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Indian Health Bureaucracy and its Delivery System

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Organization of Indian Health Bureaucracy and its Delivery System

K. Srinivasan & Raka Sharan

The aim of this paper is to probe into the structure and functioning of health bureaucracy in India with specific reference to rural health bureaucracy of Tamil Nadu state. A healthcare deliver system is a system in which the services related to healthcare are delivered to the target population. In healthcare the higher-level officials do the planning while the local staff do the implementation. In such a kind of setup, is the mechanistic and vertical delivery system able to deliver healthcare to all sections of society.

K. Srinivasan is Assistant Professor at the Indian Institute of Information Technology and Management, Kerala, Trivandrum and Raka Sharan is Visiting Professor at LNM Institute of Information Technology at Jaipur.

The aim of this paper is to probe into the structure and functioning of health bureaucracy in India with specific reference to rural health bureaucracy of Tamil Nadu State, based on the fieldwork conducted during 1993-95. Bureaucracy is defined as "a hierarchical division of staff who act on formal assignments"—Gouldner (1954). This definition suggests five specific dimensions of bureaucracy, namely: (i) hierarchical structure (ii) nature of work and progress (iii) procedural devices (iv) decision making and (v) procedural bottlenecks, have been considered in this order to understand the functioning of bureaucracy. These factors are particularly relevant to the understanding of bureaucratic functioning as the previous studies have indicated that the magnitude of these attributes varies from one organisation to another (Hall, Peabody, Meyer). The functional complexities of any bureaucratic system largely depend upon the combination of these attributes (Bennis).

Hall, for example, observed that certain organisational activities are related to one or more of the above-mentioned dimensions. The attributes, like division of labour, hierarchical structure and the type of decision-making have been found to be closely linked with one another. Similarly Lindblom concludes that the selection of goals and appropriate means are generally interwoven. Good policy can be formulated when decision makers find themselves in agreement.

As regards planning and coordination, Meyer's findings have revealed that the nature of work and supervisory positions determine the level of coordination and nature of planning. Some studies have noted that complexity of rules and procedures adversely affect bureaucratic efficiency.

All these studies are essentially centered around Weber's model, which presumes that these attributes are ideal for the functioning of any organisation.

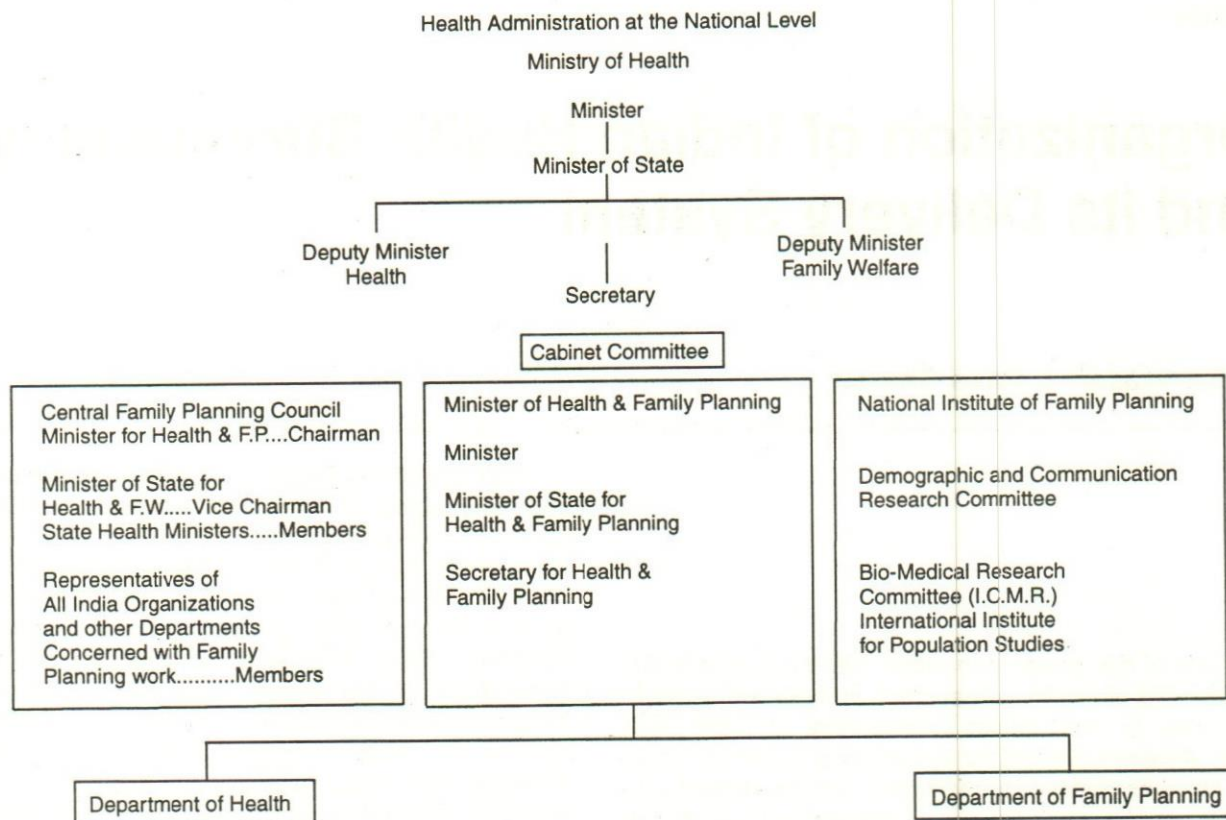


Fig. 1. Health Administration at the National Level

Within this theoretical perspective the present analysis centres around a very broad query i.e. whether these attributes have implications for aspects like decision-making and overall organisational functioning. If so, then what is the functioning of the organisational set up under study.

The organisational functioning is being analysed here with a view to identifying those attributes that influence organisational effectiveness and decision-making.

Max Weber, the master theoretician, found four major attributes of bureaucracy that marked it out for its advantages. They are efficiency, predictability, impersonality and speed. As an ideal type, it could possess all those attributes and perhaps more, at one point of time or all times. However, a sociological analysis of functioning of bureaucracy in a transitional society like ours shows that no real society can have all attributes at one point of time. The ideal type attributes can work as a goal and one can desire to achieve them by putting in proper efforts. However, it may not possible for a bureaucracy to have all of them at one point of time.

Further, Weber suggested some desirable elements of a bureaucracy, such as

- *Hierarchical structure*: the lower officials are supposed to be supervised by the higher officials and there has to be a ring-like structure in any bureaucratic organisation,
- Nature of work and progress,
- Procedural devices for recruitment of functionaries as well as policy decisions,
- Decision-making and maintenance of all records,
- Procedural bottlenecks and their solution.

The above features suggest that in a bureaucratic organisation, there has to be some definite rules and procedures, and all officials of different levels are controlled by those rules and procedures. Further, it has been suggested that the organisation cannot perform its functions properly unless assignees are strictly appointed based on their merit and efficiency. Hierarchical structure needed to be maintained to provide proper supervision of lower staff by higher ones. The appointments and promotions have to be made on the basis of technical competence. Weber had given lots of importance to the process of selection of bureaucrats and had given some basic principles for their role-performance.

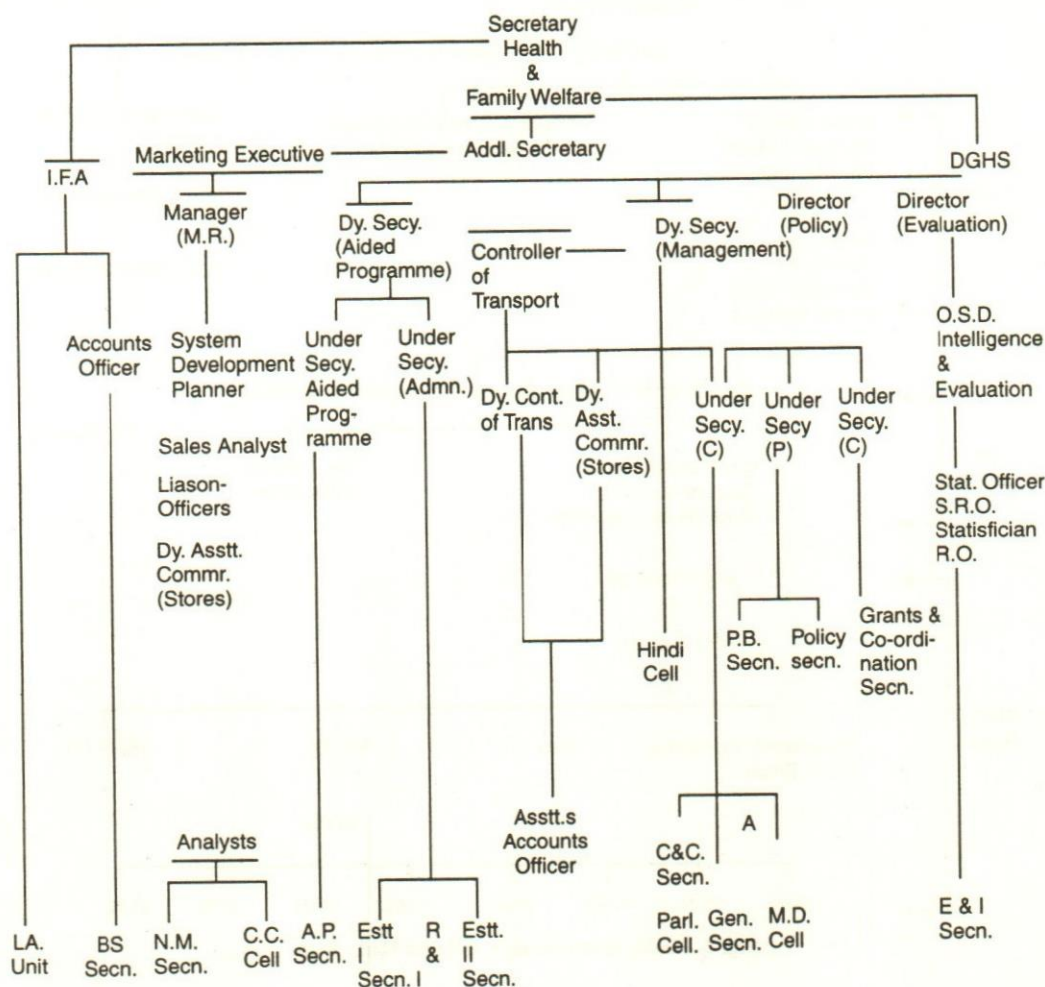


Fig. 2. Health Administration at the National Level

According to Weber each and every person working in an administration has to obey the officials who are superior to him/her. Also, the decisions made at the lower level have to be ratified by the superior officials. For Weber, an efficient administration must be able to have some schemes of distinct distribution of power allocation to different levels. However, it was observed in a number of studies that the above scheme might create certain amount of malfunctioning (Bennis 1972).

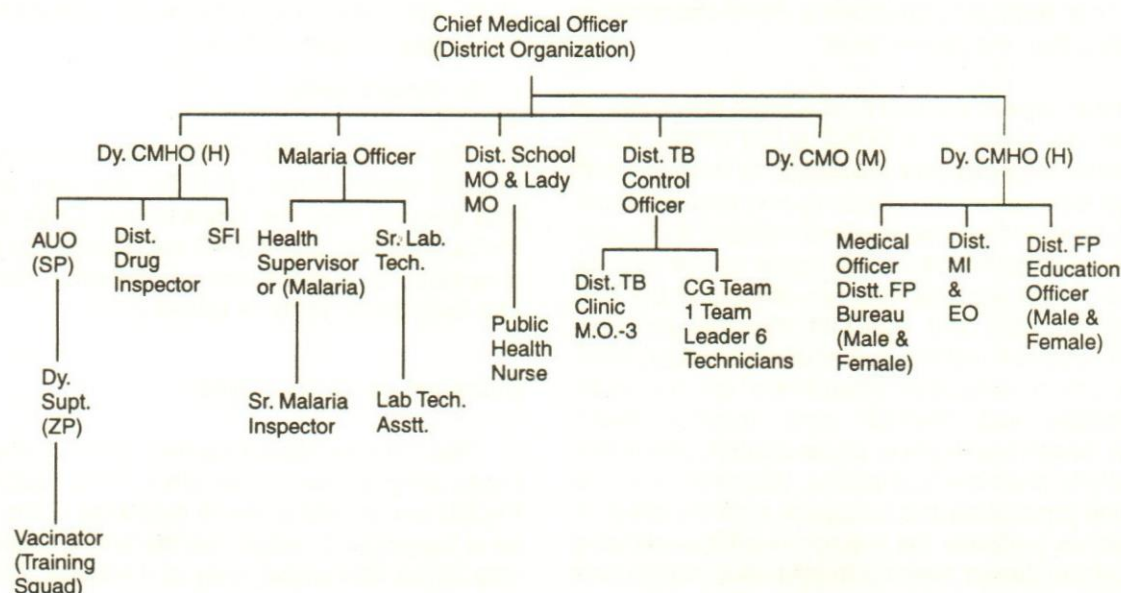
The Organisational Structure of the National Health Organisation

India has a parliamentary system of government with a President, a Council of Ministers (Cabinet), 'a House of the people' (Lok Sabha) and a House of the States (Rajya Sabha). Administratively, the country is divided into 28 States and seven Union Territories. In all, India comprises of 602 districts (most of them having a population between 1.25 to 1.5 million), which are fur-

ther divided into smaller Tehsil or Taluk and Blocks each with population of 80,000 to 1,00,000 for taking care of development programmes.

Under the constitutional provision, health service is the responsibility of state governments. The responsibility of the Union Government is only confined to international health, food quarantine, inter-state quarantine, research and promotion of special studies and institutions. As the Union Government is also directly responsible for administration of the union territories, it is also directly responsible for running the health services in those territories.

The Union Government has established the Central Health Council, consisting of the Union Minister of Health and all the health ministers of the state governments (see Fig. 1). The council is, theoretically, an advisory body, but in practice it has assumed the form of supreme body of policy making for health with the Union Health Minister playing a dominant role.



D.F.P. & MCHO: District Family Planning & MCH Officer
 Dy. C.M.O.(H): Deputy Chief Medical Officer (Health)
 Dy. C.M.O.(M): Deputy Chief Medical Officer (Medical)
 A.U.O.(S.P.): Assistant Unit Officer (Small-pox)
 Z.P.: Zilla Parishad
 S.F.I.: Senior Food Inspector
 Dist.. MI & EO: District Mass Information & Education Officer

Note: The ministerial staff attached to the CMO's office, Malaria Office and DFP & MCH Office are not shown in this chart

Fig. 4. Health Administration at the District Level

In practice, however, the Ministry of Health and Family Welfare of the Union Government has much more power, as the state governments have to depend on it for finances. This financial power exerts some control over state governments through various agencies, particularly the National Planning Commission. The Union Government is responsible for taking care of international health and international relations. This enables the Union Government to make use of the resources made available by various international agencies and government and non-government organisations of foreign countries to ensure the cooperation of states in the health schemes proposed by the international agencies. The Union Ministry of Health and Family Welfare initiated almost all major health programmes of the country, for example, the various vertical programmes, establishment of primary health centres, the family planning programme, the multipurpose workers scheme and the community health worker's scheme.

Health Administration in Tamil Nadu

Having discussed the national level health bureaucracy, now let us have a look at the state health organisation of Tamil Nadu state. Tamil Nadu is a state in

which the health organisation is organized in a very coherent manner. The administrative pattern of the state is similar to that of the Union Government (See Fig. 3). A Minister of Health is responsible to the state cabinet headed by the 'Chief Minister' and the cabinet is collectively responsible to the state legislature. Again, a secretary heads the administration, who is a non-technical administrator belonging to the Indian Administrative Service (I.A.S.) cadre, assisted by the office of the top ranking health official. The Directorate of Health and Family Welfare Department is called the "Directorate of Medical and Rural Health Services" in Tamil Nadu. It has a status of 'attached office' to the state ministry. "The Directorate of Public Health and Continuing Education" is merged with the "Directorate of Public Health and Preventive Medicine" and called, "The Directorate of Public Health and Preventive Medicine" (G.O. Ms. No. 25, HIMFW, dated, 3.1.91).

The above discussion shows that the structure of health services of this state is different from the central health services. Firstly, there is no dichotomy between the health and family welfare programmes. The services are provided as an integral unit. Second, as state governments have considerable executive responsibility for implementing various programmes, the demarcation

between 'line' and 'staff' functions is much more clearly in the states than the central level.

As in the case of the DGHS at a state directorate of health services similar to a DGHS at the centre, it also has a director who provides leadership to this team with assistance from additional directors and joint directors. Deans of the state financed medical colleges and superintendents of large hospitals also report to the director. Director of health services also has officers of the rank of deputy directors and assistant directors to assist him/her in fields like malaria, tuberculosis, leprosy, blindness prevention, extended programme on immunization, hospitals and medical care, nursing, health education, health intelligence, drugs control, prevention of food adulteration medical stores, laboratory services and vaccine production and transport. A senior officer in the directorate performs the line function for overseeing the work of the district health administration, which runs all the health services in rural areas. Health departments of municipalities are responsible for providing preventive and curative health services to urban population.

District Health Administration of Tamil Nadu State

The reorganisation of Health and Family Welfare Department took place in Tamil Nadu in 1991. It aimed at the integration of the services at all levels. The health programmes in the district are placed under one Joint Director of Health Services (Refer Fig. 4). He is in-charge of the entire health programme including public health, family welfare, blindness, tuberculosis, leprosy etc.

There are two Deputy Directors at the district level. One is known as Deputy Director of Medicine, and another is Deputy Director of Rural Health Services. The Joint Director of Health Services and the Deputy Director of Health Services are redesigned as District Medical Officer and District Health Officer respectively for statutory purpose. The District Family Welfare, Maternity and Child Health office is called as "district Family Welfare Bureau" and the Joint Director of Health services shall be the head of office (refer G.O. Ms. No. 25, of HIMHFW order dated, 3.1.91).

The programmes through which various functions of health units are implemented in the district are:

1. Medical care,
2. Control of communicable diseases,
3. Collection of Vital statistics—births & death record,
4. Family planning and maternal and child health,

5. Environmental sanitation (including prevention of food adulteration) and

6. School health.

The entire population of the district is covered by 12 primary health centres (P.H.C.) and they get line and staff support from the office of the CMO. Besides the PHCs, the office of the CMO also supervises the work of a number of dispensaries of allopathic (about 30-40) and indigenous systems (about 8-12).

Block set up of Tamil Nadu

Two Primary Health Centres (P.H.C.) undertake the health programmes of the block. Two doctors man the P.H.Cs; one doctor is made in-charge of the P.H.C. and he is supposed to supervise the entire health programmes of the operational area of the block, while another doctor is supposed to work under the in-charge of the hospital as second in command. It means in the absence of the medical in-charge, the second doctor would look after the duties of the medical in-charge (see Fig. 5). There is a medical in-charge who is in-charge of the entire health programmes in the operational area. There is a Medical Officer second under Medical Officer in-charge.

At the primary health centre level, line functions are predominant. The medical officer in-charge provides leadership to other physicians, nurses, laboratory scientists, block extension educators, health assistants and multipurpose workers. He works along with the community population covered under his PHC. In addition to this he is supposed to act as a catalyst for bringing change in the orientation of population.

The above description suggests that administration and organisation of health services in Tamil Nadu is divided into a 3-tiered structure: state, district and blocks.

Health services are designed to reach out to virtually each of the over 56 million household, located in over 560,000 villages, towns and cities of the country. This task presents a major challenge to health administrators of the country. Increase in the domination of generalist administrators and failure to introduce a proper medical cadre of pan Indian nature have generated the lack of managerial orientation in the contemporary health-administration of India. The virtual absences of managerial physicians who can properly shoulder the new types of responsibilities have become the major obstacles that have affected the proper functioning of delivery system of health care.

Organizational Chart of the Primary Health Centre at Block Level

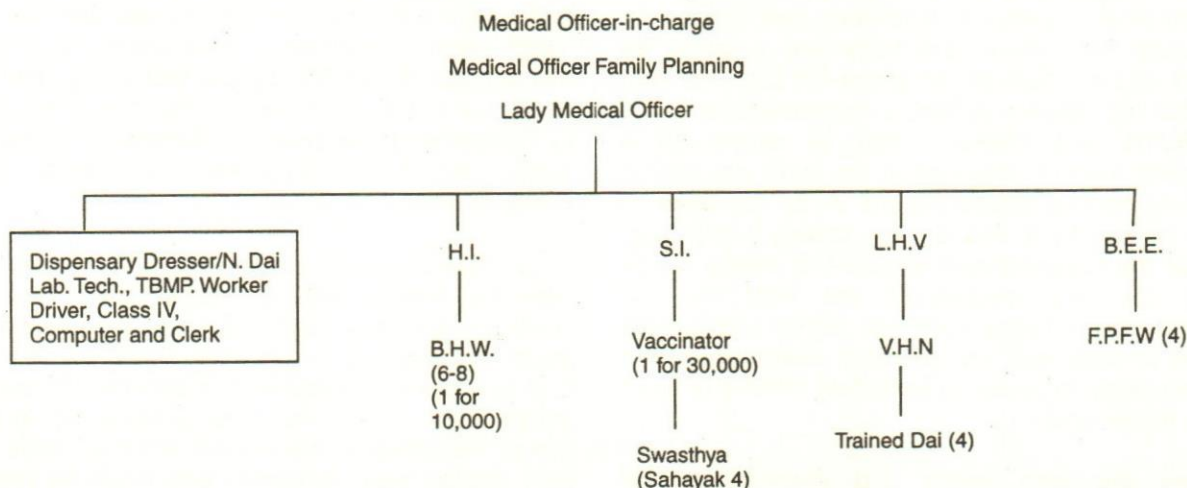


Fig. 5. Organisational set-up at the Block Level

Now let us have a look at the delivery system of health care units. Generally the term 'delivery' means conveying or distributing goods and services to a destination. For health delivery we mean hospitals and dispensaries, which come into the direct contact of the population and they are supposed to render the services of health care to the masses.

Health Care Delivery System

The health care delivery system is a system in which the services related to health are delivered to the target population. In health care the higher-level officials do only planning and local staff do the implementation. In India, including Tamil Nadu, the implementing agency of health care programmes at the block level is known as Primary Health Centres (P.H.C.). Another medical officer assists the medical officer in-charge of the P.H.C. There is a block health supervisor who supervises the health activities of the block hospitals. Under him there happens to be a computer to compute various data, a pharmacist to provide medicines, a Block Extension Educator for propagation of health education through various orientation-training camps. Generally these camps are focused on information dissemination, health education etc.

In addition to this under the block health supervisor there are three health supervisors and five health assistants and three sector health nurses. The supervisors and health assistants visit the villages for pathological aids, while the sector health nurses are sent to villages to monitor the activities of village health nurses (V.H.N.). The village health nurses are the lower level staff that are

engaged in the village health units. There are eight health sub-centres attached to one P.H.C. Each health sub-centre has one V.H.N. The duties of the V.H.N.s include pre-natal care, post-natal care, immunization, and taking care of the sick population by visiting the villages daily. They have to stay within the health sub centres for all 24 hours. V.H.N.s are the key functionaries of health sub centres and they have to provide medical help round the clock. Five trained midwives (dais) from each sub-parts (hamlets) of each village assist a V.H.N. These sub-parts are made only for the health operational purposes.

Since important roles are played by the block and village health officials (medical officers, village health nurses, sector nurses, etc.), it was thought appropriate to collect some detailed information on the delivery processes from the different levels of health officials and the village respondents.

Hierarchical Structure

It is observed that the organisational set-up of health care organisation is hierarchical and it comprises of a centralized system. The delegation of power is not very effective and clear. In the health care delivery organisations, the specializations include immunization, inoculation, epidemic control, etc., and the officials are given various assignments to take care of the segmental issues. Each individual pursues his own task without bothering about the total segment of tasks as a whole, as if it was the subject of a sub-contract. Consequently, each officer feels that 'somebody at the top' is responsible for seeing the entire organisational task decision-making process.

The subordinates do not have power to take any decisions regarding plans and programmes. Hence, the subordinates always look towards their bosses for some clear cut orders, directions and planning as reported by the health officer of the P.H.C.s. This suggests that the delivery system is mechanistic and vertical (Burns and Stalker, 1961) in nature. In a mechanistic kind of organisation the tasks are broken down into various specializations as is the case of P.H.C.s of villages A and B. This finding further suggests that the organisational structure of village hospitals is not only mechanistic but rigid too. As discussed, the technical methods, duties and powers attached to each level are precisely written down and are accordingly informed to individual officers of each level to follow upon.

There are both merits and demerits of the mechanistic model. For example, in case of the projects related to immunization, family planning etc., this kind of rigidity is needed in work-allocation. Therefore, for such programmes this system is a boon. Because of this, Tamil Nadu could achieve 100 per cent immunization and could reach to a top-ranking position. But in case of individual treatment, which varies from location to location, person-to-person, one requires to have a certain kind of flexibility so that personal attention and personalized care can be given. This cannot be tackled with rigid directions. Therefore, one requires having a balance between rigidity and flexibility of decisions. There is lack of this kind of balance in the village health organisation of the sample population.

