

# **POSITION OF TRIZ IN THE PROBLEM-SOLUTION TOOL SYSTEM**

## **TRIZ UTILIZATION FROM THE POINT OF AVERAGE ENGINEERS' VIEW**

**Japan TRIZ Symposium 2011**

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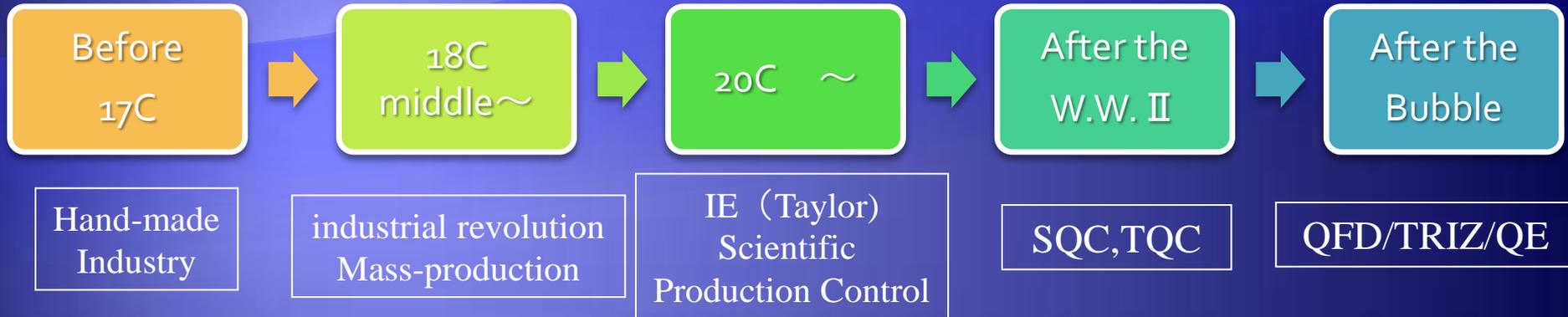
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1. Background and Motivation
2. Trend of Innovation Tools
3. Past Study
4. Monodukuri Engineering Matrix
5. Tool Questionnaire Result
6. A Proposal of TRIZ for problem solution
7. Future Plan

# 1 . Background and Motivation

## Historical Transition of production



Individual Skill

Production Scale

Production Efficiency

Product Quality

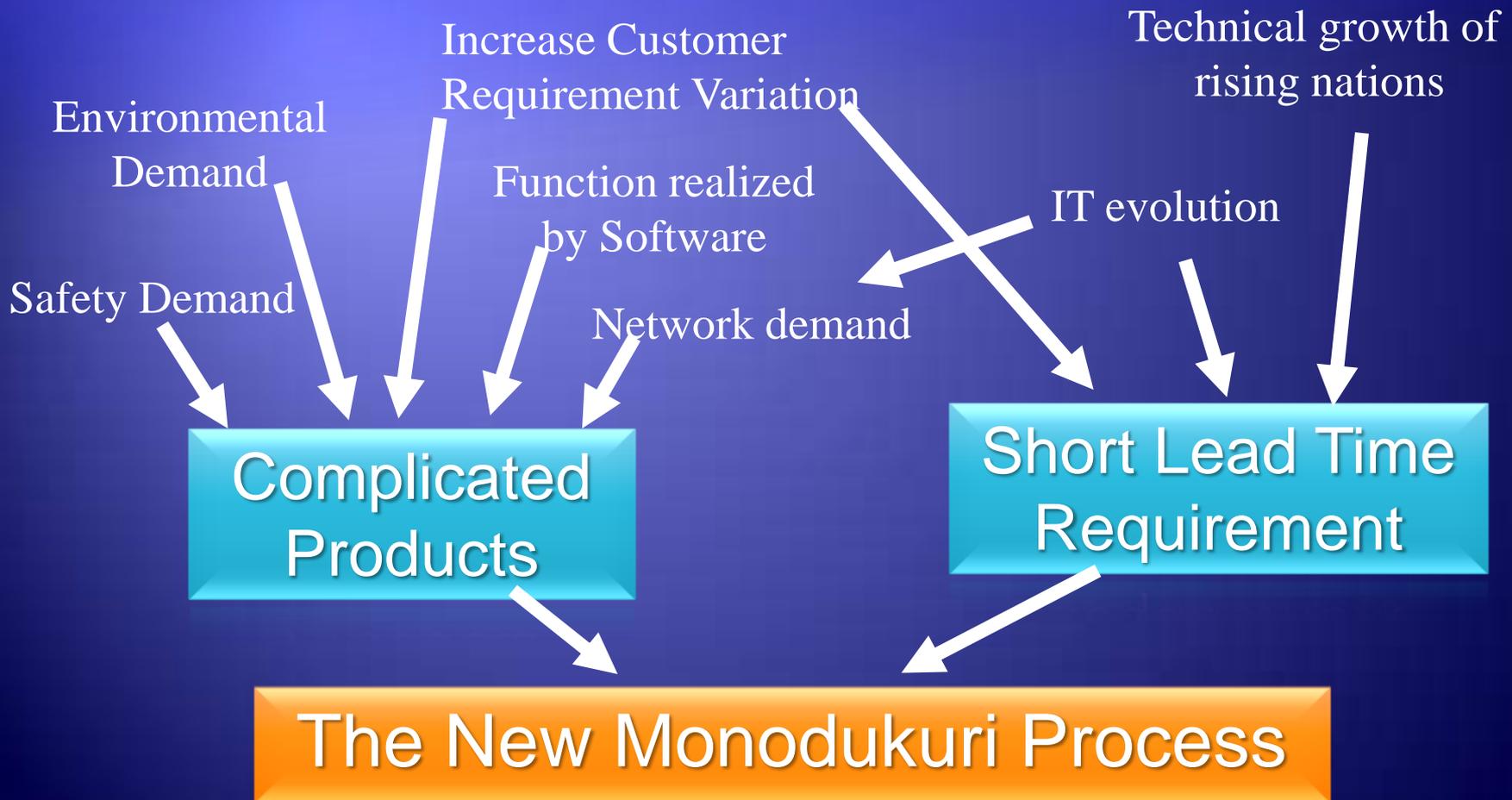
Design/Plan Quality

Transition of important items

Many control tools were developed according to the market requirement

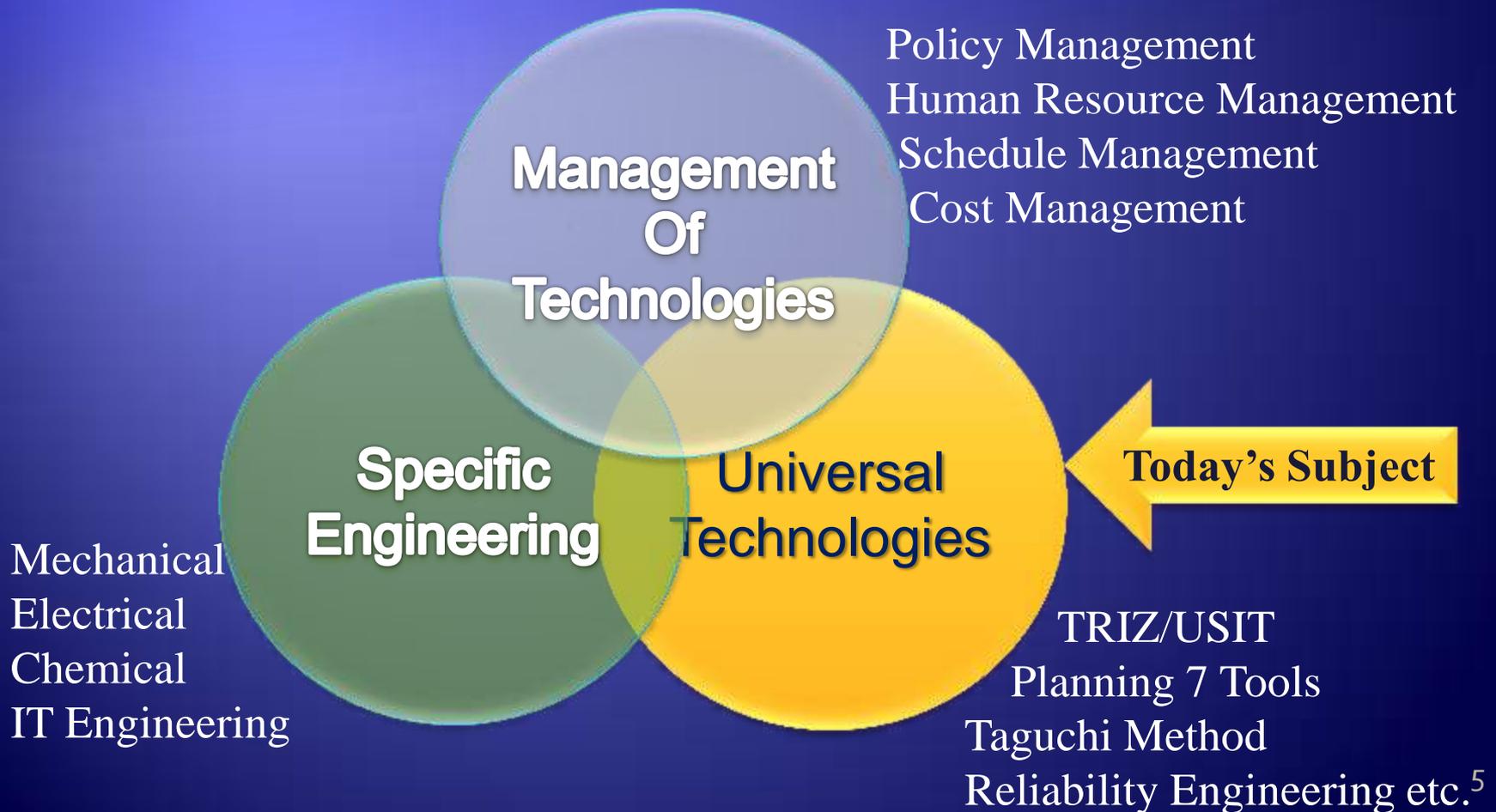
# Increasing Monodukuri Innovation Importance

