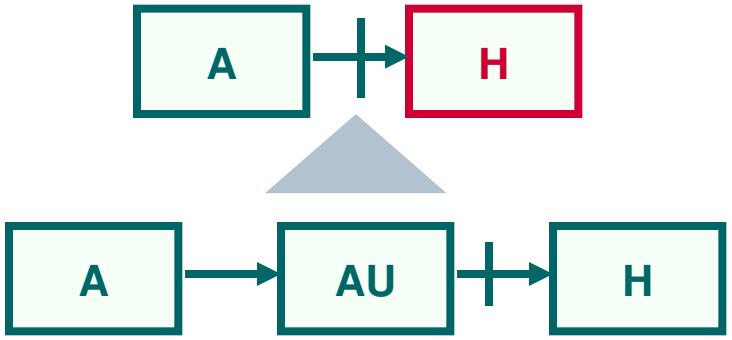
What is harmful about A?



What direct consequence of A yields H?



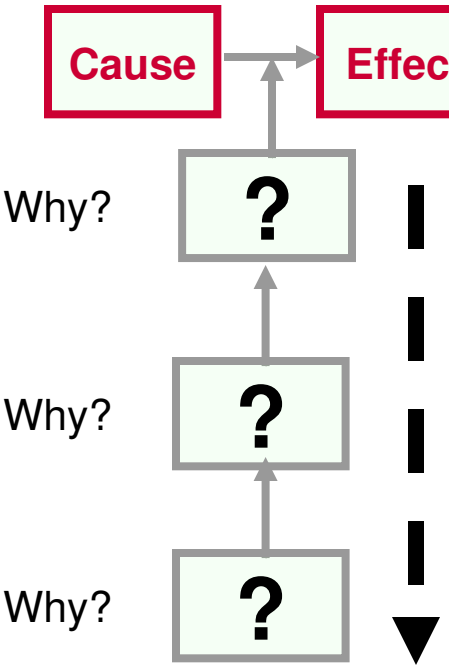
What specifically about A counteracts H?

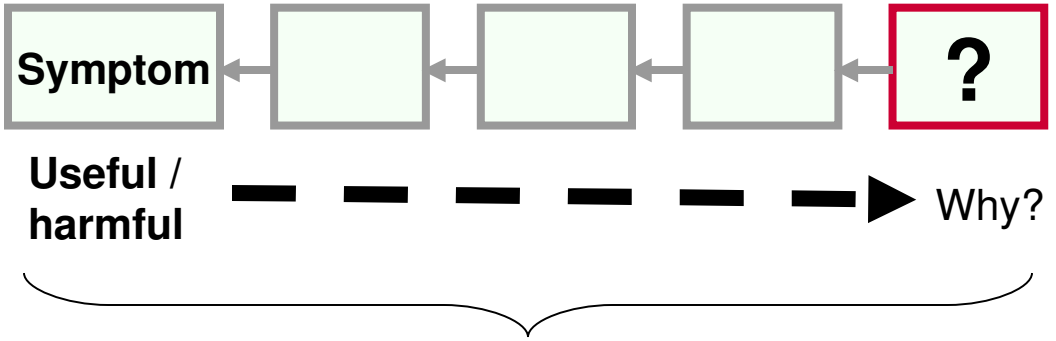


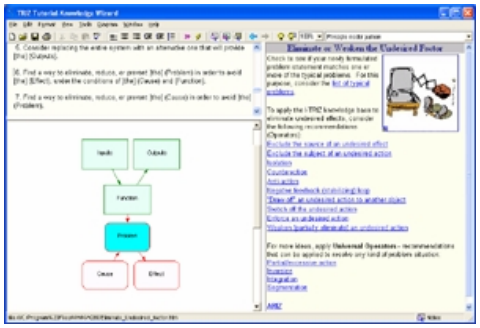
EXPERIENCE. RESULTS.

