How to apply TRIZ at SAMSUNG

Hyo June Kim

4th Japan Invention Machine User meeting
2003.09.10

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1	History of TRIZ Activity at Korea	Focused in SAMSUNG & TRIZ Russian Experts
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4	4 Key Success Points at Company	Result of Experience as TRIZ Consultant
5	What does Break the Success of TRIZ? #1 Contradiction about Education	TRIZ Poster TRIZtrainer TRIZ Database TRIZ Korean Book
6	What does Break the Success of TRIZ? #2 Contradiction about TRIZ Theory	How we understand Theory of TRIZ
7	What does Break the Success of TRIZ? #3 Contradiction about TRIZ Result	Now, 6sigma is trends at Korea Industry. What is demerit of 6sigma & How TRIZ reinforce it's demerit.

History of TRIZ Activity at KOREA

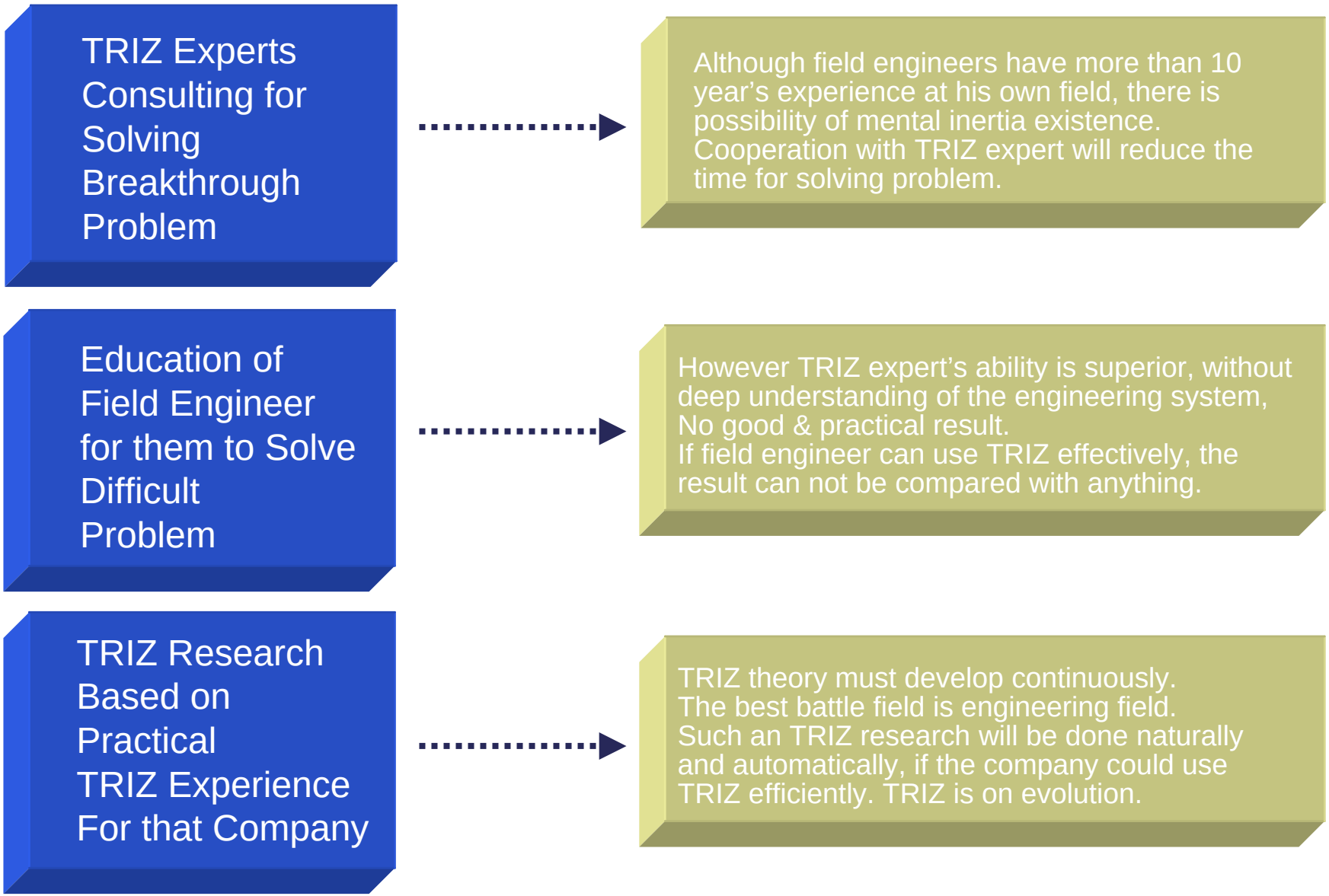
Year	Main Events	Etc.
1997	Nikkei Mechanical write TRIZ article. LG made contract with Nikolai Khomenko. 6sigma starts at SAMSUNG SDI by CEO SunWook.	Khomenko stopped contract and so LG invited another Russian TRIZ expert named Dmitri Kuchiliali until 2001 year.
1998	SAMSUNG Electronics (SEC) invited Royzen for TRIZ seminar & test problem.	Noise problem of Hard disk was selected. The final proposals were not accepted to field engineer. SEC was disappointed.
1999	SAMSUNG SDI made contract with Russian expert Vasilli Leniachine. LG made contract with Peter Chuksen.	CEO of SDI was Sun Wook. Chechurine also made contract with SDI for translation of Russian to English. Chuksen continue until now at LG.
2000	SAMSUNG SAIT made contract with Nikolai Khomenko & Nikolai Shpakovsky	They start from June. Khomenko visit 2~3 times in a year for education. Shpakovsky works for full time.
2001	SEC made contract 2 Russian expert. Vasilli move company from SDI to SAIT. SAIT made contract with Elena Skuratovich start work at LG.	Kraevsky and Chernayk. This decision was influenced by 2000 year's successful help of TRIZ consulting by SAIT. Elena developed software for TRIZ on-line engineering with SAIT TRIZ experts. He works until now at LG with Chuksen.
2002	SEC start to invite 4 more Russian. SEC start Innovation Master Program.	It was decided directly by CEO of SEC, because SAIT consulted Cellino project for DVD pickup cost saving.
2003	SAMSUNG Electronic Mechanics (SEM) made contract with Russian expert Kini.	

TRIZ Software(S/W)

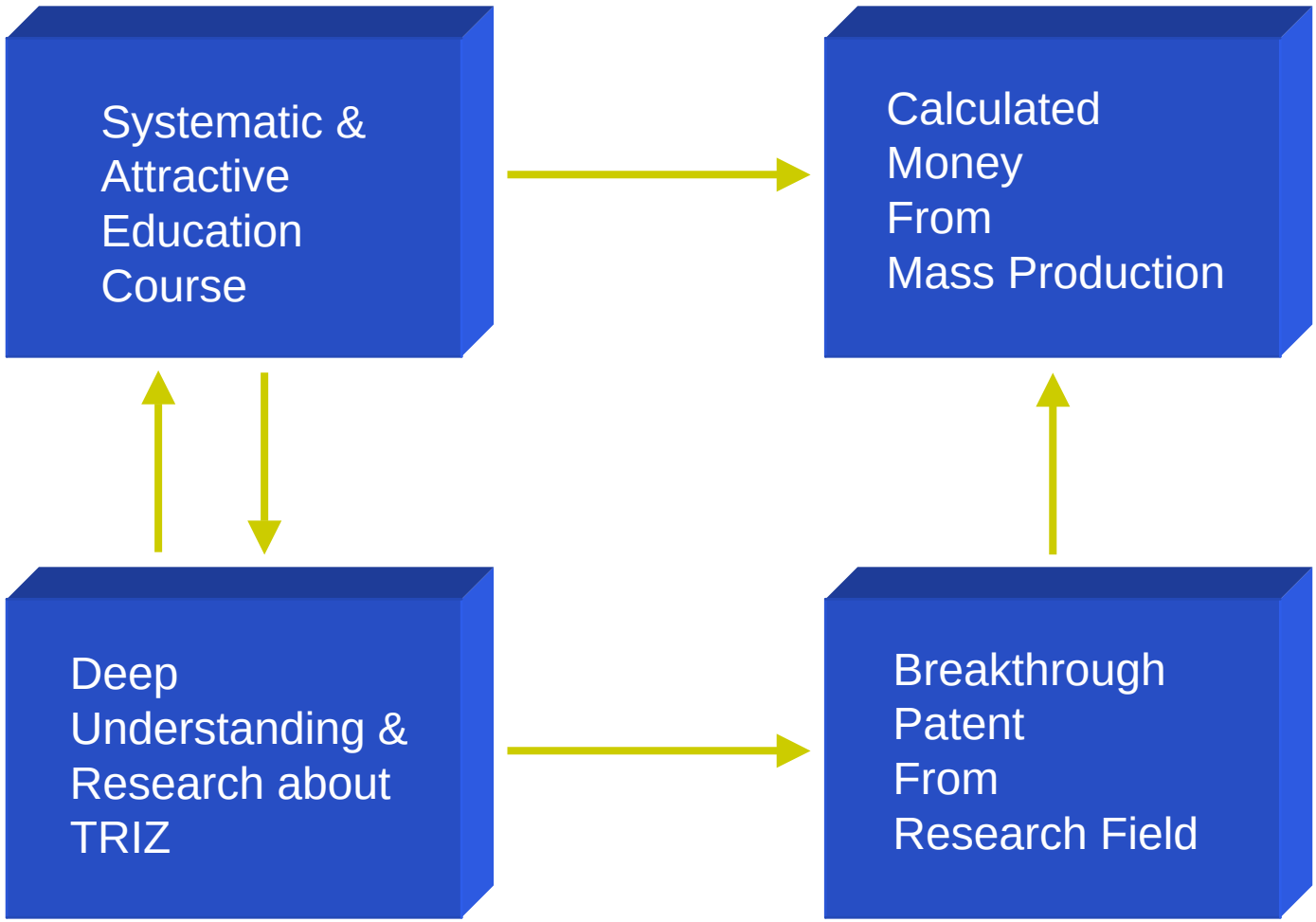
Company	TechOptimizer	Knowledgist
SAMSUNG	SEC 30 Network User License (ID type) SAIT 2 Single User License SEM 9 Network User License (ID type)	SEC 8 Network User License (ID type) 2 Single User License SAIT 3 Network User License (plan to convert it to 6 ID network license) SEM 3 Network User License (ID type)
LG	Electronics 10 Network User License Chemistry 4 Network User License Caltex 2 Network User License LifeHealth 2 Network User License Etc* 4 Single User License	Electronics 10 Network User License Chemistry 4 Network User License Caltex 2 Network User License LifeHealth 2 Network User License Etc* 4 Single User License
POSCO	4 Network User License	1 Network User License
KOREA Telecom		4 Network User License Plan (ID type)

Data from TRIZKOREA Ltd.
Etc* means LG Life Science, LG Electrical Line,LG Industrial Electric,LG-OTIS

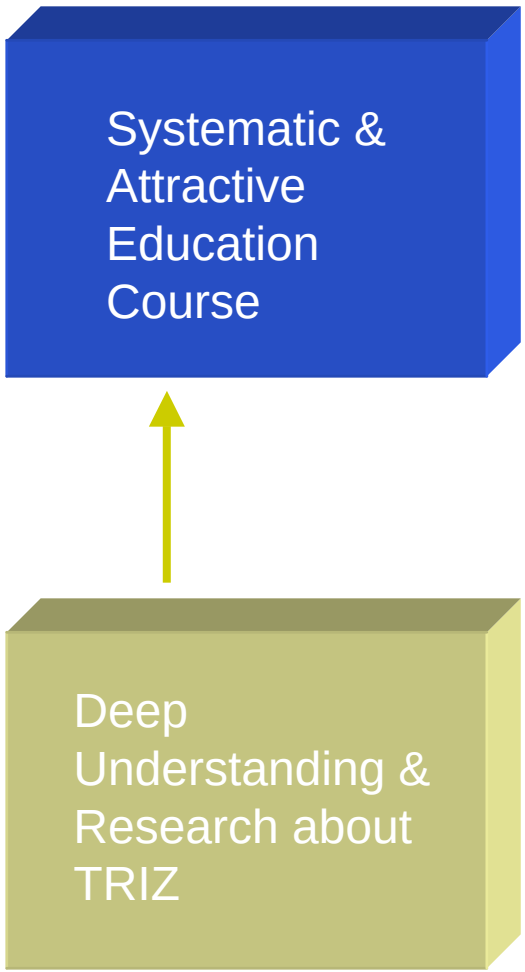
3 TRIZ Missions at Company



4 Key Success Points at Company



What does break the success of TRIZ? #1



Education Course must be short

Project Manager will not send his workers for 1 or 2 month

Education Course must be long

Engineer can not master TRIZ during 1 or 2 weeks. TRIZ different with Taguchi or QFD absolutely.

#1 Segmented Principle

SAMSUNG made TRIZ-1,2,3,5 education course. TRIZ-1 is one day light course. By the help of on-line education TRIZ-4, total education time is 2 month without bothering engineers. Basic course TRIZ-1,2,3,5 is 120 hour.

TRIZ Education Curriculum

2003年 SAIT TRIZ 教育計劃

If the schedule is changed, it will noticed by company bulletin board.
Education Place : 6 Sigma Research Center, Creative Room
Lecture Time: 09:00~17:00
This education is opened to all employee of SAMSUNG.
Just give attendance e-mail to triz@samsung.com before 1 week.

강좌	TRIZ 初級 (8h)	TRIZ 中級 (16h)	TRIZ 高級 (24h)
1次	02월 04日	02월 06,07日	02월 11,12,13日
2次	03월 07日	03월 13,14日	03월 26,27,28日
3次	04월 11日	04월 17,18日	04월 23,24,25日
4次	05월 02日 [in English]	05월 06,07日 [in English]	05월 14,15,16日 [in English]
5次	06월 13日	06월 19,20日	06월 25,26,27日
6次	07월 04日	07월 10,11日	07월 23,24,25日
7次	08월 01日	08월 07,08日	08월 20,21,22日
8次	09월 05日	09월 18,19日	09월 24,25,26日
9次	10월 10日	10월 16,17日	10월 22,23,24日
10次	11월 07日	11월 13,14日	11월 19,20,21日
招請 講座	Ph.D Nikolai Komenko : OTSM-TRIZ (2003年 5月 19~23 & 26~30 총2次例 實施) Ph.D Ikovenko : Techoptimizer, Knowledgist 活用 (2004年 下半期)		

□ 教育過程 詳細內容

教育 時間 : 120 時間 (特別過程除外)

講座	教育期間	教育內容	資格取得
TRIZ-1 (初級)	1 日 · 理論 (4h) · 實習 (4h)	□ TRIZ 入門者 □ TRIZ Overview · What is TRIZ? □ TRIZ SW · TechOptimizer 活用 · Knowledgist 活用 · TRIZtrainer 案內	· TRIZ White Belt
TRIZ-2 (中級)	2 日 · 理論 (16h)	□ TRIZ-1 修了者 □ 40 Principles · 200 examples	· TRIZ教育 認證書
TRIZ-3 (高級)	3 日 · 理論 (8h) · 實習 (16h)	□ TRIZ-1,2 修了者 □ 76 Standard Solutions □ ARIZ-85c · 1 問題 ARIZ 共同 實習 · 1 問題 ARIZ 曹別 實習 · 1 問題 ARIZ 個人 實習	· TRIZ教育 認證書
TRIZ-4 (特別 1)	5日 · 理論 (40h)	□ TRIZ-1,2,3 修了者 □ OTSM-TRIZ, ARIZ □ By Nikolai Khomenko	· TRIZ教育 認證書
TRIZ-5 (Cyber)	180時間 · 實習 (72h)	□ TRIZ-1,2,3,4 修了者 □ Triztrainer.com	· TRIZ教育 認證書

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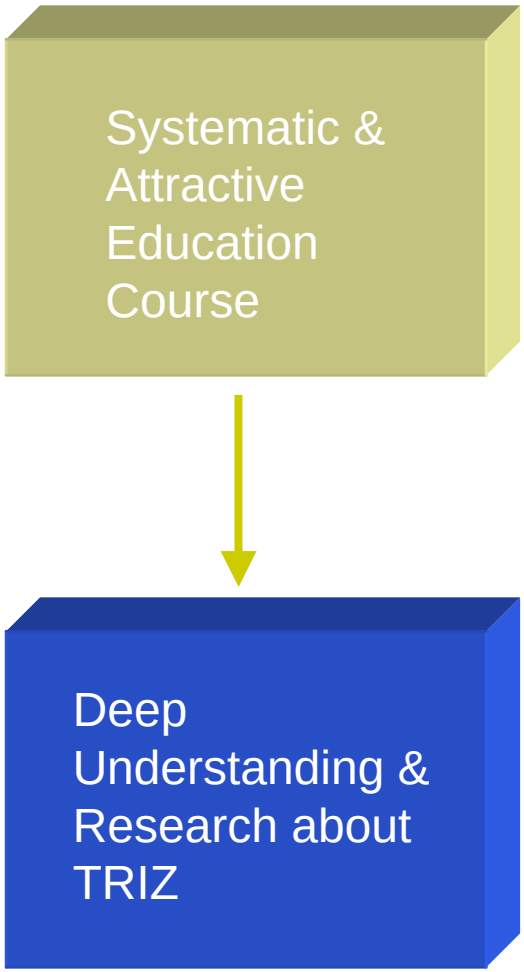
□ 教育過程 詳細內容

教育 時間 : 120 時間 (特別過程除外)

講座	教育期間	教育內容	資格取得
TRIZ-6 (特別 3)	5 日 · 理論 (32h) · 實習 (8h)	□ TRIZ-1,2,3,5 修了者 □ TRIZ SW · TechOptimizer 活用高級 □ By Ikovenko(IM社)	· TRIZ教育 認證書
TRIZ-7 (特別 4)	1 日 · 理論 (8h)	□ Technology Evolution including Analysis of Engineering System □ By Nikolai Shpakovsky	· TRIZ教育 認證書
TRIZ-8 (特別 5)	1 日 · 理論 (8h)	□ Interaction Between Harmful and Useful Systems as Invention Situation Analysis □ By Vasilli Leniachine	· TRIZ教育 認證書

What does break the success of TRIZ? #2



Theory must be simple

"A theory is the more impressive the greater the simplicity of its premises, the more extended its area of applicability " by Einstein

Too many tools at TRIZ

40 Principle, Contradiction Matrix, Su-Field Analysis, 76 standard solutions, ARIZ, Effect DB, … What are those?

Unified & Simple Understanding

Company could not see any trace of using TRIZ by Russian TRIZ experts.
They just see sky and A4 paper at desk with pen in his hand.
But the generated idea is superior in quality and quantity.
There must be something in TRIZ.
But what is it?

