ORGANIZATIONAL FLEXIBILITY AND LEARNING ORGANIZATION
----ORGANIZATION OF CIMS ENTERPRISE

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ABSTRACT

By studying the essence and characteristic of CIMS enterprise, the paper discussed organizational flexibility, which corresponds engineering flexibility. Then the structural characteristic of flexible organization is inquired. On the basis of this discussion, the importance of learning organization(LO) is highlighted. The paper points out that organization of CIMS enterprises should be learning organization with high flexibility.

Conception of CIMS and Practical Obstacle

The conception of CIM (Computer Integrated Manufacturing) is coined in Dr. Joseph Harrington's *Computer Integrated Manufacturing*. It emphasises on two viewpoints:

1). Links in the production chain should be viewed as a whole.

2). The process of production is essentially process of gathering, transferring and working the data. The final product can be regarded as material express of the data.

These two points are core from then on.

Not only a kind of technique, a set of management philosophy the CIM is. It links the whole process of production. Its most important significance lies in the method which organizes production. It is a deep revolution comparing with the traditional way.

Factors	Scale
Software	8.4%
Interface	7.6%
Communication	0.6%
Performance Requirement of System	8.1%
Personnel	9.8%
Management	12.9%
Plan Process	20.4%
Organizational Problem	32.2%

Table 1. Practical Obstacle to CIMS(Yankee Group Report 1986)

CIMS, saying not exactly, is target of CIM's thought. Building CIMS is a progressive procedure. It

will take about a decade to form a successive flow of computer integrated information from setting up manufacturing island. The practical obstacle to CIMS includes several factors. Up to 80s', people realized that factors of people and organization are more important than technical factors. Yankee Group Report 1986 was the first study that realized this problem. It is shown in table 1.

The study showed that only no more than 25%'s difficulty lay in technology. The rest were all related to people, organization, plan and management. Another study in 1990 proved that the factors of people and organization were the most important.

Treating this optimistically, we can say that people's factor represents the revolution that will create integrated technical and social system. Subsequently, it is more significant to probe into improving people and deploying organization than raising level of technology for CIMS's development.

Organizational Flexibility

1. flexibility

Flexibility is the character and capability to adapt alternation. Simply, it is being able to do many things.

There are two distinguishable dimensions in the concept of flexibility; the first is temporal and the second intentional. The temporal dimension comprises an *ex ante* mode-preparing in advance for some future transformation, and an *ex post* mode -- after-the-fact adjustments undertaken once a triggering episode has occurred. The intentional dimension comprises an offensive mode-creating and seizing an initiative, and a defensive mode-guarding against predatory moves or correcting past mistakes.

As shown in table 2, the concept of flexibility can be classified into these four dimensions. Robustness, for example, is defensive in an *ex ante* sense, providing the capability to with stand or deflect the consequences of an unanticipated contingency so that a strategy can remain viable in spite of changes in the environment: resilience is also defensive, *ex post*, providing the recuperative capability to return to a previously viable state. Whereas hedging, on the other hand, is a practice that enables a potentially damaging contingency to be insured against, and is thus an *ex ante*, defensive form of flexibility. Versatility provides a variety of response repertoires for dealing with unexpected or novel situations in an offensive manner, which is installed or developed, *ex ante*, before the nature of the initiating contingency is known.

	EX ANTE	EX POST
OFFENSE	Agility Versatility	Liquidit Elasticity
DEFENSE	Robustness Hedging	Corrigibility Resilience

Table 2. Flexibility: An integrative framework

2. Organizational Flexibility and its Significance to CIMS

1>.Engineering flexibility and organizational flexibility

Flexibility is a kind of strategy for an enterprise. The overall flexibility consists of two aspects: engineering flexibility and organization flexibility. The former is the technical facets of an enterprise, the later is the structural facets of an enterprise, as for the survival and development of organization, the former is direct, the later is indirect. With the increasing competition, the consumer's demand is becoming multiple; the product life cycle is becoming shorter; the market category is becoming longer; the relationship between the engineering flexibility and competitive advantage is more and more close. It determines the innovation ability and adaptability to the changing market, as well as the survival ability to an enterprise. The organization is the fundament of the engineering flexibility. Without moderate organizational flexibility, the engineering flexibility cannot last for a long time.

As for CIMS, the engineering flexibility refers to the flexibility related to the production and manufacturing, including machine flexibility, process flexibility, product flexibility, routing flexibility, volume flexibility, expansion flexibility, operation flexibility, production flexibility, modification flexibility, innovation flexibility, and material flexibility. The engineering flexibility can be measured by two facets: one is volume, the other is variety.

