

Operational Excellence by TOC Armed IE

Omron Healthcare Co., Ltd.

Atsushi Kitabayashi – Vice President Omron Dalian Co., Ltd.

Company Profile of OMRON Corporation

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Foundation	1933/5/10
Establishment	1948/5/19
Head office	Higashi-iri Horikawa shioko-jidori Shimogyo-ku Kyoto
	Tokyo Office : 3 -4-10 Torano mon Minato-ku Tokyo to
Capital	64.1 billion yen



Business of Electronic Components



Business of Automotive Electrical equipment

OMRON
Sensing tomorrow™



**Control equipment
Business of FA system**



**Business of Health and medical service
(Omron Health care co,Ltd)**



Business of social system

Company Profile of OMRON Healthcare

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【Business】

Development , production and sales of healthcare equipment for home and medical
Development and sales of health control software, expansion of the health promotion service.

【 Manufacturing sites 】

Omron Matsuzaka (Matsuzaka Japan)

Omron Dalian (Dalian, China)

Omron Healthcare Manufacturing Vietnam

【Employees】 As of 2010 March

404人 Omron Healthcare Co., Ltd 404

4037人 Omron Healthcare group 4037 (Domestic 772, Overseas 3265)

【research and development Sites】

2 (Kyoto, China/Dalian)



Company Profile of OMRON Healthcare

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【Business sites in Japan】

8 (Sapporo, Sendai, Tokyo, Nagoya, Osaka, Hiroshima, Takamatsu, Fukuoka)

【Business sites in foreign countries】

8 (United States, Singapore, China, Taiwan, The Netherlands, Germany, UK, France)

【Sales site of medical equipment】

Omron Colin

【Sales】 FY ending March 31,2010/ Consolidated)
63.4 Billion yen



Company profile of Omron (Dalian)

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1.Foundation 3rd April ,1993 (Established in 19th Dec, 1991)

2.Capital 2,390 million yen

3.CEO Mioki Masahiro *1

COO Ida Masaaki

Director Ozeki Toru *2

Inagaki Takashi *3

*1 President of Omron Matsuzaka

*2 General Manager of Omron Healthcare (China)

*3 General manager of Omron Healthcare Product Development

4.Employees 2178 as of Feb 2011

5.Site area

Land 55,000m²

- 1st Factory 24000m²

- 2nd Factory 18000m²

6.Location Song Jiang Lu, 3-hao, Dali an Economic And Technical Development Zone, Dalian, P.R.China,



Products 1 – Healthcare Equipment

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Blood pressure Monitor



Digital thermometers



Pedometers



Low-frequency therapy equipment

Products 2 Medical facilities

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“Form” for arteriosclerosis



Blood pressure monitor for Hospital
“Kentaro”



Steam Vaporizer



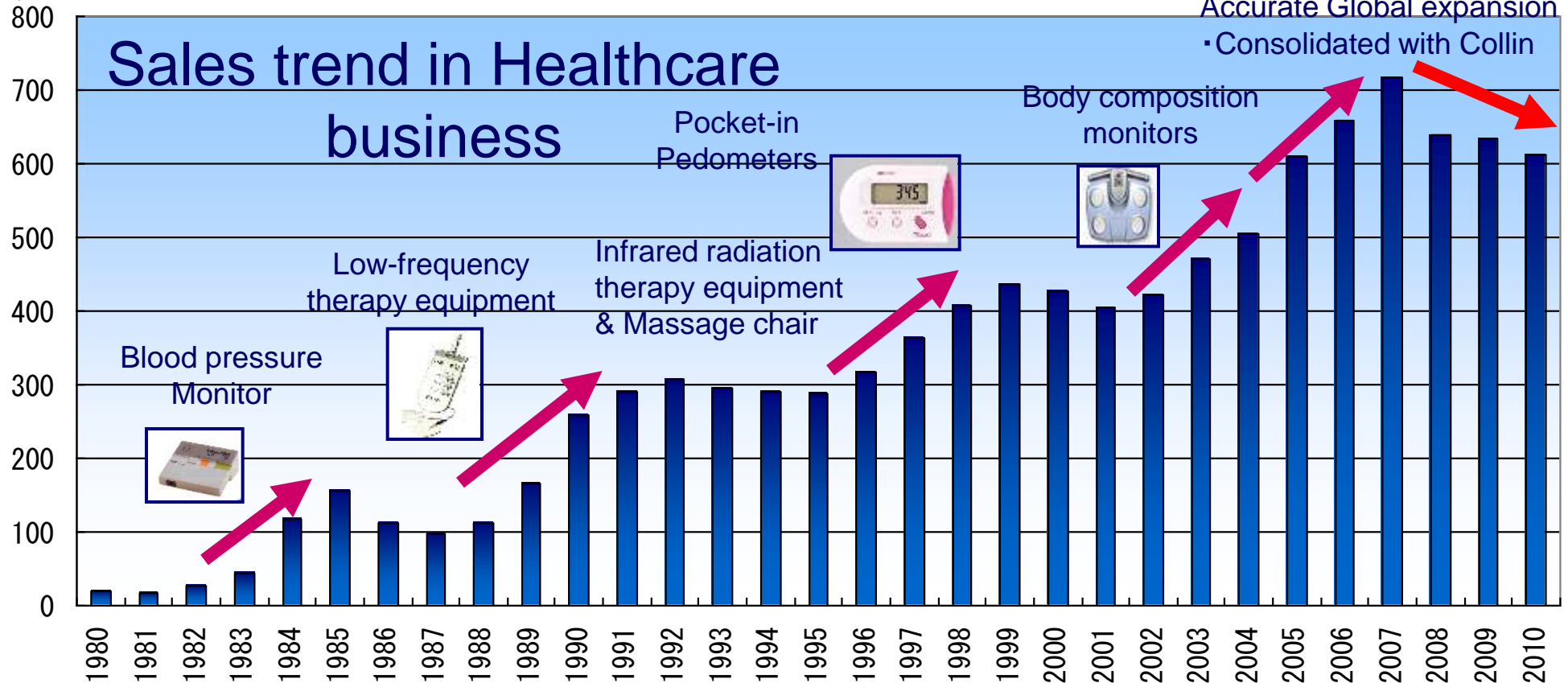
Nebulizer

OHQ has grown by creating new value

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(億円/hundred-million)

Sales trend in Healthcare business



■ 1978
HEM-77 was released as the first Home Digital Blood pressure Monitor



■ 1981年
初めての家庭用自動血圧計 (自動加圧ー減圧) HEM-68
HEM-68 was released as The first home automatic Blood pressure Monitor

(Automatic pressurization- decompress



■ 1985年
最初のオシロメトリック血圧計 HEM-700C
HEM-700C was released as The first oscillometric Blood pressure



■ 1991年
ファジィ技術最適加圧 (最高血圧を予測し加圧) HEM-706
fuzzy technology to optimize the pressure HEM-706(pressurization by estimation of maximal pressure

■ 2000年
フィットカフ HEM-770A
Fit cuff HEM-770 A was released

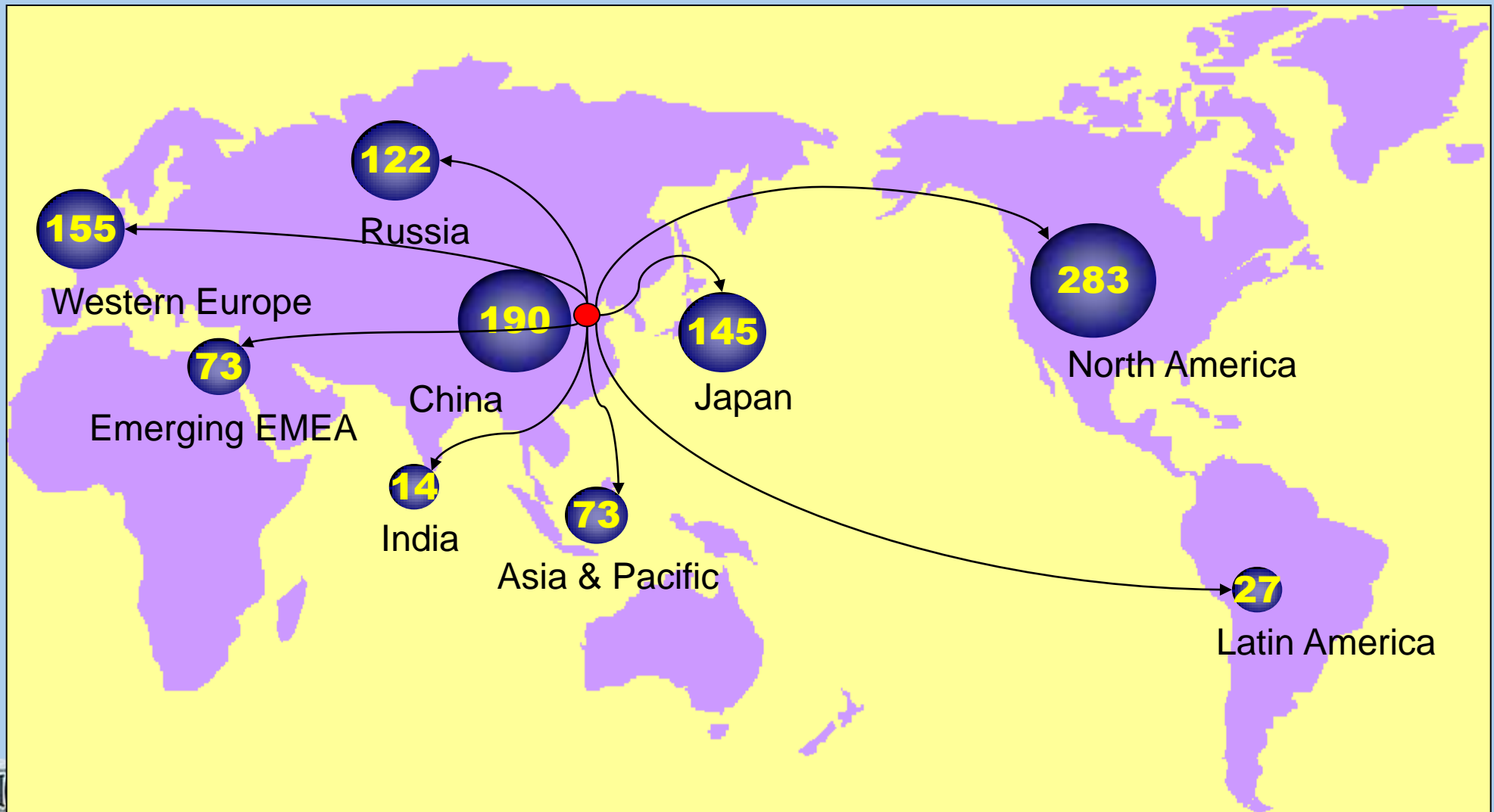
■ 2004年
家庭向け全自動上腕 HEM-1000
HEM-1000 was released which is Home automatic Blood pressure Monitor by measuring upper arms.