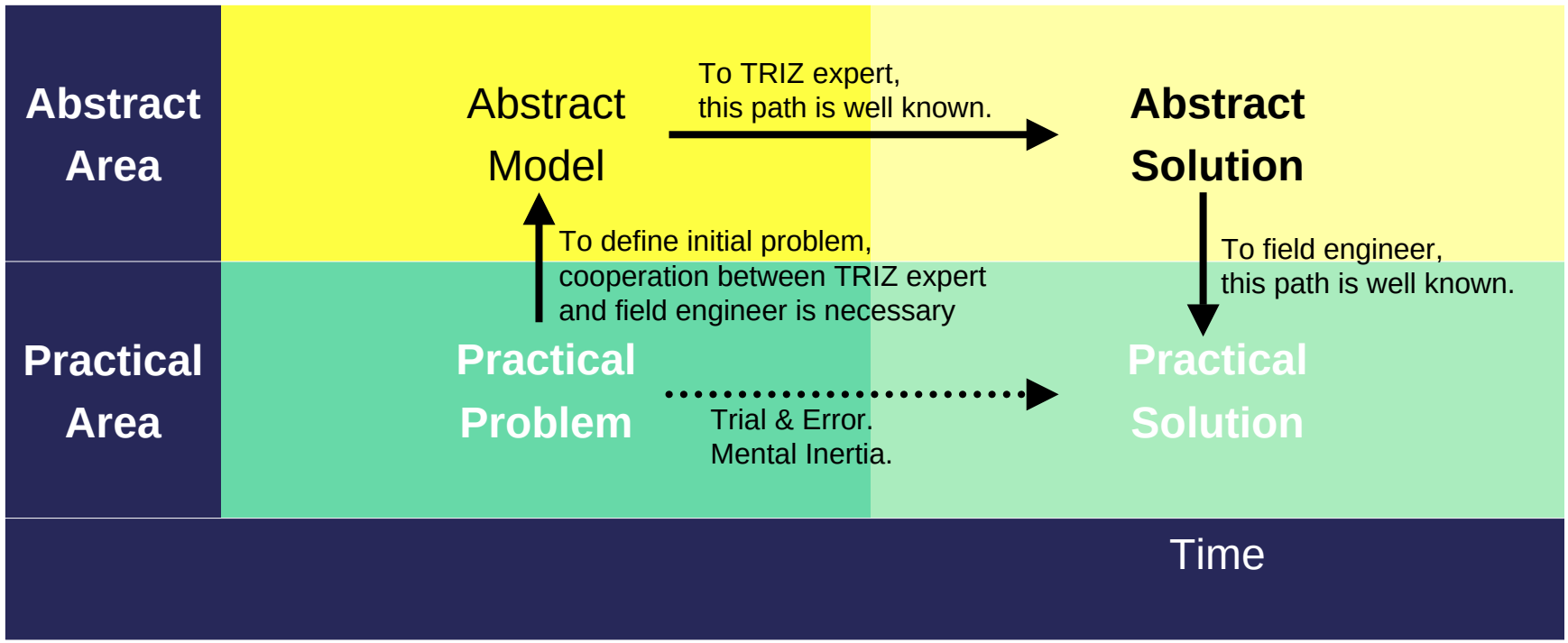
Why so many tools? Altshuller's explanation

Model of Problem	Tools	Model of Solution
10 x 5	Multiplication table	**50**
HCl + NaOH	Chemical Laws	**H2O**
Engineering Contradiction.	Matrix Table	40 Principle
Physical Contradiction.	Separation Principle	Suitable Principle among 40
Su-F Model.	Effect (Change Parameter) 76 Standard Solution	Suitable Effects Suitable Standard Solution
Function.	Effects	Suitable Effects

"ARIZ will convert initial problem to contradiction model
Or convert to Su-Field model
Or other models of of TRIZ."

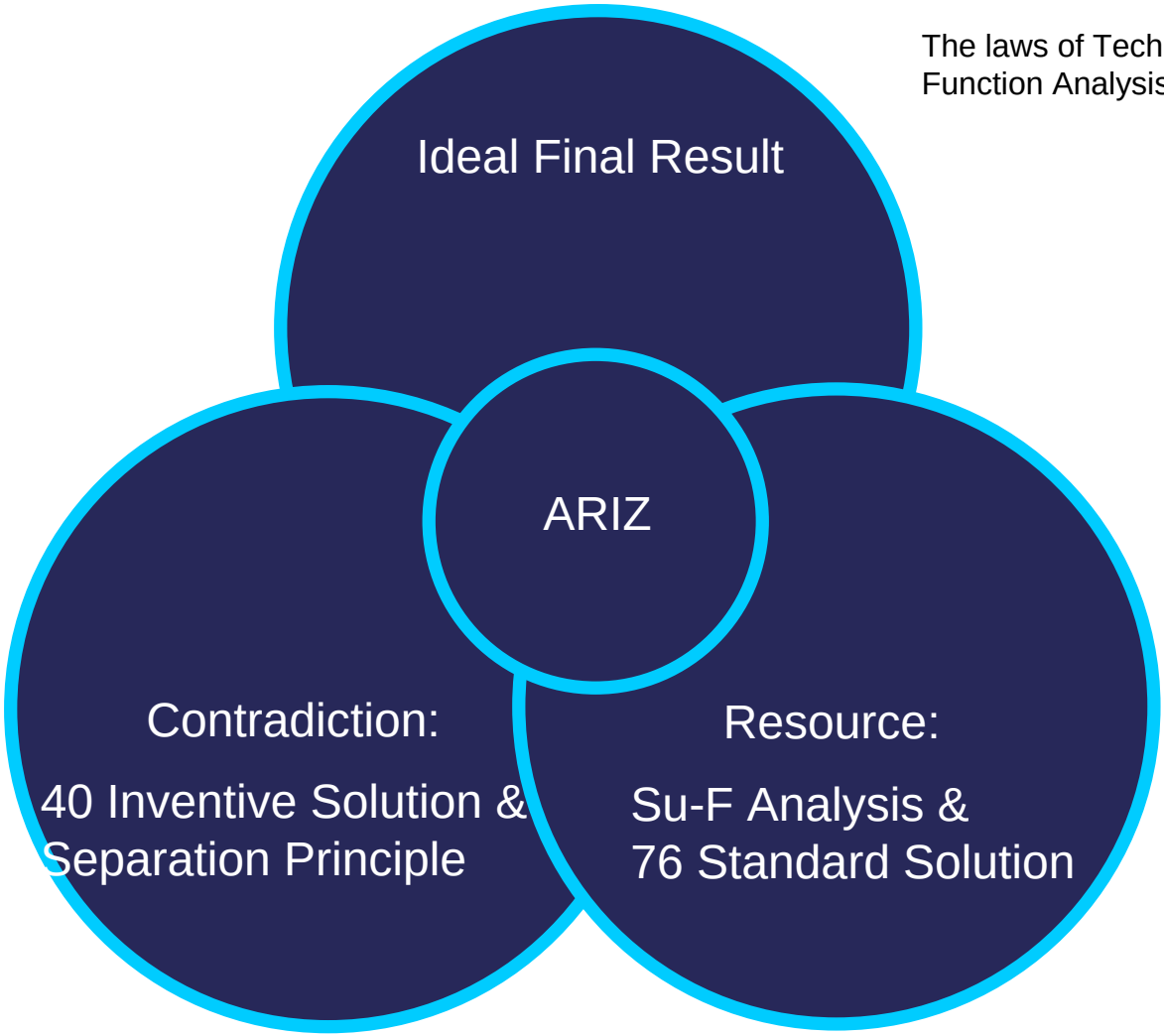
*from TRIZ master Ikovenko.

What is general approach at TRIZ ?



*from Nikolai Khomenko

Unified and Understanding at SAMSUNG

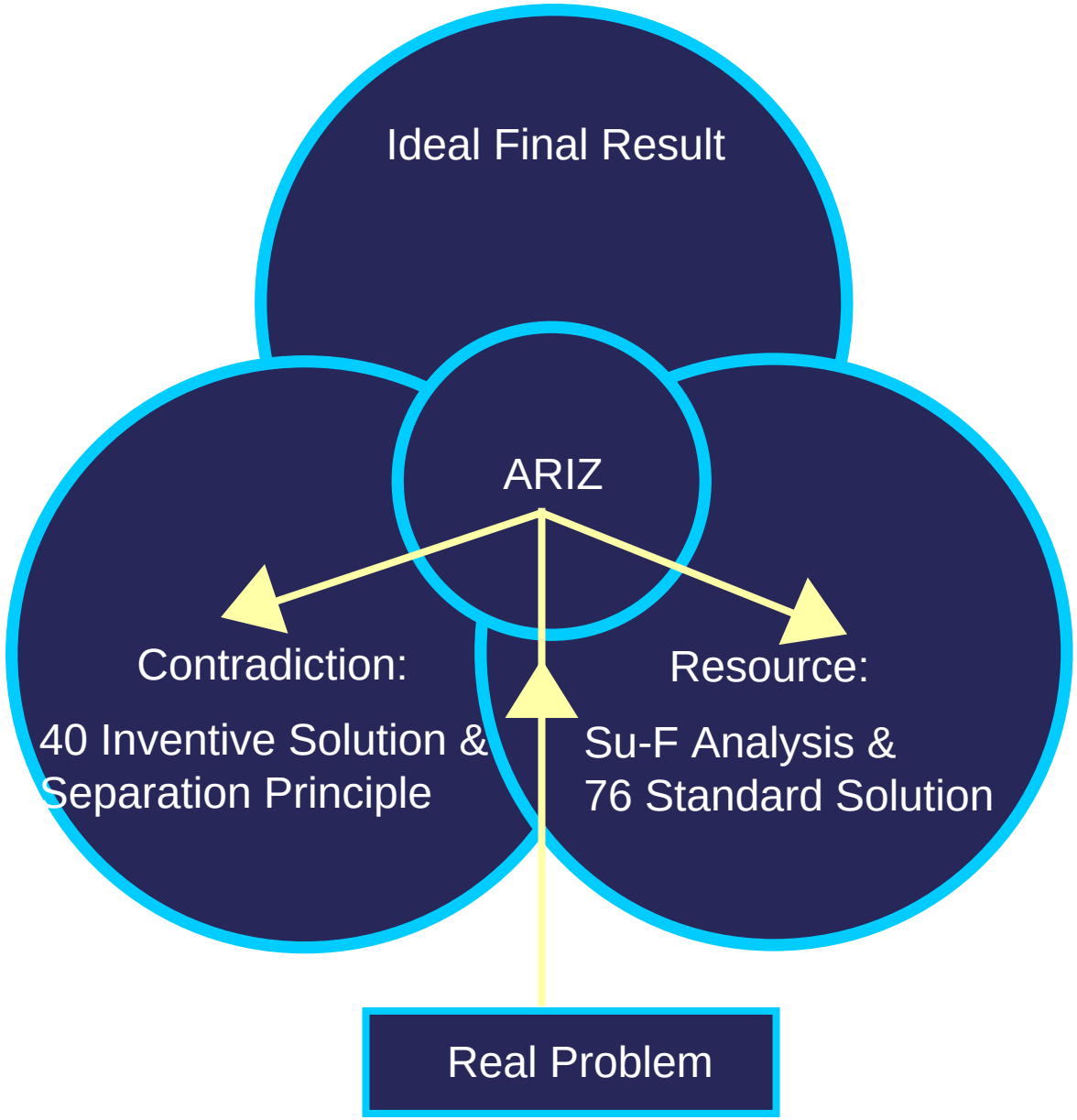


The laws of Technology Evolution
Function Analysis at TOC…..

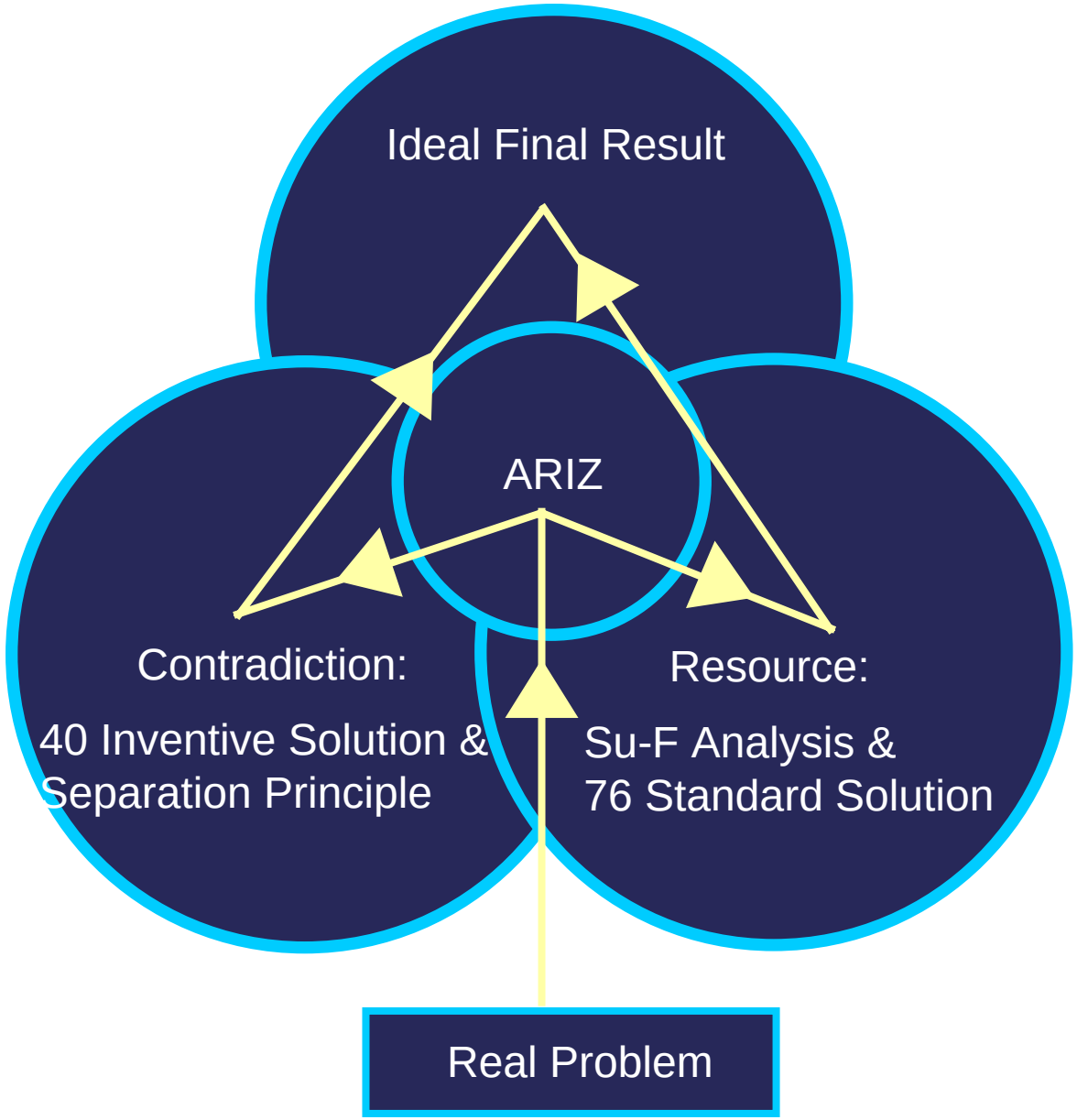
Contradiction Matrix
Principle Module at TOC…..

