

From Profit to Profit Potential

—— Redesign the Performance Indicator to Support Toyota Production System ——

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Abstract

The 20th century manufacturing management tended to “control” people by management accounting numbers. However, in order to survive the global competition, the management accounting must raise the precision of its measure so as to help, knowledge workers tap the reservoir of their tacit knowledge.

Admitting the intrinsic effectiveness of ROA as the key performance indicator (KPI), while at the same time, indicating its limitation for the purpose of measuring operational profitability, this paper proposes the notion of Profit Potential (PP), and offers the actual case of PP analysis regarding Japan’s Big Three, including the after shock of Lehman Brothers bankruptcy in 2008. The relative superiority of the Toyota Production System (TPS) as well as its problem is exposed through this analysis.

Key words : operational profitability, Just in Time (JIT), cash versus profit, management information tiers, Profit Potential (PP), respect for people

Introduction

How can an enterprise adapt to the new wave of innovation, from the hybrid to electric cars (EVs) or cell cars, for example ? The innovation inevitably takes an overall change in the way of basic research and development, production engineering and manufacturing process. In such total innovation process, the imperative is the redesign of the management accounting frame work that flourished in the 20th century. Through the fall of American Big Three and the bubble burst, the limitation of a short-term-profit-oriented management model became evident. What the manufacturing industry requires today is not the MCS (Management Control System) depending on accounting numbers, but the systematic approach to tap the reservoir of tacit knowledge of frontline engineers and workers.

A typical model to hone such tacit knowledge is the TPS which drove Toyota to the world top position in the auto industry. In the early 1950s, facing bankruptcy risk, Toyota needed cash to continue operation, which led to the cash saving, inventory-negative “pull-system” that depends on the human’s creative thinking which is called Kaizen, whereas the US Big Three continued the

inventory-affirmative, economies of scale oriented push-system. The result became clear in the first decade of the 21st century.

However, we also have to admit that shifting the ongoing push- to the pull-system is quite a challenge. Spear and Bowen (1999) described “What’s curious is that few manufacturers have managed to imitate Toyota successfully — even though the company has been extraordinarily open about its practices. Hundreds of thousands of executives from thousands of businesses have toured Toyota’s plants in Japan and the United States.¹ A major barrier to shifting to the Pull, or the JIT (Just in Time) system is the conventional accrual based financial accounting which is “profit-distribution-oriented” and in which only the bottom line profit to serve the outside investors is important.

Take the example the financial indicator, ROA or ROI, created by Du Pont around 1915. ROA is a robust indicator still used today, but is so aggregate an indicator that no insiders except for the top of the enterprise or the business unit pays interest because the ROA is just the mixture of operation, finance and extraordinary transactions. Insiders rather want a financial indicator to know more specifically the degree of their evolution in their profit ‘acquiring’ capability, rather than the profit ‘distribution’ capability of the company as a whole.

Another serious accounting barrier for implementing JIT is the conventional full absorption costing which supports the economies of scale paradigm, or “the more you make, the cheaper the unit cost becomes (regardless of sales)” which squarely contradicts JIT’s principle in that “the less the inventory, the faster the material flow and the more cash flow” is the principle. In order to resolve such contradiction of principle, this paper proposes the notion of Profit Potential (PP) to measure the operational profit acquiring capability, while at the same time supporting the JIT logic.

1 Management Information Tiers

This section presents a model of management information system expressed as the layer structure to clarify the characteristics of the system that we address. Specifically important is the first tier at the bottom whose mission is to tap the reservoir of tacit knowledge of frontline engineers and workers.

Management information tiers model assumes that the structure of management information consists of three layers of non-data, scene-information, physical information and monetary information. The first tier of non-data world corresponds to the notion of Genchi Genbutsu (“GO and SEE”) or “Ask why five times” in TPS that forces people to think thoroughly for themselves. “Now, machine has stopped what should we do ?” “We are running out of jobs, how to behave for now ?” The conceivable best response to such scene information is represented by phrase like

¹ Spear & Bowen (1999)

Exhibit 1 Management Information Tiers Model

Phase	Image Type	Kind of information	Object	Expression	Old mgt	New mgt
3rd Tier	Copied Image II	Monetary Dimension	Accounting	numerical value	control	measure
2nd Tier	Copied image I	Physical Dimension	Production	numerical value	control	measure
1st Tier	real image	non-data, real world	Scene	phrase	no control	encourage

Source : Kawada, M (2004). p.129 (in Japanese)

“Stand still when you have no job to do (never make in-process inventory).” TPS is quite different from the mass production system. It continued to explore the first tier, non-data, tacit knowledge for the past half century.

The second tier information is expressed with the data as the copy of the first tier’s real image. It is represented by the physical performance indicator. For instance, “machine operating ratio” is a chosen indicator that copies and represents the first tier real scene from the aspect of the push system. In TPS, on the other hand, the choice of the physical indicator at the second tier would be the “lead time” or the “turnover days” so as to support the pull-system. Also different from the mass production system is that in TPS the second tier information is formed, not to “control”, but to help people think out by “visualizing” the non-data world.