The number of blood pressure gauges sold in FY09 by region

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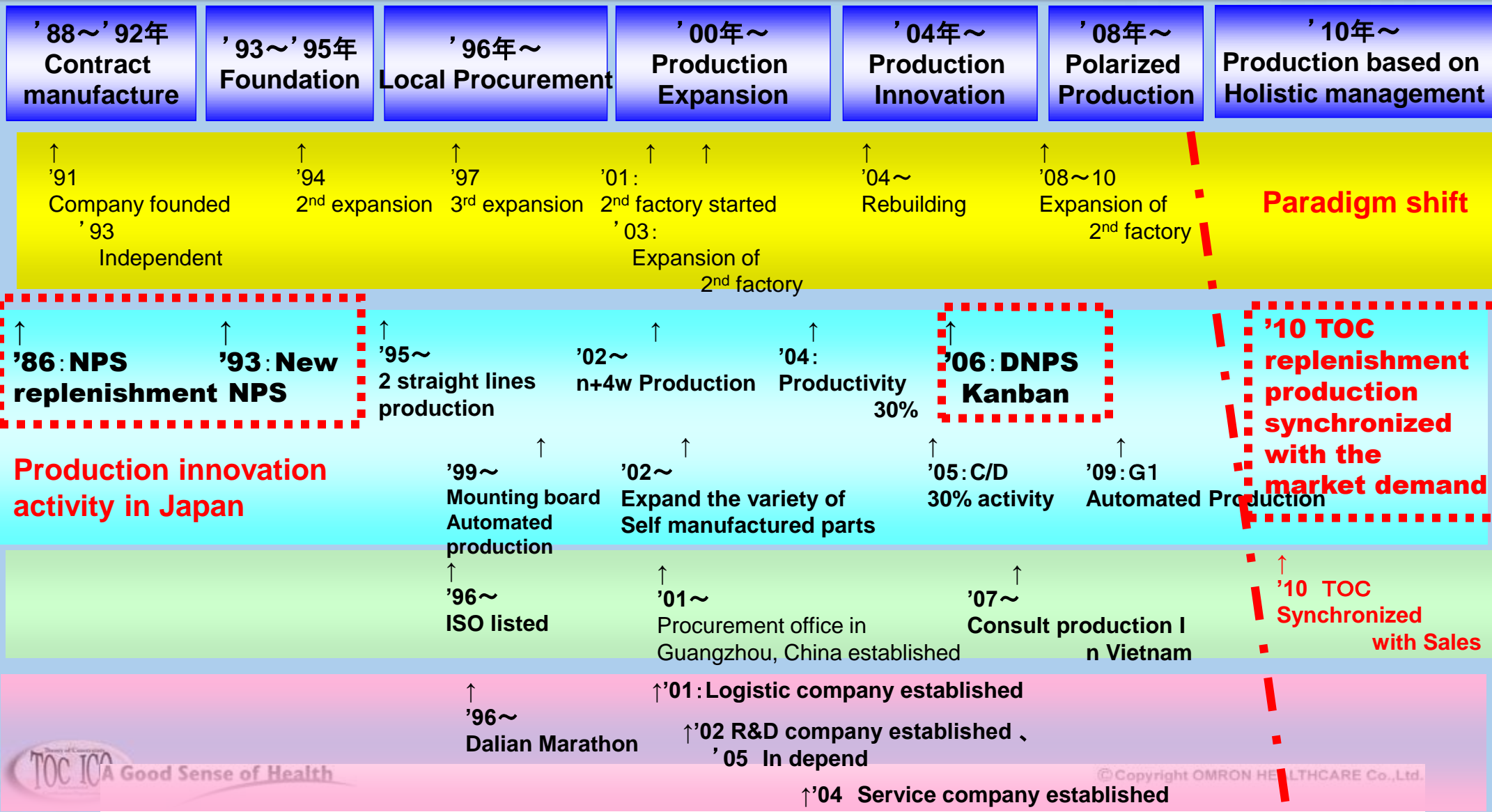
万台



History of Production innovation in OMD

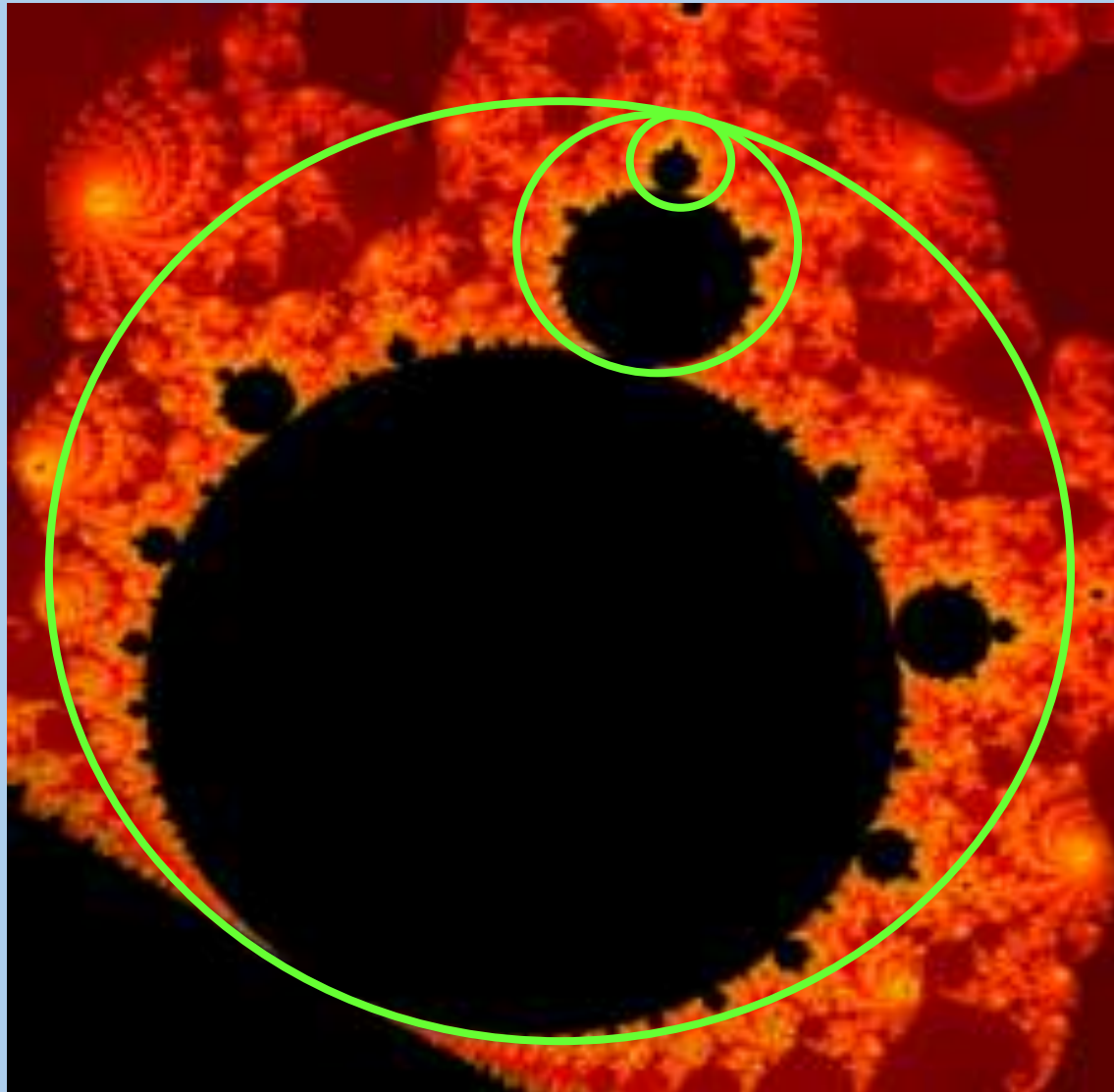
~toward the holistic management

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Fractal

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Workshop in March of 2010 (all managements attended)

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History of Production Innovation in OMD ~Toward Holistic Management

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Positive factors in Business environment surrounding OMRON

Positive Factors

- People prefer healthier life
- Demand to slow down the increase of medical related costs
- Collapsed Social Security system → Increase the consciousness of self-healthcare
- Huge potential of the emerging markets

Be a winner by strengthening the competitiveness



History of Production innovation in OMD

~Toward Holistic management

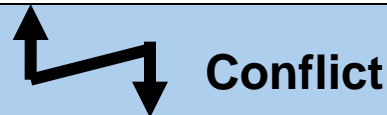
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However...

Pressure to reduce price

Competitors try to gain market share from the market leader OMRON by reducing prices. This tendency will be stronger and stronger.

Forced to enter the price competition to get SOM (Share Of Market)



Avoid price competition to get added value/ to secure the profitability

- **Are our global No.1 strategy and added value products enough to keep the current market share?**

History of Production innovation in OMD

~Toward Holistic management

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However...

Pressure of increasing product development cost

Necessity of actions to expanding emerging market

- Full-fledged development of the emerging market has just started and it is an opportunity for OMRON. It is essential to have localization and the wide selection of goods to compete in the market.

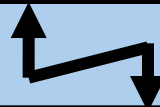
Actions to make the developed market return to its growth track again

- Develop new category
- Develop new business model

But success is uncertain.

New comers have joined from different industry

Cannot reduce development cost because we need to catch both by running after two.



Conflict

Cannot increase development cost to achieve stable profit year by year due to the time lag and the inherent uncertainty of the new business development

History of Production innovation in OMD ~Toward Holistic management

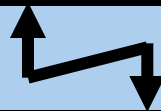
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However...

Priority to emerging market=Resource spreading in the front line

- The huge market is now revealing when the income level is rising in the emerging nations.
- The competitors must focus in this main battle field and will make a localized war.
We should assume that it is a cost war.
- The failure in this market will jeopardize the future of OHQ. We cannot lose.

Need to focus to win in the specific countries and meet the cost.



Conflict

Need to continue to win in every main country regardless of the risk of dispersion in resource and to avoid the cost competition for securing profit

History of Production innovation in OMD

~Toward Holistic management

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Sense of Crisis

- *Can we survive in this world of rapid change by the extension of current strength?*
- *Should we need to obtain a new competitive edge to survive along with the current strength?*



Establish the Decisive Competitive Edge by providing Inventory Turns (IT) when the product CE parameters (quality, performance, cost ...) remain the same.

Improve IT drastically by changing the operation from forecast driven to demand geared

<<<Reducing shortage while reducing inventory>>>

History of Production innovation in OMD

~Toward Holistic management

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The pillars of TOC “Inherent Simplicity and People are Good”

Earlier start never accelerate the completion.