1. Lack of delegation of power: The health officials informed that for each and every issue of P.H.C.s the decisions are taken in the state health directorate. In those decisions, P.H.C.s members (block and village level) are hardly involved. This leads to a communication gap between the desired action and the actual decisions. This leads to either wrong decisions or delayed actions. The medical officers of the Kodaikanal and Nilokkottai Blocks and the village health nurses of the Michael Palayam and Periyur health sub centres informed that the centralized power of direction and guidance often leads to inordinate delays. They mentioned that, specific areas (geographical) had to be tackled by the local official who was conversant with the problems. But generally it was not done and the district level authorities that didn't have proper understanding of the local problems were asked to decide. This invariably leads to serious consequences like death or outbreak of an epidemic. They informed that village A has different kind of climatic condition. The residents of village A suffer from asthma and other cold-related sicknesses, which were linked to the climatic conditions of this village only. No special programme or fund allocation

was made to the village A's P.H.C. to keep the disease in control. Consequently, a large numbers of residents were suffering from the disease and the village health officials remained as mute spectators. They further suggested that this disease was being ignored because the district level health authorities were not able to comprehend the problem. According to them the solution was for the local administration to transfer power to them.

2. Lack of proper resource allocation based on the individual requirements of villages and P.H.C.s: The health programmes applicable to local populations are made and imposed by the state health administration. Due to a lack of communication between the state and decentralized institutions, there exists a gap in allocation of resources. In the present exercise, some block-level officials were contacted who might be helpful in providing solutions to problems at the field level. The medical officer informed that the Primary Health Centres (P.H.C.s) were not able to pay proper attention to health problems of villagers because of the lack of funds. Further, the medical officer informed that presently the village needed more medicines to take care of gastro-enteritis, jaundice etc., but they were unable to purchase them since they did not have any fund with them at their disposal. Consequently, the villagers had to face difficulties at the time of crisis.

3. Lack of equitable distribution of duties and responsibilities: It was observed that in health administration, that the state authority generally decides the duties and responsibilities of health officials at different levels. They distribute the job based on the inputs available in the district officers. The Medical Officers of the P.H.C.s and the Village Health Nurses of both the villages mentioned that there were unequal distribution of duties and responsibilities. The nurses reported that they were given responsibilities of maintaining the records of births of births and deaths, immunization, etc., in addition to taking care of patients. On the other hand, the other health staff, such as, Health Assistants, Health Supervisors and Health Inspectors were given very few responsibilities. They were generally involved in the supervision of different activities. Consequently, the nurses invariably were making complaints against the administration for not distributing the responsibilities in an equitable manner. This suggested that the female health staff had more and diverse responsibilities to carry on, while the male staff had fewer duties. Due to the unequal distribution of duties, it was observed that the Village Health Nurses and Sector Health Nurses of sample villages were losing interest in their jobs and were having a feeling of injustice. It is interesting to suggest that this was not a lone case but it was a norm of almost all P.H.C.s.

In the above paragraphs the structure and function of government health care organisation is discussed. However, there are some Non-Governmental Organisations engaged in health and family welfare activities in the sample village of our study.

The structure and functions of Non-Governmental Organisations

The operation of N.G.O.s was found to be very different from the governmental health units. Findings suggest that they have a lateral relationship between superiors and subordinates. This kind of relationship may be termed as an organic organisation.

Table 1: Patterns of Organisation and Management In Governmental and Non-Governmental Health Organisations

	Governmental Health Organisations	Non-Governmental/ Health Organisations
Nature of Organisation	Relatively stable	Flexible (time to time variation)
Nature of task	Achievement of fixed targets efficiently	Need-based
Organisation of work	Clearly defined jobs arranged in hierarchical pattern	Jobs defined by individuals concerned through interaction with others
Nature of authority	Clearly defined and vested in formal position of hierarchy; seniority important	Pattern of authority informal and constantly changing as roles becomes redefined with changing circumstances vested in appropriate skills and abilities
Nature of Communication system	Vertical	Completely free
Nature of Employee commitment	Commitment to own particular jobs	Commitment to central task

The organic or organismic structures are flexible in nature (Morgan, Gareth, 1988). Organic structures are adapted to unstable conditions, when problems and requirements for action arise, which cannot be broken down and distributed among specialist roles within a clearly defined hierarchy. Sickness is a situation which cannot be predicted in a specific point of time. It is because of unstable conditions. It varies from person to person, region to region and culture to culture. Because of this, the N.G.O.s follow a flexible organic approach to solve such problems. Individuals perform their tasks based on their own skills and training. Jobs lose much of their formal definition in terms of methods, duties and

powers, and have to be redefined continuously by interaction with others. Interaction runs laterally as much as vertically; communication between people of different ranks tends to resemble lateral consultation rather than vertical command. The nurse who stayed in the village attended the cases with her own technical skills without depending on the orders of the superior body.

Conclusion

Presuming that the nature of hierarchy plays an important part in health bureaucracy the respondents were asked about difficulties arising from the hierarchy in the health delivery processes. From the information made available by the respondents it was revealed that centralized control created problems in dealing with emergency situation. Consequently, respondents did not prefer to go to a government hospital if it was a matter of life and death. They felt that by the time help would arrive for them, something unwarranted would happen. To some extent the health officials of the P.H.C.s. supported the respondents' views.

Procedural devices

Different levels of offices have different functional responsibilities but they are supposed to act in coordination. Therefore, coordination becomes the basic ingredient of an efficient bureaucracy. The possibility of reaching to this objective largely depends upon procedural devices. Procedural devices involve information in the proper form from the right kind of personnel and speedy action taken in the content of information with proper consultation. Normally, it is presumed that the rule of the field information would be very crucial and their information or noting should be the most important device. However, respondents and the village health functionaries informed that things did not happen in this form. The lower officials were the first to record the facts of the case and subsequent actions to be taken on a file. As the files move upward in the hierarchy, the higher officers are free to accept their opinions or take decisions overriding them. Usually the higher officials decided and the issue was supplemented by the comments/opinions of the field medical officers. However the field officers (health) reported that sometimes they did require to consult their bosses because of certain doubts about some rules or some clarification sought on certain orders.

To probe further on the issue of the decision-making process we asked some questions to health officers and the respondents. Answers presented some fascinating aspects of the decision-making process in bureaucratic

functioning. The village health officials mentioned that many decisions related to policy issues, instruments to meet the policy requirements fund distribution etc., were dependent upon the nature of cases. In general it was observed that the superior officers had the deciding power on each and every issue. The sense of powerlessness and consequent lack of a sense of responsibility found among the junior health officers apparently affected the overall functioning of the public healthcare units and their delivery units as per the opinions of the respondents.

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Under budgetary pressure (arbitrary or not) it is truly remarkable how many options one discover one can do without.

— James R. Schlesinger



Total Quality Management in Healthcare Industry

Bhimaraya A. Metri & N. Banerjee

This paper first introduces the current challenges facing the healthcare industry in general and then highlights the imperatives of total quality management in healthcare to improve overall performance. The paper concludes that in the healthcare organisation those that take initiative in implementing TQM have a great future in years to come.

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Healthcare is undergoing fundamental changes due to new diagnostic and therapeutic techniques and information technology. The influence of rising costs of healthcare and consumerism has further resulted in significant changes in healthcare delivery. The rapid pace of change in the healthcare system presents tremendous challenges for healthcare managers charged with the delivery of healthcare services.

Declining reimbursement, new incentive structures and increasing competition are placing unprecedented pressure on providers to deliver healthcare effectively and efficiently. Quality management constitutes an appropriate response to this challenge. It is a way to organize work flows in healthcare organizations as usefully as possible and to achieve an optimum outcome quality, i.e. quality of healthcare services, patient satisfaction, employee satisfaction and overall performance results.

One of the most important objectives of healthcare organizations is to achieve the greatest possible improvement in healthcare services at the lowest possible cost to both the patients and the healthcare providers. Application of quality management in the healthcare industry improves quality and builds up the confidence of patients, professionals and cost payers in the quality of the context, the structures, the process and the outcomes. Therefore, quality management is a powerful medicine to cure the ills of the healthcare industry.

Currently the healthcare system in India is a mixed public-private system. The country already has a strong public-health infrastructure, but public hospitals and clinics are understaffed by 15 to 20 per cent, on average (Gupta, et al., 2005). The public healthcare system consists of healthcare facilities run by the central and state government, which provide services free of cost or at subsidized rates to low income groups in rural and urban areas.

In the private sector healthcare industry, healthcare facilities are run for profit by companies. Healthcare facilities run by charitable organizations also provide services totally free or at very low costs depending on the income of the patient or patients family.

Indias healthcare industry is worth \$23 billion today or roughly 4% of GDP. The industry is expected to grow by around 13% per year for the next four years. The Government of India has accorded a high priority to the healthcare sector by an increased budgetary outlay (currently to 3% of GDP in medium term) and heavily slashed customs duty on imports of medical equipment. Further, the Government of India's National Health Policy (2002) envisages an overall increase in health spending to 6 per cent of GDP by 2010, of which one-third would be committed to public health investment (Vazirani, 2006). Post-liberalization, the healthcare industry emerges with greater opportunities and quality changes.

Healthcare is a societal concern. Today, the consumers demand high quality healthcare services at reasonable and affordable costs. With rising cost, healthcare organizations in India are grappling with a variety of issues such as quality and cost-conscious environment. Perhaps the most significant of these issues is how to improve the quality of healthcare services to meet and exceed customers' expectations. Hence, Indian hospitals are searching for ways to change the delivery of patient care. Although, a number of private and corporate hospitals are constantly innovating and improving the technical/clinical and service aspects like never before in order to improve healthcare services and many hospitals are getting ISO certification, little effort has been made to successfully implement total quality management (TQM).

Imperatives of TQM in Healthcare

TQM is an integrative management philosophy aimed at continuously improving the performance of healthcare processes and services to achieve and exceed customer expectations (Antony et al., 2002). The goals of TQM are to satisfy the needs of customers, prevent poor quality rather than correcting problems after the fact, develop an attitude of continuous improvement, understand the value of measuring performance to identify opportunities and maintain improvements, and eliminate chronic sources of inefficiencies and costs.

Total quality management (TQM) is one such philosophy which aims to provide organisations with a template for success through customer satisfaction.

TQM is seen as a continuously evolved management system consisting of values, tools and techniques, the aim of which is to increase the external and internal customer satisfaction with a reduced amount of resources (Hellsten and Klefsjv, 2000). TQM is a way of managing to improve the effectiveness, efficiency, flexibility, and competitiveness of a business as a whole. It is also a method of covering healthcare as lean healthcare by removing waste, by involving everyone in improving the way things are done. TQM is, therefore, total organisation-wide effort, which involves the entire workforce to concentrate on continuous improvements for the satisfaction of customers.

Manufacturing organisations have successfully deployed TQM philosophy in support of strategic choices. Most successful TQM implementation and applications are commonly found in the manufacturing industry. In this context, however, service organisations, particularly healthcare organisations are still lagging behind their manufacturing counterparts in terms of their strategic commitment to TQM. The apparent reluctance of service organisations to utilize TQM-based strategies is alarming, especially in light of the increased significance of the service sector to national and global economies. For example, service activities in India accounted for a 54 per cent of the Gross Domestic Product. The trend signifying the increasing importance of the service sector is expected to be strengthening in the future. In recent years, one of the fastest growing industries in the service sector is the healthcare industry. Given the nature of most service operations in healthcare where the customer is the focal point, the need to have customer-focused and quality-driven strategic orientations seems to be a necessity rather than a luxury. As such, the effective implementation of TQM in healthcare settings would be expected to be the rule rather than the exception. Increased customer sophistication and the globalisation of healthcare activities have not left any option for the healthcare industry other than to re-engineer their culture, operations and systems to support customer-focused and quality-driven competitive strategies through TQM.

Inefficient operations not only harm individual hospitals and their ability to remain viable, but they are also having an impact on the countrys economy as a whole. Competitive economic forces are driving the healthcare industry to try new management methods to remain cost effective and efficient. Today, merely technical knowledge of medical professionals is not sufficient to assure the quality services in the healthcare industry. It also requires administrative as well as managerial support.

Implementation of TQM in healthcare organisations brings fundamental changes in the organisations culture,

structure and working methods and integrates the administrative and managerial support with medical care to provide world class service to ever-demanding customers. The measurement of quality is not yet well established in the healthcare industry, although there are some measurement mechanisms in place. TQM uses quality as the fundamental measurement metric, continuous improvement as the philosophy and employee involvement as the approach. Therefore, the basic health of healthcare can be measured and improved on a continuous basis through TQM.

Adopt or Adapt TQM?

As mentioned in the earlier section, the TQM philosophy has its roots in manufacturing industry; it is based on many techniques which could easily be transferred to the healthcare setting. As opposed to manufacturing organisations, where TQM is applied widely, service in healthcare organisations is intangible and perishable. Healthcare organisations cannot produce their service prior to its need; in most cases the service must be provided within minutes of the request; and most importantly, healthcare organisations deal with the intangible of individual preferences, so finding objective assessments of quality is more difficult. Therefore, what applied in the manufacturing industry seldom applies in the healthcare industry. There is a need to adapt TQM considering the following several elements:

- Every situation and every patient is different. You cannot treat patients like an assembly-line manufactured product.
- Service quality is viewed based on the attributes of the service delivery system, the extent of customer satisfaction and/or the interactions among the different elements of the service system which define the service encounter.
- Nurses cannot be handled like assembly line workers because every situation is different.
- Work flows across many different departments in a wide variety of ways.

The workforce is fragmented. A simple task requires the communication and co-operation of a number of different departments and employees.

Principles of TQM

TQM is the culture of an organisation committed to total customer satisfaction through continuous improvement. In such a culture, resources, material, equipment and quality management systems are cost effectively implemented and fully utilized. In order to achieve these

goals, as well as to gain a competitive advantage, principles of TQM should be fully understood and committed by the entire healthcare organisation workforce before implementing TQM. The principles of TQM in healthcare systems include:-

1. Management must be involved and lead.
2. Quality can and must be managed.
3. Everyone has a customer and is a supplier.
4. Processes, not people, are the problem.
5. Every employee is responsible for quality.
6. Problems must be prevented, not just fixed.
7. Quality must be measured.
8. Quality improvements must be continuous.
9. The quality standard is defect free.
10. Goals are based on requirements, not negotiated.
11. Life cycle costs, not front end costs.
12. Plan and organise for quality improvement.
13. Decision making based on facts and figures.
14. Team-based problem solving.

Dimensions of TQM for Healthcare

Following dimensions are critical for the successful implementation of TQM:

Top Management Commitment

Research suggests that most quality tools associated with TQM do not generally produce an advantage, but certain tacit behavioural features such as executive commitment can produce an advantage. Many a times TQM initiatives have failed to fulfil their potential due to lack of senior management commitment to the quality process. Thus, the success of a quality improvement programme or activity depends much on the senior management commitment.

Quality Culture

Organisations need to create a culture where all the employees should participate in the quality awareness programmes and quality improvement projects relevant to their own workplace. Factors like use of information for improvement, authority equal to responsibility, job security, climate of fairness, compensation based on equality, teamwork, collaboration, learning

and involvement, ownership, and development form an organisational culture, which then leads to increase in productivity, quality and customer and employee satisfaction.

Strategic Quality Management

Strategic quality management concepts are to be put into practice by inclusion of quality objectives in the strategic planning process and through strategic planning frameworks, like quality function deployment, which provides specific instructions for approaching, executing, and evaluating the development of strategic concepts. Internal issues are developing a long-term road map, incorporation of core competencies concepts and emphasizing adoption of new technologies. External issues are the response of the organisation to the economic swings in the industry, the impact of new market opportunities on existing business practices and protection against competitors.

Process Management

Process management focuses on managing the healthcare process so that it operates as expected, with zero defects. Process management minimizes non-value adding activities and enhances the productivity in healthcare services and consequently enhances customer satisfaction.

Supplier Quality Management

Supplier quality management includes fewer dependable sub-contractors, reliance on suppliers process control, strong interdependence of supplier and customer, purchasing policy, emphasizing quality rather than price, supplier quality control and supplier assistance in quality development. Instead of relying on tools such as acceptance sampling to establish the quality of incoming materials and component parts, it is preferable for hospitals to purchase from a more limited number of qualified or certified suppliers.

Education and Training

Education and training ensures that employees not only possess adequate knowledge and skills to perform their jobs, but also have specific values, knowledge and skills associated with TQM issues and activities. Reasons cited for the failure of the TQM initiative includes lack of appropriate training and inadequate knowledge. Thus employees will be motivated to engage in quality-oriented behaviour when their roles and the relevance of their training to overall quality goals are clarified.

Teamwork and All Level Employee Involvement

Healthcare organisations should utilize all employees' skills and abilities, and people in various departments should work as a team for any problem-solving initiatives. Empowerment and involvement enhances the individual's self-esteem and improves his/her capability to solve problems and make low-risk decisions. Worker motivation, responsibility and accountability are generic concepts that can benefit any business organisation. The causes of ongoing quality problems like lack of team work, conflict, and lack of worker involvement are overcome by personally participating in quality improvement activities, which leads to the success of TQM.

Information and Analysis

Information and analysis consist of evaluation for various policies and strategies, quality audit, analysis of quality costs, department/function performance evaluation, and employee and supplier performance evaluation. If there is inferior dissemination of the generated information, quality techniques like benchmarking and SPC tools will be rendered ineffective. To maintain a true customer focus, an organisation must ensure that prompt feedback of customer survey results in appropriate functional areas for effective actions.

Customer Focus

Understanding, satisfying and surpassing customer needs and expectations on a continuous basis should be the key goal of TQM. The needs and expectations of consumers have always been in the mind of all employees. It is necessary to identify these needs and expectations and their level of satisfaction.

Measurement and Feedback

Measurement is necessary to conduct against a series of key results indicators, both internal and external. Therefore, an organisation should always analyse the feedback, which can help to improve the healthcare service quality on a continuous basis. An organisation should also measure the result from both internal and external benchmarking and customer surveys. This will assist the company to know the market and to better understand the customer needs and expectations.

TQM Approaches to Healthcare Quality

There are many TQM approaches to superior per-

formance in healthcare. The most popular approaches are the MBNQA excellence model, the EFQM excellence model and six sigma quality.

The MBNQA Excellence Model

The introduction of internationally respected quality frameworks the Malcolm Baldrige National Quality Award (MBNQA) in 1987, followed by the EFQM in 1988 has provided an opportunity for organisations to self-assess, using the models of TQM and business excellence which underpin these frameworks. In this process of self-assessment, an opportunity exists to identify the strengths and weaknesses in the current management of operations. Healthcare organisations can learn about best practices from Baldrige-winning companies, and will thus be assisted in developing a composite for excellence. Since 1999, MBNQA has a separate award for the healthcare organisations in USA.

MMBNQA is an excellent framework for both incremental and breakthrough improvement and healthcare excellence. MBNQA framework focuses on achievements and improvements in seven key areas: leadership; strategic planning; customer and market focus; measurement, analysis, and knowledge management; human resource focus; process management; and results.

The EFQM Excellence Model

The European Foundation for Quality Management (EFQM) Model, also known as the European Quality Award (EQA), has its roots in the philosophy of total quality management. It is a non-prescriptive TQM framework based on nine criteria. Five of these are enablers and four are results. Enabler criteria cover what an organisation does. The result criteria cover what an organisation can achieve. The EFQM model recognizes that there are many approaches to achieving sustainable excellence in all aspects of performance, and is based on the promise that excellent results with respect to performance, customers, people and society are achieved through leadership driving policy and strategy, that is delivered through people partnerships and resources, and processes (EFQM, 2006). This approach represents an important means of achieving excellence in healthcare. Self-assessment can examine current practice and establish capability, thus driving improvement rather than a reaction to weaknesses in the current system.

Six Sigma

Six sigma is a powerful expansion of TQM because

it repackages some of the stronger TQM principles while adding its own distinct concepts and methodologies (Black and Revere, 2006). Six sigma engages senior healthcare leaders and leverages dedicated resources against the quality improvement projects with the biggest patient care and financial impact. It achieves its results by expanding the original tools of TQM to refocus on statistical analyses and by providing a metric by which quality improvement can be gauged. It pursues to produce services with only 3.4 defects per million, meaning Six sigma in statistical terms. DMAIC (Define, measure, analyze improve and control) method of six sigma works well in healthcare industry. Healthcare organisation can measure the performance using certain metrics like service levels, patient satisfaction, service costs and clinical excellence etc.

Conclusion

Consumers (patients) are expecting more of healthcare providers and are demanding higher standards of care and service. Rising costs, along with a multitude of other factors, have brought outside scrutiny on the industry and forced healthcare to take a serious look at how it does business. The time has arrived when healthcare no longer will be allowed to operate as it pleases. In this competitive world, continuously improving quality is a core goal of most healthcare organisations. Engaging in quality signifies that the organisation is concerned about the value it brings to its patients, its providers, its employees, and its stakeholders. The excellence models and six sigma for quality implementation are useful tools in facilitating the cultural change required for a TQM strategy in healthcare services. The overall success of TQM depends on the healthcare organisations commitment and extensive training to their employees in TQM.

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A Study of Total Quality Management Practices in Healthcare Services

R. Rohini & B. Mahadevappa

In today's highly competitive environment, market and accreditation pressures have motivated the hospitals to implement Total Quality Management (TQM) philosophies and concepts. Total Quality Management has the potential to help hospitals solve many of the problems they are currently facing. This paper aims to study the TQM practices in healthcare services. The measuring instrument used in this study was based on MBNQA for health care. An analysis covering a sample of 100 executives/physicians/administration staff from nine hospitals in Karnataka, India, revealed that the greater the current practices of TQM in healthcare, the higher is the hospital performance results I and lower is the hospital performance results II.

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The healthcare sector is one of the fastest growing areas of the economy of most developed and developing countries. In India, the past few years have witnessed an increasing concern over the quality of health care services. The globalisation and liberalisation policies have significantly changed the healthcare scenario in India. With increasing awareness the patients, as consumers, expect quality in healthcare services. Quality has been shown to be an important element in the consumers' choice of hospitals (Lynch and Schuler, 1990). In the light of these changes, there is an emerging need to improve the quality of healthcare services.

Recently, market and accreditation pressures have motivated hospitals to implement Total Quality Management (TQM) concepts. The TQM applications in hospitals are seeking ways to lower costs and improve care. In healthcare, quality monitoring has focused on individual performance and decision making. Several researchers have asserted that successful implementation of TQM can result in significantly superior outcomes in healthcare organizations (Short and Rahim, 1995; Arndt and Bigelow, 1995; Zabada et al, 1998), such as the upgradation of service quality, improvement in healthcare quality and productivity, prevention of costly or fatal mistakes in medical treatment, reduction in the cost of medical treatment and satisfying both internal and external customers. Therefore adopting TQM practices will not only help overcome the financial crisis of the healthcare organizations, but will also help overcome many critical problems (Short and Rahim, 1995). Although TQM may be in various stages of implementation throughout healthcare, the entire industry has embarked on the concept.

This paper presents the results of a study designed to measure hospital executives/administration staff and physicians' perceptions on TQM practices in nine hospitals.

Literature Review

TQM, which originated in manufacturing, stands in sharp contradiction to traditional approaches to quality assurance in the healthcare industry. TQM started becoming popular in the healthcare industry during the late 1980s (Garvin, 1988; Westphal, Gulati, and Shortell, 1997). Research literature has thrown up numerous models by different researchers across the world. Several research studies provide comprehensive definitions of the term TQM in healthcare institutions (Frist T, 1992; Mayer D, 1992; Matherly L. L., & Lasater H. A., 1992; Mueller, R. A., 1992).

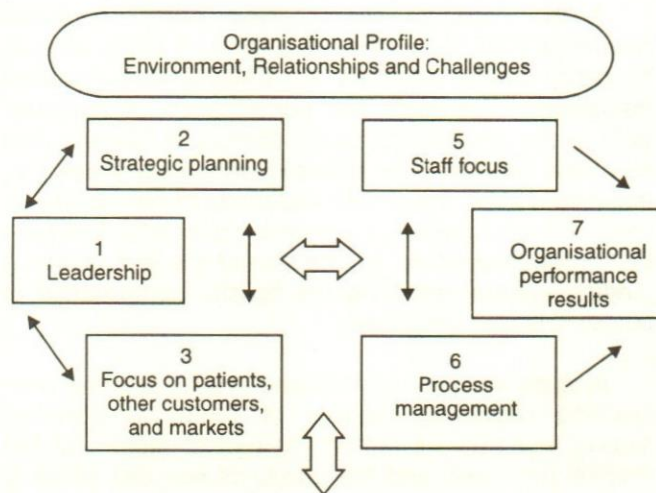
Another research stream deals with the assessment and successful implementation of current practices of quality management practices by healthcare institutions (Matherly, L. L., & Lasater, H. A., 1992; Cerne, F., 1993; Hassen, P., 1991; Boyd, M and Haraway, C., 1991; Sahney, V. K., & Warden, G.L., 1991; Houghton, J., 1992; Materna, S., & Rothe, K., 1992; Burney, R., 1994; Gothard, I., & Wixon, N., 1994; Hale, J., & Weiner, R., 1994; Hammonds, K., 1994; Hillebrand, P., 1994; Schwartz, M., 1994). Most of these research studies illustrate how TQM can create a competitive advantage.