Lateral thinking and systematic methods are complementary

Example technique:
Five Whys





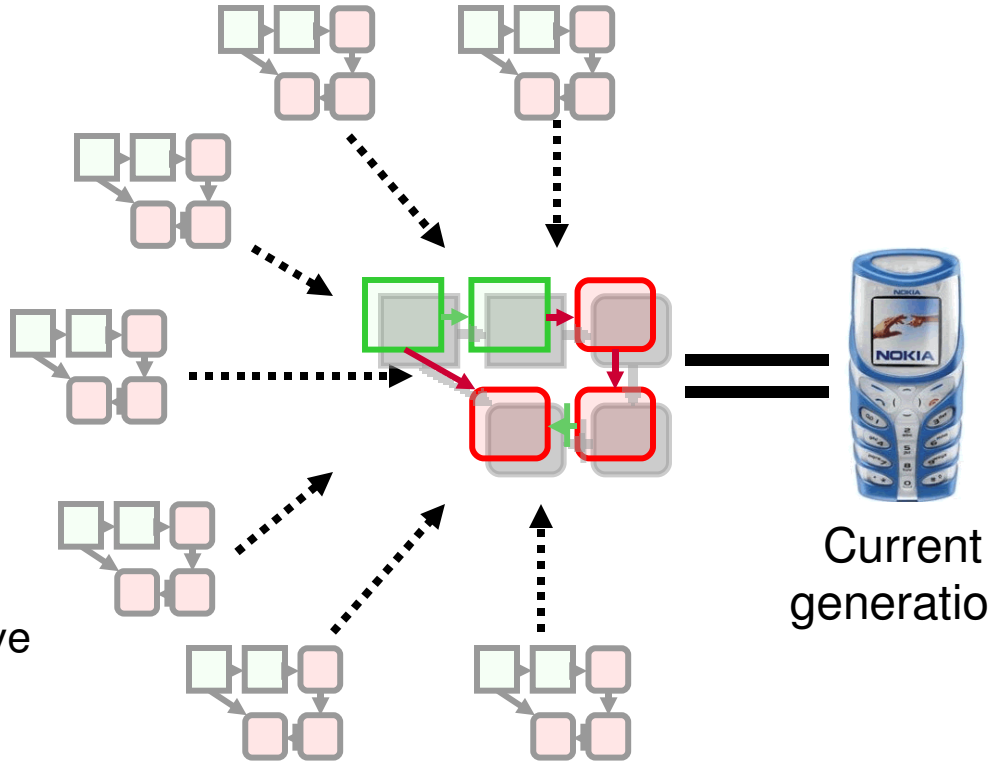


Formulator expands intellectual property

Exhaustive solution pathways generated

An alignment of many models is required

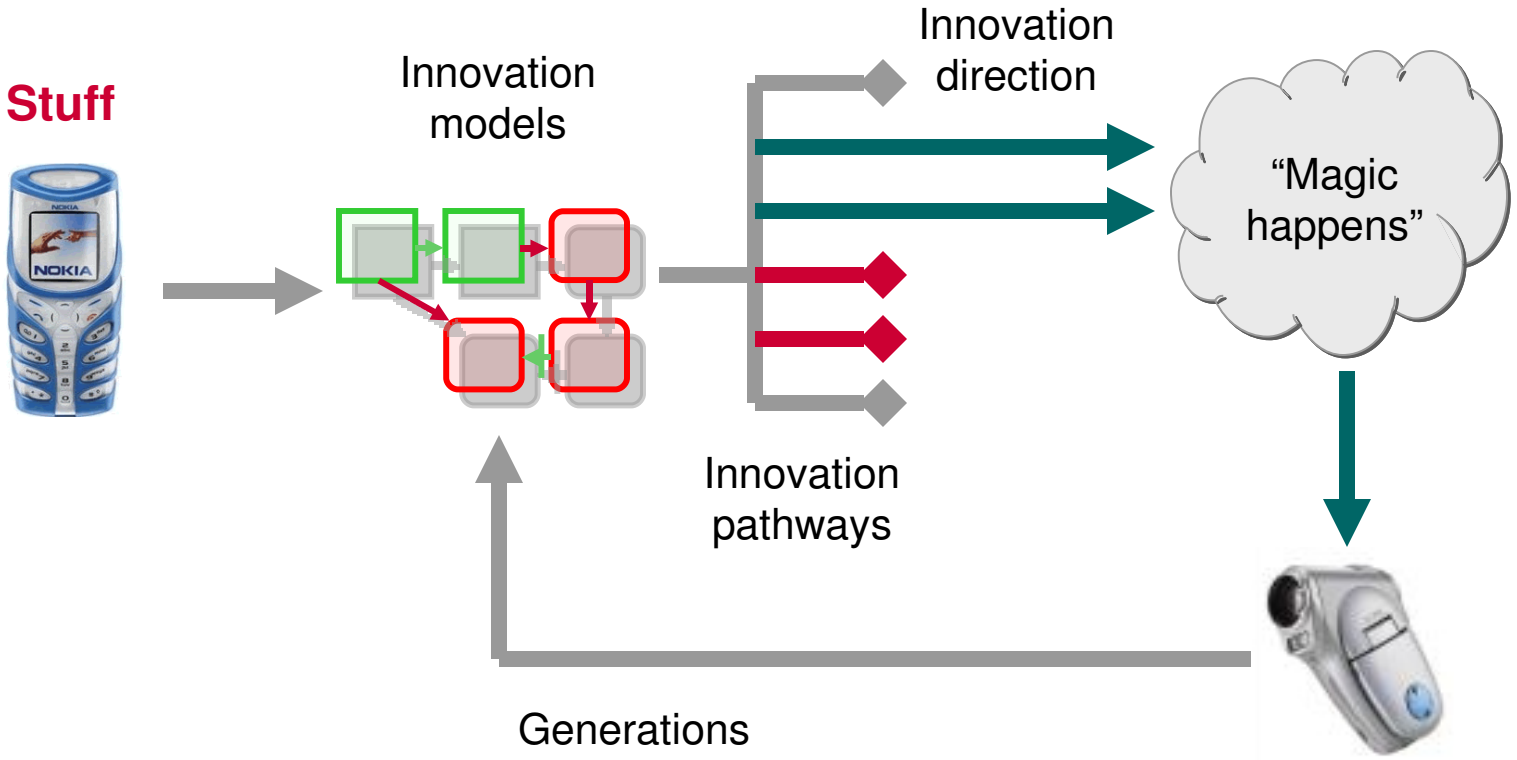
Perspective innovation models



Aspect innovation models

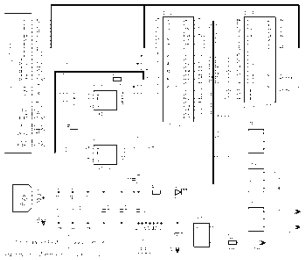
Current generation

The high level innovation process looks like this

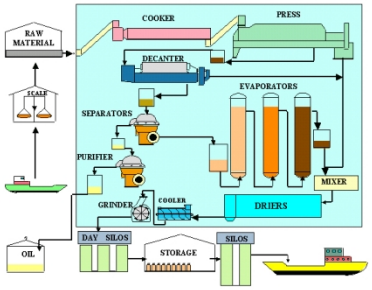


EXPERIENCE. RESULTS.

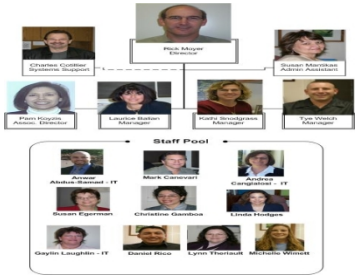
We must improve everything always



Engineering design



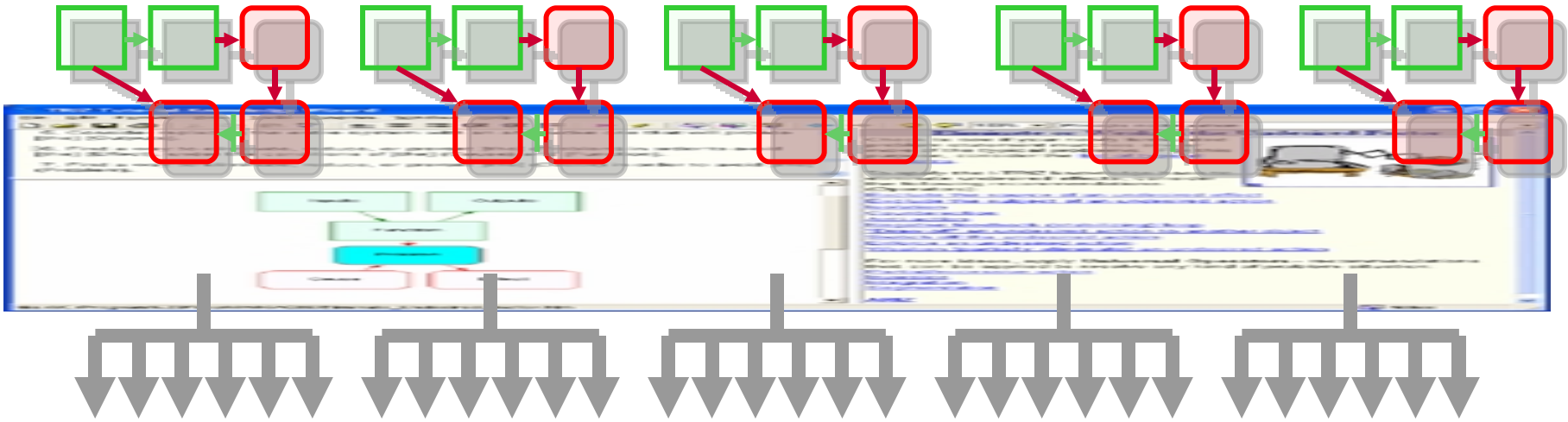
Process design



Organizational design

Production design

Operations design

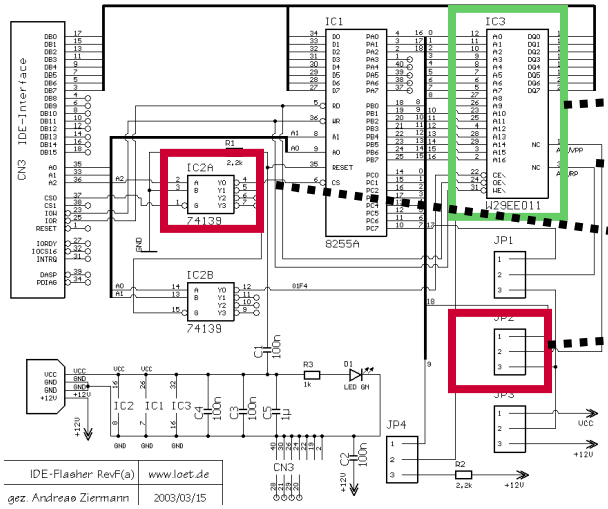


Improvement, renewal, replacement

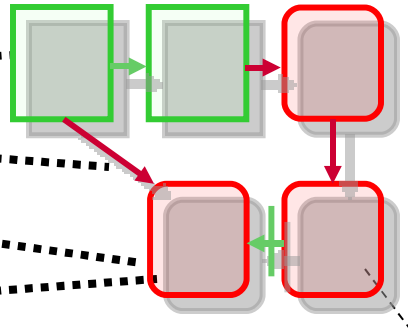
EXPERIENCE. RESULTS.

