



*“The most important task of civilization is to teach the human to think.”*

*Thomas Edison*

# xTRIZ & Systematic Innovation in Business & Technology for MENA

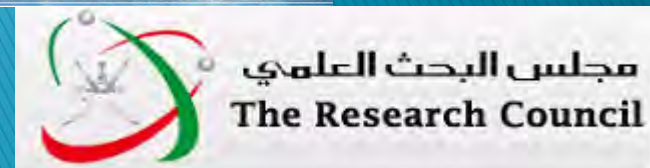
*Presented by  
Hussein Al-Natsheh  
Founder & General Manager  
Ciapple CO LTD*



*xTRIZ at Ciapple Accredited by  
Valeri Souchkov, ICG T&C*

**ETRIA** EUROPEAN TRIZ ASSOCIATION

Round Table Workshop INCONET-GCC, Best Practice in S&T policies, Dec 6, 2010, Muscat, Oman



# Content



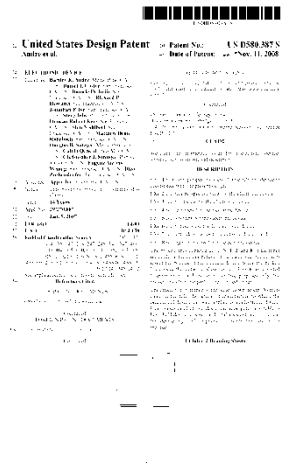
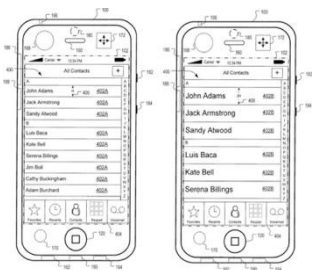
- ▶ Innovation VS Invention
- ▶ What is TRIZ
- ▶ TRIZ Approach & Ideality
- ▶ Root Conflict Analysis & Contradiction Elimination Example
- ▶ Blue Ocean Strategy
- ▶ Technology Transfer & Entrepreneurship
- ▶ Summary: Moving Ahead

# Invention and Innovation



## Invention

**Innovation = New Idea (+ Patent) + Successful Implementation + Recognized Value + Accessibility**



# How do we innovate?



**We need an idea of a new product...**

**Let's brainstorm?**

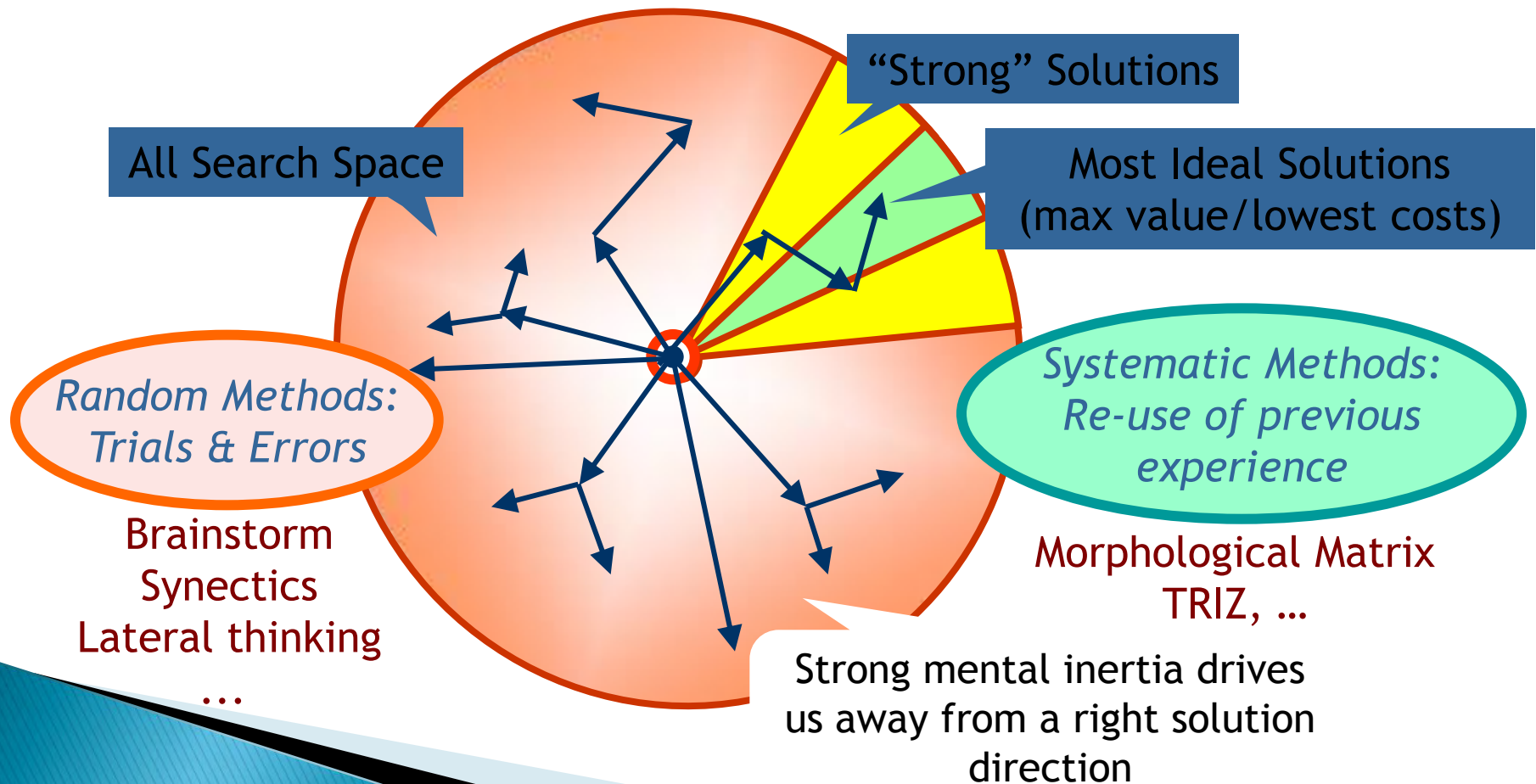
**But remember: we only have one hour!**