Several research studies have been carried out in different parts of the world to investigate the status of TQM efforts and utilization of analytical tools to ascertain quality standards and meeting customer satisfaction (Binsham Lin & Jennifer Clousing, 1995; Huq, Ziaul., 1996; Brashier, Leon W et al., 1996; Motwani, Jaideep, et al., 1996; Boerstler, Heidi, 1996; A K Aggarwal & Mohamed Zairi, 1997; Rabi, Joyce, 1998; Ziaul Huq, Thomas N Martin, 2000; Overetveit, 2000; Isaiah O. Ugboro & Kofi Obeng, 2000; John Overetveit, 2001; Gary J Young et al., 2001; Ching Horng & Fenghueih Huarng 2002; Sunhee Lee et al 2002; Paola Adinolfi, 2003; Gopal K Kanji & Patricia Moura e Sa 2003; Kay Downey-Ennis et al., 2004; René Schalk, Wim van Dijk, 2005).

Several research studies have been conducted using the Malcolm Baldrige National Quality Award (MBNQA) framework to examine the impact of TQM on hospital performance (Barsness et al., 1993-1994; Graves et al., 1994; Shortell et al., 1995a; Shortell et al., 1995b; Carman et al., 1996; Chen, 1999). The Malcolm Baldrige National Quality Award Program is administered through the Department of Commerce National Institute of Standards and Technology (NIST) with assistance from the American Society for Quality (ASQ). The Baldrige Healthcare criteria for performance excellence focus on organizational performance results and use the Plan-Do-Check-Act (PDCA) cycle of continuous improvement (Deming, 2000; Evans & Lindsay, 2001;

Joint Commission on Accreditation of Healthcare Organisations, 1999).

The seven Baldrige categories and the core values form the building blocks and the integrating mechanism for the system. A systems perspective of the concepts of the Baldrige criteria is depicted in Fig. 1.



Source: Malcolm Baldrige Health Care Criteria for Performance Excellence, 2004

Fig. 1. Baldrige health care criteria for performance excellence framework: a system perspective

A research study by Meyer and Collier (2001) was the first empirical study to test the causal relationships in the MBNQA Health Care Pilot Criteria. The Baldrige model of quality management for the healthcare industry is tested here using data from 220 US hospitals. Results of the confirmatory structural equation modelling show that many of the hypothesized causal relationships in the Baldrige model are statistically significant. The study also clarifies and improves the understanding of within-system performance relationships.

Goldstein and Schweikhart (2002) investigated the relationships captured by the Baldrige Healthcare framework that improving leadership, systems, and processes leads to improved results. Their findings of significant associations among Baldrige Categories 1 through 6 and each of the 5 results dimensions provide confirmatory evidence that the Baldrige Framework of Quality management is a useful self-assessment tool for healthcare organizations striving for performance excellence.

Weech-Maldonado, Neff and Mor (2003) examined the relationship between quality of care and financial performance in 1,287 nursing homes in five states of the United States. They found that nursing homes that produce better care were able to achieve lower patient

care costs and in the process reported better financial performance. The finding was different from the studies of Goldstein and Schweikhart (2002) and Shortell et al (1995a). Weech-Maldonado, Neff and Mor (2003) also found that the relationship between the level of quality of care and the private-pay market share of the nursing homes was positive, but not significant.

A few research studies have been conducted regarding TQM in healthcare in India. A study by G.D. Sardana (2003) attempts to present a conceptual framework to evaluate the performance of hospitals, both in the private and public sectors. A classification has been proposed for different ownership styles viz., the state-owned, the private and the trust-owned. Under each of these categories, nine classes of hospitals have been proposed based on the size of the institutions. A grading system indicating the holistic performance of hospitals is also proposed.

In another study by J.P.Sahu (1992) at three non-teaching hospitals, analysis of three components, namely, input-output factors, attitudinal factors of the hospital personnel and the quality of services which is assessed through the patients' perception, are presented. High patient satisfaction and favourableness of the attitudinal factors was recorded in the voluntary hospital, while industrial and State Government hospitals lagged behind in these components of healthcare service. B. Krishna Reddy et al., (2002) attempt to study six sigma aspects in the ultrasound department of a hospital. The study findings indicate that a significant reduction in waiting time of patients leading to a substantial improvement in quality of service at ultrasound department can be achieved through the six sigma process. Various research studies on TQM in hospitals have been conducted at the Tata Memorial Hospital, Jamshedpur. Among them are – "A TQM approach to implementation for handling and management of hospital waste" (N. K. Das, 2001); "Benefits of TQM in every sphere of the hospital" (Sujatha Mitra, 2001); "Usage of balanced scorecard concept for the prioritization and alignment of individual goals with the organizational goals" (Sujatha Mitra, 2001). There are few empirical studies using MBNQA to measure the practice of TQM in healthcare in India. The literature survey suggests a lack of research gap in knowledge about TQM in healthcare. To fill this research gap, this empirical study was undertaken.

Research Objectives

The specific objectives of the study were to:

- Investigate the TQM practices in hospitals

- Examine the effectiveness of TQM practices on hospital performance results
- Identify the measures that can strengthen the TQM efforts in hospitals.

Hypotheses

The hypotheses of this research study are:

H₁: The greater the practices of leadership, the higher the hospital performance results I and lower the hospital performance results II.

H₂: The greater the practices of strategic planning, the higher is the hospital performance results I and lower is the hospital performance results II.

H₃: The greater the practices of focus on patients, other customers and markets, the higher is the hospital performance results I and lower is the hospital performance results II.

H₄: The greater the practices of measurement, analysis and knowledge management, the higher is the hospital performance results I and lower is the hospital performance results II.

H₅: The Greater the practice of Staff Focus, higher is the hospital performance results I and lower is the hospital performance results II.

H₆: Greater the practice Process Management, higher is the hospital performance results I and lower is the hospital performance results II.

Methodology

a) Sample

The present study was designed with the cooperation of nine hospitals in Karnataka, India. The management teams were up-to-date with the current literature and emphasised the pragmatic aspects of the research. Their active involvement helped in the assessment of reliability and ensured that the research instrument would be of practical significance. The sample consisted of five multi-speciality corporate hospitals, two super speciality hospitals, one missionary hospital, one medical college attached, a private hospital and a teaching hospital. Among these, five hospitals are ISO-9000 certified. All the nine hospitals belong to the State of Karnataka, India. In these nine hospitals, a sample of 100 was selected to investigate the status of TQM implementation. The details of hospitals and the

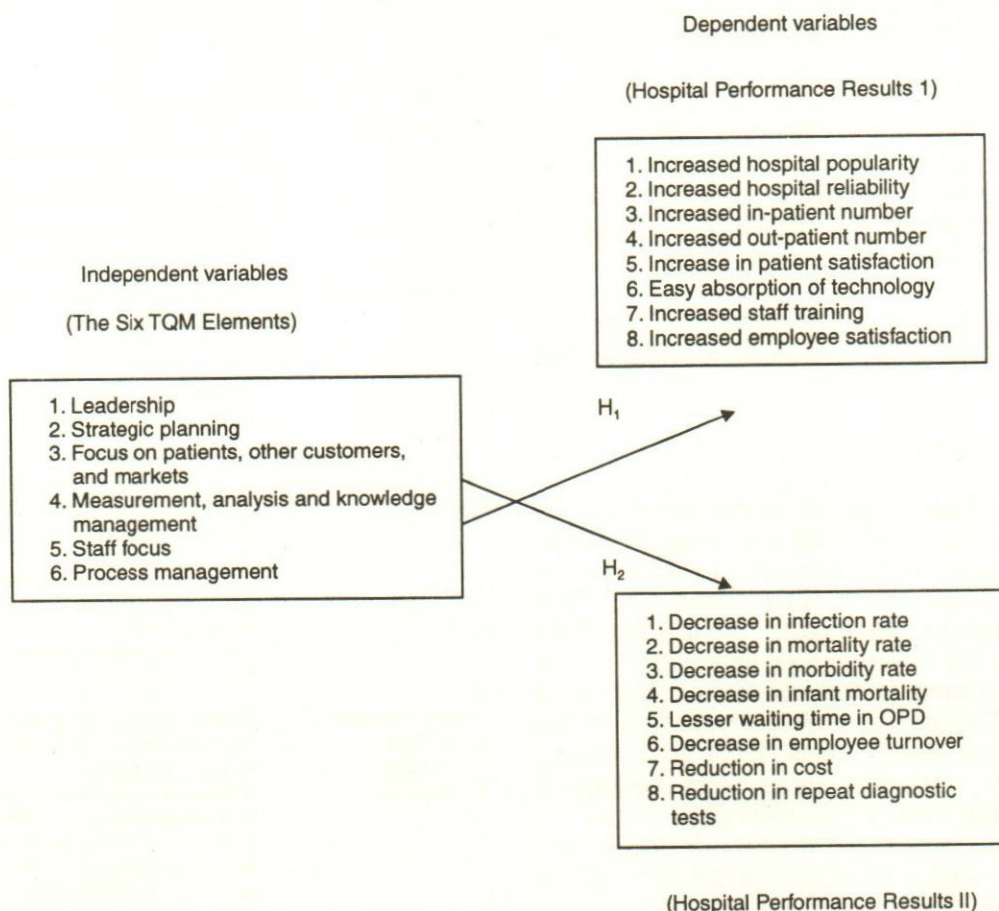


Fig. 2. Research Model

respondents' demographic information are given in Table 1 and Table 2 respectively.

Table 1: Hospitals by type, bed size and ISO-9000 Certification & Ownership

By Type	n %	By Bed size	n %
1) Multi-specialty hospitals 5 55.56		< 100 1 11.11	
2) Super specialty hospitals 2 22.22		100-200 3 33.33	
3) Missionary hospital 1 11.11		200-350 3 33.33	
4) Teaching hospital 1 11.11		350 - 500 1 11.11	
		> 500 1 11.11	
Σ 9	100.00	Σ 9	100.00
By Certification	n %	By Ownership	n %
ISO-9000 Certified 4 44.40		Missionary 1 11.10	
ISO- 9000 Non-Certified 5 55.60		Private 8 88.90	
Σ 9	100.00	Σ 9	100.00

Table 2: The Demographic Information of Respondents

Gender	n %	Experience	n %	Profession	n %
Male : 52	52	< 2 years	24 24	Physician/ surgeon	42 42
Female : 48	48	2-5 years	39 39	Executive	17 17
		5-10 years	20 20	Nursing Superintendent	9 9
		10-15 years	13 13	Administration personnel	32 32
		> 15 years	4 4		
Σ 100	100	Σ 100	100	Σ 100	100

b) Research Model

This study utilized the model of Malcolm Baldrige Health Care criteria (MBNQA, 2004). The structure of the MBNQA in healthcare is a model of TQM for healthcare organizations. The structural elements associated with TQM include leadership, strategic planning, focus on patients, other customers and markets, measurement,

analysis and Knowledge Management, staff focus, process management and organisational performance results.

The Malcolm Baldrige Healthcare Criteria provide a systems perspective for managing the healthcare organization and its key processes to achieve results and performance excellence. The model of our research study is presented in Fig. 2.

The operational definitions of the six TQM elements and the Hospital Performance Results are given in Table 3.

c) The Research instrument

The questionnaire designed in this study was to investigate the practice of TQM and hospital performance and to examine the relationships between the six TQM elements and the hospital performance. The instrument consisted of three parts: The first part (Part A) pertained to the demographic information of the respondents, including gender, profession and years of experience. The next part (Part B) consists of the six TQM elements with 34 items: Eight items belong to the leadership criterion; three items belong to strategic planning; five items belong to focus on patients, other customers and markets; measurement, analysis and knowledge management criterion has six items; staff focus criterion has six items; and process management has six items.

The third part (Part C) consisted of evaluating the performance of the hospital, i.e the hospital performance results, which had two parts - Hospital Performance Results I and Hospital Performance Results II, with eight items in each category. Respondents were asked to mark their perceptions about these seven criteria on a continuous five-point Likert scale as strongly agree, agree, unsure, disagree, and strongly disagree. For the eight negative statements of the Hospital Performance Results II, the scale has been reversed.

d) Data collection and Analysis

The primary data on 100 hospital executives/physicians/administration staff was collected in nine hospitals using the research instrument to measure the extent of TQM practices and their impact on Hospital Performance Results. Personal interviews with the respondents were also conducted. Out of the 130 distributed questionnaires among hospital executives/physicians/administration staff, 100 responses were received, yielding a response rate of 76.92%.

Table 3: The Operational Definitions of the Six TQM elements and the Hospital Performance Results I and II

TQM Elements	Operational Definition
1. Leadership	Senior leaders' address values, directions, and performance expectations. Focus on patients and stakeholders. Encourage collaboration between administration and medical staff. Fulfilling social responsibility.
2. Strategic Planning	Developing Strategic objectives and action plans. Balancing objectives with short and long term challenges and opportunities. Project future performance on key performance measures or indicators.
3. Focus on Patients, Other Customers, and Markets.	Determines key requirements, expectations and preferences of patients, other customers, and markets. Develop new health care service opportunities. Listening and learning methods to determine patients/customer requirements. Compare patients' satisfaction data with that of competitors.
4. Measurement, Analysis, and Knowledge Management	Selects, gathers, analyses, manages, and improves data, information, and knowledge assets. Measures, analyses, aligns and improves performance data and information. Communicate the results of the analyses to work-group and functional-level operation to enable effective support.
5. Staff Focus	Efforts to build and maintain a work environment and staff support climate. Utilisation of work force's full potential for achievement of overall objectives and action plans. Addressing the key needs of staff education, training and career development. Staff motivation through performance appraisal system.
6. Process Management	Examining key aspects of hospitals process management, including key health care, business, and other support processes for creating value for patients, other customers, and the organization.
7. a. Hospital Performance Results I	Increased hospital popularity, increased hospital reliability, increased in-patient number, increased out-patient number, increase in patient satisfaction, easy absorption of technology, increased Staff training and increased employee satisfaction.
b. Hospital Performance Results II	Decrease in infection rate, decrease in mortality rate, decrease in morbidity rate, decrease in infant mortality, lesser waiting time in OPD, decrease in employee turnover, deduction in cost, reduction in repeat diagnostic tests.

e) Reliability and Validity

The internal consistency method (Nunnally, 1978) was chosen to assess the reliability of the research instrument used in this study. The internal consistency of a set of measurement items refers to the degree to which items in the set are homogeneous. The most popular test of inter-item consistency reliability is the Cronbach's coefficient (α , Alpha), (Cronbach, 1984), which has a value of ranges from 0 to 1. The nearer the value of α to 1, the better the reliability is. Cronbach alpha is computed for a scale based on a given set of items. Using the reliability programme, (Hull and Nie, 1981), an internal consistency analysis was performed separately for the items of each of the seven criteria of MBNQA using SPSS v 11.0 for windows (SPSS, 2000).

Table 3 presents the number of items, means, standard deviations, and reliability co-efficient associated with all the seven criteria of the survey instrument. The reliability co-efficient ranged from 0.8095 to 0.9724. Typically, reliability coefficients of 0.7 or more are considered adequate (Cronbach, 1951; Nunnally, 1978; Hair et al., 1998). Accordingly the scale used here was judged to be reliable.

Table 4: Results of Reliability Analysis

	No. of Items	Mean	SD	Alpha
TQM Elements				
1 Leadership	8	4.13	.66	.91
2. Strategic Planning	3	4.17	.75	.91
3. Focus on Patients, Other Customers and Markets	5	4.19	.61	.84
4. Measurement, Analysis and Knowledge Management	6	4.00	.73	.93
5. Staff Focus	6	4.01	.77	.93
6. Process Management	6	4.13	.72	.93
7. a. Hospital Performance Results I	8	4.14	.52	.86
b. Hospital Performance Results II	8	2.23	.53	.81

The questionnaire also fulfils the more practical requirements of validity as found in a number of studies.

Results and Discussion

Table 5 represents the details of the six TQM elements, hospital performance results I and II with their means and standard deviations.

The study results revealed that two of the six TQM elements, viz., measurement, analysis and Knowledge Management and staff focus measured lower (4.00 and 4.01 respectively) than the other four TQM elements. Focus on patients, other customers and markets measured highest (4.19).

Leadership

In the survey instrument the leadership element represents how senior leaders address values, directions, and performance expectations and review the hospital's organizational performance. Their focus on patients and stakeholders is very important and the encouragement given for the collaboration between administration and medical staff plays a vital role in addressing the important decisions. It also shows that to what extent the hospital is responsible for fulfilling social responsibility and provides its contributions towards community health.

In this study the researchers found there is still a need for improvement in the hospital practices in using review findings for continuous and breakthrough improvement and innovation (Q. 1.6). Most of the respondents strongly agreed upon the fact that they are fulfilling the public responsibilities and the leadership supports and practices good citizenship and community health activities.

Strategic Planning

The Strategic Planning element shows how the hospital defines and develops its strategic objectives that are well balanced with the needs of its patients and other customers. Balancing the objectives with short and long-term challenges and opportunities that the hospital is facing is one of the important strategic planning actions. The element also addresses the issue of how the hospital projects future performance on key performance measures or indicators.

In the present study, even though the hospitals' executives strongly agreed that they have set well-defined strategic objectives that are well balanced according to the needs of patients and other customers, there is less consensus on the part of physicians/surgeons/other specialists regarding the hospitals having a key performance measurement system for tracking progress relative to their action plans. This accounts for a comparatively lesser score (Q. 2.3) than the other two items (Q. 2.1 and Q. 2.2) of the strategic planning element.

Table 5: The Average Scores of TQM Elements, Hospital Performance Results I & II

Items	Mean	SD
1. Leadership	4.13	.66
1.1.The senior managers have set hospital values, short and long term directions.	4.18	.85
1.2.The hospital has established an environment for	4.11	.93
1.3.The hospital's leadership has encouraged a strong collaboration between administration and the medical staff for better performance.	4.16	.84
1.4.The hospital's leaders have placed a significant emphasis on training and professional development.	4.11	.80
1.5. The hospital regularly reviews organisation's performance.	4.18	.81
1.6. The hospital uses review findings for continuous and breakthrough improvement and innovation.	4.03	.83
1.7. The hospital fulfills its public responsibilities and encourages,supports and practices good citizenship.	4.19	.83
1.8. The hospital supports community health activities.	4.11	.88
2. Strategic Planning	4.17	.75
2.1 The hospital has set well define strategic objectives that are balanced according to the needs of the patients and other customers.	4.24	.83
2.2 The strategic planning processes are well associated with competitive environmental change.	4.21	.81
2.3 Our hospital has key performance measurement system for tracking progress relative to our action plans.	4.07	.80
3. Focus On Patients, other Customers and Markets	4.19	.61
3.1. The hospital systematically and regularly measures the extent of patient satisfaction / dissatisfaction.	4.41	.75
3.2. The hospital obtains information and feed back from patients on patient safety issues to improve the delivery of health care.	4.35	.74
3.3. The hospital listens and learns from other customers to recognize their requirements.	4.19	.79
3.4. The hospital has effective management processes for understanding customer complaints.	4.27	.69
3.5. The hospital compares the patient satisfaction information with that of competitors/ similar service providers.	3.74	.92
4. Measurement, analysis and Knowledge Management	4.00	.73
4.1. The hospital has a comprehensive system to gather and integrate information for decision making.	4.14	.85
4.2. The hospital ensures that the clinical information technology is reliable,secure and user friendly.	4.15	.87
4.3. The hospital effectively uses the analysed results to act as the basis for improvement and bench marking.	3.93	.90
4.4. The hospital effectively communicates the analysed results to work group/ functional level operations.	3.85	.87
4.5. The hospital ensures the needed data and information available to staff, suppliers, partners and patients as appropriate.	4.09	.75
4.6. The hospital builds and manages its knowledge assets to improve efficiency and effectiveness.	4.02	.77
5. Staff Focus	4.27	.84
5.1. The hospital promotes team work and co-operation.	4.08	.78
5.2. The hospital efficiently evaluates the requirements of knowledge and skill of staff.	4.06	.94
5.3. The hospital efficiently evaluates the processes of recruitment, hiring and training of staff.	4.10	.96
5.4. The hospital ensures a safe, secure and healthful work environment for all the staff members.	3.94	.96
5.5. The hospital has a comprehensive system to motivate staff, and help them attain career development.	3.66	1.00
5.6. The hospital has a well developed staff satisfaction measurement system	4.13	.72
6. Process Management	4.10	.80
6.1. The hospital addresses the quality factors of health care service in designing processes.	4.13	.81

(Contd....)

Table 5: The Average Scores of TQM Elements, Hospital Performance Results I & II (Contd.)

Items	Mean	SD
6.2 The hospital incorporates changing customer market requirements and new technology into related processes.	4.02	.91
6.3 The hospital regularly audits processes and performance to minimize costs associated with inspections and tests.	4.19	.92
6.4 The hospital has a standardized and documented operating procedure to support daily operations.	4.22	.79
6.5 Our hospital has well established systems for intra and inter-departmental communications.	4.13	.85
6.6 Our hospital has well developed systems for collaborations and aligned efforts in implementing best practices to match current health care need.	4.15	.53
7. a. Hospital Performance Results I	4.30	.69
7.1. Increased hospital popularity.	4.30	.64
7.2. Increased hospital reliability.	4.35	.67
7.3. Increased in-patient number.	4.31	.66
7.4. Increased out-patient number.	4.11	.71
7.5. Increase in patient satisfaction.	4.06	.73
7.6. Easy absorption of technology.	3.90	.89
7.7. Increased staff training.	3.84	.91
7.8. Increased employee satisfaction	2.23	.53
b. Hospital Performance Results II	1.90	.67
7.9. Decrease in infection rate.	2.00	.69
7.10. Decrease in mortality rate.	2.00	.65
7.11. Decrease in morbidity rate.	2.29	.84
7.12. Decrease in infant mortality.	2.35	.87
7.13. Lesser waiting time in OPD.	2.45	.88
7.14. Decreased employee turnover.	2.38	.79
7.15. Reduction in costs.	2.47	.92
7.16. Reduction in repeat diagnostic tests		

Focus on Patients, Other Customers and Markets

This element explains how the hospital determines key requirements, expectations and preferences of patients, other customers and markets. Development of new healthcare service opportunities, listening and learning methods to determine patients/customer requirements are also highlighted. Finally, how the hospital compares patient satisfaction data with that of competitors/similar service providers is addressed.

In the present study, most of the respondents did not fully agree on getting comparative patient satisfaction feedback data from other similar service providers. This means in the highly competitive healthcare environment, each hospital is trying to improve quality by catering to the needs of its patients in its own way without giving much importance to what other hospital is doing to improve patient satisfaction. This accounts for the least mean value for Q 3.5.

Measurement, Analysis, and Knowledge Management

This element describes how the hospital selects, gathers, analyses, manages, and improves its data, information, and knowledge assets. It also explains how the hospital measures, analyses, aligns and improves performance data and information based on patient satisfaction surveys and communicate the results of the analyses to the work group and functional-level operation to enable effective support.

In this study, there is less agreement on the hospital effectively using the analysed results to act as the basis for improvement and bench marking. Also there seems to be less of a consensus among the managers and medical staff in effectively communicating the analysed results to work group/functional level operations and the data and information are not fully available to staff, suppliers, partners and

Table 6: Results of the Regression Analyses

TQM Elements	Hospital Performance Results I			Hospital Performance Results II		
	Beta	t value	P value	Beta, t value	P value	
Leadership	.59	7.19	.000	-.51	5.94	.000*
Strategic Planning	.54	6.41	.000	-.42	4.62	.000*
Focus on Patients, other Customers, and Markets	.54	6.35	.000	-.50, 5.68	.000*	
Measurement, Analysis and Knowledge Management	.62	7.91	.000	-.64	8.23	.000*
Staff Focus	.67	8.83	.000	-.50	5.81	.000*
Process Management	.59	7.35	.000	-.49	5.69	.000*

Note: *p < .001

patients as appropriate. Thus, lower values have been observed (Q 4.3, Q 4.4 and Q 4.5).

Staff Focus

The element staff focus addresses the hospital's efforts to build and maintain a work environment and staff support climate and utilisation of work force's full potential for achievement of overall objectives and action plans. The key needs of staff education, training and career development and staff motivation through performance appraisal system is also discussed. From the current survey, the researchers found that the nursing staff and middle level management personnel felt the need for better career development opportunities and motivation. The staff of some of the surveyed hospitals expressed the view that the staff satisfaction measurement system is not very well established in their hospital. Therefore, lower values have been observed (Q 5.5 and Q 5.6).

Process Management

This element examines key aspects of hospitals process management, including key healthcare, business and other support processes for creating value for patients, other customers and the organization. Periodical audits, standardized and well documented operating procedures to support daily operations are also addressed. In the research study, except for the Q. 6.3, where there was not much agreement about the regular auditing processes and performance to cost minimization associated with inspections and tests, other items in the element almost match each other. However, there is strong agreement that there are systems for intra and interdepartmental communications, thus yielding a highest score for Q 6.5.