## Society Change



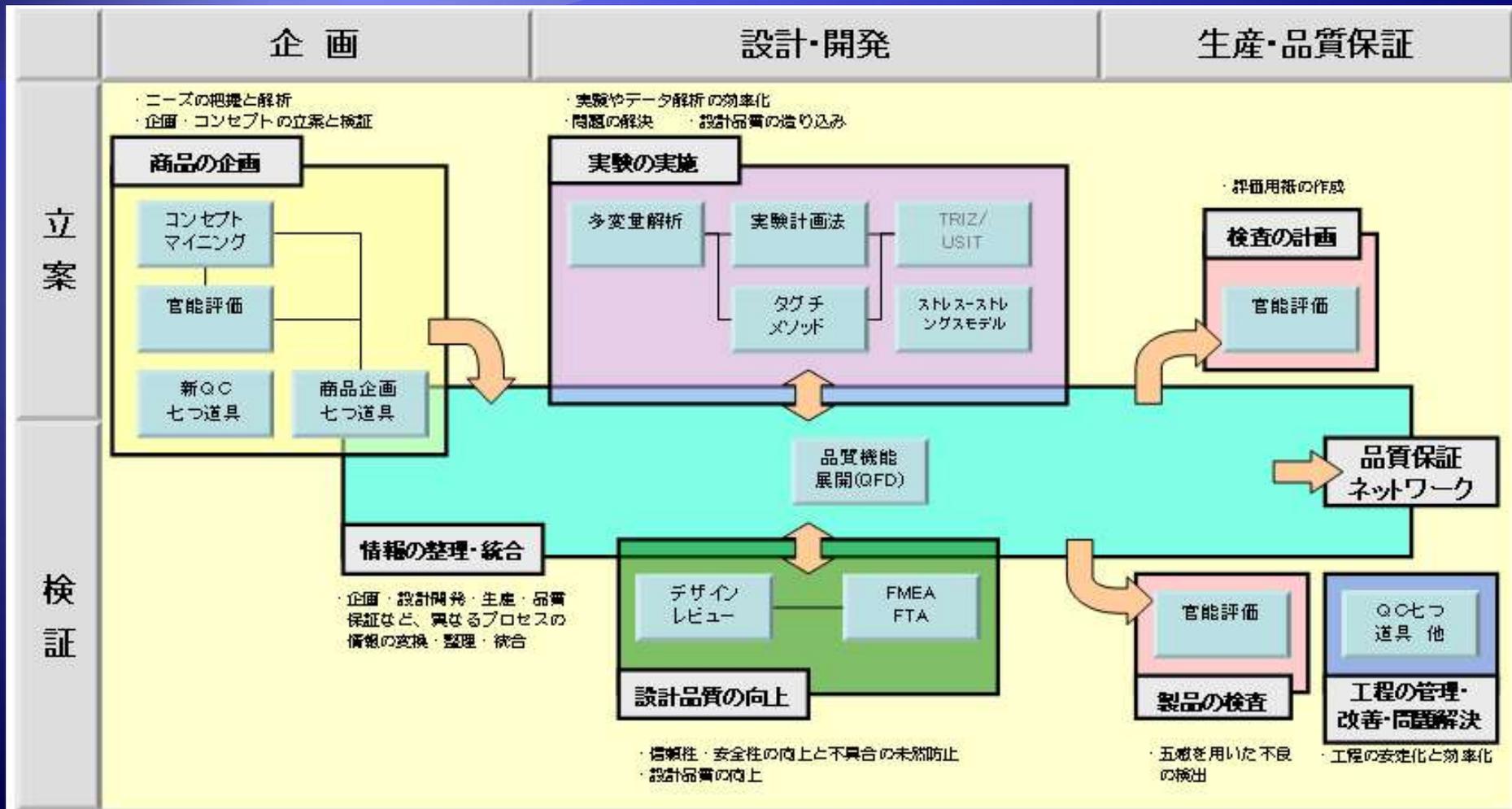
# Monodukuri Solution Structure

Triangle of Specific Engineering/Management  
Technologies/Universal Technologies



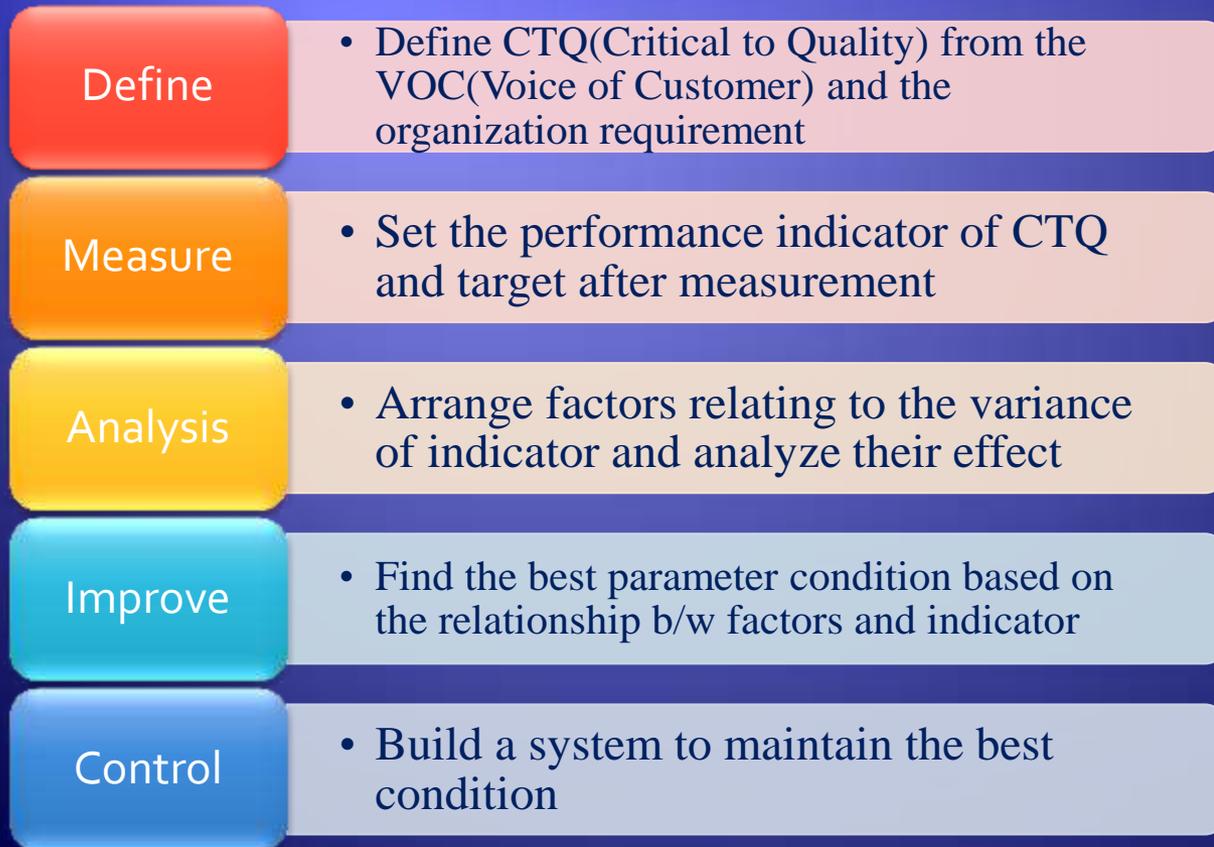
# 2. Trend of Innovation Tools

## Ex. Union of Japanese Scientists & Engineers



# Ex.2 Six Sigma Activities

- ◆ Management, QC, Problem Solution Procedure
- ◆ Focus on the variance more than the average



# In-corporate Activities Examples

- ◆ Panasonic      QSD Activity
- ◆ Hitachi          HiSPEED21
- ◆ Toshiba         MI(Management Innovation )
- ◆ Sanyo            SMART21
- ◆ Koganei         IMpactV Development

Most of major companies including above mentioned are applying some methods and tools in their monodukuri process.

