

Chapter 2

Literature Review

2 Literature Review

Managing engineering is relatively difficult and very demanding when compared to other human resource management, especially in hi-tech industry. There were several approaches in organization management, none of them could be a magic solution for all organization situation.

There are 3 major factor need to be optimized, "Process", "Resource", and "Technology" incorporated with appropriate structure to allow effective execution. When organizational restructuring is considered, improvement in organization capability, efficiency, and effectiveness are expected to align with business requirements.

"Restructuring" in this paper means rearrangement of organization to enhance its capability with appropriate tools and workflow.

Drucker (1993) presented ideas in managing an organization to maximize work effectiveness. Changing "bad habits" instead of changing the culture of the organization, start with defining objective goals and asking "where is in our business processes working to achieve the goals?". Defining measurement of the business should be divided into sections to simplify the analysis for further improvement. He also addressed that one business process should support only one purpose to be cost-effective.

Hammer (1994) addressed that organization objective is always missed when process is divided into tasks and each task handled by a responsible group. Re-engineering concept was introduced to improve business process and to create competitiveness by integrating tasks, shortening the process, and leveraging by computer technology. The keyword in his reengineering is "radical change", a change to conventional process. Employee resistance is expected to the radical change, while gradual improvement is not recommended since it causes confusion.

Technology leverage: Hallmark, 1980's, a greeting card company, realized that the marketing process was not flexible enough to response market requirement, management did not receive market and sales in timely manner. The company decided to reengineer and leveraged their process

with information technology, such as bar coding and computer at sale location, to process information to management in timely basis. This allowed company to make a proper change to market requirement and utilize manufacturing equipment cost-effectively.

Solid direction and understanding customer needs: Taco Bell, 1980's, realized that company had no clear direction and was not in a good competitive position with other fast food restaurants. The company, then set a clear vision that it will be a market leader in fast food business. Customer assessment is conducted and discovered that what customer needs was not what the company thought. Reengineering to its processes producing product that suit customer needs as a result in reduction of man-hours accounted for \$7 million a year, while its quality control and employee morale have been improved.

Hammer also addressed that a primary failure when computer technology is introduced, management always asks for how to utilize the technology to existing works. In fact, inductive question should be asked as how the technology can help to do works that company never do. Inductive thinking is a good start for reengineering and breakthrough conventional limits.

Hammer (1996), in Beyond Reengineering, admitted that keyword "radical" in his previous reengineering was wrong, and he defined new keyword "process". Process, not individual tasks, became the basic building blocks, the center of the corporation. His process-centered organization is similar to matrix organization concept, it demands rethinking process on the work that people do, the responsibilities they hold, the way performance is measured, the roles managers play, and even the principles of a corporation's strategy. Making-a-big-job concept is addressed, inefficient non-value adding work and task boundaries can be eliminated by grouping tasks into multi-task jobs. With only one person involved, the coordination, communication, and checking work are eliminated. Even if one person cannot do the entire process, everyone in the process working together. This reduce the need for non-value adding works by understanding how their work fits in with other people's work. A process (a big job) can involve one person or many, the key is that everyone recognizes it as one common job.

Chanchai Charuvasta (Round Table Seminar, March 30, 1994) mentioned on reengineering of IBM (Thailand), he defined reengineering as a revolution of People, Process, and Technology for the sake of cost, quality, and speed. IBM

started with defining a clear vision toward customer success, then formulating strategies on competency, capability, and culture. With its quick radical change as a result in downsizing its employment, IBM experienced resistance from employee.

IBM (Thailand) is an American company in Thailand, which is similar to Seagate Technology. The difference of the case to Test Engineering is that IBM made a quick radical change, downsized, and leveraged by technology to achieve required capability, but Test Engineering is moving toward leveraging capability of existing workforce to achieve increasing in required activity, capability, and quality.

Bantoon Lamsam (Round Table Seminar, March 30, 1994) mentioned on Thai Farmer Bank reengineering, the bank led employee into the perception "the organization is not good enough" in order to drive a need of changes. Resistance from 16,000 employee was at only one point, employee worried about unemployment due to introduction of computer system, A clear communication was carried out to solve the problem. It took time to make change in the organization due to its culture, political sometimes is very important in such organization.

