Strategic Management Cycle as an Underlying Process for Building an Aligned Linkage of Practices

Michiya Morita
E. James Flynn
Shigemi Ochiai

Gakushuin University
Indiana University
Jonquil Consulting Inc.

ABSTRACT

This study tries to explore into the mechanism of building an effective manufacturing practice linkage that is a basic attribute of high performance manufacturing. We advocate a strategic management cycle underlies the construction of the linkage. The cycle starts with forming visions and goals of the company, goes through strategic planning and practice implementation and ends with performances leading to next revolution of the cycle. We hypothesized the strength of the cycle determines the degree of planned behavior that integrates strategic activities and necessary practices as an effective linkage. We also argue the quality of the initial stage of the cycle is important and it is determined by front-end loaded visionary planning. We will emphasize inter-functional behaviors that support such successful strategic management cycle. We make an experimental analysis on the data of the High Performance Manufacturing project for the argument.

Keywords: Linkage of practices, strategic management cycle, inter-functional behavior

INTRODUCTION

The importance of manufacturing practices, mostly observed from excellent Japanese manufacturing companies in the 1980s, are still valid in the now prevailing global competition where Q, C, D and efficiency of operations are more important than ever because potentially huge emerging markets such as BRICS require more cost-effective products and the constraints on availability of natural resources and CO2 emission that are becoming more tighted.

It, however, used to be not easy to realize the contribution of such manufacturing practices to the requirements imposed on manufacturing companies because the company needs the managerial competence to align such practices effectively beyond just imitating them individually. Well-aligned practices, that is, an effective linkage of practices, is the managerial outcome that leads to high performance manufacturing. (Schroeder and Flynn, 2001) Still all companies cannot do it.

The present global market competition requires higher Q, C, D and resource efficiency. This implies the company should build more competitive linkage of practices. But it introduces another requirement on the construction of linkage. Higher requirements of Q, C, D and the efficiency demands for not only operational excellence, but also the inclusion of technologically innovative development into products including matured products. More innovative product and process performances in terms of usage of

energy and resources besides traditional Q, C, and D criteria become sources of critical competitive differentiation. In other words, traditional Q, C and D performances should go hand in hand with the technological innovation at the same time to be satisfactorily competitive. Especially in matured advanced markets, the company needs to create product differentiations significant enough to give a reason to replace existing owned products when new products or models regardless of the degree of change are introduced under the present circumstance.

These technologically innovative developments tend to be more expensive in terms of cost and time. It demands for well focused and designed development strategy to be in good cost-effectiveness criterion. Also it should be aligned with competitive and fast ramp-up operational process. The linkage now required covers from development strategy to operations. The linkage of business strategy with operations has been emphasized. (Wheelwright and Hayes, 1985) But sometimes it goes too far. The company is inclined to lose the flexibility to adapt to new technological changes in markets due to the close linkage of specific technologies pursued with business processes and its underlying mind-set. (Christensen, 1997) But the effective linkage of technological development policy with operational processes is important to create high value since operational processes should work to harvest technological developments. For example, highly technological equipment developed should be operated under the environment designed for it and by workers who are well trained to operate it. A new product requires appropriate processes to be manufactured. The problem is to construct the effective linkage with competitiveness over time.

This study tries to explore into the construction of the linkage that is competitive over time. The construction is one of most important agenda nowadays.

LINKAGE REVISITED

What is linkage?

The linkage in this study assumes that practices relate with each other, usually positively. (Morita and Flynn, 1997) In other words, if a practice is highly implemented, another ones are also highly done. This positive relationship implies some technical and behavioral factors work under the relationship. The technical relationship works in such a way that poorly trained workers cannot maintain their machines or cannot implement statistical quality control well. The behavioral relationship means a worker is influenced or inspired positively by other workers' sincere attitudes toward their jobs, and *vice versa*. The positive relationship causes a virtual cycle or vicious cycle. It drives continuous upheaval or decline of the company.

On the other hand, sometimes a negative relationship works in a balancing process. If a worker observes other workers' lazy attitude, he or she may feel he or she will never work in that way, and *vice versa*. It generates an opposite force to existing momentum. This gives birth to a negative linkage. This negative linkage is a cause of an up-and down of the company's performance over time. Some factors that create a turning point such as initiatives spurred by a crisis or arrogance bring about the negative linkage.

The linkage, positive or negative, is an organizational phenomenon. If some organizational force works within the company, practices of the company relate with each other. If not, they are implemented independently. Some turmoil that dissolves the organization such as lack of communication or leadership loss infiltrates under the situation.

We hypothesize a high performance manufacturing company maintains the positive linkage where workers interact with each other positively. They inspire others or are inspired by others. They are motivated to learn more to do good jobs to respond to others' expectations and achieve their goals they

commit. Or they are trained so that they can fit in with the company's scenario to meet the company's goals.