We can open existing intellectual property to innovation

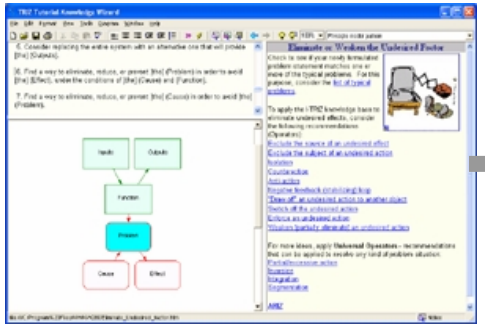
Schematic, document, etc.



Innovation mark-up



Innovation model



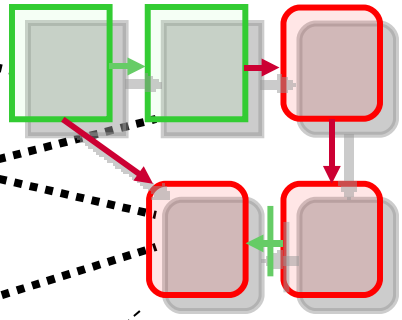
Formulator

Innovation pathways

EXPERIENCE. RESULTS.

We can mark-up any artefact to create innovation

Org chart innovation mark-up

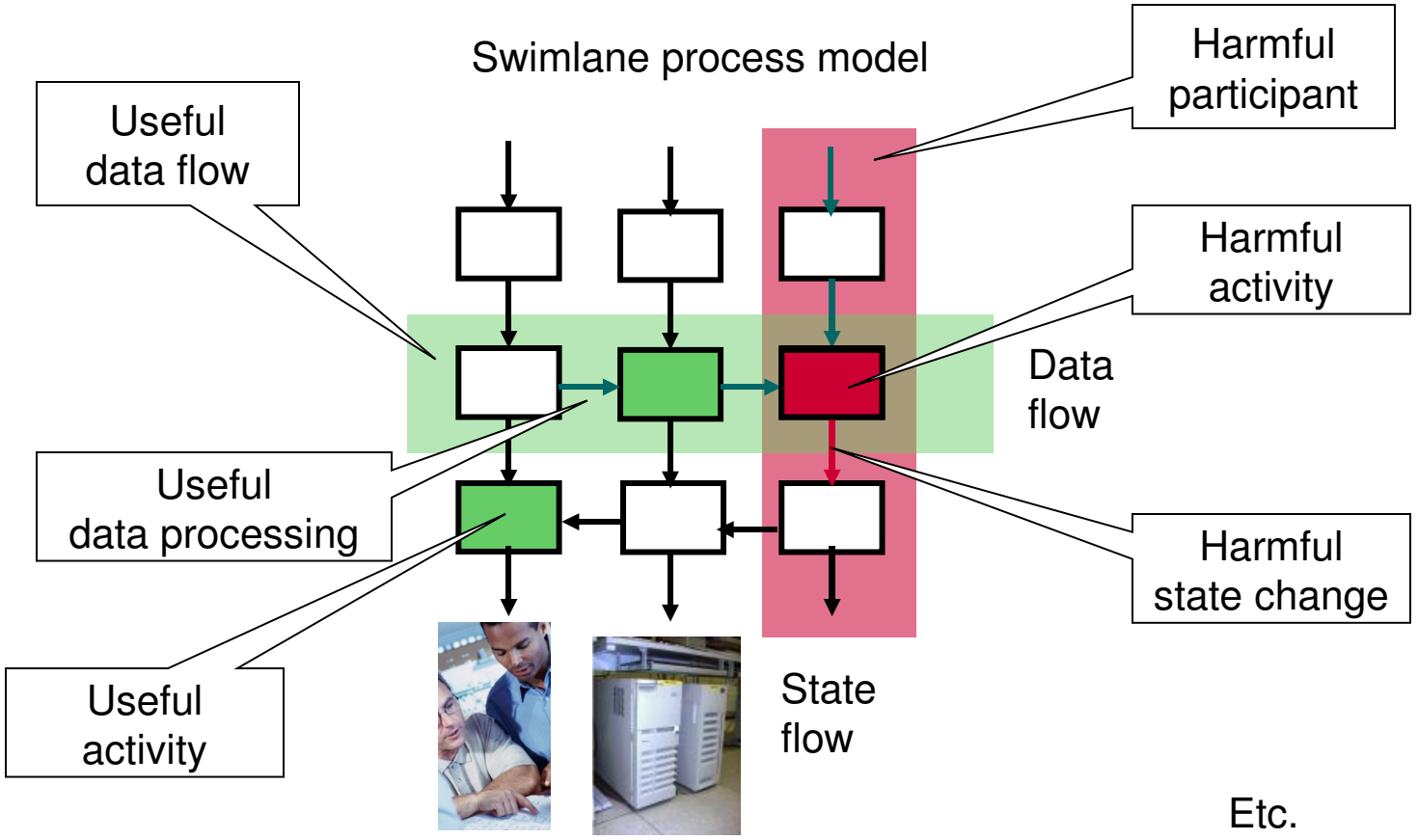


Inter-personal and inter-departmental relationships

3. Find a way to protect [the] (Direction) from the harmful influence of [the] (Mid Management).
3.1. Try to compensate for the harmful influence of [the] (Mid Management) towards [the] (Direction).
3.2. Try to reduce the sensitivity of [the] (Direction) to the harmful influence of [the] (Mid Management).

EXPERIENCE. RESULTS.