Multi Screen Method
Effects DB
Knowledgist…..

Unified and Simple Understanding



Unified and Simple Understanding



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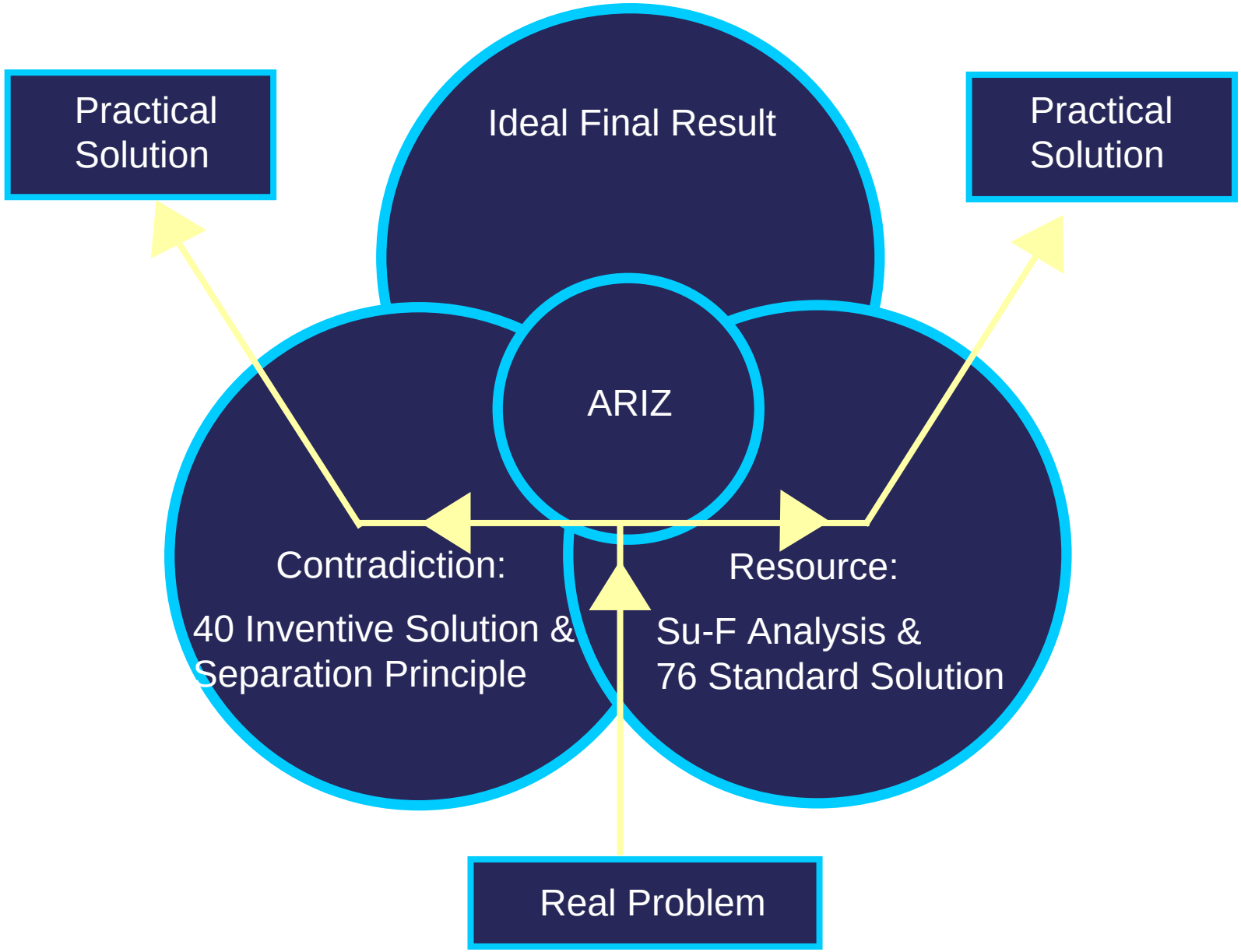
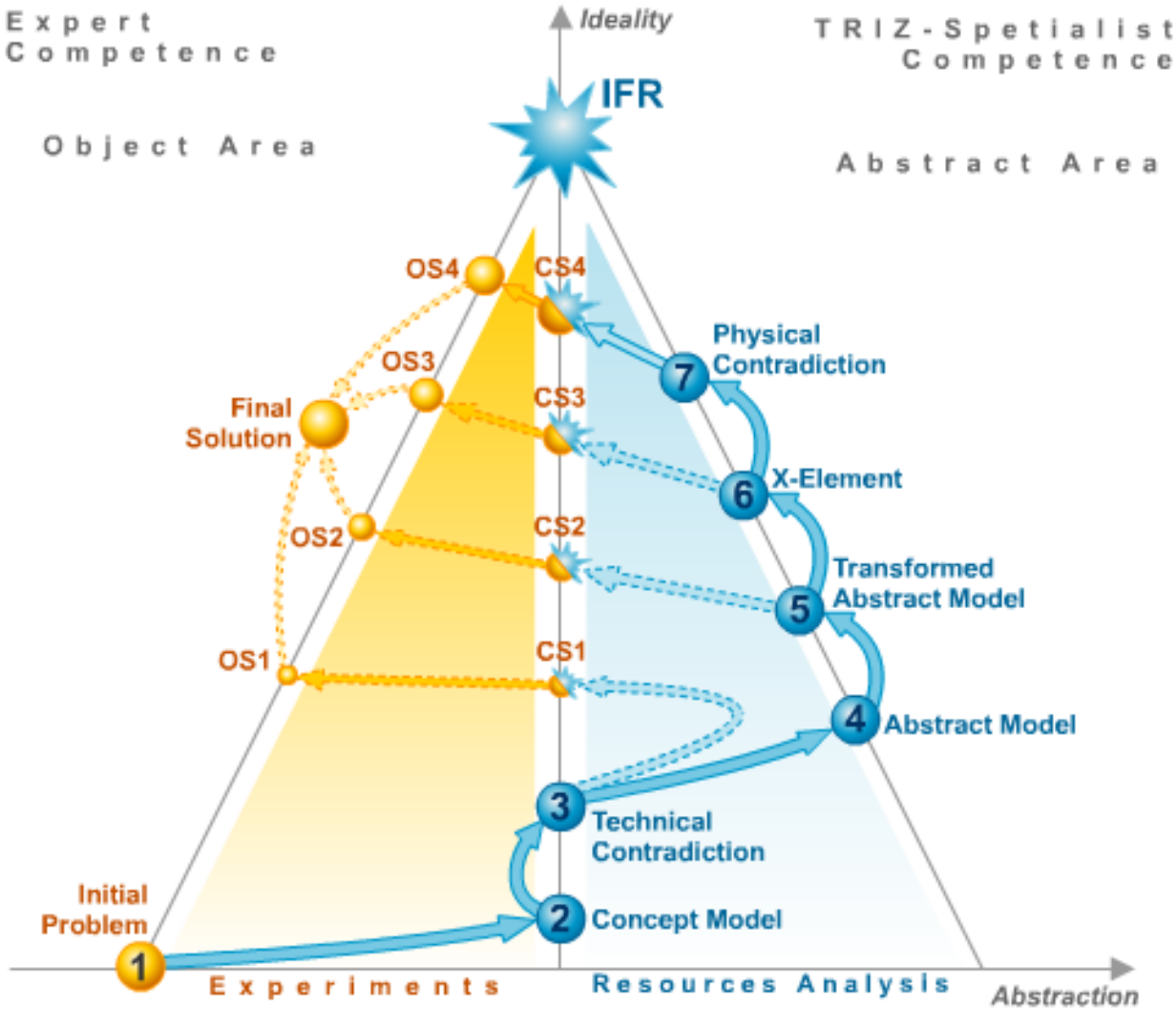


Unified and Simple Understanding



“Christmas Tree” diagram.

On-line TRIZ Education Program

SAMSUNG TRIZ

Korean English ?Help

How to start?

TRIZtrainer

1 Control Tasks

Try to solve some problems from Control Tasks. If You solved one or some problems, send your solution to consulting group from (after Registration).

2 Analysis of Solution

Study on examples how to use TRIZ for the solving of problems: detailed Analysis of the Solving of the problems.

3 Introduction in TRIZ

If the tasks do not give in, study the theory: Introduction in TRIZ. If the tasks have appeared easy - read the theory for the information.

Your Easy Solving Way

Step by step:
General Scheme of Problem Solution

Use additional Blocks:

Clossary

For short and quickly information use Glossary.

Reference

For additional knowledge You can read the text from TRIZ-Addition.

Communicatiom

Send your solutions and questions by Communication. Your need to register for change messages with your consultant.

All Consulting Group

TRIZ.INFO

About TRIZ
What it is, who created this theory, what it is able to do.

TRIZ-education system
In Samsung, process and results.

About TRIZ-trainer
How use this system for learning TRIZ

ABOUT TRIZ TRAINER

FLASH-MOVY

Big size in new window

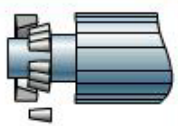
TRIZtrainer+

TRIZ-News

Test: Giraff in refrigirator... more
TRIZ-Conference in London: Report from Nickolay Shpakovsky, TRIZ-consultant... more
New solution from SAMSUNG's TRIZ-experts... more

Task of week

Turbine assembly
Installation of bearings at assembly of heavy water-wheels - rather uneasy work. It is necessary



To task of week

TRIZtrainer-competition

Condidion of Competition:
In TRIZtrainer-competition any student may participate. Regisry as student in TRIZ-trainer System and send Your solutions to Consultant...more

Samsung, SAIT

Ask question to: (organization) Hyo June Kim, (methodology) Shpakovsky and Lenyashin, (usability) Novitskaya, (functionality) Veller

On-line TRIZ Education Program

TRIZtrainer

Korean English

Home | Control Tasks | Analysis of Solution | Introduction in TRIZ | Glossary | Reference | Communication | ?Help

Training problems

- Pizza Box
- Automobiles and Camels
  - 1. Initial problem
  - 2. Conceptual model of a prob...
  - 3. Technical contradiction
  - 4. Abstract model of a proble...
  - 5. Abstract model of solution
  - 6. X-Element
  - 7. Physical contradiction
  - Final Solution
- Safety Rope of Mountaineer
- Chip separation
- Clean copper production
- Vase from the bottom of sea
- Undercarriage of the plane

Experience of SAMSUNG

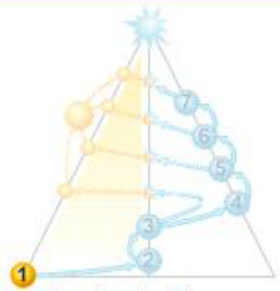
- Heater of Refrigerator
- Diode printing machine tool

Automobiles and Camels: 1. Initial Problem*.

The main vehicles of the desert are automobiles and camels. Camels are practically invisible in the dark, so it is difficult for a car driver to prevent a collision with a camel. For a camel to be seen well at night, some battery-energized lights are attached to its harness. This system basically copes with the task but it has some disadvantages.

1. This is an additional load on a camel.
2. Batteries discharge comparatively quickly.

Question: How to increase the reliability and to reduce the weight of the warning lights system?



Go to Complete Diagram

Notes

Question
How to increase the reliability and to reduce the weight of the warning lights system?

START OF SOLUTION

Samsung, SAIT

Ask question to: (organization) Hyo June Kim, (methodology) Shpakovsky and Lenyashin, (usability) Novitskaya, (functionality) Veller

On-line TRIZ Education Program

TRIZtrainer

Korean English

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Training problems

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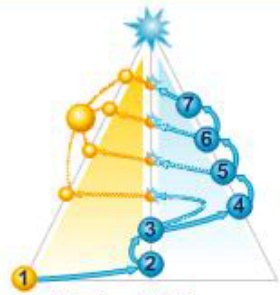
Automobiles and Camels: Final solution.

After analyzing all the obtained solution concepts and after making mental or other experiments, we propose the following solution to the customer:

To cover the camel's harness with luminescent paint.

To intensify the solution:

1.Use a kind of a cover in order to increase the light spot surface.
Additional effect: it warms the camel at night.
2.Put cat's eyes on the camel's harness.
3.Attach piezo-winkers to the camel's hooves.



Go to Complete Diagram

Notes

Question

How to increase the reliability and to reduce the weight of the warning lights system?

IFR

X-element provides fulfillment of the main useful function "Warn the driver with lights about approaching the camel" without complicating at all the system that consists of a light source and a driver's eye.

Concepts

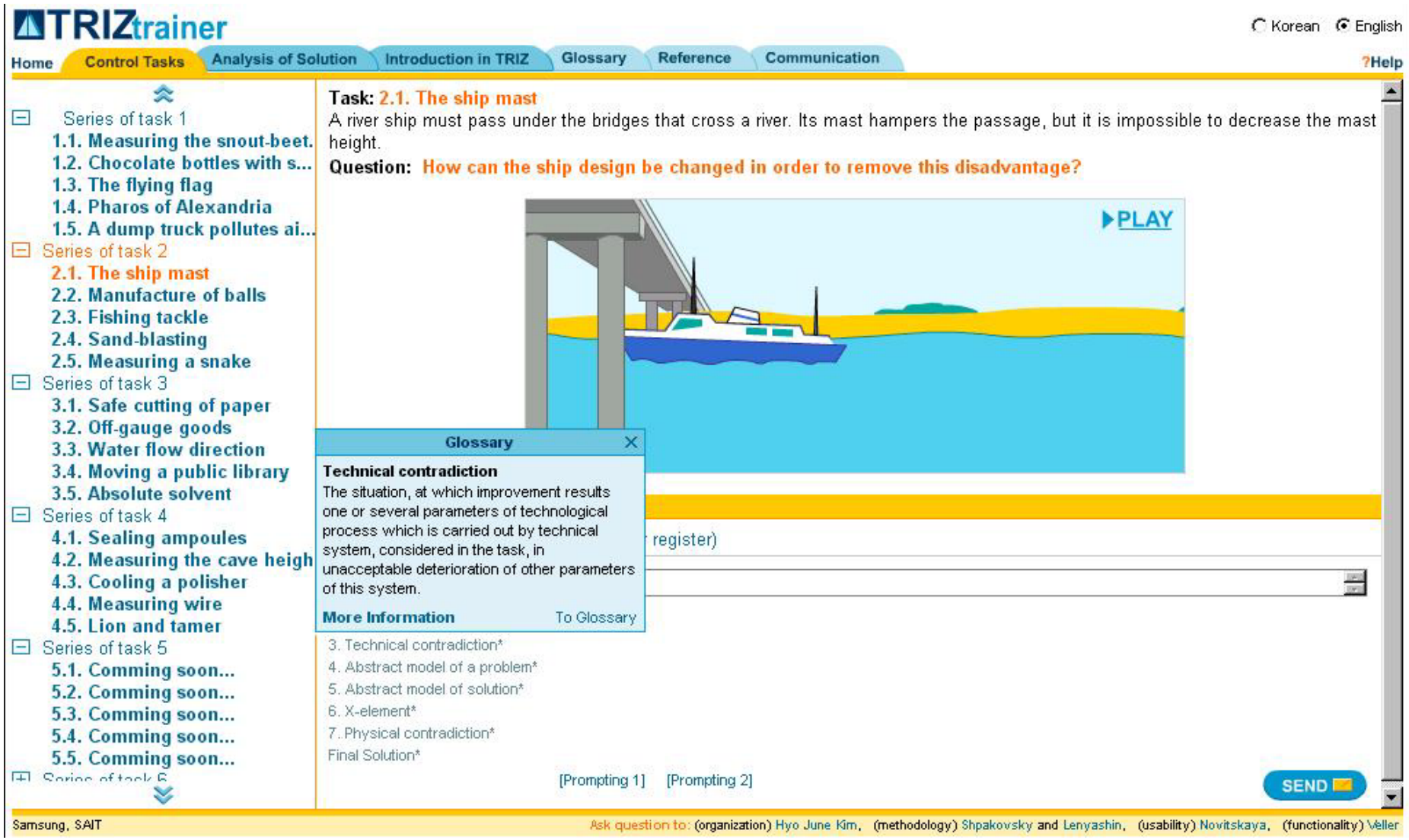
CS1. The system is already dynamized, that is, the lights are off in the day-time and on at night. The next step - the lights are off when there is no automobile, and they are switched on when an automobile approaches.