Measurement of linkage

In order to confirm the linkage between practices, we classify many types of manufacturing practices into eight categories based on qualitative judgment and also the factor analysis. These practices and categories are shown in Table 1. Though results are not shown due to the limitation of pages, all practice in Table 1 are passable in the reliability and validity tests by Cronbach's alpha and the factor analysis respectively with the cutoffs of alpha and factor loading, .60 and .55. The data of factories used in the analysis were collected from 2002 to 2004 in Austria (21), Finland (30), Germany (41), Italy (27), Japan (35), South Korea (31), Sweden (24), and U.S.A (29) in the High Manufacturing Project that now includes ten countries. Industries chosen are Electronics (79), Machinery (79) and Transportation (Vehicle) (80). The figure in parenthesis is the number of factories collected in each country and industry. Seventy nine factories come from the category of world class manufacturing judged mainly based on reputation, ninety three are randomly sampled and 66 are unidentified in these categories. The number of respondents is 19 per plant including plant manager (1), plant superintendent (1), plant accounting manager (1), human resource manager (1), information systems manager (1), production control manager (1), inventory manager (1), process engineer (1), quality manager (1), supervisor (4) and direct labor (5). The figure in parenthesis is the number of respondents. Each respondent's questionnaire sheet is specifically designed for the respondent's category. Besides numerical answers such as sales, several persons respond to each questionnaire, which used a Likert's scale from 1 to 7.

Table 2 summarizes the average values of the eight practice categories of above average and below average groups classified based on the average level of the eight categories of each country. Table 2 shows a parallel gap that implies there exist positive relationships between the practice categories that hold in any country. Table 3 shows the correlation coefficient of the eight practice categories of all factories. We appear to have found the positive relationship holds between the categories.

Table 4 indicates comparatively the correlation coefficient of the practice categories in the three groups classified evenly as highest, middle and lowest by the average value of the eight practice categories. They are generally lower than those of Table 3 because of the reduction of variance due to the classification. The highest and lowest groups' correlation coefficients are all positive when significant, but the middle group shows there exist negative relationships in a few cases and more not-significant cases than the other groups. It suggests some balancing and isolating factors work in the middle group. Especially, the negative correlation between the two categories, strategy and efficient operation, indicates the attribute of this group's practice alignment. The overall relationship between the practice categories in the middle group is weaker than the other two groups. The group's companies may struggle to go upward but their efforts remain isolated or not aligned. This group may be expected to join the highest group someday with effectuating leverage to invoke a virtual cycle of enhancement otherwise it may go down to the lowest group.

Companies in the lowest group stay stagnant as a whole. This situation is a trapped one where practices pull down on each other. We name the linkage types of the three groups in the order of practice level as levered, transitive and trapped. (Morita, Flynn and Milling, 2001) We confirm these types of the linkage with the new data from more countries and factories than that of 10 years ago. The company's main managerial agendum is to manage the linkage, that is, to realize the levered linkage as high as possible.

Table 5 summarizes the practice categories and competitiveness of the three groups. Competitiveness is the average value of thirteen competitive measures evaluated perceptually by plant

manager in terms of a Likert's scale from 1 (Worst) to 5 (Best). The thirteen competitive measures are unit cost of manufacturing, conformance to product specifications, on-time delivery performance, fast delivery, flexibility to change product mix, flexibility to change volume, inventory turnover, cycle time (from raw materials to delivery), speed of new product introduction into the plant (development lead time), product capability and performance, on-time new product launch, product innovativeness and customer support/service. The factor analysis of these measures suggests any rotation fails to converge. Cronbach's alpha is .860 and all factor loadings are higher than .500. The difference between the levered group and the other two groups is clearly notified.

Table 1 – Practice category and constituent practice

Practice category	Constituent practice	Factor loading and Cronbach's alpha
Strategy: The extent to which the factory operates strategically	Formal strategic planning Manufacturing-business strategy linkage Anticipation of new technologies	.877 .886 .842 alpha=.828
Supply chain: The degree of implementing SCM effectively	Supply chain planning Trust-based relationship with suppliers Cooperation	.863 .874 .834 alpha=.809
Facility efficiency: How efficiently the factory operates equipment and processes	Effective process implementation Autonomous maintenance Preventive maintenance Maintenance support	.859 .738 .848 .822 alpha=.821
Efficient operation: How much the factory implement just-in-time operation	Daily schedule adherence Just-in-time delivery by suppliers Just-in-time link with customers Synchronization of operations	.671 .814 .783 .800 alpha=.799
External involvement in quality improvement: How effectively the factory involve clients and suppliers	TQM link with customers Supplier partnership Supplier quality involvement	.759 .920 .916 alpha=.831
Organizational quality improvement culture: What extent the factory's cultural preparedness to improve quality	Continuous improvement and learning Customer focus Customer involvement Customer satisfaction Organization-wide approach	.853 .654 .757 .733 .640 alpha=.805
Quality improvement foundation: The degree of provision of environment to improve quality	Cleanliness and organization Feedback Process control	.747 .853 .867 alpha=.760
Activation of floor: How interactive and cooperative the factory's floor	Commitment Coordination of decision making Suggestion-implementation and feedback	.734 .762 .818

	Multi-functional employees	.754
	Recruiting and selection	.753
	Shop-floor contact	.748
	Small group problem solving	.802
	Supervisory interaction facilitation	.751
		alpha=.899

Table2– Comparison of above than average and below than average groups in the eight countries