To be more specific, consider how a worker responds immediately when he or she runs out of work for the moment. In the context of TPS, the worst response is to fetch the raw material due for the next week from the warehouse and process it now. The best response is to stand still doing nothing, sending the “I am free now” signal to the boss, and the worker may be asked to help address the difficulty that exist elsewhere in the plant, which could satisfy the customer as well as recover the otherwise lost cash flow. In TPS, such response is formulated as the “standard work.” Moreover, that standard work itself is to be improved continuously. Taiichi Ohno, the guru of TPS, said, “Unchanging the standard work for as long as one month is a salary thief !” He was convinced of the importance and the possibility in exploring the first tier information in manufacturing.

“We found that, for outsiders, the key is to understand that the Toyota Production System creates a community of scientists. Whenever Toyota defines a specification, it is establishing sets of hypotheses that can then be tested. In other words, it is following the scientific method. — We learned that the system actually stimulates workers and managers to engage in the kind of experimentation that is widely recognized as the cornerstone of a learning organization.”²

² Spear & Bowen (1999) p. 98

The third tier information is expressed in terms of the currency, the language of accounting. Suppose the physical data of the “standard operating time” and the “number of unit processed” chosen at the second tier are copied again onto the third tier, where these two items are multiplied by the “overhead burden rate”, or the “dollars per hour”, then at the third tier, monetary information of the “processing cost” is formulated.

The point here is that in designing a workable enterprise system, there should be an alignment in the implication of each of three tiers. For example, if one wants to shift the first tier world (Genba) from the push- to the pull-system, the KPI at the second tier should be changed from the machine operating ratio to the takt time and/or lead time. Further, the financial KPI, the third tier information at the headquarters should also change from “profit” to “cash flow”. Otherwise, if the third tier KPI sticks to the short term “profit”, TPS can not take root as people reject “the less the inventory, the better” thinking, because, under the conventional full-absorption costing, producing less means the less profit for the current fiscal term.

Unfortunately, such alignment of implication though the three tiers did not happen in the 20th century, although Johnson & Kaplan (1987) indicated the disrupted linkage between the third tier and the second/first tier, saying that the conventional financial information is too aggregate, too short and even distorted³. The headquarters in charge of the third tier tend to support or overlooks increasing inventory made at the first tier, thus rejecting the JIT thinking. Unraveling the implication linkage once firmly set is not an easy job. Specifically in America, CEOs and CFOs lean more to the “profit distributing accounting” for shareholders, and less to the “profit acquiring accounting” for the knowledge workers.

In view of several cases in Asian countries where Toyota guided them to introduce TPS, a common point is that JIT successfully took root in their respective first tier, non-data world, while they had nothing to do with the third tier accounting information.⁴ Asian countries, different from the Western, had not been contaminated by the preceding push-system paradigm, because Toyota hired the laymen to teach them JIT from scratch as they had not any preoccupation of push-system. Remarkably soon, they reached the level of ‘one minute takt time’ which is almost equal to the level of their mother plants in Japan.

A Chinese section chief who had been working for Tianjin Toyota (TFTM) for the past five years, who led as many as 900 assembling workers, also reached the one-minute per car takt time. She confessed, “I did not know at all until recently that what I was told to do was a special way called TPS. We only did what we were told to do; we don’t know any other ways of production.” Taiichi Ohno told, “whoever can count ten by folding fingers can implement TPS.” and Ohno realized his word in Brazil Toyota in the 1960s.⁵

The management accounting, the third tier information, was formed as a technique for the

³ Johnson & Kaplan (1987)

⁴ Johnson (2006)

upper management to control the lower management. Around 1920, however, the role of accounting numbers was wisely and correctly recognized. Accounting indicators did not mean to run the company by numbers. "The return on investment reports went only to top management who used the information for planning and company-wide control. Subordinate managers were not compelled to achieve return on investment targets ; rather they strove to achieve economies and efficiencies within their respective activities."⁶

However, since the post - World War II, the situation changed in America. ROA permeated throughout the US⁷ as a means to command and control the decentralized business unit. Merely riveting budget numbers to discrete responsibility center, letting people postpone necessary R&D expense or use up acquired budget by procuring unnecessary items, thus weakening the creative thinking at the first tier that may have grown otherwise.

2 Accounting Mechanism that Hinders the Pull-System

This section confirms the dysfunction of the conventional accrual- based accounting against the JIT, because reducing inventory reduces the reporting profit at the fiscal year in which reducing inventory started (see Exhibit 2).

In Exhibit 2⁸, the first three columns to the left shows what happens to the current operation which produces 1000 units and sell 800 units. What happens if it increases inventory by producing 1100 units ? Or what happens if, on the contrary, the company reduces inventory by 100 units, so produced only 900 units and sold 800 units ? Sales is the same for each of the three columns, that is, \$1,600M (= @\$2000K times 800units),

The formula of the full absorption costing is, the sum of manufacturing expense incurred in the current term plus the value of the beginning inventory are distributed to the Cost of Sales and the carried over final inventory in proportion to the number of units produced and the carried over inventory. In the case of Exhibit 2, see the column of "More Inventory 1st year", where "the sum of the beginning inventory (0) plus costs incurred in this year (\$1,920) is distributed to the carried over final inventory (\$524) and the CS (\$1,396) in proportion to the ratio of the number of unit sold (800 units) and the the number of Final Inventory (\$300)." As the result of increased production (from 1,000 units to 1,100 units), increased carried over final inventory (from 200 units to 300 units) in proportion to the number of units sold unchanged (800 units), drags comparatively more costs (\$524) over to the next period than the current (\$360). Consequently, less CS

⁵ This is what Kawada (2007) calls "Accounting-Free" approach in introducing TPS. Johnson (2006) insists likewise that unless you shed accounting, TPS can not take root.