# 3. Past Study (1)

- ◆ Toshihiro Hayashi : MOT from the Viewpoint of an Engineer in Design & Development Field, JIMA, "Management System", Vol.14, No.1, 2004
  - ◆ **Business/Product Strategy**: PEST Analysis, PPM, SWOT Analysis, STAR, Marketing Tools, Attribute Matrix Analysis, Value Chain Analysis, Management Simulation, Product Planning 7 Tools, etc.
  - ◆ **Design & Development Process Engineering** : Social/Technology evolution forecast, QFD, **TRIZ**, Taguchi Method, Design Navigation(DN Method, Nakazawa Method), Design Theory, Failure Science, Concept Selection Tools, DFX Engineering, etc.
  - ◆ **Digital Engineering Technology**: CAD/CAE/CAM, PDM, PLM etc.
  - ◆ **Software Engineering Technology**
  - ◆ **System Lifecycle Management Technology**
  - ◆ **Project Management Technology**: P2M, DSM, etc.

# Past Study (2)

- ◆ Manabu Sawaguchi: “VE and TRIZ”, Douyukan, 2002
  - ◆ Product realization capability requires the following management technologies to utilize specific engineering
  - ◆ **Customer requirement analysis technologies:** Marketing Tools, QFD, 0 Look VE
  - ◆ **Product development idea technologies:** Idea Tools, **TRIZ**
  - ◆ **Effective design/development realization technologies:** Taguchi method, AHP, FTA, FMEA



# Past Study (4)

- ◆ Nancy R. Tague : THE QUALITY TOOLBOX, ASQC Quality Press, 1995
  - ◆ Relationship between Idea Tool\*5, Process Analysis Tool\*11, Cause Analysis Tool and 10 functions including Policy setting, Observation, Learning were indicated.
  - ◆ TRIZ not included

Tool	E/F	Mission	Customer requirements	Current state	Opportunities	Root causes	Changes	Do it	Monitor	Standardize	Learnings
Affinity diagram	E/F	X	X	X	X	X	X			X	X
Brainstorming	E	X	X	X	X	X	X			X	X
Brainwriting	E	X	X	X	X	X	X			X	X
Nominal group technique (NGT)	E	X	X	X	X	X	X			X	X
Relations diagram	E/F		X		X	X	X			X	X
Cost-of-quality analysis	E			X	X	X					
Critical-to-quality analysis	E			X	X	X					
Deployment flowchart	E/F			X	X	X	X	X	X	X	
Flowchart	E/F		X	X	X	X	X	X	X	X	
Matrix diagram	F		X	X	X	X	X	X	X	X	
Relations diagram	E/F		X	X	X	X	X			X	X
Requirements matrix	E		X	X	X				X	X	
Requirements-and-measures tree	E		X	X	X				X	X	
Storyboard	E	X	X	X	X		X	X		X	X
Top-down flowchart	E/F	X		X	X	X	X	X	X	X	
Work-flow diagram	E			X	X	X	X	X	X	X	
Contingency diagram	E				X	X	X	X		X	
Fishbone diagram	E				X	X					
Force field analysis	E				X	X	X	X		X	
Is-is not matrix	F				X	X					
Matrix diagram	F		X	X	X	X	X	X	X	X	
Pareto chart	F				X	X	X		X	X	
Scatter diagram	F				X	X			X		
Stratification	F			X	X	X			X	X	
Tree diagram	E				X	X	X	X		X	
Why-why diagram	E					X					

# Past Study (5)

- ◆ Nikkei Monodukuri: [Practice] Monodukuri Innovation, 2010
  - ◆ Following 11 tools were proposed as innovative production methods
  - ◆ **Production Management** : Toyota Production System, Daiseru System, TOC, Six Sigma, ABC
  - ◆ **Planning Development Management** : Product Planning 7 Tools, QFD, **TRIZ**, Taguchi Method, Nakazawa Method, VE
  - ◆ General explanation, effect, procedure, actual examples are explained

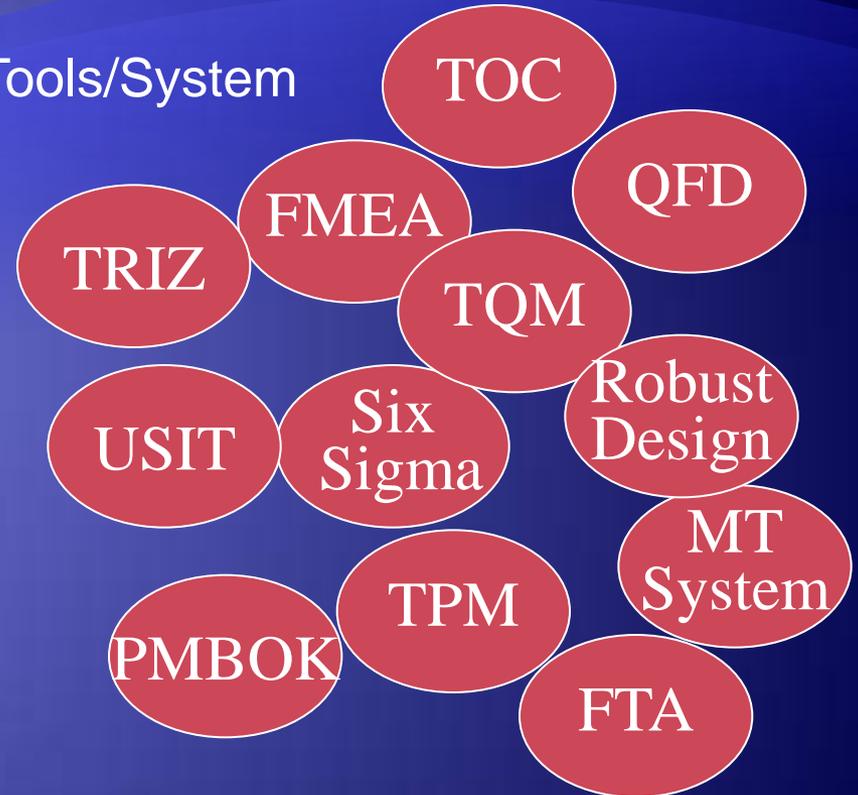
All five studies do not explain how to select tools clearly

# Engineers' Frustration

Subjects



Tools/System



?

- A lot of tools are introduced, though...
- A use of tools itself is not the goal !
- What kind of tools should we start from?

# 4. Monodukuri Engineering Matrix

- ◆ Structure
  - ◆ Subject indexed innovation tool framework
  - ◆ Analogy of TRIZ(Effect) and QFD
- ◆ Target
  - ◆ General engineers and managers who encounter problems and are not familiar with effective tools
- ◆ Expected Effect
  - ◆ Recognize effective tools for the problem earlier and easier

# Effect of Frameworks

- ◆ Breakthrough prejudice
  - ◆ Planning prejudice → QFD
  - ◆ Idea prejudice → TRIZ, Mind Map
  - ◆ Design prejudice → Taguchi Method
  - ◆ Project prejudice → PM
- ◆ Benchmark of the best practice
  - ◆ Squeezed experience of excellent scientists and engineers

# Framework Examples

- ◆ Management templates made by excellent leaders
  - ◆ QC circle → QC Story, Q7
  - ◆ Quality Management → ISO9000
  - ◆ Environment Management → ISO14000
  - ◆ Development Process → Six Sigma
  - ◆ Job Improvement → TQM
  - ◆ Management Quality → JQA
  - ◆ **Monodukuri Innovation** → **Monodukuri**



# Applying Procedure of the Matrix

## Case1: Subject is clear

- ◆ Find a similar subject from the left list
- ◆ Check effect expected tools looking horizontally
- ◆ Factors to select from candidate tools
  - ◆ Characteristics of the individual subject
  - ◆ Allowed period for the solution
  - ◆ Organization capability, knowledge, experience, company style
  - ◆ Side effect consideration