Practice Category	Austria	Finland	Germany	Italy	Japan	South Korea	Sweden	USA
Strategy	6.04 5.18	5.71 4.94	5.69 4.84	5.49 4.51	5.72 5.13	5.74 5.04	5.55 4.83	5.52 4.56
Supply chain	6.05 5.47	5.90 5.49	5.90 5.24	5.69 5.24	5.45 4.94	5.68 5.17	5.65 5.14	5.63 5.15
Facility efficiency	5.64 4.70	5.17 4.57	5.23 4.49	4.95 4.29	5.33 4.55	5.47 4.88	4.91 4.15	5.17 4.24
Efficient operation	4.89 4.16	5.06 4.24	4.82 4.03	4.99 4.39	5.12 4.24	5.36 4.78	4.72 3.88	5.21 4.46
External involvement in quality improvement	5.36 4.80	5.57 5.13	5.29 4.65	5.40 4.79	5.13 4.66	5.29 4.92	5.20+ 4.93+	5.53 4.98
Organizational quality improvement culture	5.70 5.25	5.75 5.34	5.54 5.04	5.51 5.12	5.05 4.63	5.27 4.94	5.53 5.12	5.70 5.24
Quality improvement foundation	6.01 5.04	5.20 4.65	5.63 4.72	5.42 4.57	5.50 4.85	5.60 4.92	5.24 4.67	5.80 4.82
Activation of floor	5.64 5.16	5.39 4.93	5.60 4.77	5.13 4.65	5.31 4.75	5.48 4.89	5.64 4.93	5.66 4.77

Note) the figure above is for the above average group and that below for the below average group. The difference between the groups is significant at 1% significance level except that with the mark+.

Table3 – Correlation coefficient of the eight practice categories

Practice Category	1	2	3	4	5	6	7	8
1. Strategy	1.00	.536	.688	.394	.415	.336	.556	.519
2. Supply chain		1.00	.615	.494	.522	.624	.488	.699
3. Facility efficiency			1.00	.554	.444	.439	.671	.669
4. Efficient operation				1.00	.470	.353	.537	.482
5. External involvement in quality improvement					1.00	.701	.632	.531
6. Organizational quality improvement culture						1.00	.533	.649
7. Quality improvement foundation							1.00	.667
8. Activation of floor								1.00

Note) all correlation coefficient are significant at .1% significance level.

Table4 – Correlation coefficient of the eight practice categories of the three groups

Practice Category	1	2	3	4	5	6	7	8
1. Strategy	1.00	.312	.434	ns	ns	ns	.245	.202

		ns .250	.286 .505	-.137 ns	ns ns	ns ns	ns .204	ns ns
2. Supply chain		1.00	.373 ns .355	ns ns ns	ns ns .295	.406 .487 .389	.203 -.278 ns	.484 .377 .541
3. Facility efficiency			1.00	.287 ns .211	ns -.325 .246	ns ns ns	.422 ns .355	.453 ns .436
4. Efficient operation				1.00	ns ns ns	ns ns ns	ns ns ns	ns ns ns
5. External involvement in quality improvement					1.00	.587 .539 .552	.278 ns .429	.259 ns .306
6. Organizational quality improvement culture						1.00	.372 ns .300	.488 .370 .516
7. Quality improvement foundation							1.00	.538 ns .418
8. Activation of floor								1.00

Note) ns implies for being not significant at 10% significance level.

Table5– Comparison of the practice categories and competitiveness of the three groups

Practice Category	The levered group	The transitive group	The trapped group
Strategy	5.81	5.25	4.75
Supply chain	5.82	5.44	5.14
Facility efficiency	5.35	4.87	4.34
Efficient operation	5.19	4.54	4.20
External involvement in quality improvement	5.44	5.07	4.75
Organizational quality improvement culture	5.54	5.25	5.02
Quality improvement foundation	5.70	5.13	4.61
Activation of floor	5.56	5.11	4.77
Competitiveness	.421	.023	-.438

Note) the differences between the groups are all significant at .1% significance level. Competitiveness is normalized by country.

TRATEGIC MANEGEMENT CYCLE AS A DRIVER OF THE LEVERED LINKAGE

Strategic management cycle

The levered linkage indicates a linkage from strategy to operational floor. In other words, it suggests the integration of strategy with operation is effectuated within the company. Strategy and operational activities are aligned to achieve specific company's goals. Strategy is different from operation, (Porter, 1996) but the integration of them is important. The P-D-C-A cycle, the management cycle, is known as a practice to implement effective rational behaviors for goal seeking. The levered linkage above

implies the extent to which the management cycle works from strategic planning to operation is higher than the other two groups. We call the management cycle the strategic management cycle. Though the implementation of the effective strategic management cycle is still not easy to many companies, the difference of excellence of management shows up in this implementation capability. (Kaplan and Norton, 1996)

When it comes to continuity or enhancement of the levered linkage, however, one good cycle from strategy to operation is not enough. We observe many companies go up and down or stop existing over time even though they used to be successful. It's not easy to sustain the good momentum. What sustains this long-term success is still one of the most difficult puzzles management faces. The existence of a set of core values to to which the company's members dedicate and more than mere profict generation is among them. (Collins, 2001)

Here we hypothesize that the company with the highly levered linkage takes a long-term orientation sustained by seeking the values. (Hayes, Wheelwright and Clark, 1988) It takes time for resource commitment such as R&D, training, systems and physical investment to be harvested. Without the long-term orientation, desirably with a set of values to seek for, it's difficult to make such resource allocation decisions rationally.