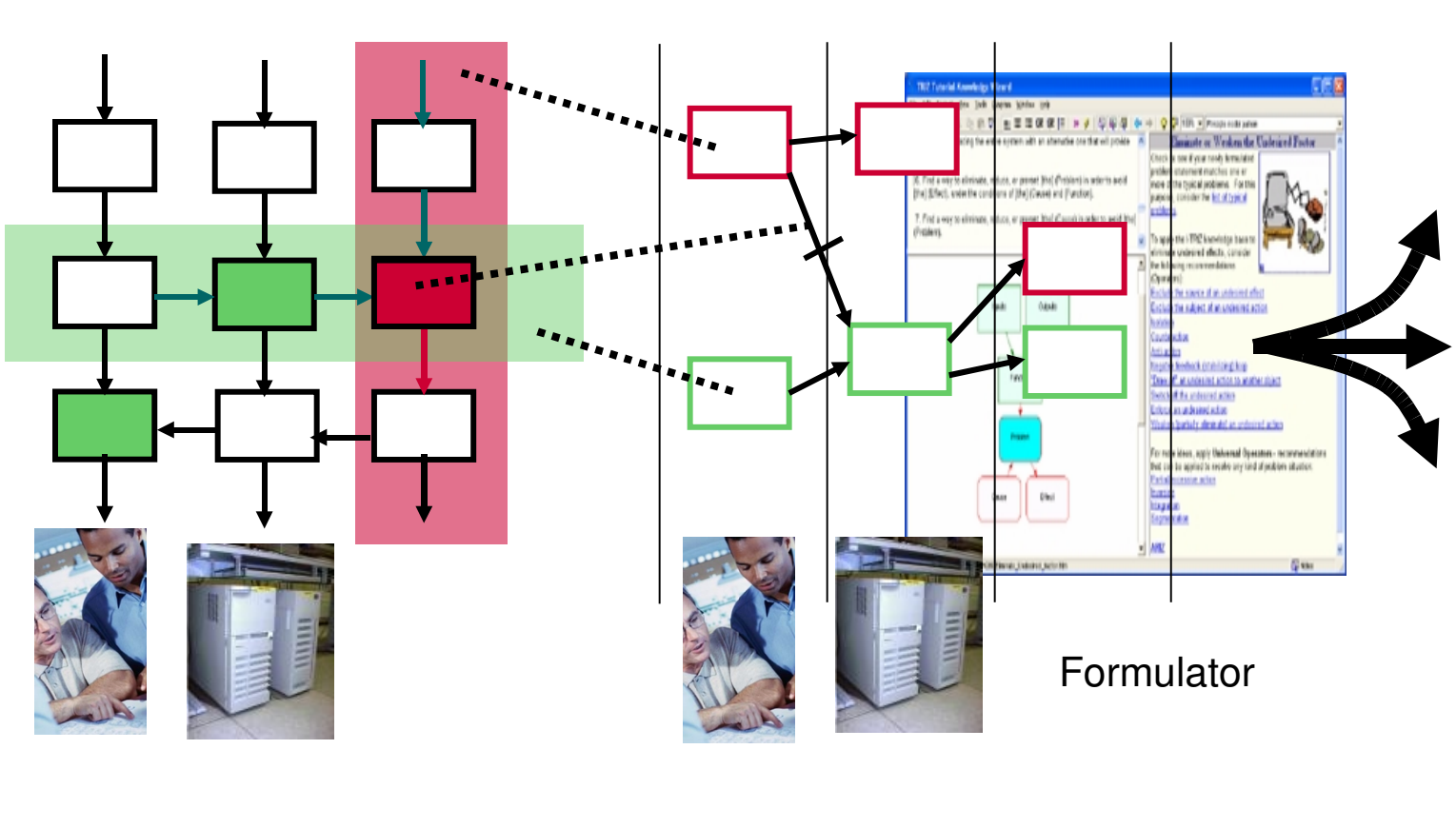
Processes can be analyzed for innovation



EXPERIENCE. RESULTS.

… opening pathways to alternate process designs

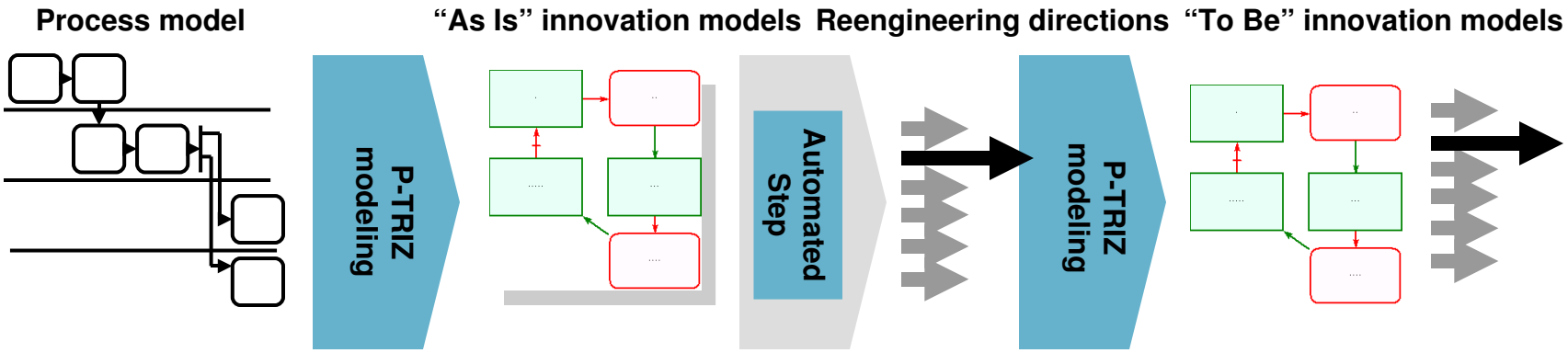
"As Is" Process model → Innovation model → Reengineering options



Formulator

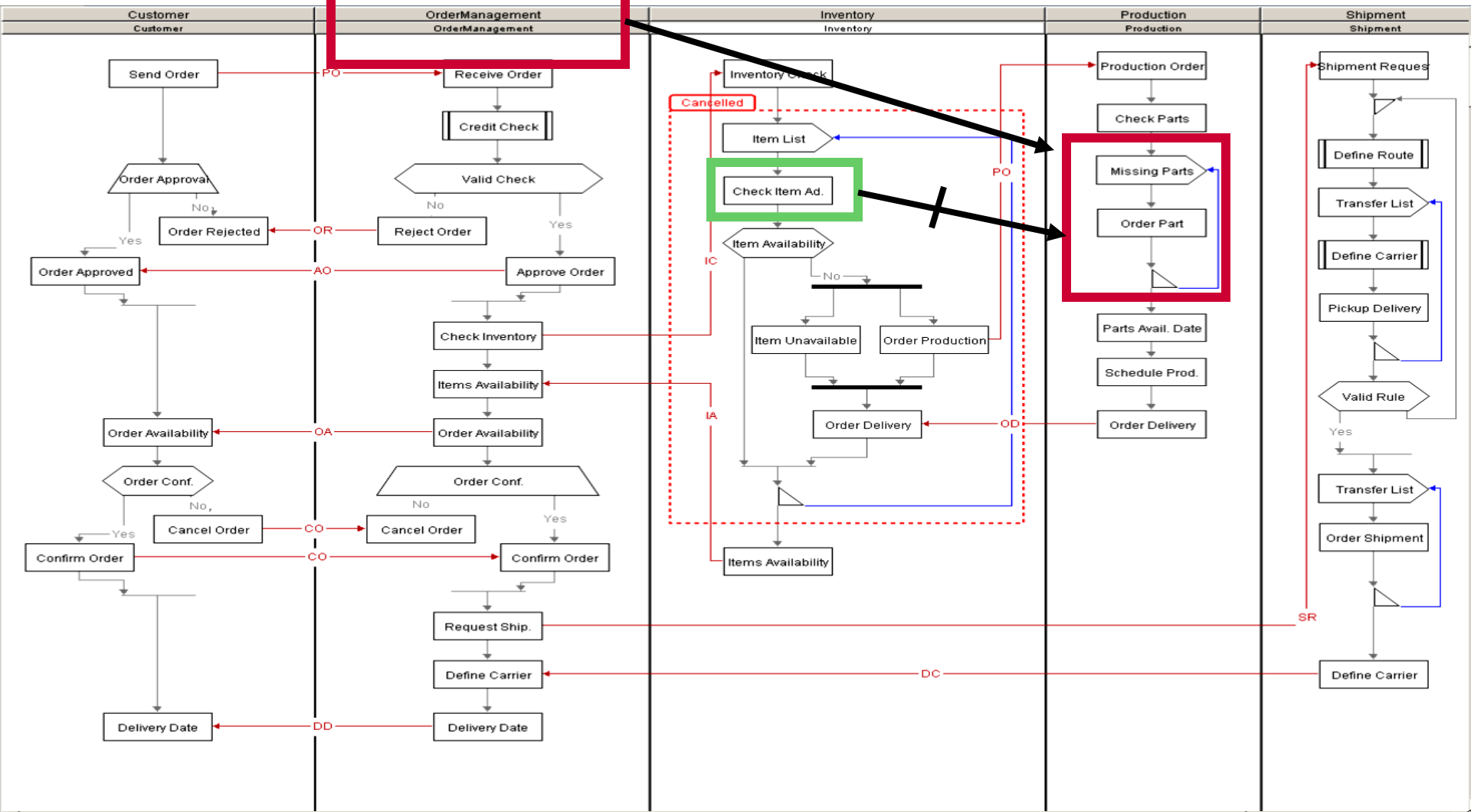
EXPERIENCE. RESULTS.

