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New Approach to Management Accounting for Process Industries with Mathematical Programming

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Contents



1. From SCM to **RPM**
2. **Cost Planning** for Process Industries
3. Management Accounting for Process Industries(**Profit-and-loss simulation**)

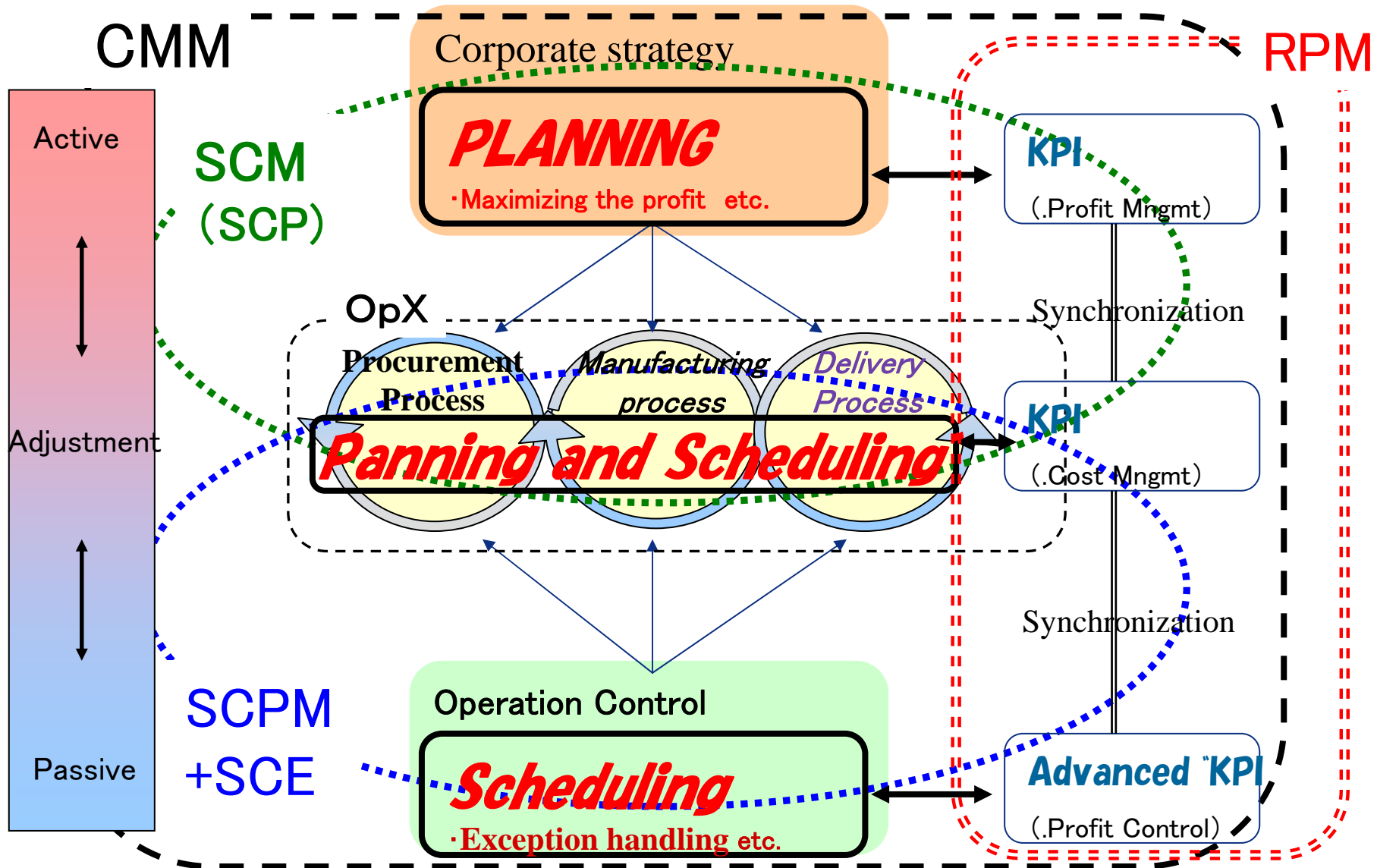