⁶ Johnson & Kaplan (1987) p. 85

⁷ Hiromoto (1993)

⁸ Kawada (2007)

Exhibit 2 Conventional full-absorption costing which justifies Increasing Inventory

	current level 1st year	More Inventory 1st Year	JIT 1st year	JIT 2nd year
Number of units produced	1,000	1,100	900	1000
Number of units sold	800	800	800	1000
Beginning Inventory	0	0	0	100
Final Inventory	200	300	100	100
Sales @\$2,000K	1,600	1,600	1,600	2,000
Beginning Inventory Costs	0	0	0	187
Total mfg costs	1,800	1,920	1,680	1,800
Direct cost @\$1,200K	1,200	1,320	1,080	1,200
Fixed indirect costs \$600K	600	600	600	600
Cost of Sales (CS)	1,440	1,396	1,493	1,788
Gross Margin	160	204	107	212
Depreciation	200	200	200	200
Final inventory costs	360	524	187	199
Cash Flow	0	-120	120	201
PP : Gross Margin/Inventory	0.44	0.39	0.57	1.10

(\$1,396) is charged to this term's sales so that the Gross Margin increases from \$160 to \$204.

A serious problem of this full absorption costing is that the Gross Margin (\$164) is regarded as already "accrued", but the sales may not accrue in the future, and that the Gross Margin may be just an illusion, but the next period's \$539 is already paid out cash, the collection of which depends on uncertain future sales. In the down-market, this may result in the black-ink bankruptcy due to cash shortage. This is exactly what happened after shock of the Lehman Brother's bankruptcy in 2008.

With the same logic, if one reduces inventory at the "JIT 1st" year, gross margin decreases by 33% (\$160 → \$107). Who will willingly reduce inventory at the expense of such radical profit decrease? On the other hand, let's look at the movement of cash flow (which is calculated as "Gross Margin + depreciation ± incremental inventory"). "More Inventory 1st year" has lost cash by 40% (\$0 → \$ - 120), expanding the wound of fund shortage, which may liquidate the company despite the increased reporting profit. But, the fewer inventories at "JIT 1st year" created cash of \$120, which perhaps rescues the firm from the bankruptcy. What you can expect further is the additional saving of cash by the tax avoidance by the understated taxable income. Which do you choose, profit or cash?

Further ahead, in the "JIT 2nd year", the sales increase by 100 units does not take any incremental expense. They only exploited the otherwise exposed idle time caused by reduced

operation due to the fewer inventories. Gross Margin recovered and went over the current level by 33% (\$160 → \$212), and the cash increased sharply by 76% to \$201. The point is that the number of unit produced recovered to the same level with the current year's 1000 units, but this time all of them were sold out, which means that although the number of units produced is the same with the current level and the fixed cost is the same \$600, the factory created free resources by producing the less inventory, and used that free resources to sell more.

PP (Profit Potential) at the bottom line of Exhibit 2 is a new financial performance indicator to measure the ratio of profit and inventory. If inventory increases in the first year, PP falls from 0.44 down to 0.39, which means that the rise of gross margin by 44 (\$160 → \$204) was made at the expense of – \$120 cash-out. Such profit increase should be penalized, while profit decrease of \$53 due to the reduced inventory by \$173 (\$360 → \$187) should be praised because of the increased cash on hand by \$120.

Nevertheless, many companies may not be able to stand the sharp decrease of reporting profit in the first year when they start JIT as in Exhibit 2. They tend to think that JIT does not fit to their company and quit JIT. The choice between profit and cash thus became a divide for GM and Toyota. GM continued to chase profit, while Toyota embraced cash flows and raising people. The notion of PP will be explained in details later.

3 From Profit (P) to Profit Potential (PP)

3.1 ROA, ROE, Leverage

Exhibit 3, Exhibit 4 and Exhibit 5 show respectively the trends of ROA, ROE and the financial leverage of Japan's Big Three. "The true test of whether the profit is too great or too small is the rate of return on the money invested in the business and not the percent of profit on the cost."⁹ — this concept of ROA (or ROI if you get rid of non-interest-bearing current liability) is a respectable concept invented by Du Pont in 1915, and still used today. Essentially, the important lesson delivered by ROA is that one should see the Balance Sheet and the Income Statement simultaneously and with compound eyes.

In reality, however, Americans became all the more interested in the reporting profit in the Income Statement. Stiglitz (2004) pointed out, "the rise in the share prices was supposed to create shareholder value in the long term, but in too many cases, the market focused only on the short run, today's bottom line. And with executives' pay, depending on today's share price, they had more of an incentive to focus on today's profit and less of an incentive to focus on the firm's long-term reputation."¹⁰

The implication of ROA, which is the true test of profit as the rate of return on the money