# Applying Procedure of the Matrix

## Case2: Subject is not clear

- ◆ Job Assessment
  - ◆ All layer from top management to staff
  - ◆ Each operational organization
  - ◆ Re-verification of the effect
- ◆ Effective even for the case subject is clear
  - ◆ A surface symptom may be observed instead of real cause

# Job Assessment Sheet Sample

	Question	Answer
1	ここ3年で製品企画の受賞件数が増加した	2
2	ここ3年で雑誌に取り上げられる製品企画の受賞件数が増加した	2
3	利用者からのアンケートで製品仕様に対する評価が上がっている	3
4	カスタマーサービス(電話、メール)で製品性能、機能に対する提案、要望が増えてきた	4
5	カスタマーサービス(電話、メール)で製品性能、機能に対する賞賛が増えてきた	3
6	カスタマーサービス(電話、メール)で製品故障、不具合の苦情が増えてきた	4
7	価格.com口コミで製品性能、機能に対する提案、要望が多い	2
8	価格.com口コミで製品性能、機能に対する賞賛が多い	2
9	価格.com口コミで製品故障、不具合に対する苦情が多い	3
10	販売店、代理店から製品性能、機能に対する提案、要望が多い	4
11	販売店、代理店から製品性能、機能に対する賞賛が多い	4
12	販売店、代理店から製品故障、不具合に対する苦情が多い	3
13	企画会議でマーケティング(企画)担当と技術担当の意見が合わない	2
14	企画(製品仕様)が決まった後でも、違う意見を言い続けるメンバーがいる	4
15	企画(製品仕様)が決まった後で、従わないメンバーがいる	4
16	マーケティング情報で製品仕様が頻繁に変更される	4
17	経営上層部の意向で製品仕様が頻繁に変更される	5
18	声の大きなメンバーの意見が製品仕様には反映されやすい	3
19	販売部門の要求で技術的/期間的に不可能と思われる計画が通ってしまう	2
20	開発テーマは技術部のシーズを中心に決定される	3
21	マーケティングと開発担当のコミュニケーションは良好である	3
22	マーケティングからの要求に対して開発、設計担当は短時間で応答している	1
23	当社製品の性能は業界トップレベルにある	4
24	当社製品の機能は業界トップレベルにある	3
25	当社の技術発表は常に先進的で、驚きを持って迎えられる	2
26	当社の技術発表は企業規模にしては多い方である	1
27	当社の技術発表はメディアに取り上げられる率が高い	2
28	開発会議の中でしばしば新しいアイデアが議論される	2
29	開発期間短縮の要望が企画、販売部門から寄せられる	3
30	開発中の技術、設計中の製品仕様が他社に先を越される場合が多い	4
31	技術の開発よりもその評価に苦労している	2
32	信頼性(寿命)評価の費用が開発費の10%を超えている	4
33	ソフトウェア関連の市場クレームが多い	4
34	ソフトウェア関連で開発費よりテスト費用の増加が多い	4
35	生産が開始した後もソフトウェアが頻繁に変更される	5
36	設計仕様の問題点が試作で多く見つかる	3
37	試作が予定回数を上回る事が多い	4
38	開発スケジュールが予定より伸びることが多い。	4
39	開発や設計技術者は出図が近くなる24時前に帰宅できない	3
40	サーバーに大量のデータが保存されているが、すぐに引き出せない	4
41	新しい技術開発にたくさんの実験やシミュレーションが必要になる	3



	ものづくり課題	ポイント
1. 企画		
	企業戦略・方針に整合した製品を企画したい	8
	お客様の気持ちをつかむ製品/技術を明確にしたい	10
	魅力品質の高い製品を企画したい	5
	複数の案から最適なものを選択したい	2
	企画構想の変更を防止したい	7
	製品企画、構想を関係部門で確実に共有したい	6
	技術シーズから製品を企画したい	3
2. 開発、設計		
	開発すべき技術テーマを的確に選定したい	8
	新規な機能を実現するアイデアが欲しい	5
	目標レベルの高い技術を実現したい	4
	設計条件の最適化を効率化したい	12
	開発時間を短縮したい	11
	技術完成度を早く的確に評価したい	6
	信頼性評価の時間、費用を低減したい	5
	開発プロセスの停滞、後戻りをなくしたい	10
	採取済みのデータから有意な要因を判別したい	3
	多元材料で最適比率を求めたい	1
	開発の進捗管理をしっかりしたい	7
	外部組織への依頼仕様を明確にしたい	2
	過去の情報を有効に活用したい	3
	ソフトウェア開発を効率化したい	11
	効果的な特許を創出したい	5
3. 生産		
	開発した技術特性を安定化したい	9
	突発品質不良を早く解決したい	7
	慢性品質不良を解決したい	8
	不良発生を未然防止したい	9
	不良問題を早期に発見したい	5
	不良原因を特定し、的確に対策したい	7
	製品規格、工程内検査の規格を合理的に決定したい	2
	製造パラメータから特性値を予測したい	3
	合否判定を効率的にしたい	7
	低価格の部品で代替したい	8
	製造(検査、保全)コストを低減したい	15
	生産スループット(量)を上げたい	8
	設備稼働率を上げたい	6
	在庫(部材、中間、製品)を減らしたい	7
	生産リードタイムを短縮したい	9

# Sample Case (suitcase)

- ◆ Background
  - ◆ Company A is a suitcase production/sales middle sized company whose sales share in Japan is 18%. \$191M of sales and \$9.7M of profit was achieved last year.
  - ◆ Sales are not increasing because of Recession in Japan, High suitcase coverage, Declining population.
- ◆ Subject
  - ◆ Plan to enlarge business, make a development idea, and design the product.



# Product Plan and Development

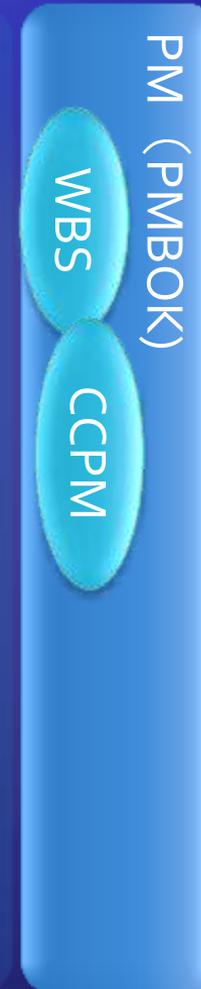
- ◆ ○ Product Planning 7 tools
- ◆ ○ QFD
- ◆ ○ TRIZ/USIT
- ◆ ○ Taguchi Method (Parameter Design)
- ◆ ○ CCPM
  - ◆ △ Idea Tools
  - ◆ △ FMEA, DR
  - ◆ △ Six Sigma, APQP
  - ◆ △ Fish born Chart
  - ◆ △ Project Management (PMBOK, WBS, PERT)

# Product Development Flow and Monodukuri Engineering



Realization Idea

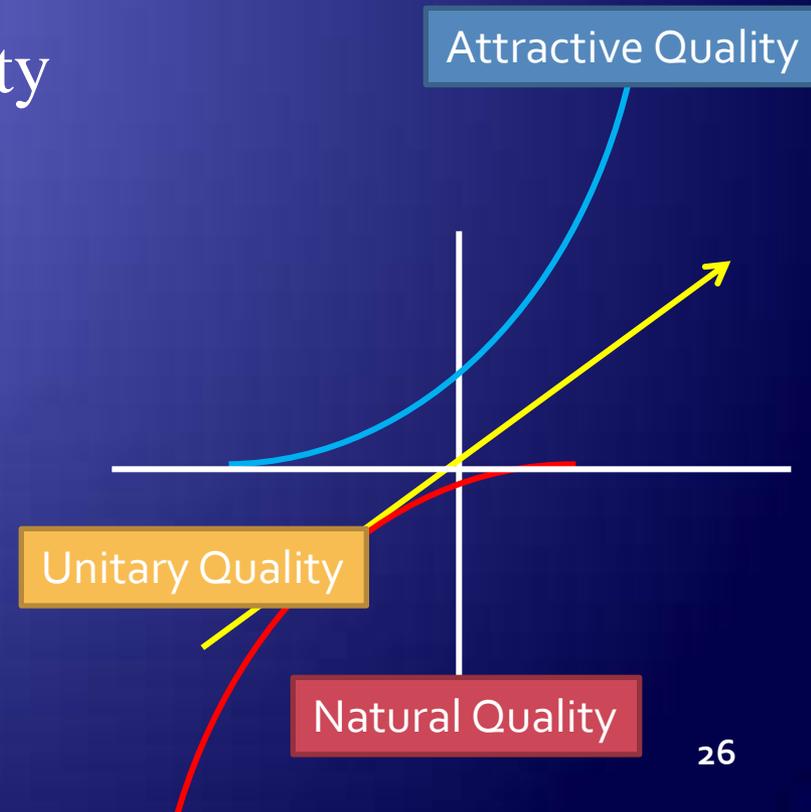
Parameter Setting



Project Management

# Checking the Subject itself

- ◆ Business strategy is right?
- ◆ Development subject is customer oriented?
- ◆ Product Plan is
  - ◆ Not biased to Natural Quality
  - ◆ Precede to customer needs
  - ◆ Positioned uniquely
- ◆ In-company condition
  - ◆ Production has room?
  - ◆ Sales are well organized?



