

Business Process Management & Innovation (P-TRIZ)

Howard Smith

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Co-Founder BPMI.org
Founder SouthbeachInc.com

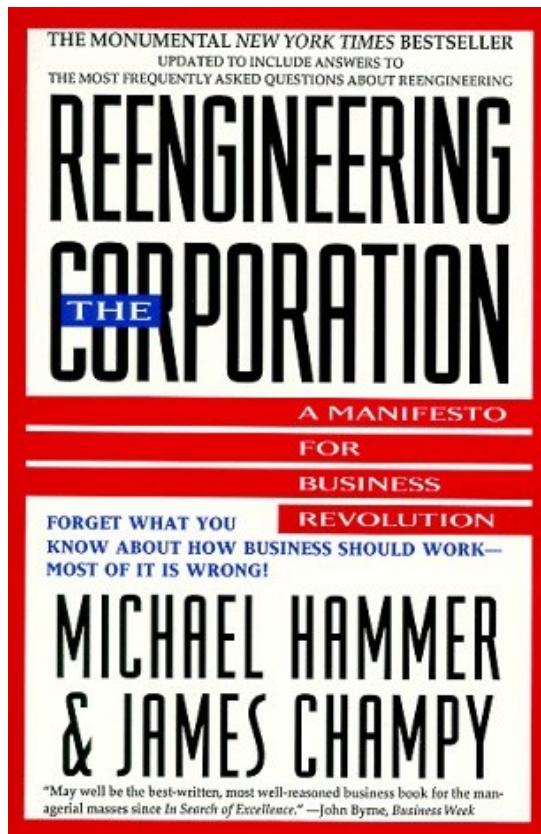


London, March 2006

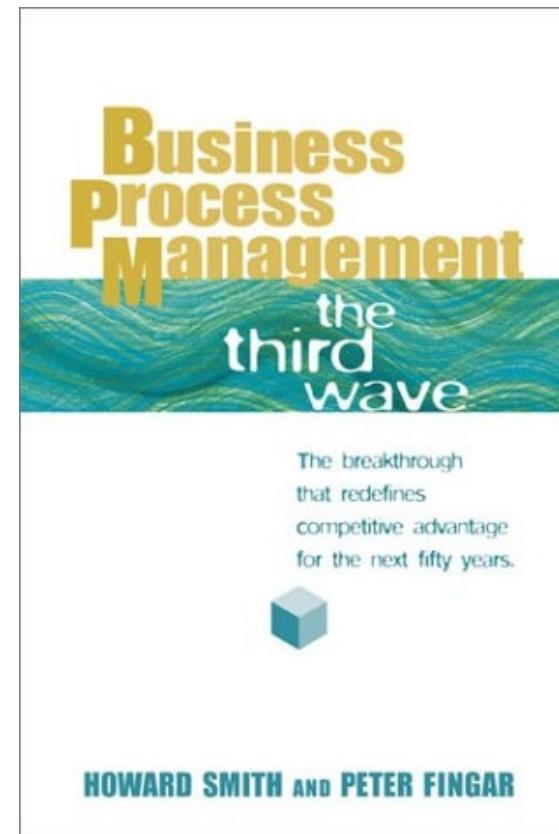
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Ten years on, CSC has a new process agenda



1993



2003



First wave

1920s
Methods & Procedures
Analysis
Process implicit in
Work practices
Little automation

Second wave

1980-90s
ERP, other packages
Manual reengineering
IT Enablers/Automation
One-time creation

Third wave

2000s
Process focus of IT
Path to execution
Agility, adaptation
Closed loop optimization

1980s
TQM
Continuous
Scientific
Incremental

1990s
Reengineering
Disruptive
Un-scientific
Radical

2000s
BPM
Continuous
Scientific
Lifecycle

1970-90s
DBMS
Sharing data
Data aware applications

1990s
Distributed computing
Sharing functions
Distributed applications

2000s
BPMS
Sharing processes
Distributed processes



Latest report: BPM case studies and history

A CSC White Paper
September 2005

From CIO to CPO via BPM

THE NEXT GENERATION OF ENTERPRISE AUTOMATION

CSC.COM CONSULTING SYSTEMS INTEGRATION OUTSOURCING

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From CIO to CPO via BPM:

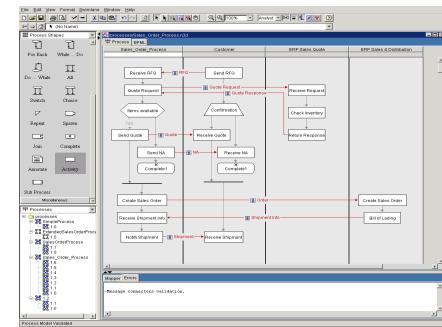
***The Next Generation of
Enterprise Automation***

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



Value = invention + scale

HOME BUDGET, 1979			
	NOV	DEC	TOTAL
SALARY	2500.00	2500.00	30000.00
OTHER			
INCOME	2500.00	2500.00	30000.00
FOOD	400.00	400.00	4800.00
RENT	750.00	750.00	4200.00
HEAT	110.00	120.00	575.00
IREC	100.00	100.00	1200.00
TAXES	1000.00	1000.00	12000.00
ENTERTAIN	100.00	100.00	1200.00
MISC	100.00	100.00	1200.00
CAR	300.00	300.00	3600.00
EXPENSES	2460.00	2470.00	28775.00
REMAINDER	40.00	30.00	1225.00
SAVINGS	30.00	30.00	300.00



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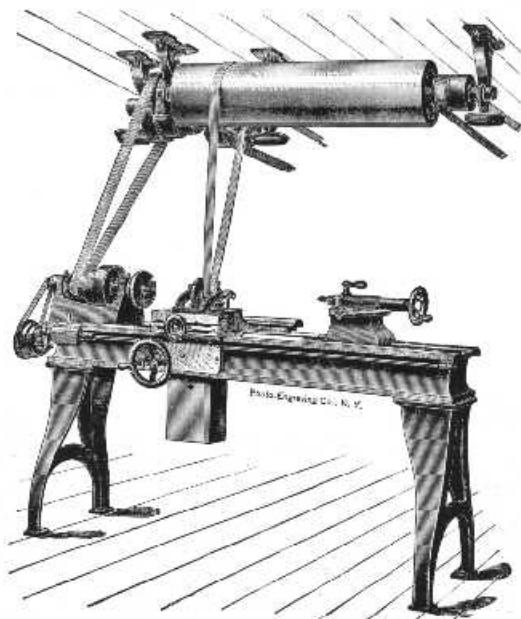


Microsoft
.net

W3C



1900 - Frederick W. Taylor



Carl Barth



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



1981 Etude: An Integrated Document Processing System

4/18 10:10 RT=85 M=214377 GC=2 L=.0 546 Hlto: address/Letter		Document: letter:BodyText
returnaddress		MIT Laboratory for Computer Science 545 Technology Square Room 217 Cambridge, MA 02139
		March 10, 1980
address	John Jones World Wide Word Processing Inc. 1378 Royal Avenue Cupertino, CA 95014	
salutation	Dear John:	
body, paragraph	We are pleased to hear of your interest in our ETUDE text formatting system, which is now available for demonstration. Enclosed you will find a copy of our working paper entitled <i>An Interactive Editor and Formatter</i> , which will give you an overview of some of the goals of our research. This research is funded by a contract with Exxon Enterprises Inc.	
paragraph	Our efforts have been guided by a number of general principles:	
number, item	I. ETUDE should be easy to use. The system should respond in a reasonable manner, regardless of the user's input. In particular, the user should not be reluctant to try a command, for fear of losing the current document.	
item	2. A user of ETUDE should not be concerned with the details of a document's formatting	

“Out of this collection of tools can be built virtually any office application system”

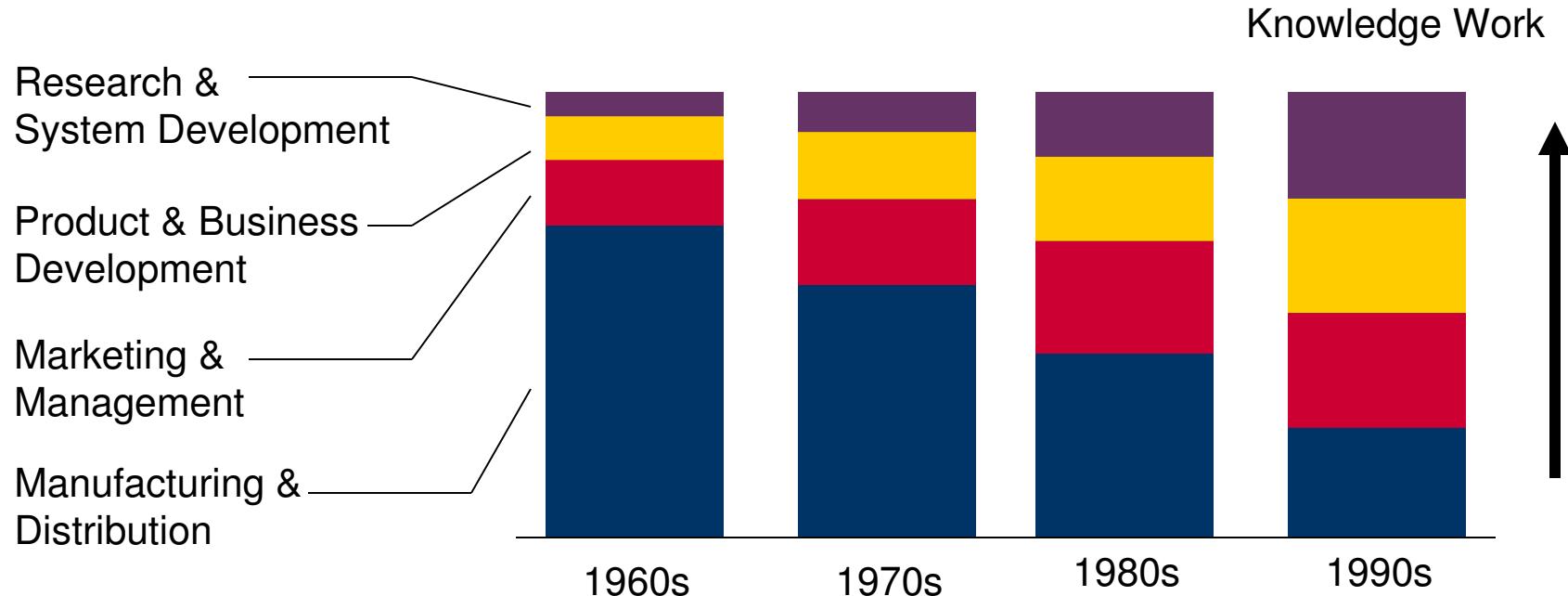
-Michael Hammer et al,
MIT Office Automation
Group, 1981

www.recordare.com/good/oa81.html



2000 - The rise of knowledge work

- Objects did change the world
- Processes are going to change it again



Knowledge worker costs are now 50% of all corporate costs

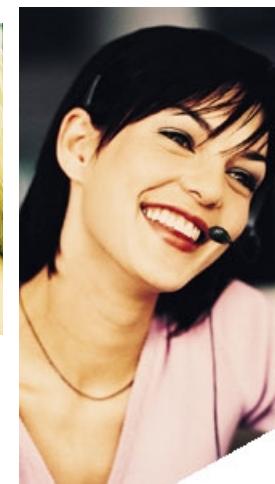


Not call centre worker robots



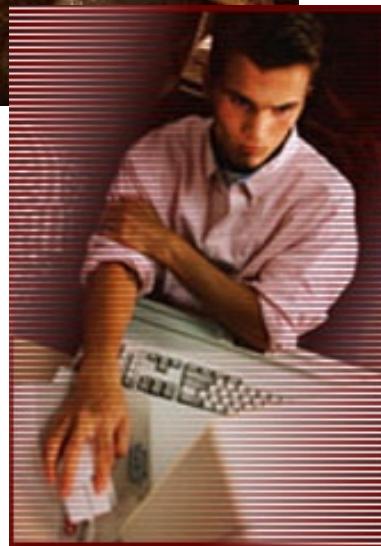


“Knowledge” workers





A process tool is needed



*Work with processes and
work in processes*

**WHAT PART
OF**

$$F_s = \iiint_V \vec{f}_p \, dv + \iiint_V [\vec{R} \cdot [2\omega x \nabla_{xyz}] + [\dot{\omega}xr] + \omega x[\omega xr]] \rho \, dx =$$

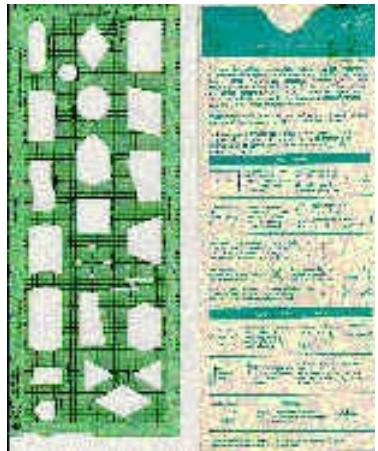
$$\oint \oint \nabla_{xyz} [\rho \nabla_{xyz} \cdot dA] + \frac{\partial}{\partial t_{in}} \iiint_V \nabla_{xyz} [\rho \, dv]$$

**DON'T YOU
UNDERSTAND?**

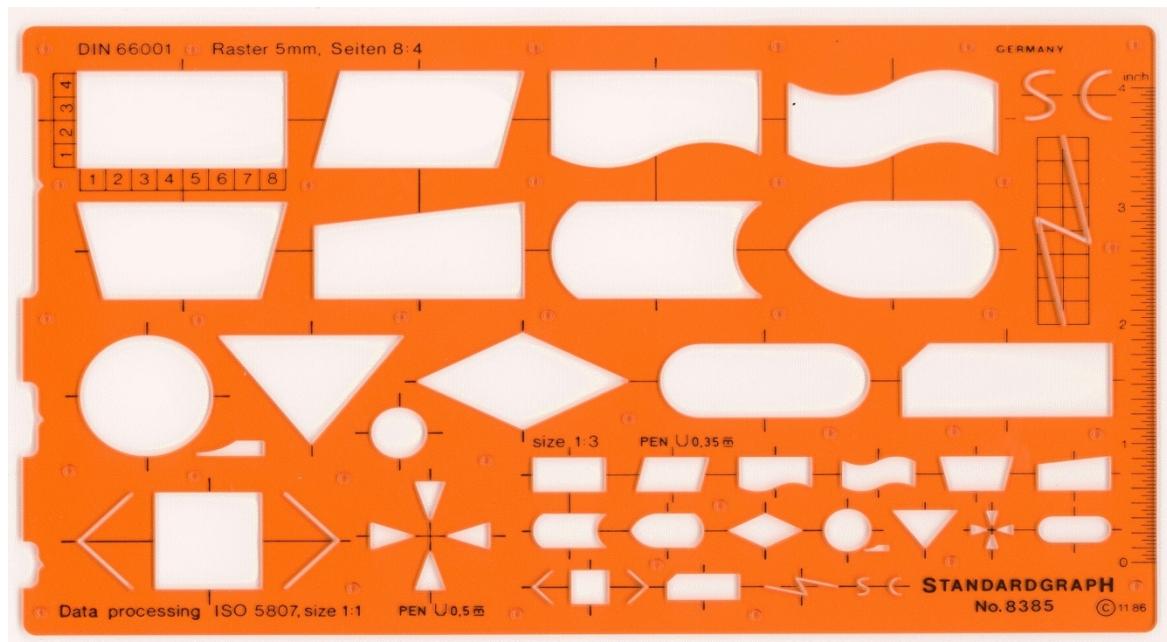
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www.folz.com



Who remembers these?



Tacky
cardboard
sleeve

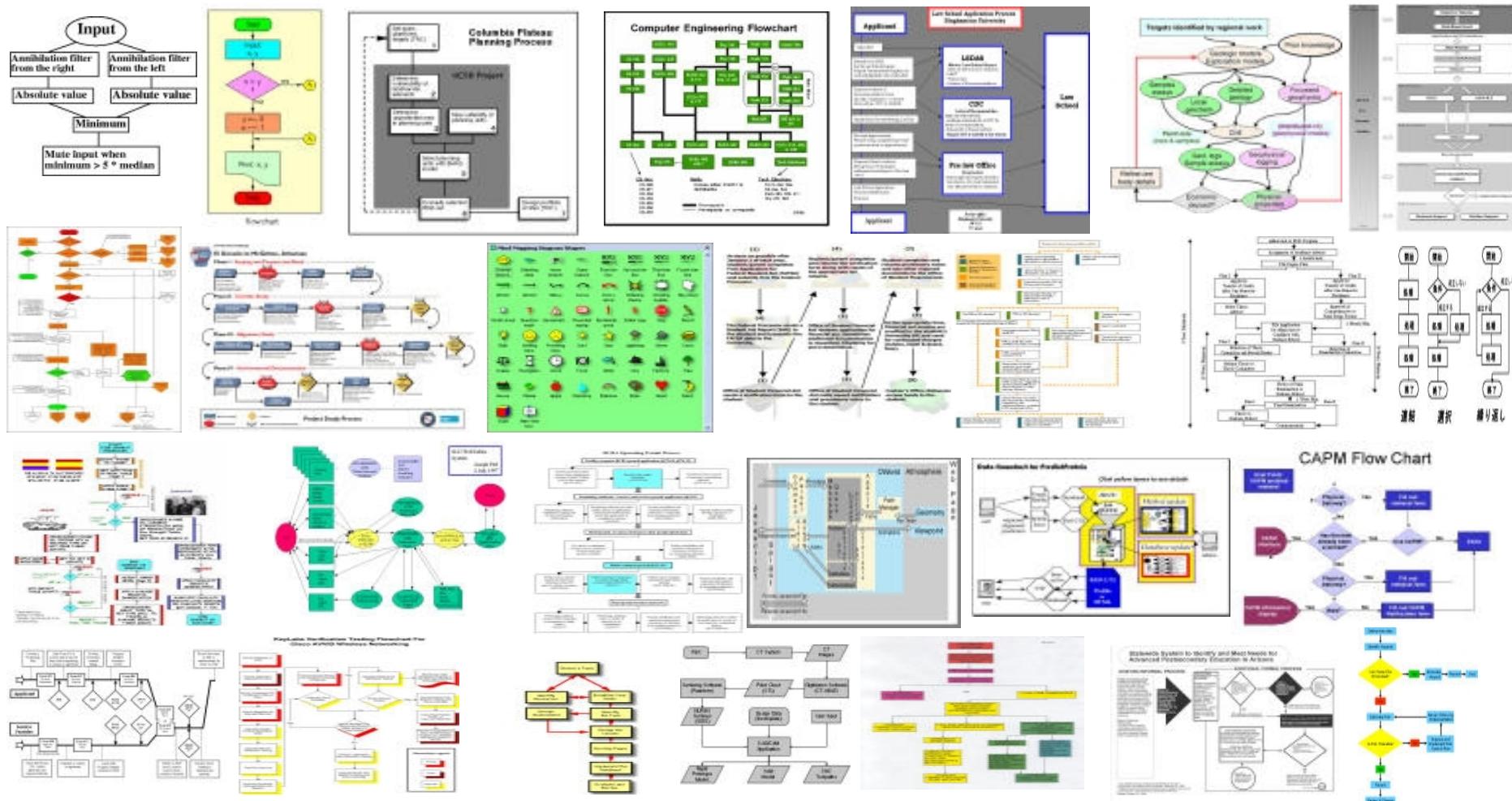


When was the last time you used one?



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We still draw them, what's stopping us using them?



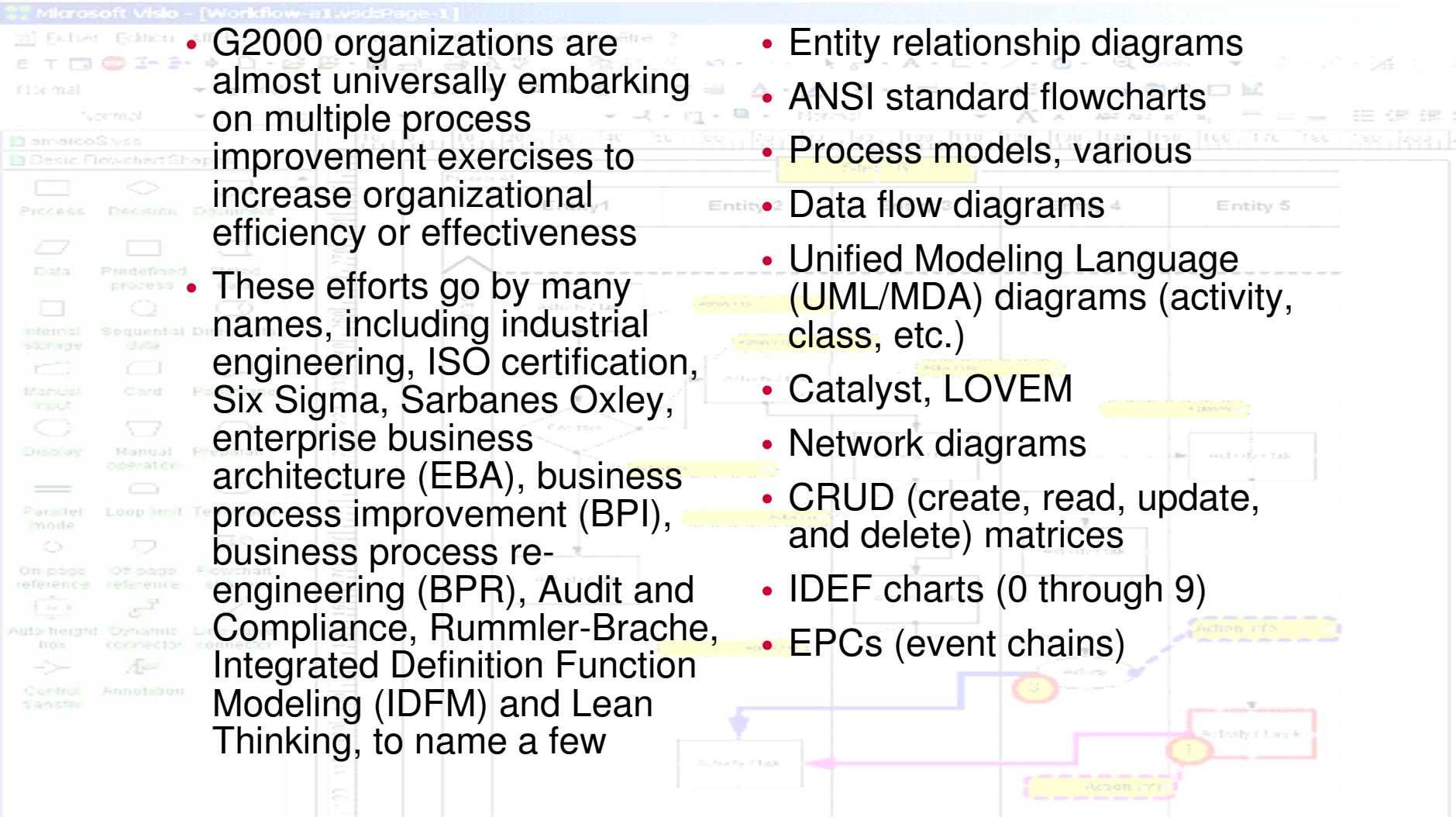


Process work is pervasive but **terminology** varies

- G2000 organizations are almost universally embarking on multiple process improvement exercises to increase organizational efficiency or effectiveness
- These efforts go by many names, including industrial engineering, ISO certification, Six Sigma, Sarbanes Oxley, enterprise business architecture (EBA), business process improvement (BPI), business process re-engineering (BPR), Audit and Compliance, Rummler-Brache, Integrated Definition Function Modeling (IDFM) and Lean Thinking, to name a few