CS2. The batteries are recharged from solar

Samsung, SAIT

Ask question to: (organization) Hyo June Kim, (methodology) Shpakovsky and Lenyashin, (usability) Novitskaya, (functionality) Veller

On-line TRIZ Education Program



On-line TRIZ Education Program

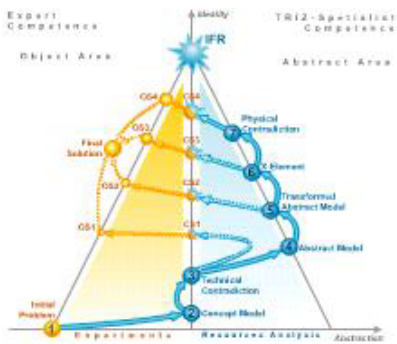
TRIZtrainer

Korean English

Home | Control Tasks | Analysis of Solution | Introduction in TRIZ | Glossary | Reference | Communication | ?Help

- General Sheme of Problem So...
- Initial Problem
- Conceptual Model of the Pro...
  - Conceptual Model of the Probl...
  - The main usefull functions of...
  - Problem Type
- Technical Contradiction

General Sheme of Problem Solution



The METHODS attributes of anchors and links provide information about the functions that the user may perform on an object. These are more accurately given by the HTTP protocol when it is used, but it may, for similar reasons as for the TITLE attribute, be useful to include the information in advance in the link.
For example, the HTML user agent may chose a different rendering as a function of the methods allowed; for example, something that is searchable may get a different link appearance. The value of the METHODS attribute should be a comma separated list of HTTP methods supported by the object for public use.

Notion	Determination	Result
To use a light-reflecting mirror.	Reflected light of the same intensity is obtained.	It is difficult to correctly position the mirror relative to the automobile.

NEXT

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Ask question to: (organization) Hyo June Kim, (methodology) Shpakovsky and Lenyashin, (usability) Novitskaya, (functionality) Veller

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TRIZtrainer

Korean English

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Conceptual model of a problem: Problem type

Manage multiple mail and news accounts If you have several mail or news accounts, you can use them all from one window. You can also create multiple users, or identities, for the same computer. Each identity gets its own mail folders and Address Book. The ability to create multiple accounts and identities makes it easy for you to keep work separate from personal mail and also between individual users.

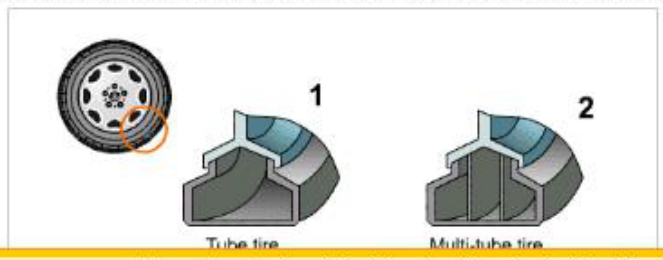
Browse through messages quickly and easily

Using the message list and preview pane, you can view a list of messages and read individual messages at the same time. The Folders list contains mail folders, news servers, and newsgroups, and you can easily switch between them. You can also create new folders to organize and sort messages, and then set up message rules so that incoming mail that meets your criteria automatically goes to a specific folder. You can also create your own views to customize the way you look at your mail.

Keep your mail on a server so you can view it from more than one computer If your ISP uses an IMAP mail server for incoming mail, you can read, store, and organize your messages in folders on the server without downloading the messages to your computer. That way, you can view messages from any computer that can connect to that server.

Example: A tire.

1. You can save names and addresses in your Address Book automatically by simply replying to a message or by importing them from other programs, by typing them in
2. or by searching popular Internet directory services (white pages). The Address Book supports Lightweight Directory Access Protocol (LDAP) for accessing Internet directory services.



Exersise

Exersise 1
How to increase the reliability and to reduce the weight of the warning lights system? The Automobile and the Camel themselves without additional devices warn the Driver about mutual approach.

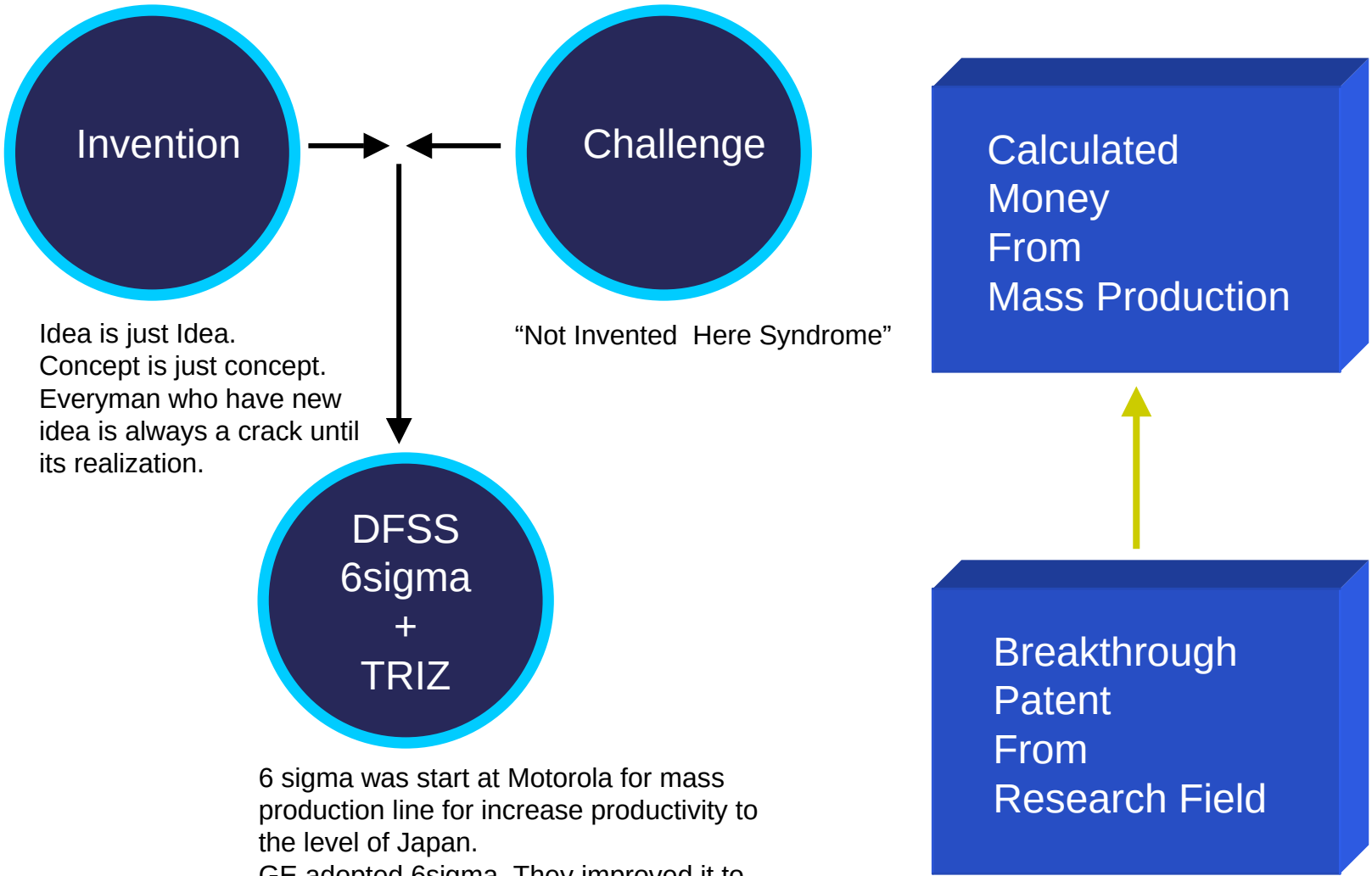
Control Answer

Exersise 2
X-element provides fulfillment of the main useful function "Warn the driver with lights about approaching the camel" without complicating at all the

Samsung, SAIT

Ask question to: (organization) Hyo June Kim, (methodology) Shpakovsky and Lenyashin, (usability) Novitskaya, (functionality) Veller

What does break the success of TRIZ? #3

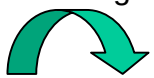


TRIZ in 6sigma

Why is it necessary?

The typical engineering approach is to compromise, but that approach does not lead to an invention. An Invention overcomes the contradiction.

Destiny of Quality is already decided at design stage.



Manufacturing

DMAIC

Motorola

Customer's CTQ.
Data Based Analysis.
Statistical Decision.
"Analyzing Data will Guide to the solution For 6sigma Level Quality"

Product Development

DMADV

GE

Improved Design for 6sigma Level Quality.
Design Improvement & Optimization
based on Customer need.
Robust Design.

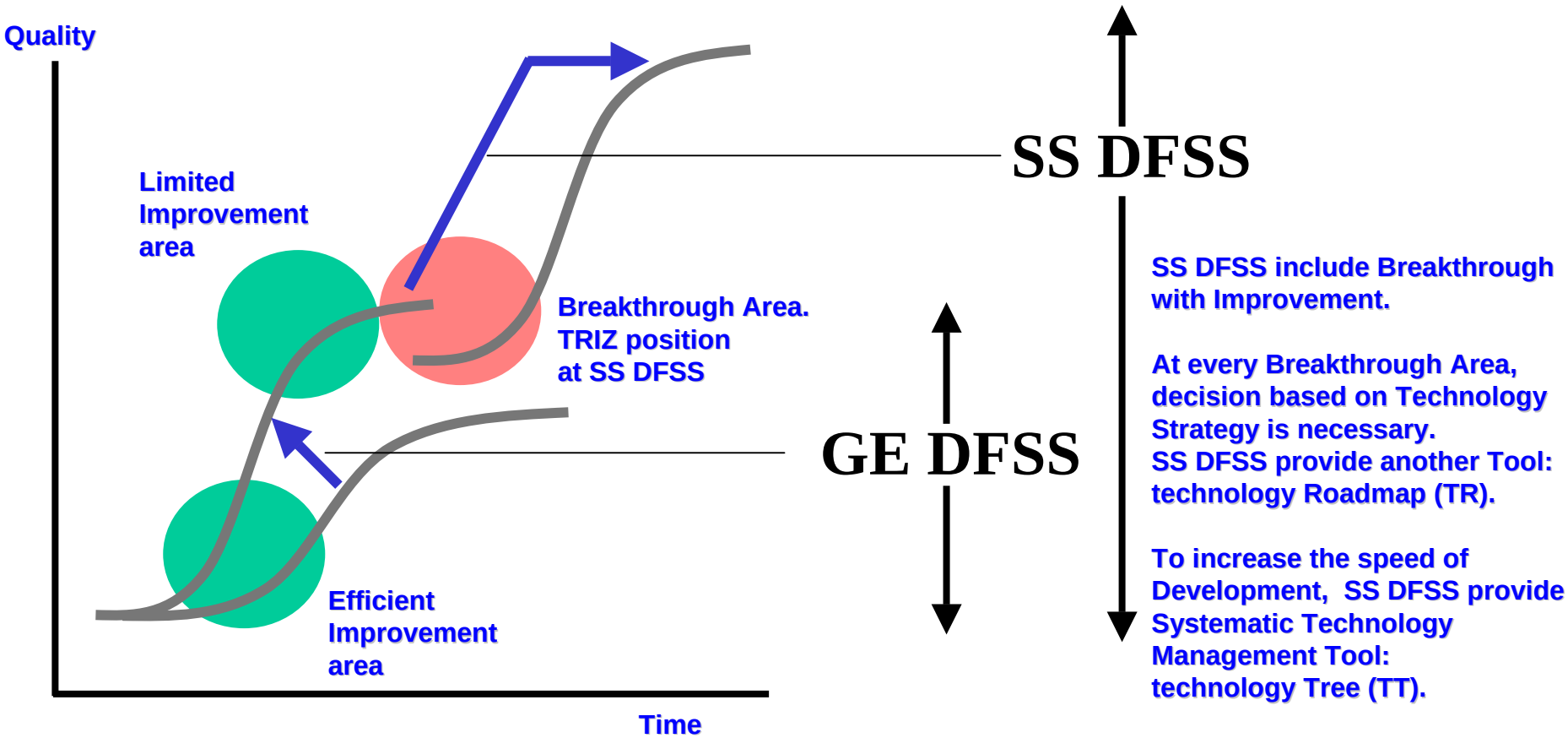
Research

DMADOV

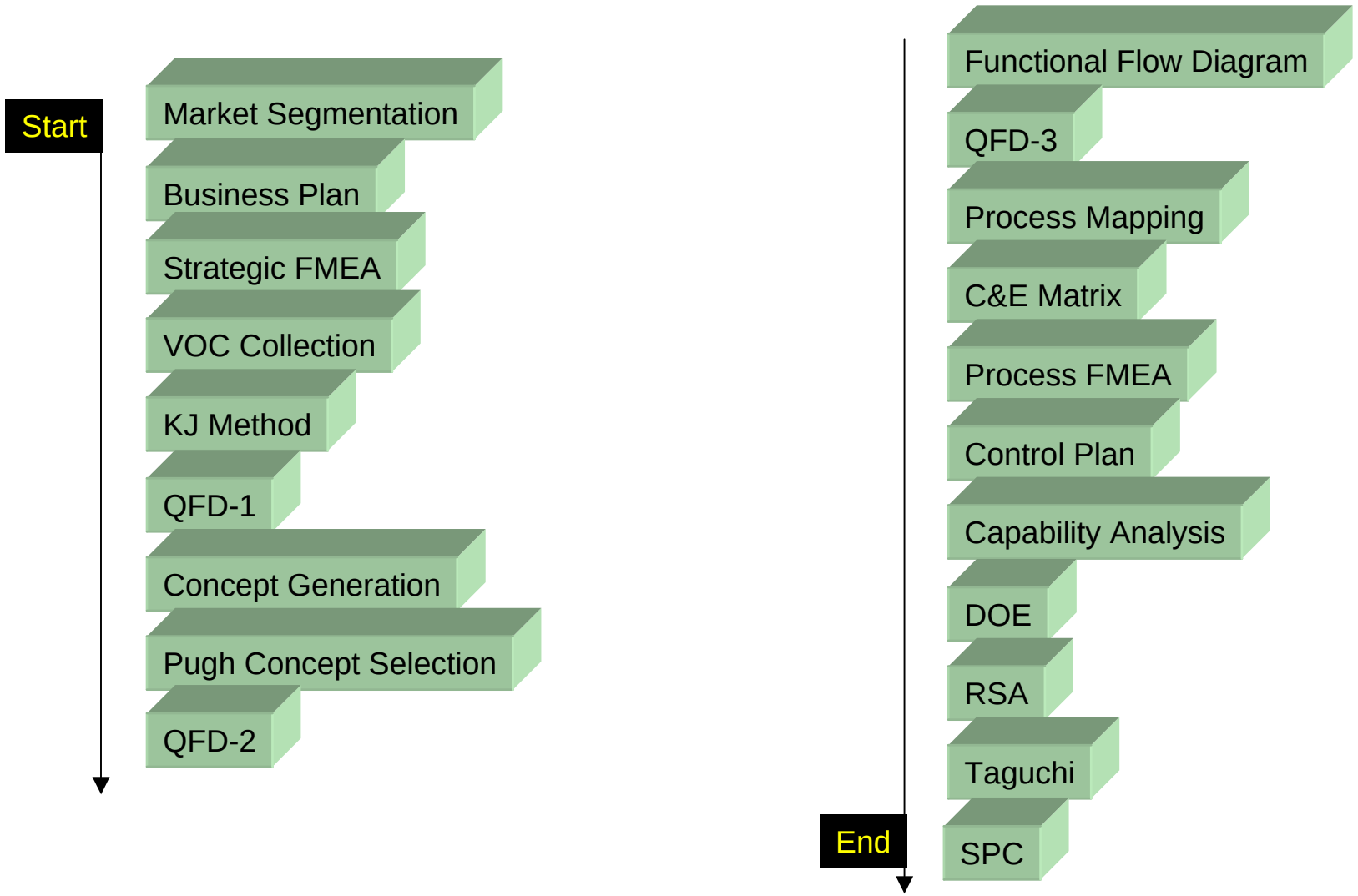
SAMSUNG

Optimization is just optimization.
Breakthrough than improvement.
We need jump to next S-curve.