# Kissing many frogs...



*“You’ve got to kiss a lot of frogs before you find your princess...”*

*“It is difficult to find a black cat in a dark room especially when the cat is not there.”*



# What Others Say...



*“TRIZ is the Intel’s  
innovation platform of the  
21st century”*

*Amir Roggel, Innovation Leader, Intel Corp.  
At TRIZCON 2008 keynote talk,  
Kent State University, US*

# Origins of TRIZ



Genrich Altshuller (1926-1998)



400.000 inventive solutions (more than 2 mln. studied by today)



**TRIZ: THE THEORY OF SOLVING INVENTIVE PROBLEMS**  
(abbreviated in Russian from “Teoria Reshenia Izobretatelskih Zadatch”)

# Creator of TRIZ: Genrich Altshuller



“I am often asked: “Do you really believe that everyone can be taught creativity?” Yes, every engineer might and can learn how to solve tasks which we regard as creative.

Can someone learn to move at the speed of 50 km per hour? Yes, one uses a car. Can everybody learn to dig faster than the best shovel worker? Yes, if we replace a shovel with an excavator. TRIZ provides an engineer with such an excavator”.

Genrich Altshuller (1922–1998)  
Creator of TRIZ

# TRIZ at Glance



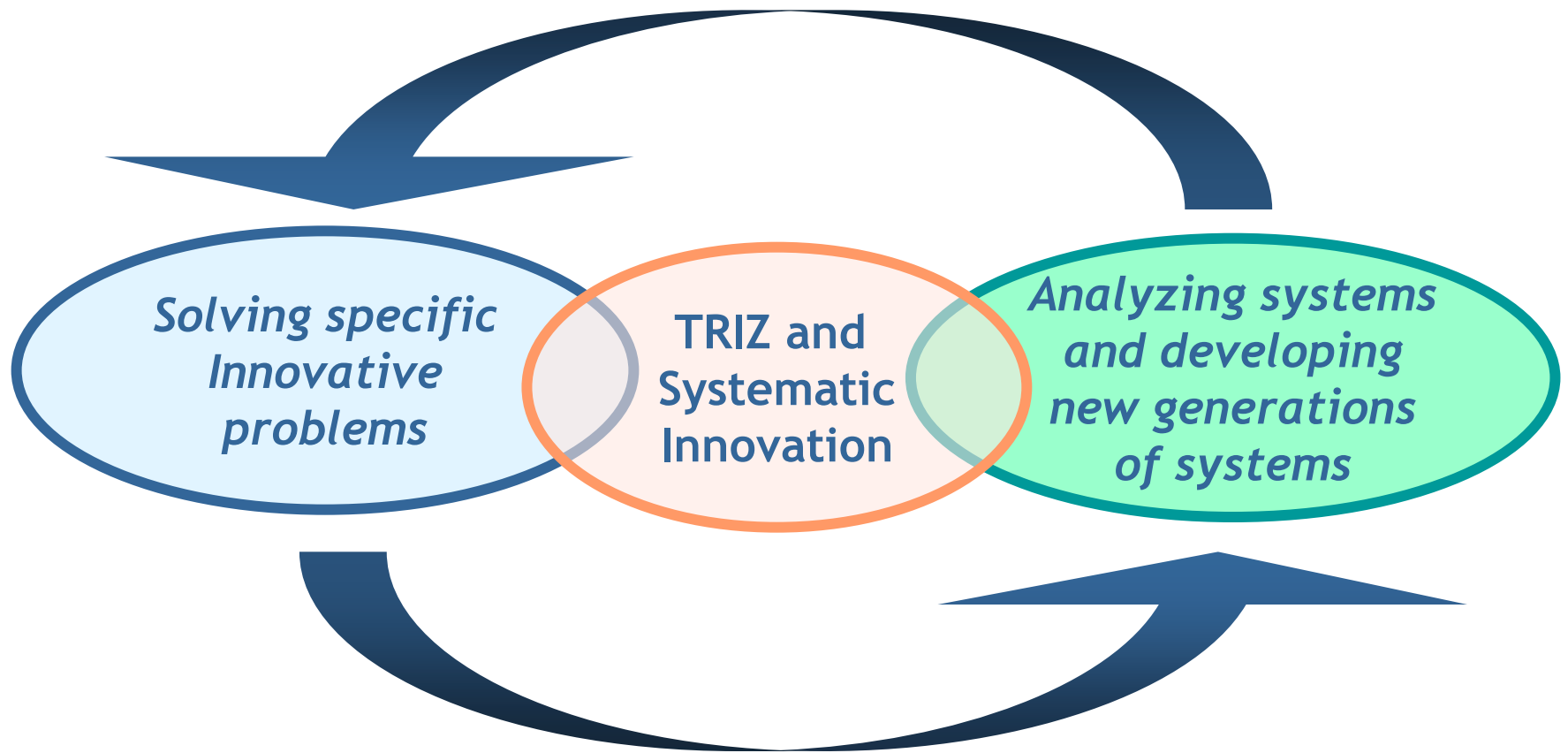
- ▶ **TRIZ:** Theory of Solving Inventive Problems (abbreviated from Russian: “*Teoria Reshenia Izobretatelskikh Zadach*”).
- ▶ TRIZ and Systematic Innovation are a set of methods and techniques which help *solving non-ordinary problems* and *producing innovative ideas*.
- ▶ Result of more than 50 years of research by more than 300 people and studies of more than *2 million creative solutions*.