Hospital Performance Results

The hospital performance results are based on the

physicians/executives/administration staff's perceptions of the hospital performance as a result of TQM adaptation. In the present study, the hospital performance results were categorized into two sections, viz., Hospital Performance Results I - consisting of increased hospital popularity, increased hospital reliability, increased in-patient number, increased out-patient number, increase in patient satisfaction, easy absorption of technology, increased staff training and increased employee satisfaction and Hospital Performance results II - consisting of decrease in infection rate, decrease in mortality rate, decrease in morbidity rate, decrease in infant mortality, lesser waiting time in OPD, decrease in employee turnover, reduction in cost, reduction in repeat diagnostic tests. The results are summarized as follows.

Hospital Performance Results I

The researchers found that there is strong agreement regarding increased hospital popularity, increased hospital reliability, increase in in-patient number, increase in out-patient number by adopting TQM practices in the hospitals. However, the staff was not sure about the fact that TQM practices implementation lead to increased employee satisfaction, because satisfaction depends on many other internal and external factors, thus yielding a lower score for Q 7.8.

Hospital Performance Results II

The study found that there is strong agreement among the hospital personnel with respect to decrease in infection rate, decrease in mortality and morbidity rates, as a result of TQM adaptation. However, there is strong disagreement regarding TQM implementation leading to decreased employee turnover (Q. 7.14) and there will be reduction in repeat diagnostic tests (Q. 7.15) which eventually lead to cost reduction (Q. 7.16).

Testing of Hypotheses

Table 6 presents the results of the Regression Analyses between the six TQM elements with Hospital Performance Results I and II.

The results of regression analysis support the hypotheses formulated in this study. The statistically significant positive beta values between the six TQM elements and hospital performance results I shows that the greater the practices of TQM elements, the higher the hospital performance results I i.e. increased hospital popularity and reliability, increased number of in-patients and out-patients, higher patient satisfaction, etc.

The statistically significant negative beta values between the six TQM elements and hospital performance results II shows that the greater the practices of TQM elements, the lower the hospital performance results II i.e., decreased infection, decrease in mortality rate, decrease in morbidity rate, and infant mortality rate, lesser waiting time in OPD, etc.

Conclusion

Total Quality Management has the potential to help hospitals solve many of the problems they are currently facing. Adopting a TQM philosophy can not only help them tide over the financial crisis, but also lead to improved quality of care and better relationships with both internal and external customers. With the emergence of a variety of 'new' customers (i.e. the payers of the health care services), more attention has to be paid in satisfying the needs of multiple customers with divergent requirements and expectations.

The concept of TQM is continuously a focus of executives in hospitals. Since TQM is a process that evolves cultures and transforms management style, it is crucial to capture the hospital executive's perspective on the TQM programme. As TQM is a holistic concept involving all facets of the hospital, it is imperative to have an understanding of the physician involvement and administration personnel's perceptions regarding TQM programme.

This paper attempted to study the perceptions of physicians/executives/administration personnel on the practices of TQM and its impact on hospital performance results in nine hospitals in the state of Karnataka, India. Results reveal that the sample hospitals have been following TQM practices. The study also found that TQM has been effective in improving hospital performance results. We can conclude that the relative strength and significance of the regression coefficients

are instructive in understanding the extent of TQM in hospital performance. A managerial insight, which can be deduced from this study, is that improvement of hospital performance should concentrate more on the two TQM elements, viz., measurement, analysis and Knowledge Management and staff focus. This does not mean that the other four TQM elements, namely, leadership, strategic planning, focus on patients, other customers and markets, and process management should be ignored. If hospitals implement only one or a few of the elements, the result would not guarantee improvement, which is why the quality programme is called total quality management. All the six elements as a whole, and collectively contribute to the results.

The authors suggest a few recommendations such as establishing a steering committee to implement TQM, establishing a standardised process with a performance measurement system, effectively classifying and evaluating the TQM education and training, maintaining an efficiently operating communication system, and finally creating a new culture, which is fulfilled with a sense of shared values, organizational trust, team work and collaboration in continuously improving organizational systems and processes for further improvisation of the hospital performance. Further studies may incorporate the environmental and economic factors into the variables to examine their impact on hospital performance and investigate the link between these two factors.

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Stress is an ignorant state. It believes that everything is an emergency."

— Natalite Goldberg

Municipal Solid Waste Management: Status & Strategies in India

Kamal Taori & A.K. Saxena

This paper discusses the present status and strategies to be followed for Municipal Solid Waste Management in India. It also discusses about the role of NPC in MSW Management.

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Solid waste management has been a matter of concern right from the beginning of human civilization. The Harappa civilisation saw the first well planned garbage collection and efficient organized city cleaning brigade around 2500 BC. However, the organized waste disposal system was lost with the decline of the Harappa Civilization.

Solid waste management has been the most neglected area of urban development over the years and has accounted for severe health problems in urban areas all over the country. A number of cases have come to light because of mismanagement of municipal solid waste management. The devastating pneumatic plague in Surat, Gujarat, in September 1994 is a true example of how uncontrolled garbage led to the outbreak of the disease. This resulted in promulgation of the Municipal Solid Waste (Handling & Management) Rules, in September, 2000. Despite the fact that more than five years have passed, the situation of solid waste management has not improved, as desired.

Rapid urbanization has been experienced in the country after the economic liberalization, which coupled with population explosion, has changed the waste generation scenario. Most of the people who migrate from rural to urban areas for employment generation, live in unauthorized squatter settlements. This rapid urbanization coupled with industrial growth and economic development has resulted in increase in per capita consumption and solid waste generation. As compared to the developed nations, however, the per capita solid waste generation is far below average. However, with the changing culture and lifestyle, the waste generation scenario will change and with the introduction of more packed and fast food, the waste generation rate is bound to increase in the future. There is a direct relationship between waste generation to the GDP of the country. Table 1 shows the relationship between wealth and waste generation in some of the developed

and developing nations. It may be observed from the table that the countries having more per capita GDP generate more waste than the developing nations.

Table 1: Wealth & Waste Generation Correlation

Country	GDP per capita lakh/yr	Solid Waste Generation kg/capita per day
USA	18.1	1.5
South Korea	8.05	1.0
Philippines	1.9	0.6
India	1.1	0.5

Source: N.C. Vasuki, "Issues in Municipal Waste Management"; National Workshop on Municipal Waste Management: Sharing of experiences and Lessons Learnt, New Delhi, July 13-14, 2005).

It is a fact that residents in urban areas generate double the waste as compared to their counterparts in the rural areas. The data pertaining to solid waste management from urban areas may be available but rural solid waste management data are virtually non-existent. Keeping these factors in view, most of the solid waste management efforts have been concentrated on urban areas. Even the Municipal Solid Waste (Handling & Management) Rules, 2000, gives priority to a population of more than one lakh.

Present Status of Municipal Solid Waste Management

Solid waste management is one of the important aspects of the urban infrastructure and an essential service pertaining to public health related to the provisions of sanitation and hygiene in an urban area. The urban local bodies are responsible for maintaining the solid waste management systems in their respective areas. Before we go into the details, let us understand what is covered under the Municipal Solid Waste. The Municipal Solid Waste consists of domestic waste from kitchen, garden; commercial waste from business premises, market; institutional waste from large hotels & restaurants, vegetable, fruit, fish, meat markets; community halls, religious places; street sweepings; construction and demolition debris; waste-offal, dead animals, etc.

There are 393 Class-1 cities, having population more than 1 lakh, contributing to more than 68% of urban population and 888 Class-5, having population below 5000, contributing only 2.36% of urban population in India. About 25-39 million tonnes/year of municipal solid waste is generated in India. Out of about 30 million tonnes/annum of urban municipal solid waste about 8.5 million metric tonnes/annum is generated from nine

metropolitan cities alone and only about 60-80% of generated waste is collected daily while the rest remains on the roads, streets and/or dustbins to decay (Palnitkar, 2000).

If we look into the solid waste management system, there is no segregation of wet and dry waste at source. The partial segregation of recyclable waste, having economic value, is being carried out by the people. Articles particularly white goods, electronic items, etc. are being reused quite intensively. In another sense, the products have extended life in one of another manner. In most of the places, there is no system of primary and ineffective secondary waste collection and storage system leading to unhygienic conditions. The street animals may be seen scattering the waste all around resulting in the spread of vector diseases. The transportation system is inefficient and irregular. The collected waste is disposed off unscientifically in dugout trenches, so-called "Landfills".

The economic development which started after 1992 has changed the solid waste generation scenario. There is a wide variation in waste generation from smaller towns and bigger towns with a population of more than 20 lakh. The waste generation in India varies from 200 gms per capita per day to about 600 gms per capita per day (1 & 2). About 11,500 MT/day of municipal solid waste is generated in India amounting to about 42 million MT/year of MSW. There is a wide variation in waste generation trend from the rural areas than the urban areas which depends not only on the living habits but also on the purchasing capacity. The bulk density of solid waste ranges between 500-600 kg/m³. The physical composition of waste is quite different from the developed nations. It varies from the source of generation to the final disposal. In India, rag picker play an important role in the composition of the waste. The typical physical composition of Indian MSW waste is presented in the following tables.

Table 2: Typical Physical composition of Municipal Solid Waste

S. No.	Composition	Value (%)
1.	Total Compostible	39 - 57
2.	Paper	2.9 - 6.4
3.	Leather/Rubber/Synthetics	0.28 - 0.78
4.	Inert	44 - 54
5.	Metal	0.33 - 0.8
6.	Glass & Ceramics	0.35 - 0.94

Source: "Manual on Municipal Solid Waste Management", CPHEEO, 2000

The following may be observed from the physical

Table 3: Typical Chemical composition of Municipal Solid Waste

S.No.	Composition	% by weight
1.	Moisture	19.52 - 38.72
2.	Organic matter	25.14 - 39.07
3.	Nitrogen as Nitrogen	0.56 - 0.71
4.	Phosphorous as P ₂ O ₅	0.52 - 0.82
5.	Potassium as K ₂ O	0.52 - 0.83
6.	C/N Ratio	21.13 - 30.94
7.	Calorific Value in kcal/kg	800.7 - 1009.89*

All values, except moisture, are on dry weight basis.

*Calorific value on dry weight basis.

Source: "Manual on Municipal Solid Waste Management", CPHEEO, 2000

and chemical composition of Indian municipal solid waste:

- Most of the recyclable materials like paper, plastic, etc. are segregated at source.
- It does not have sufficient calorific value which can be viable for generating energy on its own. In order to generate energy, we need to add either supplementary fuel or biomass to increase the calorific value of the waste.
- C/N ratio of the waste if less than 30 then it is not sufficient for composting. Whenever the C/N ratio is less than the optimum, carbon source such as straw, sawdust, paper need to be added, while if the ratio is too high, the sewage sludge, slaughter house waste, blood, etc. need to be added as a source of nitrogen.

Present Status of MSW Management

At present, the solid waste management system is in a mess. In most of the urban locations, the collection efficiency is not more than seventy per cent. The generated waste is neither being segregated nor being disposed off scientifically, leading to environmental pollution along with health hazards.

The episode in Surat after the flood in 1994 is a case of improper management of municipal solid waste, which created a lot of awareness and also the need for scientific management of such waste. Keeping this in view, the Ministry of Environment & Forests, Government of India promulgated the Municipal Waste (Handling & Management) Rules in September, 2000, under the Environment Protection Act (1986), that addresses all aspects of waste management from collection, transportation, storage, recycling, processing to its disposal. The Rules em-

phasise integrated solid waste management right from house-to-house collection to processing of organic waste and scientific disposal of inert waste.

Requirements of MSW Rules, 2000, & its status

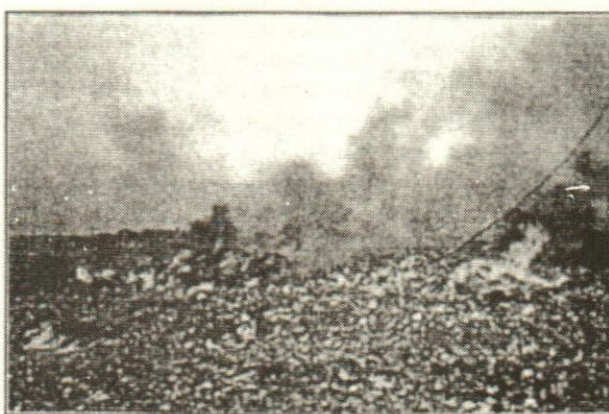
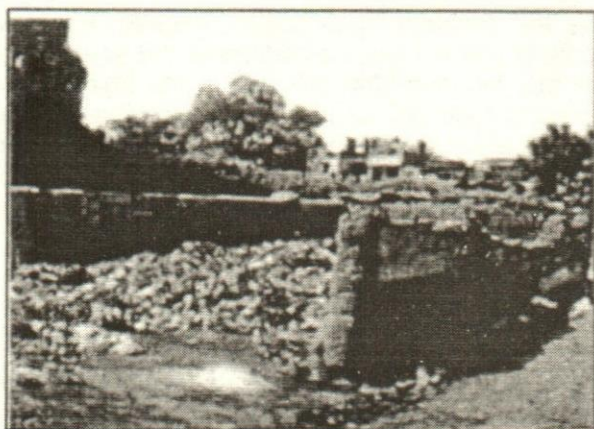
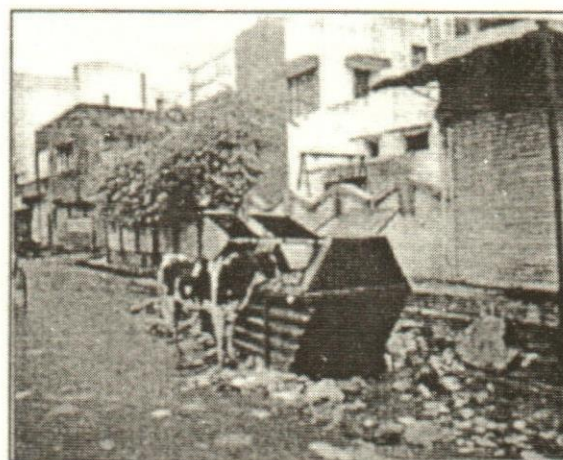
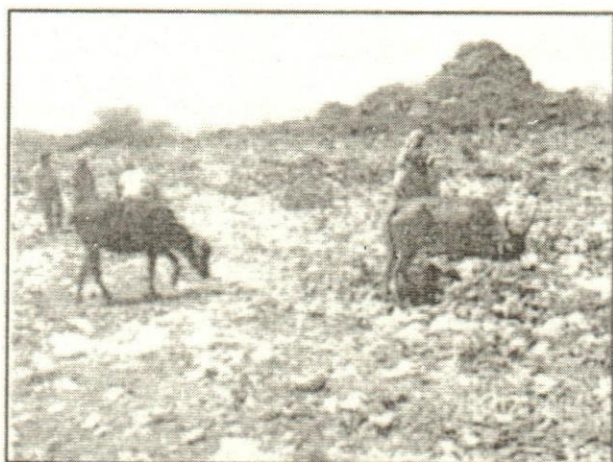
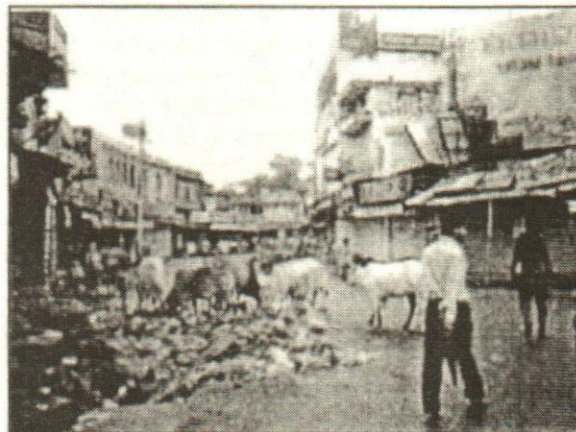
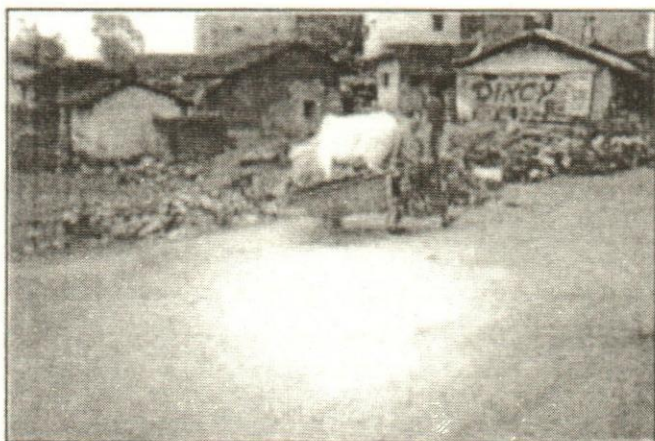
As per the Rules, all the Urban Local Bodies with a population of more than 1 lakh had to have appropriate waste management system by December, 2003, which had already lapsed. According to the Rules, the following implementation programme with regard to waste processing and disposal facilities has been laid down.

1. Improvement of existing landfill sites as per provision of these rules (31.12.2001)
2. Identification of landfill sites for future use and making site (s) ready for operation (31.12.2002).
3. Setting up of waste processing and disposal facilities (31.12.2003).
4. Monitoring the performance of waste processing and disposal facilities (once in six months).

It is clear from above that apart from improvising solid waste management in the city, the Rules have stipulated specific dates for complying with the requirements of setting up waste disposal facilities, which indicates that establishment of such facilities is very important at this stage. The most important provision is improvement of existing landfill sites. It may be observed that all the dates prescribed in the Rules have already lapsed and not much progress has been made with respect to the implementation of the provisions of the Rules.

Through introducing the provision of making improvement in the existing landfill site, the Ministry of Environment & Forest envisaged to give some lead time to the local bodies before they set up a full-fledged waste management facilities including sanitary landfill. By improving the existing dumpsite and operating it as per the provisions of the rules, the concerned personnel at the local bodies would also get an insight of development and operation and maintenance of the landfill facility. This provision will also enable the local bodies to comply with the Rules even during the selection of development of new scientific facility.

In addition, the rules specify other requirements with respect to segregation, collection of both primary and secondary as well, storage, transportation and processing of the waste.



Photos showing current status of MSW management in Indian cities

Compliance Status

The Status of implementation of MSW Rules is quite dismal. In most of the cases, the data is not available or the data is incomplete. Some of the states like Maharashtra, Gujarat, West Bengal, Karnataka have

made an effort to gather information on the status of MSW management in their respective states. The information available for 128 Class - 1 cities with respect to the compliance of MSW Rules is presented in Table 4.

The most common constraint cited by the urban

local bodies are lack of financial resources and support from the state governments apart from lack of public awareness, non-availability of technical know-how, skilled manpower. Above all, it has been observed that there is a resistance to change, due to the typical mind set of people in the local bodies and lack of willingness and commitment at the top level.

Table 4: Showing Status of Compliance with MSW Rules, 2000 in 128 Class - 1 Cities of India

S.No.	Provision of MSW Rule	% Compliance
1.	Storage of segregated waste at Source	41
2.	Segregation of Recyclables	33
3.	Primary Collection from doorstep	38
4.	Daily Street Sweeping	72
5.	Abolition of open Storage sites—Provision of covered containers	29
6.	Transportation of waste in covered vehicles	52
7.	Processing of Waste by Composting or Power generation	9
8.	Disposal of Non-biodegradable in the Engineered Landfills ^{1.4}	1.4

Source: P.U. Asnani. "Urban Solid Waste Management in India—National Perspective". India—EU Environmental Forum, New Delhi, 12th November, 2005.

NPC's Recommendations for the Compliance of MSW Rules, 2000

In fact, selection of any new site for development of waste management facility is a controversial and multi-disciplinary issue and involves various environmental, economical, legal, administrative and community aspects. Based on the experience, the National Productivity Council (NPC) has developed a logical algorithm to be followed before embarking on full-fledged integrated waste management facilities as follows:

- Step I: Identify the Major Dump Sites
- Step II: Select the Dump Site to be improved/Upgraded
- Step III: Develop improvement/upgradation plan
- Step IV: Improve/Upgrade the Selected Dump Site.
- Step V: Operate and Maintain Upgraded Dump Site till new site is selected and developed into landfill facility

While carrying out the above four steps, the local bodies would get about a year's time period. During this period, they would initiate the procedure for selection of new site for development of integrated solid waste manage-

ment facilities in consultation with the State Pollution Control Board and Department of Urban Development.

- Step VI: Prepare a Detailed Project Report (DPR) on MSW
- Step VII: Select Potential Disposal Site in consultation with District Administration, State Pollution Control Boards, Experts, etc.
- Step VIII: Carry out Environmental Assessment Studies
- Step IX: Develop plan for Integrated Solid Waste Management Facility of about 20-25 years.
- Step X: Construct the facility in a phased manner as per the requirement
- Step XI: Operate, Maintain and Monitor the Facility

Upgradation of Dumpsites

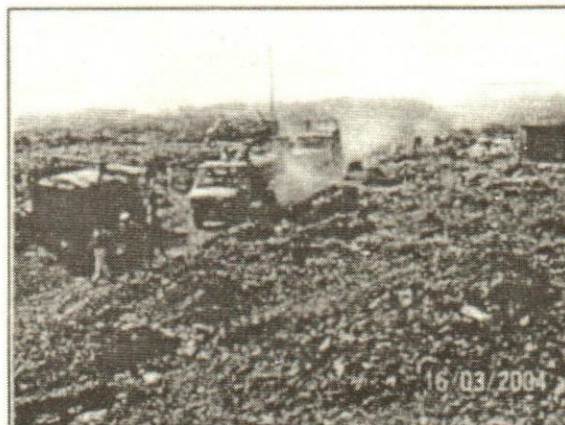
National Productivity Council (NPC) is very active in the field of solid waste management and assisting ULBs in more than 12 states in the country to manage their municipal solid waste. NPC has prepared plans for upgradation of existing dump sites for Nagpur, Mooradabad, Kanpur, Vadodara, Chennai, etc. The upgradation plan developed by NPC for Bhandewadi dumpsite, Nagpur, is shown below.

A very few Municipalities like Pune, Surat, Nagpur have developed plans for upgradation of their existing sites, while Surat has developed a cell of SLF. Some of the states such as Gujarat, Rajasthan, West Bengal, Andhra Pradesh, Karnataka have taken initiatives to tackle the problem in a holistic manner. However, majority of states have not addressed the issue. It appears that the lead time provided in the Rules is not sufficient to gear up our local bodies to develop their capacities within the given time frame. The intervention from the Hon'ble Supreme Court has geared up most of the ULBs to take action for MSW management.

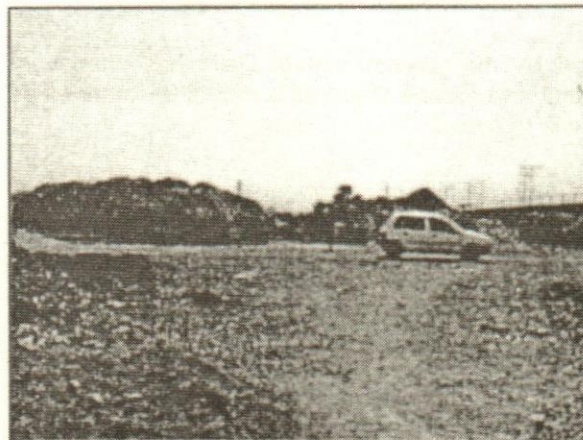
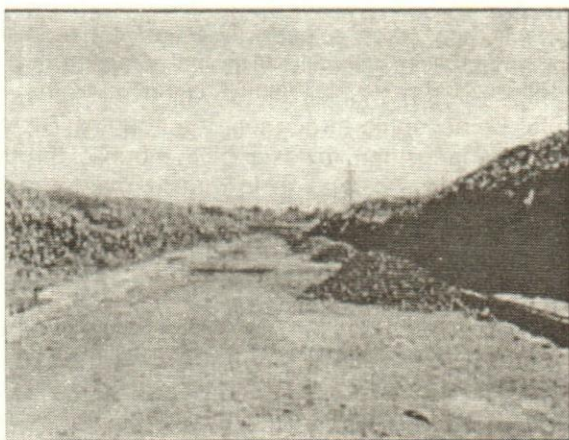
Government of India Initiative towards MSW Management

A number of initiatives have been taken by the Government to help ULBs and the State Department of Urban Development to manage their solid waste in environmentally sound manner. Some of the measures are highlighted below:

- The Ministry of Urban Development, Govt. of India is providing financial assistance to various states for developing an integrated solid waste management system.



Before Upgradation



During Upgradation

- The Ministry of Environment & Forests, Govt. of India is providing 50 per cent grant for development of solid waste management system.
- Central Pollution Control Board provides financial assistance in the preparation of Detailed Project Report (DPR) on Solid Waste Management.
- The Ministry of Environment & Forests, Govt. of India provide funds to create awareness on solid waste management amongst various stakeholders.

of organic manure from wet waste. However, there is a need to synchronize and make a coordinated effort to make Solid Waste Management a success.