# 5. Tool Questionnaire Research

## ◆ Purpose

- ◆ Research in-company recognition and usage of tools listed in the Monodukuri Engineering Matrix.

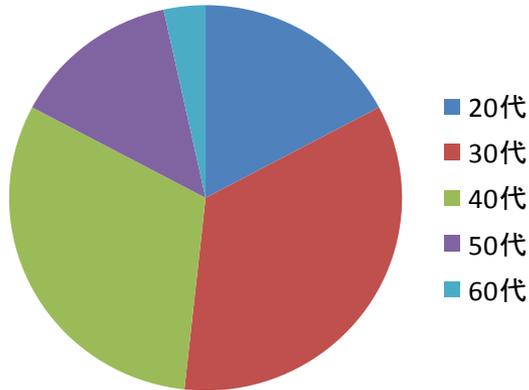
## ◆ Research method and items

1. Ask working students/OB in TUAT MOT to reply to the questionnaire
  - ◆ Student/OB himself, his boss and colleague
  - ◆ Answer personal recognition, organizational practice, effectiveness
2. Personal recognition rate, recognition index, organizational practice rate, effectiveness index are compared
3. Simple tally and Cross tally
  - ◆ By age , by number of company employee

# Profile of replier

Sample number : 29

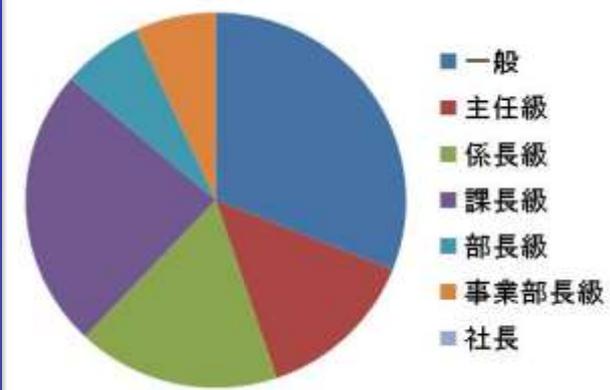
Age



Occupation



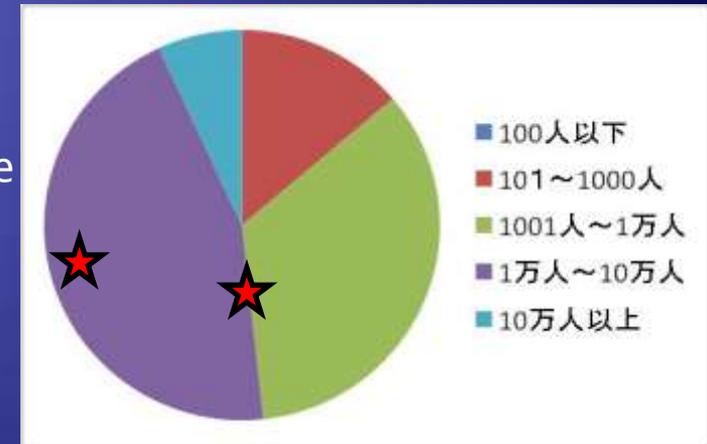
Position



Industry



Number of employee



- ◆ Relatively well balanced
- ★ Machinery ratio is a little high

- ★ Many development engineer
- ★ Big company size

# Question Items and Choices

Higher  
Recognition



1. Personal Recognition
  - ① Possible to teach
  - ② Using currently
  - ③ Used before
  - ④ Knows use, procedure and theory
  - ⑤ Knows use, but , procedure and theory
  - ⑥ Knows name, but use
  - ⑦ Never heard

Higher  
Usage



2. Organizational practice rate
  - ① Using as all company policy
  - ② Using as a few department policy
  - ③ Using by some employee individually
  - ④ Once used before but now
  - ⑤ Never heard to be used in company

Higher  
Evaluation



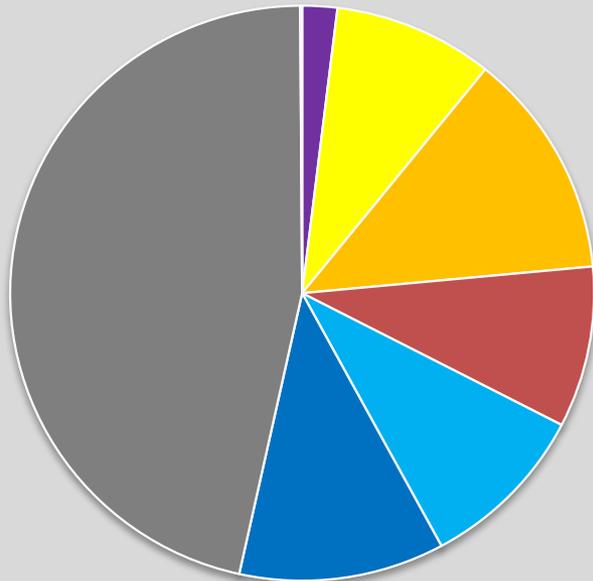
3. Effectiveness to work
  - ① Effective in all company
  - ② Effective in some department
  - ③ Effective in no department
  - ④ Impossible to evaluate without knowing the tool

# Tools

- **Strategic tool** : SWOT 5F(Five Force) BSC
- **Product planning 7 tools** : Group interview Questionnaire Positioning analysis  
Conjoint Analysis QFD
- **Idea tools** : New QC 7 tools TRIZ USIT Osborne's check sheet  
Scenario planning Brain storming Focus idea NM method Mind mapping
- **Quality Robust Engineering** : Parameter design Function verification Online QE  
Loss function MT system
- **Statistical Quality Control** : Statistical test/ Estimation Sampling Orthogonal array  
Response surface design Regression analysis Multivariable Analysis
- **Reliability Engineering** : FTA FMEA/DRBFM DR Weibull Distribution
- **Safety Engineering** : Safety design policy (ex. Fool proof) Redundant design  
VTA/ETA KYT activity RCA R-Map
- **Quality Management** : TQM QC 7 tools ISO9000 Six sigma APQP
- **Production Management** : SLP VE/VA IE Cell production MRP ABC/ABM  
TPM TOC (DBR)
- **Knowledge Management** : Group ware Data common server PDM
- **Project Management** : PMBOK/ISO10006 WBS PERT/CPM EVM CCPM
- **Environment Management** : ISO14000 Modal shift Green purchasing
- **Others** : 3 D-CAD/CAE Combinatorial KT method

# Simple Tally (Recognition Rate)

- Recognition Rate : Rate more than “Know the name”
- As all replier average have experience to use 23% of 66 tools, which mean about 15 tools
- Have heard 54% or about 36 tools
- Have never heard 46% or about 30 tools
- TRIZ ratio : #51 among 66 tools



- ① 指導する事が出来る
- ② 現在も良く使っている
- ③ 使った事がある
- ④ 用途、使用法、原理まで知っている
- ⑤ 用途は知っているが、使用法や原理は知らない
- ⑥ 名前は知っているが用途は良く分からない
- ⑦ 全く聞いた事がない
- 無回答