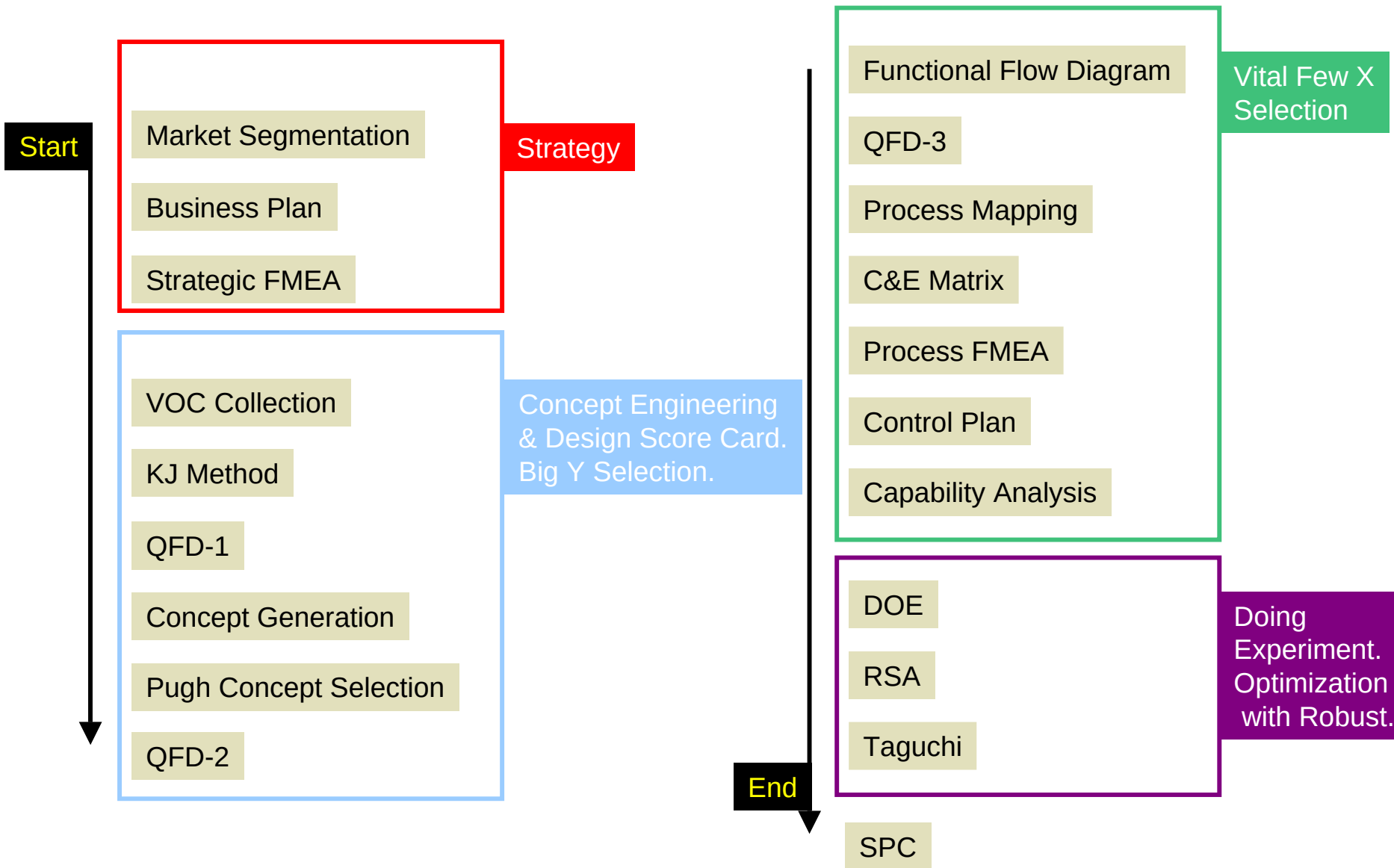
SAMSUNG Standard DFSS with 3T



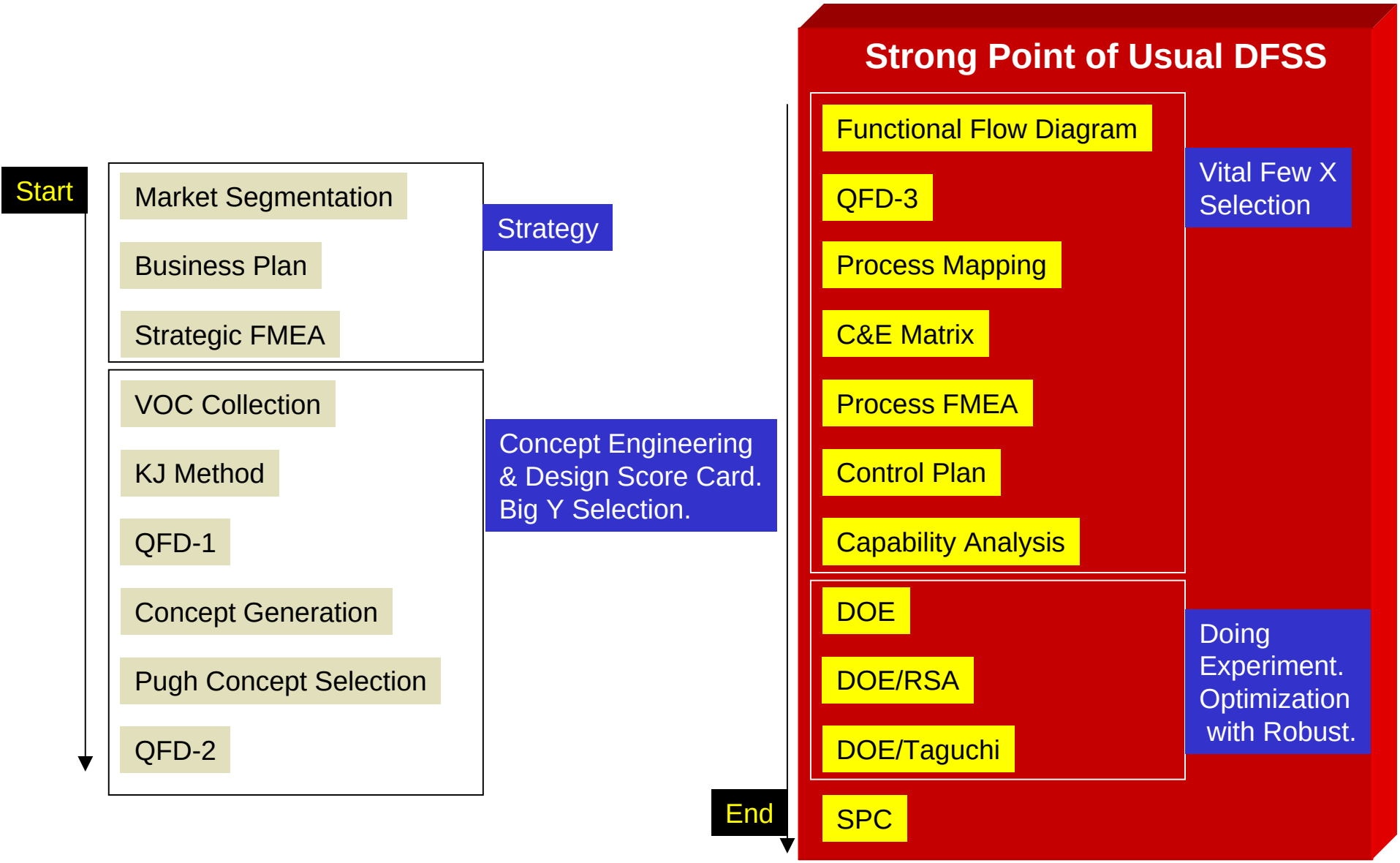
Analyze Of Usual DFSS



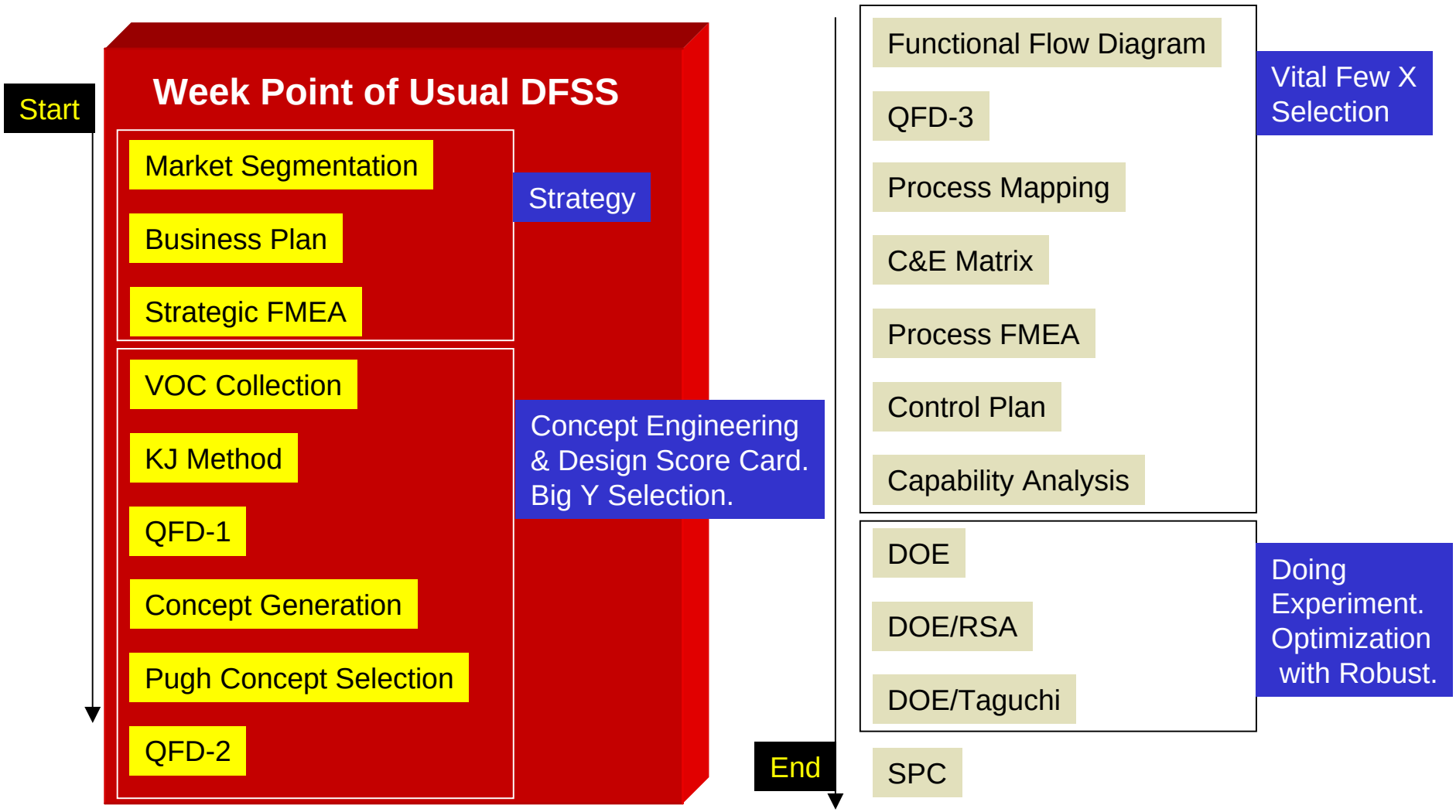
Analyze Of Usual DFSS



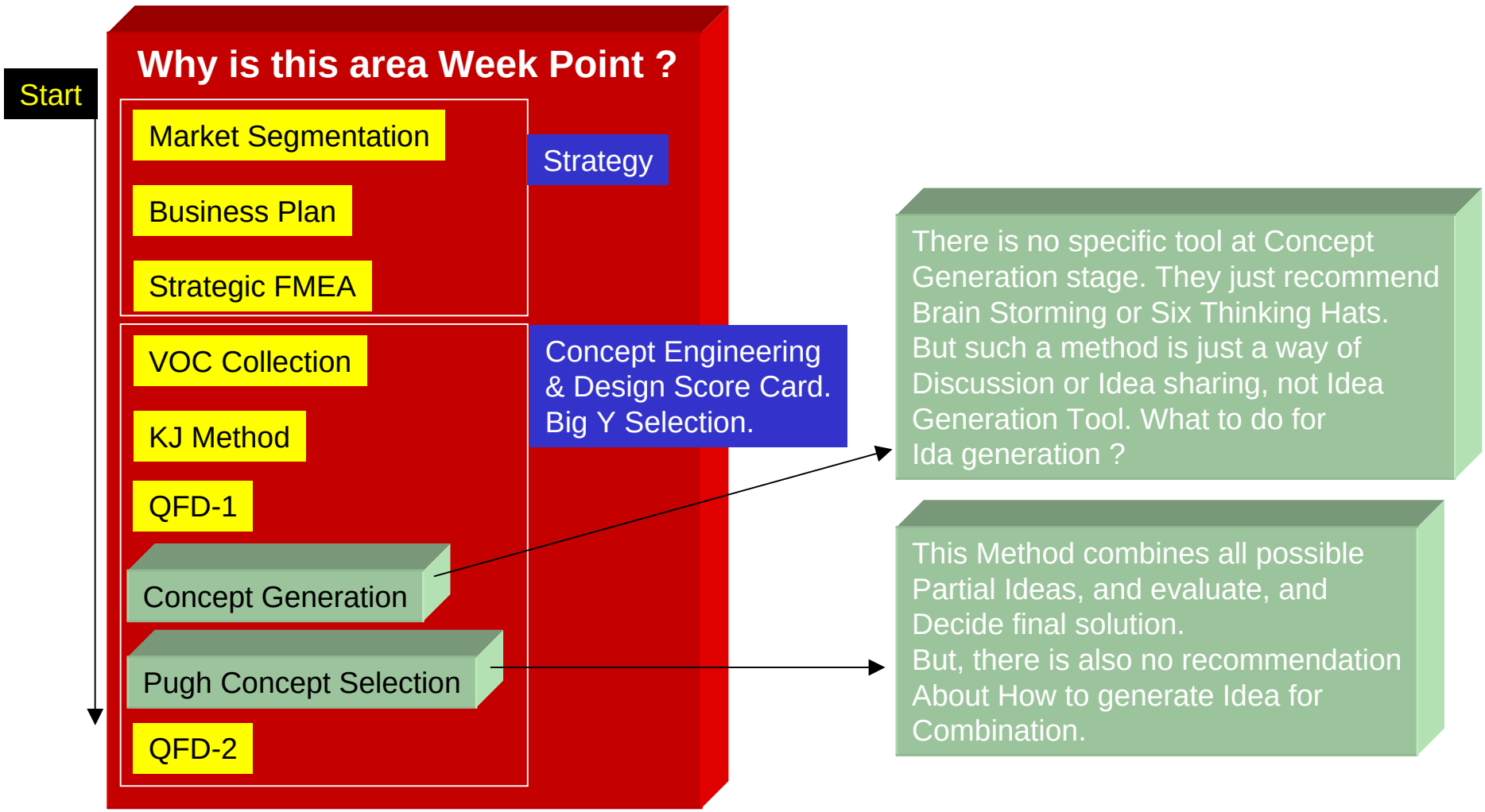
Strong Point of Usual DFSS



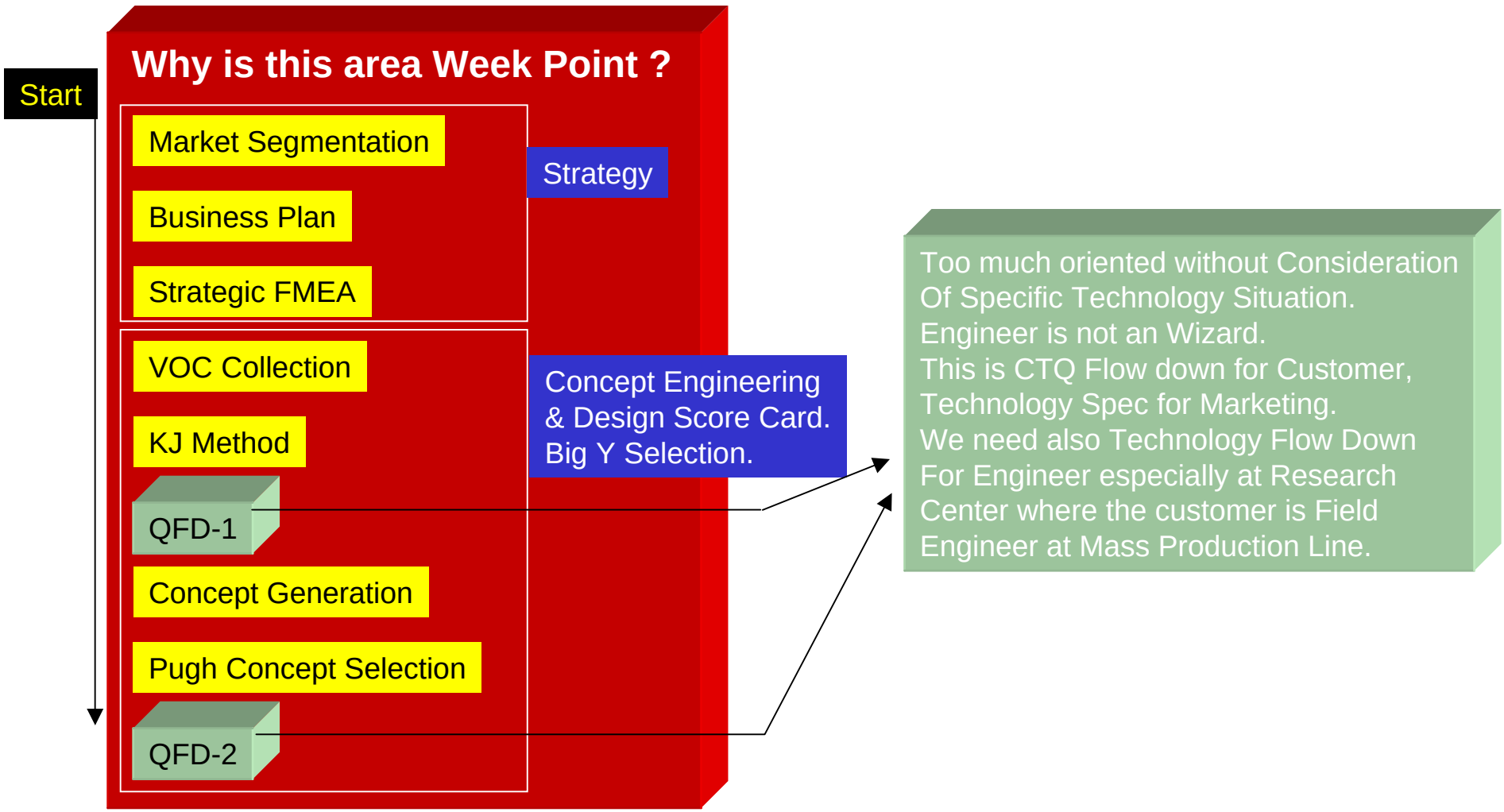
Week Point of Usual DFSS