The most important thing in production is to accelerate the expansion of **OMD's MTA** operation to the global operation by sharing the process after the operation become the firm and stable one.

Current operation: more than 15 weeks

Forecast
period
8 w

Demand
Plan LT
1 w

Production
Fix LT
4w

Transport
LT
1-5w

Local
delivery LT
1w

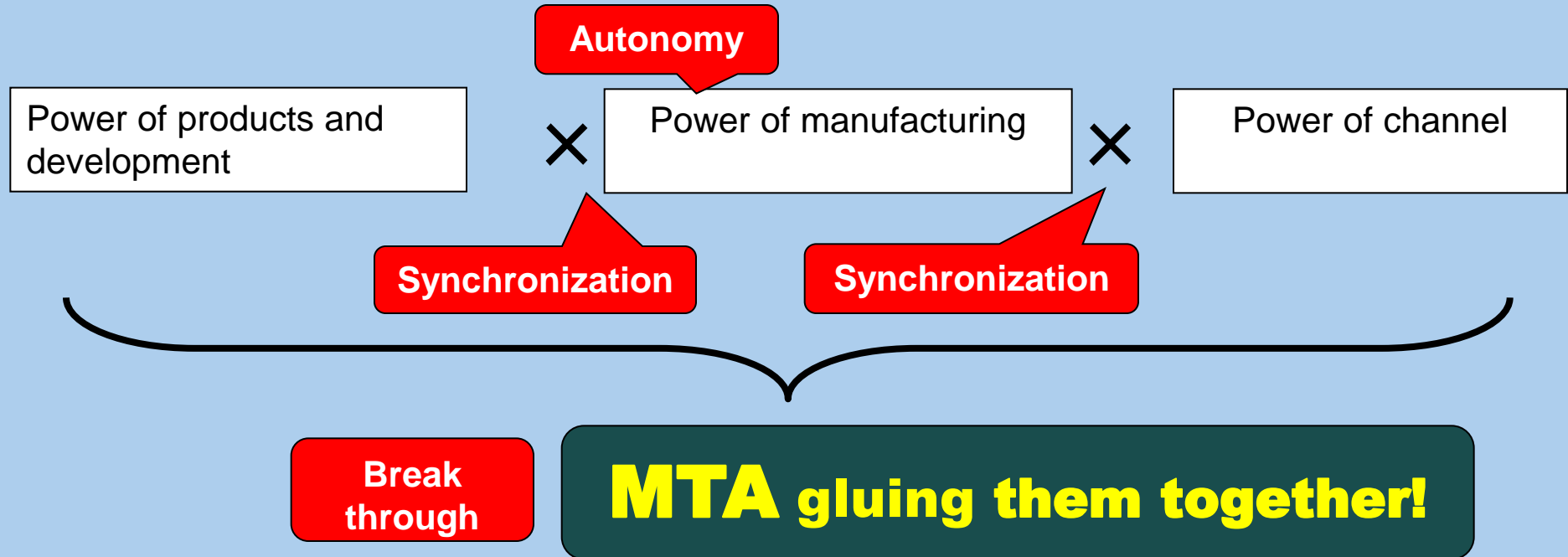
Realize Win-Win relation with client by realizing 1 week production LT and MTA with appropriate inventory in RDC.

History of Production innovation in OMD

~Toward Holistic management

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By strengthening OMD's competitive edge further, attempt to win and grow



Autonomous nerves are stretched around throughout the plant synchronized with the market!

How do we realize MTA?

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MTA is replenishment production same as TPS(=ONPS) yet....

OMD has continued to increase productivity by applying IE Kaizen. We learned TPS and implemented it.

It was named DNPS(Dalian New Production System)that had been implemented based on ONPS (Omron New Production System) However , the final target “n + 1 (1week confirmed order => production)” had not been achieved.



By learning TOC, L/T reduction has been tried again with **MTA**.

The biggest difference is that OMD started synchronized with sales, this time. And that MTA to RDC in Japan has been started without the special preparations such as production Gemba improvement, LT negotiation with parts supplier and setting safety parts inventory.

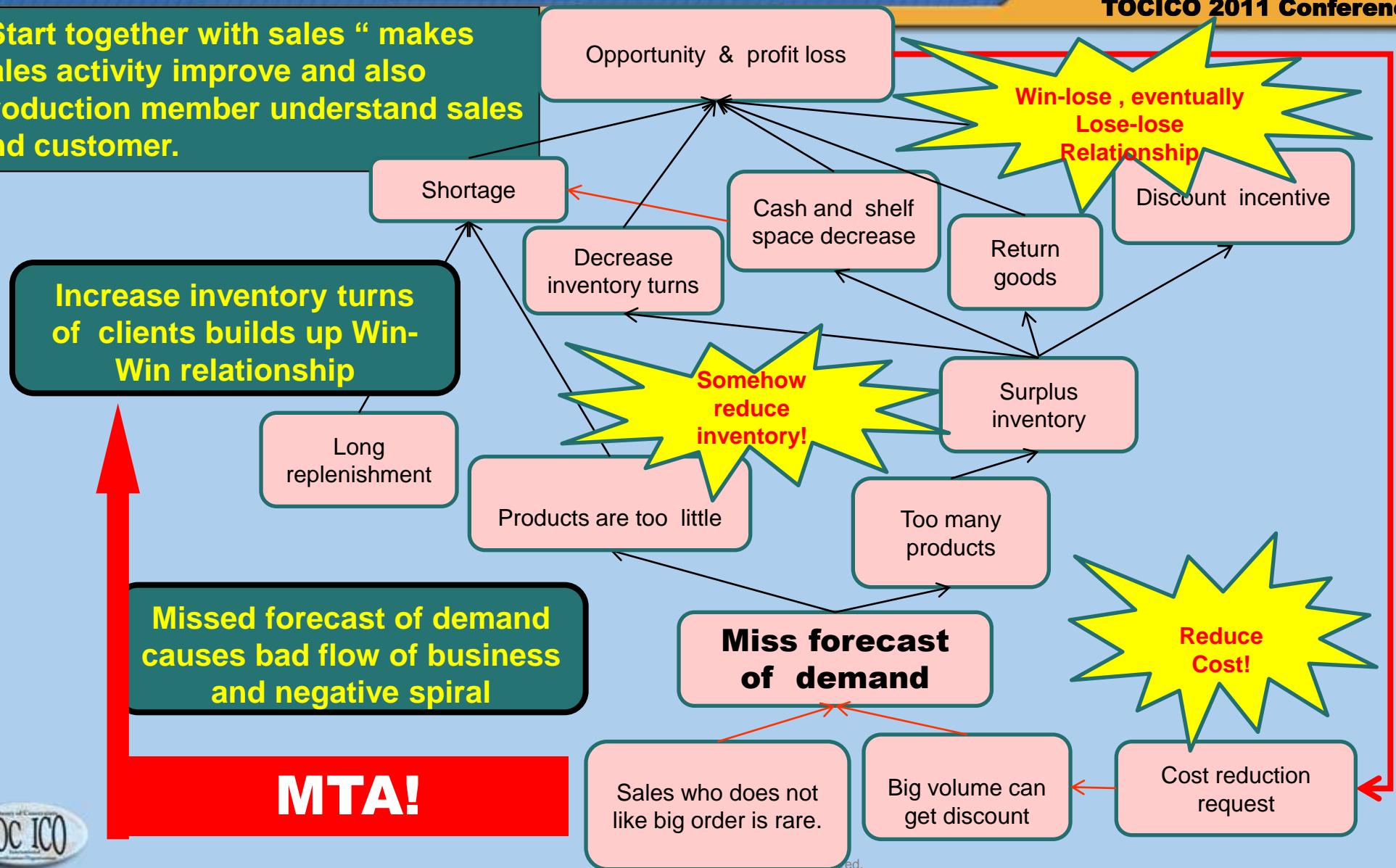
The only way to avoid risk is “to experiment with only limited SKU’s”.

Activity started with ignoring parts procurement preparation was naturally resisted by almost all members.

Activity for demand driven replenishment production.

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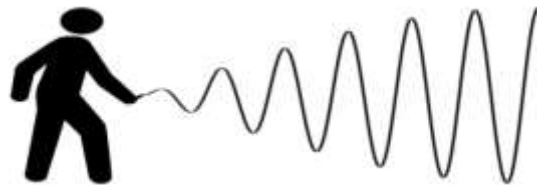
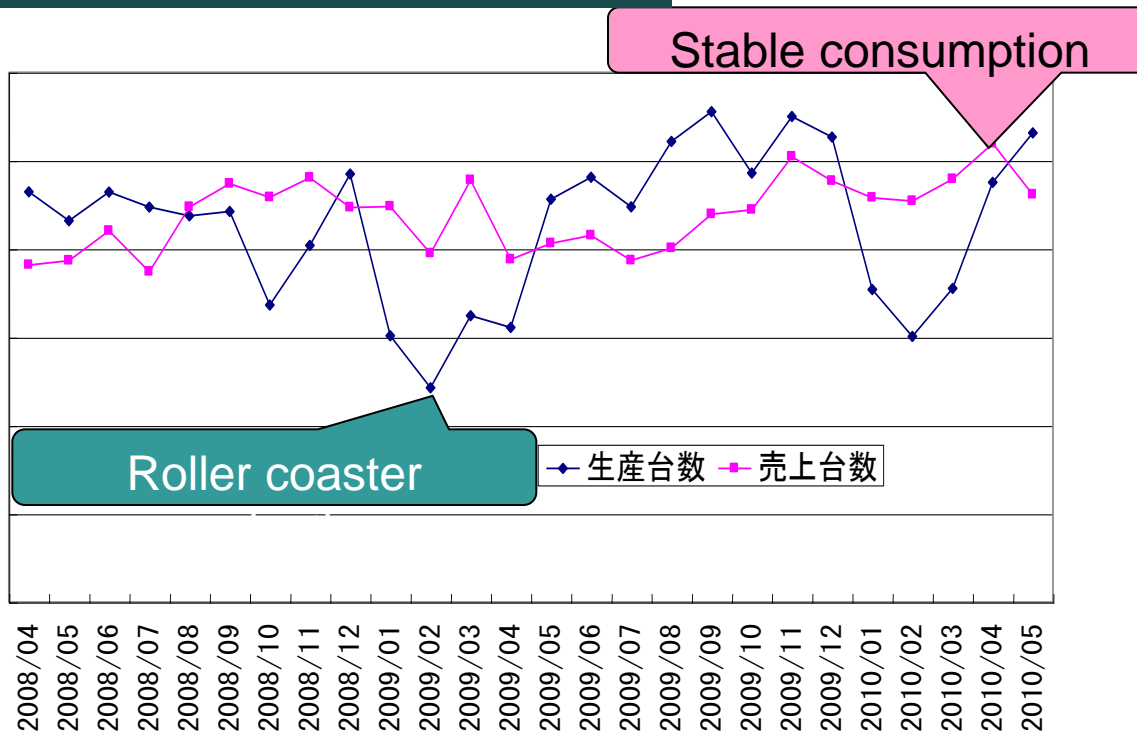
“Start together with sales “ makes sales activity improve and also production member understand sales and customer.