Table 6 indicates how the long-term orientation presents the linkage of the practice categories. The correlation coefficient between the average of the practice categories and the long-term orientation is .318 that is significant at .01% significance level. Table 7 presents the results of Cronbach's alpha and factor loadings on the measurement scale of long-term orientation. Table 6 suggests the hypothesis is not rejected. The company that is long-term oriented tends to show higher linkage. Then we hypothesize that, if the strategic management cycle works effectively over time, the levered linkage is likely sustained. One factor that drives the strategic management cycle effectively over time is the long-term orientation of the company.

Table6– Comparison of the practice categories between above average and below average groups of the long-term orientation

Practice Category	Above average group	Below average group
Strategy	5.45	5.07
Supply chain	5.56	5.37
Facility efficiency	5.01	4.69
Efficient operation+	4.71	4.58
External involvement in quality improvement	5.20	4.97
Organizational quality improvement culture	5.35	5.19
Quality improvement foundation	5.28	5.01
Activation of floor	5.26	5.01
Competitiveness	.133	-.133

Note) the differences between the groups are all significant at 1% significance level except the practice with the mark + that is significant at 10%.

We restructured the linkage into the strategic management cycle as shown in Figure 1. When we define the company as a mechanism to achieve objectives or goals, the management process is concerned with achieving them. (Barnard, 1938) In order to achieve objectives, the company moves stepwise as shown in Figure 1. The management process first generates visions and goals reflecting the set of values based on initial conditions such as past performances, existing strengths and weaknesses and forecasted environmental situations. The outcome status of it is the environment for goal seeking behaviors such

as the degree of long-term orientation, clearness of organizational visions, and goals. The prevailing long-term orientation is especially important because it supports steady goal-seeking behaviors characterized by preparatory behaviors such as anticipatory R&D and other fundamental investment including education and systematization.

Table 7 – Long-term orientation and constituent questionnaire

Practice	Constituent questionnaire	Factor loading and Cronbach's alpha
Long-term orientation	We plan for the long-term, rather than optimizing short-term performance.	.804
	We believe that focusing on the distant future will lead to better overall performance than worrying about short-term goals.	.745
	Management outside of the plant is primarily concerned with short-range financial performance. (Reverse)	.701 alpha=.612

Secondly the process transforms the environment into strategy to give a framework for operational behaviors achieving organizational goals. Strategy should be formally clear, anticipatory and consistent with business objectives.

Thirdly the process is concerned with the deployment of operational activities, that is, to make operational plans to convert strategy into actions and deploy all required activities organizationally to implement the plans. The outcome is the actual level of practice in each activity. Manufacturing practice's level is important part of the outcome.

Finally the process coordinates or controls the operational practices to achieve the goals actually by adjusting to unexpected changes and contingencies. The outcome is a set of actual competitive performance measures resulting in organizational performances such as sales and profitability depending on the interaction between the measures and market conditions. The measures consist of quality, delivery, cost and new product performances, etc. The outcome determines starting conditions for the next first step.

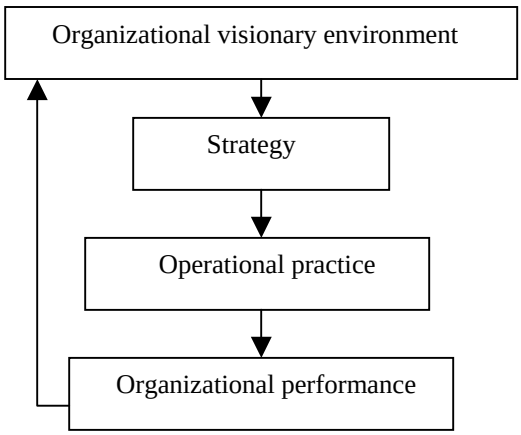

Figure 1. Strategic management cycle

Traps in the Strategic Management Cycle

The strategic management cycle contains the management process embracing the sequential steps in Figure 1. The achieved level of all of the steps measures the degree of success of the cycle. The firm can survive and grow when the management processes sustain an effective series of the cycle in the sequential phases. Figure 2 shows how the strategic management cycle operates dynamically with transforming activities between the stages explained above. If the cycle starts with the activity of organizational vision and goal setting and infiltration, the outcome is organizational visionary environment. Then the activity of forming a strategy starts based on the environment to result in the strategy. The strategy triggers the planning and deployment of operational practices that lead to the operational practice. The activity of coordination and control of the practices results in the organizational performance.

In Figure 2, each quadrant has two lines, real thick and thin ones each of which exemplifies a dynamic path of the cycle. The thick line is an upward path and the thin one a downward path. Two companies can start from the same level of the organizational visionary environment, A, but one cycle creates a big difference, C-B, of the environment between them. The lines show the difference of the capabilities of the activities of quadrants. In other words, the angle between the thick and thin solid lines indicates the variability of the capability.

We assume that the high linkage company locates itself at four corners of a large square such as the one shown by the real thin line in Figure 2 because the four axes should be balanced and their levels are high. When an average company moves up, it will follow a spiral process as indicated by the thick lines. The shift to the thick line can be possible in any quadrant.