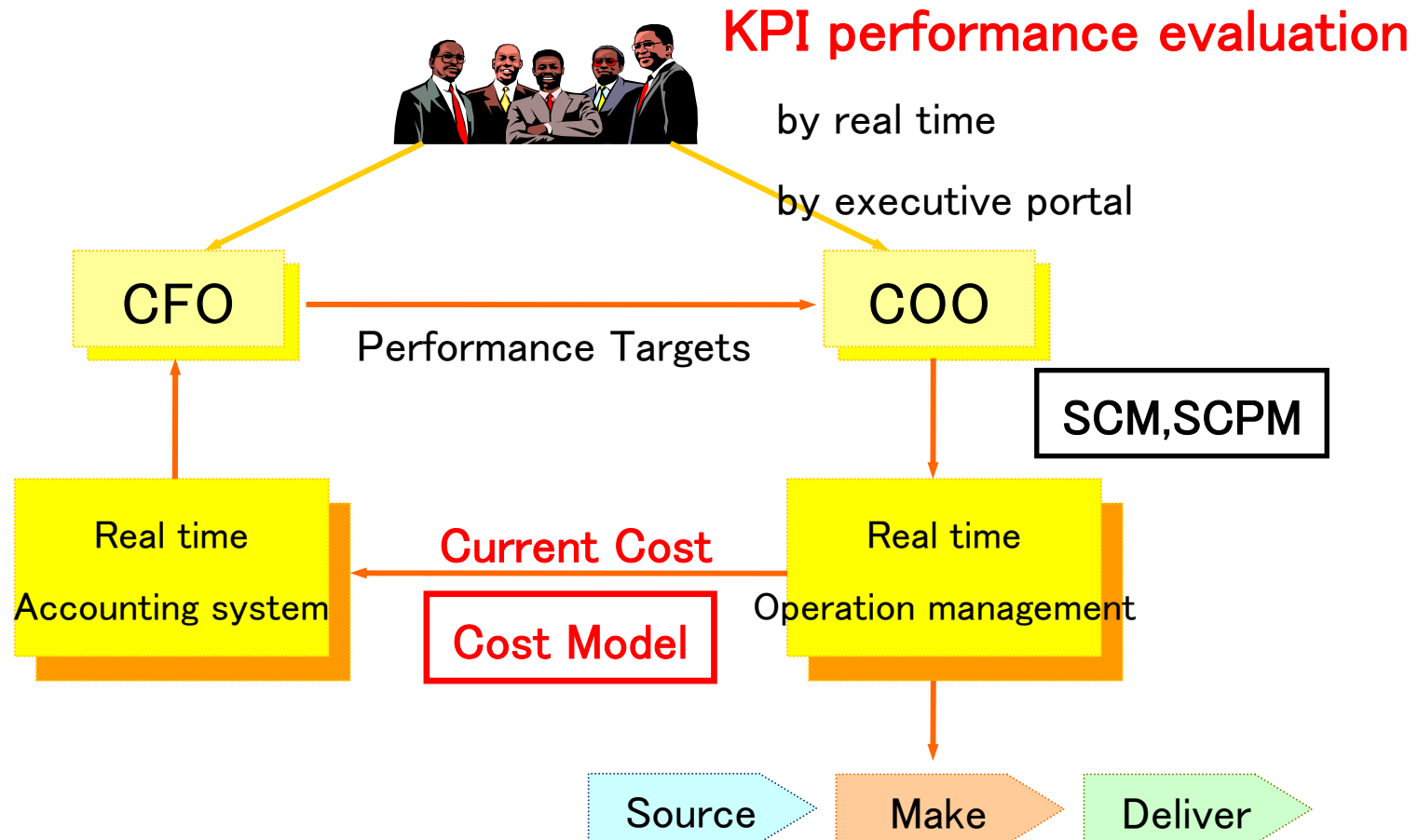
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From SCM to RPM (Real-time Performance Management)





RPM ⇒ Judge the current cost structure and make the most suitable decision

(from ARC documents)



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Difficulty for the production cost calculation in process industries