# TRIZ Discoveries



- ▶ Discovered a number of *general patterns of creative solutions* which comply with majority of inventive solutions.
- ▶ Discovered major *trends and lines of man-made systems evolution*.
- ▶ Extracted basic principles behind the *processes of technical and business creativity* and *made them repeatable*.

# Two Tasks of TRIZ



# Ideality



Everything that creates and increases overall value

Factors that reduce overall value

**USEFUL EFFECTS – NEGATIVE EFFECTS**

**DEGREE OF IDEALITY**

=

**COSTS:**

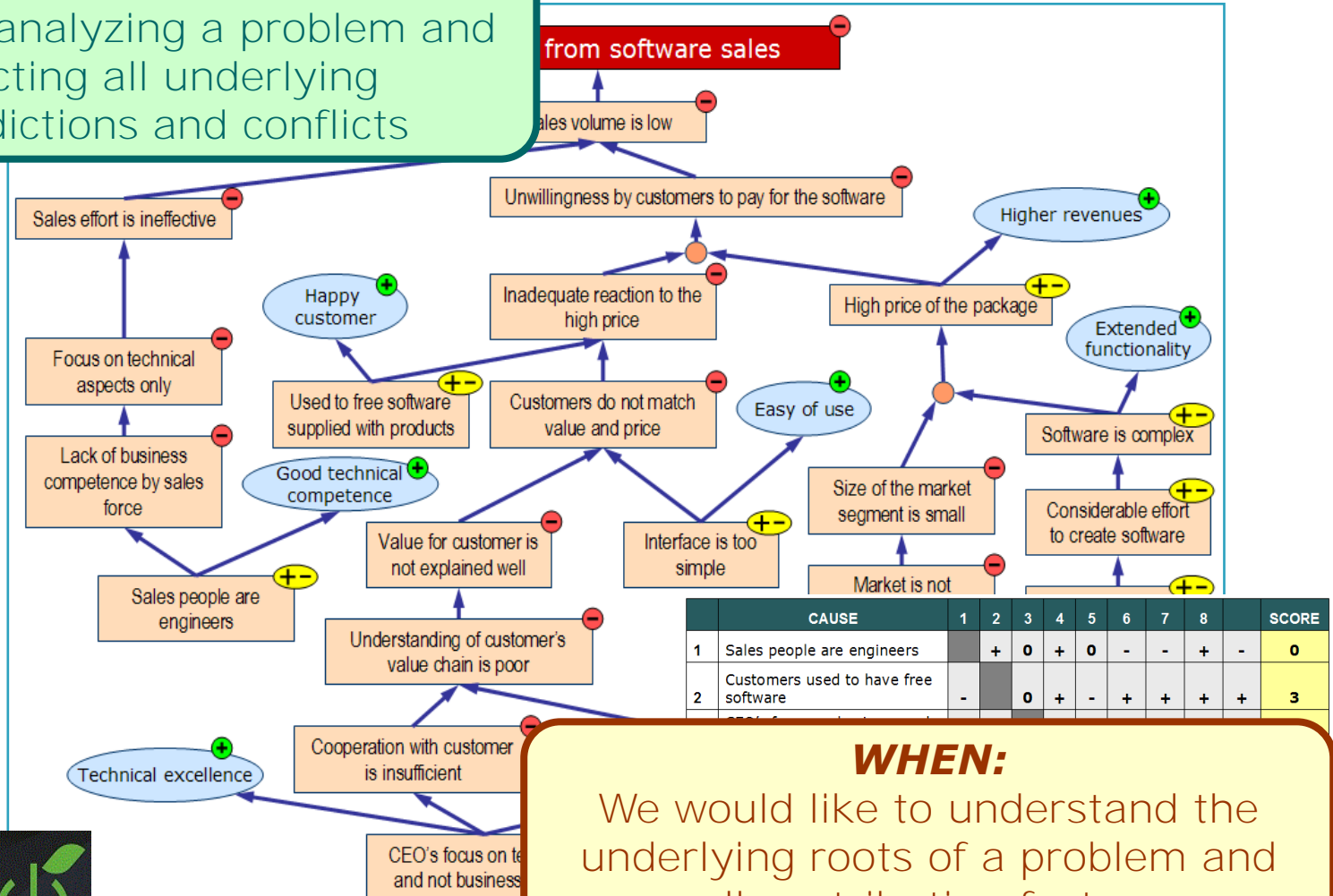
Material, energy, information...