The organization flexibility is the management ability to achieve engineering flexibility, which is made up of the flexible policy-decision and strategy, high efficient allocation of staffs, multiple-ability employee and appropriate engineering process. The core of the organizational flexibility is the constant change to meet demand of engineering flexibility. The organizational flexibility is necessary to the engineering flexibility and guarantee of overall flexibility. This is the key of this article.

2>.Importance of organizational flexibility for CIMS

As for as CIMS, a new style of production and organization concerned, the importance of organizational flexibility is outstanding. There are two unbiased fields, the flexible structure and new type of management idea.

(1). Structural flexibility

With the constant change of the enterprise and the environment, any ossified pattern will distort the consistence between the enterprise and environment in which the enterprise is living in. Therefore, it is prerequisite to the flexible structure. Structural flexibility refers to multi-polar, group, front-line orientation, etc., which will be discussed later. Enterprise should adapt different type in different developing period according to its character, including scale, product.

(2).Flexibility of Management

Now technologies always accompany new management philosophy. Some old "rules" may be challenged. A new style of management idea regards the enterprise system as a whole, which can think and adapts the nutrition from the experience and environment. Under the direction of this kind of management idea, the enterprises establish a new organization culture atmosphere. All kinds of relationships, including the managers, subordinates, comrades, departments and customers, should adapt new style. At the same time, with the development of organization, people can fully develop themselves. This is so called the organization that has the learning ability. In the following, firstly, contents of learning organization is studied. Moreover, the method and detailed ways to improve study abilities are discussed. At the same time, it is also the way to improve organizational flexibility.

3. Structural characteristic of flexible organization

1>.Flatting

Flatting of administrative levels have some benefits:(1). information is transferred more correctly and quickly; and delay is minimized;(2). management is more close to front-line and customers.

2>.Multi-Polar Organization

Multi-polar organization is more akin to a "federation" or a "constellation" of business units that are typically interdependent, relying on one another for critical expertise and know-how. The center's role is to orchestrate the broad strategic vision, develop the shared organizational and administrative infrastructure, and create the cultural glue which can create synergy, and ensure the unity of mission and purpose. However, these tasks are undertaken together with the line units, rather than for them.

3>.Dualistic Systems

The traditional formal structures--in the sense of clear reporting relationships, grouping of skills, and concise assignment of responsibility, authority, and accountability--are in low efficiency. But the continuous flux structures often cause confuse. Therefore, an ideal one is both structured and disordered; it evolved dualistic organizational systems, designed to strike a dynamic balance between stability on the on hand, and flexibility on the other hand. The first component is a substrate of the formal structure which only periodically undergoes major transformation. This provides a formal mechanism for grouping skills, clustering activities, and assigning reporting relationships, as well as a base unit which gives many employees an anchor of stability. However, due to inertial forces, these bedrock structures can not be changed as frequently as may be warranted by internal and external changes. The compensation for the relative inflexibility of the bedrock structure is by using of temporal project teams and multi-functional groups whose members are drawn from various operating units.

4>.Front-Line Orientation

Historically, organizational roles and departmental activities have been divided into staff and line positions. The first category comprise functions whose power and influence are based on advisory or monitoring roles. Typically, these groups have limited direct control over line operations. But this instrumental distinction between staff and line functions is becoming increasingly blurred. The impetus for change has largely come from competitive pressures to reduce costs. Many staff functions are becoming directly exposed to the "front-line" realities of their customers.

5>.Cosmopolitan Mindset

Many firms become global very early in their development. Such a rapid process of globalization makes it necessary to develop a cosmopolitan mindset that incorporates different cultural assumptions and premises. Despite the inherent challenges, however, a pluralistic culture can provide considerable versatility by drawing on diverse perspectives, approaches and solutions.

6>.Multi-Talented Employees

The organization can thus be characterized as montage of individual capabilities and informal networks and relationships, rather than a series of pre-determined roles and positions and formal hierarchical relationships. The productivity of knowledge-based entities depend on employees' capabilities, commitments, motivations, and relationships. Talented employees can often change an enterprise. Subsequently, it is important for department of human resources to search and train versatility of the employees.

7>.Semi-Permeable Boundaries

Much has been written in recent years about the rise of strategic alliances and collaborative partnerships. The consensus seems to suggest that such alliances be a novel form of "hybrid" organizational arrangement, provide a mechanism for pooling complementary capabilities, addressing rapid product development cycles, reducing risks, and providing strategic flexibility.