The P-TRIZ process



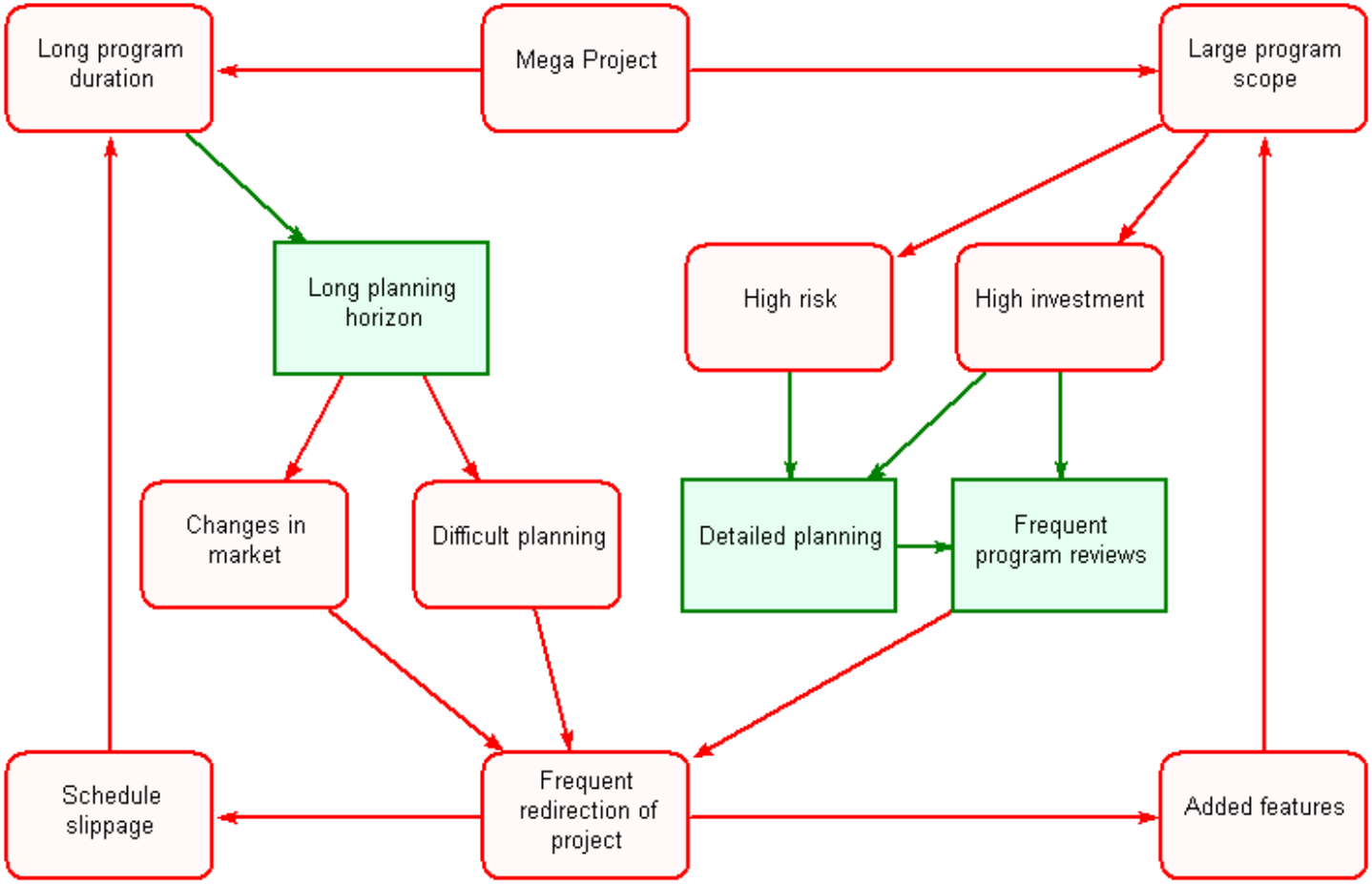
EXPERIENCE. RESULTS.

P-TRIZ and BPMN



EXPERIENCE. RESULTS.

P-TRIZ can also cope with fuzzy processes not amenable for formal process modeling



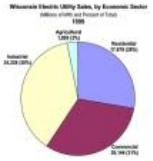
EXPERIENCE. RESULTS.

The innovator is a problem solver

Resources few
Projects many








Projects few
Resources many

Mind

Innovation Process

Market

Problem

Solution

Improved Stuff

Delivered Stuff

Technical feasibility … Market feasibility …Manufacturing feasibility … Delivery feasibility

EXPERIENCE. RESULTS.

