RESEARCH Newsletter
of the Research & Publications Committee, IIMA

December 2003

Competition, Regulation and Strategy: Information Technology Industry

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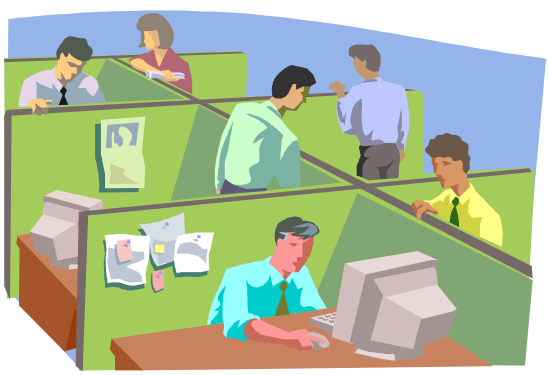
The IT industry (both software and hardware) is characterized by 'vast consumer side scale and scope economies' which are incomparably larger than in other industries with supply side network economies like pipelines or electricity distribution. In IT the supply side, economies are also incomparably larger because the marginal cost of an additional unit of the software or hardware, especially the former, is very small. But its uniqueness arises on the demand side. The interaction of these two economies, in a situation of heightened technological dynamism, imposes a greater degree of contingency, and hence path dependency in the developments in the industry as a whole. In this respect these industries are, therefore, distinguished from nearly all other prior industries. It makes possible giants line Microsoft and CISCO. Even as they extract significant part of the scale economies in the form of large profits, such firms are competitive in the more relevant dynamic sense. The endogeniety of critical points in the development of the industry implies considerable scope for strategy on the part of such large firms. It also means that inter-firm linkages dynamically develop and thrive even in societies like the US that have been abhorrent of extra-market links, and have had the conceptual space to recognize only two kinds of economic coordination–within firms (managerial hierarchies) and through markets. Path dependency implies that physical clusters in IT have a far stronger economic logic, and the difficulties in the emergence of new clusters are far more severe.



Traditional anti-trust like regulation or price regulation is entirely outmoded for the development of these industries. To challengers (countries and clusters) few independent options exist. Strategies with the most potential would involve promoting inter-firm linkages, promoting industries with the least need to be in contact with other firms, in fresh clusters. The effort has to be to lower the time and cost of networking with the dominant cluster. The costs of disassociation are too large even for large countries attempting to have a role in the evolution of IT industries, so that closed-door approaches are almost entirely unworkable.

Morris, Sebastian (2003). "Corporation, Regulation, and Strategy: The Information Technology Industry," *Economic and Political Weekly*, Vol.38, No.33, August 16, 2003

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Improving In-plant Logistics by Process Reengineering: Case Study

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Recently, we have documented the experience of redesigning in-plant logistics operations of a large petrochemical complex (LPC) in India. The LPC was characterized by aggressive growth in revenue and profitability, economies of scale, large production capacity, proven financial and operational performance. LPC location had easy access to sea route. There was a perpetual shortage of trucks. The major transport contractors operated from Bombay with a small office at the plant site.

The existing systems and procedures at LPC to receive and inspect a truck, load material, and complete commercial formalities were designed with a target truck turnaround time of 82 minutes. However, in reality the actual truck turnaround time was significantly higher than the target turnaround time. Inordinate delay in truck turnaround time was a major demotivating factor for the truck companies to place their trucks with LPC. Consequently, there was a significant variation between the planned and actual dispatch of finished goods.

Based on a systematic analysis, the following reasons for the significant departure in the truck turnaround time were identified.

- The loading operation was not the major contributor for truck turnaround time. The other related activities were acting as a drag on the system.
- The bottleneck activity was security and vehicle check.
- There was a mismatch in the portfolio of activities and the time allotted for these activities.
- Work was fragmented; there was no consumer focus; several non-value added activities; too many documents; cumbersome process.
- Myopic optimization on resources. Stretching ordinary resources to execute complex jobs.
- Duplication in work, convoluted information sharing leading to poor performance.

Several solution procedures like automation including extensive computerization, deployment of additional resources, process simplification, reduction of activities were considered with a view to reduce the truck turnaround time to acceptable levels. However, such changes were not recommended in the final analysis as they addressed only a segment of the processes. In order to improve the turnaround time substantially, there was a need to redefine work, and fundamentally change the underlying process.

The plant loaded material on a FIFO basis to the truck in uniform pack sizes of 25 kgs. The bags were identifiable by batch number and a serial number. An appropriate electronic counter in the loading area would provide the weight of the material loaded. Such an arrangement would eliminate the need for weighbridge operations. This arrangement should be supported by automated (bar code) identification of bags, and material handling at the warehouse, frequent material accounting in the warehouse. The back office work like generation of invoices etc. would be triggered by truck loading information and the documents would be handed over to the driver at the exit gate.

Such a process would ensure minimum turnaround time, maximum of one stoppage point for the truck, almost no interaction by the truck driver with any of the departments in the plant and seamless data and process integration. The resources employed for such a process would be the lowest. Data accuracy would be 100%. Ability to adhere to FIFO and material accounting would be easy.