Top 5 tools

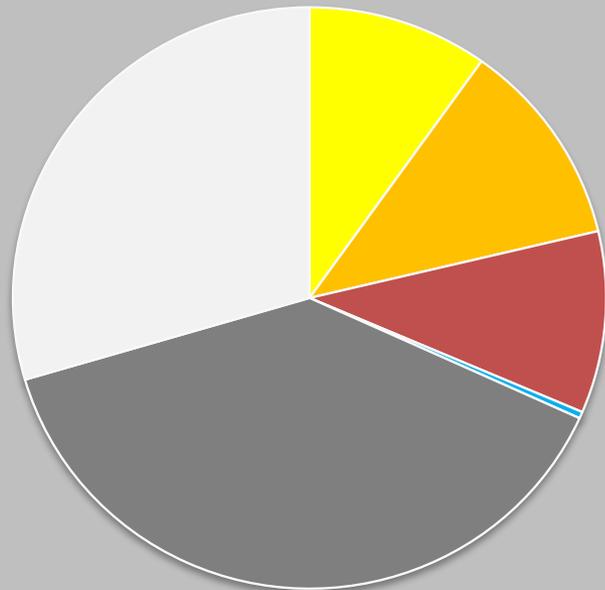
認知率	
①	ISO9000 96.6%
②	ISO14000 96.6%
③	ブレインストーミング 96.6%
④	トヨタ生産方式 96.6%
⑤	デザインレビュー 89.7%

Bottom 5 tools

認知率	
①	SLP 10.3%
②	CCPM 10.3%
③	オンライン品質工学 10.3%
④	KT法 10.7%
⑤	NM法 13.8%

# Simple Tally (Organizational Practice)

- As all replier average, 10% of 66 tools, which mean about 7 tools are used company wide.
- Removing no answer from the data, 55% or 36 tools are not used at all.
- TRIZ : #48 among 66 tools



- ① 全社方針として使われている
- ② 全社方針ではないが、一部の部門方針で使われている
- ③ 方針ではないが、一部の社員が個人的に使っている
- ④ 一時使われていたが、今は使われていない
- ⑤ 社内で使われているのを見聞きしたことがない
- 無回答

## Top 5 tools

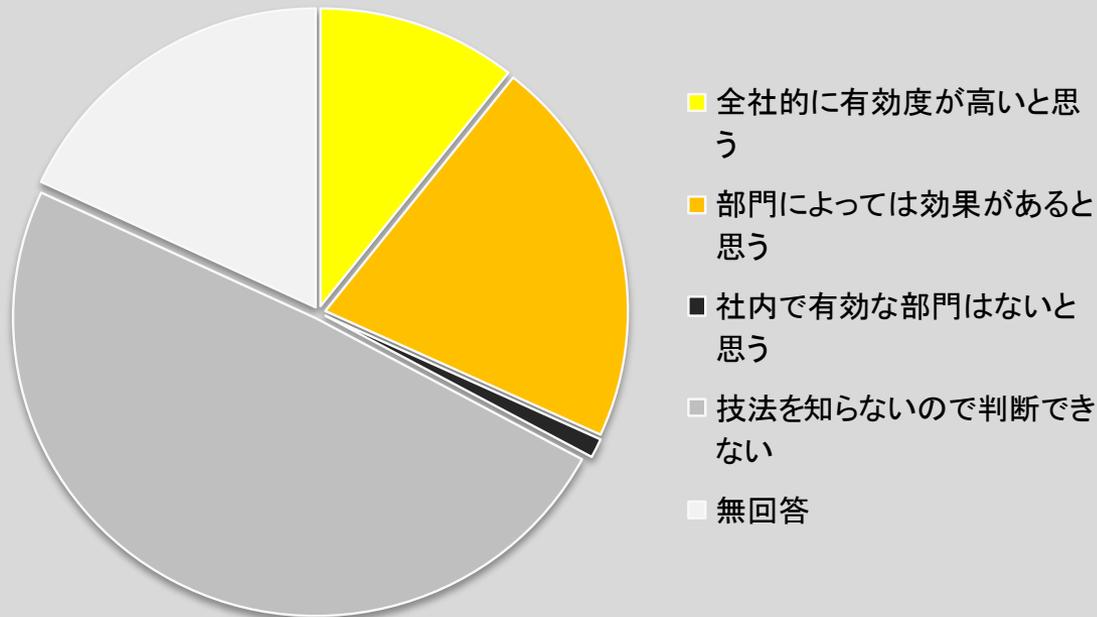
組織的活用率		
①	ISO14000	96.3%
②	ISO9000	96.3%
③	ブレインストーミング	91.3%
④	回帰分析	90.0%
⑤	グリーン調達	83.3%

## Bottom 5 tools

①	オンライン品質工学	5.3%
②	KT法	5.3%
③	コンビナトリアル	5.6%
④	SLP	5.6%
⑤	APQP	9.5%

# Simple Tally (Effect Evaluation)

- Removing no answer and suspended, 98% of tools were evaluated effective somehow
- TRIZ were also evaluated well 100%



50 tools are effective  
100%

Bottom 5 tools

①	APQP	66.7%	●
②	グループインタビュー	84.6%	
③	コンジョイント分析	85.7%	●
④	トヨタ生産方式	85.7%	
⑤	シックスシグマ	86.7%	

● Less than 10 Data

# Cross Tally (Item Selection)

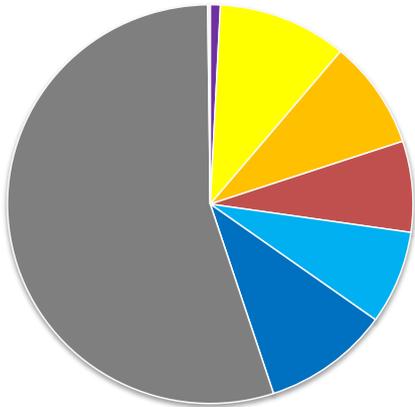
Relationship index among face sheet items

	Age	Positi on	Com. Size	Com. age
★ Replier's age	1			
Replier's Position	0.855	1		
★ Company Size (Total Number of Employee)	0.256	0.141	1	
Company Age (Years from Establishment)	0.216	0.148	0.502	1

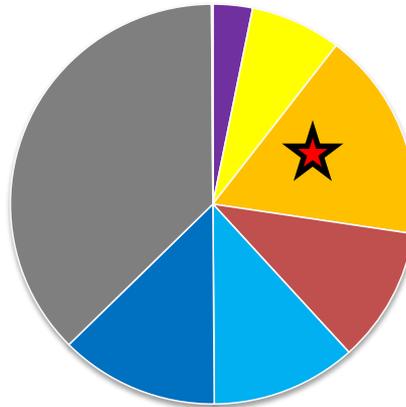
- High relationship between Replier's age / position and Company size / Age. Cross tally were made for Replier's age and Company size

# Cross Tally (Recognition)

20/30's (13人)



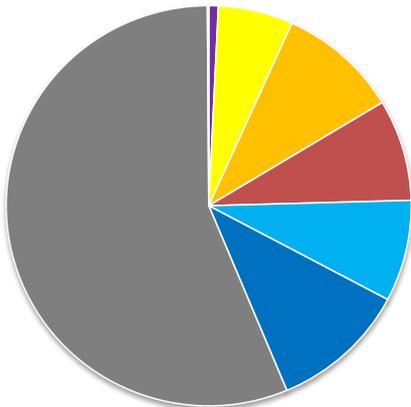
40/50/60's (14人)



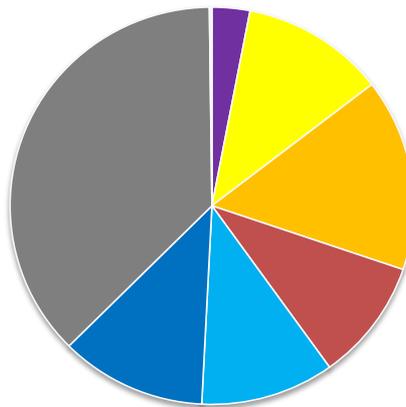
- ①指導する事が出来る
- ②現在も良く使っている
- ③使った事がある
- ④用途、使用法、原理まで知っている
- ⑤用途は知っているが、使用法や原理は知らない
- ⑥名前は知っているが用途は良く分からない
- ⑦全く聞いた事がない
- 無回答

●Older engineers generally recognize more. Assuming as of their longer experiment.

Less than 10k emplys (14人)



More than 10k emplys (15人)

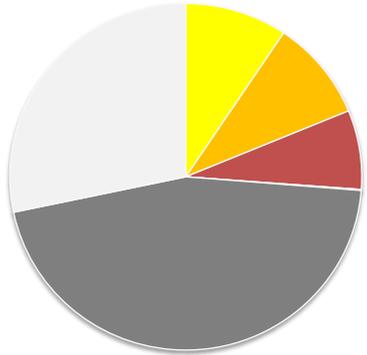


- ①指導する事が出来る
- ②現在も良く使っている
- ③使った事がある
- ④用途、使用法、原理まで知っている
- ⑤用途は知っているが、使用法や原理は知らない
- ⑥名前は知っているが用途は良く分からない
- ⑦全く聞いた事がない
- 無回答

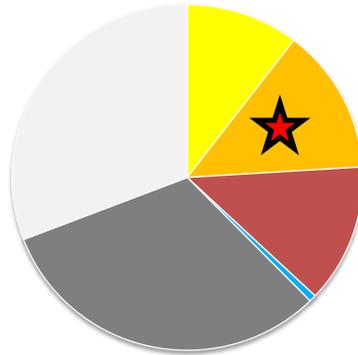
●Bigger company is assumed to supply more chance to encounter more tools for their employee.