Activity for demand driven replenishment production.

Reality of production (Before) -> **Local efficiency amplified the wave swing (Bullwhip effect)**

BPM Production/Consumption



Goods order from sales

Want to reduce stock at year end
Want not to waste sales chance
So I need a lot of stock at year beginning
Creates order fluctuation

Parts order from OMD

Parts supplier suffer even bigger fluctuation by forecast base order from factory

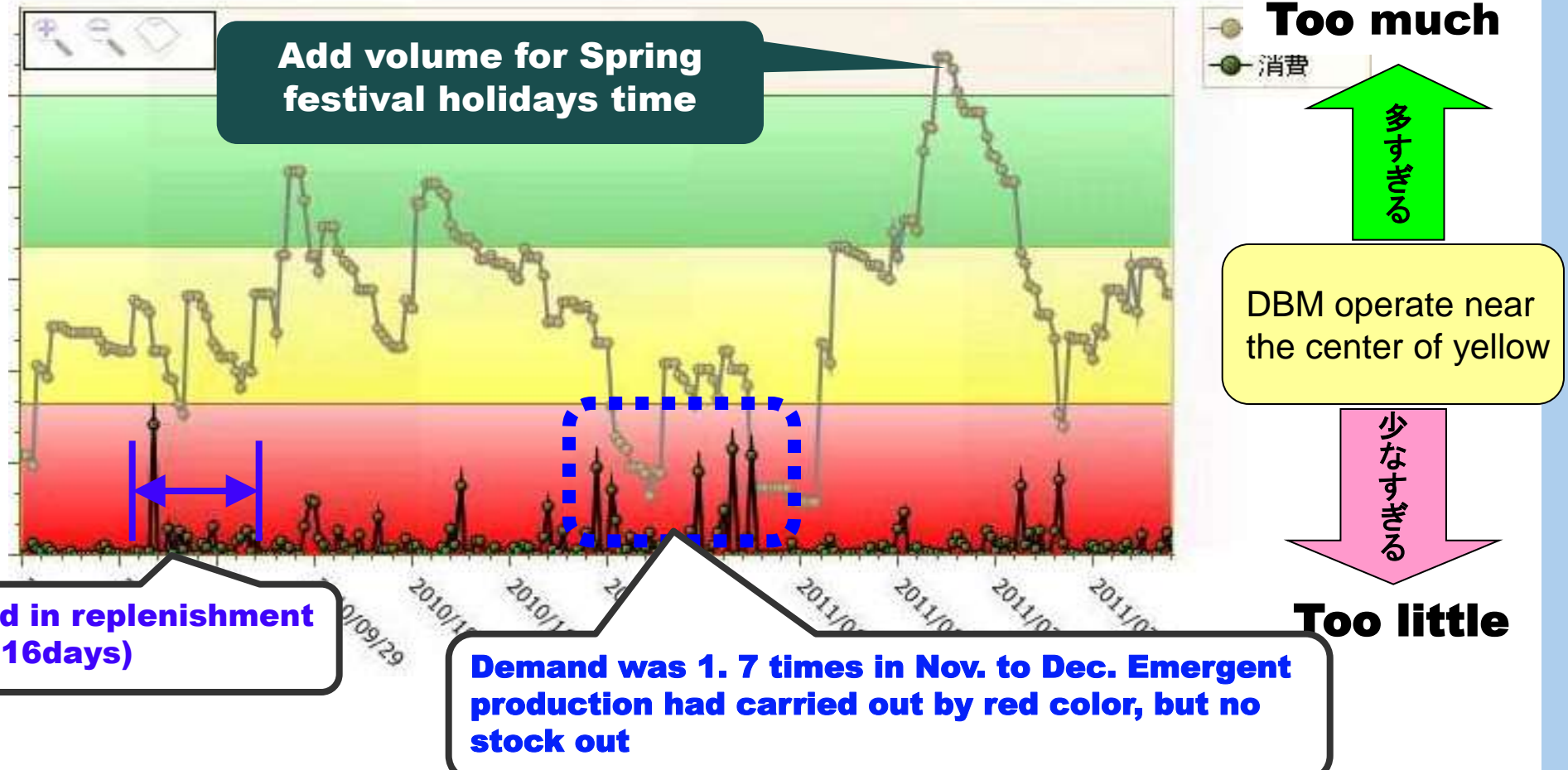
MTA example

Inventory control by DBM

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The initial inventory target for each SKU is set to be equal to "maximum demand" within reliable replenishment lead time ($\text{Order L/T} + \text{Production L/T} + \text{Supply L/T}$)

SKU: 19543, HEM-1000

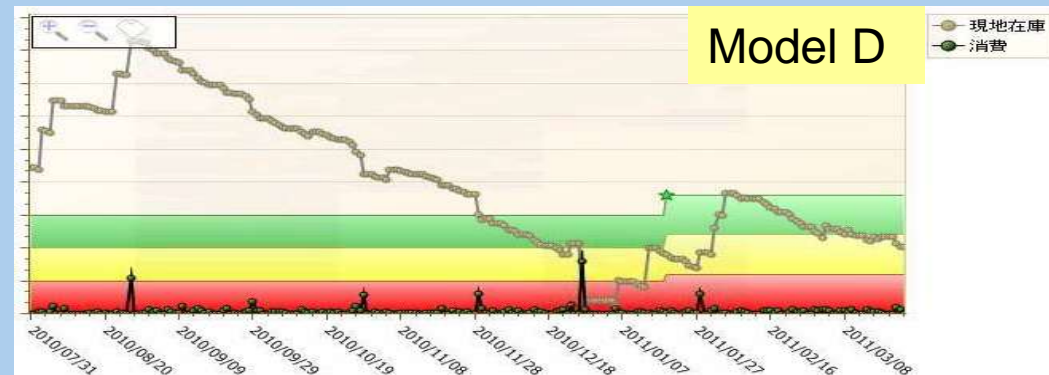
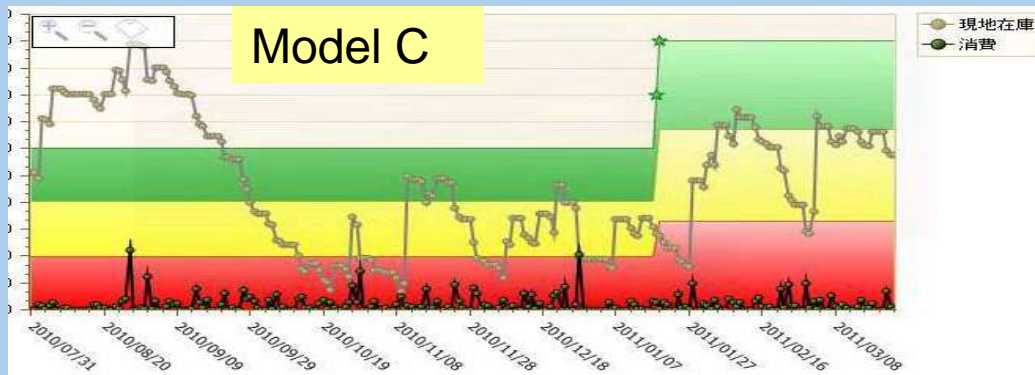
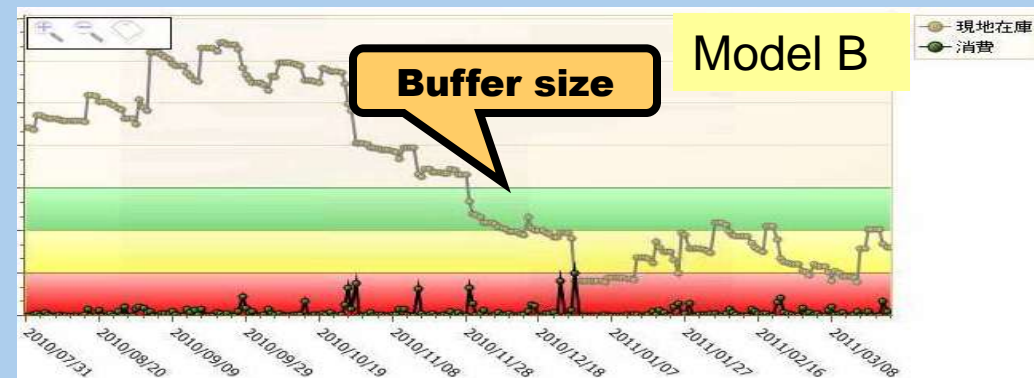
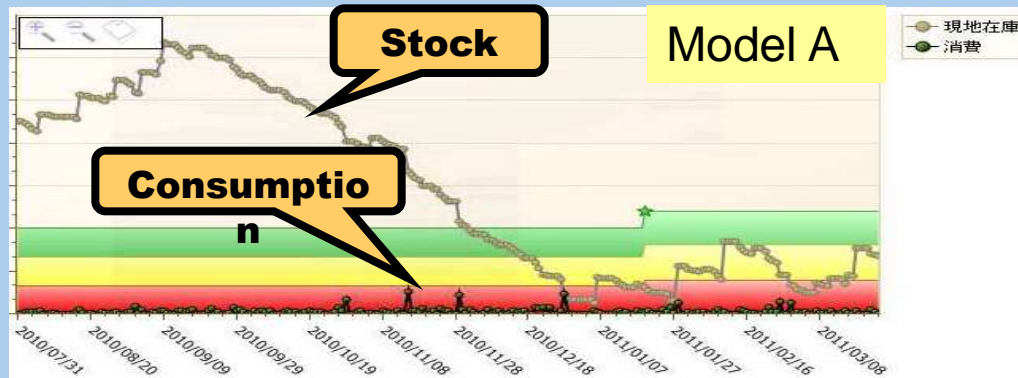