All direct and indirect expenses needed to create and maintain the overall value

# Root–Conflict Analysis (RCA+)

## WHAT IT DOES:

Helps with analyzing a problem and extracting all underlying contradictions and conflicts



## WHEN:

We would like to understand the underlying roots of a problem and all contributing factors



# Contradiction Thinking

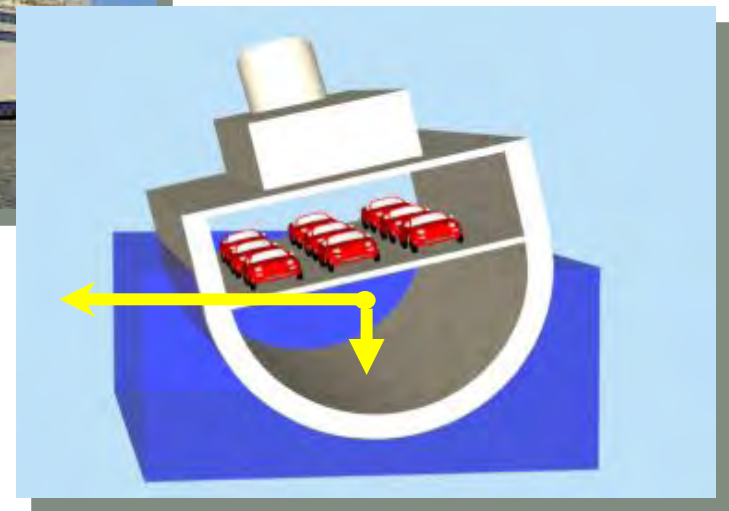


- ▶ Contradictions are the greatest trigger of innovative and breakthrough ideas
- ▶ However when facing contradictions, we start searching for compromises. But compromises do not lead us to breakthrough innovative ideas.
- ▶ Contradictions should be resolved. If we do not do it now, eventually our competitors will.

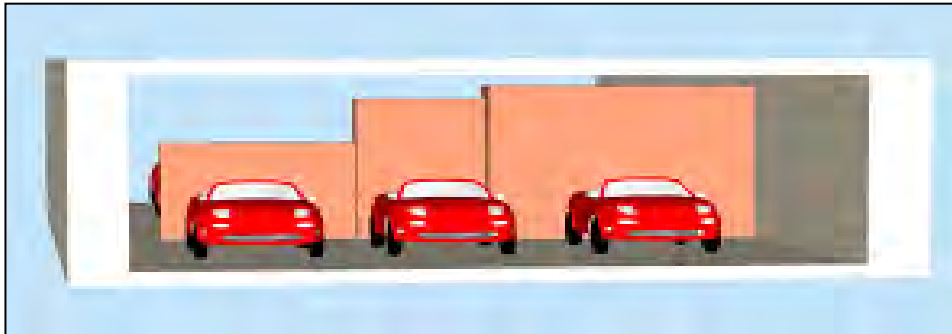
# Accident Sea Ride



- ▶ In 1994, the ferry “Estonia” capsized and sank in Baltic Sea. About 850 people died.