■ Cost accounting by each product is very difficultly complicated

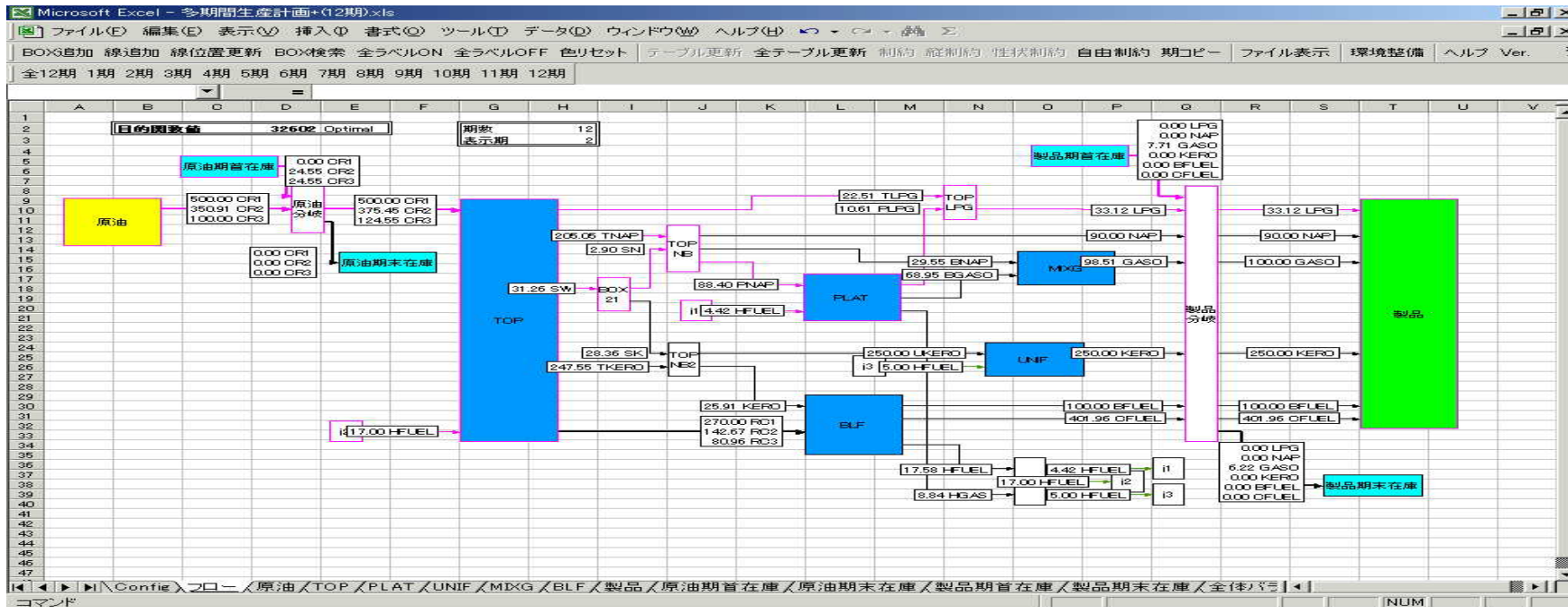
- Joint products, By-products, Materials distribution and an equipment operation plan interlock.
- Manufacturing budget planning takes two months (The example of real chemistry)

■ For agile decision making, the current value evaluation is important

- Simulation of not only the barter of products but dealing of materials and middle products
- A management chance will be judged by grasping the present value of products and middle products.

We could realize the production cost calculation (current value) based on the production plan using the process flow model and the material balance solution