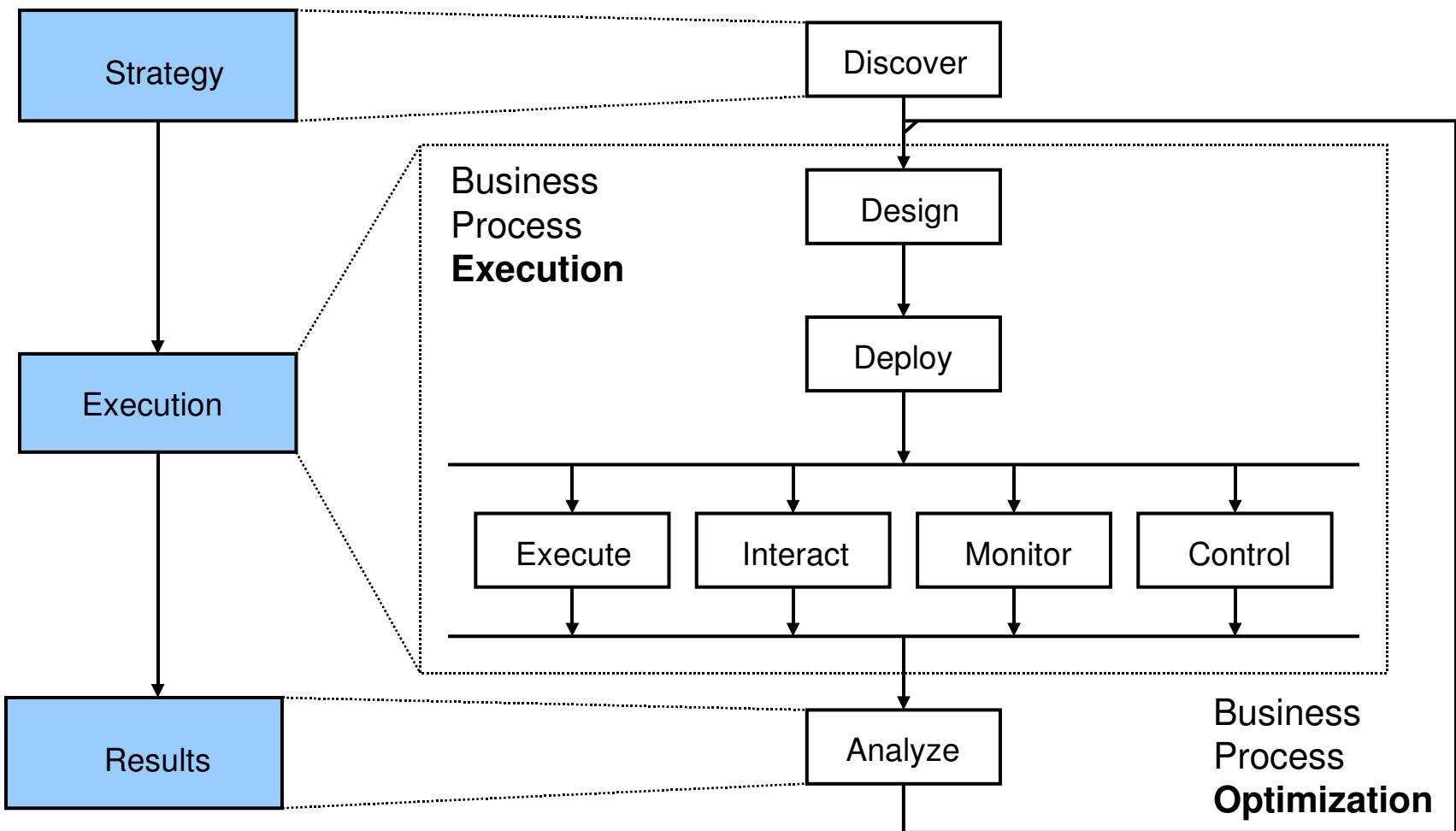
Process work is pervasive but **semantics** varies

- Entity relationship diagrams
- ANSI standard flowcharts
- Process models, various
- Data flow diagrams
- Unified Modeling Language (UML/MDA) diagrams (activity, class, etc.)
- Catalyst, LOVEM
- Network diagrams
- CRUD (create, read, update, and delete) matrices
- IDEF charts (0 through 9)
- EPCs (event chains)



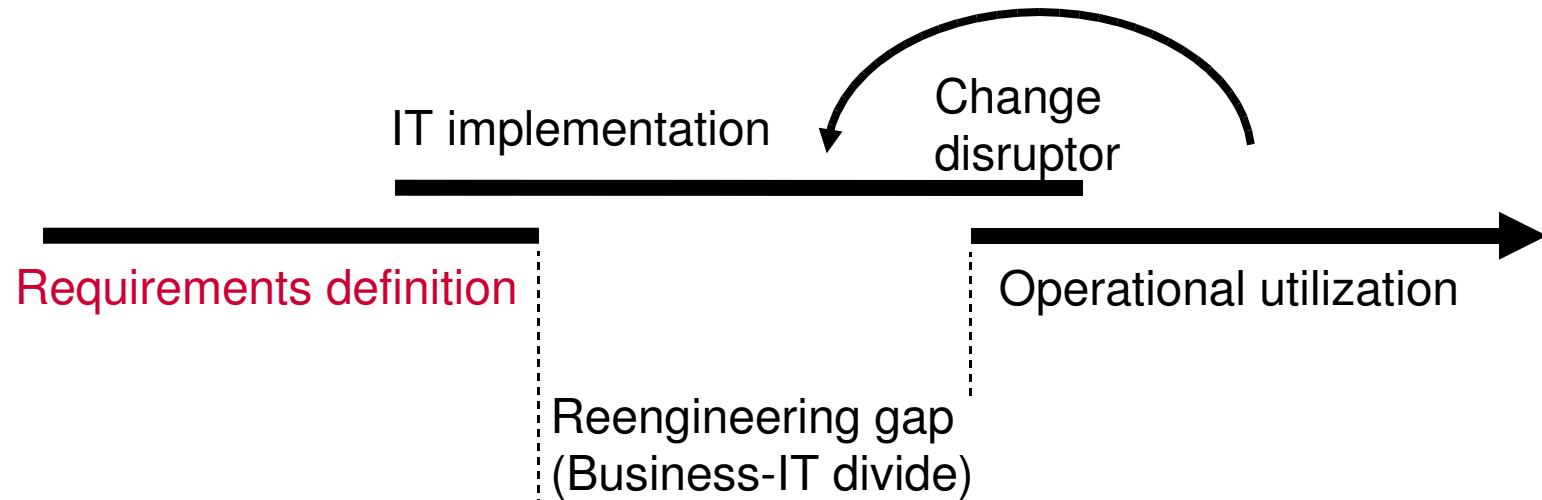


The process lifecycle

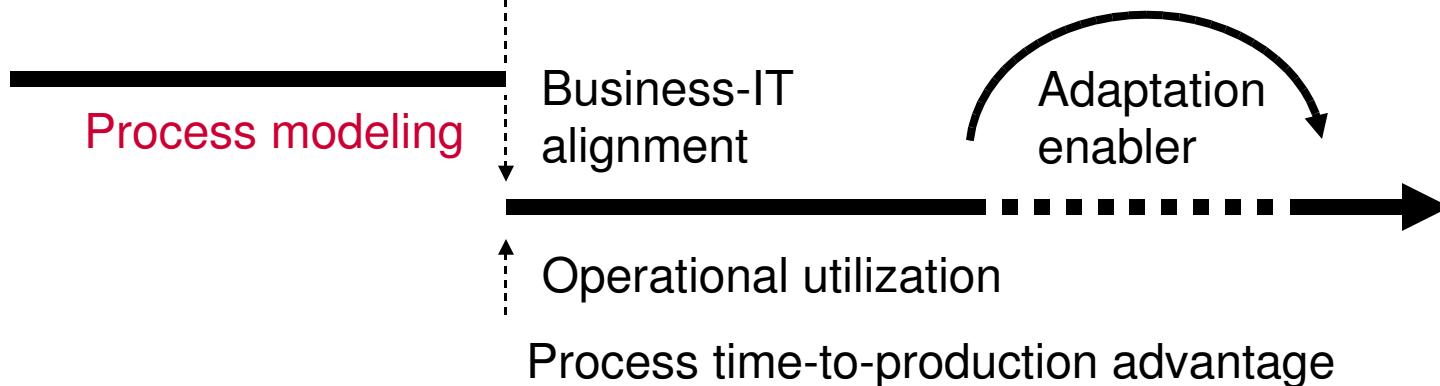




Reengineering



Business Process Management





The connection to reengineering



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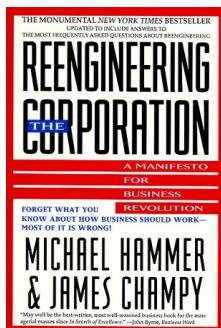
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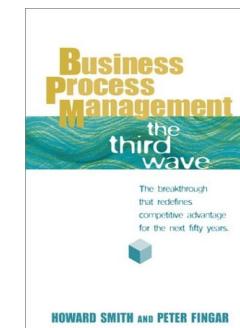


CSC 1993



BPM Definition

CSC 2003



Fast forward Post-ERP To BPML and BPMS 1999 to 2003



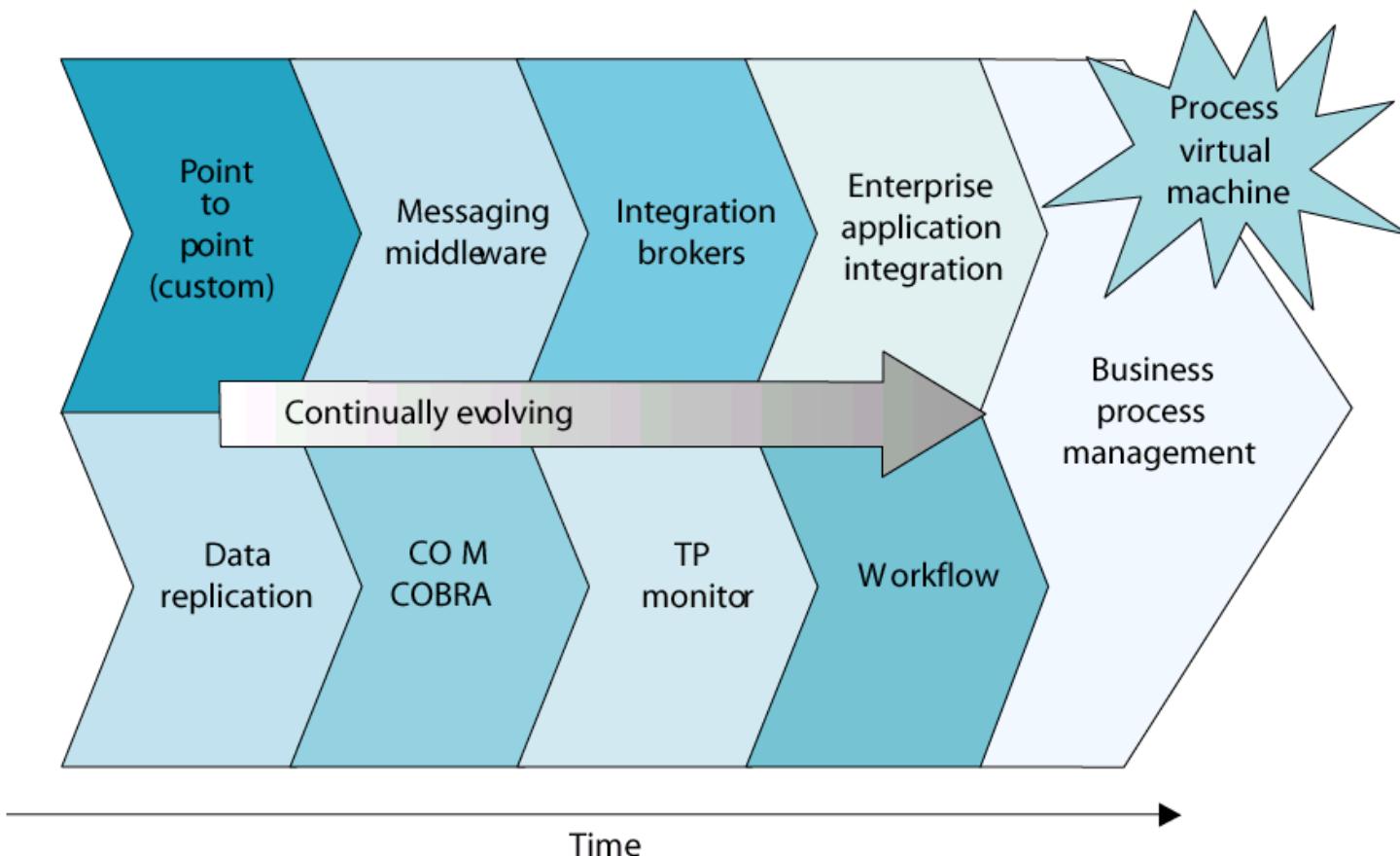
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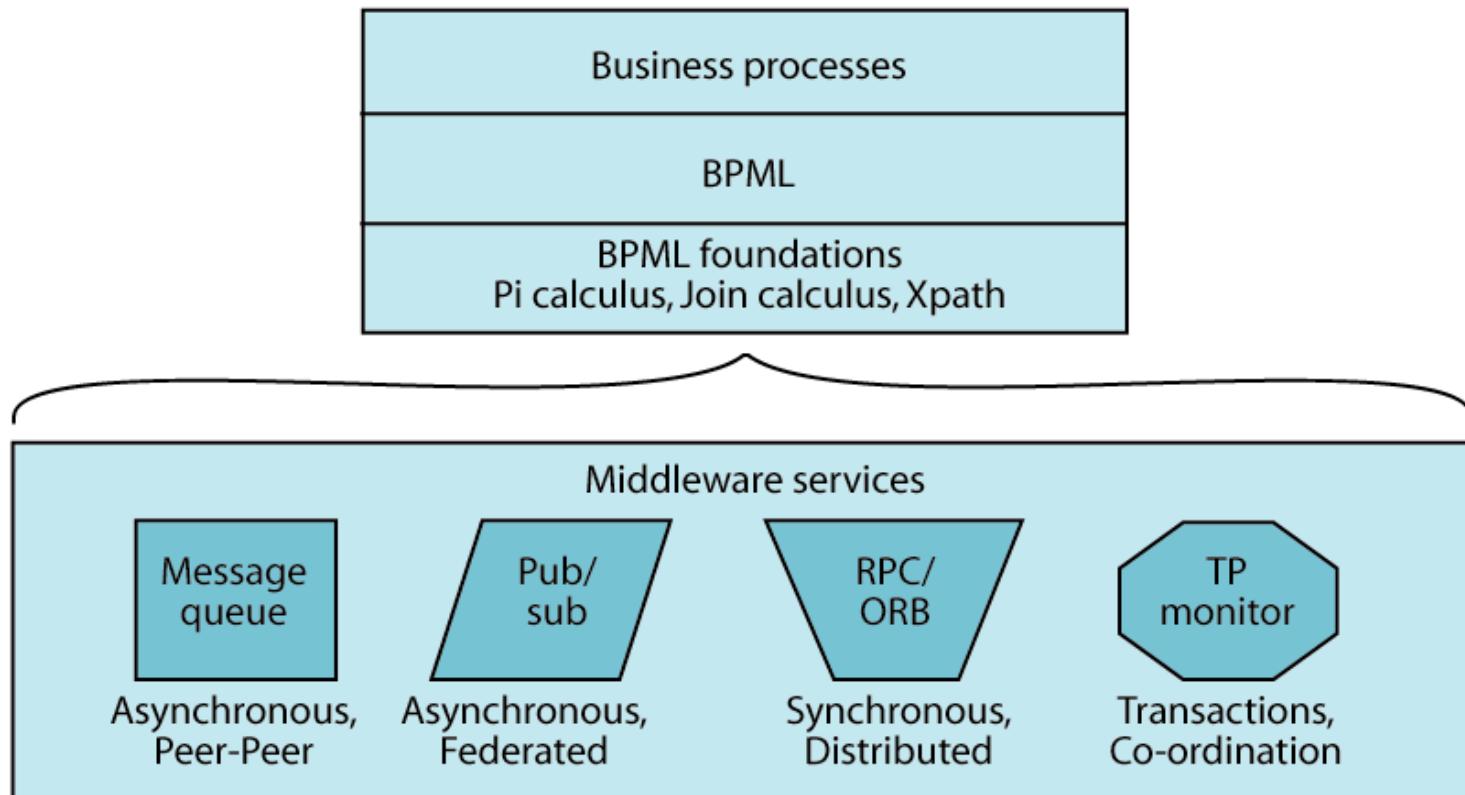
Towards a process virtual machine



Source CSC EAI Practice

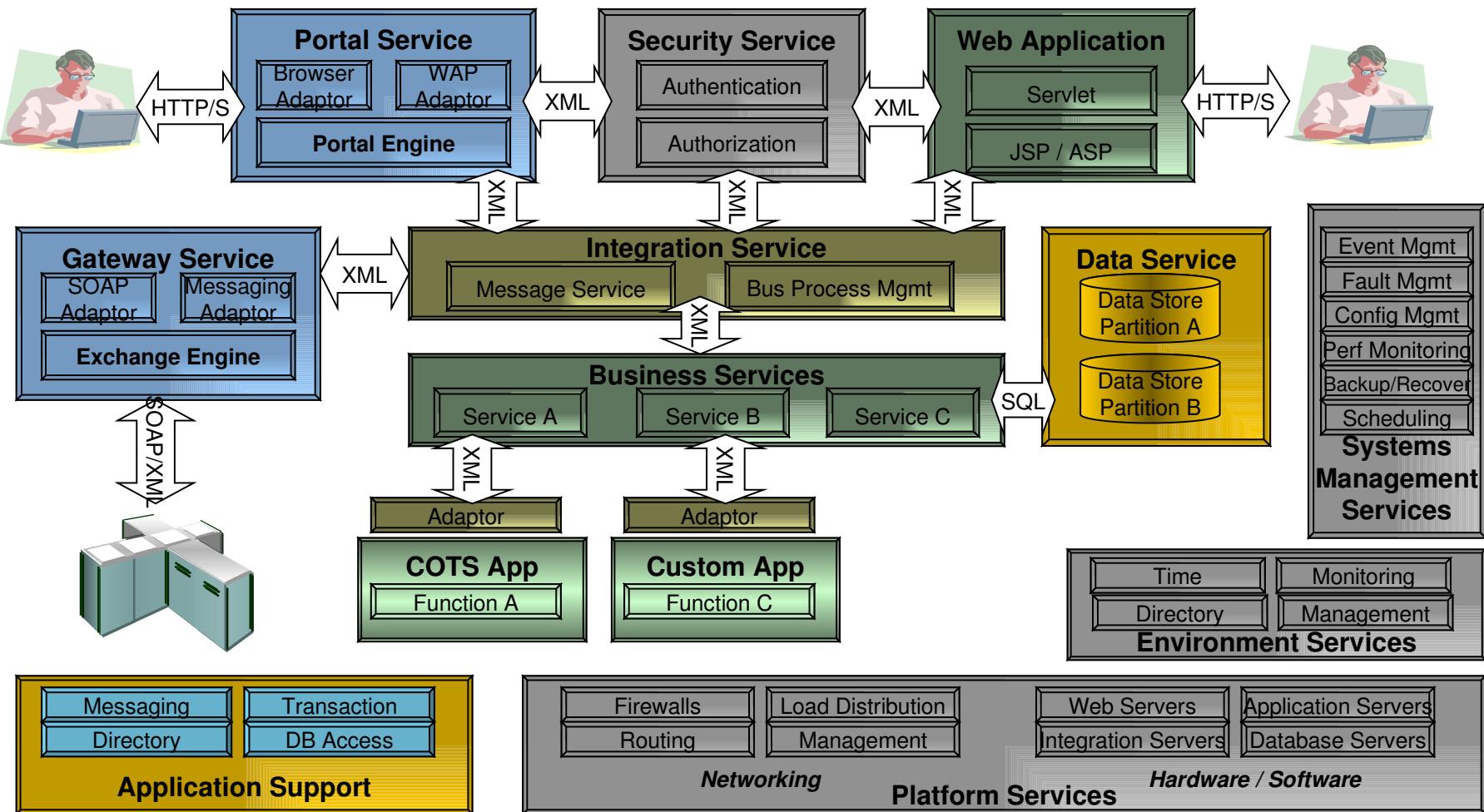


Distributed concurrent processing can be unified



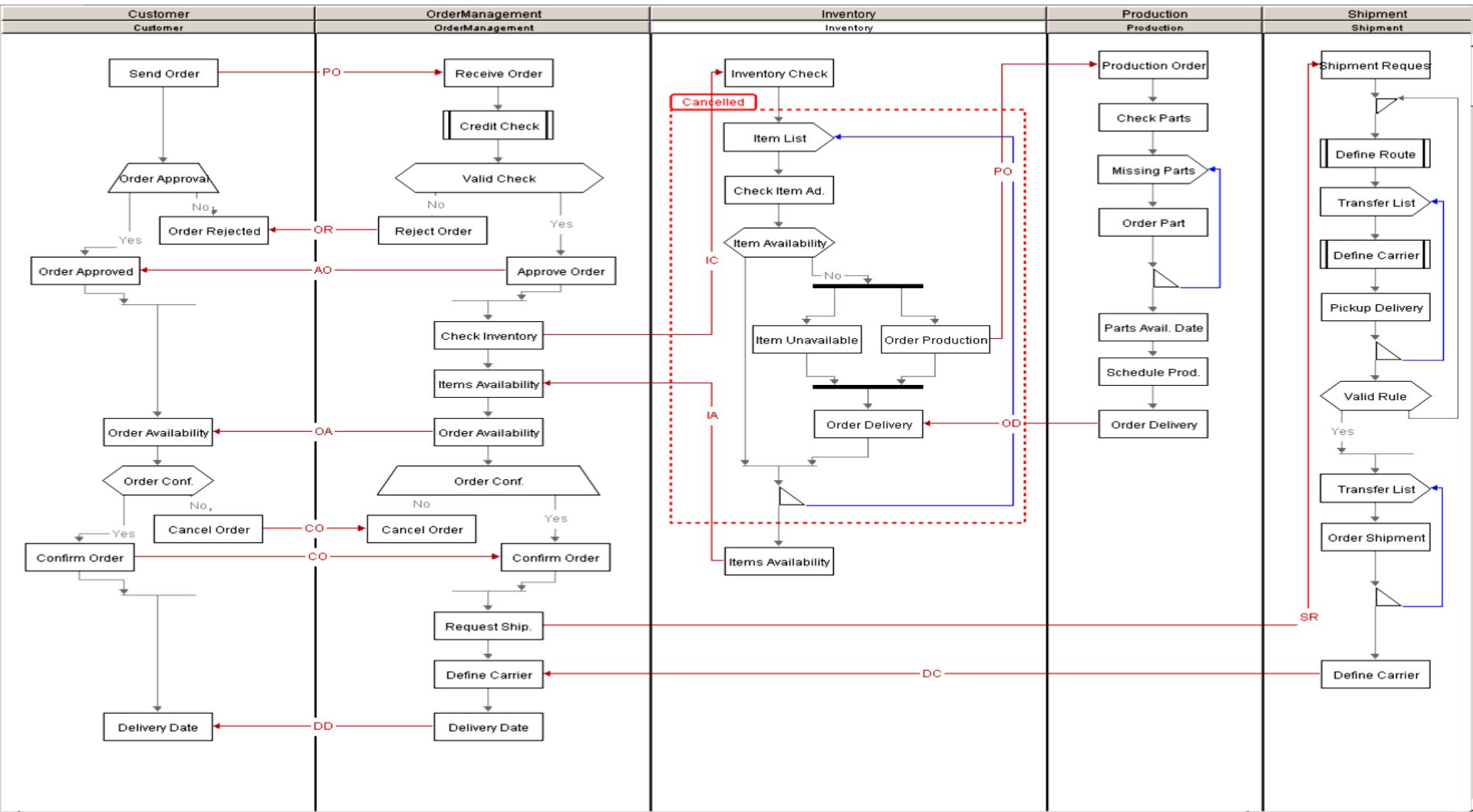


When complexity mounts and becomes unmanageable, it's time for action



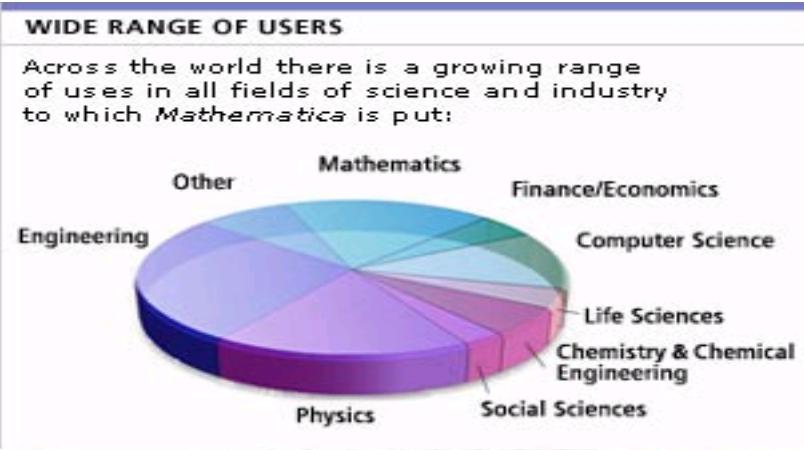


How business people think, really ...