# Known Solutions



Sliding doors

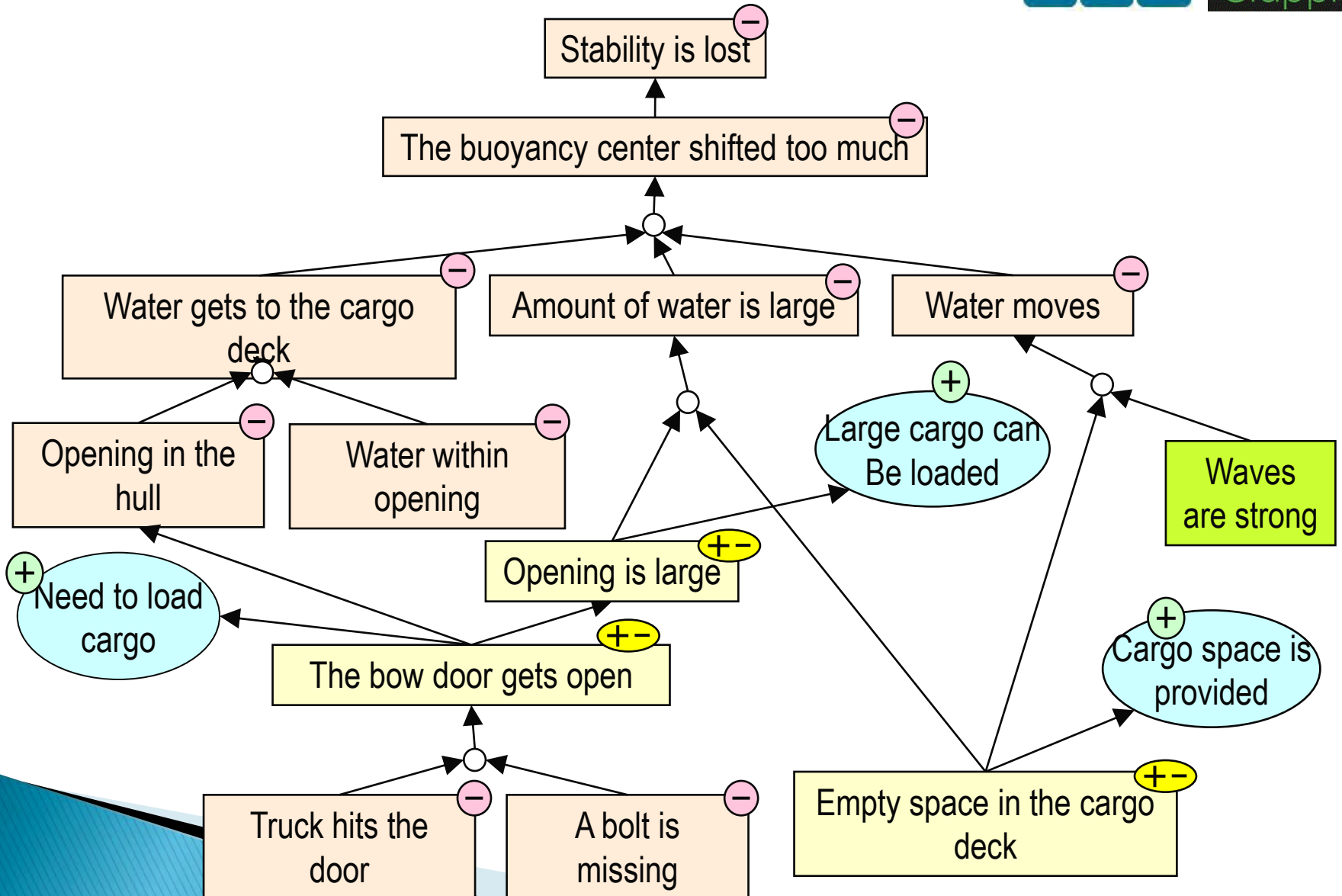


"Accordion"- type doors



Foldable doors

# RCA+: Ferry case



# Contradiction Matrix and 40 Inventive Principles




## WHEN:

After RCA+ or if a problem is represented as a contradiction

40 Inventive Principles are known

	Weight of moving object	Weight of immobile object	Length of moving object	Length of immobile object	Area of moving object	Area of immobile object	Volume of moving object	Volume of immobile object	Speed	Force	Tension, Pressure	Shape	Stability of object	Strength	Durability of moving object	Durability of immobile object	Temperature	
1	Weight of moving object	-	15, 8, 23, 24	-	23, 17, 38, 34	-	23, 2, 40, 28	-	2, 8, 15, 38	8, 10, 18, 37	10, 36, 37, 40	10, 14, 35, 40	1, 35, 19, 39	28, 27, 18, 40	5, 9, 31, 2	-	-	
2	Weight of immobile object	-	-	10, 1, 23, 35	-	-	95, 30, 13, 2	-	6, 35, 14, 2	8, 10, 19, 35	13, 23, 10, 18	26, 39, 23, 14	28, 2, 1, 40	-	2, 27, 28, 19, 32, 22	-	-	
3	Length of moving object	8, 15, 23, 34	-	-	15, 17, 4, 35	-	7, 17, 4, 35	-	13, 4, 8, 17	17, 10, 4	1, 8, 35, 29	1, 8, 15, 29, 34	8, 35, 23, 34	19	-	10, 15, 19	-	
4	Length of immobile object	-	35, 28, 40, 29	-	-	17, 7, 10, 40	-	35, 8, 2, 14	28, 10	1, 14, 35, 15, 7	13, 14, 35, 15, 7	39, 37, 35, 15, 14	28, 26	1, 10, 35	3, 35, 38, 18	-	-	
5	Area of moving object	2, 17, 23, 4	14, 15, 18, 4	-	-	7, 14, 17, 4	-	29, 30, 19, 30, 4, 34	10, 15, 35, 2	5, 34, 11, 2, 13, 39	11, 2, 13, 39	3, 15, 40, 14	6, 3	-	2, 15, 16, 11	-	-	
6	Area of immobile object	-	30, 2, 14, 18	26, 7, 9, 39	-	-	-	1, 18, 10, 15, 35, 36, 37	6, 35, 36, 37	1, 15, 28, 10, 9, 14, 1, 39	2, 38, 40	40	-	2, 10, 19, 30	34, 39, 10, 18	-	-	
7	Volume of moving object	2, 26, 23, 40	1, 7, 4, 35	1, 7, 4, 35	-	-	-	29, 4, 38, 34	2, 18, 37	13, 28, 38, 40, 15, 19	6, 18, 38, 40	35, 15, 1, 19, 35, 40	28, 33, 1, 19, 35, 5	3, 19, 35, 5	28, 30, 36, 2	-	-	
8	Volume of immobile object	-	35, 10, 19, 14	19, 14, 35, 8, 2, 14	-	-	-	2, 18, 37	24, 35	7, 2, 35, 34, 28, 35, 40, 40, 34	21, 14, 27	19, 2	-	35, 34, 38	35, 6, 4	-	-	
9	Speed	2, 28, 13, 38	-	13, 14, 8	-	23, 30, 34	7, 23, 34	-	13, 28, 38, 40, 15, 19	6, 18, 38, 40	35, 15, 1, 19, 35, 40	28, 33, 1, 19, 35, 5	3, 19, 35, 5	28, 30, 36, 2	28, 30, 36, 2	-	-	
10	Force	8, 1, 37, 18	18, 13, 1, 28	17, 19, 9, 36	28, 10	19, 10, 1, 15	1, 18, 15, 9, 12, 37	2, 36, 18, 37	13, 28, 18, 37, 15, 12	18, 21, 11	10, 35, 35, 10, 40, 34	21, 14, 27	19, 2	35, 10, 21	35, 10, 21	-	-	
11	Tension, Pressure	10, 36, 37, 40	13, 23, 10, 18	35, 10, 36, 14, 16	35, 1, 10, 15, 36, 28	10, 15, 10, 15, 36, 37	6, 35, 36, 37	35, 24	6, 35, 36, 35, 38	21	35, 4, 35, 3, 18, 3, 19, 3	2, 40, 40	27	35, 39, 19, 2	35, 39, 19, 2	-	-	
12	Shape	8, 10, 23, 40	15, 10, 26, 3	23, 34, 5, 4	13, 14, 5, 4, 10, 7	5, 34, 4, 10	14, 4, 15, 22	7, 2, 35	35, 15, 34, 18, 37, 40	35, 10, 14	34, 15, 10, 14	33, 1, 18, 4	30, 14, 14, 26	14, 26, 9, 25	22, 14, 19, 32	22, 14, 19, 32	-	-
13	Stability of object	21, 35, 2, 39	26, 39, 1, 40, 28	13, 15, 1, 28	37	2, 11, 13, 39	28, 10, 19, 39	34, 28, 33, 15, 35, 40	33, 15, 28, 18, 37	10, 35, 21, 16	2, 35, 22, 1	22, 1	17, 9, 15	13, 27, 10, 35, 39, 3	35, 1, 32	35, 1, 32	-	-
14	Strength	1, 8, 40, 34, 31	40, 26, 27, 1	15, 8, 35	15, 14, 28, 28	3, 34, 40, 23	9, 40, 28	10, 15, 9, 14, 7	8, 13, 26, 14, 7	10, 8, 3, 14	10, 3, 18, 40, 35, 40	13, 17, 35, 40	27, 3	27, 3	30, 10, 40	30, 10, 40	-	-
15	Durability of moving object	19, 5, 34, 31	-	2, 19, 9	-	3, 17, 19	-	10, 2, 19, 30	3, 35, 5	19, 2, 16	19, 3, 27	13, 3, 28, 25	13, 3, 27, 3	27, 3, 10	-	19, 35, 39	-	-
16	Durability of immobile object	-	6, 27, 19, 16	-	1, 40, 35	-	-	35, 34, 38	-	-	-	39, 3, 35, 23	-	-	19, 18, 36, 40	-	-	-
17	Temperature	36, 22, 34, 31	22, 35, 32	15, 19, 9, 15, 19, 9	3, 35, 39, 18	35, 38	34, 39, 40, 18	35, 6, 4	2, 28, 36, 30	35, 10, 3, 21	35, 39, 19, 2	14, 22, 19, 32	1, 35, 22, 40	10, 30, 22, 40	19, 13, 39	19, 13, 36, 40	-	-