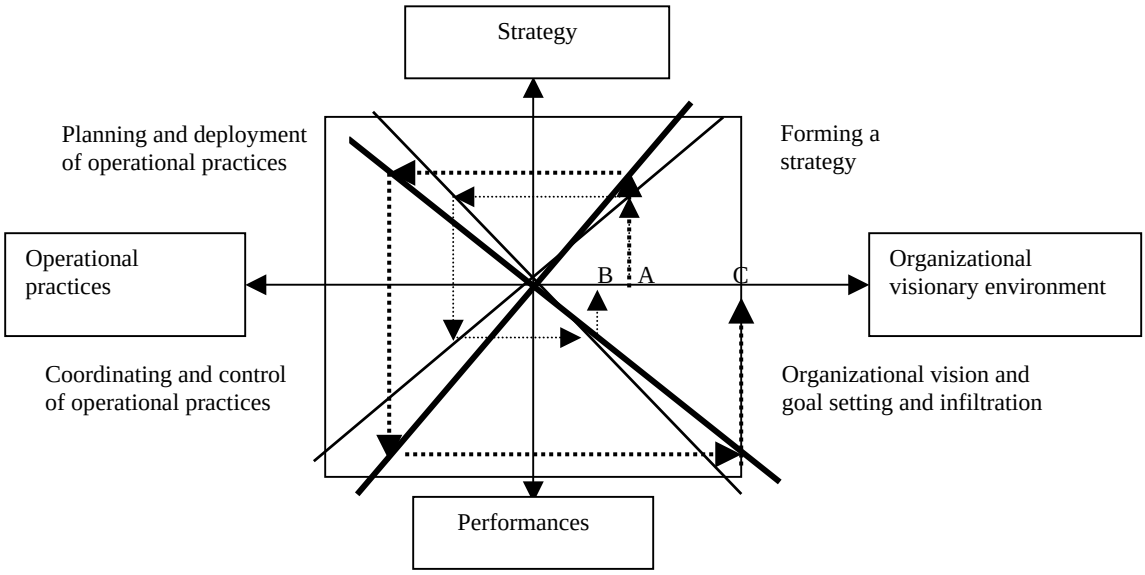

Figure 2. Dynamic transition of the strategic management cycle

When restructuring the practice categories into the strategic management cycle structure, we put the strategy of the categories in the strategy in Figure 1 and 2. Furthermore, the rest of the practice categories from the supply chain to the activation floor compose the operational practice in the figures. These practice categories can compose the operational practice. Table 8 summarizes the reliability and validity test results of these scales. The competitiveness is put into the organizational performance in the figures. The counterpart of organizational visionary environment in the figures is not available in

the eight practice categories. Then we put the long-term orientation in the organizational visionary environment, though it covers only part of attributes of the environment.

Table 8 – Operational practice scale and constituent practice categories

Practice	Constituent scale	Factor loading and Cronbach's alpha
Operational practice	Supply chain	.806
	Facility efficiency	.796
	Efficient operation	.690
	External involvement in quality improvement	.775
	Organizational quality improvement culture	.780
	Quality improvement foundation	.822
	Activation of floor	.857
		alpha=.892

Figure 3 reveals the scatter plot of actual data in each quadrant. Instead of the organizational visionary environment we use long-term orientation. Also the third quadrant is a dynamic phase, that is, the company sets up a next organizational visionary environment based on present performance. Although the data we plot is cross sectional, but we assume this phase is considered to remain stable.

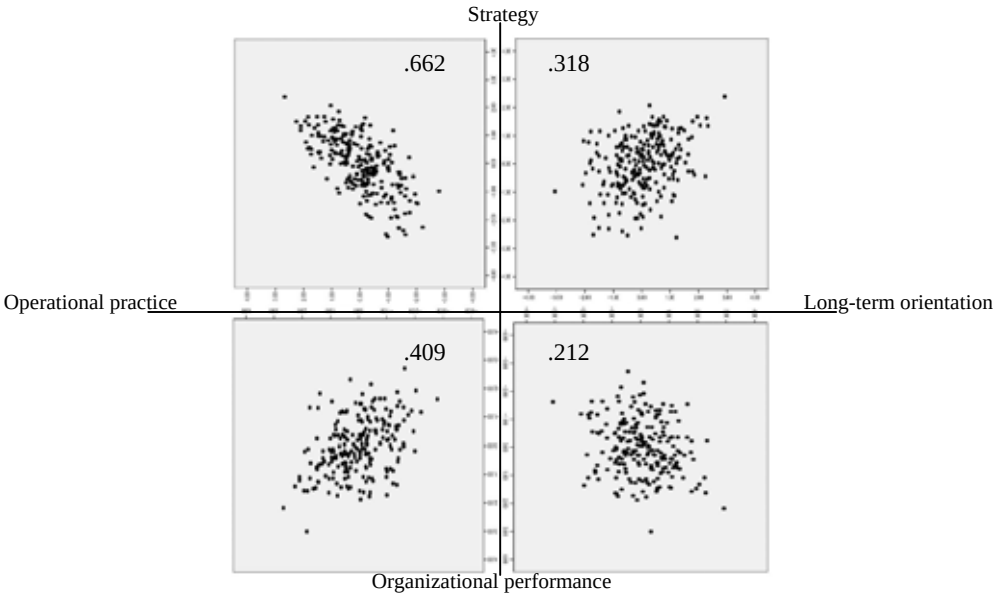

Figure 3. Measured dynamic transition of the strategic management cycle

The numerical value at the top of each quadrant is the correlation coefficient of the two axes making the quadrant. The coefficient is a surrogate for the degree of angle of the two axes. Judging from the figures, the first and second steps tend to be more variable compared with the third and fourth steps of the strategic management cycle shown in Figure 1. In other words, the setting up of organizational visionary environment based on the previous organizational performance and the strategy formation under the environment are the aspects in which the company can make a bigger difference to the establishment the strategic management cycle, that is, the levered linkage.