⁹ Chandler (1977) p. 446

¹⁰ Stiglitz (2004) p. 145

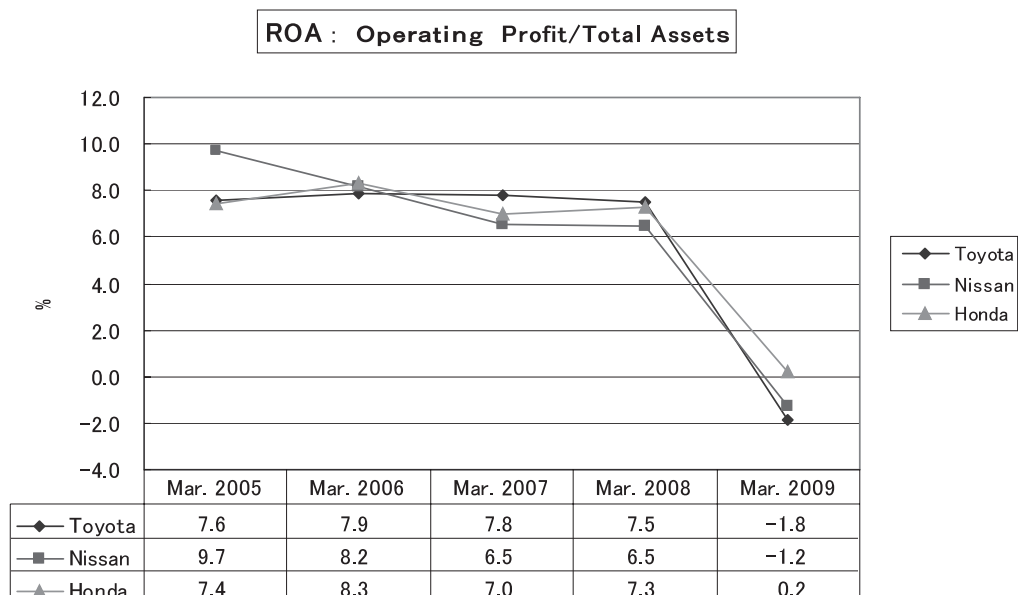


Exhibit 3 ROA of Japan's Big Three

Sauce data : Nikkei Finance search engine 2009 (consolidated)

invested, can be applied to measuring the operational profitability inside the firm. However, as ROA is the mixture of operational, financial and extraordinary transactions, it should be adjusted so as to serve insiders who wish to know the operational profitability or the degree of evolution in their capability of acquiring profit in the future, which is PP this paper advocates as the fractal of ROA .

3.2 ROE (Return of Equity)

ROE (= ROA × Financial Leverage), became a symbolic indicator of Anglo-Saxon mode, short-term profit focused, shareholder-value management. Theoretically, ROE is also a mixture of operational and financial transaction. Due to this contamination, what happened to US corporations was to beautify ROE by increasing the leverage (total asset- equity ratio), by increasing debt relatively to equity, not by honing the first tier, non-data world. In order to clear such contamination, we remove somehow the non-operational factors from both the numerator (income statement items) and the denominator (balance sheet items) of ROA¹¹

The financial leverage (= Total Asset/Equity) is ROE's constituent element, which enables to increase the value of ROE by financial, not operational, transaction. The Exhibit 5 tells that Nissan is relatively more dependent on the leverage than the other two.

¹¹ Moriyama (2009)