	Worsening Factor	Development Spec/Quality/Capability	Development Cost	Development Time
Worsening Factor				
Development Specs/Quality/Capability				
Development Cost	2, 4			
Development Time	1, 38, 35, 23, 15	26, 34, 1		
Development Risk	9, 24, 23, 36, 11	27, 9, 34	1, 29, 10, 11	
Development Interfaces	3, 24, 33, 38, 25	13, 26, 35, 1	15, 25, 35, 1	

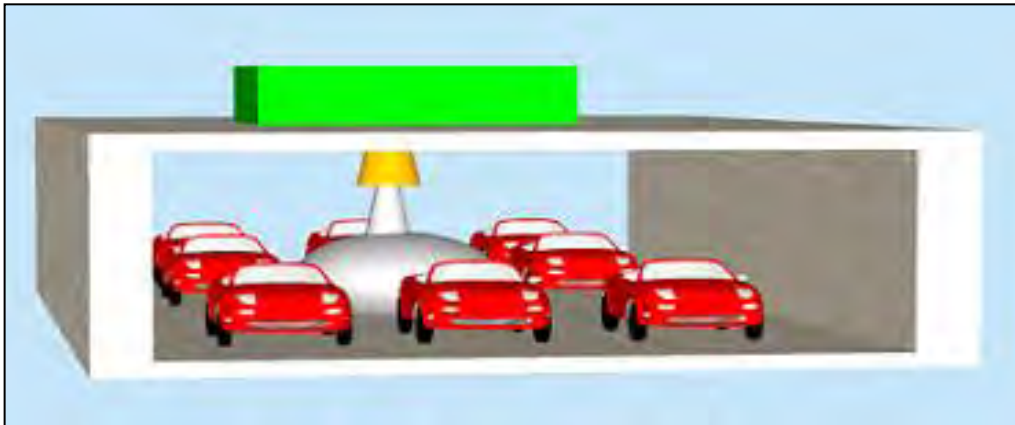
#	PRINCIPLE	EXPLANATION
1	SEGMENTATION	 <ul style="list-style-type: none"> <li>Divide your object into independent parts or linked parts.</li> <li>Divide your object into parts so that some its part can be easily taken away when necessary.</li> <li>Increase the degree of the object's segmentation by composing the object from a number of smaller objects, granules, powder, liquid or gas.</li> </ul>
2	TAKING AWAY	 <ul style="list-style-type: none"> <li>If some part of your object interferes with other parts or creates negative effect, "take away" an interfering part of your object by separating it from the object, or isolating it from the object.</li> <li>If some property of the object interferes, find what part of the object is a carrier of the property and separate it from the object by creating another object or transferring the property to some other part of the object.</li> <li>"Single out" the only necessary property of an object by creating another object which has the required property only.</li> </ul>
3	LOCAL QUALITY	 <ul style="list-style-type: none"> <li>Instead of uniform structure of your object, use non-uniform structure to localize a zone in your object that achieves positive or eliminates negative effect.</li> <li>Instead of uniform structure of environment, use non-uniform structure.</li> <li>If two functions are to be performed by the same object's part but this causes problems, divide this part into two parts.</li> <li>Redesign your object and environment so that each part of the object must be in conditions proper for operation.</li> </ul>

## WHAT IT DOES:

Provides generic recommendations on how to resolve a specific contradiction and generate out of the box ideas



# New Ideas:



Container with liquid plastic foam which solidifies after being sprayed

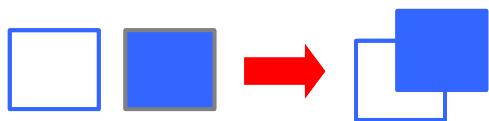


Airbags which are deployed in case of emergency

# Inventive Principle: Merging



## #5 MERGING



## Strategies and recommendations

- Merge identical (or similar) parts or components of a system in space.
- Merge identical (or similar) parts or components of a system in time.
- Merge two or more different systems to achieve synergetic effect
- Merge two or more systems to increase efficiency or save space, time, energy or any other resources.
- Merge two or more different processes or activities to a single one.
- Merge systems executing different processes or activities to a single system.