The power of unification



FOURIER THEOREM

According to the Fourier Theorem, any periodic function can be represented as an infinite series of trigonometric functions.

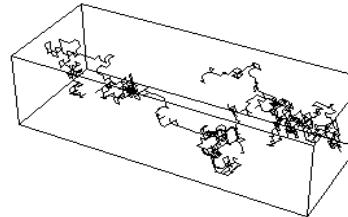
Fourier Theorem:
According to the Fourier Theorem, any periodic function can be represented as an infinite series of trigonometric functions.

Fourier Theorem:
According to the Fourier Theorem, any periodic function can be represented as an infinite series of trigonometric functions.

```
In[32]:= Simplify[%]
```

```
Out[32]= x^99 + y^99
```

```
In[17]:= RandomWalk[n_, d_] := NestList[(# + (-1)^(Table[Random[Integer], {d}])) &, Table[0, {d}], n]
Show[Graphics3D[Line[RandomWalk[1000, 3]]]]
```



```
Out[18]= - Graphics3D -
```

```
In[27]:= \sum_{\mu=0}^{\infty} \frac{\varphi^{\mu} \operatorname{Exp}\left[\frac{\pi i \mu}{4}\right]}{\mu !^2 (\mu ^2+\kappa ) (\mu ^2-\lambda )} // TraditionalForm
```

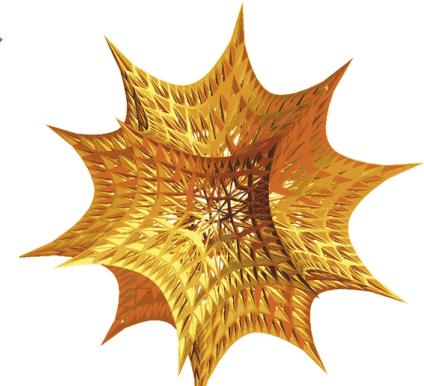
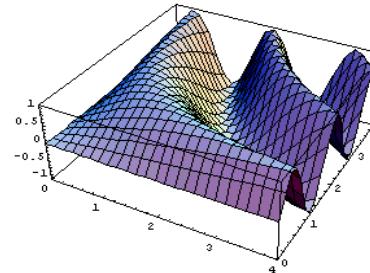
```
Out[27]//TraditionalForm=
```

$$\begin{aligned} &(-\lambda _1 F_2(-i \sqrt{\kappa };1,-i \sqrt{\kappa };e^{i \pi /4} \varphi)-\lambda _1 F_2(i \sqrt{\kappa };1,i \sqrt{\kappa }+1;e^{i \pi /4} \varphi)- \\ &\quad \lambda _1 F_2(-\sqrt{\lambda };1,-\sqrt{\lambda };e^{i \pi /4} \varphi)-\lambda _1 F_2(\sqrt{\lambda };1,\sqrt{\lambda }+1;e^{i \pi /4} \varphi))/(2 \kappa (\sqrt{\kappa }-i \sqrt{\lambda })(\sqrt{\kappa }+i \sqrt{\lambda }) \lambda) \end{aligned}$$

```
In[36]:= Solve[x^2+x==a, x]
```

```
Out[36]= \{ \{x \rightarrow \frac{1}{2} \left(-1-\sqrt{1+4 \, a}\right)\}, \{x \rightarrow \frac{1}{2} \left(-1+\sqrt{1+4 \, a}\right)\} \}
```

```
In[30]:= Plot3D[Sin[x y], {x, 0, 4}, {y, 0, 4}]
```



Fusion of procedural, functional, and rule-based programming metaphors



Business Process Management Initiative (BPMI.org)

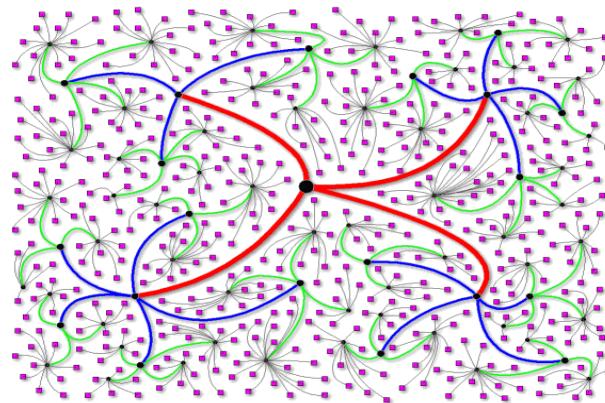




Process unifies computation and communication

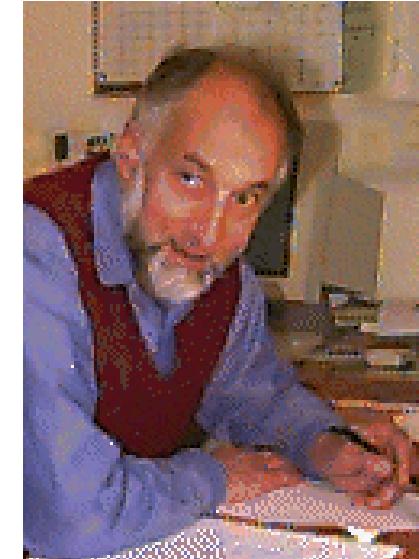


INTERACTION DESIGN





“For over two decades the Process Calculus community has sought to combine two things: the way you define and analyze mobile distributed processes and the way you program them. We believe we’ve found the basic maths to meet this challenge, and it is heartening to hear that it is being applied to the management and automation of a company’s most basic economic assets, its core processes ...”



Robin Milner, Professor of Computer Science,
Cambridge University, UK

— **ACM Turing Award** Winner, 1991



Process Calculus

\dots, \sim_ω is a decreasing sequence of relations.
Claim is a consequence of the fact that the transition relations

$\sim_\omega Q$ iff $P \sim Q$.

from the definitions that $P \sim Q$ implies $P \sim_\omega Q$.

$\sim_\omega Q$ implies $P \sim Q$ by establishing that \sim_ω is a bisimulation.
Since \sim_ω is image-finite, there is Q' such that $Q \xrightarrow{\alpha} Q'$ and
infinitely many n . We deduce that $Q' \sim_n P'$ for infinitely many n ,
 P' . \square

$\sum_{i \in I} P_i$ abbreviates $P_{i_1} + \dots + P_{i_r}$ where $I = \{i_1, \dots, i_r\}$.

Suppose that $n \geq 0$ and $P \not\sim_n Q$. Then there is a summation M
 $\tilde{z} \subseteq \text{fn}(P, Q)$ and any fresh name s ,

$$(\nu \tilde{z}) (P \mid (M + s)) \not\sim (\nu \tilde{z}) (Q \mid (M + s)).$$

For $n = 0$ there is nothing to prove, so suppose that
there are α and P' such that $P \xrightarrow{\alpha} P'$ but $P' \not\sim_{n-1} Q'$ for all Q'
(or vice versa, when the argument is the same). Since $\{Q' \mid Q \xrightarrow{\alpha} Q'\} = \{Q_i \mid i \in I\}$ for some finite set I . Appealing
to hypothesis, for each $i \in I$ let M_i be a summation such that for
(and any fresh name t ,

$$(\nu \tilde{w}) (P' \mid (M_i + t)) \not\sim (\nu \tilde{w}) (Q_i \mid (M_i + t)). \quad (2.2)$$

cases, one for each form that α can take. We give the details



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Since $A \sim B$ there is B' such that $B \xrightarrow{\tau} B'$
 $B' \downarrow_s$ does not hold. The only way this is po

$$B' \stackrel{\text{def}}{=} (\nu \tilde{z}) (Q_j \mid \Sigma_{i \in I} \tau_i)$$

for some $j \in I$. We now exploit the induction hypothesis.
We have

$$A' \xrightarrow{\tau} A''_j \stackrel{\text{def}}{=} (\nu \tilde{z}) (P' \mid \Sigma_{i \in I} \tau_i)$$

Since $A' \sim B'$ there is B''_j such that $B' \xrightarrow{\tau} B''_j$
we must have $B''_j \downarrow_{s_j}$. The only possibility is

$$B''_j \stackrel{\text{def}}{=} (\nu \tilde{z}) (Q_j \mid (M_j + s_j))$$

But $A''_j \not\sim B''_j$ by (2.2), a contradiction. Hence

Case 2 Suppose that α is $\bar{x}y$. Let s_i ($i \in I$) a

$$M \stackrel{\text{def}}{=} x(w). \Sigma_{i \in I} [w = y] \tau_i$$

The argument is then similar.

Case 3 Suppose that α is $\bar{x}(z)$. Suppose $\text{fn}(P, Q)$ and t and w be fresh names, and set

$$M \stackrel{\text{def}}{=} x(w). (\Sigma_{h=1}^k [w = a_h] t + \Sigma_{i \in I} [w = y] \tau_i)$$

The argument is then similar. In this case, using the induction hypothesis, we have

$$A' \stackrel{\text{def}}{=} \nu \tilde{z} \nu z (P' \mid (\Sigma_{h=1}^k [z = a_h] t + \Sigma_{i \in I} [z = y] \tau_i))$$

and not $A' \downarrow_s$ and not $A' \downarrow_t$. It follows that the $\bar{x}(z)$ from Q performing a bound on z is not captured by νz .



Process calculus primitives

Operation	Notation	Meaning
prefix	$\pi.P$	sequencing
action	$x(y)$ \overline{xy}	communication
summation	$a.P + b.Q$	choice
	$\sum \pi_i.P_i$	
recursion	$P = \{\dots\}.P$	repetition
replication	$!P$	
composition	$P Q$	concurrency
restriction	$(v\ x)P$	encapsulation

Business Processes



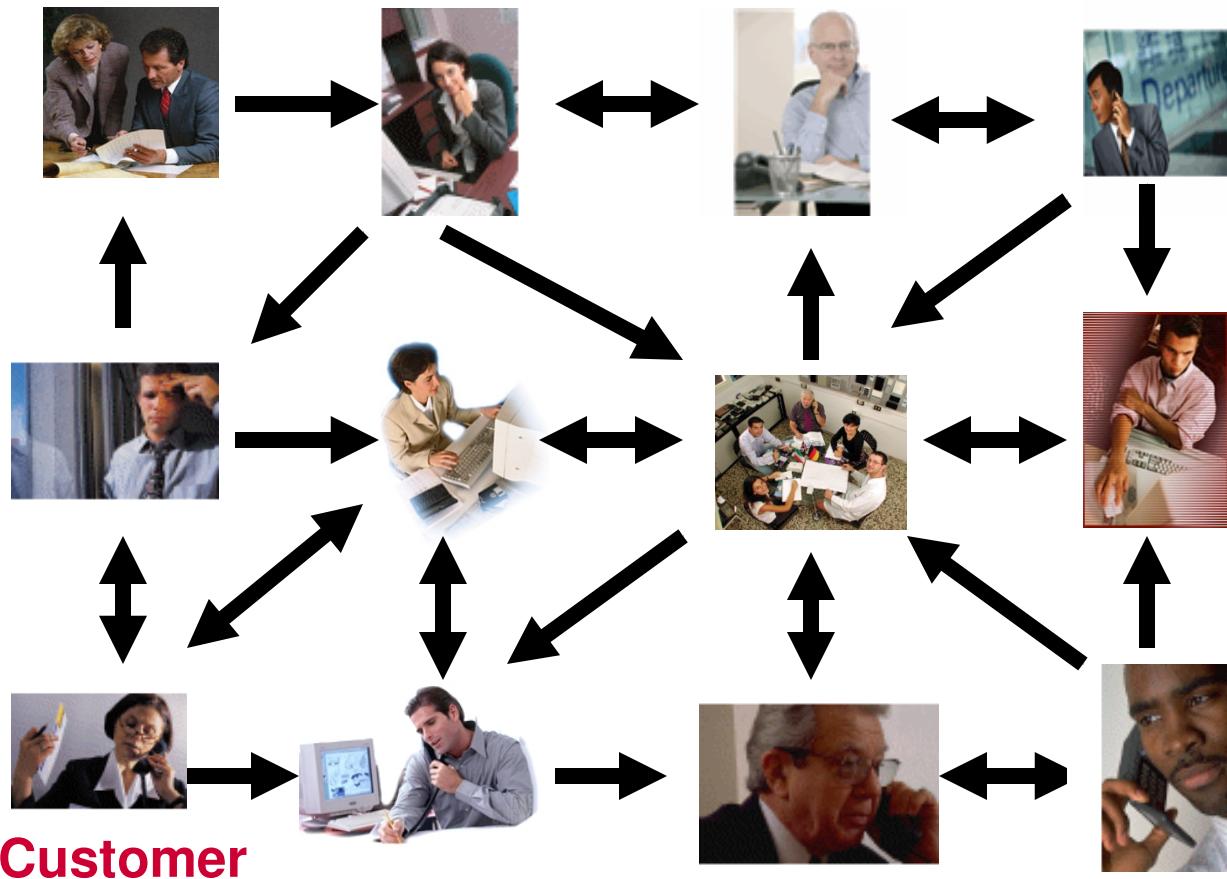
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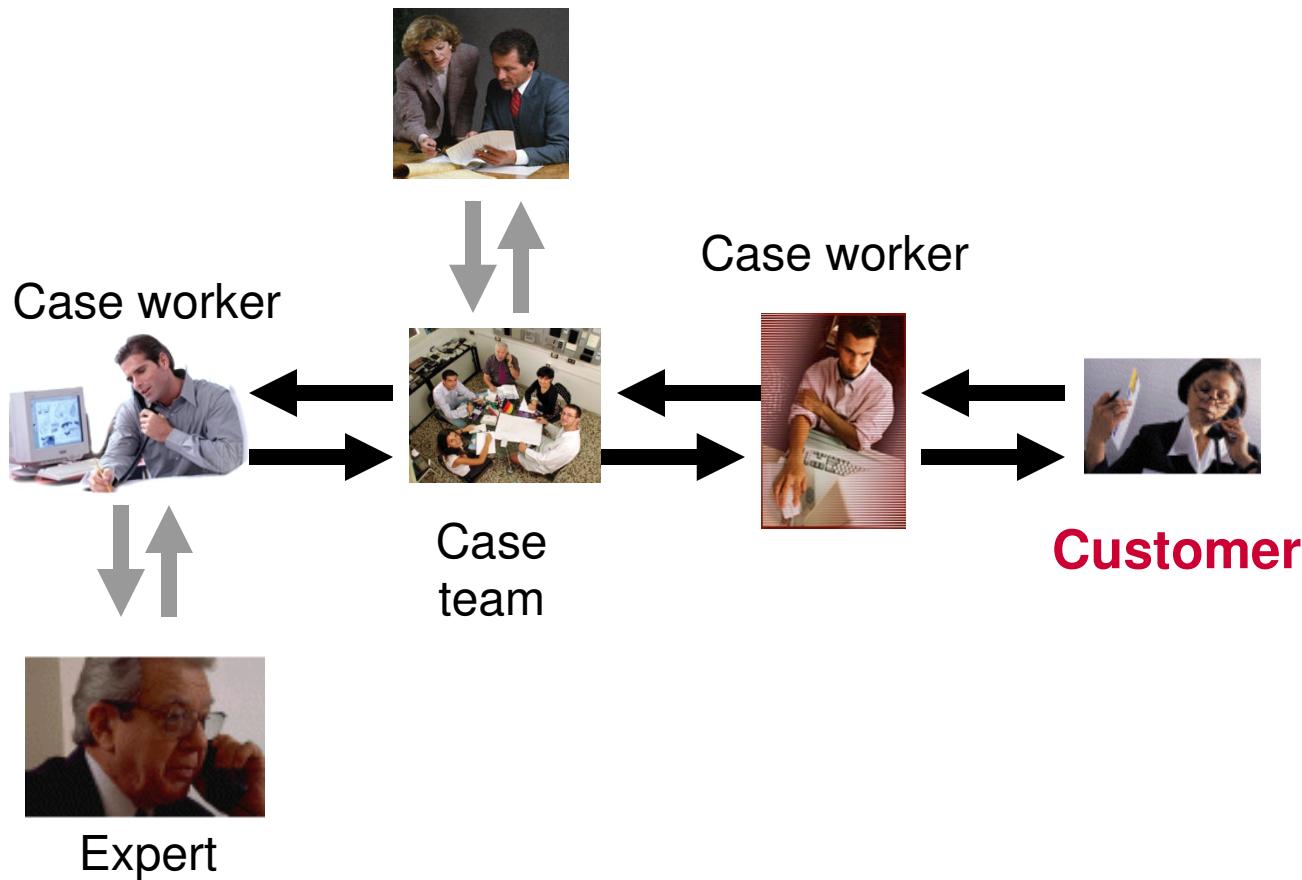


Ad Hoc Work





Process work





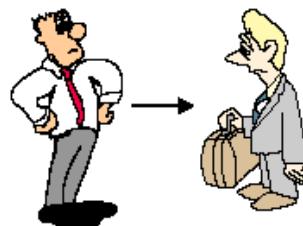
Sales as Chaos



Pursuit of all opportunities



Premature presentation of price



Miscommunication and information attenuation



“Team” decision-making

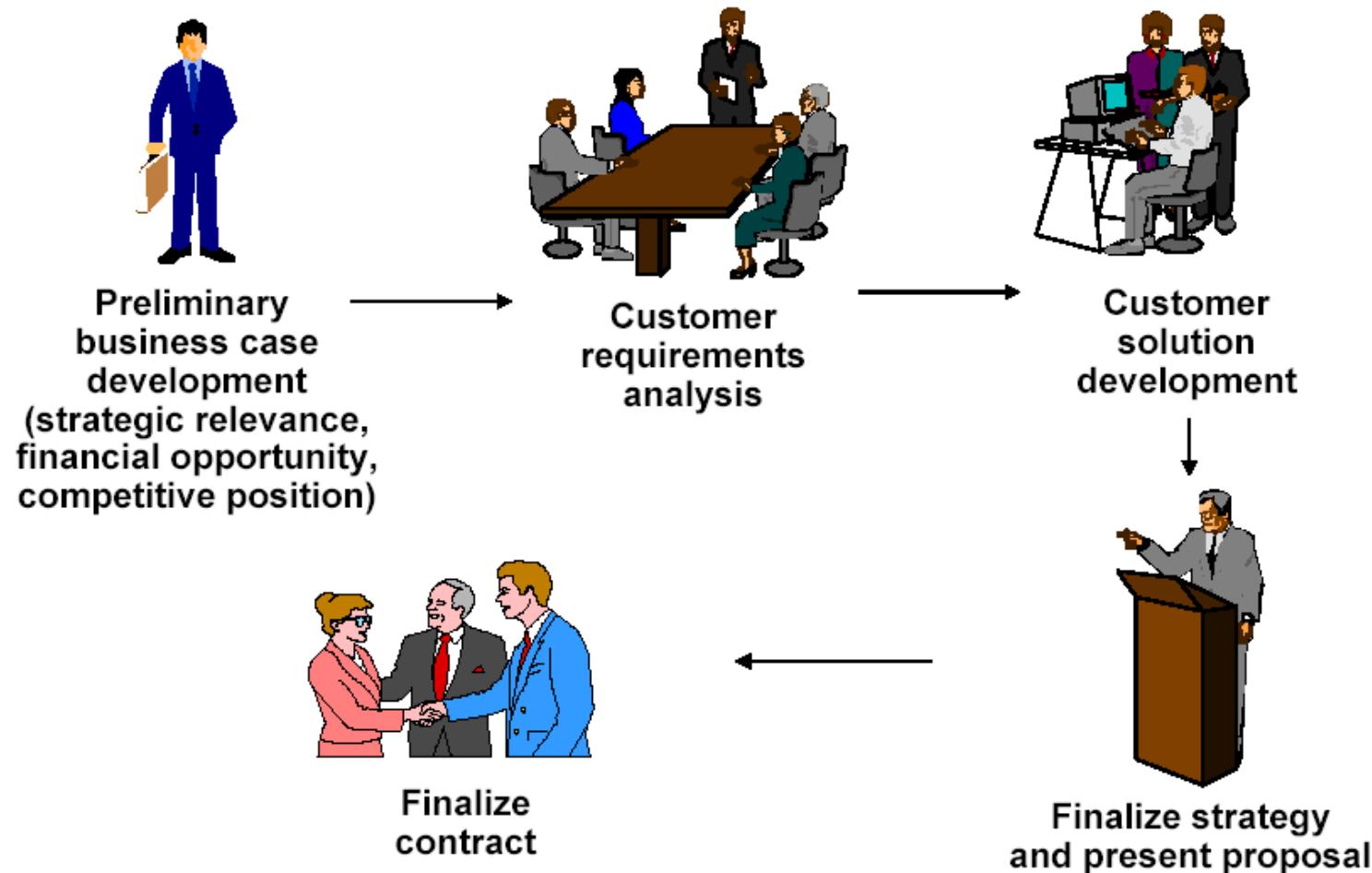


Customer confusion



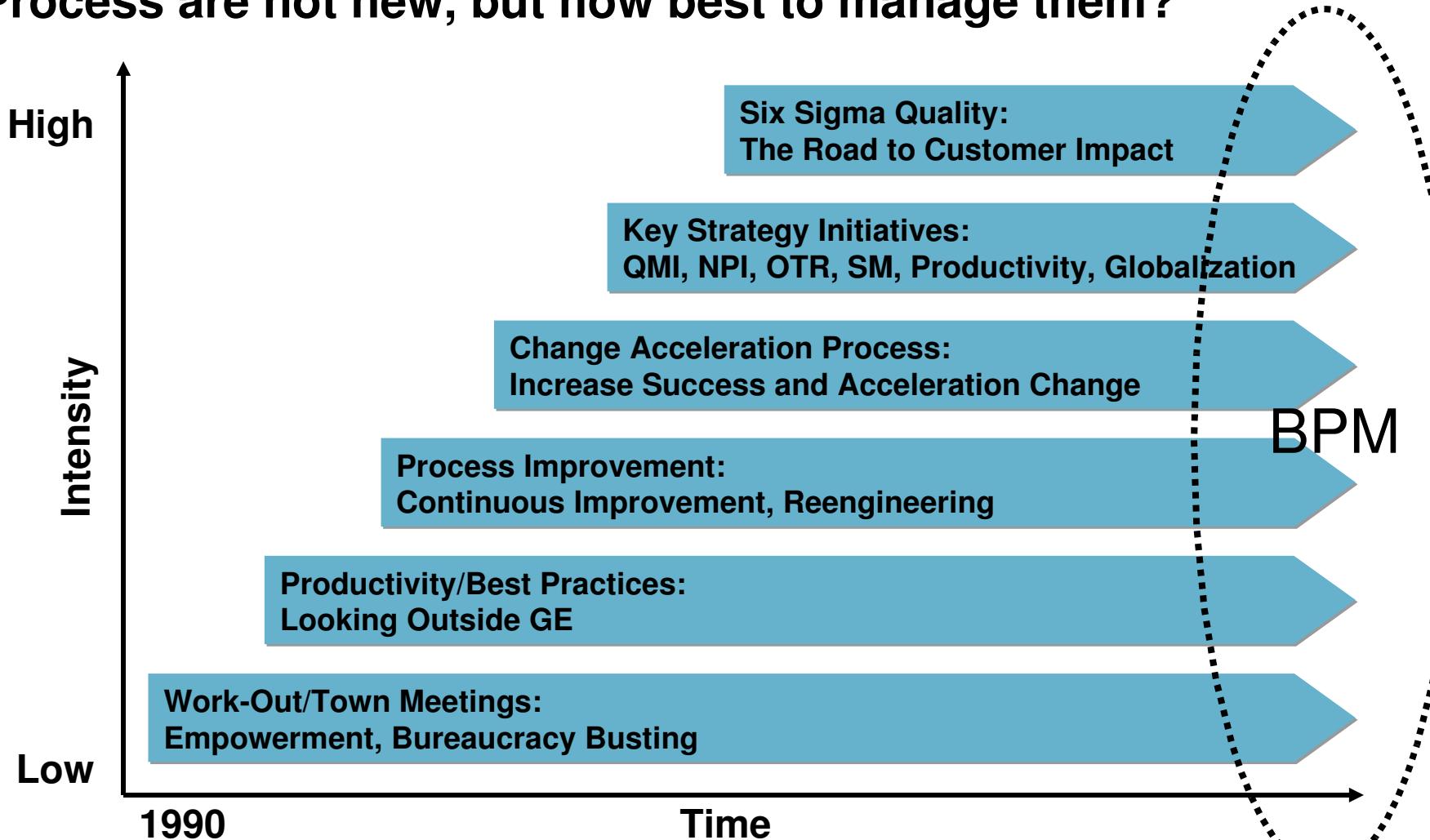
Vanishing team members

Sales as Process





Process are not new, but how best to manage them?