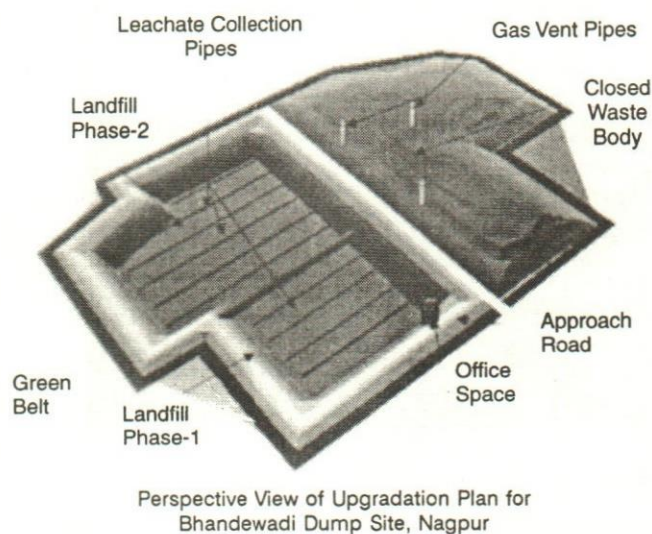
Keeping the above in view, a committee has been constituted by the Central Pollution Control Board (CPCB) to look into the various aspects of the Rules and suggest suitable modifications in the Rules which can be implemented by ULBs.

Strategies to Tackle MSW

In order to provide a better living environment to the society, it is important to have the co-operation of each and every sector of society, right from the public to the government, and collaboration between public and government in the form of public-private partnership (PPP). The Non-Governmental Organizations (NGOs) and Community-Based Organisations (CBOs) play a major role in the area of Municipal Solid Waste management. The "Bhagidari" – a community-based programme

Private Initiative

In addition to the Government, a number of NGOs are active on various aspects of Municipal Solid Waste Management. For example, 'Vatavaran' in new Delhi is engaged in door-to-door collection of domestic waste from some parts of South Delhi. In a similar way, many NGOs are engaged in manufacturing and popularizing



launched by the Government of Delhi has been very successful and can be taken as a model for other cities and towns to follow.

A number of NGOs are engaged in primary collection of waste from household in various part of the country. At places, they also segregate the waste at the time of collection for example in Namakkal, Tamil Nadu. For making MSW management a success, the following strategy may be adopted:

- Public Private Partnership (PPP) for primary waste collection and segregation,
- Involvement of NGOs & CBOs for public and mass awareness campaign,
- Capacity building of Urban Local Bodies (ULBs),
- Development of Integrated Waste Management Facilities on a regional basis and more waste transfer stations in order to reduce the developmental and O & M costs.

- A national and state level policy to deal with Municipal Waste Management in holistic manner.

No programme can be successful without the willingness and commitment of all the stakeholders. It is important that they should be involved at all levels.

Conclusion

In order to implement the Municipal Solid Waste Management Rules, there is a need for willingness and commitment from the top and cooperation from all sectors of society including the staff of the Urban Local Bodies. The composting of organic waste is an age-old technology that has been adopted in our country for long, however, due to the application of chemical fertilizers, it has taken a back seat and it needs to be popularized. The scientific disposal of waste is a new concept for the municipalities which will take same time to be accepted throughout the country. There is a need to change the mindset of the public through a mass awareness campaign in order to make the MSW system successful.

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New ideas... are not born in a conforming environment.

— Roger von Oech

Quality System Certification: Crises of Credibility

Giridhar J. Gyani

The ISO 9000 series of standards is the most widely used standards in the world. The standards specify requirements for organisations to implement Quality Management System (QMS). The standard is designed to enable the organisation to have customer-orientation, people-(staff) orientation and business-orientation. The process of certification of late has raised lots of questions on its credibility, to the extent that people have begun to term this as one of the most widely misused standards. This paper addresses some of the issues on the credibility of the certification process.

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Globalization and World Trade Organization (WTO) agreements have resulted in a comparative case of marketing of goods and services across international borders. The boundaries of the market for the organisation in a country changed from its own country to the world. In this process, while the organisations got access to the world market, they had to face competition in the domestic market from the organisations in other parts of the world. Trade within a country as well as across borders requires mechanisms to ensure that the quality of goods and services being traded is of acceptable levels. Conformity assessment and related international standards that cover product quality, management systems, environmental systems etc., provide such mechanisms.

The impact of conformity assessment on both domestic and international trade was taken cognizance of in the 1994 Agreement of Technical Barriers to Trade (TBT Agreement) of the international General Agreement on Tariffs and Trade (GATT) of WTO. The TBT Agreement recognized the conformity assessment activities could expedite or seriously hinder the free flow of goods in international commerce. To ensure that non-tariff barriers to trade do not hamper the world trade, Article 6 of the TBT agreement refers to the mechanism of recognition of conformity assessment schemes. Article 6 on recognition of conformity assessment by Central Government of Bodies states, Members shall ensure, whenever possible, that results of conformity assessment procedures in other Members are accepted, even when those procedures differ from their own, provided they are satisfied that those procedures offer assurance of conformity with applicable technical regulations or standards equivalent to their own procedures. Adequate and enduring technical competence of the relevant conformity assessment bodies in the exporting members, so that confidence in the continued reliability of their conformity assessment results can exist; in this regard, verified compliance, for instance

through accreditation, with relevant guides or recommendations issued by international standardizing bodies shall be taken into account as an indication of adequate technical competence".

The TBT agreement emphasizes that the technical competence of a body undertaking conformity assessment needs to be ensured through the process of accreditation. Accreditation by definition is the formal recognition of the technical competence of an organisation to carry out conformity assessment activities in the specified areas.

International Recognition and Equivalence of accreditation

Keeping in view the WTO/TBT requirements, appropriate mechanisms for mutual recognition of conformity assessments have been established by the International Accreditation Forum (IAF). The membership of IAF is open to all accreditation bodies and other stakeholders like association of certification bodies, industry representatives etc. IAF has also prepared guidance documents for uniform interpretation of the international standards and has established a process of "Multilateral Arrangement (MLA) of Mutual Recognition", through which the accredited certificates issued get global recognition and the need for multiple accreditation is avoided. To be a member of IAF and also be part of MLA, all members are required to give an undertaking that they would comply with the applicable international standards and guidance documents issued by IAF from time to time. It also makes it mandatory for the members of IAF to recognize accreditation granted by other MLA signatories as equivalent.

The process of becoming MLA signatory requires that member accreditation body makes a formal application to IAF MLA Management Committee (MLA-MC) and confirms that it is complying to the international standards and IAF guidance documents. After the application is accepted, IAF sends a team of expert assessors from accreditation bodies of two different countries to carry out a "peer assessment". The peer assessment involves assessment at the office of the applicant accreditation body and also the observation of the assessors of the applicant body during an assessment of the certification body by the applicant.

Role of a certification body

A certification body that is accredited by any one or multiple accreditation bodies based on its compliance to the applicable standards and the competence of their managerial and technical resources, can issue ac-

credited certificates with the logo of the accreditation body (choice of the organisation seeking certification). These certificates are issued by them after they have physically verified that the organisation is complying to the requirements of ISO 9001 standard or other applicable standards and the scope of the certificate is part of their scope of accreditation. After the initial audit and verification for their initial compliance to ISO 9001 standard, the certification bodies have to carry out surveillance audits at regular intervals (not later than one year) to ensure the continued compliance.

At the time of initial audit, if any organisation is not found to be complying with the standard, specific non-conformities (NCs) are communicated to them and are allowed time to complete the corrective and preventive action. On satisfactory completion of the corrective actions, the certificate is issued. In the event that the non-conformities are observed during surveillance audit, then depending on the severity of the non-compliance, suitable action are taken by the certification body that could be allowing time for corrective action, follow-up audit, suspension or withdrawal of certificate.

Certification scenario in Developing Countries

ISO 9000 standard based on the British standard BS 5750, was first issued in 1987. The certification to BS 5750 was initially started in UK and subsequently the standard was adopted as ISO 9000 by the international community. The certification activity was mainly led by the organisations that were involved in third party certification like ship registrars, third party inspection bodies etc. Later the certification bodies established in UK and Europe realized that it would be easier to operate through branch offices set up in the developing countries.

As the awareness in the market spread and the thrust by the European countries that ISO 9000 certification would help improve the exports of countries, a number of organisations started looking at the ISO 9000 series of standards. The certification bodies took this as a business opportunity and began to look at various options to expand their operations. They started having partnerships or tie-ups with appropriate agencies in the developing countries. Simultaneously it gave rise to local CBs coming into being and seeking accreditation from overseas ABs in the developed countries. This was because most of the developing countries, at that point of time, did not have their own accreditation bodies. Proliferation in certification brought in competition and with inadequate control of foreign accreditation bodies on the certification bodies, resulted in considerable dilution of the certification process.

Control Structure for QMS Certification Process

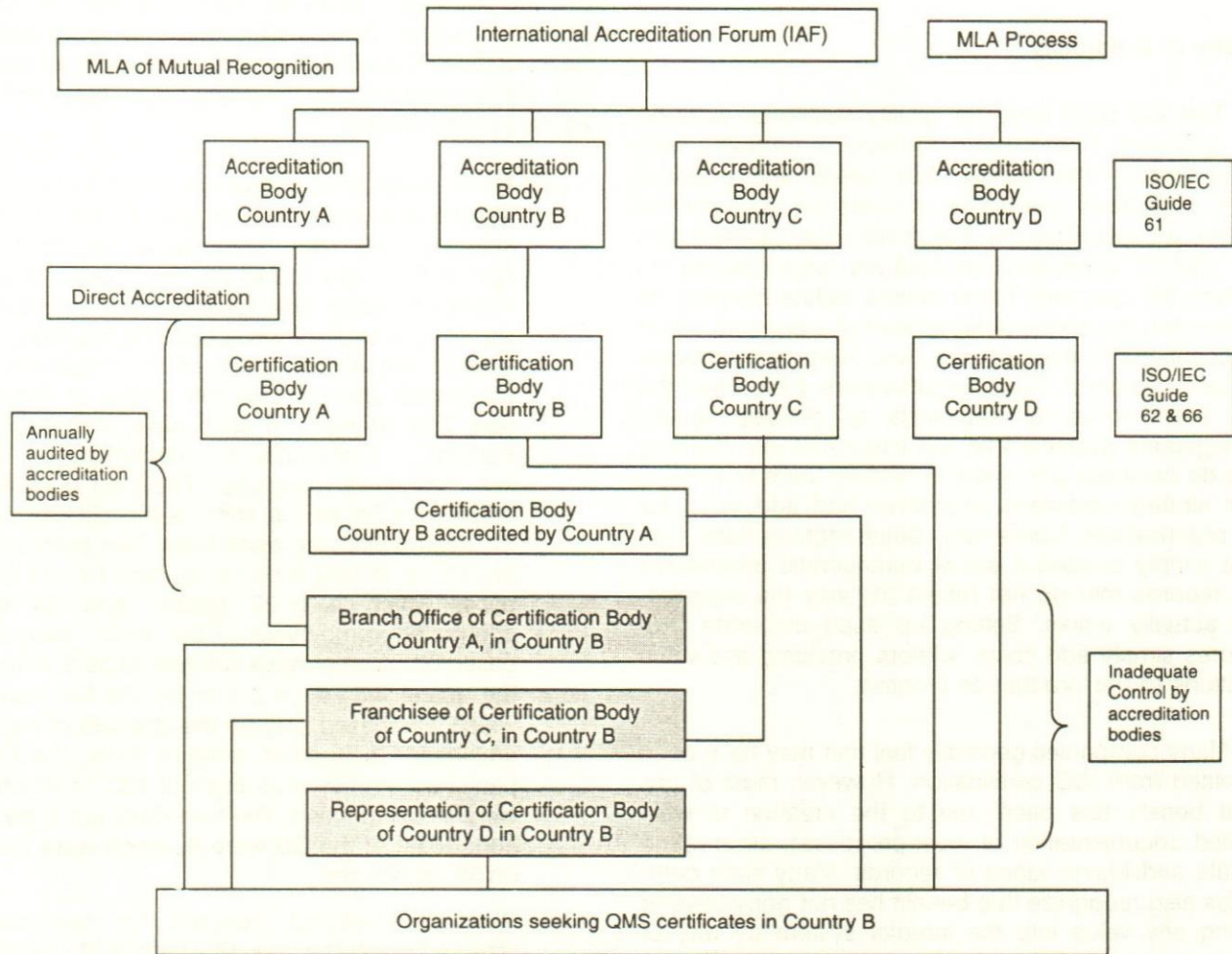


Fig. 1. Control Structure for QMS Certification Process

The controls on the (a) organisation that get certified to ISO standards, (b) the certification bodies that certify and (c) the accreditation bodies that accredit the certification bodies are graphically represented in Fig. 1.

It is mandatory for the accreditation bodies to carry out a regular surveillance assessment of the certification bodies at least once a year. Similarly the certification bodies will carry out a regular audit at least once a year on the certified organisations to ensure continued compliance. One of the main reasons for dilution of the standards of certification process is inadequate control of the accreditation bodies on the certification bodies that are operating through the branch offices, franchisee or through representation.

The certification bodies (CBs) operating in most of the developing countries fall into the following three categories:

- Category A: Certification Bodies having direct accreditation from National Accreditation body.
- Category B: Certification Bodies operating under Foreign Accreditation Bodies (ABs)
- Category C: Certification Bodies operating through branch offices, Franchisee or through representation of foreign certification bodies (CBs)

The CBs in the categories 'A' and 'B' undergo mandatory annual surveillance by their ABs, as provide in the IAF guidelines. This ensures regular monitoring and control over the functioning of CBs.

The CBs in category 'C' are in fact the ones which have largely been responsible for dilution in the certification process, mainly because of lack or absence of monitoring and control. Many CBs in this category have

never been subjected to the surveillance by the concerned ABs.

Crises of Credibility

The ISO 9000 series of quality standards work on the premises that customers require products with characteristics that satisfy their needs and expectations, collectively referred to as customer requirements or product specifications. The quality management system (QMS) approach encourages organisations to analyze the customer requirements, define the process that contributes to the achievement of a product, which is acceptable to the customer, and keep these processes under control. Some organisations have used the ISO 9000 series of standards to develop quality management systems that are integrated into the way they do business are useful in helping them to achieve their strategic business objectives and add value for the organisation. Conversely, other organisations may have simply created a set of bureaucratic procedures and records that do not reflect the way the organisation actually works. Setting up such elaborate procedures simply add costs, without providing any value additions to the product or process.

Many companies generally feel that they have been benefited from ISO certification. However, most of this initial benefit has been due to the creation of well-defined documentation of work processes, assimilation of data and Maintenance of records. Many such companies also recognize that benefit has not gone beyond adding any value into the internal system by way of improvement in efficiency, cost reduction etc. Most of the audit schedules focus only on determining whether documented procedures are being implemented in practice. Few procedures, however, define what the process they describe are designed to achieve or how these are to be measured. The audits in many cases fail to ascertain whether the process is suitable to deliver products that meet defined requirements and whether the process has realized the quality objective of the organisation. Consequently, most of the audit efforts reinforce the status quo and do little to identify scope for business improvement. Many consider such audits merely as bureaucratic, of low value to the company and a necessity only to retain certification.

Possible Malpractices in management system certification

The effectiveness of quality management system certification is based upon the credibility of the certification process. Commercial considerations, incompetence or indifference on the part of a certification

body would result in poor quality of certification and the eventual lack of credibility of the whole process. Based on the feedback received from the market about prevalent malpractices, which result in organisations being certified without fully meeting the requirements of the relevant standard, the following have been identified as noteworthy issues;

- (i) Many certification bodies are found to be violating the laid down requirements of man-days as specified by the International Accreditation Forum (IAF). Guidelines on "manpower requirements of auditor time for initial and surveillance audits" are unambiguous and the man-days are worked out on the basis of the organisation's manpower strength and the scope of certification. The strength, in such case, includes permanent, seasonal, temporary and sub-contracted manpower. The total number of employees for all the shifts is the starting point for determining the audit time. Two such cases picked up during a survey pertain to one company, which had 20 regular and 30 sub-contracted employees. The audit man-days based on 50 employees workout to be 5. Instead, the actual man-days put in by the CB were 3, which was based only on the strength of regular employee. In another extreme case, the company had employee strength of 400, of which 50 were in QA function. The man-days put in by the audit team of the CB were 5, which were based on 50 employees.
- (ii) CBs often accept contract for certification without having the requisite technically qualified auditors. The fact that ISO 9001:2000 is based on process approach the IAF guidelines coupled with provisions on ISO 19011, clearly define the competence of auditor that can carry out audits in specified fields. This is hardly being complied with. Two cases are cited as examples: one, electrical engineer auditing a company, manufacturing electrical bulbs, where the major process involved was glass blowing. Two, a commerce graduate auditing an IT company having specialized process of data warehousing. Justification comes by saying that the auditor has experience of maintaining LAN for a good 5 years.
- (iii) Defining the scope of QMS certification and consequently the exclusions from Clause - 7 of the standard is found to be another serious concern. There is widespread exclusion of Clauses 7.3 (Design) and 7.5.2 (validation of process). Design and development, as defined in ISO 9000:2000, is set of processes that transform requirements into the specification of a product,

process or system. Only when customer is responsible for design, the organisations can exclude this. However, the general observation has been that there is indiscrete exclusion of Clause 7.3. The exclusion of Clause 7.5.2 (validation of processes for production and service provision) weakens the very concept of process-based quality management system.

- (iv) ISO 9001:2000 is based on a process approach. A process is a set of interrelated or interacting activities, which transforms inputs into outputs. In many cases, neither the auditee nor the consultant understands that a process must have defined objectives, inputs, outputs, activities and resources. Processes are to be analyzed monitored and/or measured and improved, and absence of any records to prove it, amounts to non-conformance vide Clause 4.1 of ISO 9001:2000. It has been found that in a majority of cases, CBs ignore this.
- (v) A new trend is emerging: CBs have a formal marketing department for selling the concept of ISO 9000 certification. In most such cases contract review is completed first by the CB and the client is then referred to consultant(s). Sometimes it works the other way round. What is worrisome is that the nexus between consultants and CBs coupled with commercial consideration is resulting in dilution of the quality of certification.
- (vi) Yet another new trend is to outsource the maintenance of QMS. The small-scale industries (SSIs) invariably engage consultant for conducting internal audit and even the management reviews. Interestingly consultants also play the role of auditee during the initial and surveillance audits. Certification process goes on and on this way on minus ownership by the organisation.

There is silver lining: Role of IAF

Credibility of QMS certification has been at the centre-stage both at IAF and ISO. As a result ISO 9001 Auditing Practice Group consisting of QMS experts,

auditors and practitioners drawn from ISO Technical committee 176 and IAF has been set up. The group has developed a number of guidance papers that contains ideas, examples and explanations about the auditing of QMS. These reflect the process-based approach that is essential for the auditing of ISO 9001:2000 QMS requirements. (The documents are available from www.iso.org/tc_176 as free download). The CBs are being encouraged to use these documents to bring effectiveness in the QMS certification process.

IAF have issued guidelines for cross-frontier accreditation, which have come into effect from May 2004. These guidelines clearly specify the conditions under which the ABs would audit the CBs in foreign location. The documents provide that ABs should have an assessment programme that covers all the critical locations of its accredited CBs. It would now be obligatory on the foreign ABs to take the assessors from the local AB provided that local AB is member of the IAF-MLA. Aim of this guidance is to give confidence to the local market in the activities of a foreign IAF MLA signatory AB. Once the policy is implemented by all ABs, the control on CBs, particularly those operating as branch office, franchisee or through representation of foreign certification bodies, will significantly improve.

Conclusion

The ISO 9001:2000 standard by itself is an excellent document, which can help organisations in developing dynamic QMS. With the proliferation of the certification bodies and absence of adequate control by accreditation bodies, it has resulted in dilution in the certification process in general and moreso in the developing economies. Industries do not see value addition in the certification, to the extent that some of them have lost faith in the standard itself. ISO and IAF are aware of the problem and have initiated corrective measures. It is hoped that in time to come industries will begin to look upon the QMS certification as value added exercise and standard (read certification process) will regain some of its lost glory.

□

The easiest, the most tempting, and the least creative response to conflict within an organisation is to pretend it does not exist.

— Lyle E. Schaller

Knowledge Management for High Performance

Rajesh K. Pillania

This paper is an attempt to study the role of Knowledge Management (KM) in High Performance (HP). The study covers macro and micro aspects in both private and public sectors of the Indian industry, by a comprehensive coverage of international experts, domestic experts and employees in selected high performance organisations. The results show that Knowledge Management is in the introduction stage in India. Indian public sector in particular needs to reorient itself to the changing times and embrace knowledge management.

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We are in an age of knowledge revolution. Knowledge has replaced other sources of production as the primary source of wealth creation and long-term sustainability. Knowledge Management has emerged as a coveted concept for firms around the globe to survive and grow in the current turbulent business environment as well as for achieving high performance.

Indian industry has got high expectations from Knowledge Management. India as a country is buoyant about her fortunes in the knowledge century. Even the political bosses are making right noises about the Indian potential and opportunities for India in the knowledge economy. The President of India dreams of making India a superpower in this knowledge era, whereas the Prime Minister has recently announced the setting up of a Knowledge Commission.

This work is an attempt to study the role of Knowledge Management (KM) in High Performance (HP). The study covers both macro and micro aspects in both private and public sectors of Indian industry.

Knowledge Management is a systematic, organised, explicit and deliberate ongoing process of creating, disseminating, applying, renewing and updating knowledge for achieving high organisational performance.

High performance organisation manages a balance between the current performance and future growth. It shows sustained performance in financial terms like market capitalisation, total return to shareholder, return on assets and so on, as well as invests in innovation and people which show potential for future growth.

Emergence and acceptance of Knowledge as Critical Resource

Today, knowledge has emerged and is accepted as the most critical resource available to an organisation. Firstly, knowledge is the most costly resource, in terms of money and efforts. Secondly, knowledge component/resource provides the highest returns. Ultimately, knowledge has become the most crucial resources because, management scholars today consider knowledge and the ability to create and utilize knowledge to be the most important source of a firm's sustainable competitive advantage. Worldwide, firms are trying to leverage knowledge for sustainable competitive advantage.

Knowledge is the most costly resource, in terms of money and efforts.

The Importance of Knowledge Workers

During the 1980s and early 1990s the trend was towards leaner organisation through downsizing, delayering, restructuring and outsourcing. One advocate of 'business process re-engineering' urged organisations 'don't automate, obliterate' (Hammer M., 1990, "Harvard Business Review"). The strategies lost a significant part of their corporate memory, skills and capabilities, which walked away with the people, the knowledge workers. Some 'expendable' middle managers proved by their absence to have been key knowledge coordinators and synthesizers; the loss to their firms went well beyond what their official job description would suggest. A specific example of this corporate amnesia can be found at Ford, where new car developers wanted to replicate the success of the original Taurus design team. But no one remembered, or had recorded, what was so special about the effort. The organisation rediscovered the central importance of people. In many cases people who had been made redundant had to be re-hired, often as consultants because their knowledge was found to be irreplaceable. If NASA wanted to go to the moon again, it would have to start from scratch, having lost not the data, but the human expertise that took it there last time. Secondly, the organisation had to manage with lesser number of people in a leaner structure. This made it imperative to make the best use of knowledge and skills left in the organisation. These pitfalls led the organisations towards Knowledge Management efforts.

Today, for many companies, it is not the lack of

finance or consumer demand that is limiting their growth, but the absence of quality people that is the issue (Burton-Jones, 1999). Employee turnover is quite high, particularly in case of knowledge-intensive industries such as software. Expertise gravitates towards the highest bidder. One particular company in California's Silicon Valley estimates that it costs them an average of \$ 125,000 every time an employee leaves (Ware L. and Fern B., 1977). Loyalty erosion is quite high. Bill Gates has commented that if twenty of Microsoft's key people were to leave, his company would risk bankruptcy (Batra N., 2001). How to encourage loyalty and turn down turnover rate is a big problem. A study by Aon Consulting, found that the single most effective way to strengthen employees' loyalty is to increase their opportunities for growth (Steward T.A., 2001). Organisations are also trying to find out how to replace expertise when it leaves. Knowledge makes resource mobile. Knowledge workers, unlike manufacturing workers, own the means of production: they carry their knowledge in their heads and therefore can take it with them. So there is an increasing concern for having Knowledge Management systems so as to codify and store knowledge. Further, for the first time in history, the richest persons on earth are knowledge workers.

Successful Knowledge Management initiatives are People-Centric

Initially KM was hijacked by Information technology, which resulted in a number of KM failures. Later on a more holistic view emerged consisting of people, process and technology aspects. Out of these three, the most important aspect is people. Technology is an enabler. It provides a support function. Process is to help people to streamline things. At the end of the day it is people who create new knowledge, share it with others and embody it in products/services. At the centre of successful KM initiatives are people efforts. There are three reasons for this. First, they are the creator and owner of knowledge—the most important resource which lies in their head. Second, people-related issues like conversion of tacit knowledge into explicit, sharing of knowledge etc, are the big hurdles in successful KM initiatives. Last but not the least, people feature centrally because they are fundamental to the knowledge capability of the firm i.e. human capital is fundamental to intellectual capital. This research work is focused on the people aspect of knowledge management.