The solution proposed was based on operational needs and contextual information available in the system. The new approach fundamentally redefined work. It actually changed material accounting philosophy from passive to active mode. The new process was Information Technology enabled and supported by appropriate outsourcing arrangement. The implementation of this new procedure would need employee empowerment and change in the mindset of the senior management team.

Ravichandran, N. (2003). Improving In-plant Logistics by Process Reengineering: Case Study, Edited (Refereed) Proceedings of the 9th International Conference on Manufacturing Excellence, October 13-15, 2003, Melboure, Australia, pp. 1-17.

Implementation of VRS in India

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Inter-organization rivalry in last one decade has become intense in the Indian business environment. Most of these organizations in the erstwhile-protected business environment had focused on production volumes, not necessarily on productivity. Consequently, they often got overstaffed as they tried to neutralize the adverse impact of absenteeism and unionization on production volumes by hiring new staff. These organizations are now exposed to the inevitability to improve productivity to survive in the competitive environment. Commonly, they have reduced employee-strength with the help of Voluntary Retirement Schemes (VRS) for this purpose. This paper examines different types of VRS offered by the organizations in the year 1999-2000 in India. It also examines the effect of VRS on the profitability of organizations. The paper explores the consequences of VRS on retired employees. Findings are based on the VRS of 30 organizations from diverse sectors.

Findings suggest that there is no fixed pattern of VRS among organizations in India. The implementation of VRS also differs significantly between organizations. The study supports the design of schemes that target older employees and remain conservative to workout compensation to employees. The schemes that are kept open for appropriate period of time seem to be more effective.

The results indicate that the success of VRS significantly depends on how the scheme is implemented and the perception of the persons opting of VRS and the survivors. The key concerns for the successes of VRS are effective communication, building trust among employees about procedural justice and involvement of multiple stakeholders.

The study also reveals a potentially serious issue of stigma. Many of the organizations have forced low performing employees to accept VRS. This has led to stigma of "non-performers/ underachievers/unemployable" on such retired people in the society. In some geographical locations it was found that less economic independence of retired employees led to social problems in the family.

Maheshwari, S K and Kulkarni, V (2003). "Implementation of VRS in India," *Vikalpa* 28 (2); PP-75-82.

Development and Applications of Earth Tube Heat Exchangers

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Kutch district of Gujarat has vast land area but is extremely arid and hot. Salt affected soils, poor quality water, highly erratic rains make it difficult to use much of this land for profitable cultivation. In a visit several years ago it was distressing to see vast stretches of land without any cover, cattle herded in shelters surviving on hay brought from outside, and cattle being moved out of Kutch in search of feed and water. Development outlined below was triggered by this experience. It was visualized that techniques of cultivation that could increase productivity of land and water in such harsh conditions will be greatly desirable. Greenhouse is known to increase water use efficiency and yields. But the experience of greenhousing in India is still limited to colder regions, not hot and arid areas. The prospect of using-up large quantity of (already scarce) water just to cool the greenhouse was a deterrent. Therefore, Dr. Sharan and his team initiated a work on development of earth tube heat exchanger (ETHE) to see if this could be an effective solution. ETHE does not require water.

ETHE is a device that permits transfer of heat from ambient air to deeper layers of soil and vice-versa. When a heat pump is added to this device, it is termed ground source heat pump (GSHP). This technology is now well-established in North America and Europe. Over 550,000 units (most of which are domestic) are reported to be installed worldwide and over 66,000 new ones installed annually (Geoscience Ltd., UK). GSHP are used for heating and cooling space–homes, commercial buildings, office complexes, cattle housing, greenhouses. This technology uses deep ground as source and sink for heat, hence it is renewable and free. It causes no toxic emissions, hence is good for environment. GSHPs do use some refrigerant but much less than the conventional systems.

Cummins Foundation-IIMA Laboratory for Environmental Technologies in Arid Areas has introduced this technology in Gujarat in recent years. First, deep ground temperatures were determined using a specially designed probe installed at IIMA campus. Year long measurements indicated that deep ground temperature remains stable between 24-28^{o}C through out the year. Next, a small – single pass ETHE was installed near Ahmedabad to study the actual performance in cooling and heating mode. Again year-long tests indicated that the ETHE could warm-up the cold air in winter nights from 10^{o}C to 23^{o}C and cool the air on summer days from 41^{o}C to 30^{o}C. Using these results, two working systems were built. One is at Kamala Nehru Zoological Garden, Ahmedabad where it provides cooling and heating to the dwelling of tigers. This system has been working satisfactorily for the last three years. Next a much larger system was installed at Kothara (Kutch) where it provides cooling and heating to a greenhouse which stand right above it (see pictures). Technology has now begun to attract interest. There is request now to build two greenhouses in Kutch using this technology and cooling system for tigers in Delhi zoo. The most recent paper on this topic was presented at the 30th CIOSTA-CIGR V Congress on "Management and Technology Applications to Empower Agriculture and Agro-food Systems," Turin, Italy, September 2003.

Sharan, G., Prakash, H. and Jadhav, R. (2003). "Performance of Greenhouse Coupled to Earth Tube Heat Exchanger in Closed-loop Mode," *Journal of Agricultural Engineering* (forthcoming).