# Cross Tally (Practice Rate)

20/30's (13人)



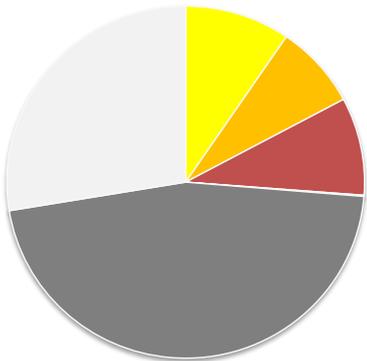
40/50/60's (14人)



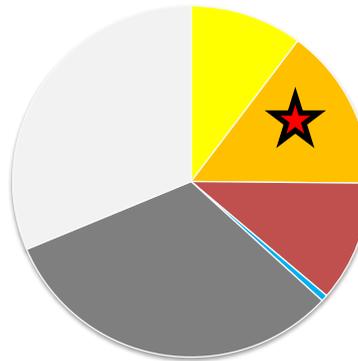
- ①全社方針として使われている
- ②全社方針ではないが、一部の部門方針で使われている
- ③方針ではないが、一部の社員が個人的に使っている
- ④一時使われていたが、今は使われていない
- ⑤社内で使われているのを見聞きしたことがない
- 無回答

●Older employees use generally more tools, assuming they have more information come from higher position and wider network.

Less than 10k emplys (14人)



More than 10k emplys (15人)



- ①全社方針として使われている
- ②全社方針ではないが、一部の部門方針で使われている
- ③方針ではないが、一部の社員が個人的に使っている
- ④一時使われていたが、今は使われていない
- ⑤社内で使われているのを見聞きしたことがない
- 無回答

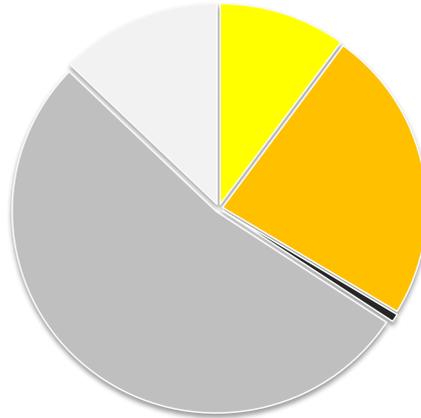
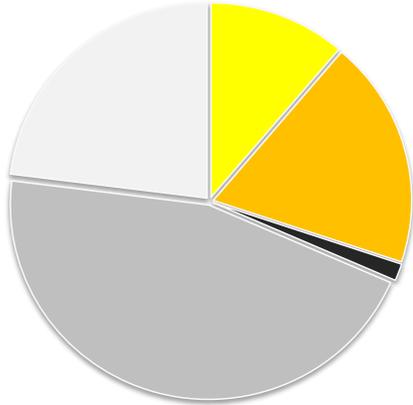
●Big company use more tools generally.

●As big one has more department, a part of their company likely to use some tool.

# Cross Tally (Effect Evaluation)

20/30's (13人)

40/50/60's (14人)

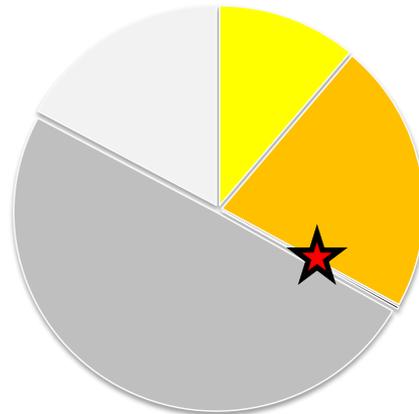
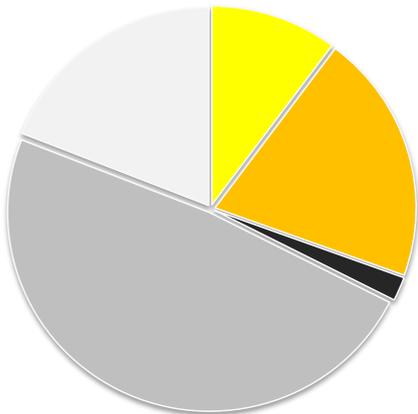


- 全社的に有効度が高いと思う
- 部門によっては効果があると思う
- 社内で有効な部門はないと思う
- 技法を知らないので判断できない
- 無回答

- Very high evaluation in any segment.
- Older employees evaluate a little higher.

Less than 10k emplys (14人)

More than 10k emplys (15人)



- 全社的に有効度が高いと思う
- 部門によっては効果があると思う
- 社内で有効な部門はないと思う
- 技法を知らないので判断できない
- 無回答

- Very high evaluation in any segment.
- Big company group shows no “Effective in no department”.

# Cross Tally (by Age)

20/30's

	認知率		組織的活用率	
①	トヨタ生産方式	100.0%	ISO14000	92.9%
②	ISO9000	93.3%	ISO9000	92.9%
③	ISO14000	93.3%	ブレインストーミング	92.3%
④	ブレインストーミング	93.3%	デザインレビュー	81.8%
⑤	サンプリング手法	86.7%	回帰分析	81.8%
	#25 TRIZ	53.3%	#27 TRIZ	36.4%

40/50/60's

	認知率		組織的活用率	
①	ISO9000	100.0%	ISO14000	100.0%
②	QC7つ道具	100.0%	ISO9000	100.0%
③	ISO14000	100.0%	グリーン調達	100.0%
④	デザインレビュー	100.0%	回帰分析	100.0%
⑤	グリーン調達	100.0%	QC7つ道具	91.7%
	#36 TRIZ	57.1%	#41 TRIZ	40.0%

●“QC7tools”are well recognized in older but younger. Field experience like QC circle activity decreasing may be the reason.

# Cross Tally (by Company Size)

Less than 10k employees  
(14人)

	認知率		組織的活用率	
①	ブレインストーミング	92.9%	ISO14000	92.3%
②	ISO14000	92.9%	ISO9000	92.3%
③	ISO9000	92.9%	回帰分析	90.0%
④	トヨタ生産方式	92.9%	ブレインストーミング	84.6%
⑤	回帰分析	85.7%	KYT活動	81.8%
	QFD	64.3%		45.5%
	TRIZ	49位 57.1%	47位	27.3%
	パラメータ設計	42.9%		11.1%

More than 10k employees  
(15人)

