Chapter 8

Conclusion and Recommendation

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8.1 Conclusion

Organization with focused-group aligned to internal customers allows appropriate focus allocation of employee in the organization. Primary responsibilities of each group are being focused with more than 50% compared to less than 25% previously, while technical study time of engineer increased from 7% to 14%. This will allow organization to develop technical capability, which will result in speed and flexibility improvement in the next step.

Organizational awareness to employee can be improved by formulating framework, workflow, mission, and objective goals. This result in employee knowing their role in business process and cross-functional work is promoted. Cross-functional workflow represented business process, the entire process is owned by specific focused-group. This forces organization to focus on process not a specific task.

Improvement quality, speed, and flexibility of the organization are also observed. The improvements are in the range of 40-100%, except 300% in the area where real-time oriented application is applied.

The focused-group structure demonstrates strength in solving technical problem to improve flexibility and quality of work process. This could be more difficult without comprehensive framework, cross-functional workflow, knowing functional role to the entire process, and a good teamwork.

It is clearly proved that deploying IT applications incorporated with appropriate support structure became a powerful tool to improve speed in operations. Cost effectiveness of the operation can be delivered against difficulties of the challenge in HGA manufacturing requirements. Test organization related cost per HGA is being maintained at $0.02 per HGA while activities are increased and other variables are fluctuated (i.e. build volume, test yield, currency exchange).

A synergy of organization can be generated by a proper structure with clear direction to a common goal incorporated with leverage tools. A simple model can be

drawn in figure 8.1 to represent changes of organization before and after the transition.

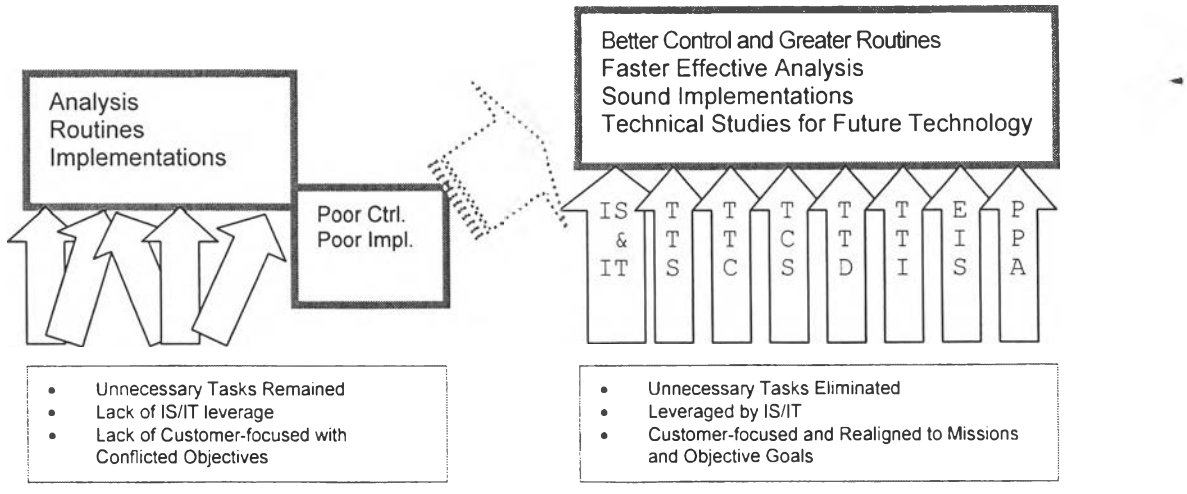

Figure 8.1 Test Engineering Organization Before and After Restructuring

One subjective area that more attentions need to be paid is customer satisfaction index. Customers did not feel significant improvement in 'Flexibility' aspect, while the improvement can be statistically observed. This indicates that more communication to customers in this particular area is highly required. In the other hand, expected flexibility of customers could be well beyond what the organization delivered.

The restructuring is considered one of the cost-effective activities. Cost of restructuring could be divided into 3 categories as shown in table 8.1. Total cost associated to the restructuring is relatively low, below $100k investment compared to a benefit of $250k per month from 0.5% electrical test yield gained in manufacturing due to improvement in speed of reaction, potential saving of $30k per month as a result of reduction in number of testers in conversion due to shortened tester conversion process, and $10k per month cost avoidance due to improvement in Ω qualification process.