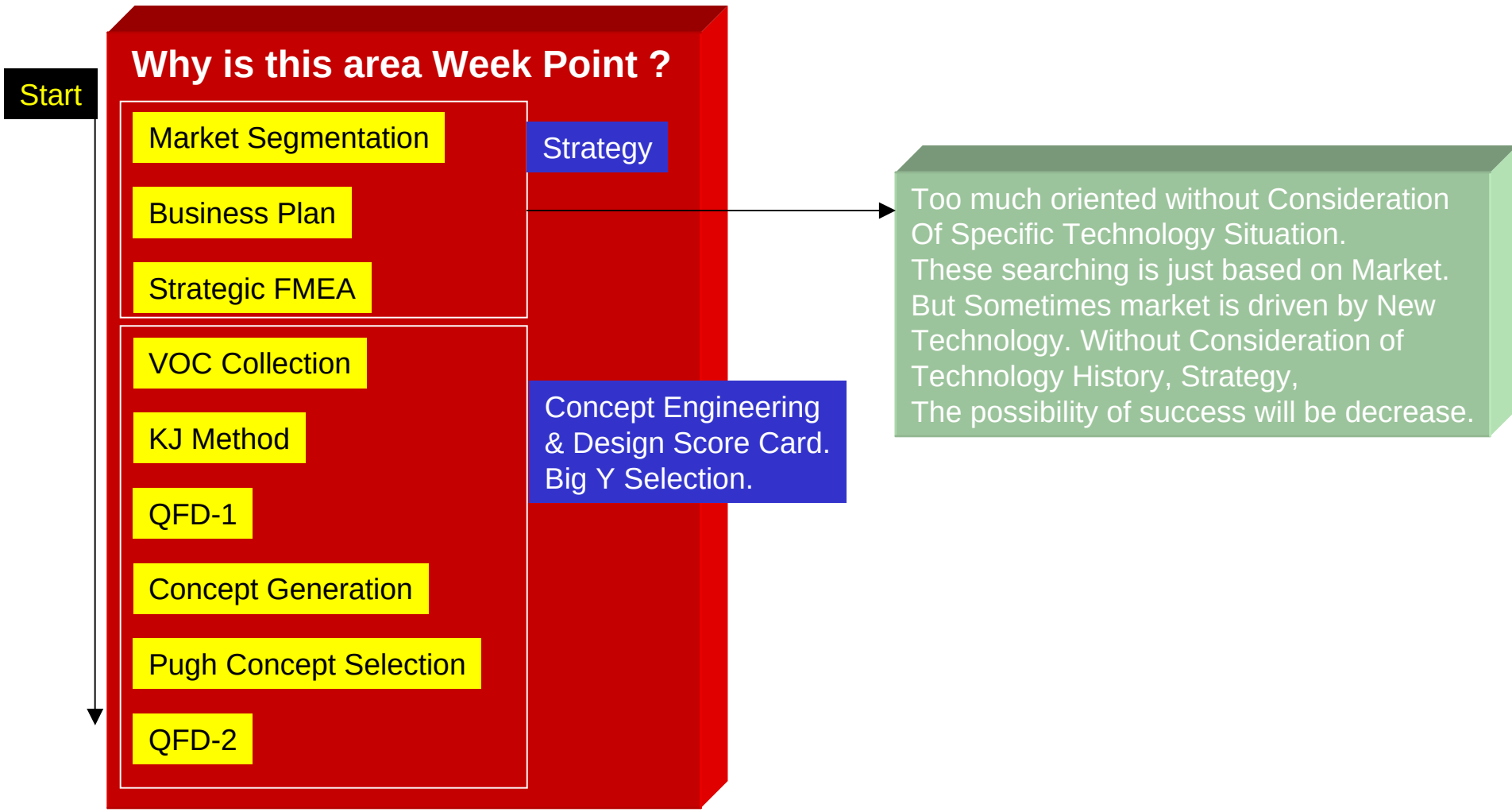
Week Point of Usual DFSS. Why?



Week Point of Usual DFSS. Why?

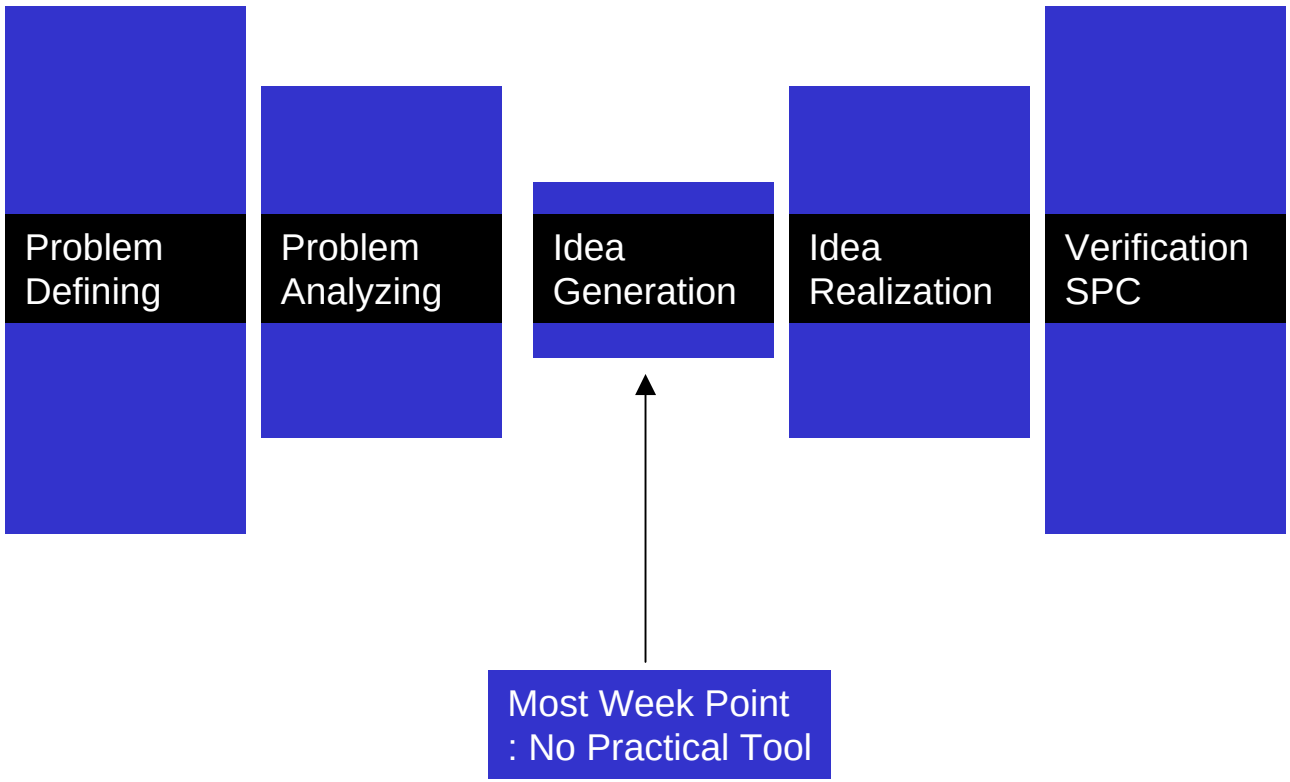


Week Point of Usual DFSS. Why?



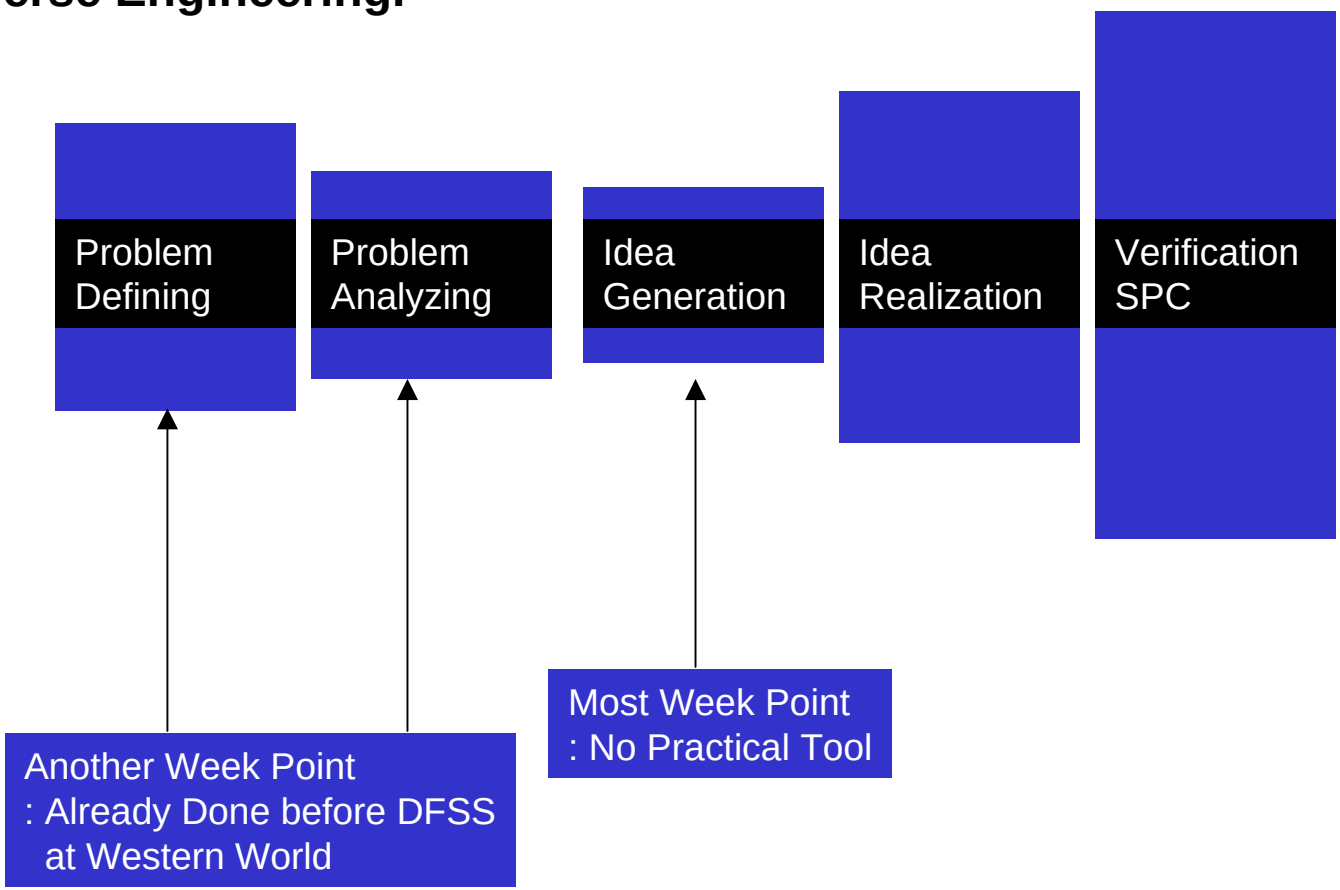
General Trend of R&D

General Trend of R&D
The Week Point of Usual DFSS was the same Origin.