Because we are talent limited, it's all hands to the pump

Stuff

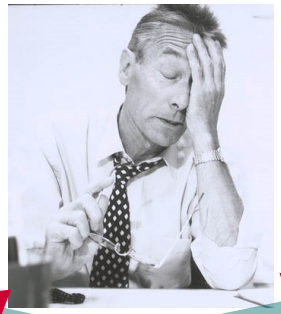
Directed evolution

Potential Stuff

Problem solving

Delivered Stuff

Impossible problems



Hard challenges

Employee creativity

Employee knowledge

Raw ideas

Idea Development

Validated ideas

Solution concepts

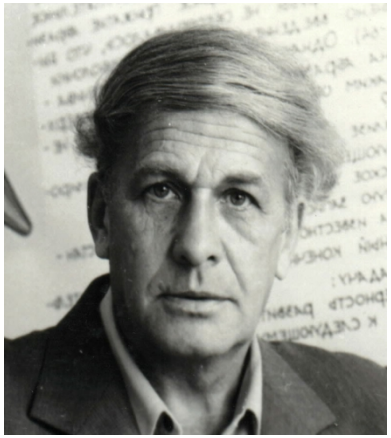
New ideas

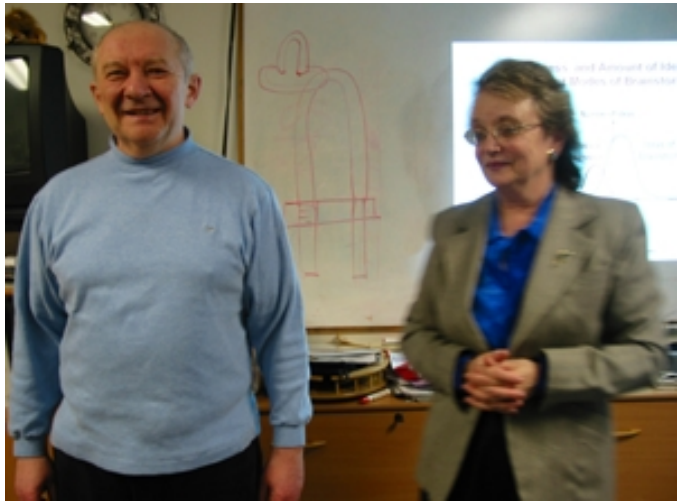
Challenge – Capture – Develop - Exploit

EXPERIENCE. RESULTS.

The roots of systematic innovation should be acknowledged

- Genrich Saulovich Altshuller
- Father of TRIZ
- Controlling and predicting innovation
- 15 October 1926 – 24 September 1998

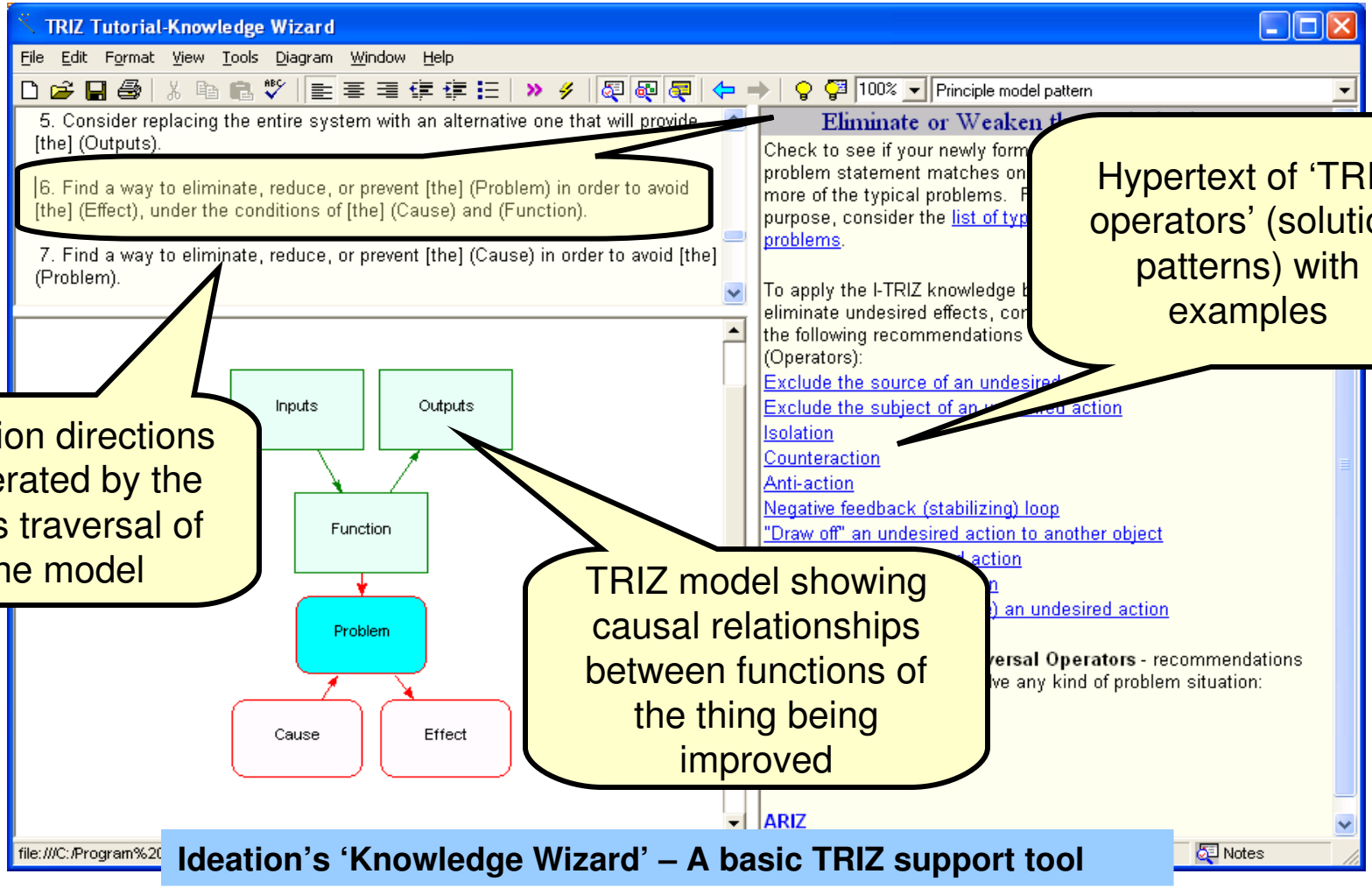




- Boris Zlotin and Alla Zusman
- TRIZ masters and inventive methodologists
- Pioneering the foundations for the development of a modern TRIZ methodology
- Ideation International