Ward and Griffiths (1996) referred to a Kobler Unit survey (1990), 30% of the organizations surveyed believed that IS/IT investment enabled them to gain a competitive advantages, while a further 20% stated that "our business would not be possible without IT". In the same survey, 30% believed that IS/IT investment delivered as good or better return than other investments, but only 34% had a comprehensive IS/IT strategy in place.

Ward and Griffiths also addressed that changes to the organization's information systems will be an integral component of business reengineering. It is not only in implementing the new processes and enabling new organization structures to function but also innovation in the use of information and new applications of IT can themselves be the essential ingredients that can create the options for change.

O'connor (1996) described in his book, The Practice of Engineering Management, traditional approach to management of enterprises was based on our perceptions of rationality and scientific reductionism. Thus work was divided into specializations. In engineering, functional organizations were created based on these specializations.

Organization forms could be simply divided into 3 forms as described below:

2.1 Functional Oriented Organization

This is where resources are divided based on skills and disciplines. It creates functional capability in the organization, but problems in prioritization and coordination tend to arise when several products (or projects) are being supported. It is relatively difficult to generate teamwork and product (or project) ownership. It is good in developing skill resource, but not very good in developing a managing director.

2.2 Product (or Project) Oriented Organization

It is sometimes called Product Line Management (PLM) organization. This is an opposite approach to functional oriented organization, resources are divided and lined up to product (or project) managers, which teamwork environment is created. It is good for developing a managing director. When this approach is used in technology-oriented engineering organization, disadvantages could be experienced in several areas. Resources could not be effectively utilized where common resource can be shared or balanced. Common approaches for similar tasks could not be ensured where they should be.

2.3 Matrix Organization

It is a compromise of two organization forms that mentioned above. Basically, it is a functional organization cross overlapped by product oriented structure where product (or project) managers are supported by functional staffs. Product managers are responsible for product and process ownership where functional managers are responsible in developing an excellence in their organization. It is similar to process-centered organization which is described in Beyond Reengineering, Michael Hammer(1996).

2.4 Organization Principles

Schonberger (1996) wrote a book, *World Class Manufacturing: The Next Decade*, suggests that financial data are not the best indicators of manufacturing company strength and prospects. More basic metrics, such as inventory turnover and customer satisfaction, may be more valid. Both of them measure differently, however, inventory-turns rise and fall slowly as a result of many activities. Thus, turns assess long-term changes in company strength. Customer satisfaction, on the other hand, can sometimes shift quickly and point to responses needed now.

Schonberger also mentioned that two indicators, customer-satisfaction and inventory turnover, provide overlapping matrices to value a business unit. Customer satisfaction measures quality and value, low inventory turnover reflects costly wastes, delays, scrap, rework, and other negative values.

Schonberger then provided 16 principles of **customer-focused, employee-driven, and data-based performance** that firms can assess and make improvement against those principles. Though test engineering organization is not a complete manufacturing operation, it is a manufacturing support organization consisting of multiple functions in the organization, which are inter-dependent. The organization has its own product and customers, which are "quality tester" and "internal customers". Quality tester is the tester that performs well at its function with repeatability, controllability, and minimal variation. Internal customers are Manufacturing, Capacity Planning (IE), and Product Engineering, they all require prompt response to product changeover, speed in reaction to the problem, and minimal error due to test related changes.

Schmidt, Kiemele, and Berdine (1997), from their experience has indicated that the major barrier to success in most organization is a lack of knowledge about process, product, and people. Without an adequate knowledge base, it is difficult to communicate and to make good decisions.

Test Engineering restructuring needed to consider key business processes within the organization and functional capability to minimize unnecessary tasks and define a structure and tools to allow fast improvement in technical capability to create centers of excellence within the organization. Knowledge base should be developed along with the restructuring. Radical change will be avoided to minimize employee resistance. Metrics, index for continuous improvement need to be considered and benchmarked.