Things we do with processes

- Automational, eliminating human labor from a process
- Informational, capturing process information for purposes of understanding
- Sequential, changing process sequence, or enabling parallelism
- Tracking, closely monitoring process status and participants
- Analytical, improving analysis of information and decision-making across processes
- Geographical, coordinating processes across distances
- Integrative, consolidating and integrating sub-processes and tasks
- Intellectual, the process of capturing and distributing intellectual assets
- Disintermediating, eliminating intermediaries from a process
- Computational, performing calculations as part of a distributed process
- Collaborative, allowing participants to manage sets of shared work processes
- Compositional, building new processes from elementary reusable process patterns

Reengineering reengineering



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Texas Instruments and the reengineering abyss

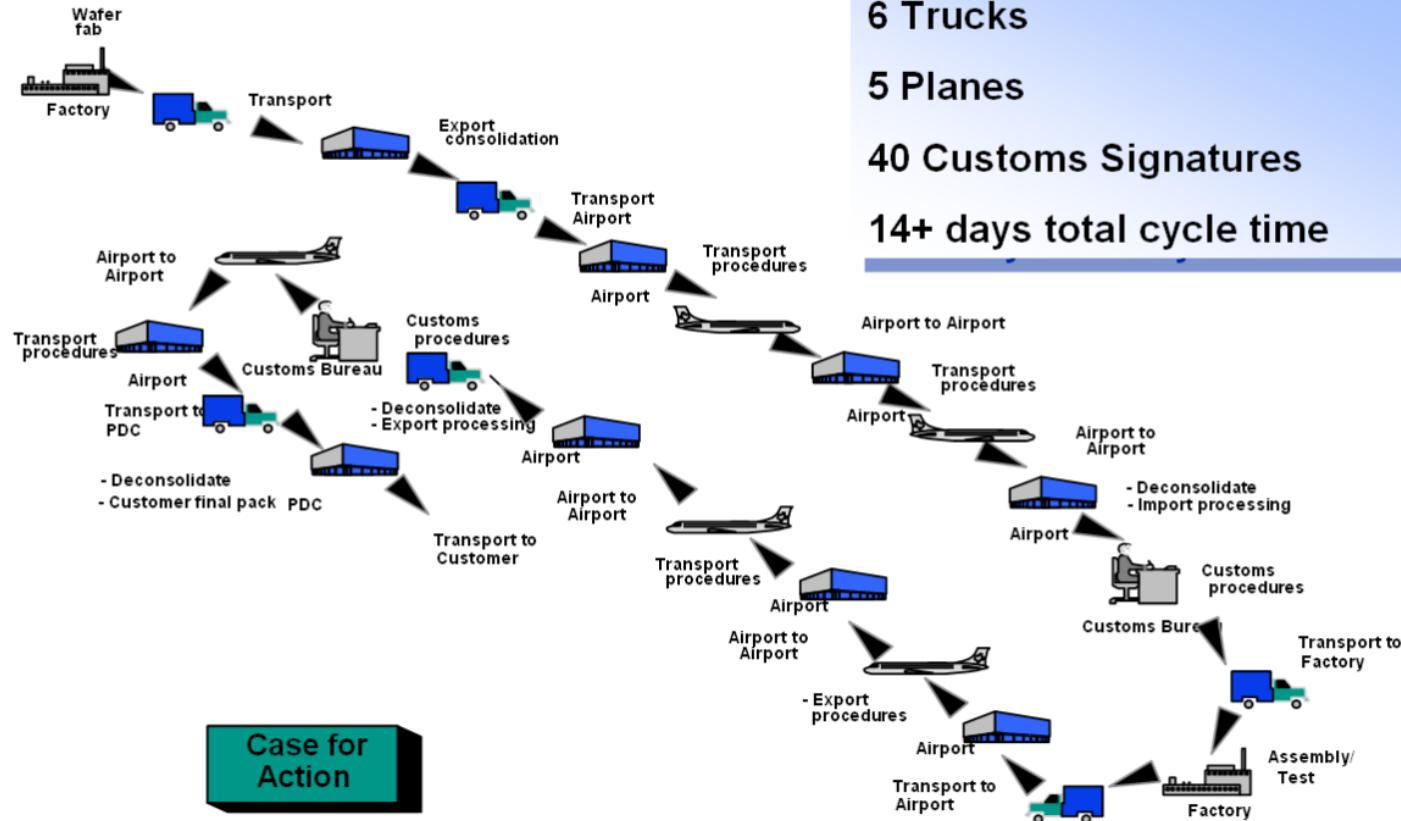


“Just one step back
Jim and we can take
the picture that tells
the CEO we have
finished the
reengineering project
”



From “As Is” lowest cost to “To Be” time to market, the challenge for Texas Instruments in the era of reengineering

Planes, Trains, and Automobiles further adventures in non-value-added...





“If I were you, I’d raise a P24D”

P24D: Request for IT-Project Prioritization Review

Smug grin of corp IT



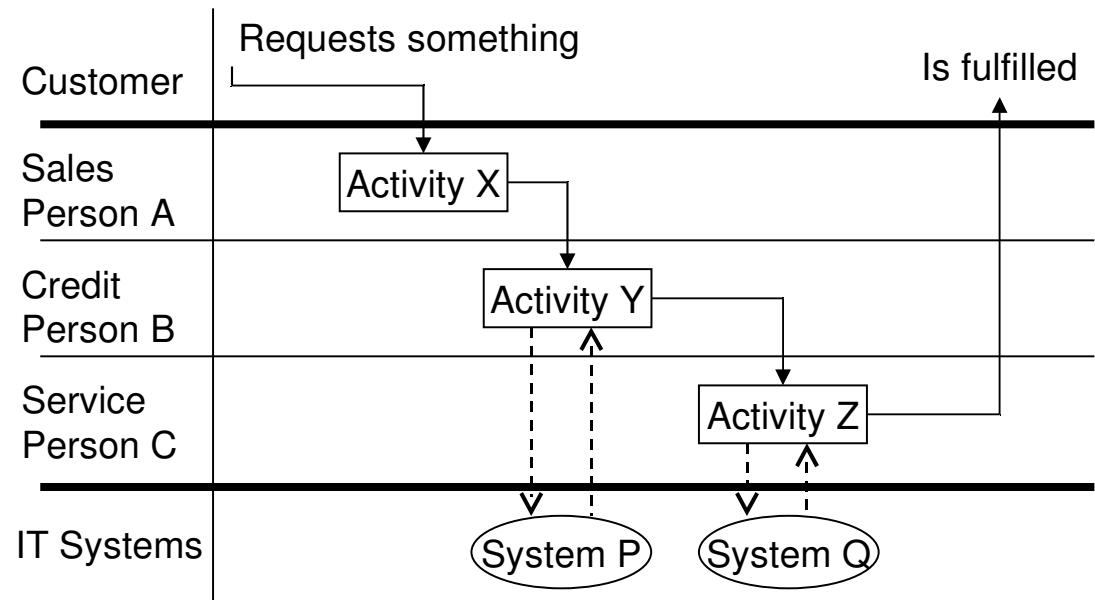
9 Months Later



***Its not what I need now
Its not what I asked for then***

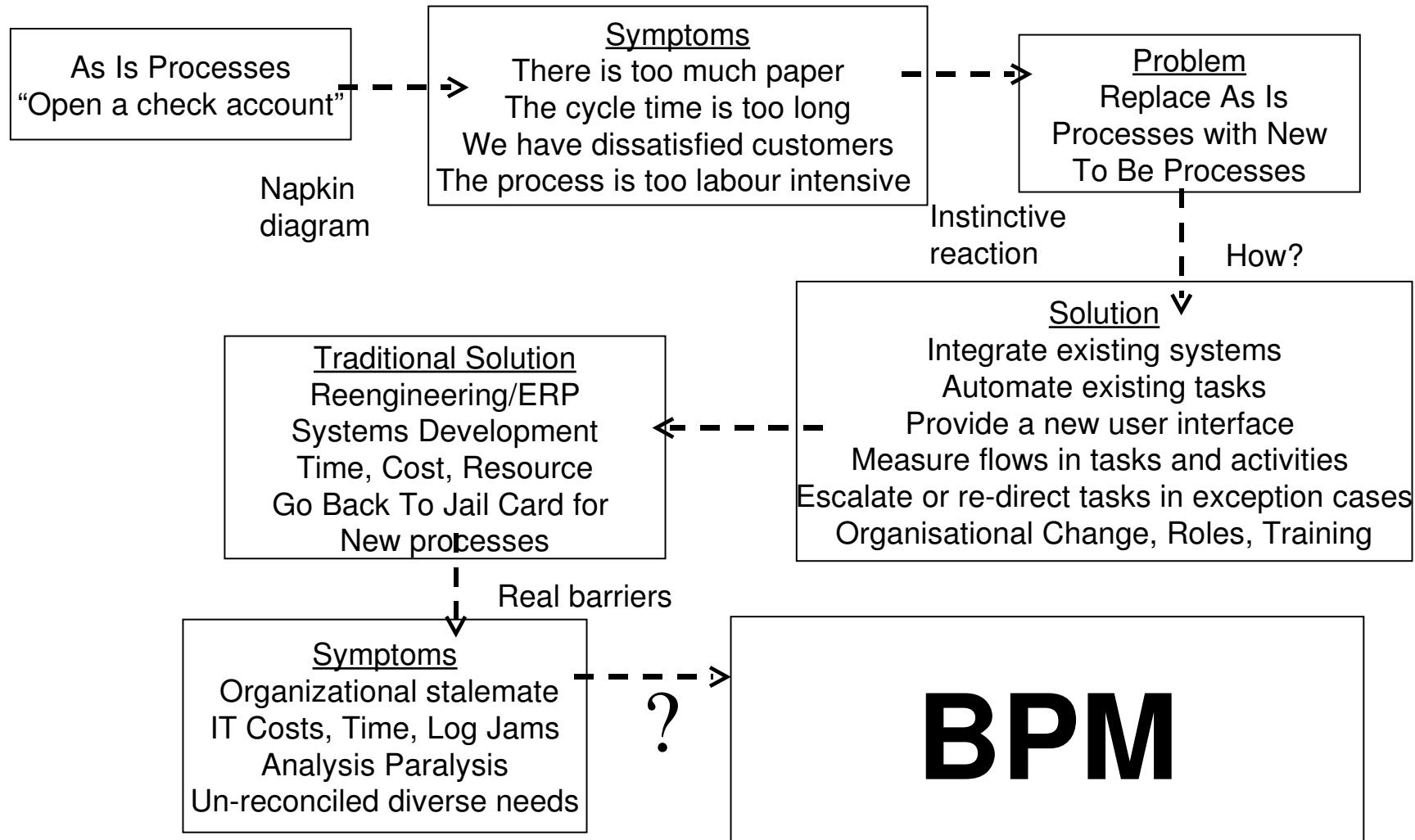


A reengineering tale of woe





The Dilemma at the heart of the Value of IT debate





IT: What are you doing?

BUSINESS: Modeling the business processes we need?

IT: Why are you doing that?
Just specify the user interface and we'll take care of the rest. No need for you to get involved in these details.

BUSINESS: But this is the first time we have been able to express requirements so they won't get distorted when implemented.

IT: It won't work, we cannot be responsible for the model you are creating, we will need to translate it into our architecture.



**Unleash the
PROCESS
MANAGEMENT
POTENTIAL
in everyone**



Example processes



- Disaster/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

The BPMS



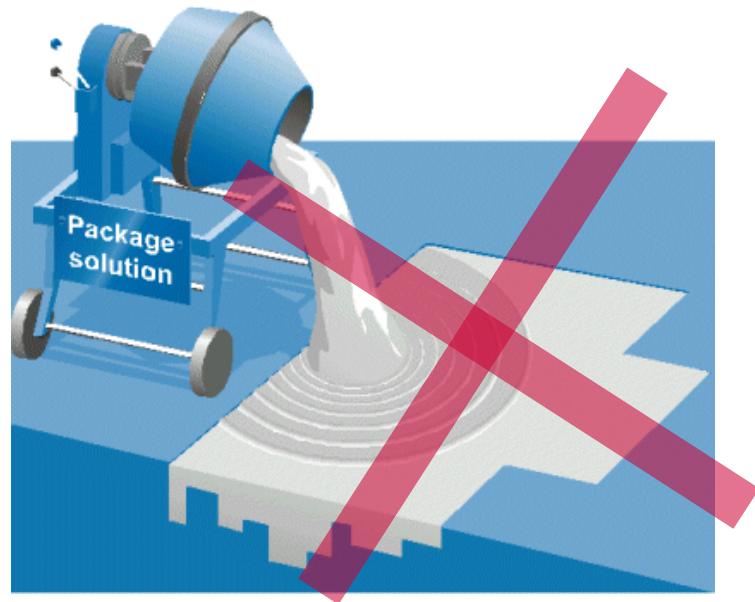
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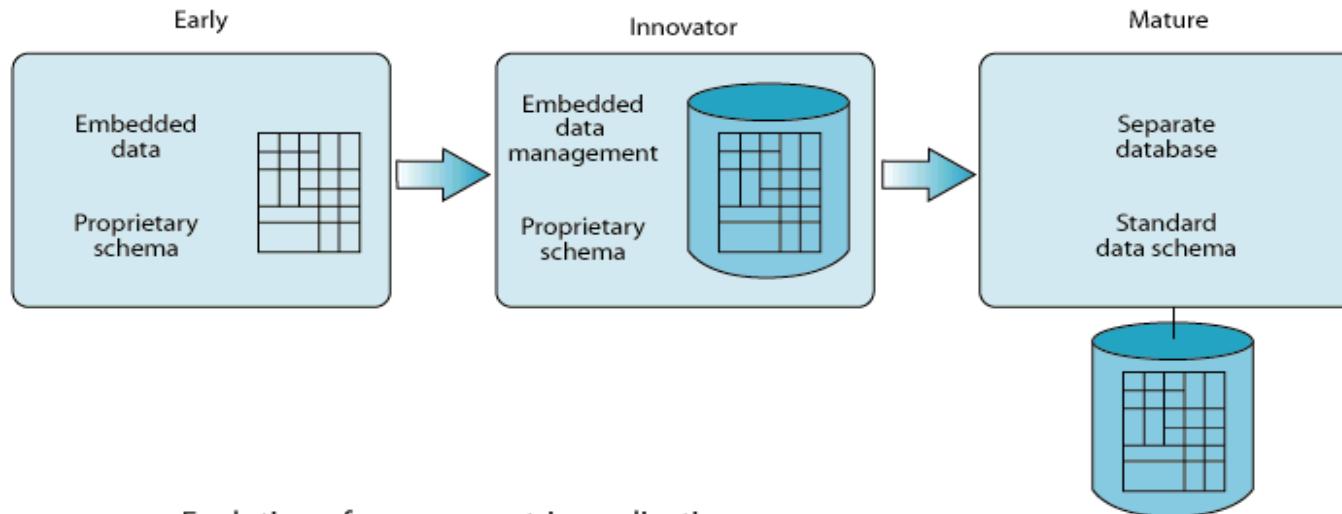
The Next Fifty Years?



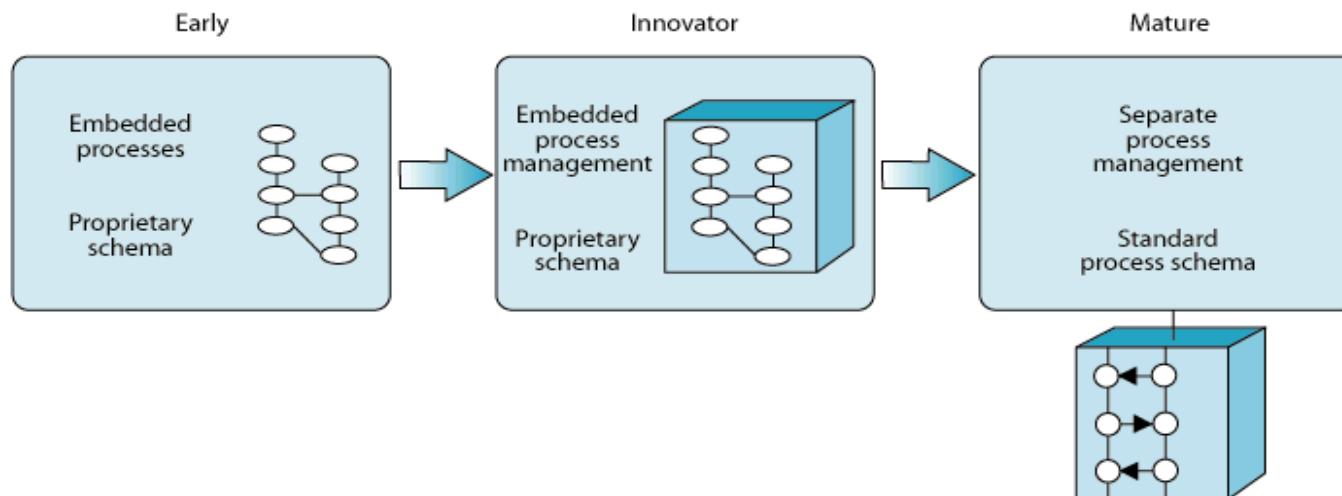
Process can be separated



Evolution of data centric applications

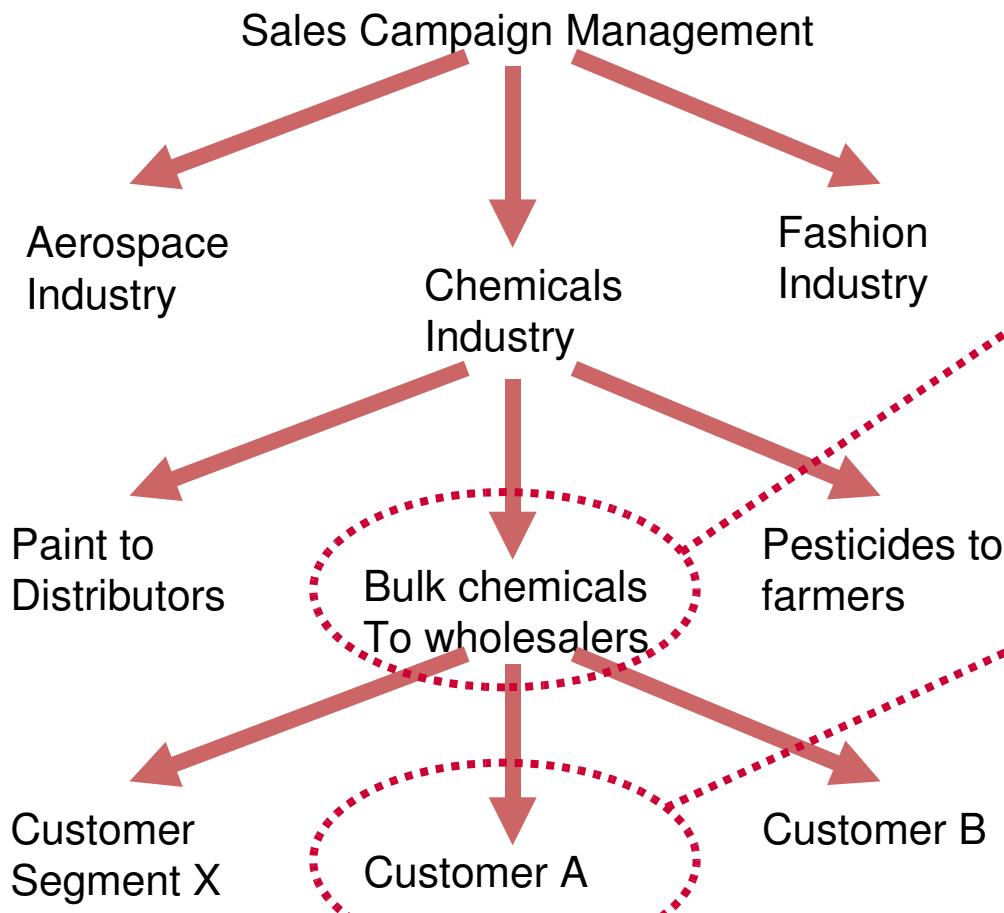


Evolution of process centric applications

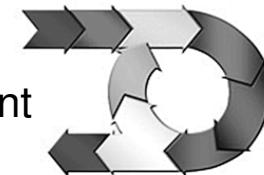




From packaged processes to packaged process management



Process
Improvement
Lifecycle

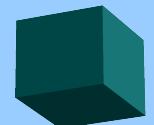


- Design the campaign
- Deploy the campaign
- Execute the campaign
- Measure the campaign
- Customize the campaign
- Optimize the campaign

Sales Campaign
Management

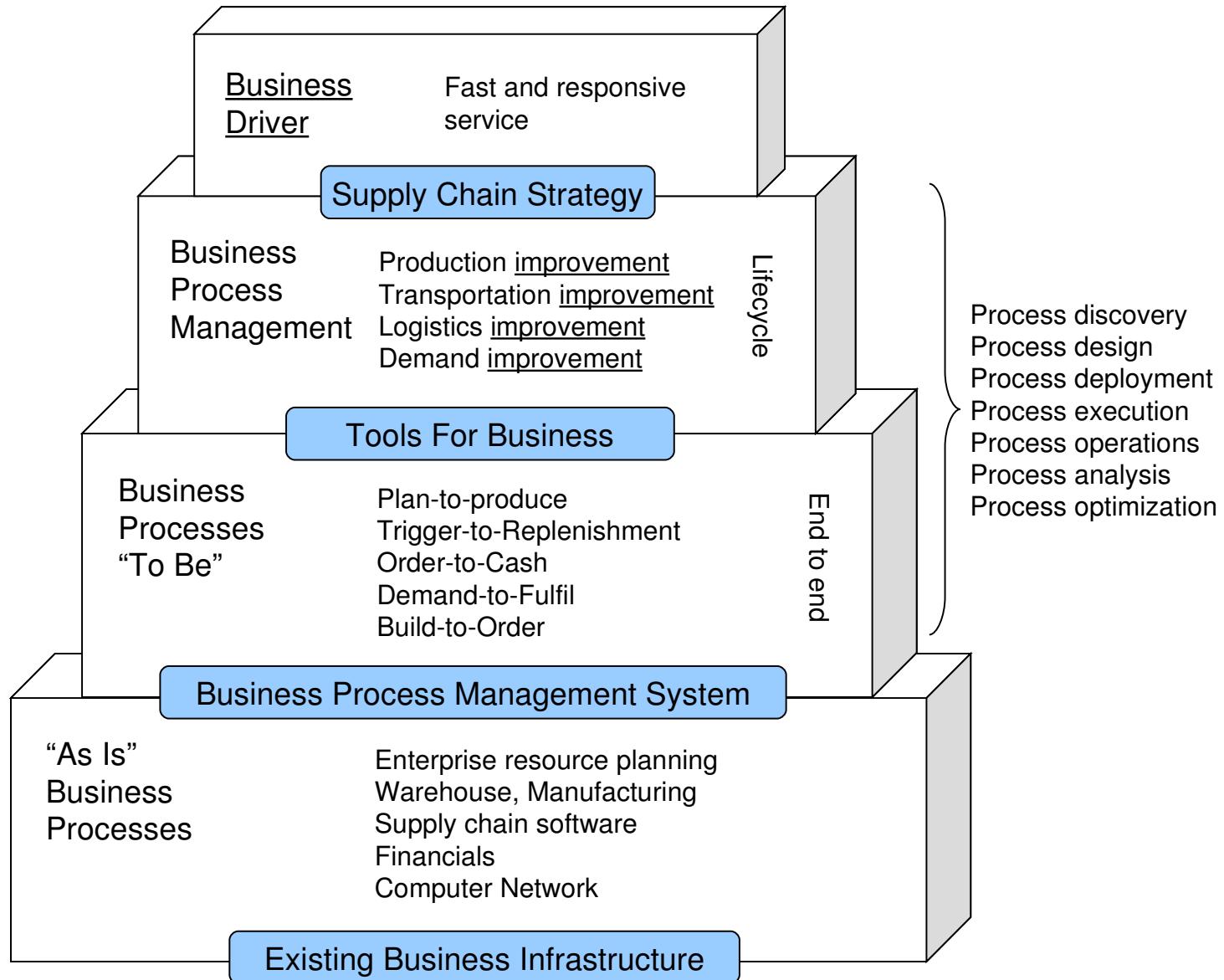


Trends in enterprise applications

Applications	MRP	ERP, CRM, SCM ...	BPM, BPO, BPU ...
Platform	Mainframe	Midrange + Unix	Web services
Language	DL/1	SQL	BPEL, BPQL
Sharing	Hierarchical data	Relational data	Process data
System	HDBMS 	RDBMS 	BPMS 



Typical BPMS Stack



Innovating Processes: P-TRIZ



CSC

EXPERIENCE. RESULTS.