Process flow modeling using computer –Benefit of Visual Modeling–

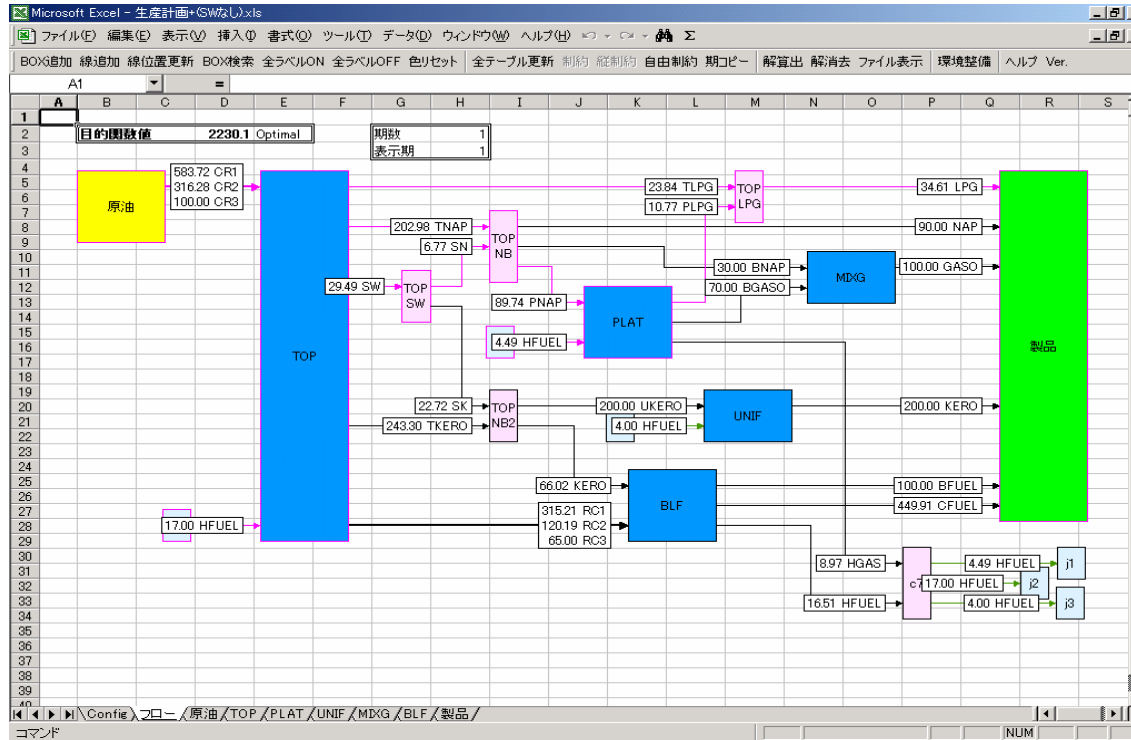


- *The model is open for everybody* (Everyone can be understood)
 - *Reduce the modeling time* (From several months to a few days)
 - *Easy model analysis* (For example: infeasibility analysis)
 - *Easy model changing and improvement* (many trial-and-error)
- If we can make the backward calculation with optimal solution, we can show the relationship with materials and products*

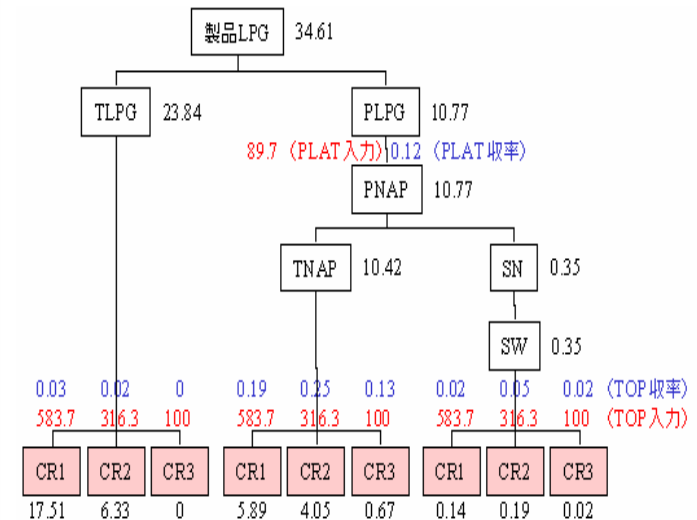
New practical use of the LP by the process flow and the optimal result



Process Flow Model



LP Optimal Solution (Material Balance)



The amount of the materials and the amount of unit operations by product are calculable from the material balance and a process flow model. ⇒ Visualize the relations among materials, product, unit : Like a “BOM”.

The amount of the materials and the unit operations by product are calculable



From the material balance table, the amount of the materials and the unit operations by product are automatically computed based on the optimal solution.

《Material Balance table》
Calculated reversely the amount of material by product

《Material Table by product》
Denote the volume of materials by product

《Unit table by product》
Denote the charged volume by product



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Management Accounting for Process Industries

- Profit-and-loss Simulation (Image) -

Microsoft Excel - 製品別原料マテリアル配分.xls

ファイル(F) 編集(E) 表示(V) 挿入(I) 書式(O) ツール(T) データ(D) ウィンドウ(W) ヘルプ(H)

BOX追加 線追加 線位置更新 BOX検索 全ラベルON 全ラベルOFF 色リセット テーブル更新 全テーブル更新 制約 縦制約 性状制約 自由制約 期コピー ファイル表示 環境整備 ヘルプ Ver.

A1 =

The amount of the materials used for every product

The amount of equipment operation for every product

原料				製品別使用量(直接分)								
原料	コスト	購入量	コスト解	LPG	NAP	GASO	KERO	BFUEL	CFUEL	HFUEL	HGAS	合計
CR1	4.5	583.7	2626.7	23.3	48.7	54.2	103.3	83.4	253.0	12.9	4.9	583.7
CR2	5.0	316.3	1581.4	10.6	35.5	39.4	80.5	13.8	129.9	3.0	3.5	316.3
CR3	5.5	100.0	550.0	0.7	5.8	6.4	16.2	2.8	67.0	0.6	0.6	100.0
合計		1000.0	4758.1	34.6	90.0	100.0	200.0	100.0	449.9	16.5	9.0	1000.0
量比率				3.5%	9.0%	10.0%	20.0%	10.0%	45.0%	1.7%	0.9%	100.0%
コスト合計				161.7	428.5	476.1	956.4	459.7	2156.5	76.4	42.7	4758.1
コスト比率				3.4%	9.0%	10.0%	20.1%	9.7%	45.3%	1.6%	0.9%	100.0%