MTA example

Inventory control by DBM

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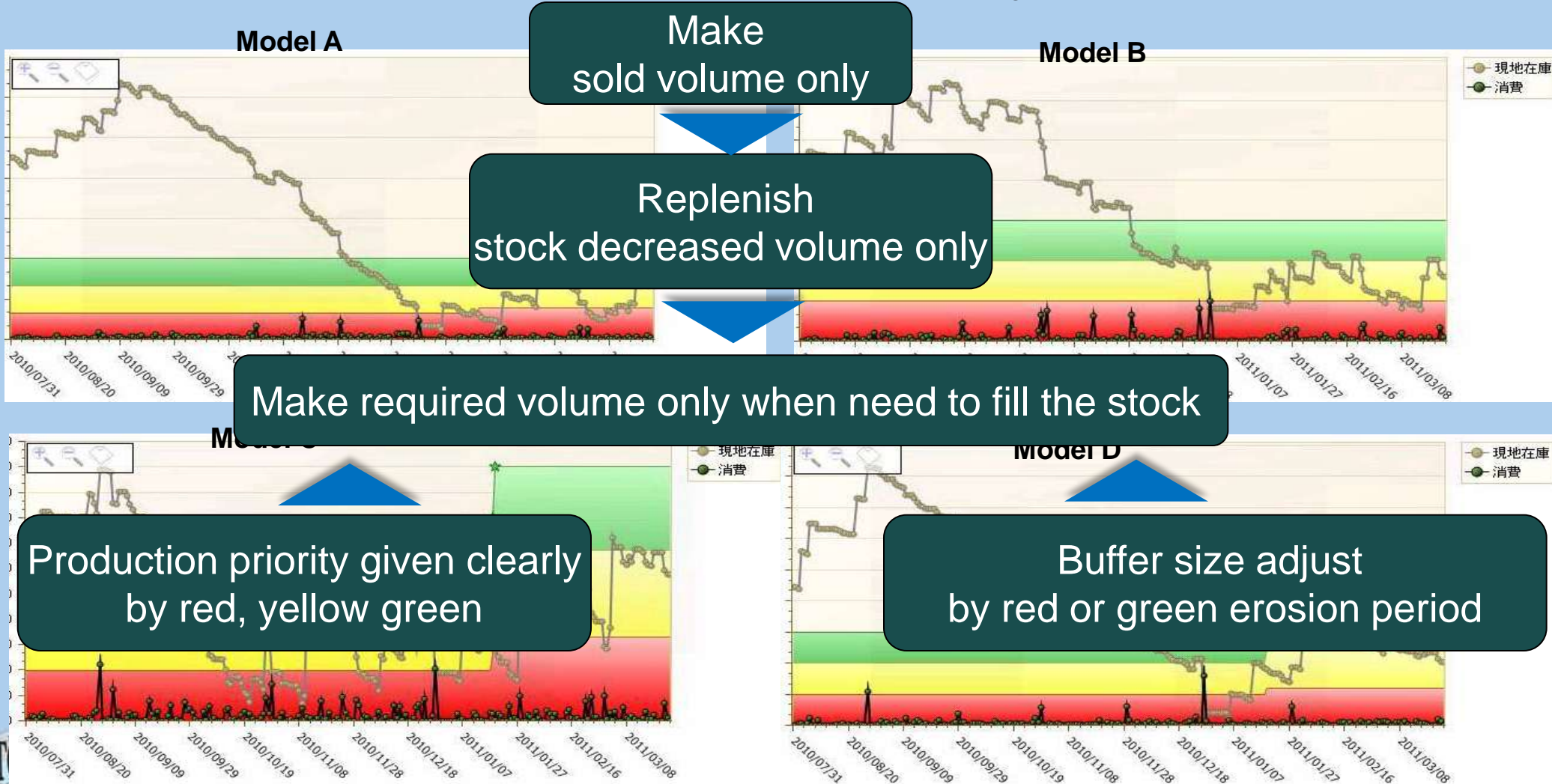


MTA

Inventory control by DBM

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- The first step of MTA is “not to make”, because of excess stock in regional WH.



MTA

Test result in PoC (Proof of Concept)

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To realize simplified & high turn operation ... Execute MTA
Replenish consumed volume quickly only when consumed

Item	POC result expected
Inventory	Finish good inventory: Average 40% less (Japan:10 models, China:4 models)
L/T	Replenishment L/T: 13 weeks -> 1 week

Item	Additional expectation
Reduce chance loss caused by stock out	Stock out ratio below 0.1% at each WP(Regional Sales HQ)

Serious material & parts shortage

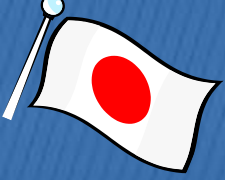
NOT the time to produce based on planned schedule

TOP urgent to make only necessary goods based on consumption

Good time to expand MTA production at a burst

All models (32) for Japanese market switch to replenishment production between March 14th (the next working day of earthquake) to March 28th.

All models (13) for Chinese market will switch to replenishment production in the week of April 5th.



Project Japan

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Setting model of
Japan revival

Amazing revival
in spite of earthquake

Increase profit drastically

Able to make products
Which are needed now

Don't produce
products which are
not needed now

Identify products
Which are needed now

Surplus of
components

Increase components
supply

INJ
Determine proper
inventory target

Sales can sustain
100 days in average

Important !

Air Entity
Over 100 days
Finish goods inventory

There are no
damage plants

W.A.
TOC can increase capacity
With short duration

"I am pleased that I don't need instruction for OMD due that OMD is simply replenishing to JPN market as HQ direction. I really appreciate TOC and we are so lucky that our main factory is being TOC world."
Said Mr Imakita, General manager of corporate planning

"I am very proud that our material availability concern is seems to be solved. OHQ will maintain regular production from now and into future."
Said two weeks after earthquake attach. Mr Mioki

Wrong

P-UDE
Sales decrease

Stop the production

Component shortage

Creditability of suppliers
Up worldwide

Recovery can be done
In short duration

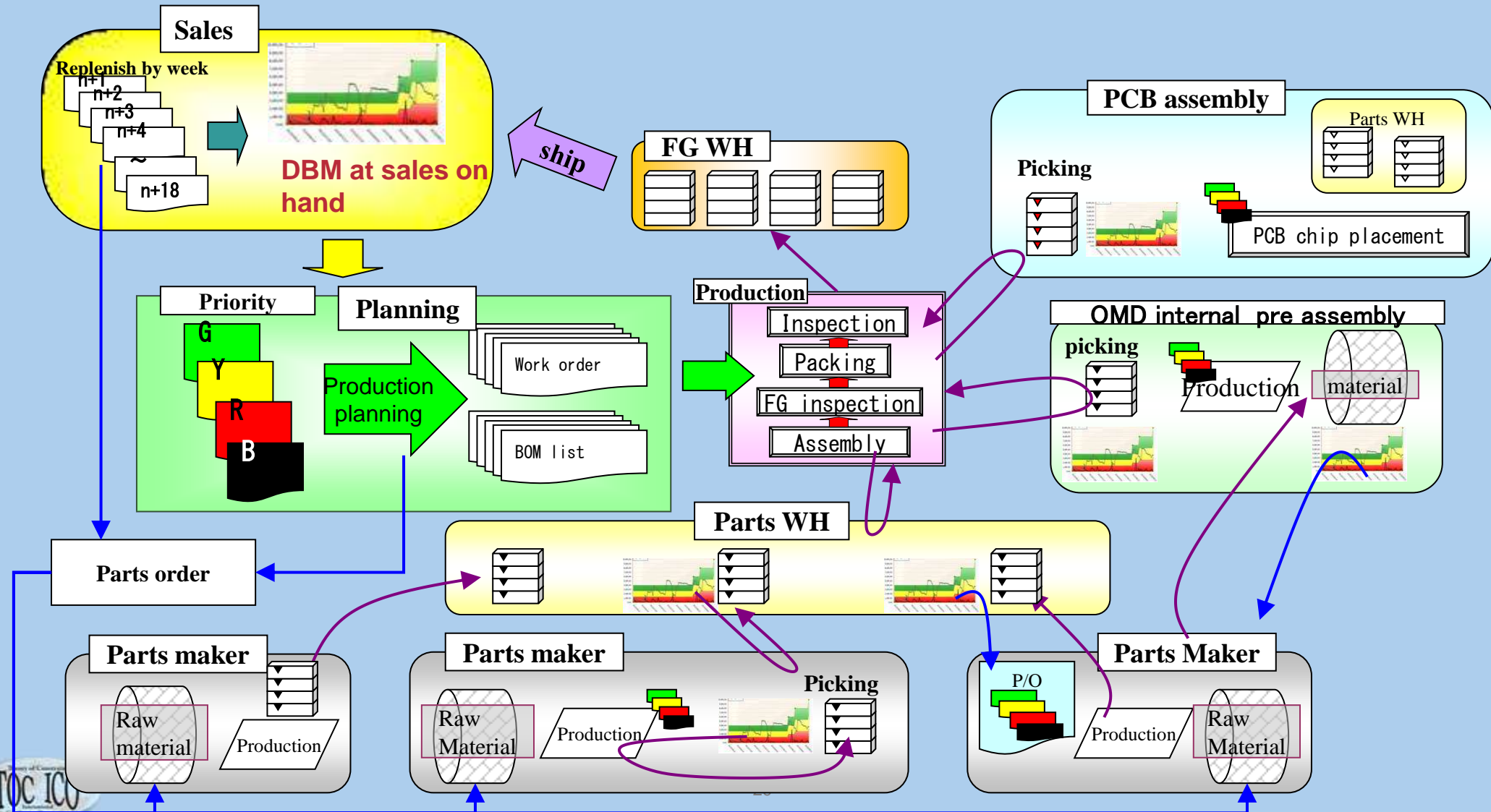
Damaged plant

W.A.
TOC can make
product shooter

MTA

Logistic completion image from order ~ production ~ delivery

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Changing the way of thinking rather than changing the way of production brought result

Our aim is to produce product only to be sold.

As a result, production is leveled and the buffer is created

Because of that, market is leveled.

Also, production can correspond to spiked demand

Sufficient buffer is created as a result.

In fact, leveled production will create smooth relationship

between us and Supplier under WIN-WIN relationship

MTA

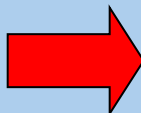
Parts MTA began from December, 2010 with one supplier (POC base)

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■ Sharing problem from K corp,(molding) MTA POC

** Leveled OMD production improves fluctuation on supplier site*

Leveled OMD production



MTA from supplier

Order is important!!

(MRP order⇒ MTA)

Phenomenon	Problem at K corp,	Action
PO is larger than real consumption	Big variation of order	Order will be leveled due to leveled OMD production
	Material may not be ready due to long L/T	L/T is needed to be adjusted for anticipating long LT(from JPN)
Batch order	Batch order kills DBM concept due that all order is way too big	OMD RTC operation=> leveled production > Order will be spirited into small size
	Urgent order won't fit for regular shipment	

The concerns to the part ended in the groundless fear!

Activity for demand driven replenishment production

The parts manufacturer faces following dilemma....

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Corresponding cost reduction request

Wish to increase profit
from today to the future
So that...