High Performance Organisations are People-centric

The common theme that emerges out of studying

the literature on HP organisations is that people are at the centre of high performance organisations. Peters and Waterman identify 'productivity through people' as one of the eight attributes of excellent companies. The excellent companies treat the rank and file as the root source of quality and productivity. All companies pay it lip service and few deliver. Annunzio, Head of Hudson Centre for High Performance, in her book titled *Contagious Success: Spreading High Performance through your Organisation* identifies 'valuing people' as one of the three characteristics of High Performance teams. The company with the best people wins. It is a simple concept regardless of industry, geography or economic condition. High performance organisations are focused on human capital and human performance issues finds Green. Lear reviewed a considerable amount of research into what it takes for organisations to achieve high performance. The list includes the studies at leading business schools like Harvard, Stanford and Cornell, the Gallup Organisation, Build to Last work of Collins and Porras and Good to Great work of Collins. Based on this review he identifies seven essential elements and puts 'people' at the centre of high performance.

Knowledge Management leads to High Performance

There are empirical studies which show that successful KM initiatives are leading to high performance across the world. Global MAKE 2004 (Teleos, The Know Network, 2004) finds that successful KM efforts yield big dividends. The 2004 Global MAKE Winners and Finalists trading on NSE/NASDAQ showed a Total Return to Investors for the ten-year period 1993-2003 of 19.3 per cent, nearly twice the average Fortune 500 Company median. Profits as a percentage of assets (Return on Assets) for the publicly traded 2004 Global MAKE Winners and Finalists were 7.3 per cent—nearly four times that of the Global Fortune 500 company median. The 2004 Global MAKE Winners and Finalists also rank high in brand value with 22 out of the top 100 global brands. These 22 brands are valued at USD 362.5 billion. Investors believe that the 2004 Global MAKE Winners and Finalists offer long-term potential due to their intellectual-capital driven growth. A total of 18 Global MAKE Winners and Finalists (44 per cent of the for-profit organisations in this year list) rank in the top 100 companies globally by market capitalization. Similarly, the other MAKE studies show evidence of high performance by MAKE Winners and Finalists.

Knowledge at rest is just the potential; knowledge in action is where the value emerges. American Productivity and Quality Council (APQC) studies KM measurement efforts at 33 organisations and finds that organisations double the return on their KM in-

vestments which is leading to further investments in KM. It is no longer possible to make huge profits on doing or moving things or by controlling money. Increasingly there is less and less return on traditional sources—land, labour, capital. The only, at least, the main producer of wealth is information and knowledge. The purpose of KM is to create high performance and it is defined in this manner by many KM experts.

Fig. 1 shows how Knowledge Management results in high performance. People, the owner of knowledge, create, share and implement knowledge. Knowledge Management makes knowledge creation, sharing and implementation possible through making KM strategy, involving top management and creating the culture knowledge sharing. Technology is the enabler and processes streamline KM efforts.

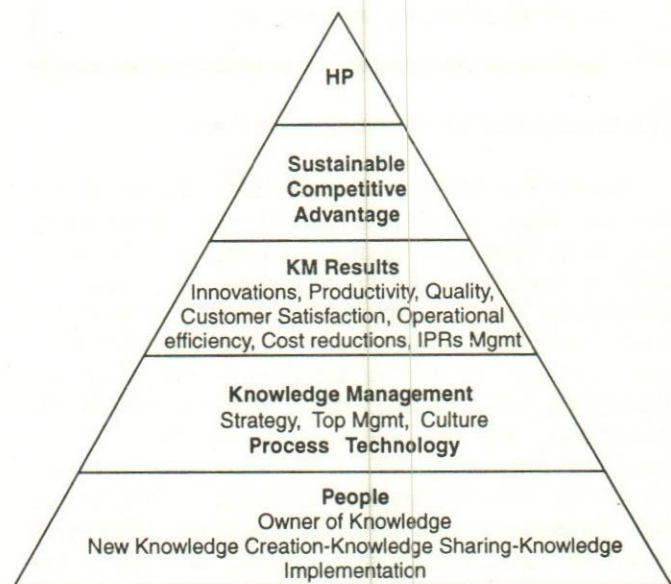


Fig. 1. Knowledge Management leading to High Performance (HP)

These KM efforts result in innovations, productivity, quality, customer satisfaction, operational efficiency, cost reductions, faster decision making and better intellectual property rights (IPRs) management. Based on these results sustainable competitive advantage can be achieved, which results in high performance.

Research Method

The research work is based mainly on primary data collected from companies under study and a galaxy of experts from industry, academics, Govt. bodies etc.

A survey method was adopted to gather primary data. Three sets of questionnaires were prepared for the

three stages namely, international experts, Indian experts and employees in the selected firms of the research. The questionnaires were discussed with experts for their valuable inputs and to avoid any bias. One questionnaire was administered to international experts in the field of knowledge management. The second questionnaire was administered to Indian experts in the field of KM. The experts consisted of academicians, industry consultants and government officers/policy makers. The third questionnaire was a structured questionnaire, which was prepared keeping in mind the objectives of the study. The questionnaire was first pre-tested on a sample of 20 respondents and necessary improvements were made.

To collect the primary data, the questionnaires were sent by mail/post/by hand, to the concerned person, and after this personal interviews were conducted.

The study consisted of three sectors of the Indian economy, namely the software, pharmaceutical and petroleum marketing sector. Out of these software and pharmaceutical have performed well on market capitalisation, exports and growth rates during the 1990s and 2000s and have been identified by the Government of India as sectors having competitive advantage. Petroleum marketing sector is the best performing public sector on market capitalisation as well as in terms of profits. This sector alone consists of three out of the total four Fortune 500 companies from India. This sector has now been opened to private parties.

From the pharmaceutical sector the firms taken, namely, Ranbaxy, Cipla, Glaxo and Dr. Reddy's Lab, were leading firms in the BT 500 survey of India's most valuable companies for the Year 2000. Though Novartis was ranked fourth in the survey, it didn't respond and so Dabur, which was ranked sixth in pharmaceutical sector, was the fifth firm for study. Out of these five firms three, Ranbaxy, Glaxo and Dr Reddy's are also part of "Passion to Win" study whereas Ranbaxy is a part of "World Class in India" study.

From software sector, the firms taken namely, Wipro, HCL Technologies, Satyam Computer Services and Infosys were leading firms in BT 500 survey. TCS, the biggest software firm in India, was not a public listed company and so falls out of BT 500 survey, and is taken for study. Now TCS is a public listed company.

From the petroleum marketing sector all the four public sector undertakings, namely, Indian Oil Corporation, Bharat Petroleum, Hindustan Petroleum and IBP Ltd. were included in the study. Indian Oil, Bharat Petroleum and Hindustan Petroleum are in the Fortune

500 list. Indian Oil has taken over IBP Ltd.

From each firm, ten people were taken on a random basis for the study. For international experts, 100 responses were gathered. This was a convenience sample drawn from KM websites like Knowledge Board, Brint, KM Australia, yahoo groups and websites of universities/institutes. For Indian expert opinion, 50 responses were gathered from industry, academics and Govt. servants/policy makers. This was a convenience sample and discussion groups at yahoo website were also used for it.

The data so collected was tabulated. Appropriate statistical measures like percentage were used for analysis and drawing deductions. In the final presentation appropriate graphs were used.

The research work has three limitations. First, the study is limited to only three sectors and only five firms from software and pharmaceutical sector and four from petroleum marketing sector. Second, the sample size is not very big i.e. 50 people each from software sector and pharmaceutical sector and 40 people from the petroleum marketing sector. Third, since KM is still in the introduction stage in India according to the dominant view among the experts both international and national, so the measurement of KM efforts leading to high performance was not possible. Also, the expectation from KM by Indian industry showing high expectations was already conducted. So the focus of this research work was to study some people-specific issues in KM which will result in successful KM efforts, which will ultimately result in high performance.

Research Findings

International KM Experts Opinion

- A very high majority of the respondents (92 per cent) say that successful KM initiatives lead to higher performance. Two per cent have no idea about it.
- Though now a more holistic view of KM is emerging, the single most important factor in successful KM initiatives is identified as people issues by the majority (52 per cent). Of the rest 12 per cent opt for technology whereas 36 per cent go for process.
- Thirty-eight per cent of the respondents think that KM is in the introduction stage in India, 22 per cent opt for nascent stage; 12 per cent go for growth stage whereas 28 per cent have no idea of KM efforts in India.

Indian Experts Opinion

- That Knowledge Management in India is in the introduction stage, is the dominant view among experts as can be seen from Fig. 2.

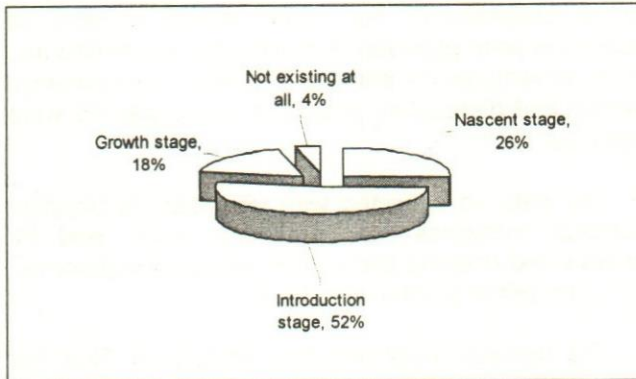


Fig. 2. The Current Stage of KM in Indian Industry

- A high majority of the respondents (86 per cent) say that successful KM initiatives lead to higher performance. Four per cent have no idea about it.
- The single most important factor in successful KM initiatives is identified as people issues by the majority (58 per cent). Out of the rest 26 per cent opt for process whereas 16 per cent go for technology.

Software Sector

- The response for the concept of Knowledge Management is encouraging as can be studied from Fig. 3. Only a very small number of people i.e. 6 per cent have not heard the term

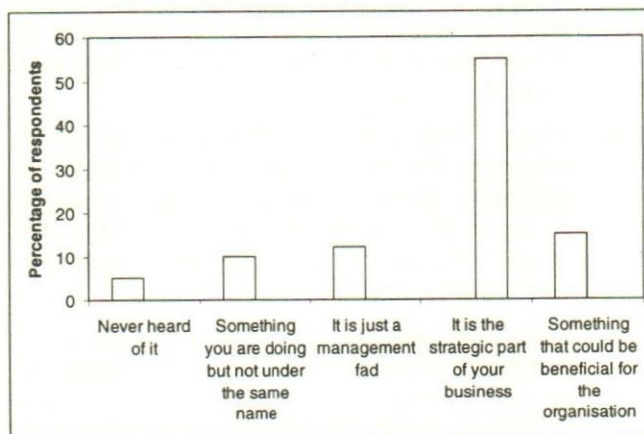


Fig. 3. Employees' View on KM

'Knowledge Management' across the various organisations. The dominant view is that, it is the strategic part of their business. Majority of the respondents at Infosys (70 per cent), Wipro (60 per cent), TCS (60 per cent), TCS (60 per cent), Satyam (50 per cent) and HCL Tech (40 per cent) view KM as the strategic part of their business.

- Organisations are making sufficient investment in learning opportunities for the employees is the majority view (78 per cent), 18 per cent don't think so whereas the rest i.e. four per cent have no idea. Majority of the people at Infosys (90 per cent), Wipro (80 per cent), Satyam (70 per cent), TCS (80 per cent) and HCL (60 per cent) think that the organisation is making sufficient investment in learning opportunities for the employees.
- Organisations value employees for what they know, is the majority view (70 per cent), 28 per cent don't think so whereas the rest i.e. two per cent have no idea. Majority of the people at Infosys (90 per cent), Wipro (70 per cent), Satyam (60 per cent), TCS (70 per cent) and HCL (60 per cent) think that people are valued for what they know.
- Forty two per cent of the respondents say that their top management regularly review promotion practices to make sure they are not losing people with strategically important knowledge, 36 per cent do not think so and a good number i.e. 22 per cent have no idea about it. Sixty per cent of the respondents at Infosys, 50 per cent at Wipro and 50 per cent at TCS say that their top management regularly review promotion

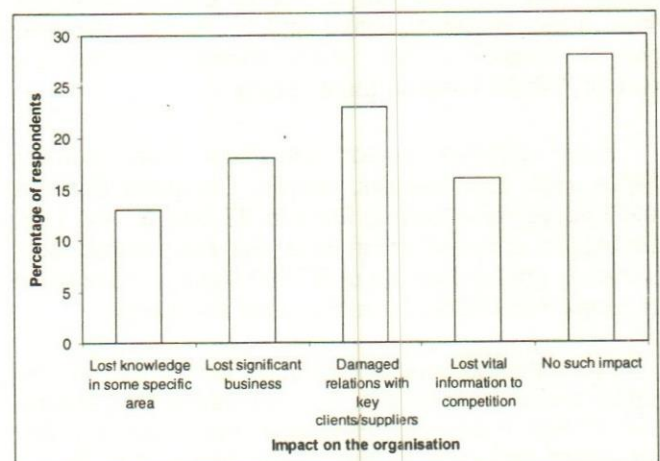


Fig. 4. Impact of a Key Employee Leaving the Organisation

practices to make sure that they are not losing people with strategically important knowledge, whereas 70 per cent of the respondents at Satyam and 50 per cent at HCL Tech do not think so or are not aware of it.

- The impact of a key employee leaving the organisation is there in this sector as revealed in the Fig. 4. A large number of people at Infosys (50 per cent), TCS (50 per cent), Wipro (40 per cent), HCL (50 per cent) and Satyam (40 per cent) find no such impact; at Wipro (30 per cent) find loss of some business.

Pharmaceutical sector

- The response for the concept of Knowledge Management is not very encouraging and is quite fragmented as can be studied from Fig. 5. A good number of people have not even heard the term 'Knowledge Management' across the various organisations. The dominant view is that they are already doing it but not under the same name and not that explicitly. Only at Reddy's Lab a significant number i.e. 40 per cent of the respondents, view KM as the strategic part of their business.

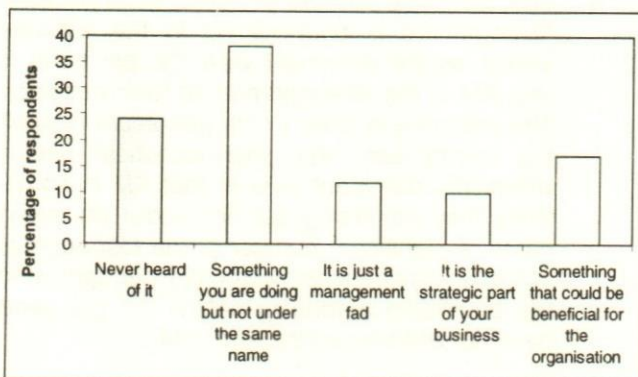


Fig. 5. Employees' View on KM

- Organisations are making sufficient investment in learning opportunities for the employees is the majority view (72 per cent), 26 per cent don't think so whereas the rest i.e. two per cent have no idea. Majority of the people at Reddy (90 per cent), Ranbaxy (80 per cent), Glaxo (70 per cent), Cipla (60 per cent) and Dabur (60 per cent) think that organisation is making sufficient investment in learning opportunities for the employees.
- Organisations value employees for what they known, is the majority view (64 per cent), 28 per cent don't think so whereas the rest i.e. eight

per cent have no idea. Majority of the people at Reddy (80 per cent), Dabur (70 per cent) Ranbaxy (60 per cent), Glaxo (60 per cent) and Cipla (50 per cent) think that people are valued for what they know.

- Forty per cent of the respondents say that their top management regularly review promotion practices to make sure they are not losing people with strategically important knowledge, 34 per cent do not think so and a good number i.e. 26 per cent have no idea about it. Fifty per cent of the respondents at Reddy's Lab and 50 per cent at Dabur say that their top management regularly review promotion practices to make sure that they are not losing people with strategically important knowledge whereas 70 per cent of the respondents at Ranbaxy, 60 per cent at Glaxo and 70 per cent at Cipla do not think so or are not aware of it.
- The impact of a key employee leaving the organisation is felt by the organisations as revealed in Fig. 6. A good number of people at Reddy's Lab (40 per cent), Glaxo (30 per cent) and Ranbaxy (30 per cent) find no such impact; at Cipla (40 per cent) find relationship trouble with clients; and at Dabur (30 per cent) find loss of some crucial information.

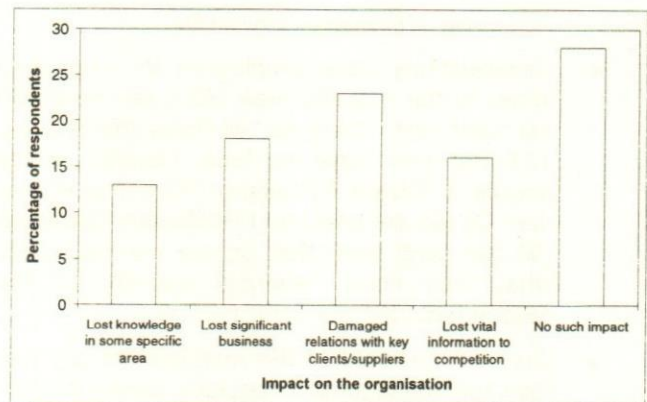


Fig. 6. Impact of a Key Employee Leaving the Organisation

Petroleum Marketing Sector

- The response for the concept of Knowledge Management is not very encouraging and is quite fragmented as can be studied from Fig. 6. A good number of people have not even heard the term 'Knowledge Management' across the organisations. The dominant view is that they are already doing it but not under the same name and not that explicitly. Only at BP a sig-

nificant number (i.e. 50 per cent) of respondents view KM as the strategic part of their business.

- Organisations are making sufficient investment in learning opportunities for the employees, is the view among nearly a half of the respondents (55 per cent), 37.5 per cent don't think so whereas the rest i.e. 7.5 per cent have no idea. Majority of the people at Bharat Petroleum (70 per cent), Indian Oil (60 per cent) and Hindustan Petroleum (50 per cent) think that the organisation is making sufficient investment in learning opportunities for the employees, whereas majority of the respondents at IBP (60 per cent) don't think so.

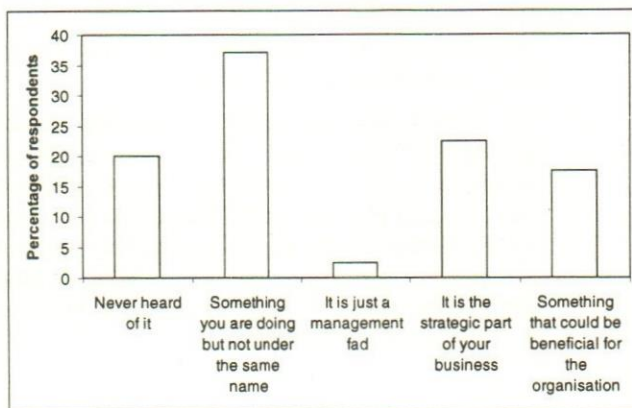


Fig. 7. Employees' View on KM

- Organisations value employees for what they know, is the majority view (52.5 per cent), 30 per cent don't think so, whereas the rest i.e. 17.5 per cent have no idea. Majority of the people at Bharat Petroleum (70 per cent), Indian Oil (60 per cent) and Hindustan Petroleum (50 per cent) think that people are valued for what they know, whereas majority of the respondents (60 per cent) think not.
- Only 7.5 per cent of the respondents say that their top management regularly review promotion practices to make sure they are not losing people with strategically important knowledge, 75 per cent do not think so and a good number i.e. 17.5 per cent have not idea about it. A high majority of the respondents at each firm IBP (100 per cent), BP (90 per cent), HP (90 per cent) and IOC (90 per cent), do not think or are not aware that top management regularly reviews promotion practices to make sure that they are not losing people with strategically important knowledge.
- The impact of a key employee leaving the or-

ganisation is not very much, as is revealed in figure 8. A significant number of the people at BP (90 per cent) and IOC (60 per cent) find no such impact; at HP (30 per cent) find relationship trouble with clients; and at IBP (30 per cent) find loss of some crucial information and (30 per cent) find business loss.

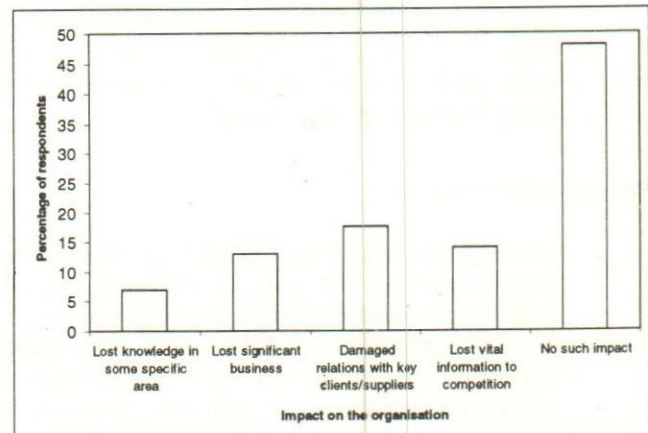


Fig. 8. Impact of a Key Employee Leaving the Organisation

Sectoral Comparison

- The response for the concept of Knowledge Management is encouraging in the software sector, as the dominant view (56 per cent) is that KM is the strategic part of their business. The response is poor in the petroleum marketing sector and the pharmaceutical sector, where the dominant view is that KM is something they are doing but not under the same name. A significant number of the respondents in the pharmaceutical sector (24 per cent) and the petroleum marketing sector (20 per cent) have not even heard the term KM.
- Organisations are making sufficient investment in learning opportunities for the employees, is the majority view in the software (78 per cent) and pharmaceutical sector (72 per cent), whereas only about a half (55 per cent) of the respondents in petroleum marketing sector think so.
- Organisations value employees for what they know, is the majority view in the software (70 per cent) and pharmaceutical sector (64 per cent), whereas only about a half (52.5 per cent) of the respondents in the petroleum marketing sector think so.
- The impact of a key employee leaving the organisation is more in software and phar-

maceutical sectors as compared to the petroleum marketing sector.

Implications

Indian industry is facing tough competition in this era of privatisation, liberalisation and globalisation. Companies are trying to find out ways to survive and compete. While there are some exceptions, satisfactory underperformance is pervasive in India. Knowledge Management could be the panacea for the industry troubles. Worldwide companies are finding KM useful for sustainable competitive advantage and successful KM initiatives are leading to high performance. This can be replicated in Indian circumstances. Productivity of knowledge and management of knowledge workers must be the top priority of the firms.

But Knowledge Management is in the introduction stage in India and this lack of focus on Knowledge Management would have serious implications for the firms, industry and the nation. Though pharmaceutical and petroleum marketing have been high performance sectors till now, this was more because of government policies. Pharma sector no more enjoys the product patent regime and is still focussed on generics market. It needs to climb higher in the value chain to carry on

the past high performance. Indian petroleum marketing sector has done well under government protection, but now it is open to private parties and the public sector firms need to reorient it to the changing times. All big talk of making India a super power will fail if we do not focus on realising the people potential and knowledge creation, dissemination and implementation seriously at national, industry and firm level.

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Confidence is preparation, Everything else is beyond your control.

— Richard Kline

Designing an Education Index for B-Schools

G D Sardana

Management education is seen as the ultimate in professional development and social acceptance. Admission seekers have increased and so have B-schools. Globalisation has also brought international education within the reach of students in the developing economies. There is a need to develop an instrument to evaluate and grade the B-school institutions. This paper attempts to present a framework of evaluation through an Education Index. The framework is based on a generic model developed to evaluate the performance of organisations. The performance evaluation is based on OPQR metrics which takes into account organisational effectiveness, process effectiveness, quality of output and recipient satisfaction.

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A B-school is a typical service organisation. Education is not a tangible output which can be measured on the traditional scales. An educational institution is a complex system and has a multitude of outputs to be delivered. Management education is more complex and encompasses facets from social, behavioural, technological and organisational management domains. Management education then becomes the outcome of interdisciplinary encounters. It requires different approaches to identify its performance and its evaluation. Some of the major approaches adopted by researchers are briefly discussed as under:

Service Quality as a measure

A large number of approaches have been suggested which focus on quality of the service. Linkages have been suggested to exist between the quality of the product and customer satisfaction. It implies that if customer satisfaction is high, one can conclude the existence of a higher degree of quality. Seminal work of SERVQUAL from Parsuraman et al (1985), SERVPERF from Cronin and Taylor (1992), provides instruments in the form of a structured questionnaire to measure service quality. SERVQUAL highlights evaluation of customer expectations and perceptions on the five dimensions of Tangibles, Reliability, Responsiveness, Assurance and Empathy. SERVPERF highlights that a performance-based measure of service quality is an improved concept. Several adaptations have been proposed limiting or raising either the dimensions or the questionnaire. Normally students are respondents in these approaches on the ground that they constitute the legitimate customers.

The questionnaire approaches have attracted large criticism. Hope and Muhlemann (1997) refer to the same as lengthy exercises, with an element of repetitiveness, lack of clarity of the questions, particularly the use of negative forms of questions and the tendency of the respondents to circle 'very important' for all aspects. Besides it has been debated whether the quality of the service delivery alone can be considered sufficient enough to represent performance.