In these quadrants, however, a trap may await every company even if the company sustains the highly levered linkage so far. The company may easily turn into the vicious cycle in these quadrants because the company makes a mistake easily due to their high variability of transformation. It may not be accidental that long lasting high performance companies have distinguished attributes related to these quadrants. Maintaining a set of values and clear strategic focus are among them. (Collins, 2001) Also it warns the danger of dependence only on operational excellence. It's part of excellence of the cycle. The continuous excellence of company depends on the working of the cycle. On the other hand, these quadrants' variability gives good chances for turn around, that is, the shift to the virtual cycle as exhibited by the thick lines in Figure 2, to an average company.

TOWARDS A SUCCESSFUL STRATEGIC MANAGEMENT CYCLE

It is a recommended agendum for the company that wishes high performance over time to develop and maintain a successful strategic management cycle. Developing a good visionary environment and a good strategy (the first quadrant) that can be aligned with good practice and its control (the fourth quadrant) is a key to long-run high performance.

The development belongs to the decision at front-end of the company's management process. The concept of front-end loading is well known as a concept related to new product development planning. (Wheelwright and Clark, 1992, Kim and Wilemon, 2002) The front-end fuzziness is a significant source of problems in new product development and project management. (Khurana and Rosenthal, 1998) Fuzziness is also critical for the whole process of the company itself. It is also concerned with visionary and strategic planning. If it's poor and contains much fuzziness, the rest of the cycle is vulnerable to conflictive, discretionary and less consistent behaviors accompanying much waste and poor effectiveness.

Integration of organizational wisdom

The decisions at front-end involves much uncertainty and fuzziness. Even if a set of values reflects beliefs of the company, the validity of them cannot go without influences of environmental values that are changeable over time as long, especially when the organization is a private company whose earnings depend on the fit between the values. Combining organizationally available wisdom to reduce such uncertainty and fuzziness is one of the most effective means, besides speeding actions, to adjust to new unexpected situations. (Jauch and Kraft, 1986) One such combining mechanism is the inter-functional or cross-functional approach in management. The approach used to be controversial in the field of new product development. Though the inter-functional or cross-functional approach may not be directly related to new product development performance, appropriate setting up the environment including communications enhances its effectiveness. (Keller, 2001)

In this study we assume, whoever is involved and whatever a set of values are set in the visionary and strategic planning at front-end, the inter-functional culture of the company is one of the most important organizational attributes to activate the linkage of all activities necessary for achieving organizational goals. We hypothesize the long-term orientation in combination with the inter-functional culture contributes to the effectiveness of the strategic management cycle, and then to the establishment of the levered linkage.

We took the average value of the inter-functional culture and the long-term orientation to make one measure of the long-term orientation with inter-functional culture and replaced the mere long-term orientation axis in Figure 3 with it. The correlation coefficient between them is .383, which is significant at .01% and suggests the new scale may be meaningful. Table 9 summarizes composing scales with the reliability and validity test results for the scale of inter-functional culture.

Figure 4 exhibits the strategic management cycle with the new scale for the visionary environment setting. The difference between Figure 3 and 4 lies in the two quadrants where management has a high probability of triggering a vicious cycle. The correlation coefficients in these quadrants are improved. It suggests that the capability for the two difficult phases can be enhanced to reduce the risk of falling into the vicious cycle by implanting the inter-functional culture in the company. That is, the company can take a relatively stable orbit to spiral up the strategic management cycle with the long-term orientation driven by the inter-functional culture.

Table9 – Inter-functional culture scale and constituent practice categories

Practice	Constituent scale	Factor loading and Cronbach's alpha
Inter-functional culture	Achievement of functional integration	.929
	Integration between functions	.920
	Leadership for functional integration	.899
	Organizational coordination of functional integration	.855
		alpha=.922

Note) though we omit the explanation of the constituent scales' measurement here due to the limitation of pages, constituent scales are all passable by the reliability and validity tests with the cutoff values of alpha of.600 and factor loading of .550.