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Do you have problems?

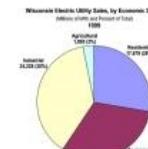


Known Problems
you must solve and
for which you have
no known solution



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

New
concepts



Business
coming in



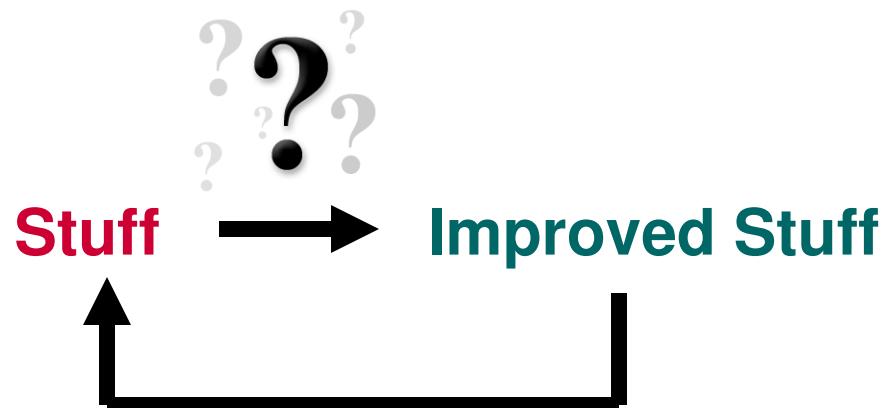
Barriers, obstacles, contradictions, inertia

Research ... Development ... Operations ... Marketing ... Sales ... Distribution



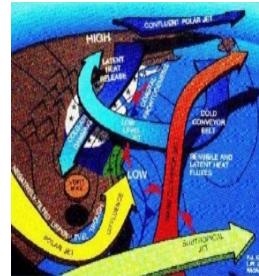
What Innovation Is

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





Stuff can be ...



Products

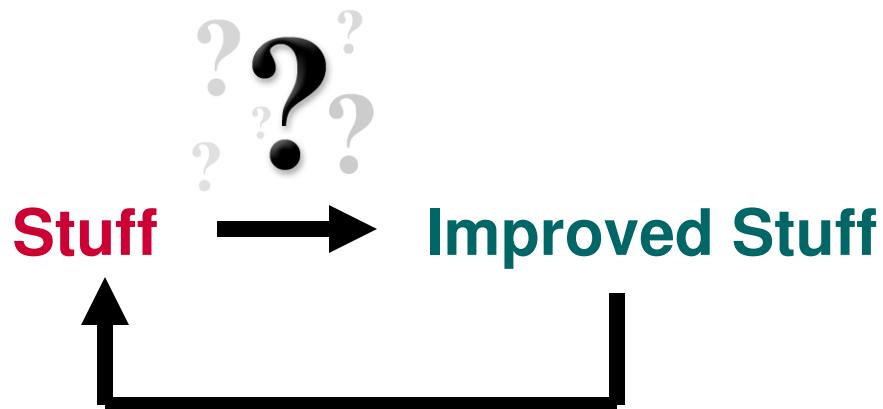
Services

Solutions

Processes

Organizations

Ideas





To improve stuff, we must decompose

Stuff



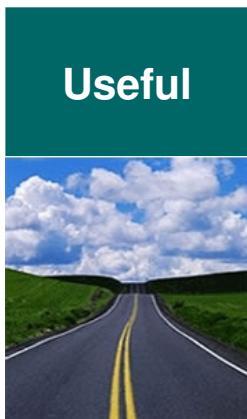


Everything is useful and harmful



Personal transport

Freedom of movement



Useful

Pollution



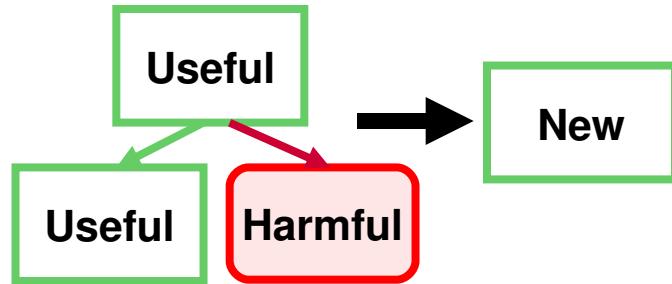
Harmful

Is it useful or harmful



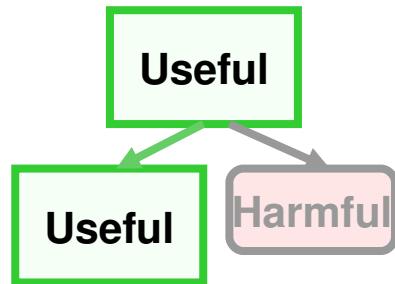


Decomposition opens pathways to improvement



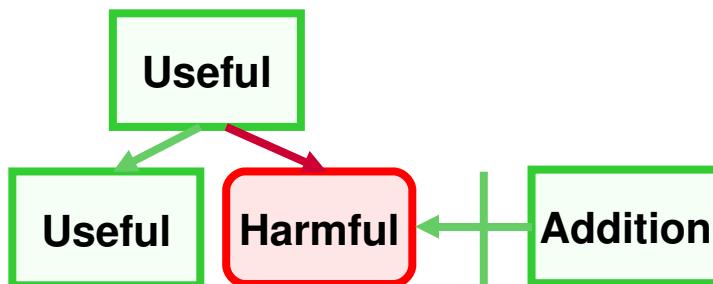
Example 1

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

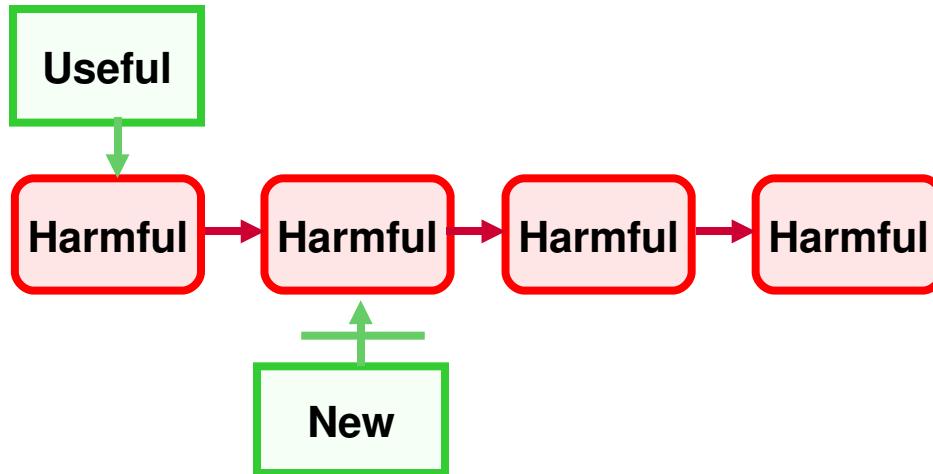


Example 3

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



More examples of innovation

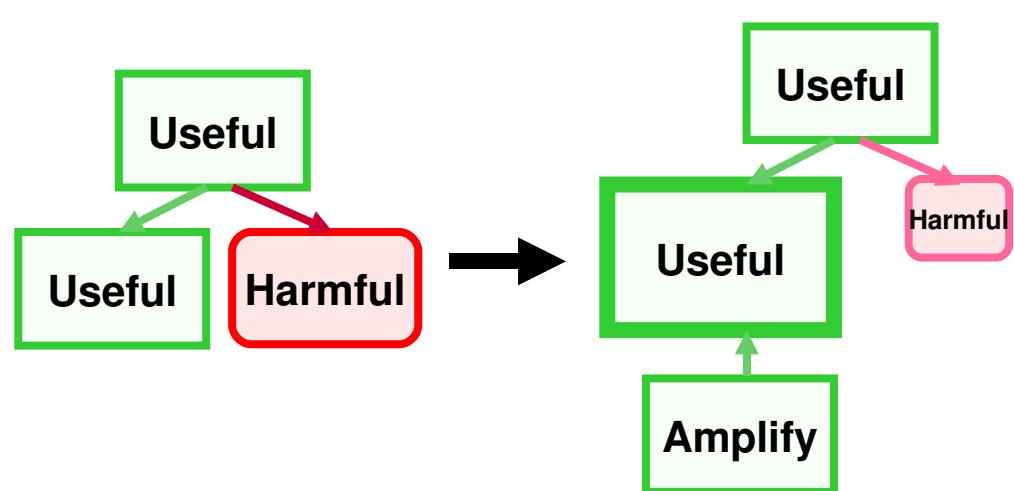


Example 4

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

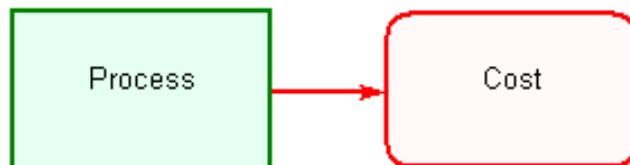
Example 5

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

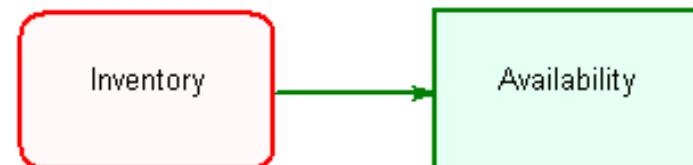




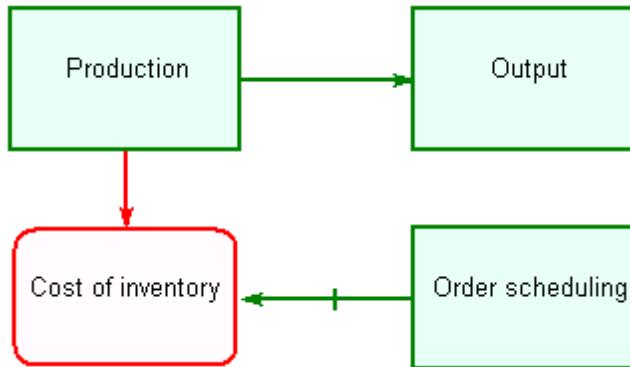
Modeling processes for innovation (P-TRIZ)



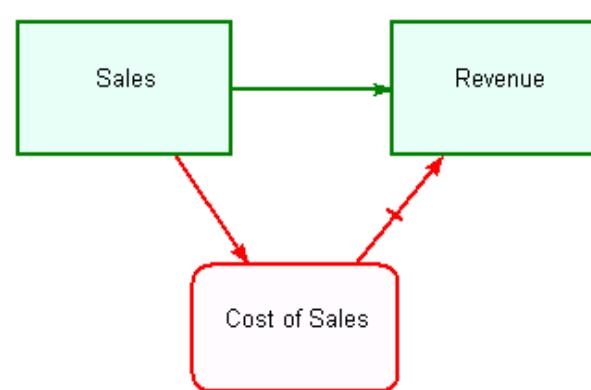
All processes have costs



Harmful functions have useful functions



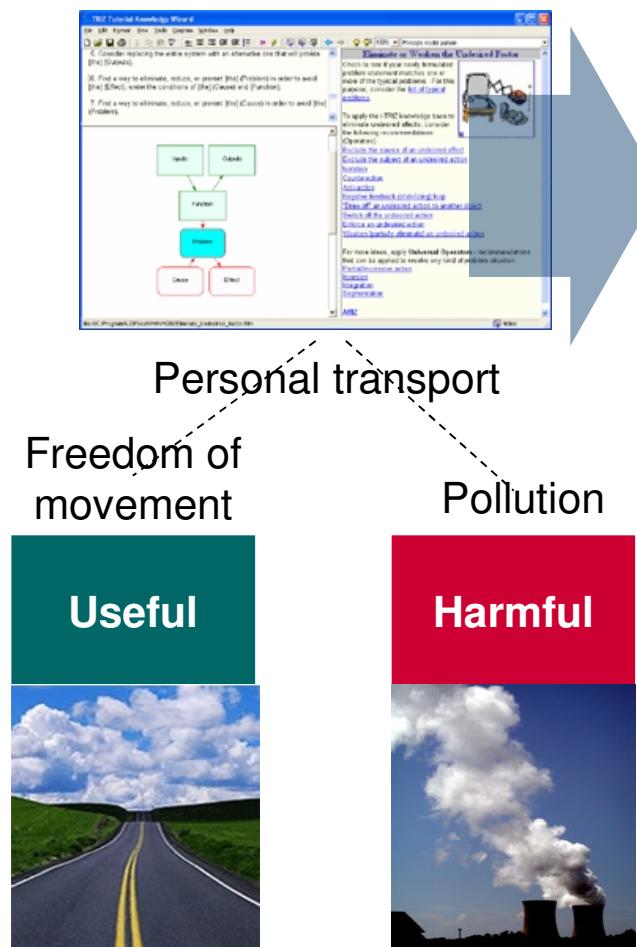
Functions are added to systems to counteract harm



Harmful side effects counteract primary objectives



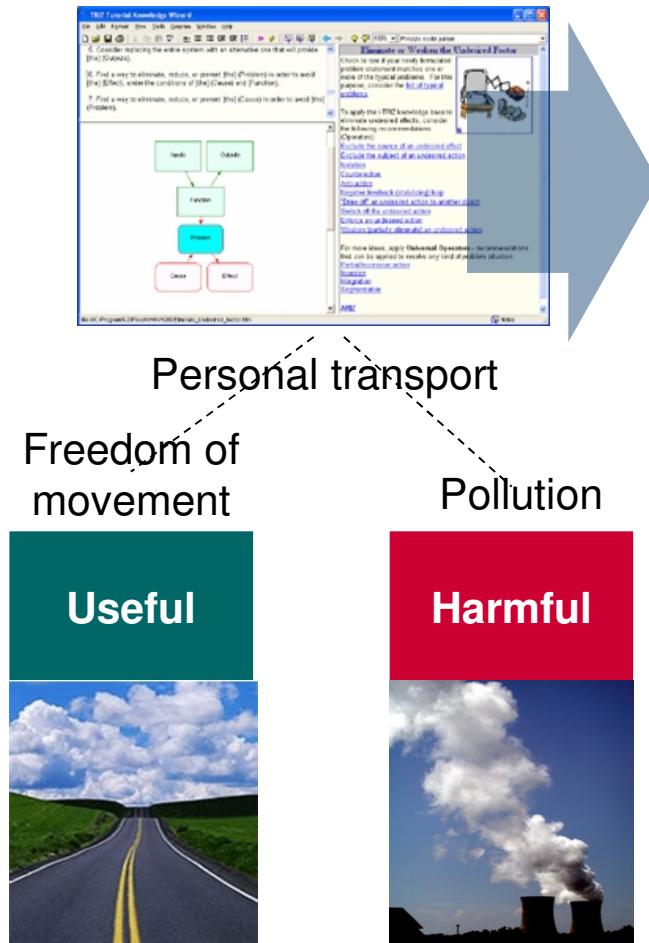
We can automate the generation of solution pathways



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).



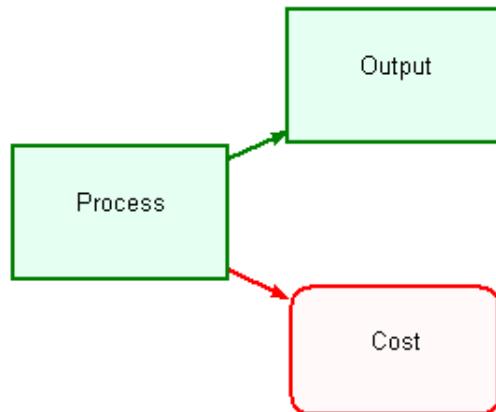
Systematic process opens exhaustive solution options



- 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.



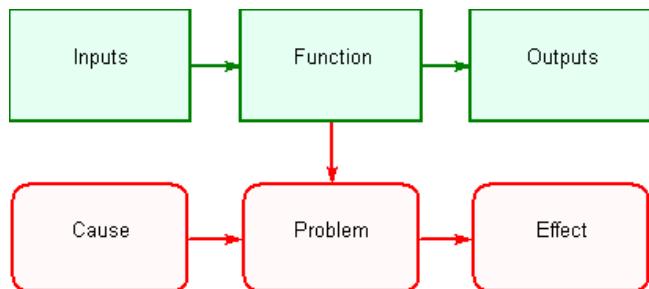
P-TRIZ formulation



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).



P-TRIZ exposes abstract process patterns



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).

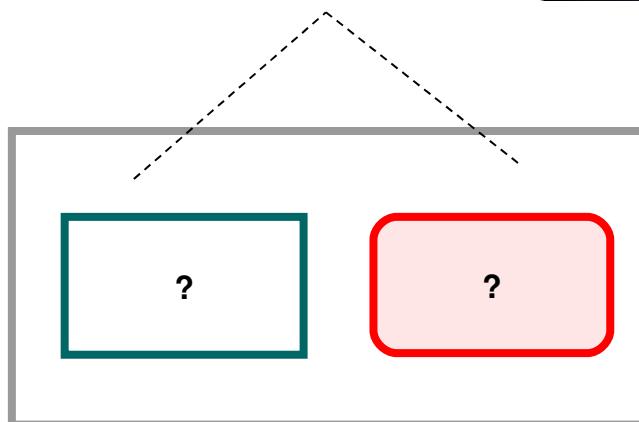
1. Find an alternative way to obtain [the] (Function) that offers the following: provides or enhances [the] (Outputs), does not cause [the] (Problem), does not require [the] (Inputs).
2. Try to resolve the following contradiction: The useful factor [the] (Function) should be in place in order to provide 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).



To whom are things useful and harmful?



Customer
Supplier
Citizen
Government
Child



To you

To me

Useful or **harmful?**

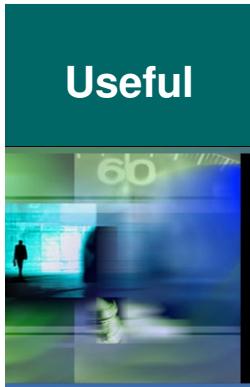


Everything is useful and harmful from many perspectives

Loss of rural environment



High speed economy



Freedom of movement



Pollution



Oil profits



Environmental damage



Harmful

Useful

Harmful

Useful

Useful



?

?

?

?

?



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.