B-School Surveys

Many agencies, businesses and trade journals, and management associations, carry out surveys of the B-schools to establish ratings and to carry out a comparison of schools. In some cases respondents also include besides students, HR managers from the corporate world and the school staff. One of the most well known surveys in India, as reported by *Business Today*, uses the methodology of ranking in stages. Aspirant students and HR managers are asked to identify top schools. A sub-objective of the exercise is also to understand the parameters that a student considers important. These parameters are further built into the second phase to understand the drivers of consideration and perception for each school. Invariably these approaches consider placement, the quality of placement in the form of the package offered by employers and the reputation of the employing companies visiting the campus as the most important criteria for performance. This is debateable. Placement cannot be justified even as a philosophical aim of education.

Excellence as a measure

These are holistic measures of excellence. Here excellence has taken a broader meaning and includes not only the traditional dimensions of quality, but also several others which are drivers of performance. The evaluation is recommended to cover both the results and the processes. Many countries have introduced these methodologies at local level with minor modifications. Major approaches are briefly discussed as under.

Baldrige National Quality Program is a well structured format for assessment. It is a tool for self-assessment, besides being an instrument for declaring awards for excellence in performance. The criteria are built on the interrelated core values and concepts. Core values and concepts are embodied in seven categories: Leadership; Strategic Planning; Student, Stakeholder, and Market Focus; Measurement, Analysis, and Knowledge Management; Faculty and Staff Focus; Process Management; and Organisational Performance Results. The criteria categories have been further subdivided into items and areas to be addressed. A scoring system has been recommended to be used with the criteria items. The responses are based on two evaluation dimensions of Process and Results.

European Quality Improvement System (EQUIS)

On initiative from the European Foundation for Management Development, EQUIS framework developed for the assessment and continuous im-

provement of quality in business schools is based on Dynamic Model for Quality Development. The model emphasises management development with a stress on institutional issues rather than on programme details and on process led assessment. EQUIS (2006) emphasises eleven domains: Corporate Connections, International Issues, Context and Mission, Students and Participants, Executive Education, Personal Development, Programme Quality, Research & Development, Contribution to the community, Faculty, and Physical Resources. The framework is intended to be used as a self-assessment tool by schools to serve as a basis for strategic audit. EQUIS accreditation has come to be accepted as a hall-mark of quality business education.

The approaches represent major departures and take into account criticism of including placement as criteria of performance or relying on surveys. However, besides students, there are other stakeholders who carry expectations from a school. These do not find representation in proper perspective in the models.

Balanced Systems

Balanced systems have been developed with a view to accommodate performance expectations of all the major stakeholders. Approaches as discussed in previous sections, for example, ignore an important category of stakeholders who have promoted and invested to achieve certain objectives. These objectives can be related to financial returns, which is true in most of the cases or non-financial returns in case the education is deemed to generate intellectual capital for the country. The balanced systems are built around a premise to integrate the various perspectives.

Balanced Scorecard (BSC) as advanced by Kaplan and Norton (1996) attempts to provide a comprehensive view of the entire operation. It views performance from four different perspectives: Financial Perspective, Customer Perspective, Internal Business Perspective and Innovation and Learning Perspective as well. The financial measures are complimented with measures of customer satisfaction, technology capability, learning and several more. Niven (2003) discusses the usefulness of the model specific to the needs of the not-for-profit organisations where a large number of the educational institutes as run by the state agencies and trusts also get fitted. However, BSC has been cited to suffer from many insufficiencies and inaccuracies. Schneiderman (1999) refers to many views which are responsible for its failure: non-variables are often incorrectly identified as the primary drivers; metrics are poorly defined; improvement goals are negotiated

rather than based on requirements of stakeholders; quantitative linkages are difficult to establish.

Fitzgerald et al (1991) suggest an approach which links types of measures to dimensions of performance, to either results or determinants. These are in turn linked to the factors that determine the desired results and determinants. Thus both the performance and the riders are included. The authors consider six dimensions of performance classified under two categories of Results and Determinants. Category of 'Results' covers two dimensions of Competitiveness and Financial performance. 'Determinants' includes four dimensions of Quality of service, Flexibility, Resource utilization and Innovation.

Objectives of Management Education

Brown et al. (2001) point out that performance measures must be balanced, dynamic, timely and efficient, and should be able to evaluate key processes. Performance can be interpreted as the degree of achievement of the performance objectives. A right performance measurement system should support operations and lead to improvement strategies. The role of the management education, in general is perceived to:

- impart a strong focus and knowledge on concepts and theories of management and to develop capabilities to apply analytical tools based on logic and rationality
- develop creative and innovative abilities to seek solutions of business problems
- generate entrepreneurial interests and develop leadership skills
- create a strong focus on business ethics, human values and contribution to community
- make the institution a strong focal point of management development activities for the industry in areas of training, applied research and upgradation of management skills.

A B-school has to choose a model and reframe objectives for the school. The curriculum, the programmes, the teaching pedagogy, industry interface, project work, the physical resources, infrastructure and even the selection of faculty will be determined by the objectives and the strategy. Formulation of education and institutional objectives is, therefore, the first step to designing a performance evaluation system. It is wrong to consider that a general set of reporting measures of performance applicable to all systems of management education can be developed. Many of the performance

measures are context and strategy specific and should take into account the expectations of all the categories of stakeholders. The following sections discuss a generic model with a provision to incorporate reporting standards specific to the objectives at level two and three of operational controls.

OPQR: A Performance Measurement Metrics

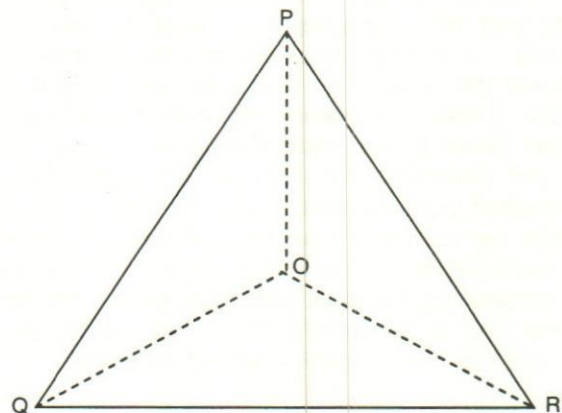


Fig. 1. OPQR Matrix

The OPQR framework presents a comprehensive and multi-dimensional evaluation system which is generic in nature but can be used to incorporate objectives - specific measures at levels of operational controls. It balances financial and non-financial issues and proposes to capture the expectations of the various stakeholders. OPQR metrics stress that the fundamental role of any performance evaluation system is to identify improvement opportunities and to monitor the performance against the standards laid or benchmarks predetermined. The framework relies heavily on the theory of systems. It considers the B-school to operate as a supra-system which in turn encompasses four systems as:

- Organisational Effectiveness (O)
- Process Outcome (P)
- Quality (Q)
- Recipient Satisfaction (R)
- Expressed figuratively, P, Q and R form the three points of an equilateral triangle.

(Ref. Fig.1). The three arms are the linkages. These linkages represent the interdependence, the interaction and influence each system exercises on the other. The centre of the triangle enclosed by the three arms carries 'O', which is connected to the three points of P, Q and R through linkages. This implies that each of the three

systems get a direction to achieve goals through 'O'. In turn, 'O' gets the feedback from the three systems to alter its directions in a changed environment or to carry out modification in the strategy.

Organisational Effectiveness (O)

B-school is a complex system. The institution requires establishing systems, structure and controls to achieve effectiveness and efficiency. It has to satisfy the demands of various customers, both internal and external. Organisational effectiveness as a system is concerned with the organisation's approach to run the operations. The system concerns evaluation of adequacy and competency of facilities, equipment, manpower and organisational structure to meet the standards once agreed.

It is a management system. Its basic objective is to provide direction and guidance to carry on and sustain the operations. The outcome of this system can be best determined by answering question: How does the B-school deliver its P, Q and R? Achievement of an effective organisation should be seen more as a performance rather than a means to achieve other parameters of performance.

Four sub-systems are visualized under this system: Strategic management, the Management process, Management of Resources, and Governance.

Strategic Management

Strategic management refers to the formalization of the process the B-school has to respond to, what it wants to be and what it proposes to do. Strategic management comprises a set of activities which determine and lay foundations for achievement of goals in the long-term. It takes into account availability of resources and the external environment which moulds the demand and the interests of the promoters. The process encompasses identification of mission, objectives, value proposition, targets, objectives, formulation of strategy and performance measures.

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The sub-system is conceptualized to comprise four KPA's: Mission, Strategic Plan, Value Proposition (Ob-

jectives) and Performance Measures.

"Mission" establishes the purpose of the school, its character, its standards of behaviour and attitude to all the stakeholders. It leads to establishing a uniqueness that it sets it apart from other schools. It provides an identity to the stakeholders in general and students in particular. It is customary to merge it with the vision.

"Strategic plan" describes the perspective in which the institution is expected to operate. It translates the mission into key tasks and provides a blueprint for implementation. Strategic plan establishes a strategy-supportive budget so that resources are identified and used effectively.

"Value proposition" is the translation of the mission statement into values. Forgang (2004) explains that value proposition specifies what the company intends to offer to its prospective customers. For a B-school, this includes various academic programmes, competencies, research programmes, specializations, MDP's, faculty development programmes, research publications, etc. Value propositions are described in terms of goals and objectives.

"Performance measures", as Forgang (2004) mentions, are the measurements of execution of the firm's value proposition. These provide standards against which performance is known. Both quantitative as well as qualitative measures are included. It is desirable to establish target-performance values or benchmarks for comparison.

Management Process

Talluru (2003) says that management is a specialised activity needed for the running of all social institutions that are comprised of human beings. A B-school is a social institution that runs essentially on human resource rich in intellectual capital. Management processes include planning, organising, staffing, directing, commanding, leading, coordinating, controlling, budgeting, reporting, communication, training etc. The following four classical KPAs are considered under this sub-system: Planning, Organising, Leading and Controlling.

"Planning" provides a blueprint for initiating action. It provides policies, programmes, and schedules of what is to be done. It provides a framework for problem-solving approaches, investigation and developing sub-plans to coordinate activities.

"Organising" details what needs to be done to achieve the plan. It specifies how it will be done, what

tasks are to be done and most importantly, who is to carry it out. It deals with creation of decision-making hierarchy, determining who reports to whom and where decisions are to be made.

"Leading" concerns directing and motivating all involved and creating an environment which is conducive to work. Leading deals with employee behavioural issues, resolving conflicts, communication and provision of effective supervision.

"Controlling" is monitoring of activities and tasks that the same are accomplished as planned. It deals with checking procedures and plans to make sure that the work/processes are progressing satisfactorily. It includes installation of a reliable information system.

Management of Resources

The extent of resources varies and depends on policies and accepted objectives. A business school is a place devoted to knowledge. Key resources examined as KPAs are: Faculty, Students, Infrastructure, and Finance.

A "teacher" is the key figure in any educational system. In a business school, he becomes a facilitator and a mentor as well. Faculty policy, compensation policy, work load balancing, faculty development, faculty evaluation and faculty retention policy require evaluation.

"Students" constitute a vital resource. A knowledge centred teacher may not be in a position to use his faculties in case he has no receptive audience. It concerns policies of admission, profiles of students to be admitted, criteria for selection, identification of their needs. If a business school has a mission to make the institution a global school, intake of foreign students might be a necessity so as to bring about a cultural fusion.

"Academic infrastructure" in a business school is present in the form of physical facilities in the form of campus, amphitheatres, audio-video educational aids, auditoriums, computing facilities, library facilities, IT and general support facilities. The facilities need to be integrated into core programmes.

"Finances" constitute the backbone of all resources. Funds are required to support the various activities and to run the organisation. Inadequacy of funds may halt the progress of various programmes. The budgeting and accounting procedures are a part of this KPA.

Governance

The classic definition of corporate governance refers to the blend of law, regulation and appropriate voluntary practices which enable an institution to attract financial and human capital, to generate long-term value for its shareholders and respecting the interests of the community. The community has a justification to know the legitimacy of the fee structure, the recruitment process followed and the values imbibed in the students. The campus environment and the values practiced are also of equal concern to the society. Four KPAs are considered: Transparency, Regulatory Compliance, Societal alignment and Fair practices.

"Transparency" is needed in the domain of recruitment, selection and admission process of the students. Within the institution there are several more areas relevant to enforcement of discipline, internal examinations, assignments, project evaluations, and assessments which need transparency.

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"Regulatory Compliance" refers to following the law of the land. The provisions related can be in admissions, the fee structure, reservation of seats, affiliation to universities and obtaining obligatory accreditations. Another dimension of the same is compliance with provisions related to the work conditions, student-faculty ratio, computer-student ratio, size of library, research etc. as stipulated by the affiliating/approving regulatory body or university.

Public good precedes private good. An effective organisation aligns itself with societal objectives for its own survival. Effective management system develops an active interaction with neighbourhood, with society at large to determine new emerging expectations of skills, learning, and knowledge and incorporates the same in its programmes.

Good governance means carrying out administration that ensures fairness to its promoters, students, faculty, employees, the regulators and society at large.

Fair practices imply following ethical practices in all activities, being sensitive to the expectations, beliefs and concerns of all stakeholders and building trust in how school manages its affairs.

Process Outcome (P)

Process outcome (P) deals with the activities that process the inputs to deliver outcome. The process outcome projects the functional performance for which purposes the institution is created. It includes imparting knowledge of structured curriculum, knowledge on soft skills, outcome of research, publications, consultancies, management development programmes, training to industry executives, project - studies, quality improvement initiatives, academic conferences, seminars, collaborative programmes. Process management seeks response to three primary questions: What is delivered? How much is delivered? What is the effectiveness in delivery?

The evaluation is proposed of sub-systems: Explicit education; Outreach; Implicit education; and Research. The financial performance and the qualitative attributes of outcome have been kept out of purview of this sub-system.

Explicit Education sub-system

It encompasses the traditional aspects of education system. It concerns instruction as per curriculum and the teaching pedagogy. Other areas include achieving functional stability in completion of courses, evaluation system and provision of flexibility. Four KPAs are proposed: Curriculum; Stability; Assessments; Flexibility.

"Curriculum" refers to evaluation of relevancy of courses and the contents to modern day organizations. Global business needs will require different design. The NGO sector has entirely different needs.

"Stability" concerns completion of courses in specified sessions, project studies, holding of examinations, and maintaining the discipline of teaching as per the calendar schedule.

"Assessments" concern determining the degree of success of students having imbibed the education. The measurement follows the examination system adopted by the institute.

"Flexibility" refers to making fast changes in the curriculum to meet the newly emerged needs and to offer choices of programmes to students to suit their abilities.

Outreach sub-system

The interface with industry keeps it informed of developments, new demands of skills and knowledge. Exchange programmes covering the students and facul-

ty and tie-ups with B-schools of repute, is another area of significance. Four KPAs are proposed: Industry interface; Consultancy; Management Development Programmes (MDP), and Collaborations.

"Industry interface" covers active dialogue with industry in various forms, students and faculty to carry out consultancies, project - studies, assignments; visits of executives to talk to the students; adoption of the school and sponsoring academic pursuits such as chairs, centres of excellence, seminars by corporate houses.

"Management Development Programmes" are carried out on specific topics. These bring together executives from diverse backgrounds and disciplines, thus creating a very fertile interaction where both the faculty and the executives gain.

"Collaborations" relate to tie-ups with educational institutes, research organizations, and universities of repute. These enable faculty and student exchange programmes, close touch on developments of new trends in education and in making of a global manager.

Implicit Education sub-system

The future manager needs to be trained on developing human values, soft skills, team work, imbibing ethics and care for the needy, the deprived and the underprivileged in society and care for the environment. Four KPAs are recommended for evaluation of the implicit education: Ethics, Values, Leadership skills, Environment care.

"Business ethics" mean respect for the law of the land, global conventions, transparency in business dealings and responsiveness to the community.

"Values" relate to respect for human rights, human cause, and values of honesty, integrity. It also amounts to non-exploitation, and protection of the weak and unprotected.

"Leadership" skills refer to the abilities to win over, take lead, accept responsibility and generate confidence. Both verbal and oral skills are necessary.

"Environment care" refers to fully understanding what the environment means to the society and the industry. A good manager takes steps that environment is well protected and preserved.

Research: Excellence of education is projected in Research. The output of the sub-system can be

evaluated in four KPAs: Doctoral-guidance, Publications, Innovations, and Applications.

"Doctoral-guidance" concerns supervising doctoral research to its logical conclusion. The numbers of PhD candidates produced, time and cost of the same are indicators.

"Publications" cover titles, papers published in journals, presentations made at conferences, seminars and symposiums.

"Innovations" in a B-school covers areas as introduction of new programmes, revisions in curriculum, and changes in teaching methodologies, evaluation systems, patents obtained, copyrights.

"Applications" refer to the usefulness of research to industry. The evaluation is needed to know the acceptance of the research efforts.

Quality (Q): Quality at a business school can be traced to several dimensions. The philosophy and the policy of the organisation as enshrined in management practices, values and ethics play an important role. The following sub-systems are proposed for evaluation: Functional Quality, Technical Quality, Process Quality and Delivery Quality

"Functional Quality" in practice is not a neutral or absolute concept. It involves valuing. It has to be evaluated in the context of what is desirable to the latent or visible needs of the customers. Functional quality refers to the quality of the outcome delivered. The functional quality is the relevancy of what is wanted or desired and how it fits the aspirations of the customers (students, business). The following KPAs are recommended to be evaluated: Relevance of knowledge, Relevance to global issues, Relevance to society, Relevance to future.

"Relevance of knowledge" relates to relevance to organizations. It evaluates the acceptance by industry.

"Global relevance" relates business education to prepare a student to move in international business. It calls for familiarisation with global issues and environment.

Business owes its existence to society. "Relevance to society" evaluates if the education imparted is rooted for the good of the society.

In a fast changing world on customer likes and technology, management education has to be high on

future orientation. This KPA concerns evaluation of its relevancy to future trends.

Technical Quality: Technical quality refers to effectiveness of the means and quality of 'how' the output is achieved. It is the competence of who delivers the output. Other areas include students as inputs, the academic infrastructure and amenities. Four KPAs are proposed: Faculty, Students, Infrastructure, and Technology.

In an institute characterised by teacher-centred style of teaching, the focus is on the teacher. The education, the experience in the profession, exposure to higher learning, and papers published determine his quality.

Quality of students admitted determines the technical quality in an institute characterised by learner-centred approach. Higher educations, work experience before seeking admission, better grades in the qualifying exams constitute an important dimension.

"Infrastructure", as the library, the computer lab, amphitheatres, supports the process of learning and acquiring knowledge.

"Technology" has a wide scope in a business school. It is present in teaching aids as well as in the form of soft ware, databases, and programmes for analytical exploration.

Process Quality: This refers to the quality of process of conversion of inputs to outputs. It refers to the efficient use of pedagogy delivering the outcome. It emphasises optimal use of resources of time, infrastructure, technology, faculty and other human inputs. Another aspect of the process quality lies in administrative quality to maintain proper ambience in the school, discipline of calendar, orderliness and up-keep of records. Four KPAs are proposed: Cost effectiveness, Time effectiveness, HR effectiveness and Infrastructure utilization.

"Cost effectiveness" is to evaluate relationship between total cost incurred and the value delivered to the customer. A better performance implies getting same value with lower expense of resources.

"Time effectiveness" concerns completion of academic activities and events, seminars, conferences, projects etc. without upsetting the other schedules

"HR effectiveness" refers to utilization of faculty and non-faculty to get the maximum value.

Infrastructure utilization is about optimised utilization of facilities and other resources.

Delivery Quality: It refers to the process of transferring the outcome to the next in line customer. Diversity of programmes, offered to the students and other participants, controls in delivery, accreditations are some parameters. The following KPAs are proposed for evaluation: Controls, Accreditation, Programme Diversity; Faculty Development.

Feedback obtained from the industry, faculty and the students are some of the parameters. Third party audits and verifications are also extensively used for controls. Financial and budgetary controls are other instruments.

"Accreditation" implies conformance to minimum standards of the certifying agency.

Higher options to choose programme speaks of availability of intellectual capital with the institution. It also leads to cross-discipline interactions making it a rich experience.

"Faculty development" is essential to improve the delivery quality. It can take form of exposing faculty to seminars, conferences, and lectures from better known faculty.

Recipient Satisfaction (R): The 'Recipients' are the stakeholders. B-school has many stakeholders. The promoters have invested as a business opportunity. Investors, students, employees, teachers, business houses, professional bodies, pressure groups, NGOs, regulating bodies, neighbourhood, society at large are some of other stakeholders. It is proposed to classify this system in four sub-systems: Promoter satisfaction; Customer satisfaction; Employee satisfaction and Societal satisfaction.

Promoter Satisfaction: The underlying objectives of promoters can vary from pure financial considerations or to serve a social cause of welfare. In case of non-profit orientations, public image, and reputation dominate. Growth, expansions, efficiency of operations, effectiveness, and image in society are common objectives in both the cases.

The following KPAs are considered: Financial Performance, Non-financial Performance, Non-profit Performance and Strategic Performance.

"Financial performance" parameters are on similar lines as applicable in any business venture. The

measures are the income, profits, return on investment, financial controls.

"Non-financial performance" includes such measures which cannot be quantified in monetary terms. The performance parameters include ratings from third party certifying agencies, number of awards won by students and faculty, acceptance by the corporate houses, recognition by international universities.

"The non-profit performance" concerns B-schools set up for social cause. It is reflected in admission policy of students from deprived sections of society, fee structure, and social environment as promoted in the school.

"Strategic performance" refers to growth, expansion, diversifications obtainable over a longer span of time. The performance evaluation concerns judging the blueprints for future growth and the steps taken to achieve the goals against emerging competition.

Customer Satisfaction: Students and programme participants from industry are the customers. Each has his expectations from the association. The evaluation is recommended to be carried out for four KPAs: Cost effectiveness, Public Image, Placement, Learning experience

"Cost effectiveness" refers to the expense which a student might have to incur if he has to pursue education. This has to be weighed against the benefits of placement packages.

"Public Image" – A student gets attracted to a school based on what he reads about it in journals, the image it has in the media and what he hears about it from his friends. The public image raises or lowers the performance in the eyes of the student.

"Placement opportunities" refer to the availability of jobs to the student once he completes the process of learning.

"Learning experience" is about the usefulness of the learning as evaluated by the student in the context of its application on the job or contribution to the employer/society.

Employee Satisfaction: Teacher as an employee is an important constituent of intellectual capital. His satisfaction determines many aspects of performance of the school. Evaluation is on four KPAs: Work culture; Growth opportunities, Job satisfaction, Compensation.

"Work culture" refers to ambiance at work and it

includes freedom at work, flexibility in work hours, encouragement to experiment, innovate, and carry out research, participation in decision making, and support from services.

"Opportunities for growth" can be evaluated in terms of promotions to senior grades and positions, areas of consultancies, guiding research, chairing conferences, exchange programmes and many more.

"Job satisfaction" as related to appropriate assignments, compatible with qualifications and experience, transparency in dealings from the seniors, recognition of performance and equal opportunities to grow.

A fair remuneration is not only needed to attract good teachers but also to retain them in the institution. One measure of evaluation is to determine the average service of a teacher at the institute.

Societal Satisfaction

A number of components are included under the generic head of the society. Business interests, non-profit organisations, regulators, society at large, pressure groups, parents, and media are major components. The evaluation of satisfaction is proposed on four KPAs:

Compatibility, Regulatory compliance, Community Orientation and Public image.

"Compatibility" is about the suitability of the management education imparted for the contemporary business environment. The employers expect that the students passing out shall be fully equipped to apply the knowledge and bring about growth and improvements.

"Regulators" represent the various government agencies and control departments who expect that the minimum norms as prescribed shall be followed

"Community orientation" concerns education being within the reach of the poor, the needy and the deserving. It should be structured to bring benefit in various forms to the society. Benefits can include creation of job opportunities, raising standards of living, transformation of neighbourhood industry etc.

"Public image" refers to the degree of acceptance of the school as a good corporate citizen by the pressure groups, media, peers and community at large. It refers to fairness in administration and its role in the welfare of citizens. In brief it is an answer to a simple question, 'How proud you feel about the school?'

Education Index for B-schools

The various systems, sub-systems and the relevant KPAs as discussed have been tabulated in Tables 1 and 2. The components are not equal. Their importance and priorities differ. The priorities can be demonstrated through weights. It is not possible to quantify the performance of each KPA's. Therefore, it is recommended that all the KPA's should be evaluated on Likert type score. Five responses with graded values of 5, 4, 3, 2 and 1 have been proposed, with 5 and 1 representing the responses of the best and the worst respectively. The tables demonstrate the use of this methodology through an illustrative case.

Once the scores are known, it is also possible to arrive at performance indices of the subsystems, systems and the B-school.

Scores on percentile scale, especially in the case of unquantifiable parameters carry high subjectivity. Small differences can convey a very erroneous picture of a non-existent real difference. Grades are easy to comprehend and convey an instant message. It is therefore recommended to express the performance in grades. The index so arrived on 100-point score in each of the systems O, P, Q, and R can be converted to an Education Index (EI) as under: -

Index above 90 A

Index 81-90 B

Index 71-80 C

Index 61-70 D

Index 60 or lower E

For a system, EI 'A' represents excellent performance. The institute is in capable hands and the education is world class. The students are proficient in concepts, their application and the use of soft skills.