## Examples

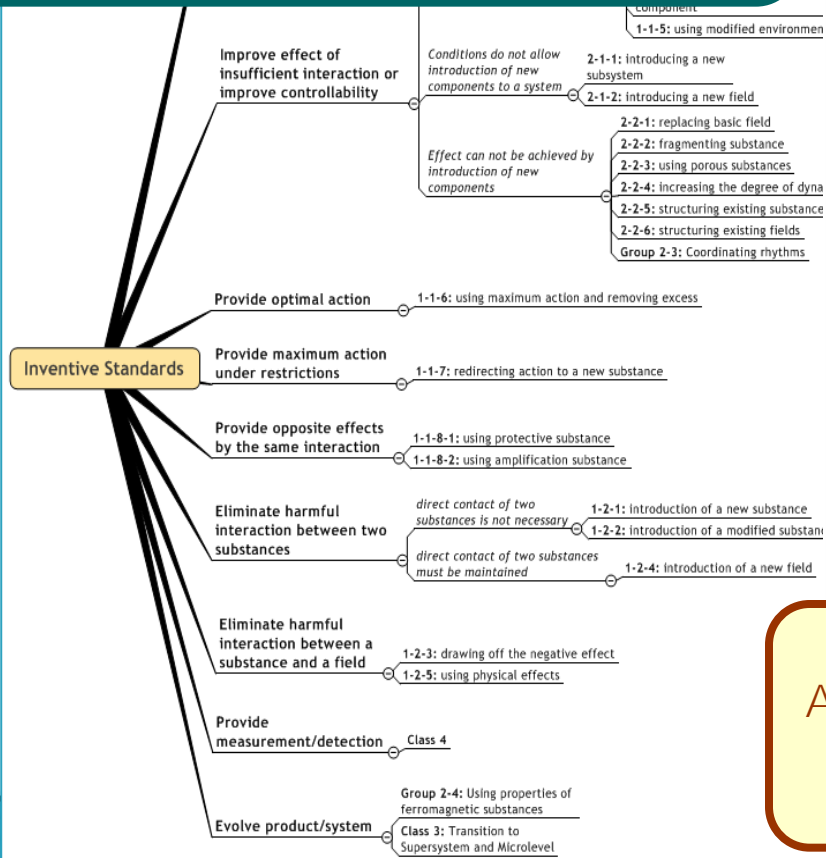
- ❑ All kinds of smaller stores are merged to shopping malls.
- ❑ Exhibitions are often conducted at the same time together with the congresses.
- ❑ Several companies create a single logistic center in another country.
- ❑ Banks, etc offer customers a full range of financial service packages - current, savings, mortgage, pension, etc in a single package.
- ❑ To operate on unknown territory, a joint venture is created between two companies providing similar services but in different countries.
- ❑ Cell-based manufacturing
- ❑ Placing fiber optics internet cables inside existing water pipes in Tokyo removed the need for additional ground work and saved space.
- ❑ Cash machine working for many different banks.
- ❑ iPod: combination of mp3 player and iTunes online service ensured market success.
- ❑ In dealing with capability shortfalls where two potential candidates are strong in some areas and weak in others, the decision is made to have the two candidates share the essential job functions.

# Inventive Standards



**WHAT IT DOES:**  
Provides patterns of solutions indicating how to change a structure of a system to solve a problem

76 Patterns are known for technology and 30 for Business



<p><b>STANDARD 1-1-4</b></p>	<p>If the contact between substances in the environment is insufficient...</p>
<p><b>STANDARD 1-1-5</b></p>	<p>If there is a need to improve positive effect and external environment does not contain ready substances which can enhance the existing interaction, these substances can be obtained by replacing the external environment with another one, or by decomposing the environment, or by introducing additives into the environment.</p>
<p><b>STANDARD 1-1-6</b></p>	<p>If a minimal (measured, optimal) effect of action is required, but it is difficult or impossible to achieve under the conditions of the problem, a maximum action can be used, and the excess of the action is then removed. Excess of a substance is removed by a field, while excess of a field is removed by a substance.</p>

**WHEN:**  
After Function Analysis or a problem is represented as a number of interacting components

# More on TRIZ:

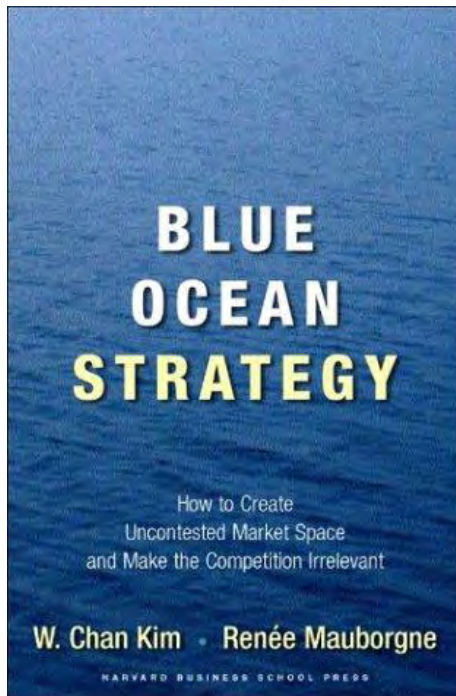


- ▶ [www.xtriz.com/publications.htm](http://www.xtriz.com/publications.htm)
- ▶ [www.triz-journal.com](http://www.triz-journal.com)
- ▶ [en.wikipedia.org/wiki/TRIZ](http://en.wikipedia.org/wiki/TRIZ)
- ▶ Or contact: [h.natsheh@Ciapple.com](mailto:h.natsheh@Ciapple.com)

## References:

This presentation used materials developed by G. Altshuller, A. Badyin, R. Jay, C. Kim, N. Khomenko, A. Maslow, R. Mauborgne, V. Souchkov, V. Tamberg.