Aspects



Brand



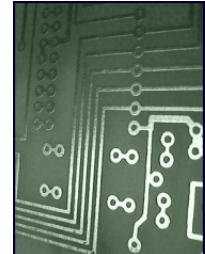
Experience



Usability



Design



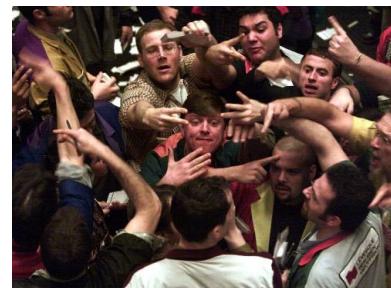
Technology



Performance



Function



Market



Business model



Manufacture



Delivery



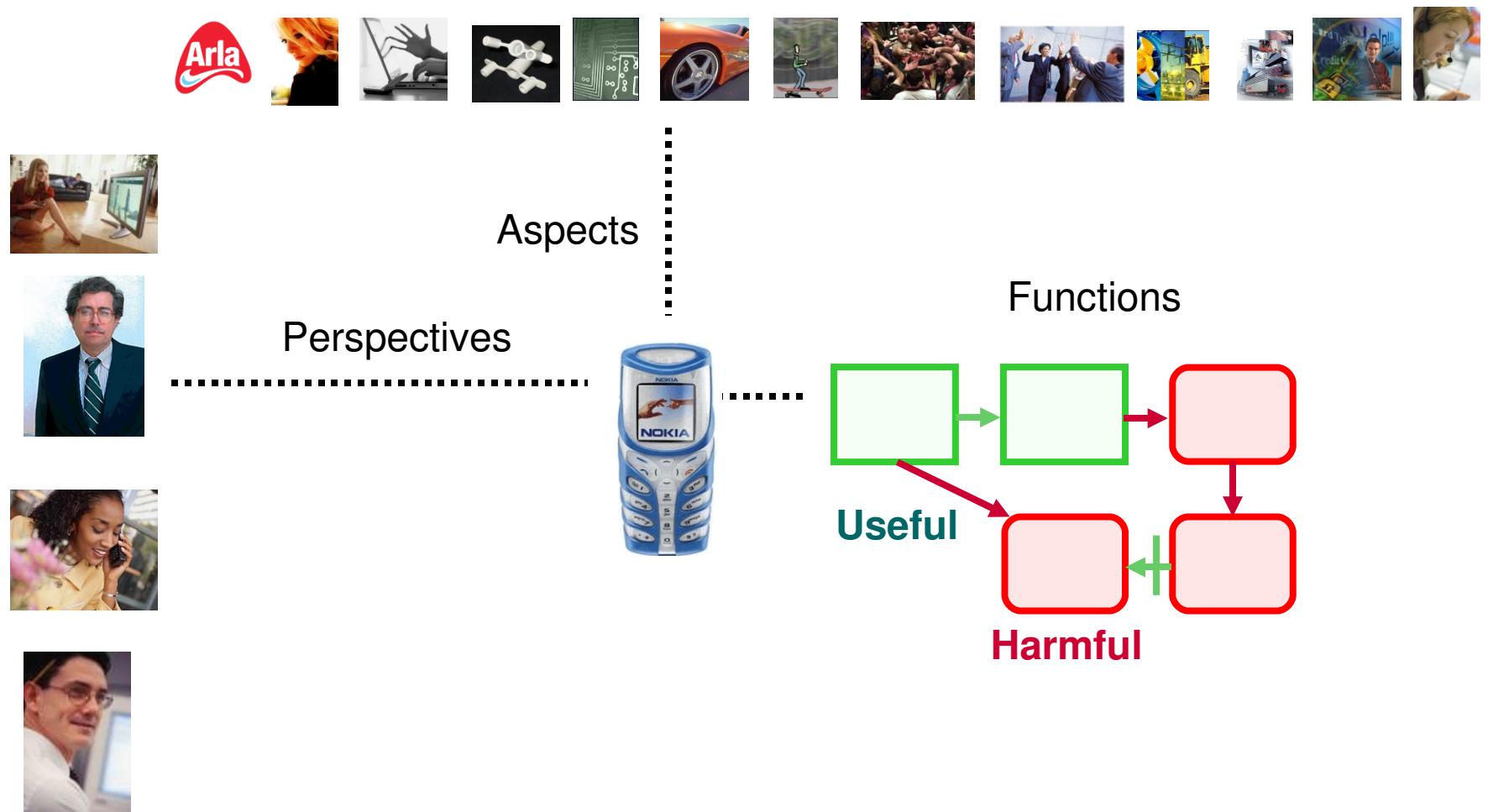
Service



Support

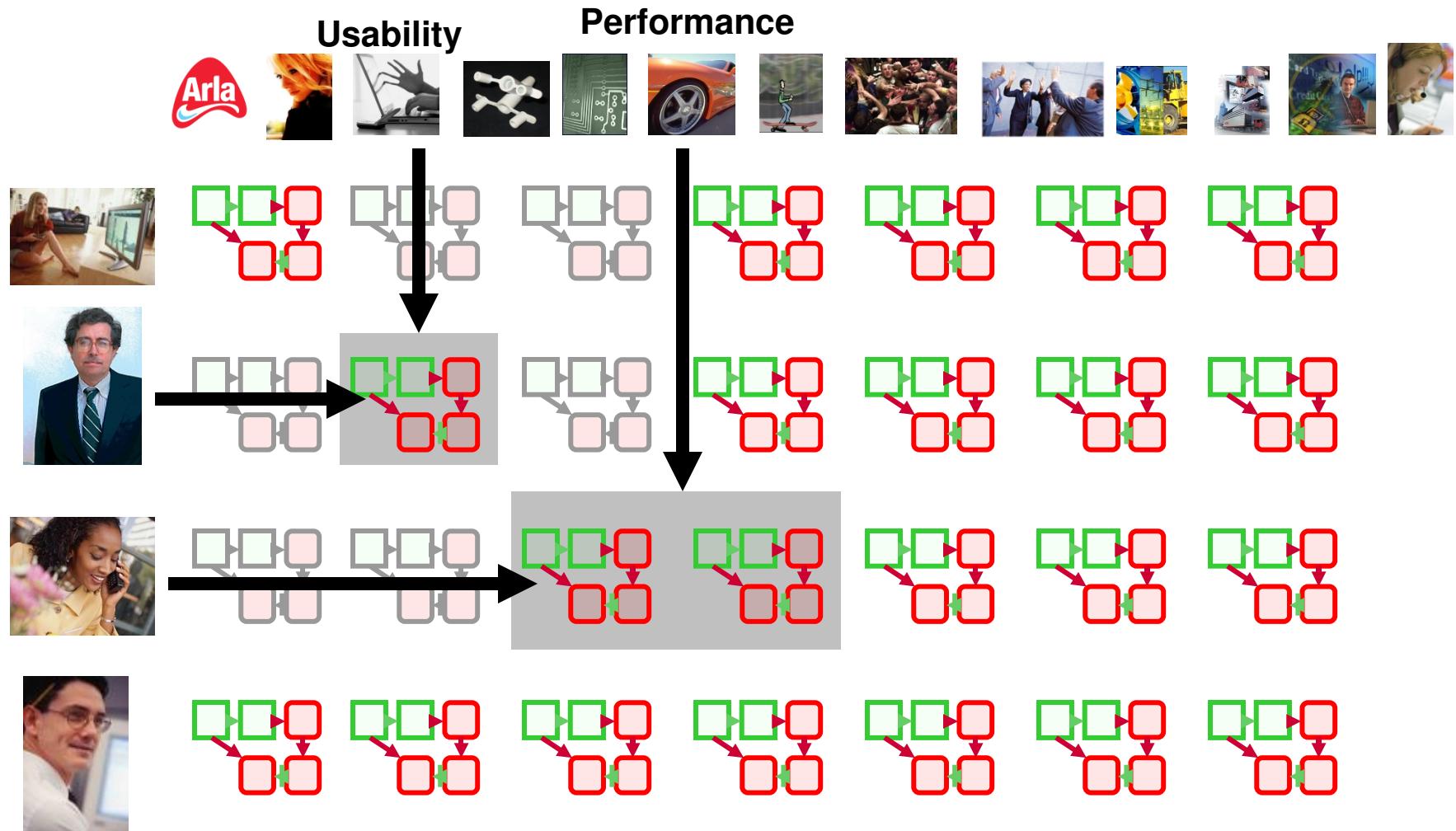


To improve, we must decompose in many ways





Many models are needed – expect contradictions





The more cars the better?



Freedom of movement
Contradiction
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).

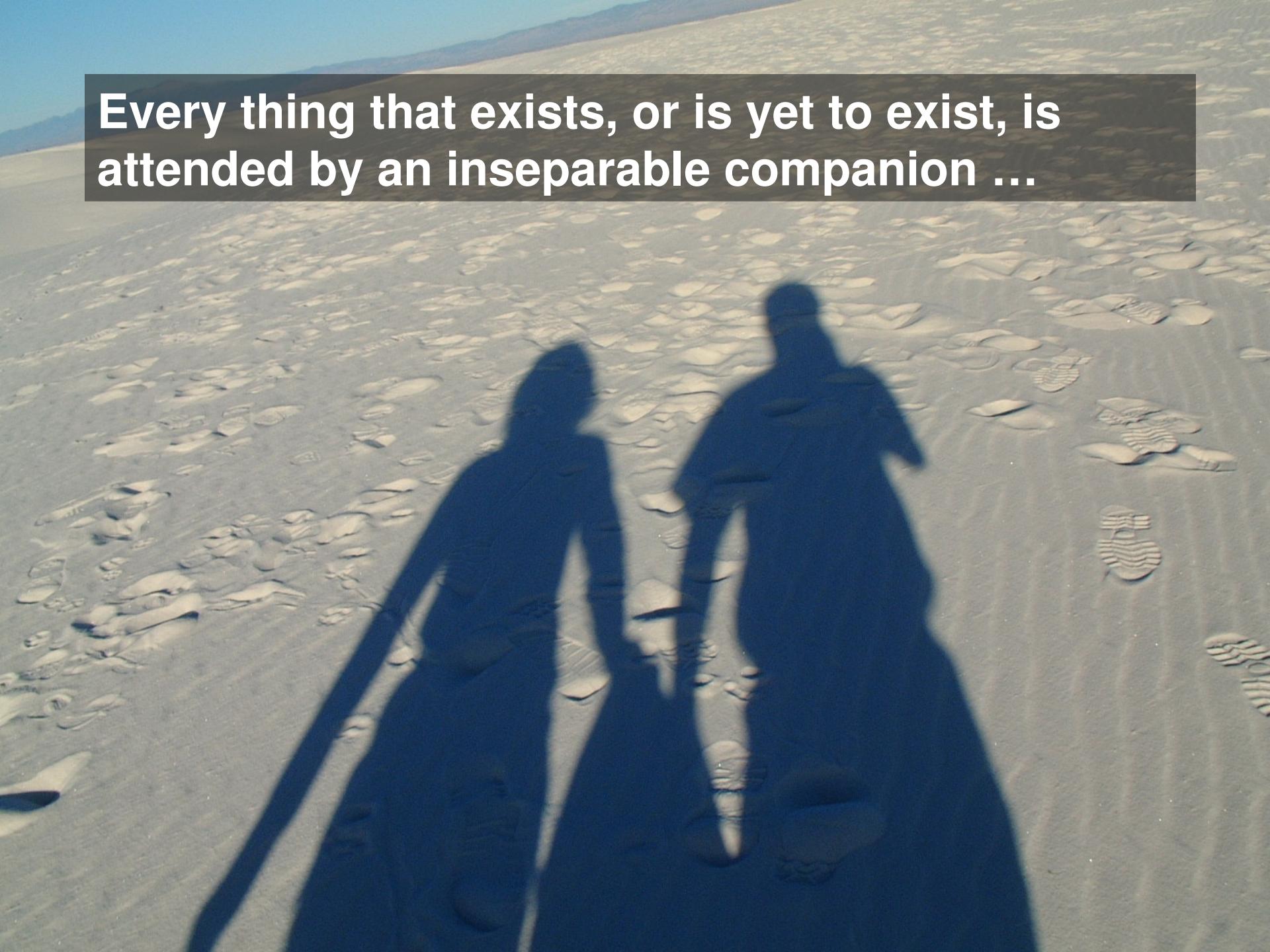


Hydrogen Internal Combustion

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

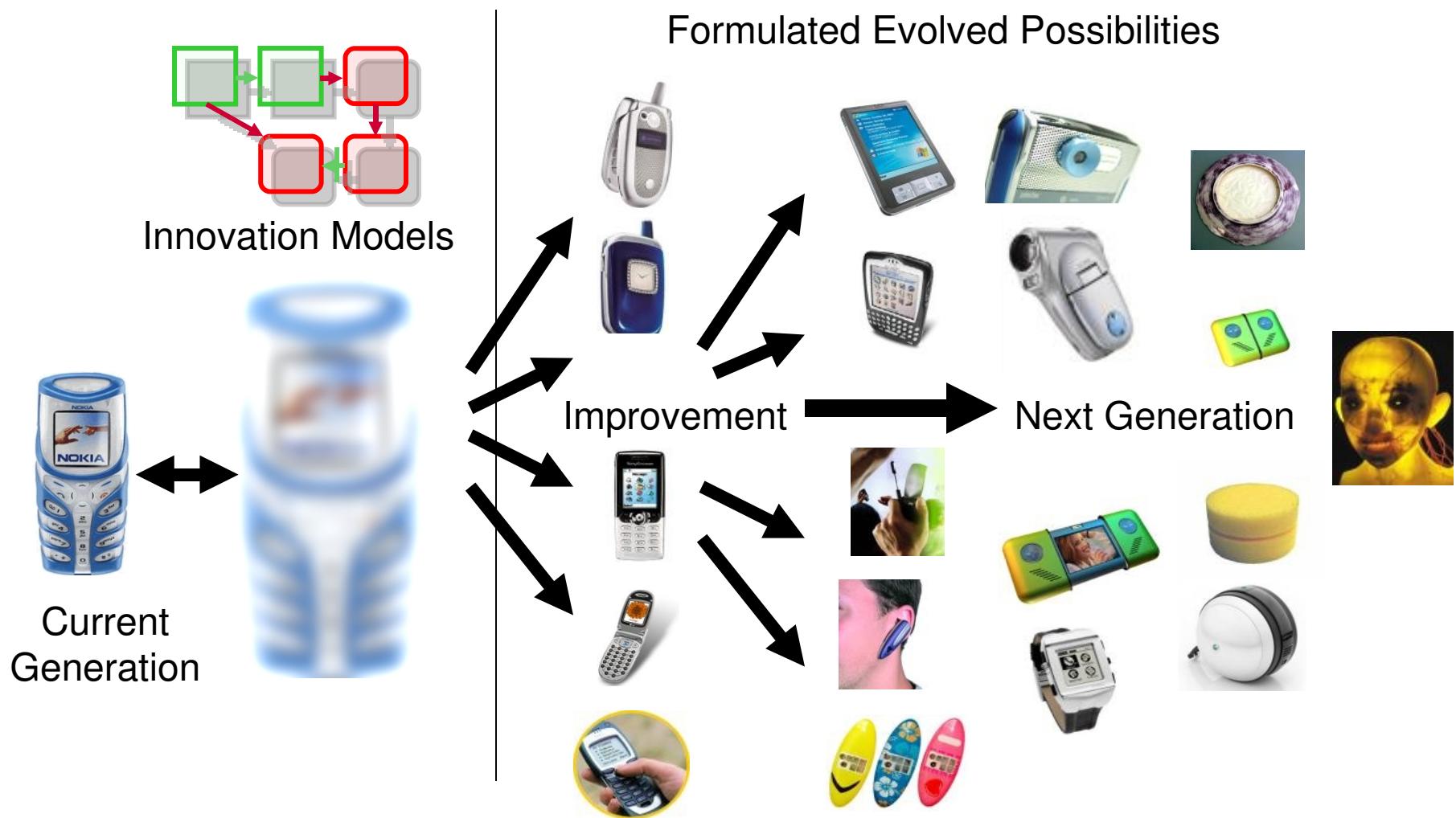
<http://www.ford.com/en/innovation/engineFuelTechnology/hydrogenInternalCombustion.htm>

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



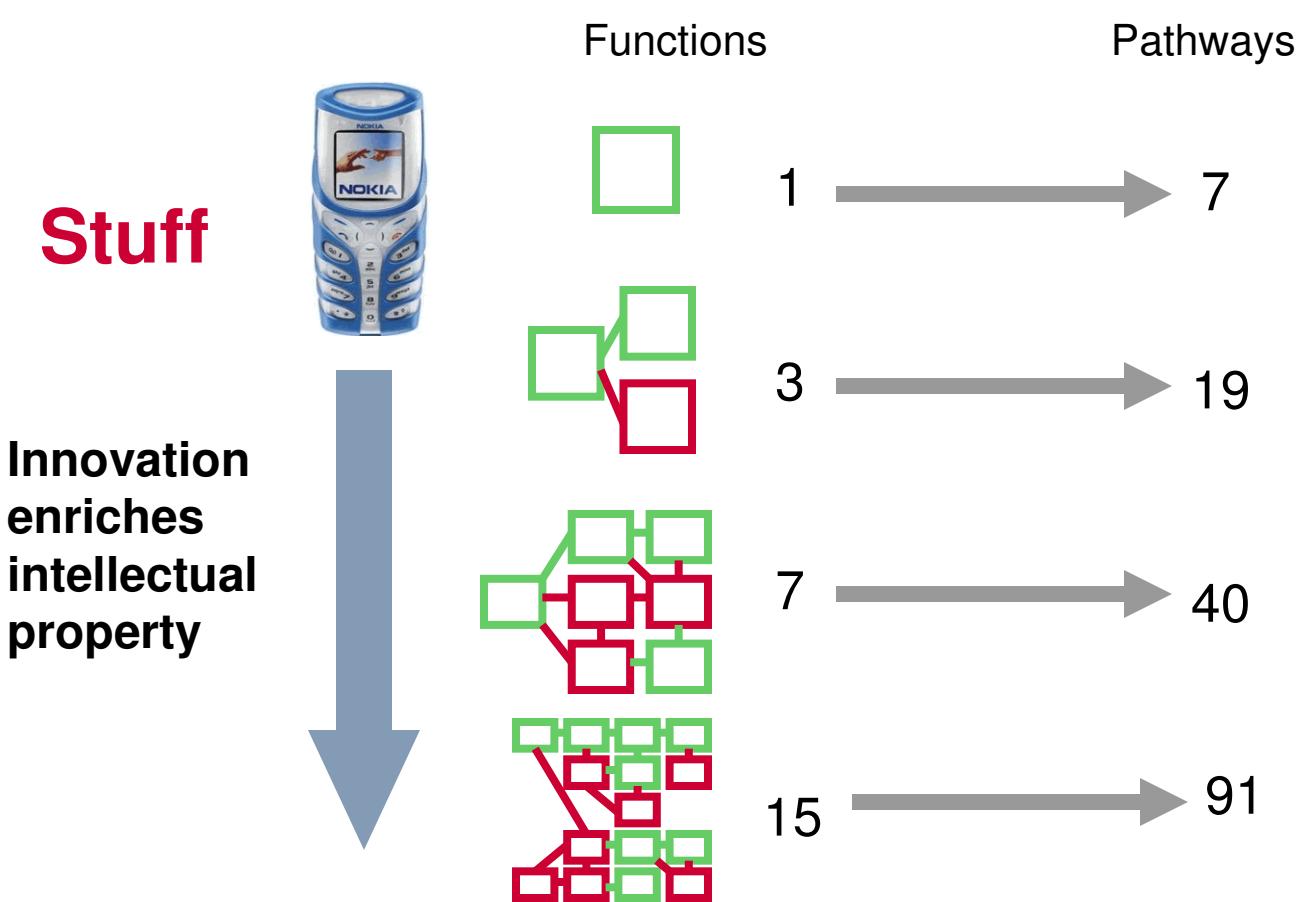


The innovation shadow-self





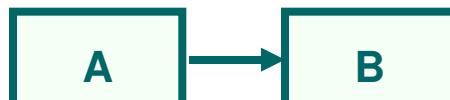
Our options expand as we add knowledge





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?



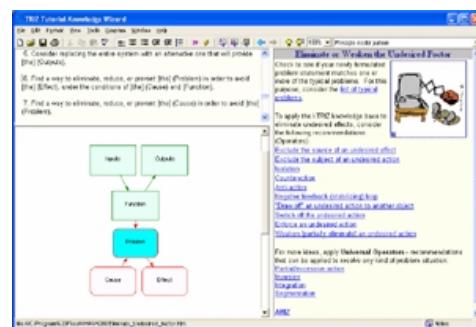
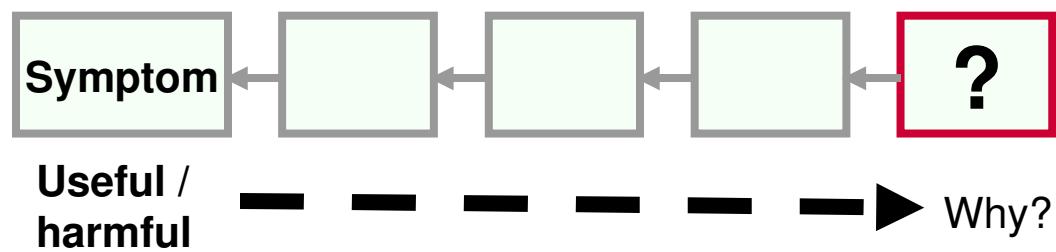
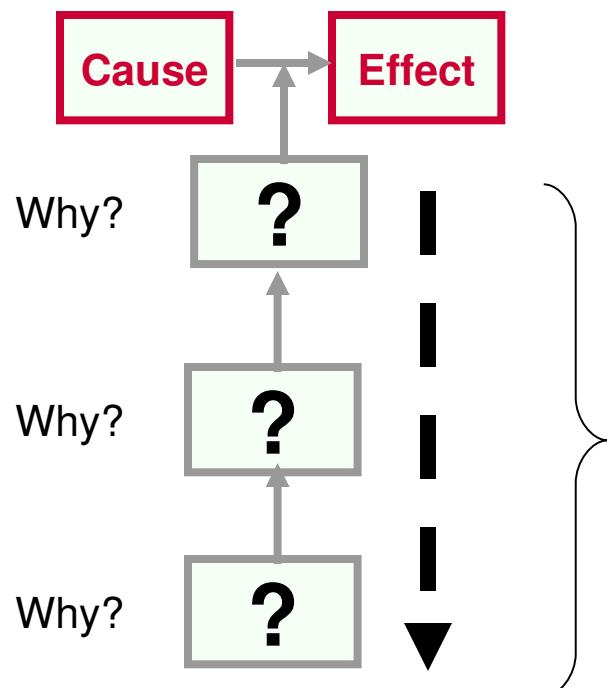
What specifically about A counteracts H?



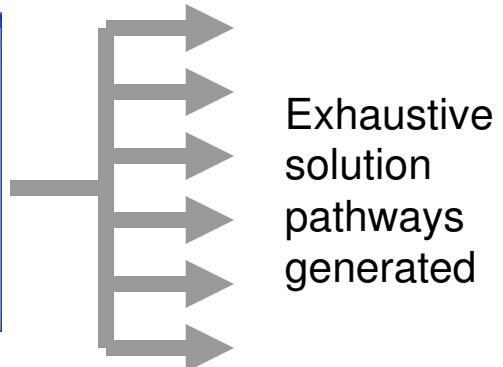


Lateral thinking and systematic methods are complementary

Example technique:
Five Whys



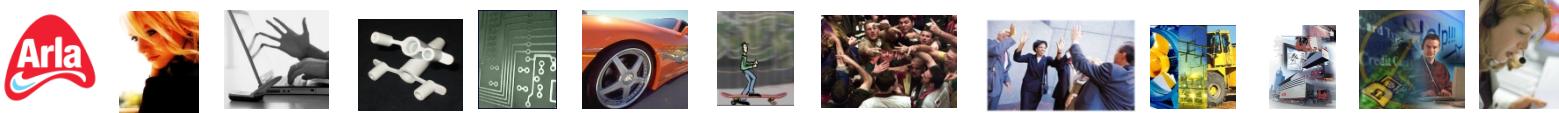
Formulator expands
intellectual property