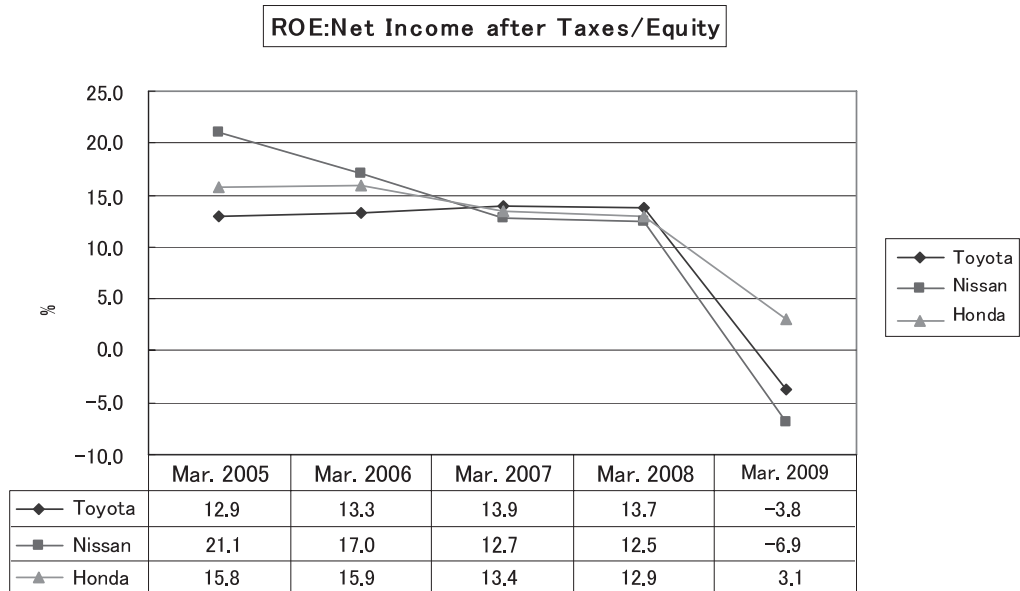


Exhibit 4 ROE of Japan's Big Three

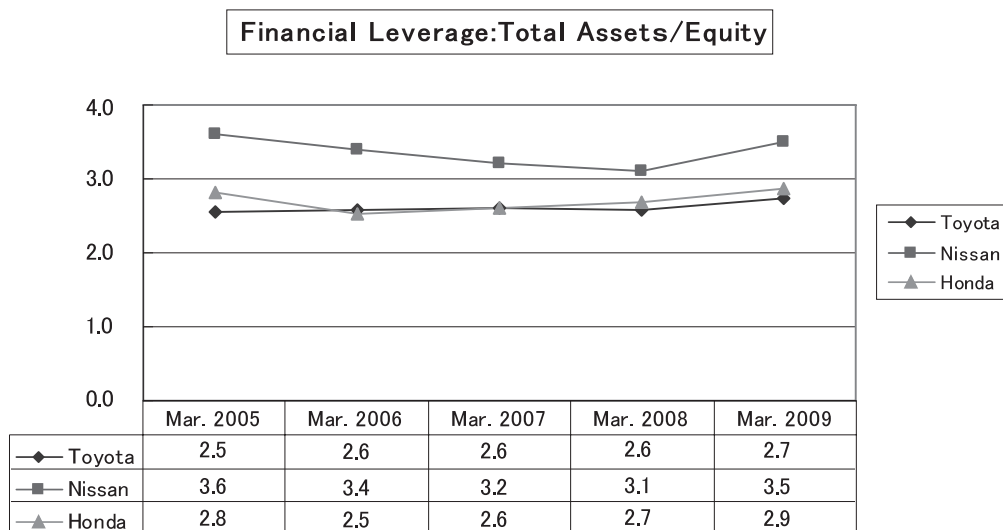
Source data: *ibid.*

Exhibit 5 Financial Leverage

Source data: *ibid.*

3.3 Profit Potential (PP)

3.3.1 Definition

Another shortcoming of financial indicators like ROA, ROE or even EVA,¹² too, is that they tend to lure managers to short-term profit focused management. In that sense, noteworthy is the Toyota Production System (TPS) that aims at long-term rather than short-term profit. Johnson (2000) defined this stance as MBM (Management by Means) as against American's MBR (Management by Results).¹³ This paper proposes an MBM-oriented KPI (Key Performance Indicator) called Profit Potential (PP) which enables to measure the degree of evolution in the profit-acquiring capability of operation. PP is a purified version of ROA, trying to remove the contaminating factors in ROA from both its numerator and denominator.

Following the spirit of the ROA, the equation of PP is the product of the profit factor and the turnover factor, and the right side of the equation insists that profit factor be pursued by design and production engineering function and the turnover factor be accomplished by manufacturing function through TPS. Headquarters so far tended to concern with the profit factor alone, but now standing on the higher position, they should appreciate the factory's contribution through the

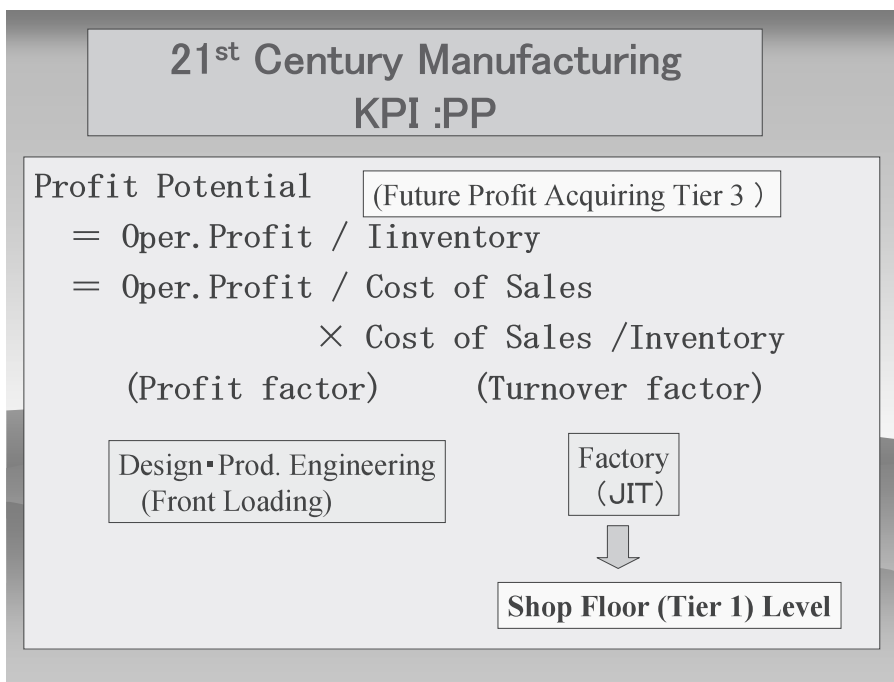


Exhibit 6 Profit Potential (PP)

¹² Stewart (1991) EVA (Economic Value Added) = NOPAT (Net Operating Profit After Tax) – Capital Cost. EVA is the notion of economic profit as against the accounting profit.

¹³ Johnson and Bröms (2000)

turnover. Accordingly, they can compare the incremental profit with the incremental inventory. A purified version of ROA is obtained by restricting the numerator “R” of ROA to the “operating profit” (business level), and likewise by restricting the denominator “A” to the “Inventory”.

Note that in the PP equation, not Sales but Cost of Sales is used to measure the turnover. This is also to remove the contaminating factor of Sales which could be influenced by the market situation. Thus, operational profitability is measured all the more accurately. Through such purification process, PP becomes a reliable KPI to measure the degree of evolution at the first tier of the non-data, real world.

3.3.2 Implication of inventory in PP

In calculating the inventory turnover for the financial analysis in general, the inventory means ‘the average of the year’. But, in the context of TPS, the inventory in the PP equation represents the final inventory of the fiscal year, which means “the amount of operation done in order to prepare for the next term’s business.” The less management resource is spared for the next term, the more resources can be distributed to the current term’s business. For example, the fewer inventories gives the opportunity to accept more orders, or switching some works from the outside to the in-house making etc, in a word, to increase throughput or the value added of the current term.