# Blue Ocean Strategy (BOS)



## Red Ocean Strategy:

- Competing on price
- Competing on small extra features
- Fighting competition by new business models

## Blue Ocean Strategy:

- Creating radically new products which have no competition
- Adapting existing products to new markets
- Finding new unfilled niches

# BOS Example



Enhance regional market reach through trained licensed partners

Create new focus on certain marketing applications for a certain segment (FMCG Medium Size Retailers)

Market Strategy (BOS)

Reduce the price of the service while keeping the high value of the knowledge

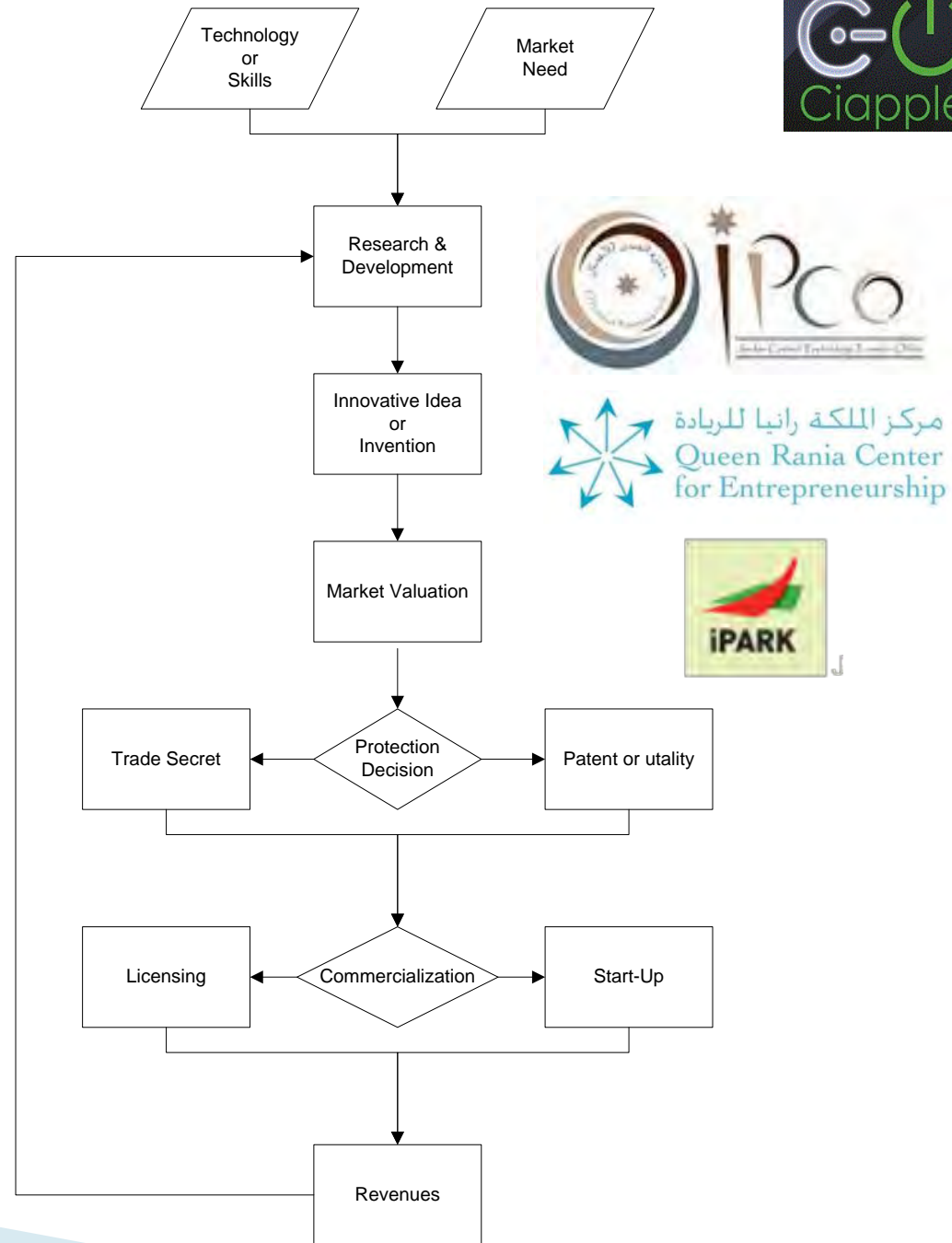
Eliminate the need for the client to hire data analysts

Eliminate the need for the client to buy the software

# Tech Transfer & Entrepreneurship

## Innovation Ecosystem:

- Science, Business Park & Innovation incubation
- Technology Commercialization Office
- Business Plans and Innovation Competitions
- Training & Mentorship
- Invest in Technology



# Summary: Moving Ahead



- ▶ We should use systematic methods at each stage of research or business activities
- ▶ We need to focus on developing new and radically improved products and services
- ▶ TRIZ accelerate problem solving & patent generation
- ▶ We need to develop ability to dynamically change business models to adapt to rapidly changing environment
- ▶ We need to develop and enhance individual and team power creative skills to come up with new innovative but focused, effective and efficient (working!) ideas
- ▶ Local innovation ecosystem fosters market driven innovation



# Thank you!

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