Table 8.1 Cost Summary of the Restructuring

Management and Training	$21k	26%
IS/IT Hardware	$28k	34%
IS/IT Software and Development	$33k	40%
Total	**$82k**	**100%**

There are couple reasons for half a month payback, a cost effective restructuring, firstly the organization owns information technology development process, and secondly the organization carried out employee training internally. All mentioned factors allowed possible flexibility in developing and tailoring the application to suit requirements as well as to accommodate rapid changes. Disadvantage of this restructuring is time-consuming transition due to all activities depended on people within the organization which is handful of routines. Priority conflicts have been experienced.

The duration of transition is considered long, 15 months vs. expected 6 months. It was due to business difficulties during 1997-98. The transition came across the difficulties at the middle of restructuring and it delayed for 6-9 months because of changes in business situation causing recruitment halted. No replacement could fill up missing headcount per original plan, which accounted for 10% of engineers. Thus the restructuring was gradually transitioned.

No significant resistance from employee has been experience, since there was no unemployment due to downsizing or due to technology replacement with the following reasons:

- Organization has been running with understaffing, the restructuring is meant to increase capability to cope with the upcoming challenges.
- No culture shock due to rapid radical change since the organization has been restructured regularly, once every 2-3 years. It was just becoming more difficult when the organization grown up.
- Everyone in the organization is familiar with computer technology and well aware of its leverage.

Incompatibility of this practice to other organization can be listed out as follows:

- A rapid change to the organization might be required in different business situation, especially the organization that operates at adequate staffing, downsizing might be a solution when business is at downturn.
- Outsourcing for restructuring consultant might be more professional solution but it cost much more investment.
- Investment pattern might not be applicable to non-technical organization, which would need more emphasis in technology training.

There is no guarantee to which type of organization is the best. It depends on an optimization of situation assessment, organization culture, and resource development. Proper organization direction with an

involvement of Manager and employee is a key factor to bringing in an appropriate solution for the organization.

8.2 Discussion

Flexibility causes money, capability needs to be developed to accommodate flexibility in long run. Speed also causes money, an optimization of speed and benefit need to be considered to avoid over-reaction to the business needs.

For example, speed of tester conversion lead-time can be improved from 310 to 175 hrs to reduce the number of testers in conversion, the capability to reduce it down to 24 hrs exists by hiring more workforce, but the business need is not their yet. One-week-ahead conversion plan still can cover schedule adherent as well as surplus testers are still available. Anyway, 24 hours conversion capability is developed to react short-notice change from downstream process.

Restructuring of multi-function technical organization has a key limitation at resources capability. In manufacturing environment, utilization of the resources are benchmarked, direct to indirect labor ratio is measured. This strongly drives organization and creates a type of environment that treats human as a machine, where its utilization is maximized to produce tangible output. What it takes to be a strong technical organization in the long run is not a number of issues or transactions that the organization responses in day-to-day work. Optimization of time-spent allocation of employees on their routines and technical studies is highly required, and management is fully responsible for it.

Management vision is required for a projection of proper development scheme of organization capability to align with current and future requirement. Table 8.2 shows a projection of test engineering organization and its environment, which is used in aligning the development scheme of the organization.

Table 8.2 Organizational Development and Upcoming Changes

Stage	Early	Middle	Present	Post	Next	Future
Years	1990-92	1992-95	1995-97	1998-00	2000-02	2002 up
Prod Cpk	>1	<1	<0.7	>0.7	>1	>2
Test Strategy	Audit & Sampling	Sampling & 100%	100%	100%	Sampling	Audit
Structure	Auto-nomous	Semi-Function	Product Oriented	Cust-focused & x-funct'l	Cust-focused & x-funct'l	Auto-nomous
Techniques	+ SPC	+ QCC	+ TQM	+ 6-sigma	+ 6-sigma	?
IT Support Level	EDP	Statistic Report	Eng. Analysis	Advanced Eng. Ana.	DSS	?
IT Platform	1-server RDBMS	Multi-server	2-tier Client/Server	3-tier Client/Server	PDA links	?
Focus	Setup & Maintain	Build & Ramp	Analysis & Trouble shooting	Control & Improve	Integrate & Develop Outsource	Out-Source
Training	+ OJT	+ Class	+ Class	+ CBT	+Rotation	?
Technology	MIG, TFI	TFI	TFI, MR	MR	MR, GMR	OAW
Vision & Mission	N/A	Not Clear	Not Clear	Clear	Clear	Clear

Product capability (Cpk) improvement is foreseen because of introducing six sigma initiative to product design process in year 1999. Test strategy tends to align with product capability, sampling test and audit test is foreseen in the next few years.