Reduced inventory under the maintained sales amount thus gives a periodic difference of PP, which is called $PP\Delta$ (PP delta). The “PP delta plus” is the evidence that the operational capability is evolving. PP delta minus is vice versa.

More specifically by case :

Last year, Operating Profit was 100 and Inventory (average of the term) was 200, then $PP = 0.5 (= 100/200)$.

Suppose, this year’s result is : Operating Profit 120 (20% profit increase), and Inventory 260, then $PP = 120/260 = 0.46$ $PP\Delta = 0.46 - 0.5 = -0.04$.

This is just the case as was explained in the Exhibit. Such case of profit increase should be penalized, because the inventory increased by 30%, losing more cash than the last year. As long as this type of profit increase is praised or overlooked, JIT never take roots.

On the other hand, suppose this company’s Operating Profit became 80 and Inventory became 120, $PP = 80/120 = 0.67$ $PP\Delta = 0.67 - 0.5 = +0.17$.

Although reporting profit fell by 20% ($100 \rightarrow 80$), the inventory was reduced by 40% ($200 \rightarrow 120$). The factory introduced JIT during the recession, and reduced inventory, consequently increasing the cash. In addition, this nose-diving profit is just the “volume variance” loss which does not entail real cash-out. If the CEO or CFO could praise the factory manager for this type of profit decrease, then this company is qualified to successfully implement JIT. This is exactly the case recommended at the “after Lehman Brothers shock” recession period.

3.3.3 Case

The Exhibit 7 is the PP analysis of the Japanese Big Three, Toyota, Nissan and Honda. Note that we adopted the operating profit here as the numerator, instead of gross margin. Because these Three are full-line assemblers in which the operation involves the entire business function of sales, technology and production.

After Lehman Brothers shock, Japan's Big Three's PP also plummeted, the drop of Toyota's PP was the sharpest among the three. But, as PP also is a product of the profit factor and the turnover factor. We can break it down into two factors.

Exhibit 8 shows that operating profit ratios is almost a “fractal” of PP including the nosedive in 2009 in the Exhibit 7.¹⁴ This fractal phenomenon could arouse an intriguing question, “PP is affected by the profit factor, then what is happening to the turnover factor in the PP?”

When we broke down PP into the profit factor (Exhibit 8) and the turnover factor (Exhibit 9), it turned out in 2009 that although the profit factor was seriously affected by the plummet of the sales volume, the turnover factor was least affected by the fall of sales, which proves the robustness of the manufacturing capability of the Japanese Big Three. Despite the down-market, production efficiency in the factory has not been affected much, although the takt time may have been

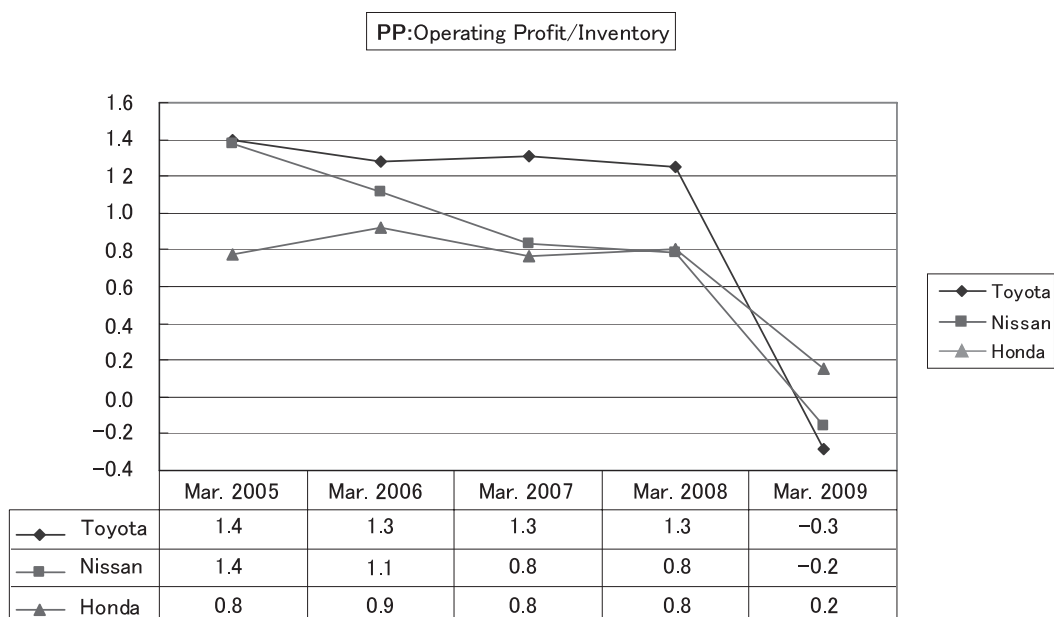


Exhibit 7 Profit Potential of Japan's Big Three

Sauce data: *ibid.*

¹⁴ “Fractal” is the term in the theory of complexity, which means generally “a rough or fragmented geometric shape that can be split into parts, each of which is (at least approximately) a reduced-size copy of the whole. Waldrop (1992)