Increase Price

*Willing Big order (batch production)
Long term and accurate forecast
Deep valley and a high mountain
in the order
Increase long term inventory*

*Partnership declines
Difficult reaching business closing
May drop from preferred supplier list*

Declining profitability

Drop sales in long-term

Development of partnership



Application sample

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Work order board for production replenishment



Replenishment for fabricated pieces



Replenishment for PCB board



Replenishment by suppliers



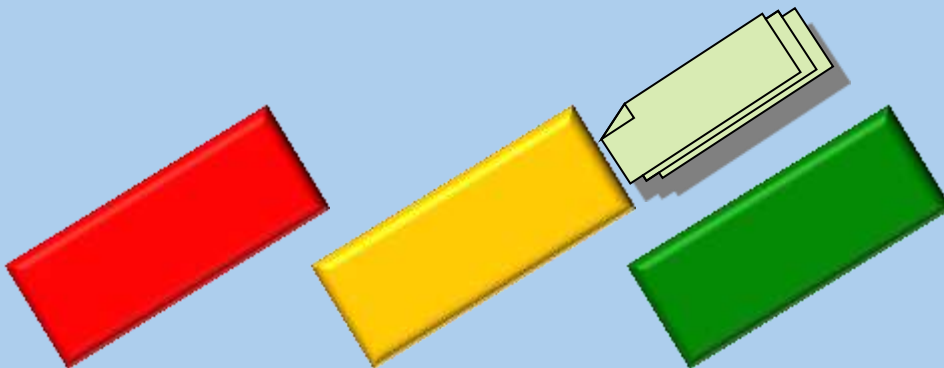
Application sample

Before(2010 Sep)

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Work order placed in color box according to priority.

Also, work order slip can be relocated by priority change.



Sales URO (UnRefusable Offer Workshop)

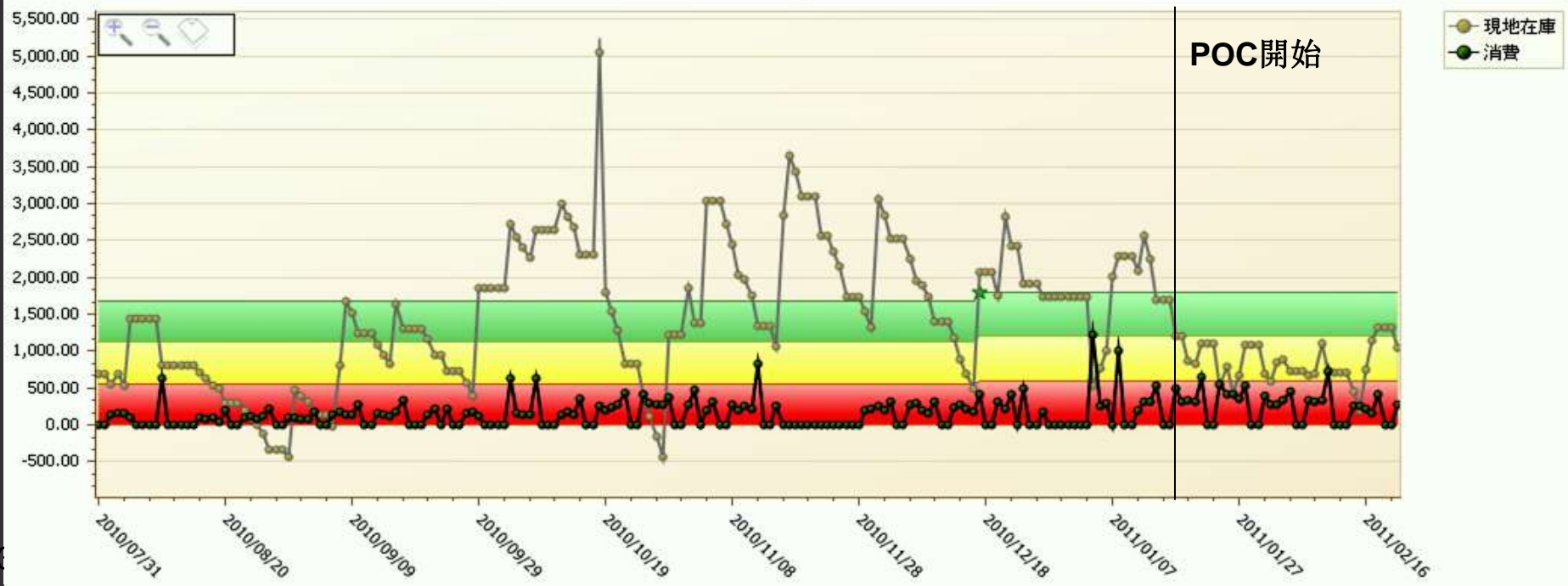
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Example of inventory reduction of one of the largest drug chain store

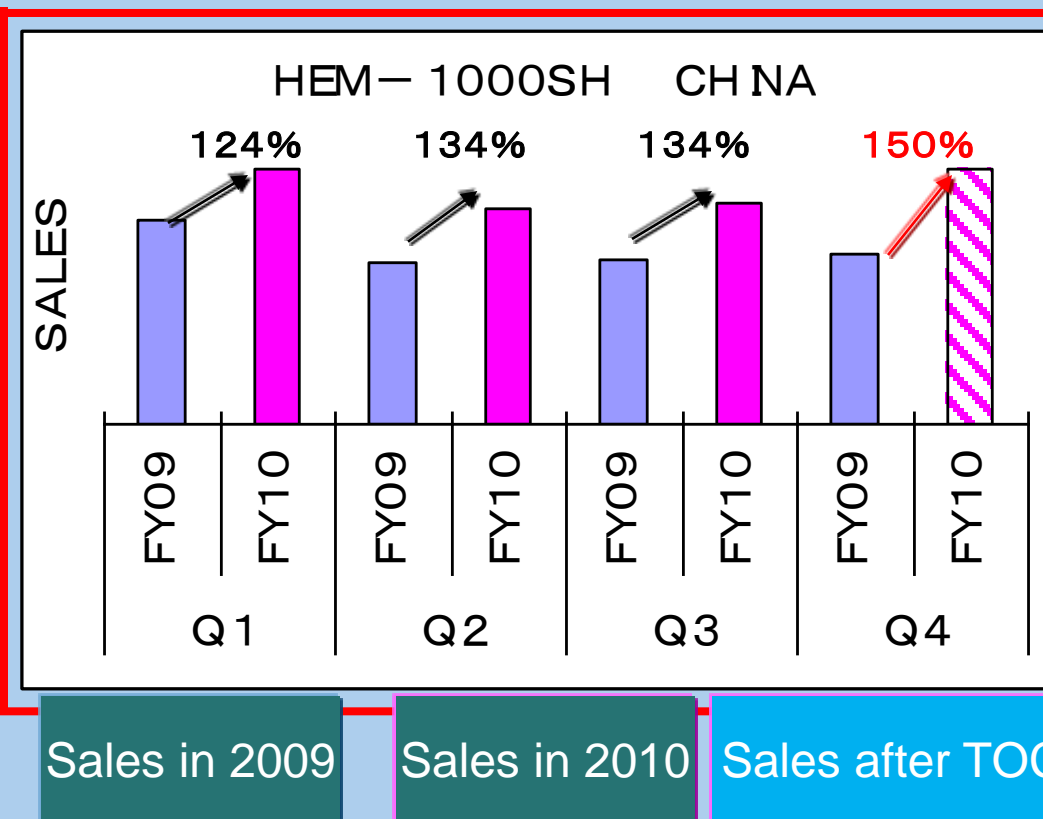
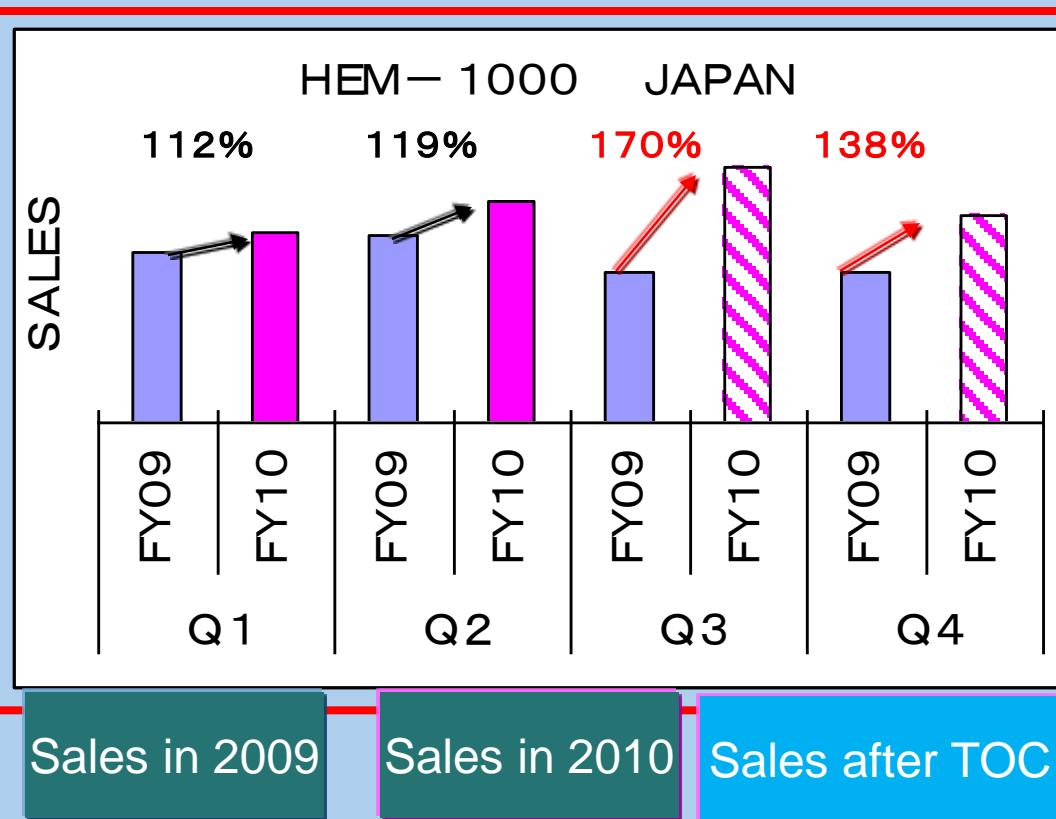
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	Average stock	MAX stock	MIN stock
Before POC (11/1-1/16)	2,001	3,647	491
After POC (1/17-2/21)	865	1,328	190



Sales increased by demand driven replenishment production

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New Product Development

CCPM work shop was held with 120 participants

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PoC for R&D in 2010 <CCPM>

More than 400 project was being choked with right priority
By involving bottom to TOP management

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The image displays four screenshots of a project portfolio management software interface. Each screenshot shows a grid of projects with columns for project ID, name, status, and other metrics. The projects are organized into sections, with some rows highlighted in green. The interface includes a sidebar on the left with navigation options and a top header with tabs for different views. The data is presented in a structured, tabular format, allowing for detailed analysis of the project portfolio.

(39/48)

WellnessLink business model

With the technology of '24 hours monitoring system for human's lifestyle' and 'the technology for preventing disease risk' The new added values are created.