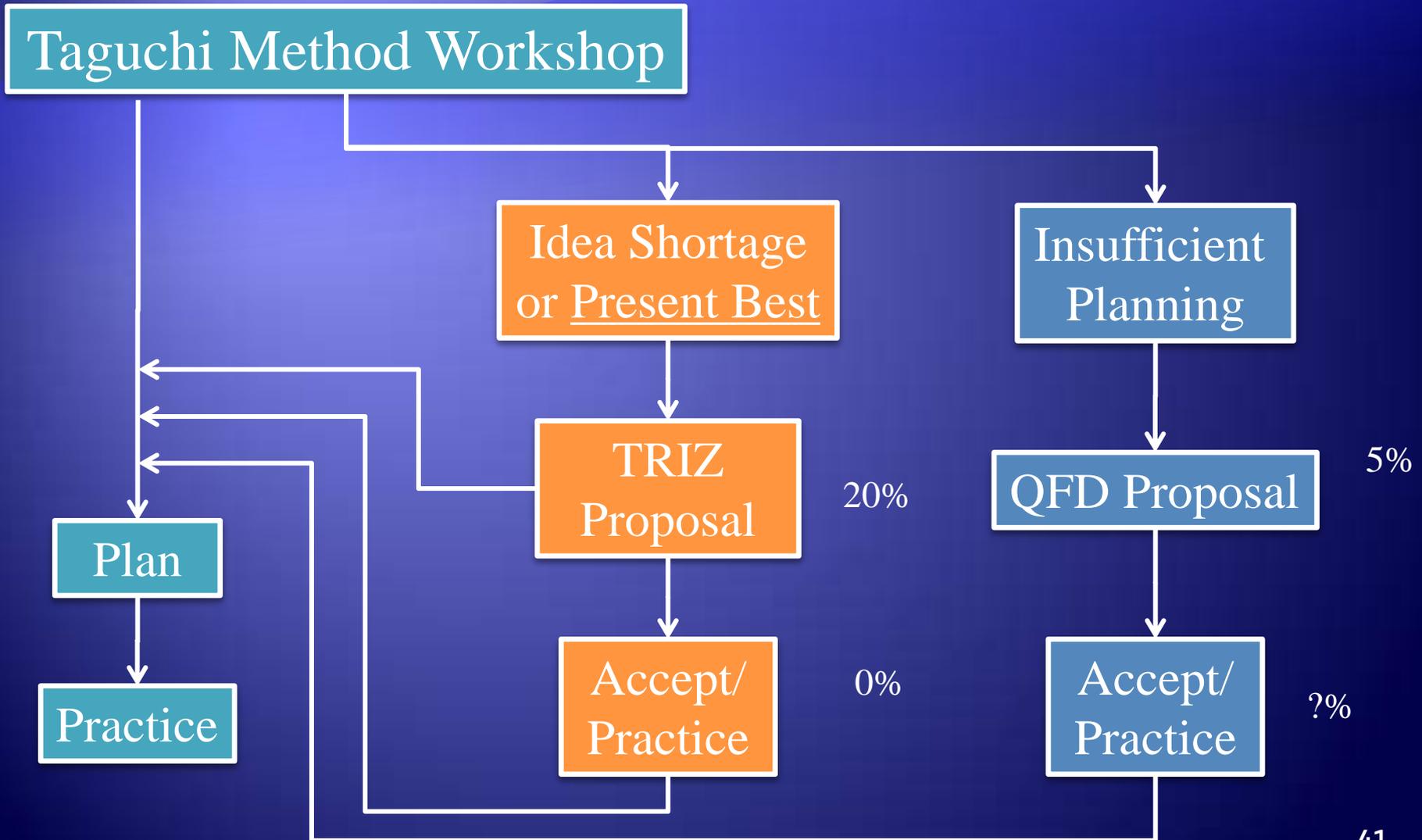
	認知率		組織的活用率	
①	ISO9000	100.0%	ISO14000	100.0%
②	ISO14000	100.0%	ISO9000	100.0%
③	デザインレビュー	100.0%	ブレインストーミング	100.0%
④	グリーン調達	100.0%	グリーン調達	92.3%
⑤	ブレインストーミング	100.0%	データ共有サーバ	90.0%
	QFD	80.0%		63.6%
	TRIZ	54位 53.3%	47位	50.0%
	パラメータ設計	66.7%		44.4%

- Big companies tend to be more active for environmental tools.
- Practice of the development major 3 tools “QFD/TRIZ/TM” are much different by the size of companies.

# Summary of the research

1. Investigated recognition rate/ practice rate/ effect evaluation of various tools
2. Bigger companies tend to use more tools
3. Especially Taguchi method practice rate depends on the company size.
4. Well recognized tools depend on generation
5. There are a lot of tools including TRIZ which are highly evaluated but not recognized nor used.  
Monodukuri productivity can be improved by means of accelerating penetration of these tools.

# 6. Proposal of TRIZ for problem solution [Case of my office]



# Why not accepted ?

## Bad 3C

Prof. Robert Hartley  
(Cleveland Univ.)

- Complacency
- Conservatism
- Conceit

- Very busy even with daily work
- Heavy load even with Taguchi method. TRIZ ?



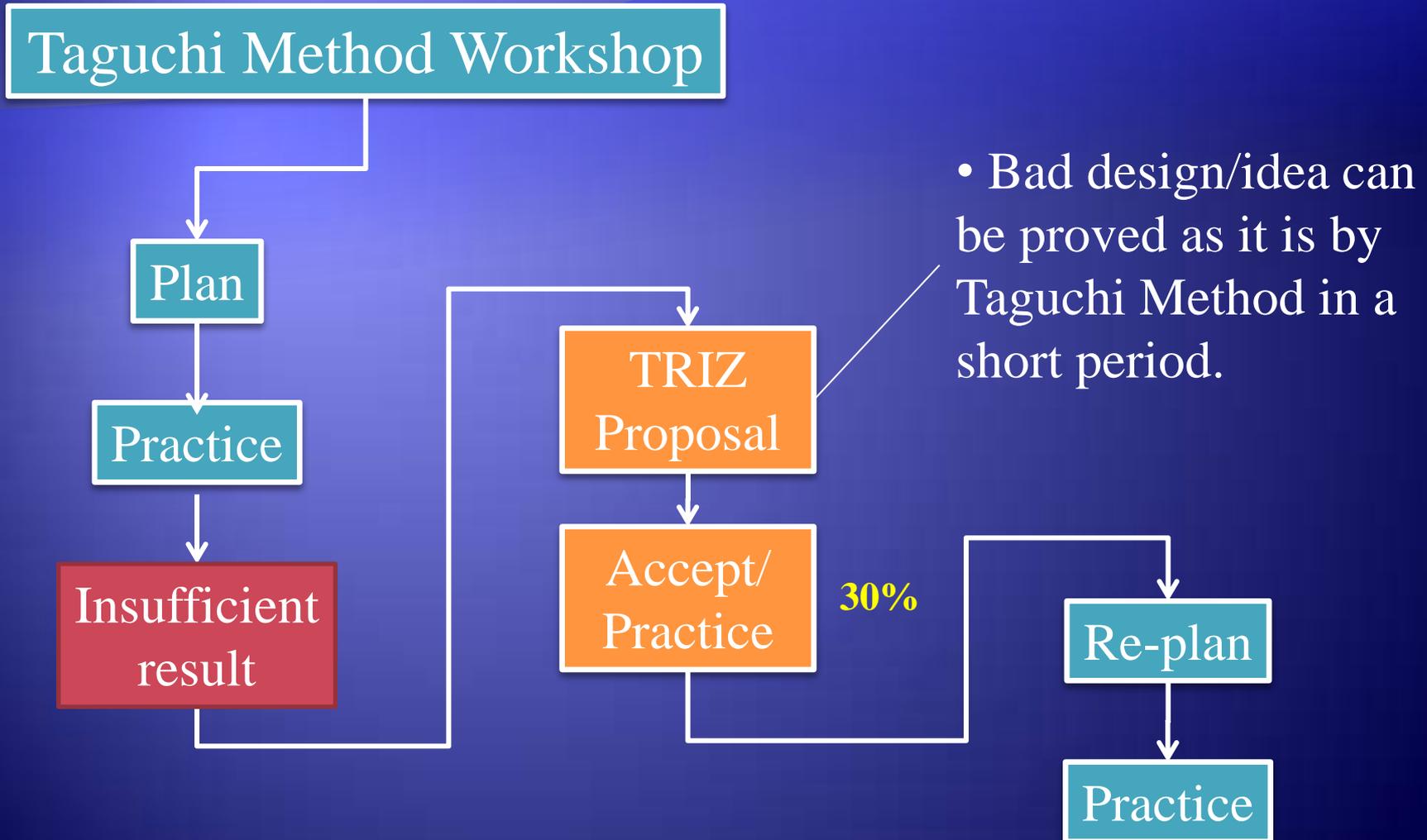
## Good 3C

Prof. Michael Hammer  
(MIT)

- Customer
- Competition
- Change

- Contribution to our society
- Improve one's capability with innovative tools

# Realistic Procedure



# In-company Promotion Process

- ◆ Top Management Support
  - ◆ Explanation and Report at Management meeting
- ◆ Clarification and Passion of promotion stuff/person
  - ◆ In-company experts training for each tools
- ◆ Active information distribution
  - ◆ Intranet web site, mail magazine
- ◆ Continuous training and practice system
  - ◆ Practical workshop manner
- ◆ Clarification of outcome
  - ◆ Outcome report meeting, Award program
- ◆ Utilization and training of in/outside expert
  - ◆ In-company workshop, study circle, consultant



# Total Summary

## Conclusion

- Monodukuri Engineering Matrix indicates a guide of innovation tools to be used
- Monodukuri in Japan has a room for progress with innovative tools including TRIZ

## Future Plan

- Appeal the tool effectiveness to educational or leading organization such as colleges of engineering, technical colleges, local industrial technology centers
- Matching companies in trouble and professionals

# Matching System with Tool Information

## Monodukuri Innovation NAVI

Information  
Supplier

Consulting  
Company

Professional

- Guide a subject to the solution tool

- Explanation contents
  - Professional support
  - Consultant support

- Solution Q&A
  - Basic questions and answers
  - Liked to tool explanation
  - Certified expert

- Expert matching
  - Expert introduction, search
  - Reliability from column, answer
  - Points to the answers

Production Companies

Free  
Registration

**Thank you for your kind attention!**