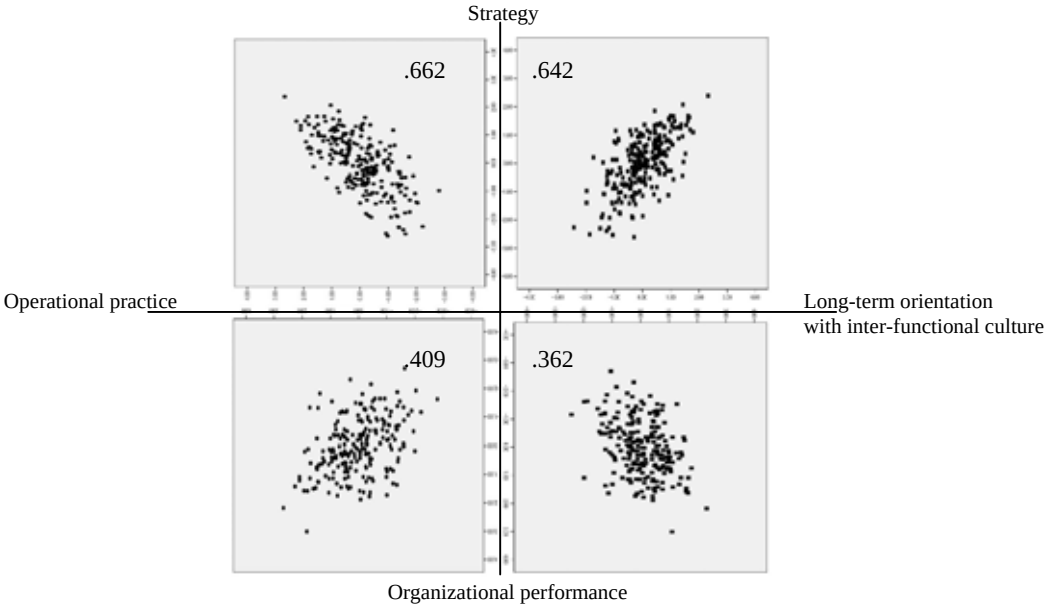

Figure 4. Increased stability of dynamic transition of the strategic management cycle

The positive effect of inter-functional culture on the strategic management cycle may not be autonomous, but Figure 4 indicates the potentiality of the inter-functional culture to sustain the effective strategic management cycle, especially in the tricky and difficult management phases. Figure 4 that hints that relatively stable relationships between the stages of the strategic management cycle though it's drawn based on static data suggests the importance of the company's integrated process of all competencies under the long-term visionary environment. The company's high performance over time can be steadily sustained by improving it.

Integrating wisdom

When we examined cases with dramatic improvements in businesses' competitive positions in markets and successful in sustaining the positions over time, most of the cases have a common improvement process. The process is concerned with the fourth and first quadrants in Figure 2. They mostly renovate their integrating functional wisdom mechanisms effectively. The point is the improvement or establishment of effective front-end loading mechanism by top leadership or organizational thrust formally supported by top management.

We introduce a case from the Electronics industry we discovered during interview research for the High Performance Manufacturing project. The business (product) is a relatively new audiovisual electronic appliance. The company A is now leading the market. The thrust was triggered by a declaration of its corporate top management that the factory would be closed if it remained uncompetitive. The effort to turn around started with an introduction of front-end loaded development process. The aim is to make a competitive product in terms of Quality (including serviceability), Cost and Delivery. They put their focus on designing product configuration based on simplification. They used to design their product concept led by product designers based on market information. But that approach was not effective in developing a really satisfactory product for the company or customers.

The new development system consisting of R&D members from basic technology and device and manufacturing related functions focuses on the product concept and configuration to enhance standardization, decomposability, lead time reduction, easiness of assembly, commonality of manufacturing technologies and processes, improvement of physical distribution efficiency, and product simplicity. This integrates product development and manufacturing process. At the same time they changed the assembly process into a cell production system that is a generally one-man cell (Yatai, i.e., stall) system to increase flexibility of product mix and volume changes. But the change gave more freedom of work than an assembly line and this stimulated an individual worker's idea generation. It was more effective with the increased clearness of future direction and targets or goals made possible by the new system. The floor became another source of wisdom.

The system invoked a lot of interactions including frictions when introduced. But this facilitated the factory's communication culture and gives birth to constructive interactions including floor people and developmental staffs. New ideas for next product design and improvement ideas of existing processes come up a lot to help development people from the floor. When product engineers walk on the floor, they often talk to or are talked from workers frankly. The plant manager told a story about introducing the system. A worker called to tell him some strangers were walking around the floor. He went to check on them only to find they were product engineers. It proved how isolated people on the floor and product engineers are from each other. A practice required for workers is a practice to make, but it has no connection with the creation of values. It's difficult to motivate workers to improve it or prepare for next changes because they cannot understand the new direction. The new front-end loading system makes it clear for involved people to understand what they should do and what is important in the future.

The firm used a room on the floor to display the final product as well as the internal structure of parts from the first model to latest one. The display also showed how the number of parts has declined graphically. The achievement is clearly shared by workers. This room is for workers, though it's also useful for visitors. The aim is to increase the workers' understanding of their contributions to the firm's improvements. For example, the latest model's size is half as large as the first model. This shows the workers how and why they improved processes and meanings of their efforts. Furthermore the information on performances is expected to drive new challenges and has them acceptable to employees.

This system may not cover all aspects of the two quadrants, but it embraces the core ones. The decision-making in the two quadrants has been characterized as ill structured. The place, however, to integrate wisdom and coordinate involved activities can be useful to reduce uncertainties and complexity attached to these quadrants.

THE REQUIREMENT FOR LONG-LASTING HIGH PERFORMANCE COMPANY

The most dangerous risk for a long lasting high performance company lies in the visionary environment setting and strategy formation stages. Even companies that highly perform manufacturing practices may step out from the cycle of success in these stages. This phenomenon can be called the disintegration of strategy and operational activities that prevails easily in many companies.

Going back to origin

The chasm emerges from the less structured process of the stages. It's vulnerable to arbitrary and biased perspectives that are brought in frequently by new top managers. They tend to forget about the importance of the levered linkage to create real competitive values. This simple rule is still reemphasized and repeated.