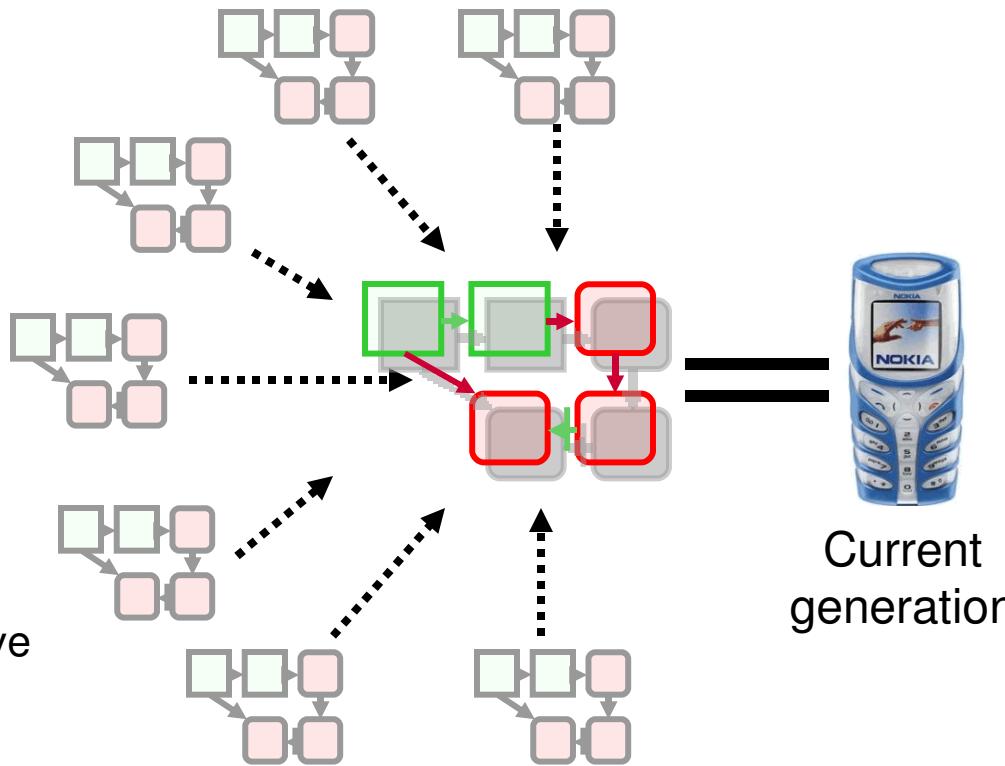
Exhaustive
solution
pathways
generated



An alignment of many models is required

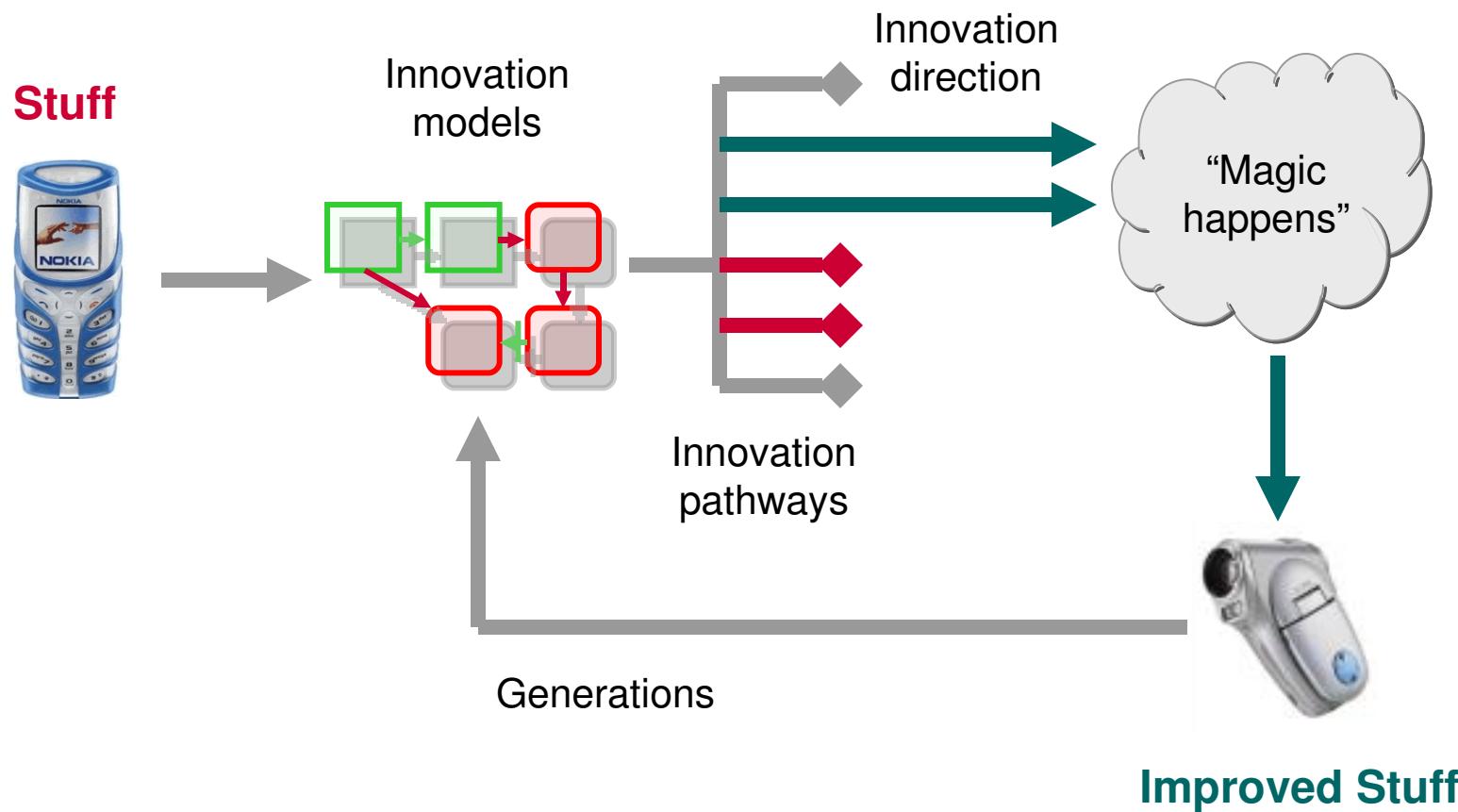


Perspective
innovation
models



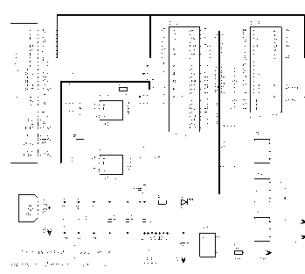


The high level innovation process looks like this

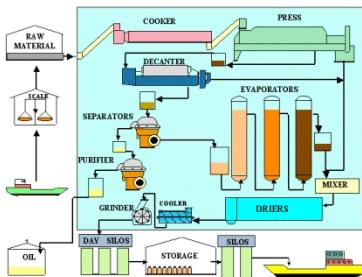




We must improve everything always



Engineering
design



Process
design



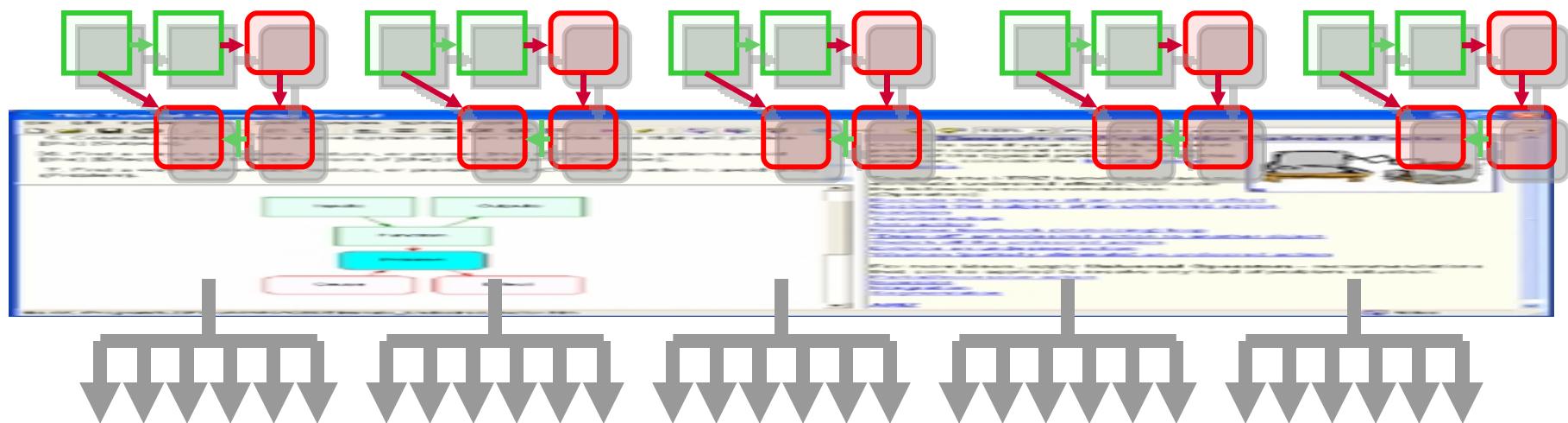
Organizational
design



Production
design



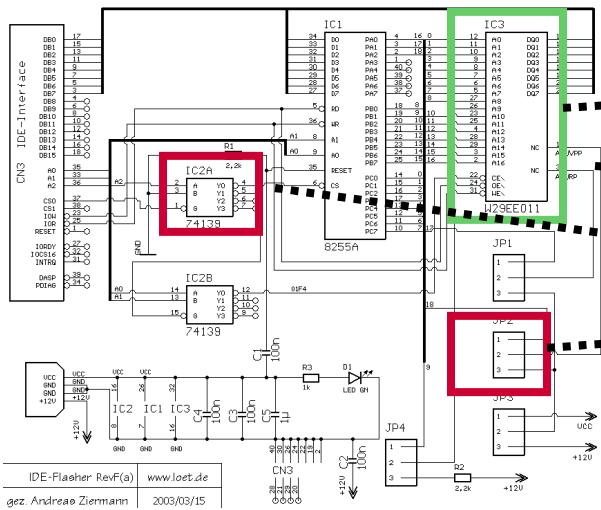
Operations
design



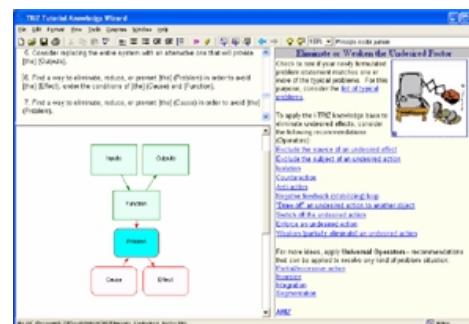
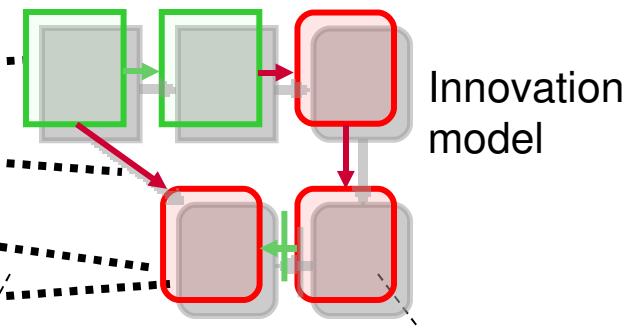
Improvement, renewal, replacement

We can open existing intellectual property to innovation

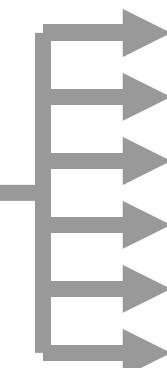
Schematic, document, etc.



Innovation mark-up

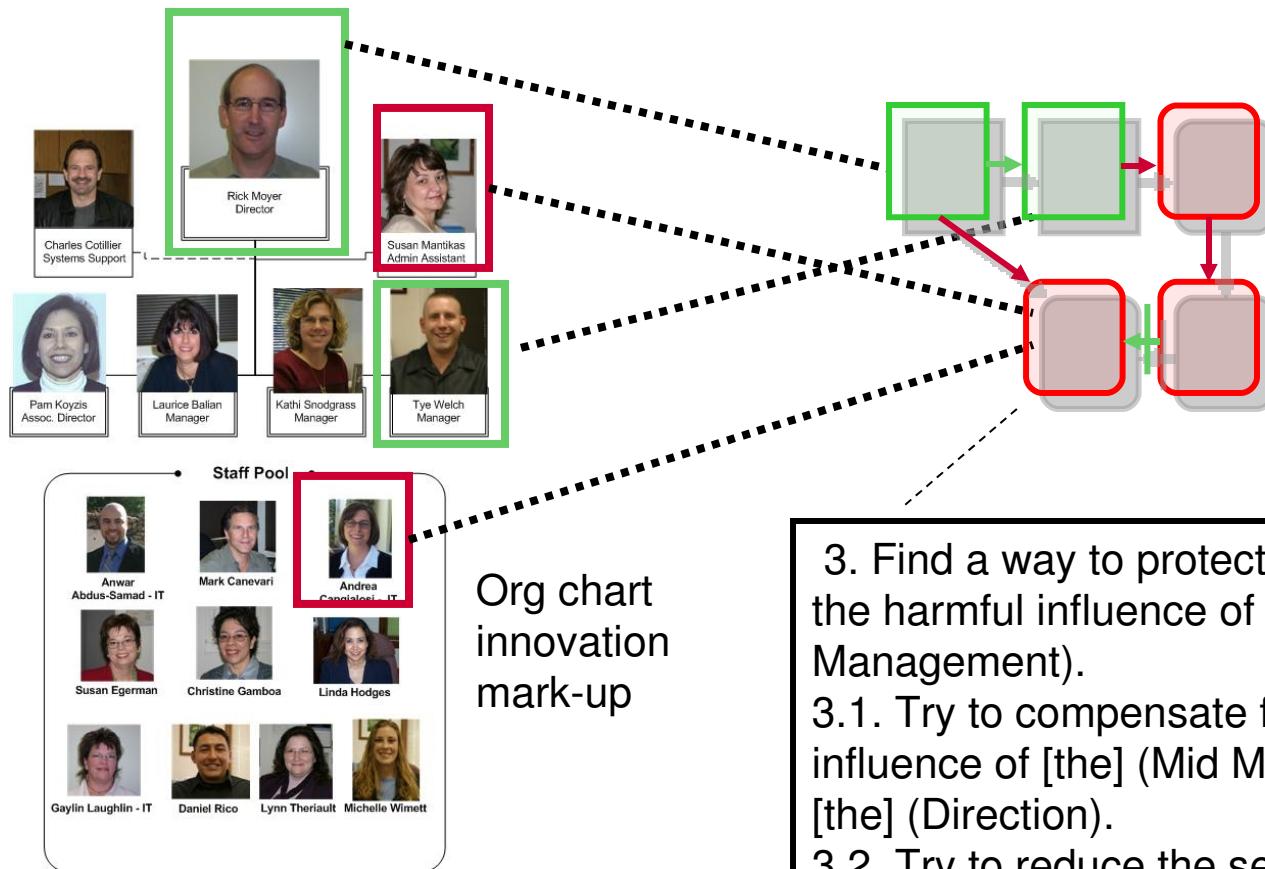


Formulator





We can mark-up any artefact to create innovation

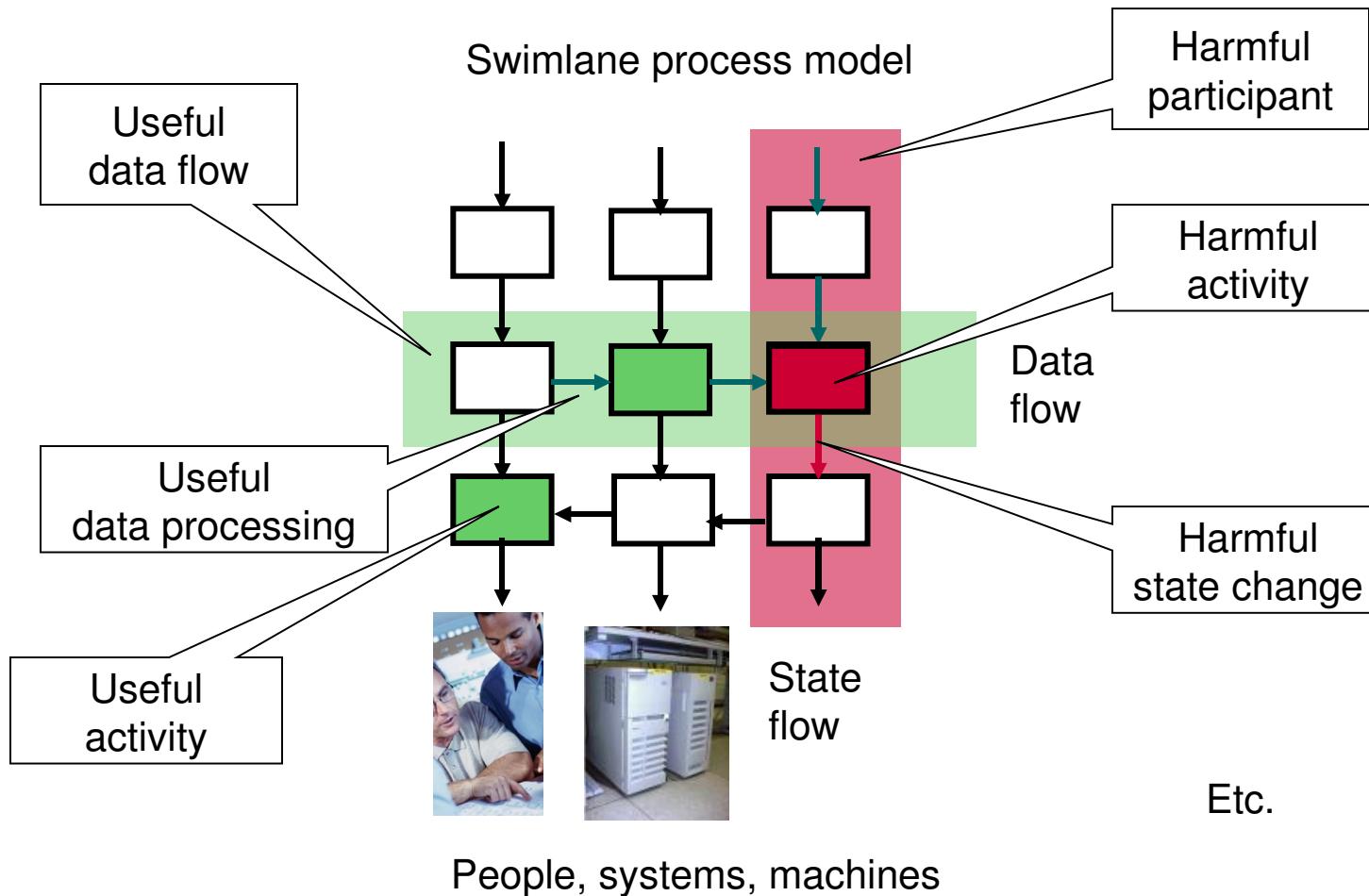


Inter-personal
and inter-
departmental
relationships

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).



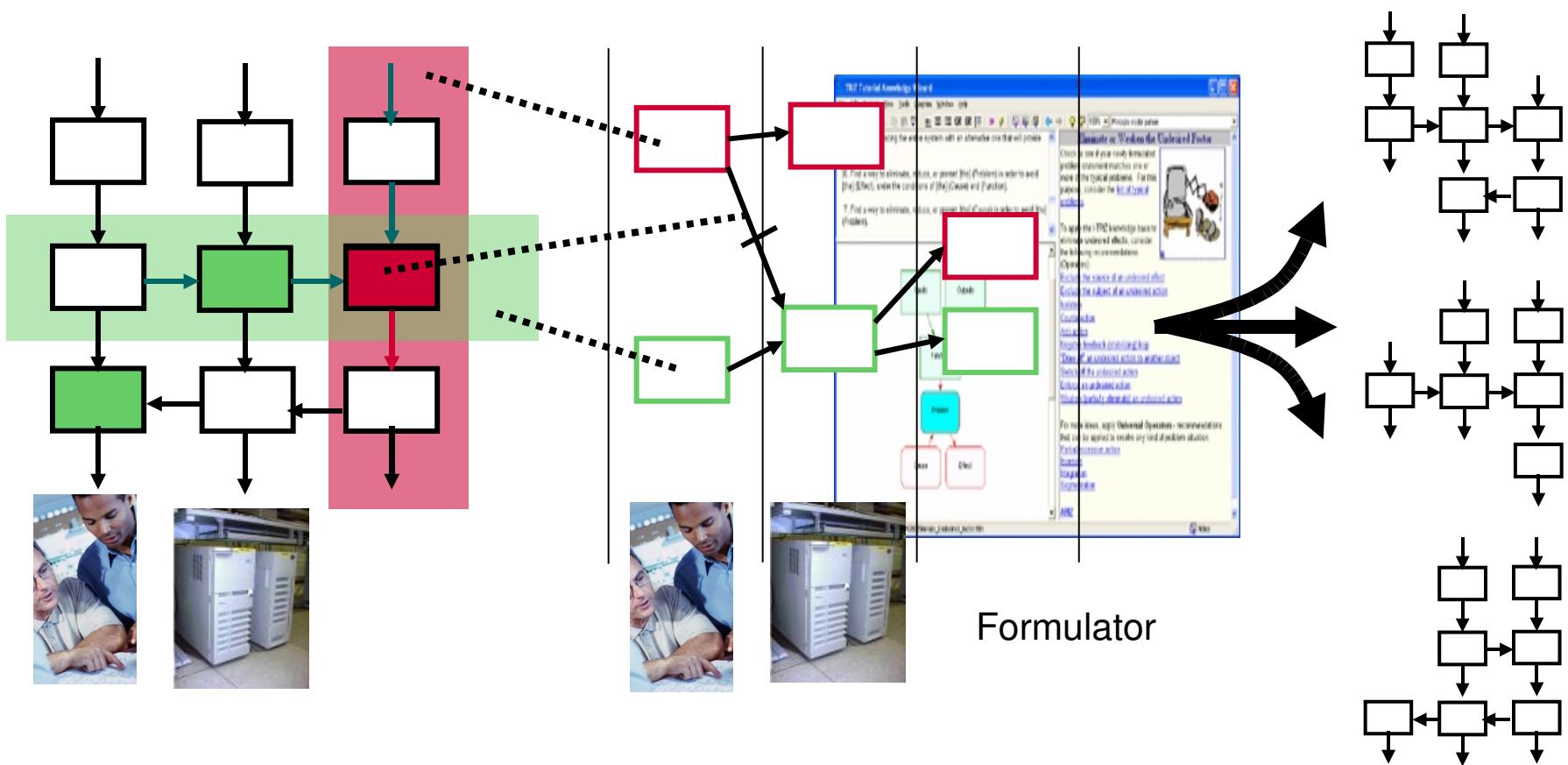
Processes can be analyzed for innovation





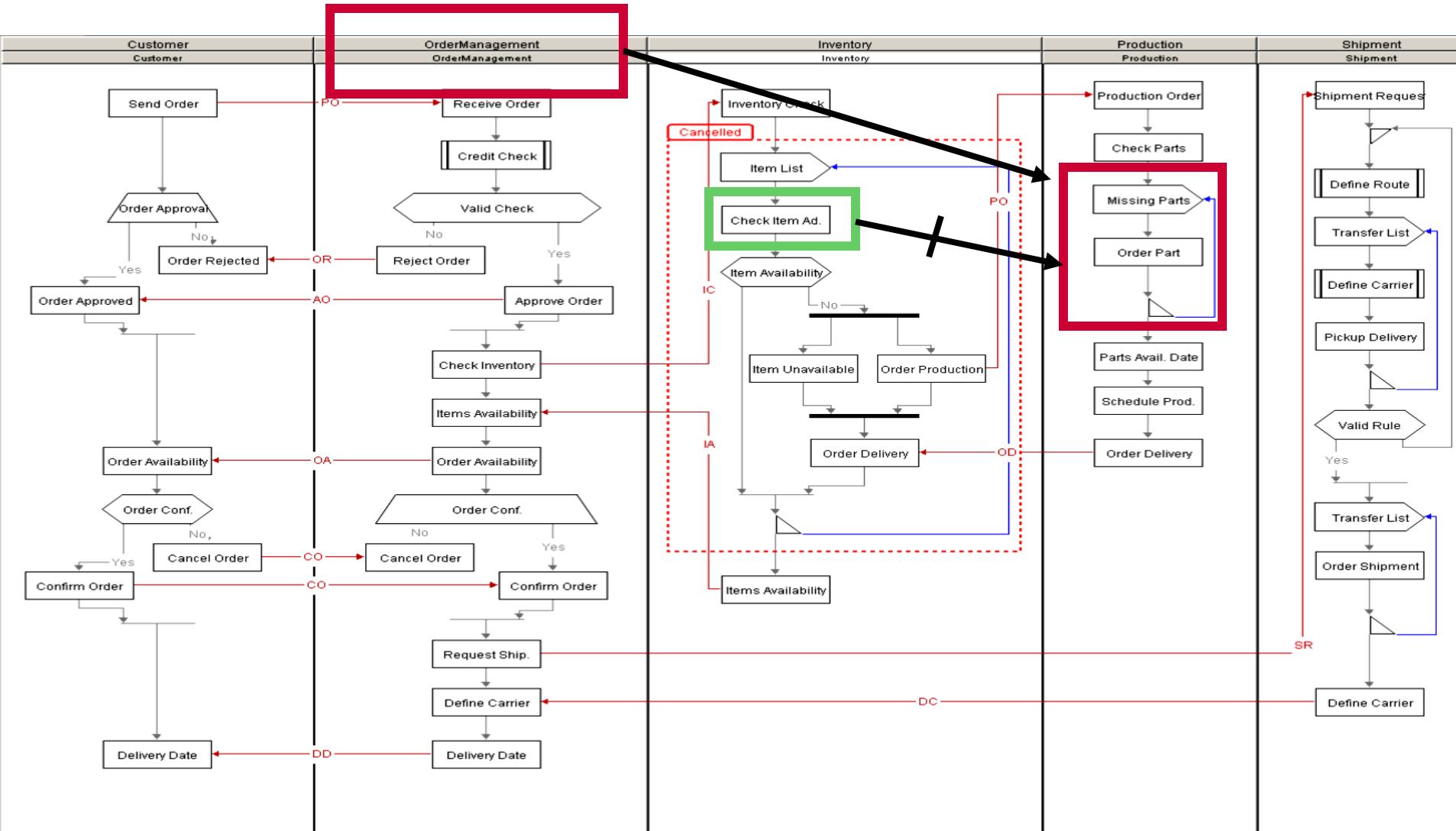
... opening pathways to alternate process designs