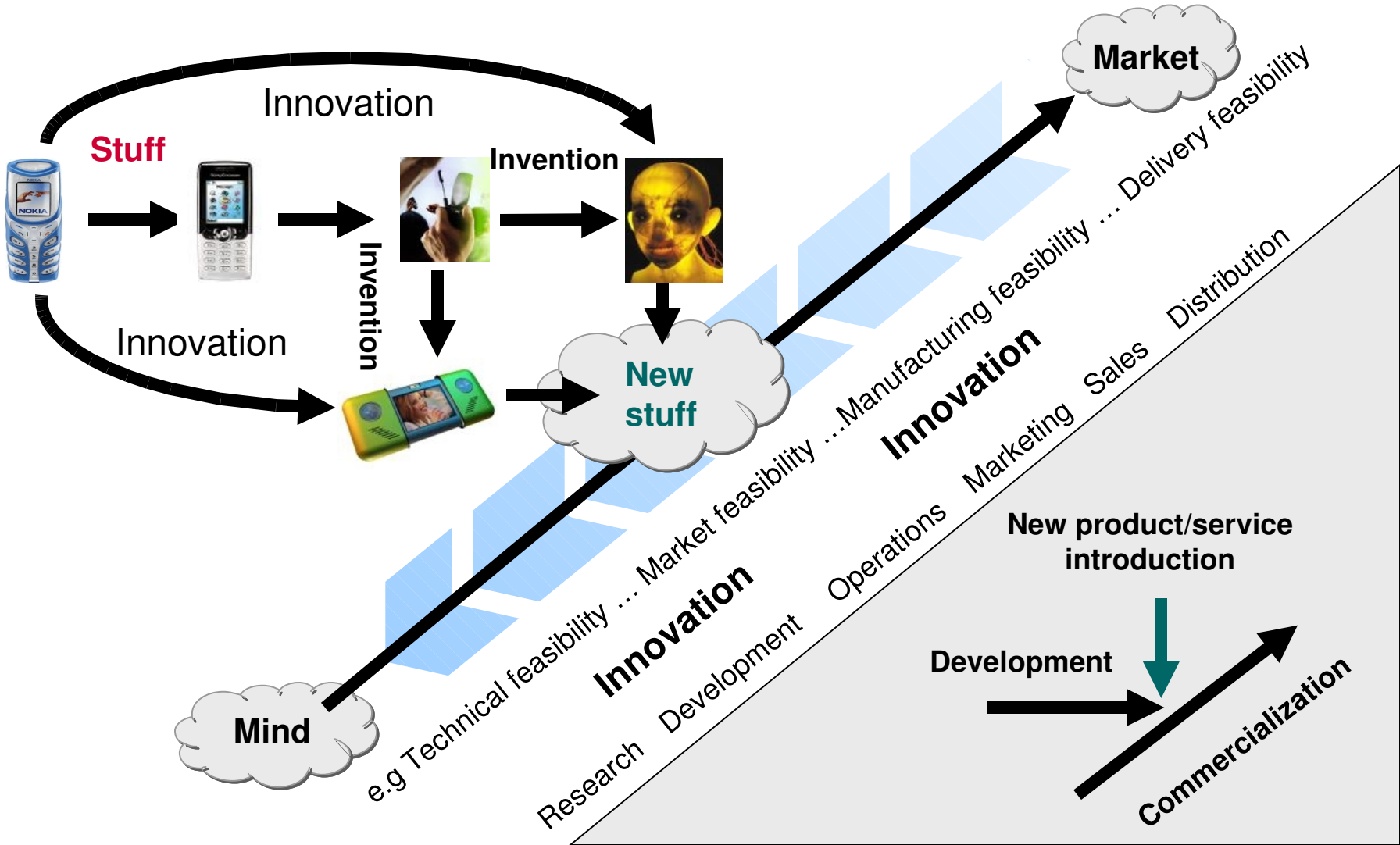
EXPERIENCE. RESULTS.

A fool with a tool is still a fool, and better tools are needed - leading to a convergence of innovation methods



Ideation's 'Knowledge Wizard' – A basic TRIZ support tool

So innovation is more than just a good idea

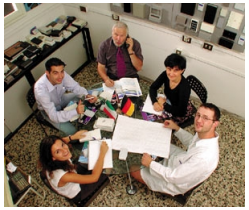


EXPERIENCE. RESULTS.

Remember… stuff can be:

Products

Services

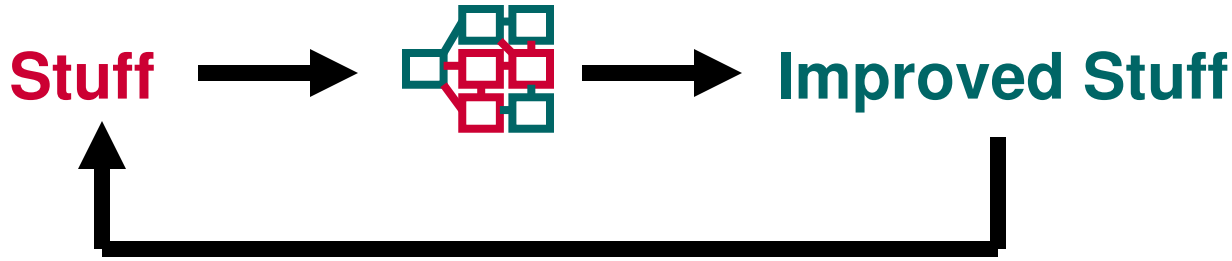


Solutions

Processes

Organizations

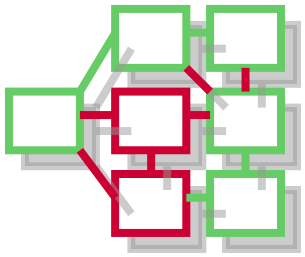
Ideas



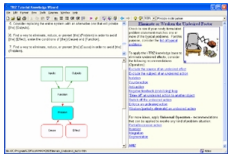
EXPERIENCE. RESULTS.

So what's this "magic happens" stuff?

Impossible problems

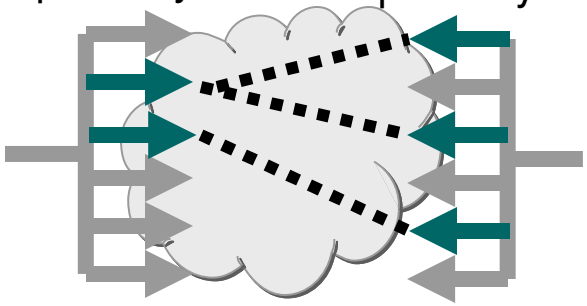


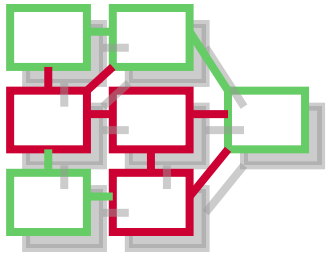
Problem mark-up



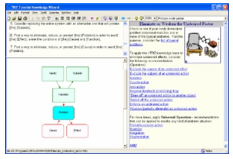
Solution pathways

Problem pathways





Solution mark-up



Unlikely solutions

Combinatorial innovation

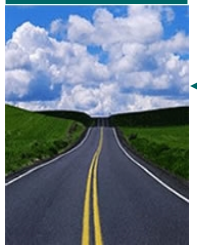
EXPERIENCE. RESULTS.