Dr. Chubachi, new president of Sony said in 2006 just after the inauguration of new top management team that was expected to restore Sony, "We created a new more streamlined structure that abolished the "The Network Company" system within Electronics in favor of a more centralized Electronics Business Group. As a result, key decision-making and key functional areas-such as product planning, technology, procurement, manufacturing, and sales and marketing-have been consolidated under the Electronics CEO. This significant structural change was designed to eliminate the business "silos" that had prevented us from focusing resources on our competitive "champion" products and to foster a more coordinated, efficient, and rapid decision-making process. In addition, the new structure would enable us to prioritize R&D, and optimally maximize our resources for growth". (Sony, 2006) In 2007, he also said, " "Sony United" was introduced as an internal slogan in Sony's mid-term corporate strategy announced in September 2005. Since then, we have implemented a variety of measures aimed at "uniting Sony", including promoting teamwork, cooperation and the marriage of key resources". (Sony, 2007)

Mr. Watanabe, on the other hand, president of Toyota whose management has been admired by business worlds as well as academia says in the Annual Report of 2006, "The ability of Toyota's employees to share large ambitions and work as a team to achieve them is the power that drives the Company's development forward". (Toyota, 2006) He also said in the Annual Report 2007, "I am committed to steadily improving Toyota's corporate value by continuing to pursue farsighted innovations and building a solid management platform". (Toyota, 2007)

Words such as integration, consolidation, coordination, teamwork, and sharing of (farsighted or long-term) visions are always key words to the company, whether it's restoring or thriving. These concepts are important ingredients for the construction of levered linkage that amplify the capability of value creation of existing resources. But the effective implementation of them is basically not easy. The company easily makes mistakes in it or is inclined to forget about the concepts if it's done well once.

Systematization of the front-end loading process

Formalization or systematization of the front-end loading process, if its implementation is advocated internally or externally, sometimes encounters intense resistance from involved people such as senior managers in charge and product development people because they are subject to severe time and resource constraints. They think it's troublesome and tedious for them to implement in addition that the process is full of uncertainty. A strong support from top management is desirable to initiate it.

The process we applied to actual companies, for example, comprises defining of values embedded into products or services, identifying of applied technologies, defining of product configuration, evaluating and planning of development projects and supply chain designing and planning. (Morita and Ochiai, 2005) All related people from functions such as R&D of product and process, procurement, manufacturing, costing, sales, etc. join the process to discuss, evaluate and understand what they are going to do. One important contrivance to implement the process is formatting through which they think and discuss.

Our observation suggests this systematization turns effective if it's applied initially to new product development. Many companies consider their new product development processes are not so satisfactory. While proceeding, they will soon or later find the lack of clearness of value definition as a company, the paucity of communication or integration of wisdom between functions, the lack of linkage of basic R&D and product development, etc. Organizational understanding of such problems promotes the understanding of the importance of systematization of the process.

This systematization turns the company farsighted. The enhancement of evaluation capability about technology, process, internal resource and business environment including market increase the capability to organize what they can do or should do in time axis. It develops the capability of mapping of necessary technologies and activities including external alliance into the future. This strengthens the long-term orientation as a result.

The systematization contributes also to the learning capability at front-end. It's similar to the standardization in operational activities. Though the concept of standardization seems invalid in the area that has been thought ill structured, it's effective in the sense that involved people can understand what they know and don't. It gives focuses for them to search for information or wisdom. The capability of information and wisdom search can be expected to increase. Then the capability improves the system in turn. The system makes the company able to choose best alternatives by organizing wisdom maximally at that time. Leaving the process fuzzy is most undesirable. It leaves the company in floating or random walk situation. The levered linkage is unrealizable.

Many manufacturing companies demand devoted implementation of lots of practice. They introduce many types of systems and scientific methods upon the knowledge of their effectiveness in competitors or other companies without hesitation. On the other hand, the fuzziness at front-end is often left untapped. It causes many troubles and inefficiencies on the floor besides the inefficiency of activities upstream such as new product development. (Morita and Ochiai, 2005) Floor operations have to spend much time and effort to make up for it. As business environments increase in uncertainty and changeability, the levered linkage becomes difficult to realize. The misalignment opportunity between strategic actions and operations increases. The company needs to pay special attention to the linkage of strategy and operation. More rational approach to the problem is needed.

CONCLUSIONS

In the 1980s to early 90s, Japanese manufacturing companies showed its excellence to all over the world. But now its strengths look waned. Much of the older literature identified the strengths of Japanese manufacturing practices, (Schonberger, 1982) and some with Japanese management style. (Ouchi, 1981) The key is how a company combines its resources and wisdom to develop the levered linkage of all activities in order to create higher and more attractive values to customers than do its competitors. Practice and culture are important ingredients for developing. Either one cannot sustain the levered linkage over time.

The goal is to drive the strategic management cycle effectively over time. For this purpose the company needs to be watchful, or paying special attention to the visionary environment setting and strategy formation stages of the cycle. Many companies, including Japanese manufacturing companies

that had a strong reputation, are likely to be lost in these aspects as markets become saturated and uncertainty increases. Highly efficient manufacturing practice without right direction cannot lead to high performance over time.

The key lies in the integration of wisdom at front-end. As long as the integration process remains fuzzy as it used to be, it's difficult to be a high performer over time. The construction of effective front-end loading mechanism is one of the most important and impending management agenda now, especially Japanese manufacturing companies.

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