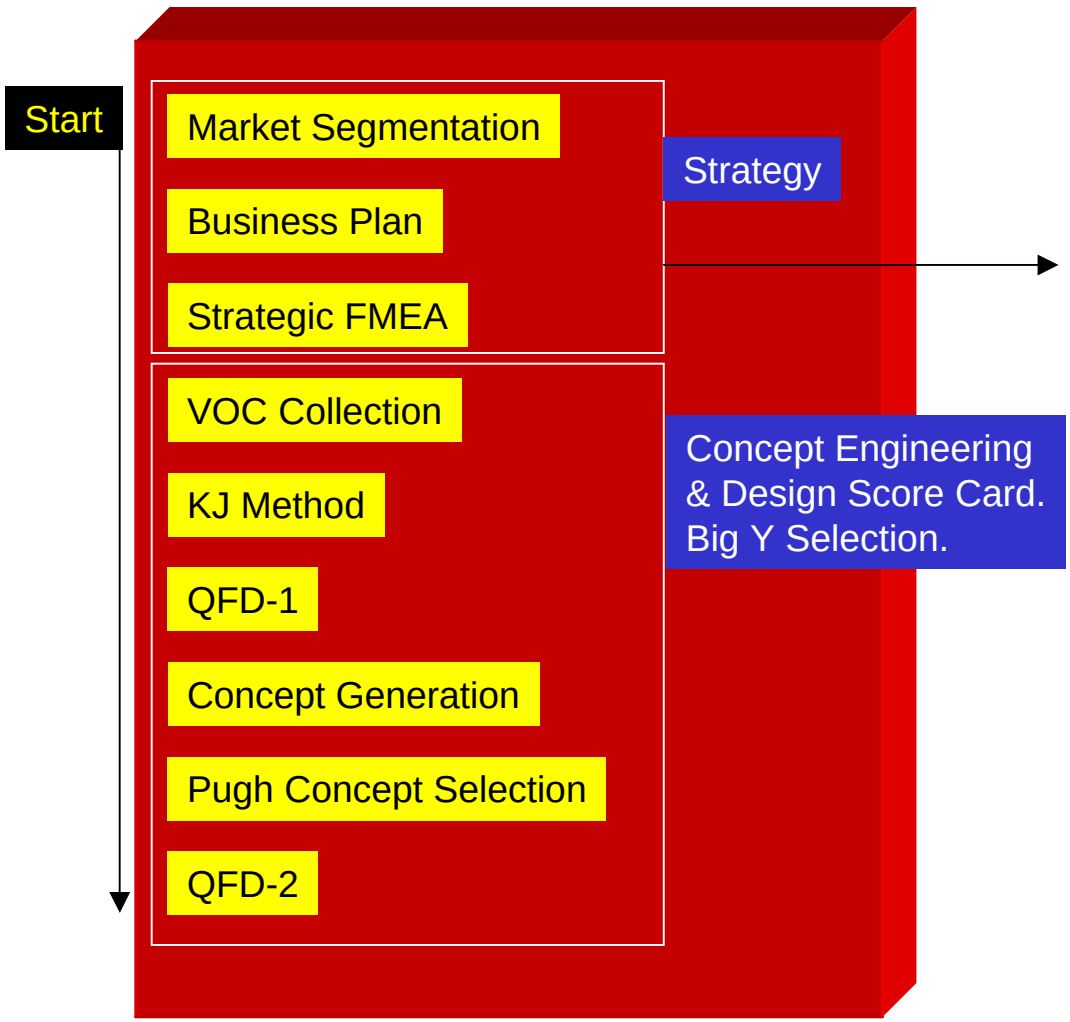
General Trend of R&D at Korea

General Trend of R&D at Korea
The Another Week Point is at Initial Stage.
On the contrary with Western World, No Fundamental Stable Career Of Technology Development.
They were busy at Copying and Reverse Engineering.



SAMSUNG Standard DFSS with 3T

How Dose we Reinforced this Situation?



Problem

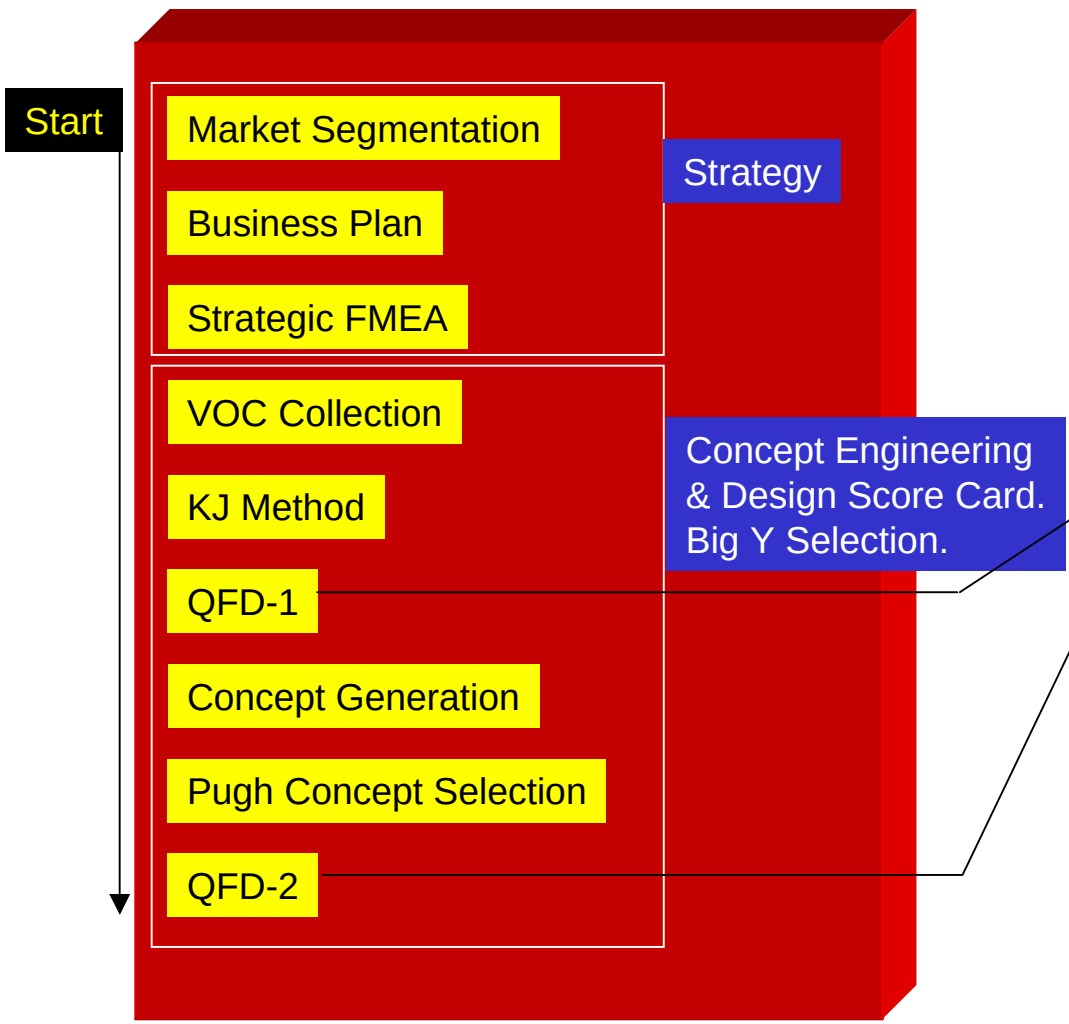
Too much oriented without Consideration Of Specific Technology Situation.
These searching is just based on Market.
But Sometimes market is driven by New Technology. Without Consideration of Technology History, Strategy,
The possibility of success will be decrease.

Solution

Strategy including Technology Development Is applied : Technology Roadmap(TR).
TR include Scenario methodology and Signpost Methodology.
And this Strategy is made with Deep Relationship with Mass Production division.

SAMSUNG Standard DFSS with 3T

How Dose we Reinforced this Situation?



Problem

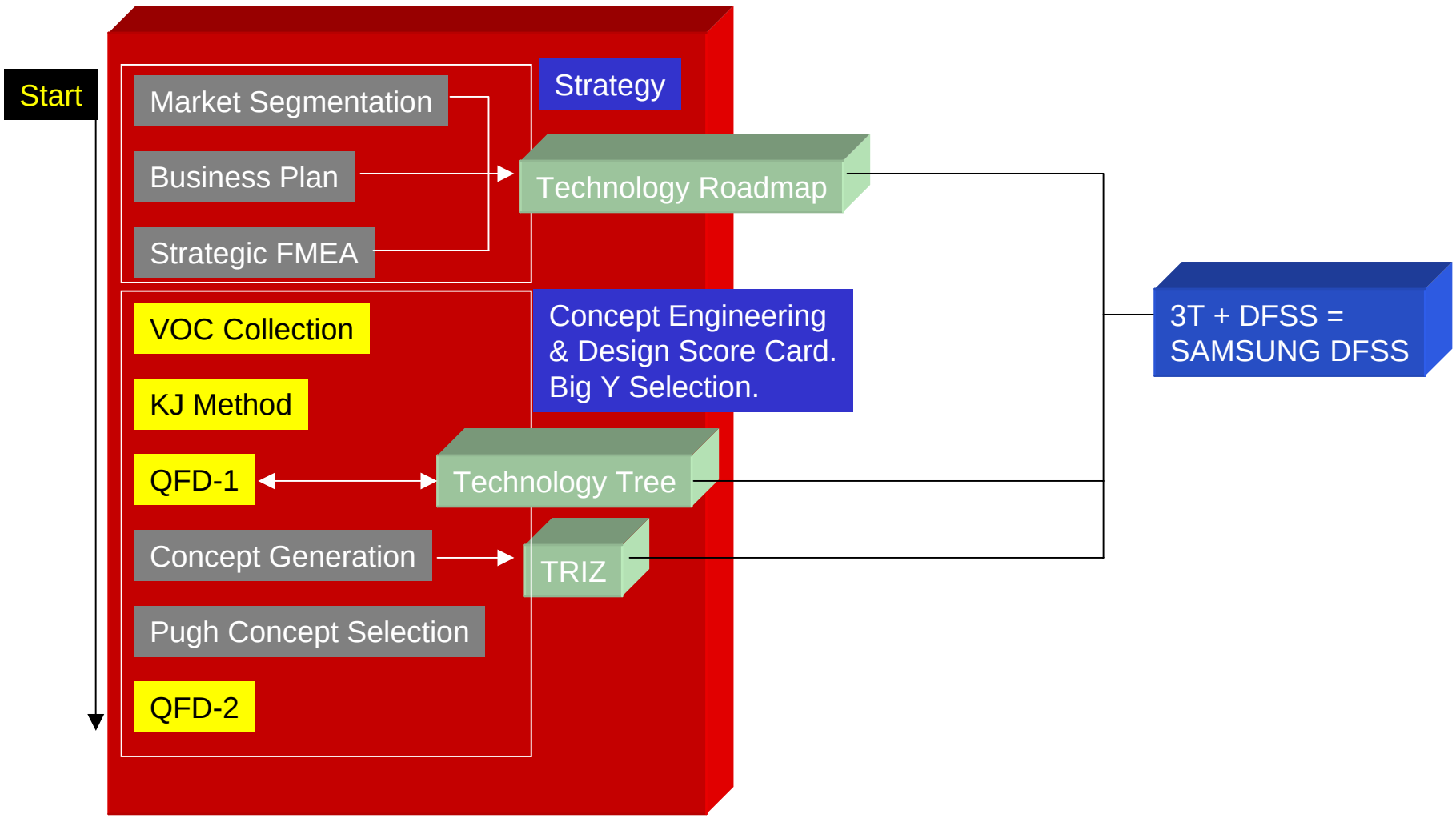
Too much oriented without Consideration Of Specific Technology Situation.
Engineer is not an Wizard.
This is CTQ Flow down for Customer, Technology Spec for Marketing.
We need also Technology Flow Down For Engineer especially at Research Center where the customer is Field Engineer at Mass Production Line.

Solution

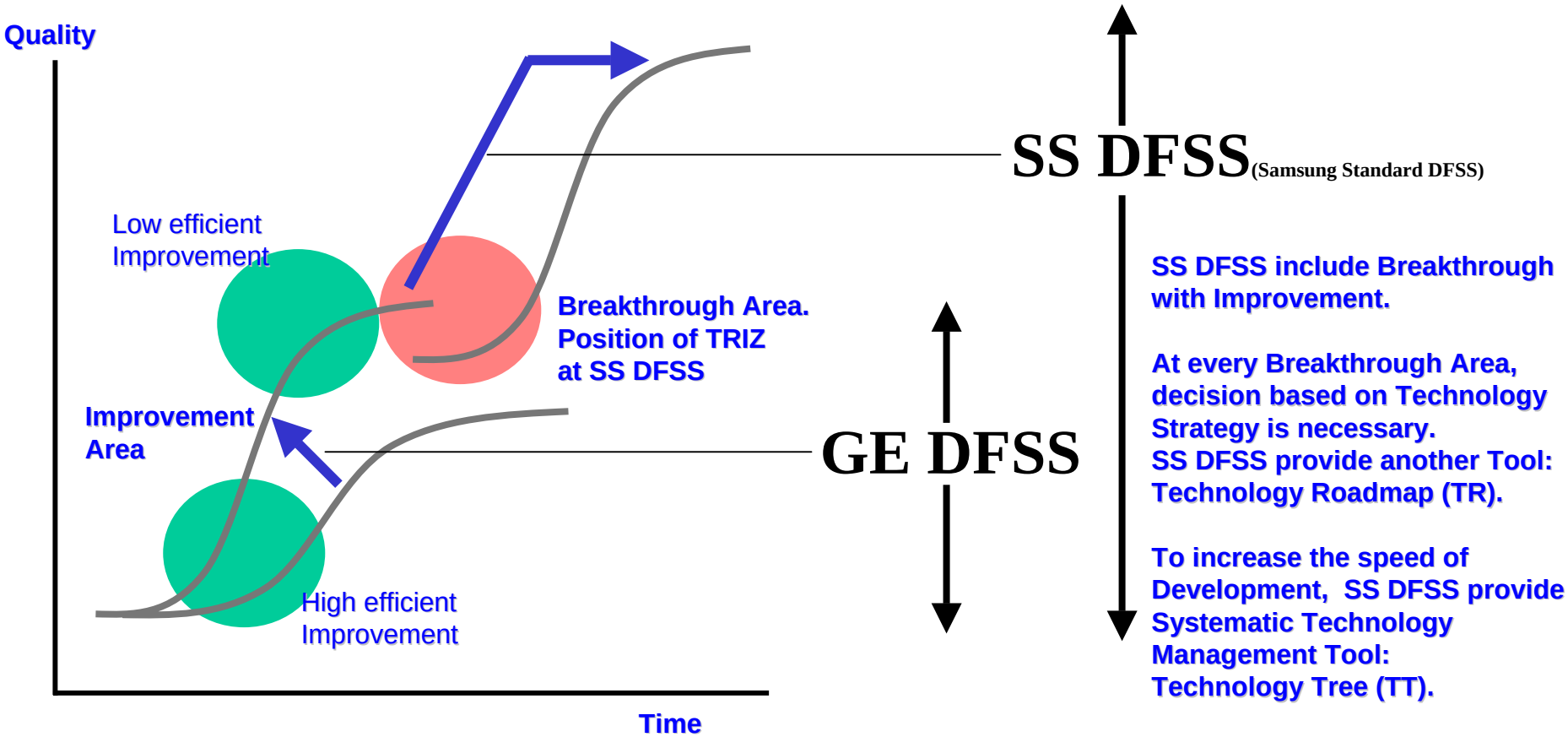
Technology Flow down is done By Technology Tree(TT).
This methodology will be done Parallel with QFD.
Based on TR, we could make concrete Action Plan with the help of TT.

SAMSUNG Standard DFSS with 3T

How Dose we Reinforced this Situation?