The same models can describe solutions leading to problem-finding pathways

Solution

Hydrogen Combustion

Useful



Harmful

Harmful

Useful

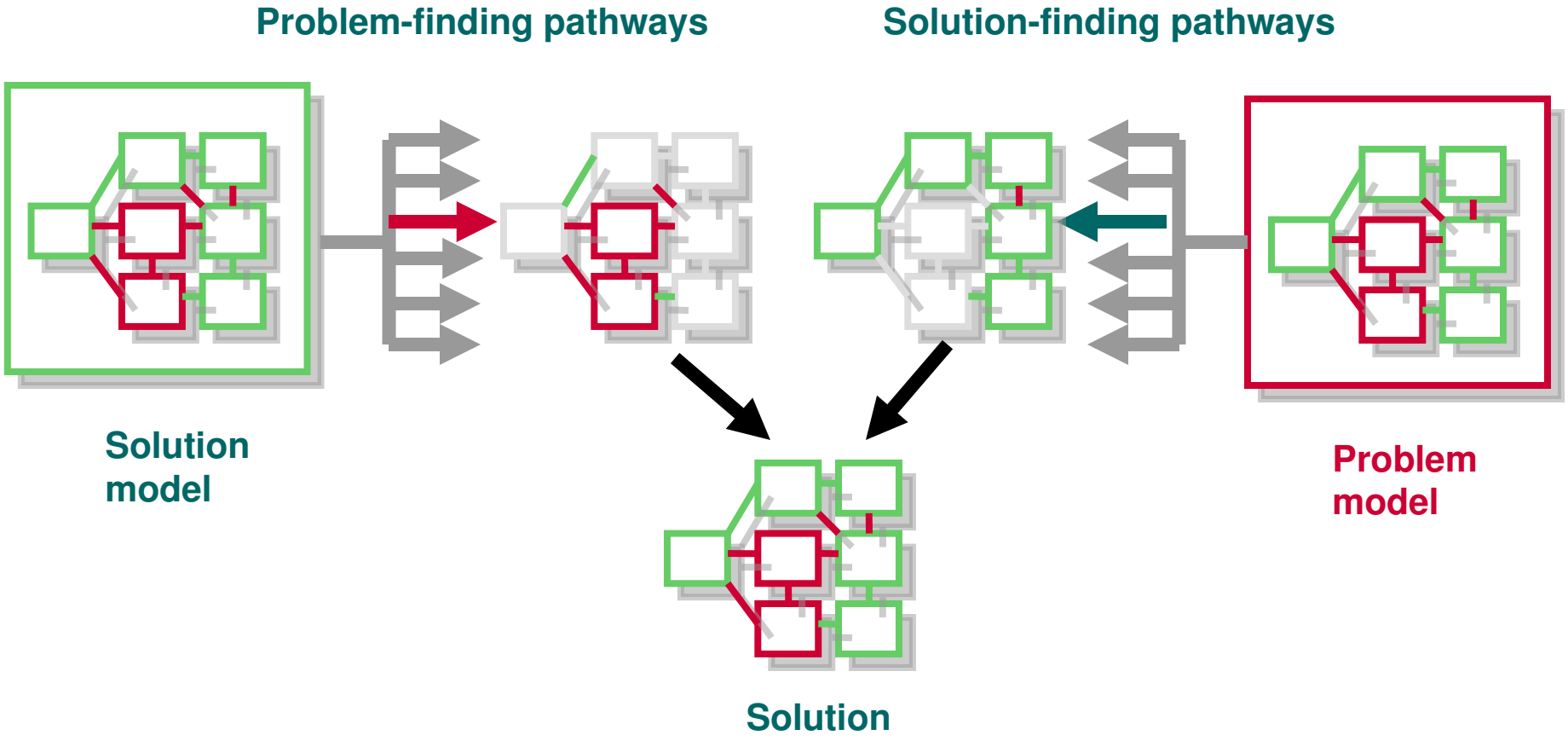
Problem

Petrol Combustion

1. Find a problem that if resolved would counteract the (Oil Industry Profits) and (Environmental damage) and which exists for the production of (Freedom of Movement)

EXPERIENCE. RESULTS.

The next generation of knowledge management for innovation

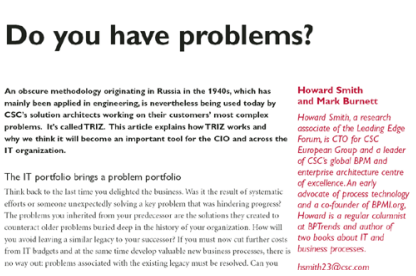


EXPERIENCE. RESULTS.

http://howardsmith.editme.com
http://trizmethods.blogspot.com

The Innovator Is A Problem Solver

Do You Have Problems?
A modern TRIZ Overview


Do you have problems?

An obscure methodology originating in Russia in the 1940s, which has mainly been applied in engineering, is nevertheless being used today by CSC's solution architects working on their customers' most complex problems. It's called TRIZ. This article explains how TRIZ works and why we think it will become an important tool for the CIO and across the IT organization.

The IT portfolio brings a problem portfolio

Think back to the last time you delighted the business. Was it the result of systematic efforts or someone unexpectedly solving a key problem that was hindering progress? The problems you inherited from your predecessor are the solutions they created to counteract older problems buried deep in the history of your organization. How will you avoid leaving a similar legacy to your successor? If you must now cut further costs from IT budgets and at the same time develop valuable new business processes, there is no way out: problems associated with the existing legacy must be resolved. Can you

Howard Smith and Mark Burnett

Howard Smith, a research associate of the Leading Edge Forum, is CTO for CSC European Group and a leader of CSC's global BPM and enterprise architecture centre of excellence. An early advocate of process technology and a co-founder of BPM.org, Howard is a regular columnist at BPTrends and author of two books about IT and business processes.

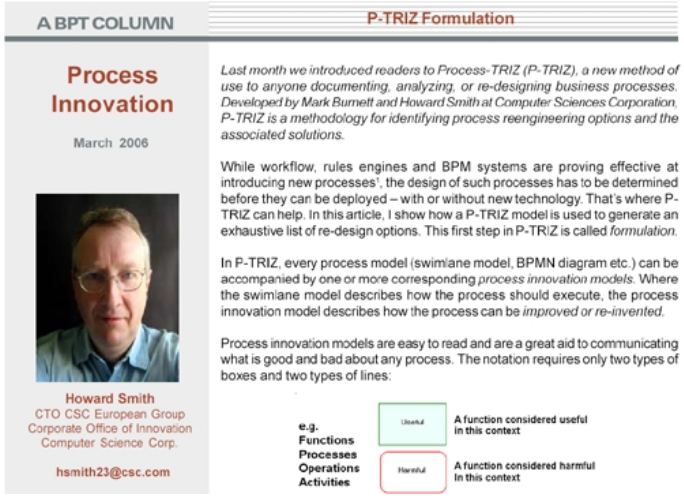
hsmith23@csc.com

EXPERIENCE. RESULTS.

What Innovation Is

White paper
38 pages

P-TRIZ Formulation


A BPT COLUMN

P-TRIZ Formulation

Process Innovation

March 2006

Last month we introduced readers to Process-TRIZ (P-TRIZ), a new method of use to anyone documenting, analyzing, or re-designing business processes. Developed by Mark Burnett and Howard Smith at Computer Sciences Corporation, P-TRIZ is a methodology for identifying process reengineering options and the associated solutions.

While workflow, rules engines and BPM systems are proving effective at introducing new processes', the design of such processes has to be determined before they can be deployed – with or without new technology. That's where P-TRIZ can help. In this article, I show how a P-TRIZ model is used to generate an exhaustive list of re-design options. This first step in P-TRIZ is called *formulation*.

In P-TRIZ, every process model (swimlane model, BPMN diagram etc.) can be accompanied by one or more corresponding *process innovation models*. Where the swimlane model describes how the process should execute, the process innovation model describes how the process can be *improved or re-invented*.

Process innovation models are easy to read and are a great aid to communicating what is good and bad about any process. The notation requires only two types of boxes and two types of lines:

e.g.
Functions
Processes
Operations
Activities

Useful — A function considered useful in this context

Harmful — A function considered harmful in this context

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