Structure of the organization would be transformed back to autonomous responsibility due to reducing in amount of product test related issues. Process improvement technique will highly depend on statistical application, i.e. six sigma approach, and SPC.

IT support will be heading toward decision support system, which highly depend on development of knowledge base and intelligent system, such as fuzzy neural network. Client/server on Intranet platform will continue to be a necessity for the operation. Palm PDA will play an important role in mobile information and decision support system.

Focus of the organization will be on integration of test information system at all levels and capability in developing comprehensive test for drive manufacturing. Training and development for technical resource will be concentrated on job rotation once centers of excellence are well established with the proposed structure. Opportunity of data storage technology is on Optical Assisted Winchester (OAW), the technical knowledge in this area has to be prepared for technical resource in the organization.

8.3 Recommendation

Restructuring the organization, the most important is to define product and customer, then a clear vision and mission need to be established to provide a solid direction.

Organization metrics is the key of knowing where the organization is and where it needs to be in the future. It is very important to ensure existing of organizational awareness of employee and accessibility of employee to organization metrics. Figure 8.2 exhibits a balance of organizational metrics against cost associated.

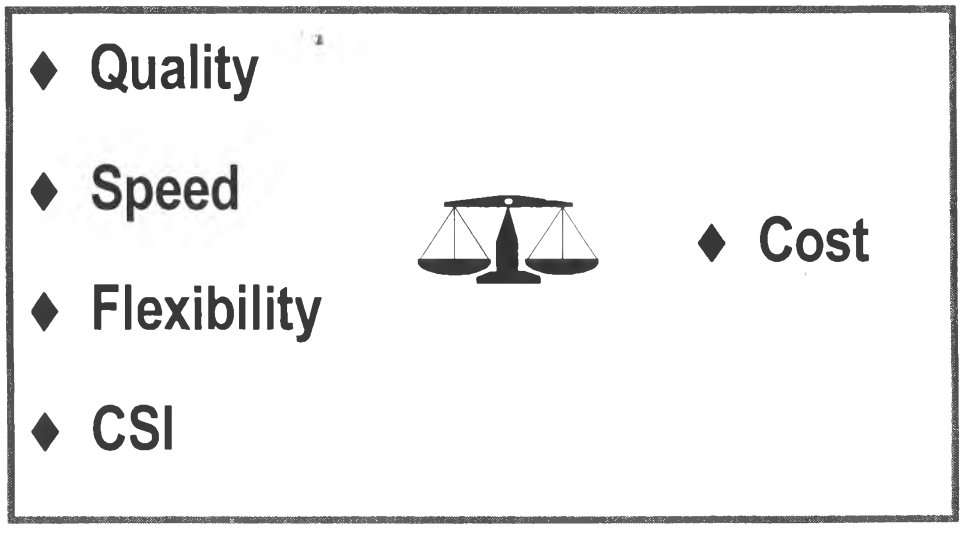

Figure 8.2 Organizational Metrics are Balanced Against Cost

To avoid downsizing and radical change in restructuring, the organization might want to reassess capability, situation, and business trend in regular basis. This will allow minor changes in the organization to cope situation requirement in timely basis.

To avoid resistance from employee to restructuring, picture of situation and vision has to be clearly communicated to employee. Employee involvement could turn it to be a cheerful activity in saving the organization.

It is difficult for manager who handles technical organization supporting manufacturing on both maintenance-troubleshooting tasks and technical development tasks. Naturally, a priority is more likely to be on maintenance and troubleshooting tasks, so called

"fire fighting" in typical day-to-day manufacturing. It causes a big failure in the long run for technical organization that involves with dynamic technological field. Appropriate prioritization on routines and technical development tasks has to be balanced within the organization, dedicated groups to perform these two major roles separately are recommended.