装置				製品別稼働量(直接分)								
装置	コスト	運転量	コスト解	LPG	NAP	GASO	KERO	BFUEL	CFUEL	HFUEL	HGAS	合計
TOP	0.4	1000.0	400.0	34.6	90.0	100.0	200.0	100.0	449.9	16.5	9.0	1000.0
PLAT	0.8	89.7	71.8	10.8	0.0	70.0	0.0	0.0	0.0	0.0	9.0	89.7
UNIF	0.5	200.0	100.0	0.0	0.0	0.0	200.0	0.0	0.0	0.0	0.0	200.0
混合				0.0	0.0	100.0	0.0	0.0	0.0	0.0	0.0	100.0
計		1289.7	571.8	45.4	90.0	170.0	400.0	100.0	449.9	16.5	17.9	1289.7
量比率				3.5%	7.0%	13.2%	31.0%	7.8%	34.9%	1.3%	1.4%	100.0%
コスト合計			5329.9	22.5	36.0	96.0	180.0	40.0	180.0	6.6	10.8	571.8
コスト比率				3.9%	6.3%	16.8%	31.5%	7.0%	31.5%	1.2%	1.9%	100.0%

製品	価格	販売量	販売金額
LPG	7.1	34.6	245.7
NAP	6.0	90.0	540.0
GASO	9.0	100.0	900.0
KERO	8.5	200.0	1700.0
BFUEL	8.0	100.0	800.0
CFUEL	7.5	449.9	3374.3
利益合計			7560.0
総利益			2230.1

製品	製造原価(配賦済み)			損益	予算
	原料原価	運転原価	合計	計	率
LPG	165.9	23.2	189.1	56.6	25%
NAP	439.5	37.1	476.7	63.3	28%
GASO	488.4	99.0	587.4	312.6	14.0%
KERO	980.9	185.6	1166.5	533.5	23.9%
BFUEL	471.9	41.3	513.2	286.8	12.9%
CFUEL	2211.5	185.6	2397.1	977.2	43.8%
合計	4758.1	571.8	5329.9	2230.1	100.0%

製品	製造単価(配賦済み)			単価損益	予算
	原料単価	運転単価	合計		
LPG	4.8	0.7	5.5	1.6	5.5
NAP	4.9	0.4	5.3	0.7	5.3
GASO	4.9	1.0	5.9	3.1	5.9
KERO	4.9	0.9	5.8	2.7	5.8
BFUEL	4.7	0.4	5.1	2.9	5.1
CFUEL	4.9	0.4	5.3	2.2	5.3

※利益としての配賦対象

The cost price to product

The unit price to product

コマンド

Introduce the management accounting similar with MRP world into process industries



■ Continuous Improvement Activities

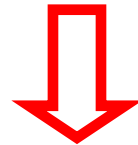
- Sell Production, Order oriented Production

■ Pursuit of additional value

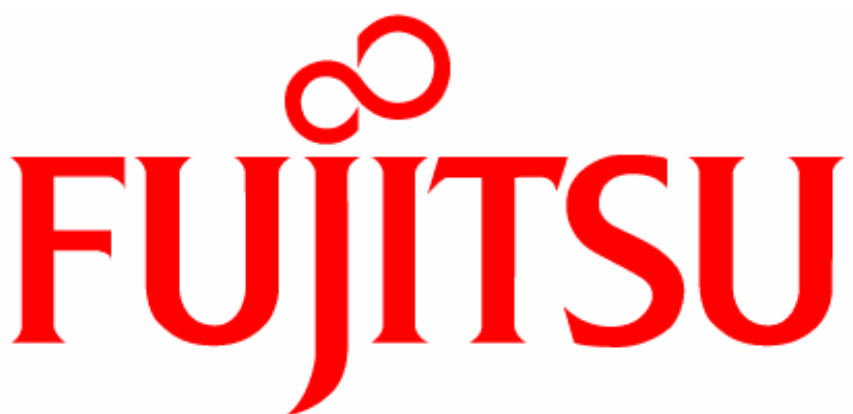

- Profits creation : Product mix

■ Shortening of all kind of lead times

- Synchronized Supply Chain and Cash chain



To become the process industry which will survive the 21st century by the IT technology which made full use of OR(s), such as **a production planning, scheduling, accounting statistics analysis, and so on.**



FUJITSU

THE POSSIBILITIES ARE INFINITE