TRIZ in 6 Sigma

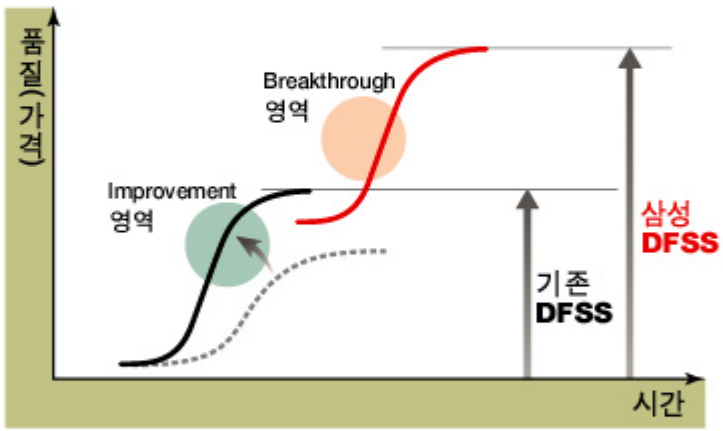


GE DFSS + TR + TT + TRIZ = SS DFSS

삼성DFSS 무엇이 다른가

기존 DFSS +

1. 기술Roadmap에 의한 기술전략
2. 기술Tree에 의한 체계적 과제계획
3. TRIZ에 의한 Breakthrough Idea



6시그마 선발 4社, DFSS 양성 인력

(명)

	전자	SDI	전기	기술원	소계
MBB	22	13	4	4	43
BB	472	48	4	25	549
GB	3,885	2,713	158	71	6,827
소계	4,379	2,774	166	100	7,419

(02년 10월 31일 기준)

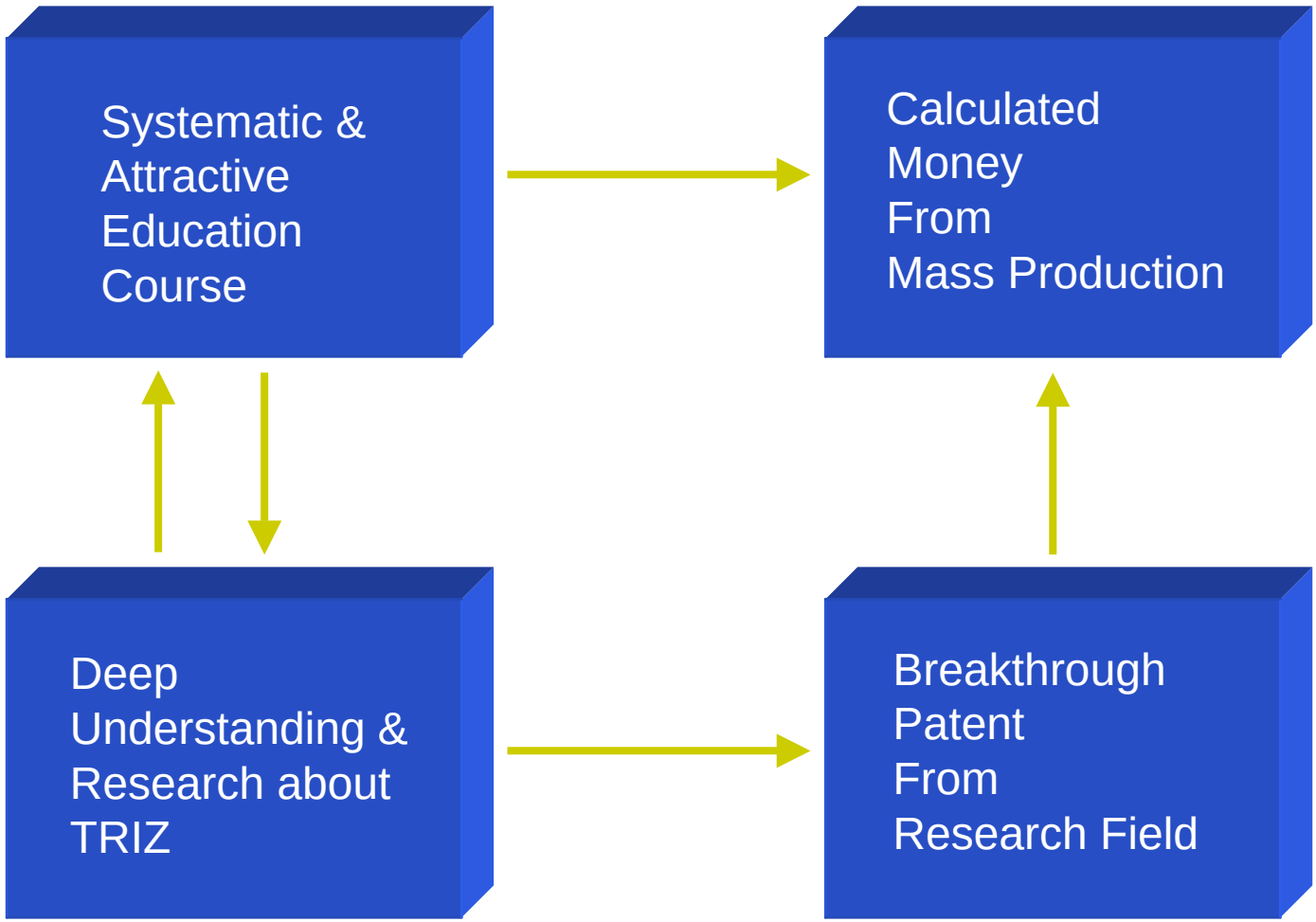
3 TRIZ Missions at Company

Summary

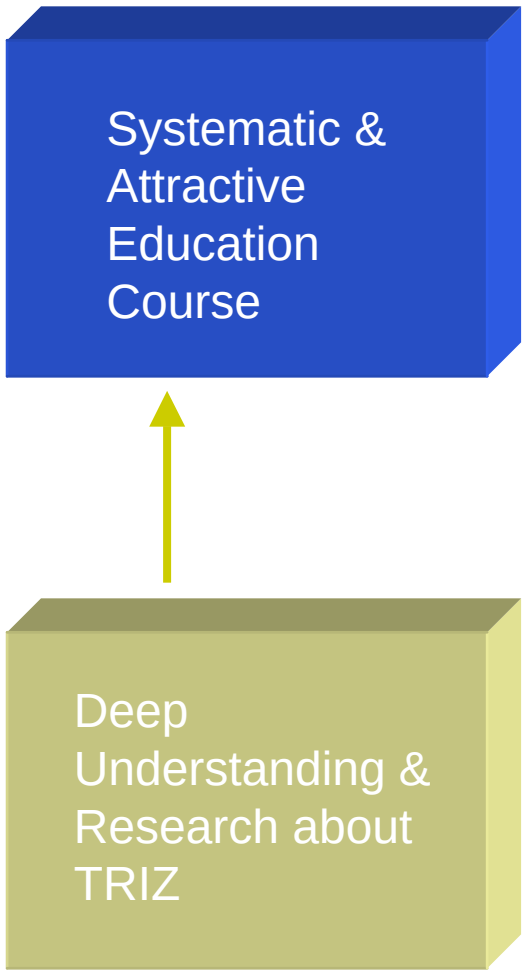
TRIZ Experts Consulting for Solving Breakthrough Problem	Although field engineers have more than 10 year's experience at his own field, there is possibility of mental inertia existence. Cooperation with TRIZ expert will reduce the time for solving problem.
Education of Field Engineer for them to Solve Difficult Problem	However TRIZ expert's ability is superior, without deep understanding of the engineering system, No good & practical result. If field engineer can use TRIZ effectively, the result can not be compared with anything.
TRIZ Research Based on Practical TRIZ Experience For that Company	TRIZ theory must develop continuously. The best battle field is engineering field. Such an TRIZ research will be done naturally and automatically, if the company could use TRIZ efficiently. TRIS is on evolution.

4 Key Success Points at Company

Summary



What does break the success of TRIZ? #1



Education Course must be short

Project Manager will not send his workers for 1 or 2 month

Education Course must be long

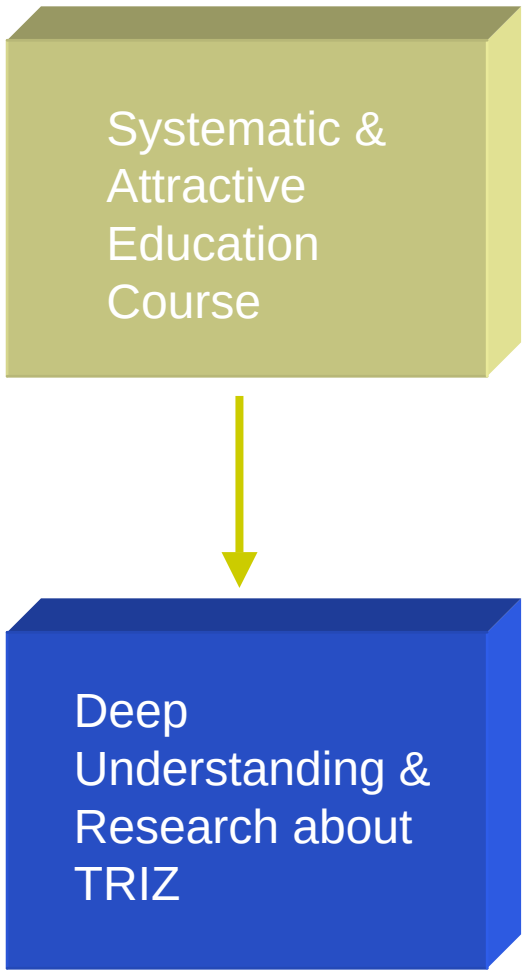
Engineer can not master TRIZ during 1 or 2 weeks. TRIZ different with Taguchi or QFD absolutely.

#1 Segmented Principle

SAMSUNG made TRIZ-1,2,3,5 education course. TRIZ-1 is one day light course. By the help of on-line education TRIZ-4, total education time is 2 month without bothering engineers. Basic course TRIZ-1,2,3,5 is 120 hour.

Summary

What does break the success of TRIZ? #2



Theory must be simple

"A theory is the more impressive the greater the simplicity of its premises, the more extended its area of applicability " by Einstein

Too many tools at TRIZ

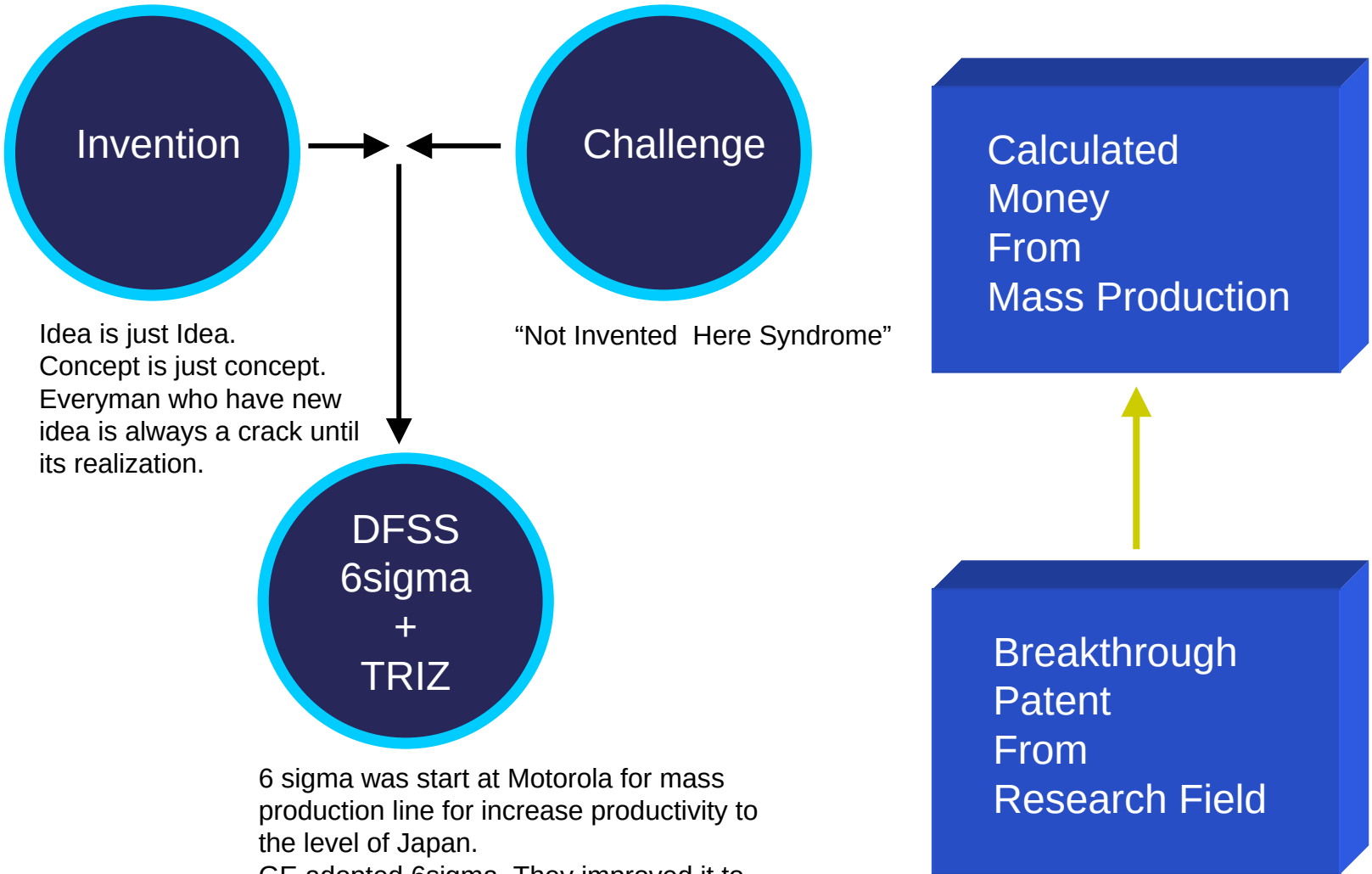
40 Principle, Contradiction Matrix, Su-Field Analysis, 76 standard solutions, ARIZ, Effect DB, … What are those?

Unified & Simple Understanding

Company could not see any trace of using TRIZ by Russian TRIZ experts.
They just see sky and A4 paper at desk with pen in his hand.
But the generated idea is superior in quality and quantity.
There must be something in TRIZ.
But what is it?

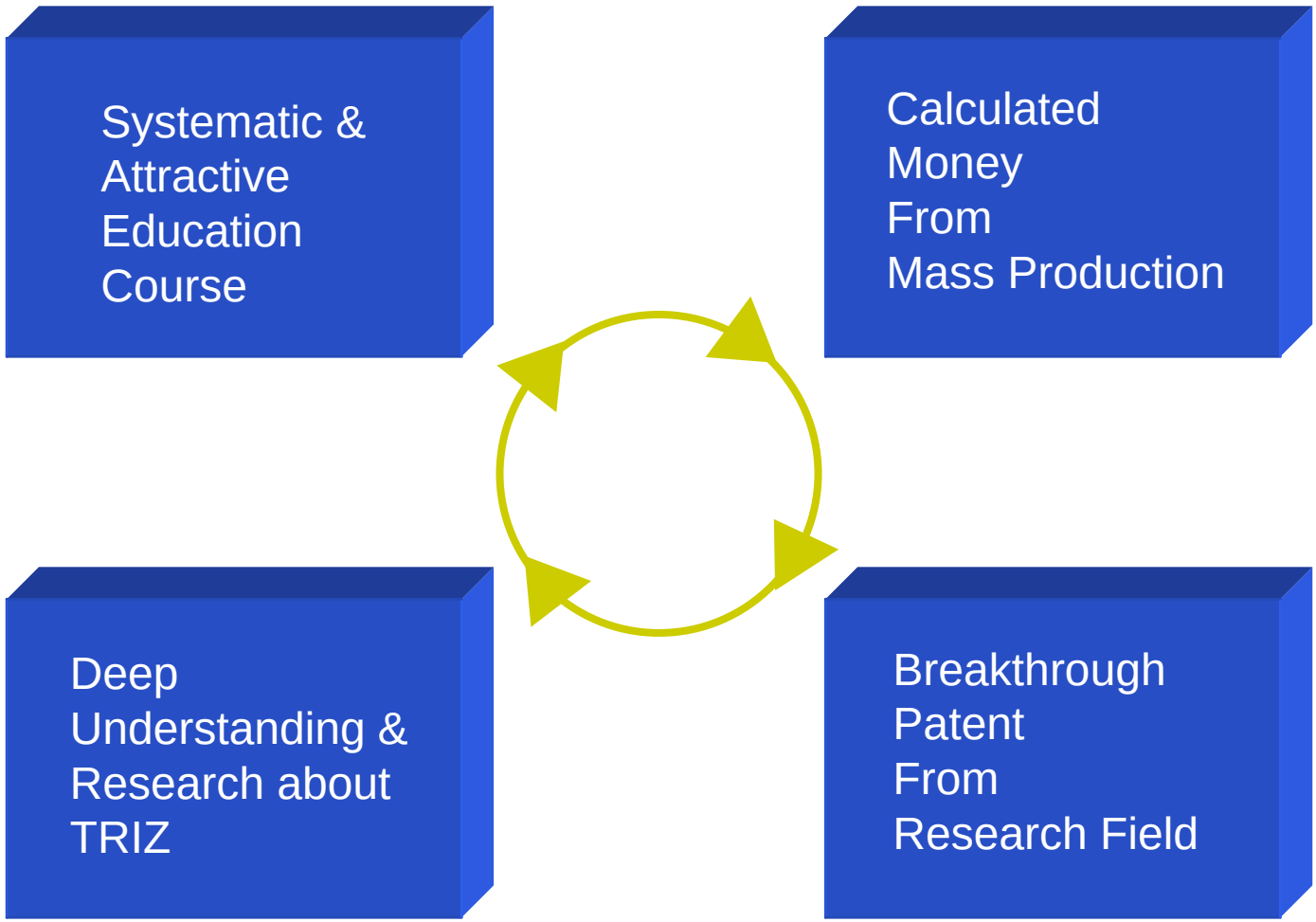
Summary

What does break the success of TRIZ? #3



Summary

4 Key Success Points at Company



Summary

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