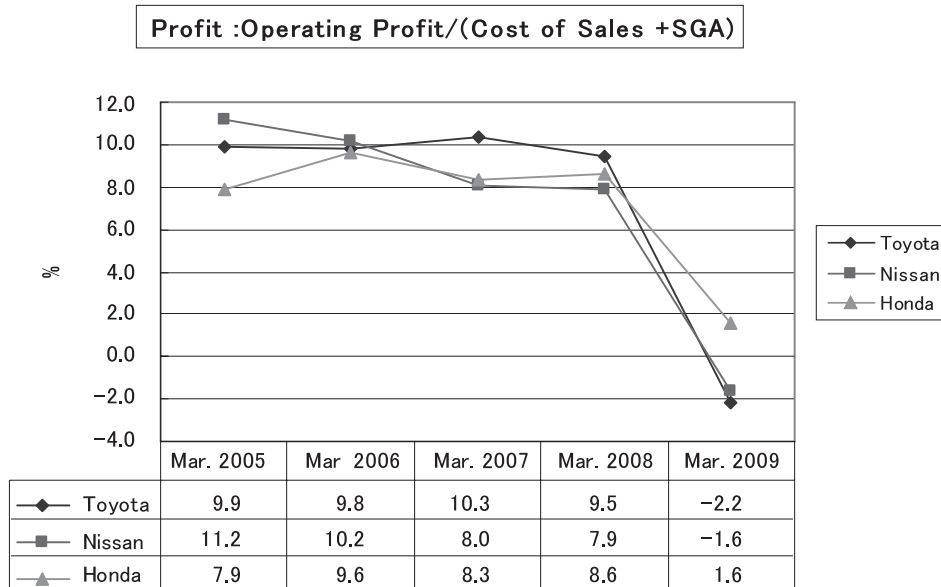


Exhibit 8 Profit factor of PP

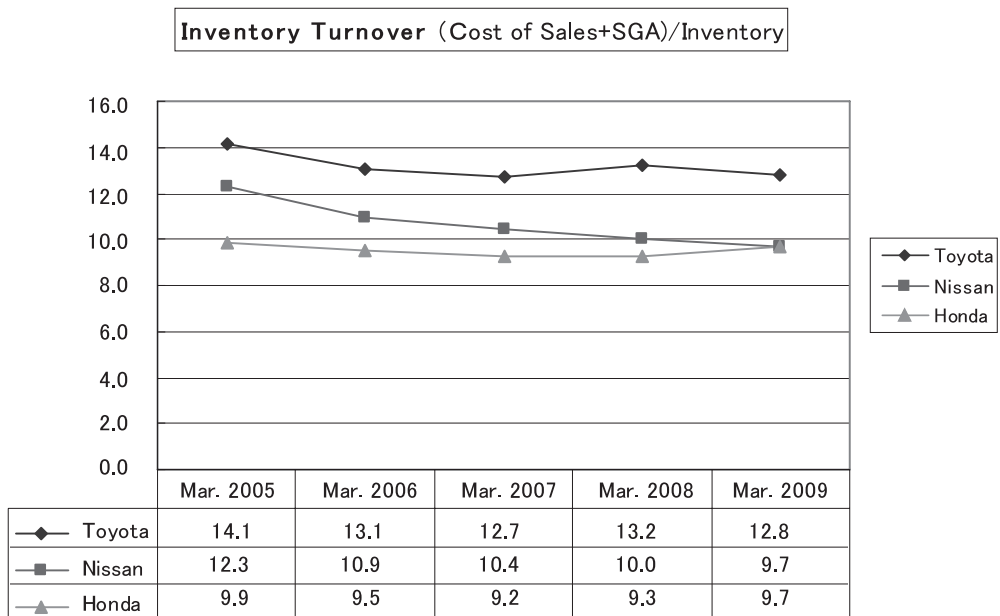
Source data : *ibid.*

Exhibit 9 Turnover factor of PP

Source data : *ibid.*

affected considerably. The factories are maintaining the tension in the sate of readiness for the next up-market.

Especially, Toyota's inventory turnover excels Honda and Nissan by around 2.5 times (8 days shorter per year), which tells the strength of TPS as the resource of its operational strength. Strictly saying, however, Toyota and Nissan's turnover has been getting gradually worse since 2005, Honda, flat at best. Accordingly, as to the degree of evolution, Japan's Big three must review the reason of their stagnation of inventory turnover which is the symbol of the operational competitiveness.

In measuring turnover, we employed as the numerator "Cost of Sales plus SGA (selling and general administrative expense)" instead of "Sales" as is usually done in financial analysis. The notion of Sales is contaminated due to the pricing factor in the market. By removing the contaminating factor of "profit", the operational profitability is more objectively measured, and gives little room for excuse for the fall of operational profitabiliy due to the market situation. Such fair and purified KPI could encourage knowledge workers to hone their skill and process continuously.

At Exhibit 10, we went further ahead to check the trends of finished products inventory, this time in terms of "turnover days". We did this because, in auto-assemblers, the function of delivering production orders of finished products to the factory on behalf of the customer is the sales department, and we saw a great number of completed cars piled up at the harbor in California after the Lehman Brothers shock.