Monitoring technology



WellnessLINK.



Accumulate the data
(Wellness Link)
Find the evidence

"At work for a better life, a better world for all"

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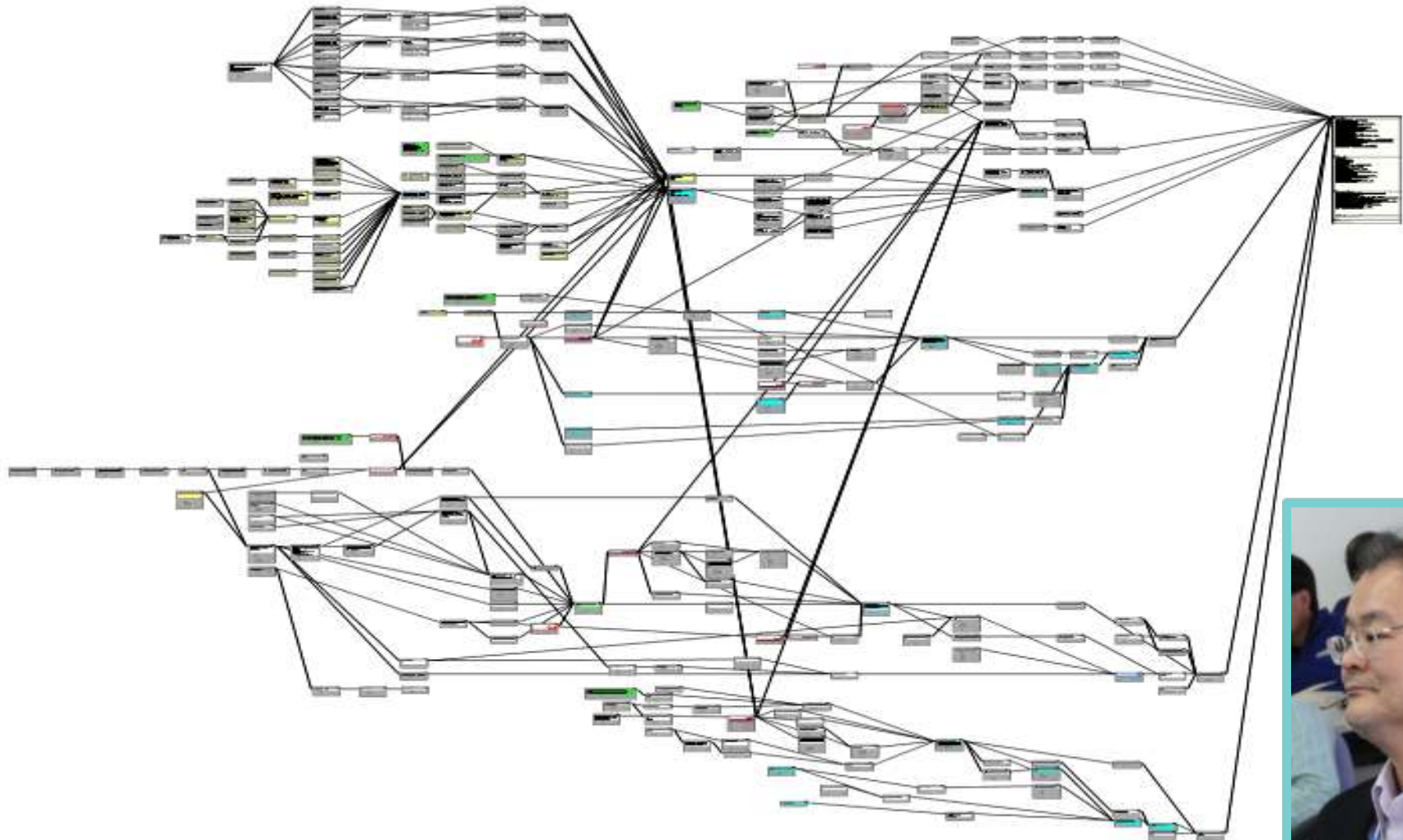
Technology for preventing
disease risk

behavior science + Medicine



PoC for R&D in 2010 <CCPM>

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Comments from R&D department leaders

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- Project was real tough situation (almost impossible to meet due date). Yet CCPM accelerated cooperation each other at right timing by improved communication.
- If we don't conduct CCPM, we might not keep the due date by poor preparations, poor communication and misunderstanding each other.
- Using this experience, we want to use CCPM from the begging with green buffer with full kit preparation.

<Mr. Tada, manager of product development.>



Comment of the experienced engineer

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Experienced project manager understand meaning/purpose of each task based on leanings and failures. Various experiences make it possible to make proper decision from different angles. And they know how to motivate people and sense people's feeling from their behaviors in the project where they need other people's cooperation.

This kind of "implicit knowledge" was difficult to transfer to younger generation since it is difficult to verbalize it to the essence. I thought the only way to transfer it was to work together with young people for years. (We learned project management like that way

However, I was amazed that young people can learn all develop project process just in a half day like real experience in end to front planning. The CCPM group discussion involving experienced project managers made it possible to transfer "implicit knowledge" to younger generation with explicit knowledge. It's just amazing.



Mr. Nishina - Fellow of Development

Production capacity up activity

Blood pressure production line case study

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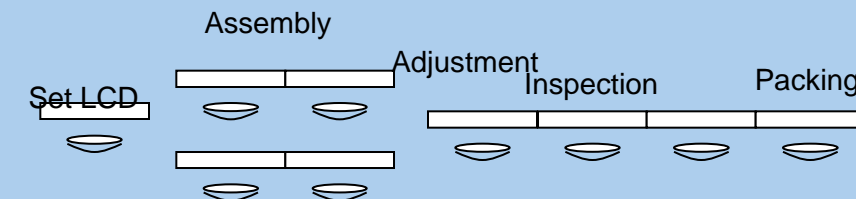
OMD had been focusing on maximizing production efficiency however, this time;

⇒ Only focus on CCR and concentrate exploiting CCR

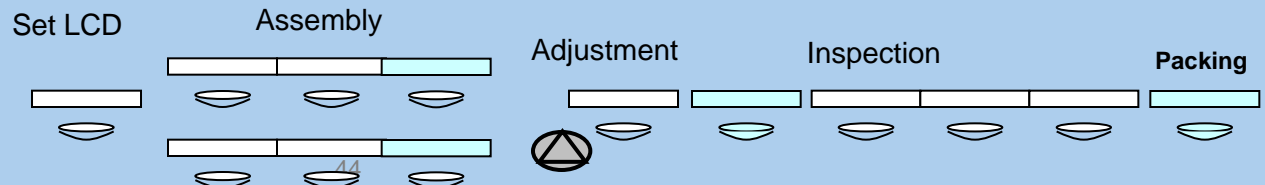
⇒ Capacity was increased **up to 60% within 6days**

description	From	to
Production capacity / line	530/8hr	830/8hr (60% up)
Headcount	9	13
Floor space	4.5m × 5.8m=26sqm TTL: 700sqm	4.5m × 7=31.5sqm TTL: 700sqm (inclusive walk way)
Cycle time	0.86min / unit	0.54min / unit

Line layout (~ July/ 23rd)



Line layout(July / 30th ~)



Activity to Increase production capacity

Case study of focusing constraint between IE and TOC

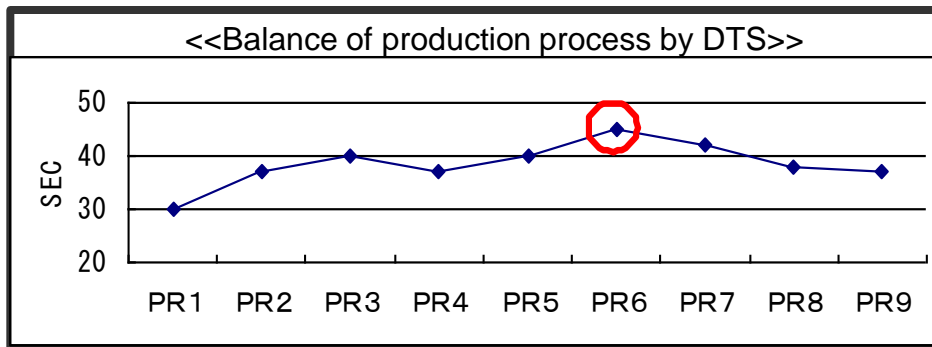
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9-person production line with a bottleneck
(CCR) of 45 sec tact time

Production output per day would be
 $(8h \times 60min \times 60sec) / 45sec = 640 \text{ sets} / 8h$

Is this reality? Probably not!!

Actual figure must be around 530 sets, correct?



Identify constraint

Exploit constraint

Put WIP before CCR, and exploit CCR
then ,Get much closer to 640 sets

Subordinate everything else to constraint

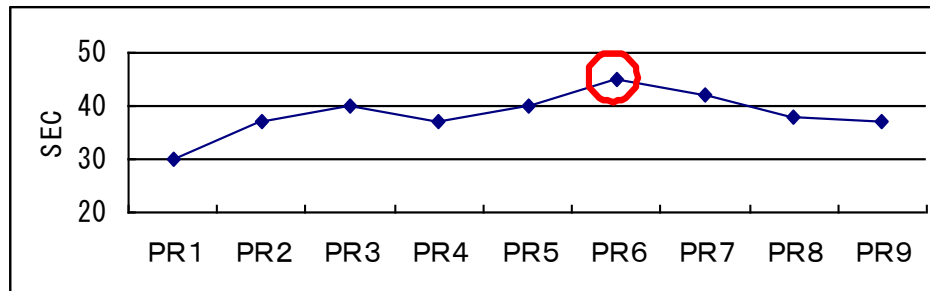
Fix CCR, align two more persons to the line

Activity to Increase production capacity

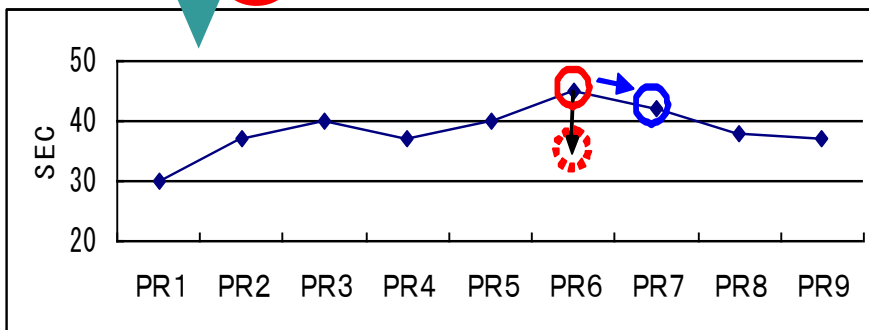
Case study of focusing constraint between IE and TOC

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Balance of production process by DTS

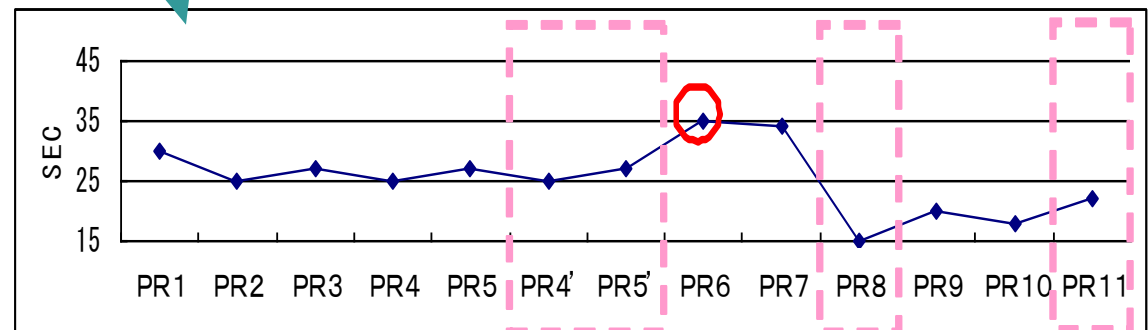


CCR moves and line tact changes to 42 sec -> 680sets / 8h



Improve bottleneck

Add worker in process for avoid jumping CCR. Capacity increases to 830sets/8h when CCR is controlled to 34sec.