“As Is” Process model → Innovation model → Reengineering options



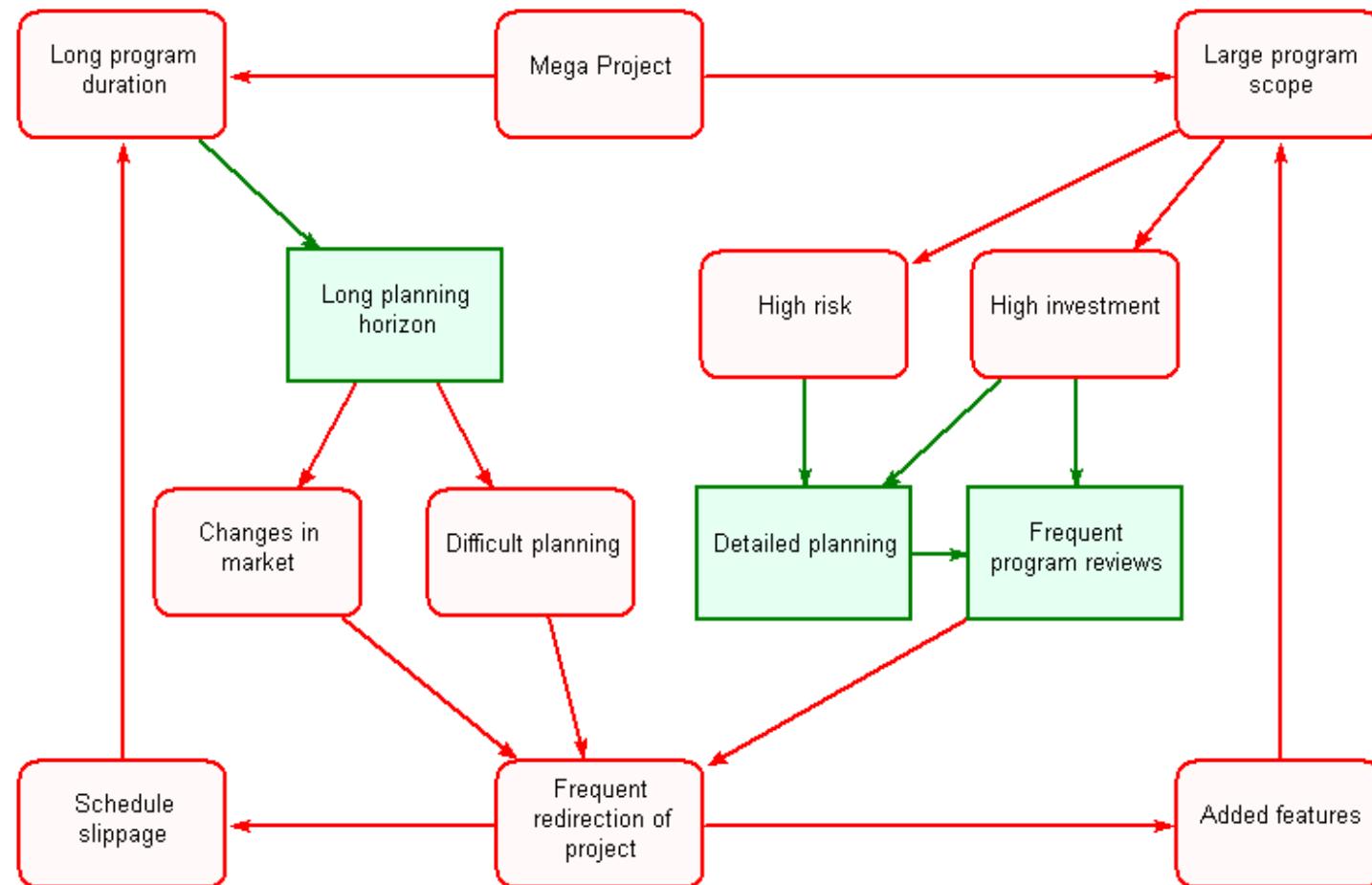


P-TRIZ and BPMN





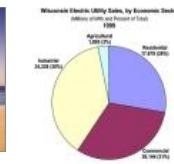
P-TRIZ can cope with fuzzy processes not amenable for formal process modeling



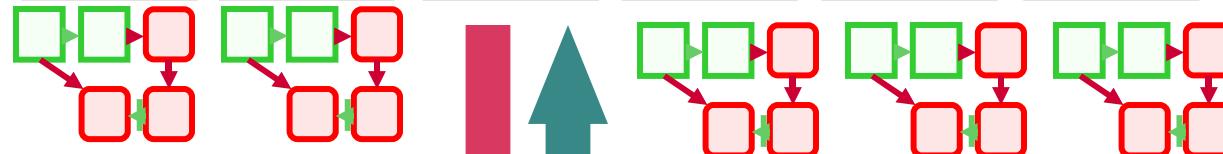
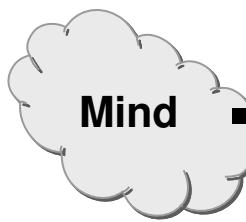


The innovator is a problem solver

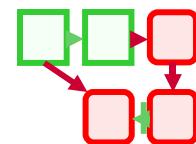
Resources few
Projects many



Projects few
Resources many



Improved Stuff



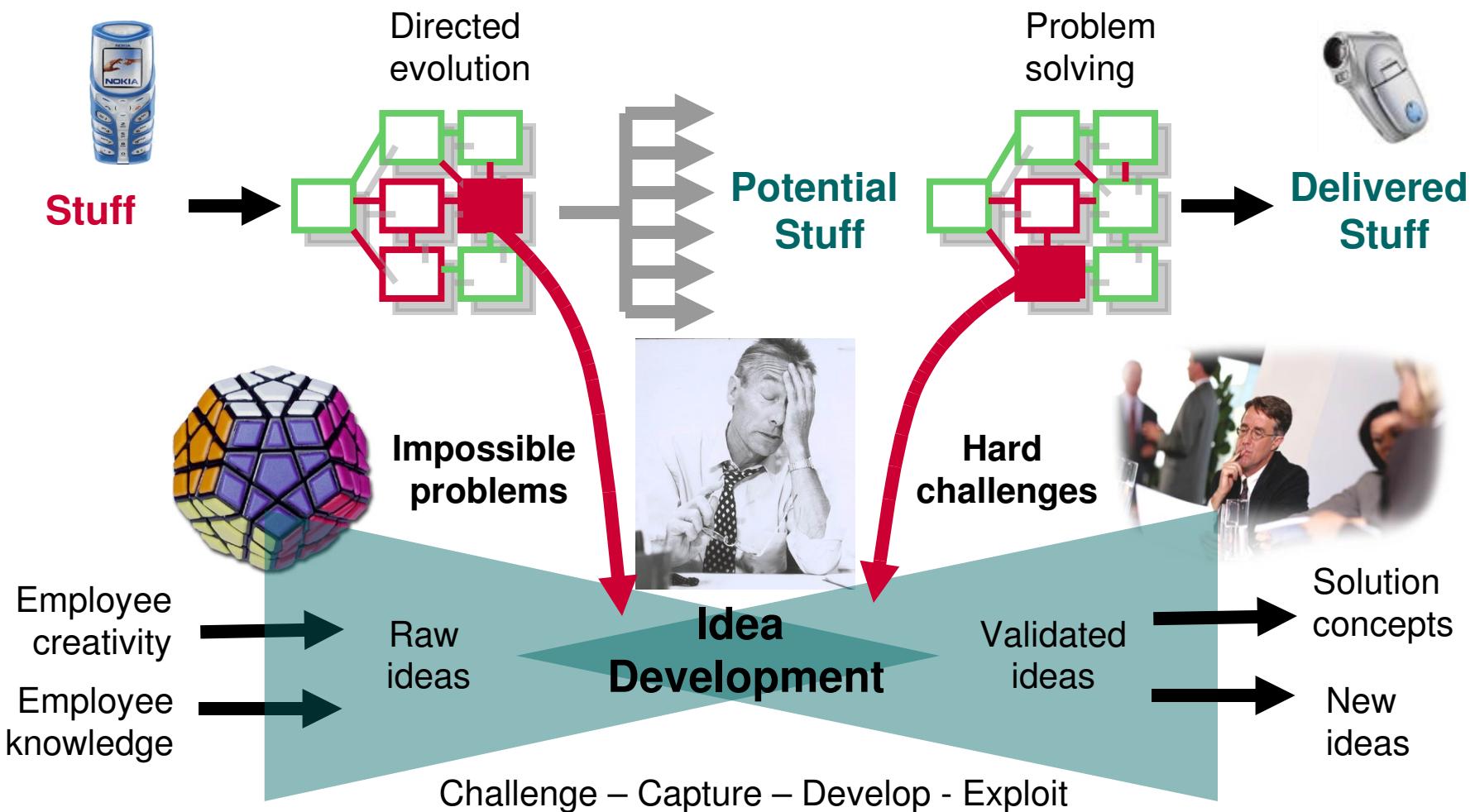
Delivered Stuff



Technical feasibility ... Market feasibility ... Manufacturing feasibility ... Delivery feasibility



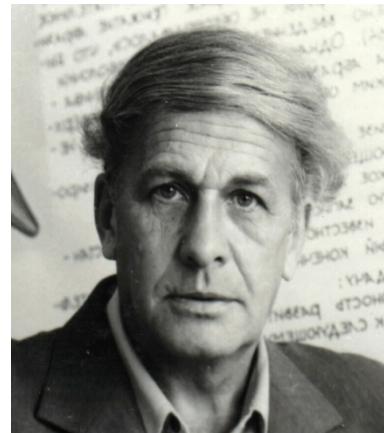
Because we are talent limited, it's all hands to the pump





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



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

Solution directions generated by the tool's traversal of the model

TRIZ model showing causal relationships between functions of the thing being improved

Hypertext of 'TRIZ operators' (solution patterns) with examples

Diagram illustrating the TRIZ model:

```
graph TD; Inputs[Inputs] --> Function[Function]; Outputs[Outputs] --> Function; Function --> Problem[Problem]; Problem --> Cause[Cause]; Problem --> Effect[Effect]; Cause --> Problem; Effect --> Problem;
```

File Edit Format View Tools Diagram Window Help

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).

Principle model pattern

Eliminate or Weaken the problem

Check to see if your newly formed problem statement matches one or more of the typical problems. For this purpose, consider the [list of typical problems](#).

To apply the I-TRIZ knowledge base to eliminate undesired effects, consider the following recommendations (Operators):

- [Exclude the source of an undesired effect](#)
- [Exclude the subject of an undesired action](#)
- [Isolation](#)
- [Counteraction](#)
- [Anti-action](#)
- [Negative feedback \(stabilizing\) loop](#)
- ["Draw off" an undesired action to another object](#)
- [Action](#)
- [Action](#)
- [Action](#)
- [Action](#)
- [Action](#)

Universal Operators - recommendations for any kind of problem situation:

ARIZ

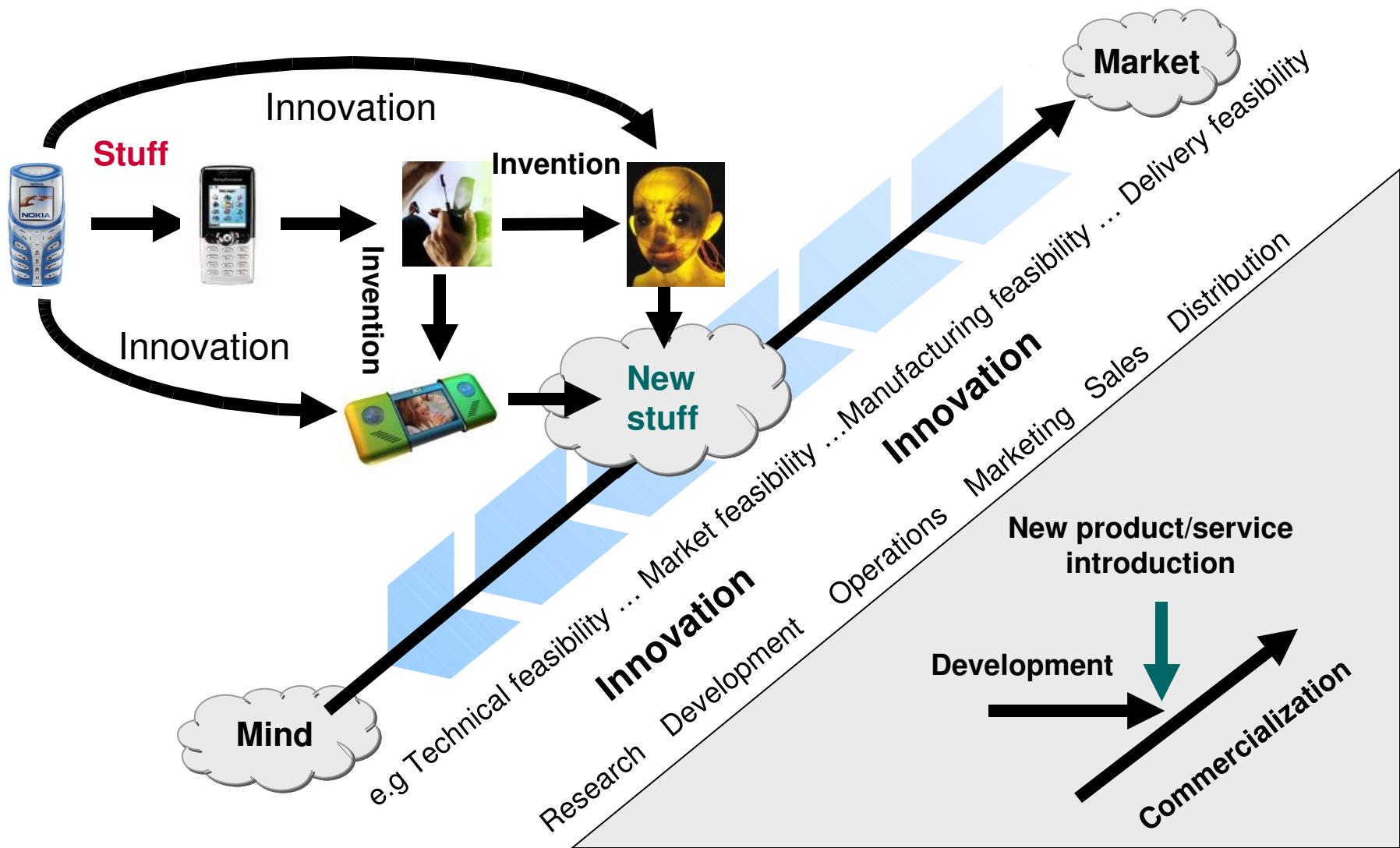
file:///C:/Program%20Files/Ideation/KW/

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

Notes

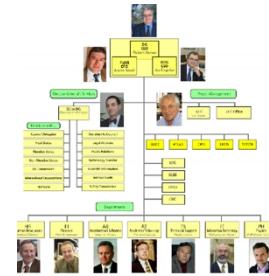
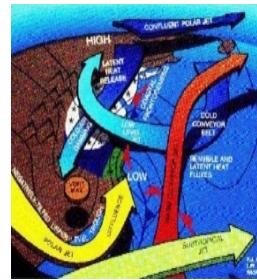


So innovation is more than just a good idea





Remember... stuff can be:



Products

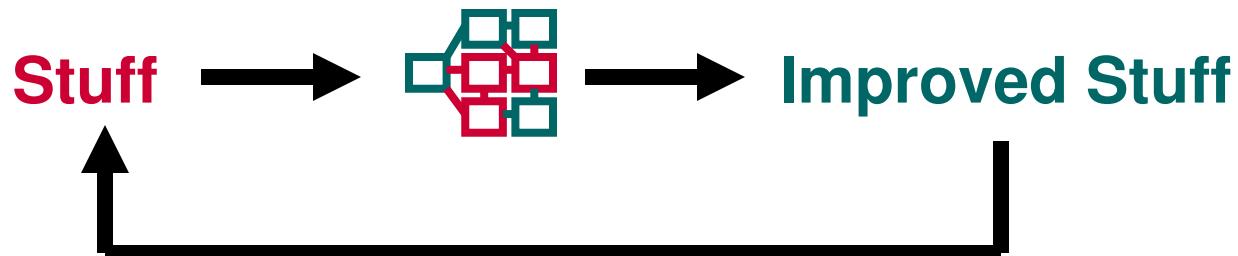
Services

Solutions

Processes

Organizations

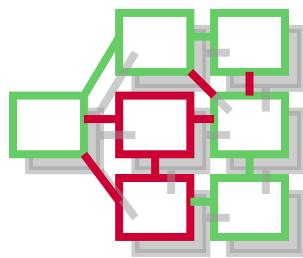
Ideas





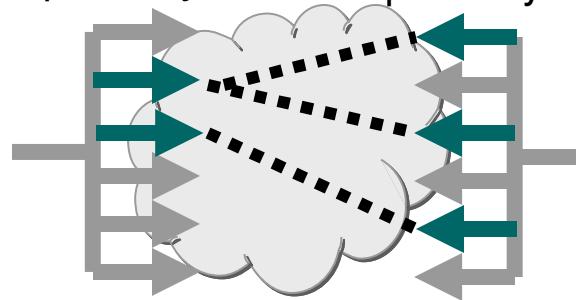
So what's this “magic happens” stuff?

**Impossible
problems**

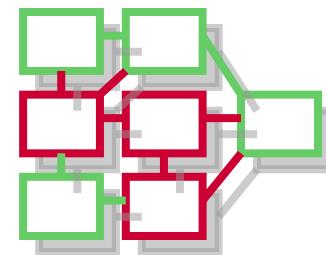


Problem mark-up

**Solution
pathways**

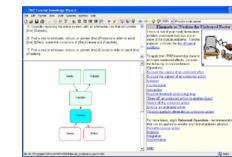
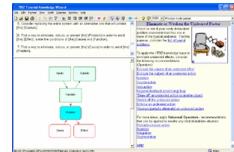
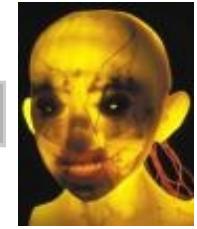


**Problem
pathways**



Solution mark-up

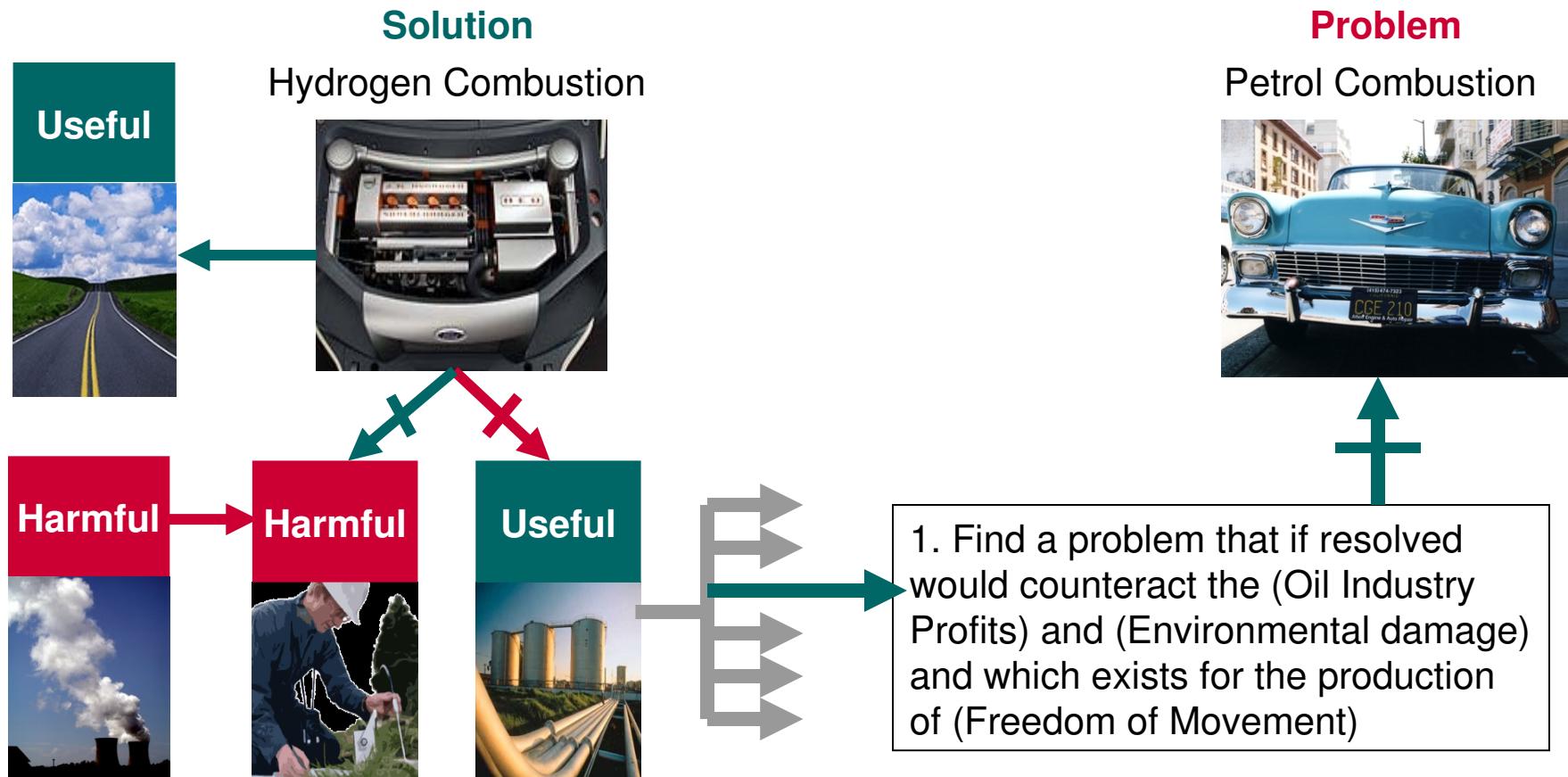
**Unlikely
solutions**



Combinatorial innovation

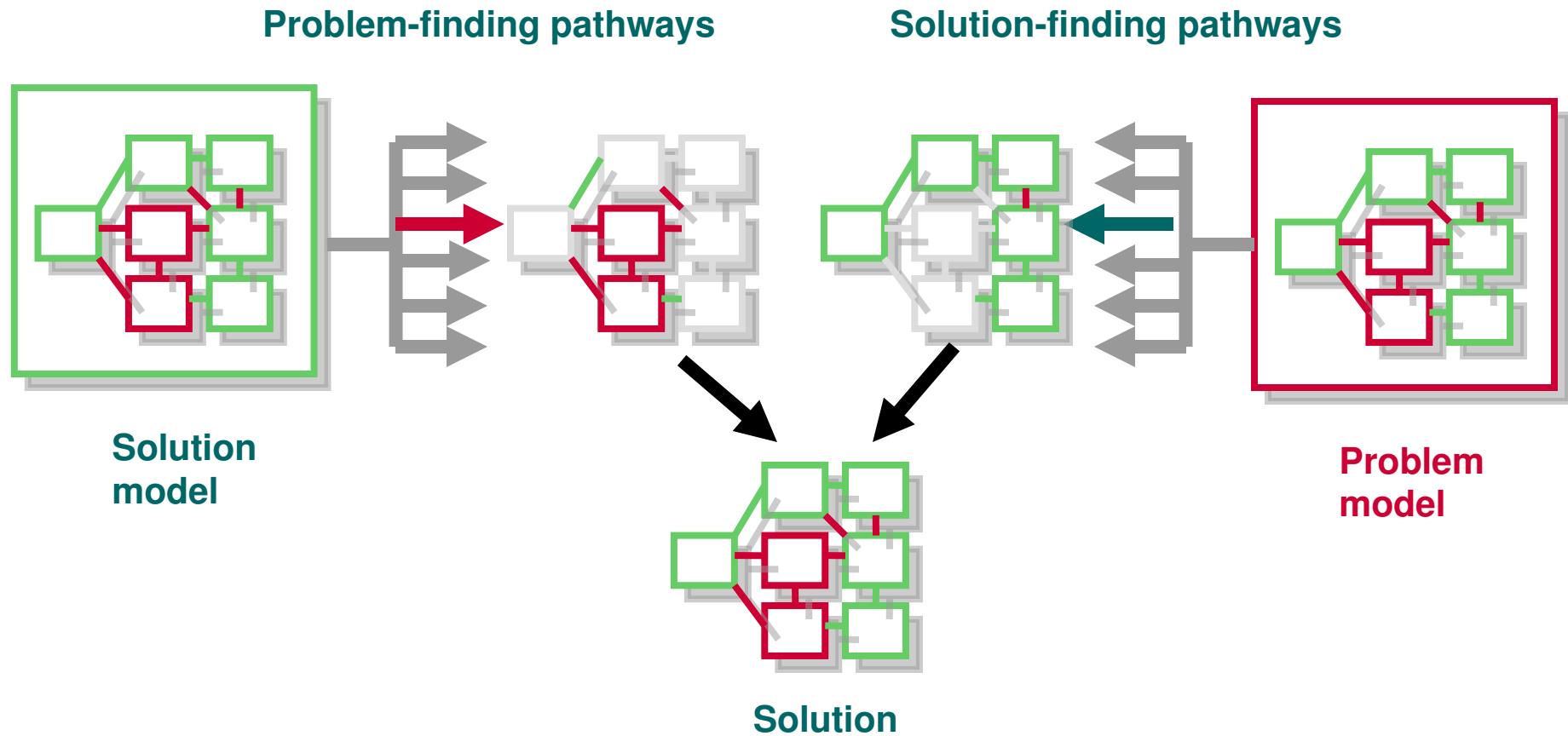


The same models can describe solutions leading to problem-finding pathways





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CSC WORLD



The Innovator Is A Problem Solver

Do You Have Problems? A 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 simplified 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 Europe. General manager of CSC's process BPM and enterprise architecture centre of excellence. An early advocate of process technology and a founder of BPM.org. Howard is a regular columnist at BPM Trends and author of two books about IT and business processes.
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P-TRIZ Formulation

Process Innovation

March 2006



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CONSULTING FUTURE INNOVATION OUTSOURCING

COMMERCE REINVENTED

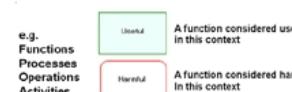
P-TRIZ Formulation

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:



Questions?

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