Exhibit 10 shows Toyota's relatively shorter finished product turnover days than Honda and

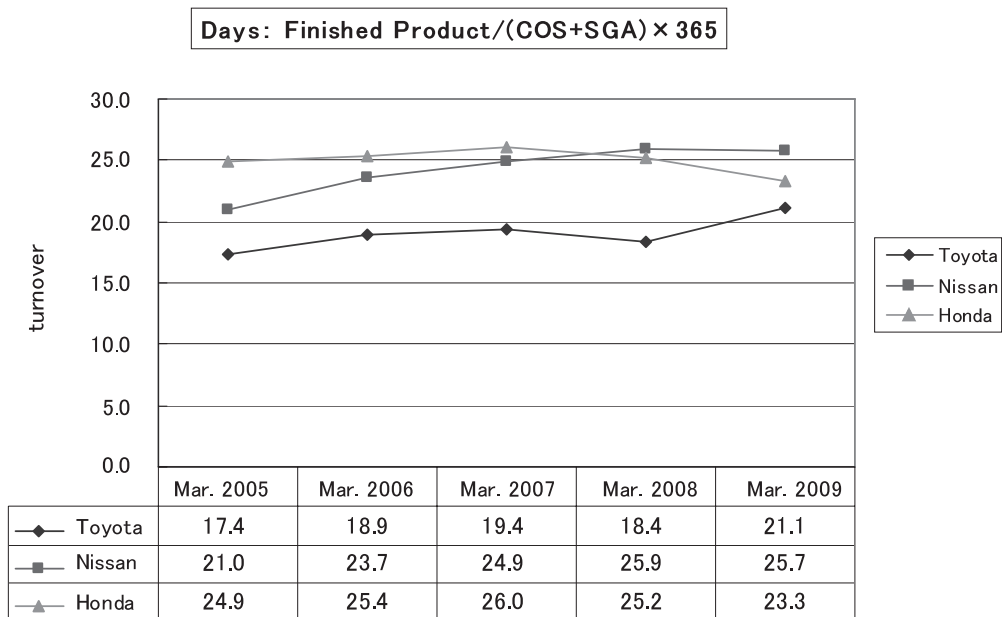


Exhibit 10 Turnover days of Finished Product

Sauce data : *ibid.*

Nissan by about one week. The important thing here is the weight of finished product inventory relative to the material and work-in-process inventory in the factory. For Toyota in 2009, 12.8 times turnover means 28.5 days turnover days ($= 365/12.8$), of which 18.1 days are shared by finished product, that is, 63% ($= 18.1/28.5$). Likewise, 68.3% for Nissan, 65.1% for Honda is shared by the finished products. These facts tell that there is much room for improvement of lead time from the shipment to the customer for all Japan's Big Three, or the room for honing the global supply chain management including responsiveness to the market, and order delivery system. In these areas of the global supply chain control, Toyota and Honda has been flat at best, Nissan is rather aggravating since 2005. It is expected that Toyota, not to be content with the relative superiority, should identify the cause of 2009 finished product's longer than ever turnover days.¹⁵ Those are the messages gained by the PP, a purified version of ROA.

Conclusion

In order to cope with the global competition in innovation, we emphasized the importance of polishing the operational capability at the first tier, non-data area of management information. For that purpose, we have proposed the KPI of PP, a purified version of ROA, shifting the concern in management accounting from the 'profit distribution to shareholders' to the 'profit acquiring capability of insiders.'

Three supplements here ;

First, what we actually need is to help knowledge workers enrich their first tier, non-data world. To this end, PP should be broken down to the workshop level. One example : " Σ standard time (output)/in-process inventory" is the "fractal" of inventory turnover at the work shop level where the imperative is to keep takt time with less in-process inventory.

Second, at least monthly, weekly or daily if possible instead of the one year of financial term which is too late and slow to respond to the non-data, real world. The past twelve months "rolling closing" enables to rotate "Plan-Do-Check-Action" cycle 12 times or even 365 times a year. Every day should be the day of reckoning for inch-by-inch evolution of the non-data world.

Thirdly, this paper emphasized the importance of cash as the resource of profit rather than the profit itself. For more than a century, profit itself has been the purpose of business, while as Exhibit 2 has confirmed, increasing inventory means the accrual based profit increase, but at the same time cash decrease.¹⁶ In order to resolve such ambivalent relationship between cash and profit as well as to visualize the effort made by the operation, "Income and Cash Flow Combined Statement" is recommended, in which immediately below the bottom-line, or the before-tax profit

¹⁵ Toyota has developed, in China, in 2008, an integrated sales distribution system called SLIM (Sales Logistics Integrated System) that visualize each individual car's current position from order delivery to the plant to the dealer's yard. Toyota's turnover recovery is expected.

hangs the “Cash flow from Operating Activities” expressed with the “indirect- method.” When the quality of accrual-based profit is checked with cash flow in operational activities every month at the board meeting with this visualized sheet, a new ethos to embrace cash rather than the short term profit would at last be formed. Visualization is also an important technique of TPS.

Finally, although purified financial indicator helps much, we should be careful not to fall into the trap of 20th century management accounting thinking that tried to “control” people by accounting numbers. Instead, in order to survive the harsh global competition, what is important is to raise the precision of measurement, and let people face those indicators directly and let them think for themselves. Noteworthy is such notion as “learning organization”, “emergence and self - organization”¹⁷, “knowledge workers” or “autonomic nerve system” as appeared in America, too, since the 1990s. Intrinsically, there is no national boundary in terms of embracing the first tier information.

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¹⁶ To avoid this confusion, listed companies were obliged to report Cash Flow Statement in 1987 in the US, and ten years later in Japan. Financial Accounting Standards board (1987), Statement of Cash flows, SFAS No. 95, paragraph 114

¹⁷ Waldrop (1992)

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