Fix constraint for on-going improvement

Difference to IE approach

Difference between IE KAIZEN and improvement with TOC

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Improvement by TOC--- produce only to consumption ➤ ***Throughput increase***



IE Kaizen – Targeted on productivity improvement ➤ ***Improve balance of whole processes***

Queue
Apply TOC

Replenishment LT

Motion
Apply IE Kaizen

Waiting Time

Touch Time

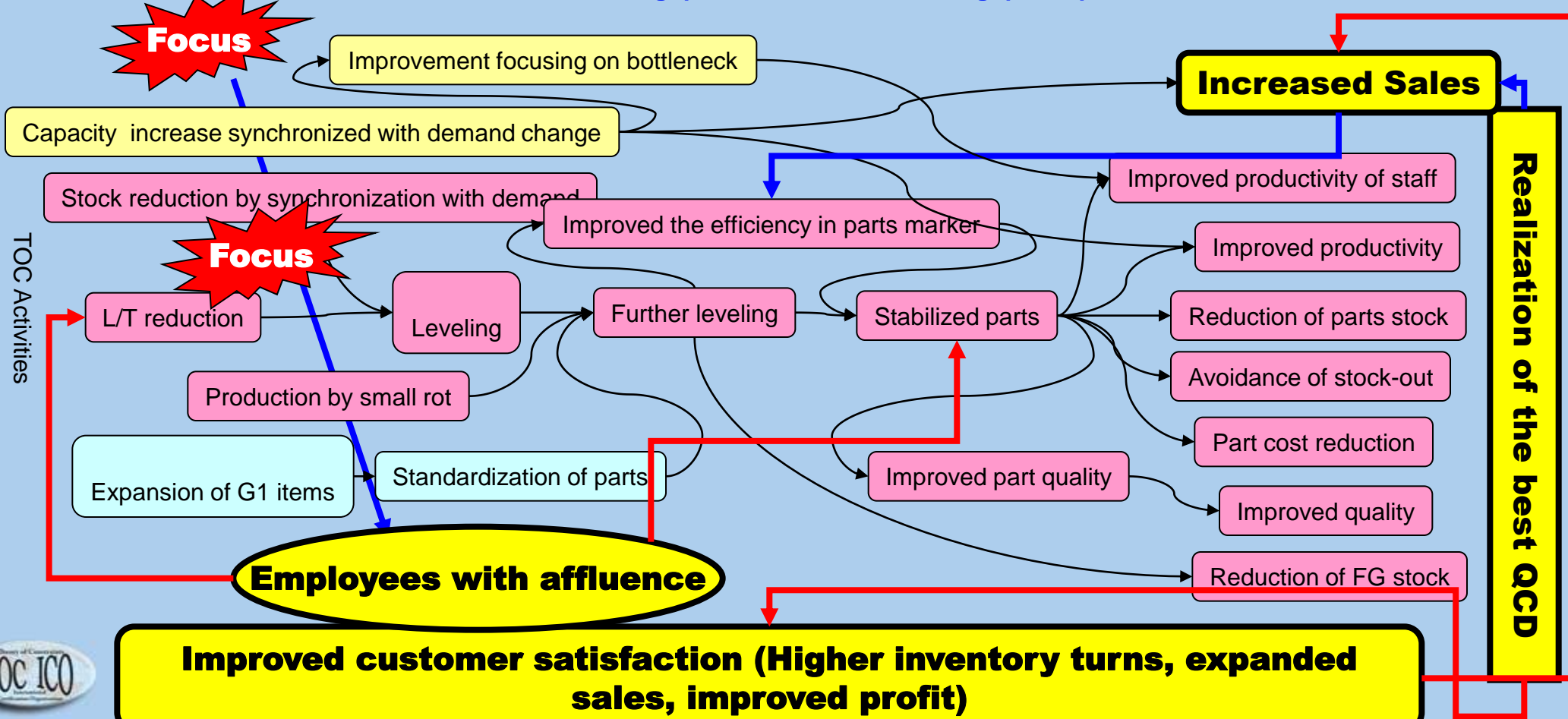
TOC armed IE

What assumptions have we changed?

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- Synchronization with market creates true customer satisfaction and leads business expansion.. In addition, it creates Win-Win relationship with supplier.
- Modulation (Standardization) of items further creates value (Statistical aggregation effect)

L/T reduction that aimed for maximization of client throughput also maximizes throughput in plant



What assumptions have we changed?

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TOC is “connection”

(There is little change in the way we produce).

“Connection” means:

- **Connection among supplier, production and market.**
- **Connection among sales, production and development**
- **And connection from past experience to future**

What assumptions have we changed?

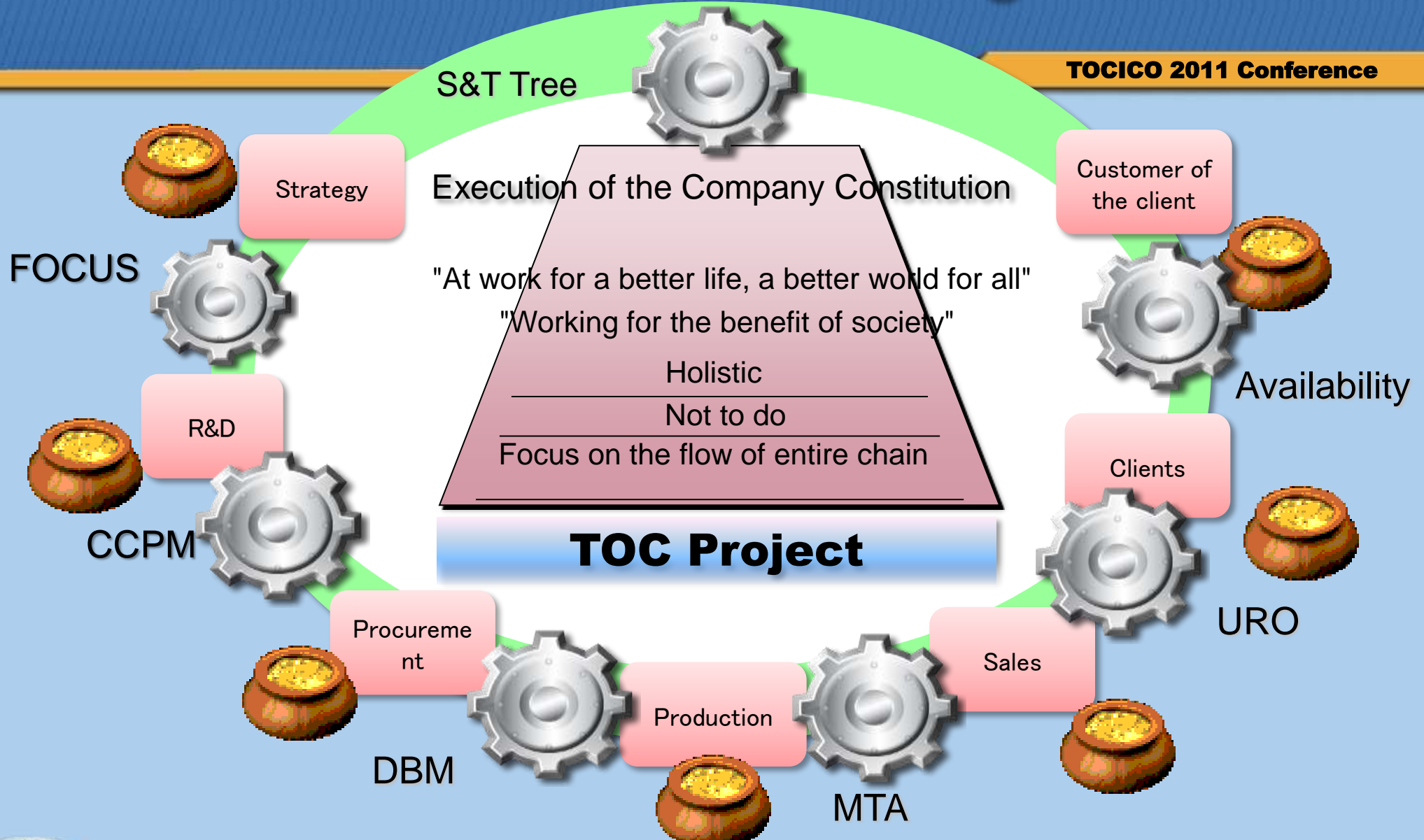
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The difference between past activities and TOC is that we changed

FROM	TO
Drive efficiency improvement in ALL tasks	Activities focusing on CCR by looking at whole system
Productivity improvement in each task contributes the improvement as a whole (which is the source of profit)	No change will happen unless we deal with CCR (Don't touch anything except CCR) Capacity control on the bottleneck affects profitability.
Batch production costs less.	Batch production costs more because it prevents production leveling and creates more works and more inventories.
If we start production early, we'll have better chance to meet demand.	Touch-time is very small fraction of whole L/T. Therefore, we follow the demand by starting as late as possible. (This is of course true for MTA, and more true for MTO).
If we ship early, we'll have better chance not to stock-out.	Stock-out will be avoided by having stock at centralized place. (Statistical aggregation effect)
Forecast precisely and manage the actual performance.	Market (world) changes. Therefore, forecast is not a reality. It is inevitable to flexibly follow the reality.
Planned production based on forecast	Production replenishment based on consumption

Be Ever Flourishing

TOCICO 2011 Conference



"With TOC, we connect"

**It is not Gemba to be changed,
it is management to be
changed.**

**If management changes,
Gemba will change.**