Learning Organization

(1). Learning Organization

Learning organization, organizational learning and systems thinking is most popular term in management science and organizational theory. Under the influence of M.I.T. Sloan, many world-wide famous corporation introduced mechanism of learning to build a learning organization. *Fortune* says that the most successful company is the organization named as learning organization which is some kind of excellent adaptive company. The reason that learning organization has so much influence is that the learning mechanism can improve organizational flexibility.

Organization learning is the process by which they become aware of the qualities, patterns, and consequences of their own experiences, and develop mental models to understand these experiences. Learning organizations discover what is effective by reframing their own experiences and learning from that process. Learning organizations are self-aware, introspective organizations that constantly scan their environments.

In the book *The Fifth Discipline*--Theory and Practice in Learning Organization, Peter M. Senge summarized his decade study to abstract five disciplines of building LO: personal mastery, improving mental model, building shared vision, team learning, systems thinking. The fifth one--systems thinking is critical. It is named as the fifth discipline by Senge.

(2). Systems Thinking and CIM

Corporation is a complicated system. It includes many links, such as supply, production, sale, human resource, technology, financial and strategy, and so on. The links interact each other. But, because people are limited in fragment mental model, this kind of organic relation is cut down. For example, product designers disregard marketing surveys and throw the product over the wall to manufacturing, which finds the design impossible to produce. After making the "appropriate" changes and producing the product, manufacturing throws it over to sales. Salesmen find themselves stuck with a low-quality product that does not meet customer requirements. The product gets sent back and departments start blaming each other. This process constantly repeats itself.

Thinking of CIM is the revolutionary production organization philosophy to change the fragmentation of company's basic function. It integrates divided functions by computers. But a "hardware" CIMS cannot get to the target. People who involve management must regard the production and marketing by systems thinking. This is because people's offect is very critical in system of operation. And many task and function must be carried out by people. Have human held mindset of fragmentation, competition and reactiveness, it is very difficult to get to their goal.

Same as the popular concept ReEngineering is. Without systems thinking, reprocessing the working procedure solely could not improve the behavior of an enterprise. Systems thinking is premise of

reengineering and procedure management.

3. Improve learning capability of organization

1> Adaptive Learning and Generative Learning

Many firms use adaptive learning. They often emphasis on product, market, services or technology being improved little by little. They like traditional way. Adaptive learners (organization or individual) abide to the model of impulse-reactiveness , they deal with changes in the environment with discontinuous mechanic action, which usually can not solve the problem directly. The old , stable and insured action model impedes diversity, experiment and the spirit of risk-seeking. Maintaining the static organizational relationship and conservative practice(although the method made the organization successful before, the outer environment has changed a great deal) makes it difficult to change and regenerate the direction of strategy. Adaptive organization changes sometimes, but it does so only in a very narrow circumstance.

But there are also many companies, such as British Petroleum, Kodak, emphasis on learning how to learn. They depend on initiative learning to change their organization and improve their efficiency. Initiative learning which is named as "double loop learning" requires that corporation get knowledge of customers and management in new mode. In fact, adaptive learning is just some kind of "single loop learning"--corrects the error by changing original behavior.

2>. Organization Unlearning

In order to build LO, managers must alter their original thinking--to unlearn the original organization. It is a difficult job because managers must give up some methods which is effective in the past but maybe not in effect now.

Learning culture   A learning organization has a culture and value set that promotes learning. A learning culture is characterized by its clearness and consistency: (1)openness to experience; (2)encouragement of responsible risk taking; and (3) willingness to acknowledge failures and learn from them. A learning culture is not so much captured in a "Sloganeered" mission statement crafted by a consulting firm; instead, it is evident in the everyday practices of a company. In a company with a learning culture, everyone--Management, employees, customers, and suppliers sees opportunities to learn and grow. Groups engage in active dialogue and conversation, not traditional discussions.

Continuous Experimentation.   Management is committed to continuous experimentation as a means of institutionalizing learning. A strategy is an outcome of the learning process.

Information Systems.   In learning organization, correct information must get to proper person in right time in most effective mode.

Reward systems.   Reward systems in the learning organization recognize and reinforce learning. This means that pay and promotion practices are tied to risk-taking, flexibility, continuous improvement, and other behaviors that learning requires, such as risk taking, continuous improvement. At the same time, learning organization do not punish for failure. But it regard failure as necessity.

Human resources practices.   A learning organization must select people not for what they know, but for whether they are able to learn.

3>. Dialogue

The world is more and more complicated, the relationship is more and more delicate, and the result is more and more unpredictive. Subsequently, demand for collective thinking is more and more strong so as to develop integrative thoughts and consistent behavior. These kind of capability is crucial for management

efficiency. Make dialogue in organization is some effective way to improve the ability. Dialogue is method for people to share and develop their knowledge. Dialogue is also important for organizational learning.

The sense of dialogue stands in stark contrast to what we normally think of as "discuss-a mechanistic and unproductive debate between people seeking to defend their views against one another. In dialogue, as we use the term, people gradually learn to suspend their defensive exchanges and further, to probe into the underlying reasons for why those exchanges exist. The central purpose is simply to establish a field of genuine meeting and inquiry--a setting in which people can allow a free flow of meaning and vigorous exploration of the collective background of their thought, their personal predisposition, the nature of their shared attention, and the rigid features of their individual and collective assumptions.

Dialogue can be initially defined as a sustained collective inquiry into the processes, assumptions, and certainties that compose everyday experience. Yet this is experience of a special kind--the experience of meaning embodied in a community of people. Often that meaning is incoherent, full of fragmented interpretations that guide behavior, yet go untested and unexplored.

If people can be brought into a setting where they, at their choice, can become conscious of the very process by which they form tacit assumptions and solidify beliefs, and be rewarded by each other for doing so, then they can develop a common strength and capability for working and creating things together. This capability exists in every community, but in most organizations it is dormant. Dialogue allows it to be awakened.

4>. Leading art in learning organization

Building learning organization is from the top of tower at least in the beginning. Therefore, the role of leaders in the enterprise is very critical. Not like leaders in traditional organization, some new job is put onto the leaders in learning organization. They are designer, tutor and steward.

Designer The functions of design, or what some have called "social architecture", are rarely visible; they take place behind the scenes. The tasks of design are:(1)the governing ideas of purpose, vision, and core values by which people will live;(2)the policies, strategies, and structures that translate guiding ideas into business decisions; and(3)effective learning processes.

Teacher In learning organizations, this teaching role is developed further by virtue of explicit attention to people's mental models and by the influence of the systems perspective. After Surfacing people's mental models of important issues, leaders help people rebuild perspective to reality--from phenomenon to structural reason behind the symptom.

Steward This is the subtlest role of leadership. Unlike the roles of designer and teacher, it is almost solely a matter of attitude. It is an attitude critical to learning organizations. Leaders' sense of stewardship operates on two levels: stewardship for the people they lead and stewardship for the larger purpose or mission that underlies the enterprise.

This is a new type of leadership. Leaders engaged in building learning organizations naturally feel part of a larger purpose that goes beyond their organization.

5>. Learning Lab

To learn by learning lab or microcosm is the most promising learning way. By describing the practical environment by computer, management group can make riskfree learning. Many policies can be tested in computer with little cost.

The vision guiding current research in management learning laboratories is to design and construct effective practice fields for management teams. Much remains to be done, but the broad outlines are emerging.

First, since team learning in organizations is an individual-to-individual and individual-to-system phenomenon, learning laboratories must combine meaningful business issues with meaningful interpersonal dynamics. Either alone is incomplete. Second, the factors that thwart learning about complex business issues must be eliminated in the learning. Chief among these is the inability to experience the long-term, systemic consequences of key strategic decisions. We all learn best from experience, but we are unable to experience the consequences of many important organizational decisions. Learning laboratories remove this constraint through system dynamics simulation games that compress time and space. Third, new learning skills must be developed. One constraint on learning is the inability of managers to reflect insightfully on their assumptions, and to inquire effectively into each other's assumptions. Both skills can be enhanced in a learning laboratory, where people can practice surfacing assumptions in a low-risk setting. A note of caution: It is far easier to design an entertaining learning laboratory than it is to have an impact on real management practices and firm traditions outside the learning lab. Research on management simulations has shown that they often have greater entertainment value than educational value. Therefore, there are many problems is needed to resolved for application of learning lab.

Practicing in Learning Lab

The process of building Learning Lab is the process to master all kinds of relationship in enterprise in a whole. Because manufacturing corporation resemble each other in structure, we need not repeat the modeling process.

Based on these, we divide an enterprise into five parts: Marketing, Research & Development, Manufacturing, Human Resources, Financial & Accounting. A quick model is set up by modifying some parameter. By this way, we studied the learning model of Shanghai Liming Clothes Machinery Factory. As it is not this paper's task to demonstrate the detail of the model, we ignore it.

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