EI 'B' indicates a holistic performance in the system and determination of the institute to move to the next grade. Students get assured offers from first rate organisations. Customers should settle for the institution in absence of availability of an institution enjoying EI 'A'.

EI 'C' depicts a reasonable satisfactory performance and a potential to improve. The students should examine the performance of all the systems in the institution and decide to associate if at least two systems enjoy a superior index. Similarly, the recruiters should

Table 1: System: Organisational Effectiveness (O)Sub-system(SS), SS, KPA's, KPA, Likert, ,

Sub-System (SS)	SS Weight	KPA's	KPA Weight	Likert Scale Score	KPA Weighted Score	Score x 20 (1-100)	SS weighted Score x (2)
1	2	3	4	5	6	7	
Strategic Management	0.3	Mission	0.2	4	0.8	16	22.2
		Strategic Plan	0.2	4	0.8	16	
		Value Proposition	0.3	3	0.9	18	
		Performance Measures	0.3	4	1.2	24	
						74	
Management Process	0.3	Planning	0.3	5	1.5	30	24.6
		Organizing	0.3	4	1.2	24	
		Leading	0.2	4	0.8	16	
		Controlling	0.2	3	0.6	12	
						82	
Management of f Resources	0.2	Faculty	0.25	4	1	20	14.8
		Students	0.3	3	0.9	18	
		Infrastructure	0.2	4	0.8	16	
		Finances	0.25	4	1	20	
						74	
Governance	0.2	Transparency	0.25	4	1	20	16
		Regulatory Compliances	0.25	4	1	20	
		Societal alignment	0.25	4	1	20	
		Fair Practices	0.25	4	1	20	
						80	
E Index for System O:							77.6
System : Process Outcome (P)							
Sub-System (SS)	SS Weight	KPA's	KPA Weight	Likert Scale Score	KPA Weighted Score	Score x 20 (1-100)	SS weighted Score x (2)
1	2	3	4	5	6	7	
Explicit Education sub-system	0.4	Curriculum	0.3	4	1.2	24	32
		Stability	0.4	4	1.6	32	
		Assessment	0.15	4	0.6	12	
		Flexibility	0.15	4	0.6	12	
						80	
Outreach sub-system	0.3	Industry Interface	0.3	4	1.2	24	24
		Consultancy	0.3	4	1.2	24	
		MDP	0.2	4	0.8	16	
		Collaborations	0.2	4	0.8	16	
						80	
ImplicitEducation sub-system	0.2	Ethics	0.25	4	1	20	16
		Values	0.25	4	1	20	
		Leadership Skills	0.25	4	1	20	
		Environment Care	0.25	4	1	20	
						80	
Research	0.1	Doctoral Guidance	0.3	3	0.9	18	6.8
		Publications	0.3	3	0.9	18	
		Innovations	0.2	4	0.8	16	
		Applications	0.2	4	0.8	16	
						68	
E Index for System 'P'							78.8

Table 2: System: Quality (Q)

Sub-System (SS)	SS Weight	KPA's	KPA Weight	Likert Scale Score	KPA Weighted Score	Score x 20 (1-100)	SS weighted Score x (2)
1	2	3	4	5	6	7	
Functional Quality	0.4	Relevancy of Knowledge	0.3	4	1.2	24	32
		Relevancy to Global issues	0.2	4	0.8	16	
		Relevancy to Society	0.25	4	1	20	
		Relevancy to Future	0.25	4	1	20	
						80	
Technical Quality	0.2	Faculty	0.25	4	1	20	16
		Students	0.25	4	1	20	
		Infrastructure	0.25	4	1	20	
		Technology	0.25	4	1	20	
						80	
Process Quality	0.2	Cost Effectiveness	0.3	4	1.2	24	16
		Time Effectiveness	0.3	4	1.2	24	
		HR Effectiveness	0.2	4	0.8	16	
		Infrastructure utilization	0.2	4	0.8	16	
						80	
Delivery Quality	0.2	Controls	0.25	4	1	20	16
		Accreditation	0.25	4	1	20	
		Programmes diversity	0.25	4	1	20	
		Faculty development	0.25	4	1	20	
						80	
E Index for System 'Q'							80

System: Recipient Satisfaction (R)

Sub-System (SS)	SS Weight	KPA's	KPA Weight	Likert Scale Score	KPA Weighted Score	Score x 20 (1-100)	SS weighted Score x (2)
1	2	3	4	5	6	7	
Promoter Satisfaction	0.3	Financial Performance	0.4	4	1.6	32	21.6
		Non-Fin. Performance	0.2	3	0.6	12	
		Non-Profit Performance	0.2	4	0.8	16	
		Strategic Performance	0.2	3	0.6	12	
						72	
Customer Satisfaction	0.3	Cost Effectiveness	0.3	4	1.2	24	24
		Public Image	0.25	4	1	20	
		Placement opportunities	0.25	4	1	20	
		Learning experience	0.2	4	0.8	16	
						80	
Employee Satisfaction	0.2	Work Culture	0.3	3	0.9	18	12
		Growth Opportunities	0.2	3	0.6	12	
		Job Satisfaction	0.25	3	0.75	15	
		Compensation	0.25	3	0.75	15	
						60	
Societal Satisfaction	0.2	Compatibility	0.25	3	0.75	15	12
		Regulatory Compliance	0.25	3	0.75	15	
		Community Orientation	0.25	3	0.75	15	
		Public image	0.25	3	0.75	15	
						60	
E Index for System 'R'							69.6

ensure that at least systems O and Q must have earned EI 'A'.

EI 'D' leaves much to be desired. Both students and recruiters should consider the risks and settle if at least O enjoys EI 'A' and one of the remaining systems gets EI 'B'.

EI 'E' is representative of lowest performance and both students and recruiters are advised to be cautious in dealings with the institution. At least two of the systems must enjoy EI 'B' for any consideration of association. Cost-benefit analysis is essential before any decision on admission.

The Education Index of a business school would read like AAAA or ABBC or BACD or ECDA etc. the first, second, the third and the fourth alphabet standing for performance of O, P, Q and R respectively. AAAA and EEEE represent the extremes of the best and the lowest in overall Education Index.

The proposed instrument of grading is applicable for all types of business schools, both in the private and the public sector. It is equally applicable to small institutions as well as large institutions.

Classification of business schools for Education Index

EI can convey a meaningful message of performance if the comparison is sought between likes. For example, a school being run to achieve welfare objectives or to meet humanitarian causes devoid of any motives for financial gains cannot be compared with an institution being run for financial gains. The perspectives vary. It is therefore necessary to classify the institutions and grade the same as per classification. The following classification is proposed:

Class S: State-owned, State promoted autonomous institutions with transparent/apparent/hidden state control; State university. These institutions do not work for financial returns and are not expected to contribute to the exchequer. In the worst case the institutions are required to be self-supporting.

Class T: Institutions run by trusts, religious, social or minority in character. Their objectives are social. Uplifting of community is the aim. Imparting education is considered the highest form of service to society.

Class A: These are state-aided institutions and therefore have to follow discipline of the fees chargeable, reservations, compensation package to the faculty,

affiliations to a state university, norms of facilities and infrastructure as stipulated by the state from time to time.

Class P: Private universities/non-universities. These schools have their own curriculum, their own system of awarding degrees/diplomas/ certificates. They have their own fee structure and operate as profit making corporate houses

The Education Index of a business school would be prefixed with S, T, A or P.

Conclusions

A business school is a complex organisation. It has many functions to perform and objectives to deliver. It is a workplace for knowledge work and a depository of intellectual capital. Its success lies in producing managers to man business, with profit or non-profit orientation. The students have not only to be made familiar with the concepts of management, analytical tools and approaches to decision making, but also they should be well developed in soft tools as leadership, team spirit, and social orientation. A B-school has many stakeholders with their own expectations often at conflict and contradiction to each other. It is the holistic performance of a system which matters most. A performance tool is foremost an internal instrument to bring about improvement of the system. It is also a yardstick for the several stakeholders to evaluate the performance against their expectations. The performance evaluation of a business school has therefore to be seen from many dimensions of expected satisfaction by each of the stakeholders. A business school has been viewed to comprise of four systems, Organisational effectiveness (O), Process outcome (P), Quality (Q) and Recipient satisfaction (R). Each of the systems has sub-systems and KPAs. These components are not equal in importance and priorities. Therefore, these require to be weighted to represent their priorities aligned with the mission of the school. The metrics OPQR takes into account the inter-relationship of various components. A framework of developing Education Index has been demonstrated.

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Although there may be nothing new under the sun, what is old is new to us and so rich and astonishing that we never tire of it. If we do tire of it, if we lose our curiosity, we have lost something of infinite value, because to a high degree it is curiosity that gives meaning and savor to life.

— Robertson Davies

Leadership for a School of Fish: The Leadership Beatitudes

Hemant K. Sabat

This paper describes the beatitudes of leadership to steer organizations in the 21st century. The historiography of evolution of business throws light on the root causes of the first business revolution and the limitations and drawbacks of the enterprise it created and the creation of the second business revolution. To deliver on the full promise of the wave of integration, this paper describes the architecture of the future organization and the role of new leadership to shape and lead such organizations.

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Success is the Holy Grail; it is the reason all companies are in business. At the same time, it is no secret that two drivers - globalization and technological revolution - are stirring change faster to generate new corporate realities for businesses. In such a turbulent milieu, many contemporary organizations that want to be flexible, lean, innovative, and dedicated through delivery culture are supine with plummeting fortunes. The answer lies in the premise: a concert is as good as its symphonies ("competencies"); an orchestra is as good as its conductor ("leader"); and a conductor is as good as the orchestra ("people").

Further, organizational leaders believe in Warren Bennis' "cat herding paradigm" to lead people. However, to lead companies successfully, it is imperative to shift from this defective assumption that managing people is like managing cats, to a novel paradigm of leadership: leadership for a school of fish. A defective a priori assumption about people leads to a defective structuring of the issue of leadership, thereby leading to a solution in an irrelevant sphere of influence. What is required while operating in a given business environment is a synergy among purpose, strategy, people, process and core competencies to deliver value. And this synergy is created and sustained by the new leader.

To succeed in the new corporate turf, we must understand:

- The current state of organizations
- The forces of change and their impact on the business and its environment
- The architecture of the future organization and the new role of its navigator

This paper describes the historiography of evolution of business and the drivers that are fundamentally changing the business environment. The subsequent section describes the mandate for a new leadership.

Table 1: Forces of change generate new corporate realities

Factors	Traditional corporate perspective	The new corporate realities
<i>Competition</i>	Business competitive primarily on a domestic basis	Globalization of business generates intense international competition
<i>Operating environment</i>	Physical surroundings	Physical and virtual business environment
<i>Key pressure points</i>	Porter's five forces (new entrants, competition, substitutes, suppliers, buyers)	New forces in global economic liberalization and new technologies, in particular, information technology revolution
<i>Impact of technology</i>	Technologies evolve gradually, with modest stress on people and organizations	New technologies dramatically impact organizations, people, products and services
<i>Role of technology</i>	Enabler	Disrupter and originator
<i>Fundamental elements of the organization</i>	Corporate machine, management machine, and corporate man	Network organization, leadership, human capital
<i>Functional precepts</i>	Scientific management; division of labour; specialization	Focus on business processes: * Integration of labour * Integration of tasks * Integration of knowledge
<i>Navigator of the organization</i>	Managers control budgets, people and production in a bureaucratic, rigid environment	New leaders, with expanded competencies, are now needed to drive change and shape corporate, national and global economies
<i>Nature of planning</i>	Static and analytical	Dynamic, intuitive and analytical
<i>Key technique to generate margins</i>	Value chain leverage	Margin growth through value chain destruction
<i>Work culture</i>	Workers rewarded, trained, hired and fired as "management knows best"	Increased competition, new technologies and personal values challenge the needs of the new worker/learner
<i>Performance measurement</i>	Work measured in terms of quantity of output and short-term return on equity.	A new workplace emerges, placing increased emphasis on productivity, performance and return on investment.

While discounting the role of a boss, this paper advocates the need for managers who are leaders. It emphasizes that leadership for the new millennium should embody the beatitudes of both an effective leader and an efficient manager. Further, this paper delves into the leadership beatitudes and describes the new responsibilities that the novel leadership should embrace to keep the businesses in the pink of the health even while pumping steroids into the organization to create a delivery culture. Only this will engender a sustainable success culture in companies.

The evolution of business

The corporate machine, the management machine, the corporate man

The roots of modern management lie in the "machine age" of the nineteenth century. Today's organizations remain modeled on the tenets of first business revolution - the *principle of division of labour* - described by Adam Smith in 1776. Smith's fundamentals that industrial work should be dissected into its simplest and most basic tasks, were humbly construed

by Frederick Taylor as "scientific management," built around specialization and division of labour. The genius of Henry Ford stepped in to pioneer the mass production techniques to increase productivity and reduce prices to generate sales. Then Alfred P. Sloan Jr. (Sloan, 1963) took what Ford had achieved on the factory floor and sought to apply it to managers and the organization as a whole through a new organizational form, called the multi-divisional form. Sloan's "management machine" was a twin component of Ford's "corporate machine." The systems championed by Taylor, Ford and Sloan carved out the "corporate man."

However, as businesses strive to survive the impact of maelstrom of change, Ford's functionalism and Sloan's multi-divisional organization seem inflexible, complicated, cumbersome and overbearing, and hence, pathetically anachronistic and antediluvian. Back in the time, there was a general sense of certainty about where we were going and how to get there - a sense of what Alvin Toffler (1980) describes as *terra firma* (the familiar landscape of tomorrow). Economy and business cantered to the future like Roman legions on a wide-open freeway.

From terra firma to terra incognita

Fast forward to the present: The only certainty for the future is change. In the present and future, change is the warp and continuity the weft in the many-coloured tapestry of history being woven before our eyes. In place of certainty, there is a sense of what Alvin Toffler (1980) describes as *terra incognita* (the uncharted landscape of tomorrow). On this new turf, we are on the edge of chaos.

The eye of the hurricane: The forces of change

Fierce global competition, dynamic aspirations, and expectations of customers that influence markets and technological breakthroughs, have combined to render the goals, methods and basic organizing tenets of the classical machine metaphor of corporation sadly anachronistic and antediluvian. Table 1 depicts how the rapidly growing global economy along with technological advancements is generating new corporate and social realities that require rethinking and changing critical mindsets that will impact one's responsibilities as a business or community leader.

The road ahead

The architecture of future state

The archaic organizational structure has been unceremoniously replaced by a fluid network organization. In the network organization, connections form and reform almost organically, like the branches of the human nervous system (Drucker, 1988; Kelly, 1995). The new organization is like a school of fish. The school swims together in the same direction until it senses danger. Within seconds of sensing danger, the entire school turns and speeds in the opposite direction. Businesses must be able to change and adapt, becoming as fast and flexible as the school of fish.

Businesses must be able to change and adapt, becoming as fast and flexible as the school of fish.

Twisted into a new shape by the fundamental forces of change, the future state of the business organization is emerging with the following distinct characteristics:

- Information-based

- Based on the see-saw balance between centralization and decentralization (yet densely linked through technology)
- Amoeba-shaped: Rapidly adaptable and extremely agile
- Creative, innovative, collaborative, and co-operative, with a team-based structure
- Flooded with "knowledge-workers" (Drucker, 1988)
- Multi-skilled people, who represent a globally diverse community
- Self-controlling in an environment that promotes sharing of thoughts, expressions, and actions, performance monitoring, and material gains, and hence breeds commitment and trust.

The leadership roller coaster

Matching the gyration of external locus of power, there is a concomitant internal currency shift:

The traditional byzantine command-and-control system is in the throes

The democracy of the forces of change summons a meritocracy of people

There is a premium set on awareness, flexibility and adaptability

There is a mandate for a new leadership to steer clear the organizations of landmines as well as to use the opportunities offered by change to grow the business profitably

"Bossism myopia:" Leaders versus bosses

The organization that is truly willing to remove its barriers to cross-functional processes and willing to encourage continuous improvement does not need gatekeepers and administrators. It needs navigators who are more than just bosses. It needs individuals with an entirely different proactive mindset. Bosses think themselves as a repository of ultimate source of authority. If you sent a goat into a board meeting with a card reading "cow" around its neck, and if the boss reads it first as "cow," it would, in due course, come out of the room rubber-stamped "passed one cow." The differentiation checklist in Table 2 confirms that you do not need "bossism myopia" as a lead steer for the new organizations. "Bossism myopia" is the kiss of death as far as organizational learning is concerned.

Table 2: The epitome of lone wolf syndrome versus the leadership roller coaster

Boss	Leader
A boss drives	A leader inspires people—innovates and charts a course providing action
A boss depends on power authority	A leader depends on goodwill
A boss evokes fear	A leader builds relationships, radiates trust, motivates, and generates commitment
A boss recites, "You" or "I"	A leader hums, "We"
A boss is self-opinionated	A leader solicits others' opinion and values it—democratic-participative style of leading
Dare you not ask help from your boss	You look to your leader in distress the leader is an "affiliate"
A boss harps who is wrong	A leader shows what is wrong and guides the team in corrective action
A boss has a reactive attitude; bases his options on curing ills	A leader has an active attitude; believes in preventive evolution
A boss is a status quoits	A leader creates an environment for change
A boss blames	A leader finds the problem and helps to solve it
A boss demands respect	A leader commands respect
A boss takes your success	A leader shares success with you
A boss is an interloper—an epitome of lone wolf syndrome	A leader is a team member
A boss believes he is infallible	A leader is fallible

Note: Adapted and modified from the "Customer Service Suggestions," *The Customer Service Management Journal*, March 1994.

From "herding cats" to "leading a school of fish"

Bennis asserts that managing people is like herding cats. This assertion is based on an a priori assumption that people need to be managed. This defective assumption leads to structuring the problem to enact a solution on a defective paradigm of herding cats. But cats do not lend themselves to be herded.

If you assume the problem is to herd cats, you behave like a cat herder. Therefore, the magical elixir to the classic issue of leadership is to restate the problem accurately. By doing so, the problem is tractable for analysis and implementation.

The new paradigm asserts that the organization is a group of people with rational strategies that are formulated to achieve personal objectives even while working towards organizational goals. That is, the fundamental premise is "actors in an organization are smart." Therefore, it will be foolish to manage people. Furthermore, actors act in a context that is created by the organizational environment. The context loads the actors with two components: Resources and constraints. Armed with these, the actors have their "problems to solve." Therefore, they develop rational strategies in the context of their work to solve their problems. In this paradigm, the leader's responsibility is to build an appropriate context to help the actors solve their problems even while achieving organizational objectives.

The second assertion of the new paradigm can be best understood through an illustration. A school of fish provides a good illustration of what businesses need to become in the new corporate milieu. Unquestionably then, to create and sustain a success culture under the new corporate realities, we require a leadership for the school of fish.

Stretching the analogy further, the school of fish maintains an *identity*, the school's identity, based on an express *purpose* (for example, security, search for food) and through a *culture* (e.g., team-oriented) that builds on relationships (or collegiality) among the members of the school. Every fish in the school trusts its surrounding members to charter its response. Commitment based on this trust then forms the basis for unified movement of the school. The unified responses maintain the school's *integrity*. In conjunction with the purpose and its common culture, the fish in the school take appropriate *initiatives* to steer clear the school of the dangers in their environment. Then there is also a "*lead fish*" that assumes additional responsibilities in the school. These responsibilities are in addition to those relating to being a member of the school.

Leaders versus managers: death by cloning

Applying this analogy to the demands of today's organizations, one realizes that the new organization needs navigators who are more than just efficient managers. Also, it cannot depend on effective leaders

Table 3: The differentiation checklist

Manager	Leader
The manager administers - carries out planning and budgeting	The leader innovates and charts a course providing direction
The manager is a copy	The leader is original
The manager maintains control and order	The leader develops
Management is of the mind; its practice is a science and it is all to do with the ordering of resources, of things material	The leader embodies a spirit compounded by personality and vision; its practice is an art
The manager focuses on inanimate objectsCsystems, tasks, structures, and results	The leader focuses on raising human potential by empowering people and aligning processes with people, technology and systems
The manager focuses on efficiency in climbing the ladder to success	The leader determines whether the ladder is leaning against the right wall
The manager's goals arise out of necessities rather than desires, and they diffuse conflicts in the interest of getting the day's work done	The leader adopts active attitudes towards goals and develops intense relationships with people
The manager relies on control	The leader builds relationships, inspires trust, motivates, and generates commitment
The manager has a short-range view	The leader has a long-range perspective
The manager asks how and why	The leader asks what and why
The manager has his eye on the bottom line	The leader deals with the bottom line and has his eyes on the horizon
The manager accepts and protects status quo; at the most, the manager can do things to manage change	The leader is his own person and creates an environmentCcontextCfor reinvention
The manager does things right	The leader does the right thing
The manager's assumed constant is <i>doing</i>	The leaders assumed constant is <i>being</i> ; the leader alters context to affect the being, which, in turn, alters action
The managers are necessary	The leaders are essential

Note: Adapted and modified from Bennis, W. (1990). *Leadership in the 21st Century, Training, May*.

alone. This leads to the magical mantra for success: A 21st century organization needs *managers who are leaders* and *leaders who are managers*. This is the manifesto for new leadership.

The differentiation checklist - managers versus leaders - sets the scene for a long-simmering battle (see Table 3). A manager's goals arise out of necessities rather than desires, and they diffuse conflicts in the interest of getting the day's work done. A leader, on the other hand, adopts active attitudes towards goals and develops intense relationships with people. The task of leadership is not to put greatness into humanity but to elicit it for the greatness is already there. Alongside, a leader embodies a spirit compounded by personality and vision; its practice is an art. Management is of the mind; its practice is a science and it is all to do with the ordering of resources, of things material. Managers are necessary; leaders are essential. Managers focus on inanimate objects, whereas leaders focus on raising human potential. Managers strive for efficiency in climbing the ladder to success; leaders determine whether the ladder is leaning against the right wall. Managers grow their people; leaders help people develop themselves. One grows individually; one develops with its

people in an organization. Managers execute the role of patrons to grow their people to grow themselves resulting in growth of cronies. Leaders are benevolent, rational, and objective critics who are interested in seeing their people succeed in whatever they do. Managers build systems that help people grow vertically up the organizational ladder. What managers overlook is one can grow from a junior manager through senior manager to an executive, yet not develop oneself as an individual as much as these titles suggest. Leaders, on the other hand, help people advance down the learning curve by creating opportunities to develop multi-dimensionally, regardless of the title of an employee in the organizational hierarchy.

Further, *doing* is the assumed managerial constant. To manage is to do something to accomplish a set of objectives. That is why when *doing* is the variable and *being* is the constant, we need a leader. Being alters action; context shapes thinking and perception. A leader fundamentally transforms the context, the platform on which people construct their understanding of the primary business of the organization and the environment of the company. The actions are altered accordingly. Last, I can be appointed a business executive

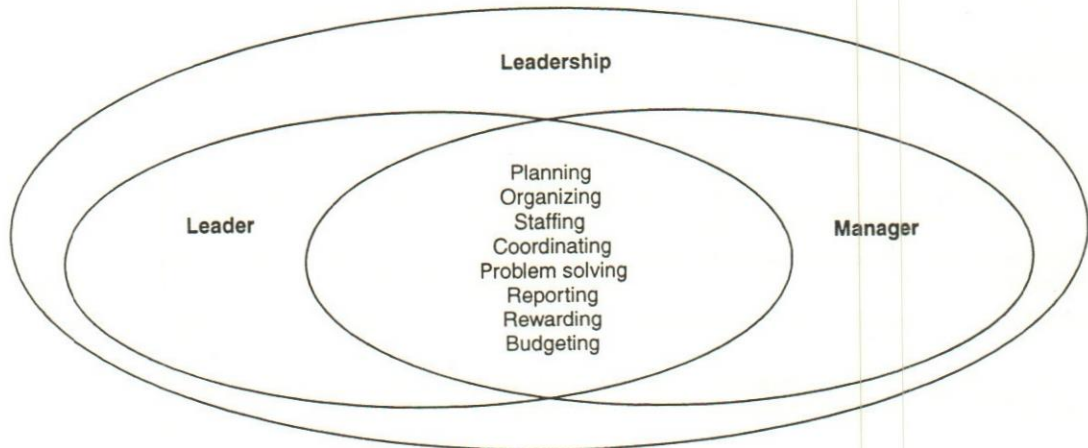


Fig. 1. Leadership for a school of fish = Leader + Manager

but I am not a leader until my personality and character, my knowledge and my skill in doing the functions of leadership are recognized and accepted by the others involved.

Manager = Science + Objective + Head + Efficiency
+ Present + Order + Security + Doing Planning

Leader = Art + Subjective + Soul & Heart +
Effectiveness + Future + Reinvention + Risk +
Context (being) Vision

Does it seem to be a race without a finish line? Or, when cobwebs are plenty, kisses are scarce.

The key themes at the core of this treatise are:

(1) Leadership is the seagull; "bossism myopia" is the Kiss of Judas. Moulding the roles of manager and leader into leadership, we realize that leadership is not exceptional (i.e., "great men are born, not made" is not universally true). Leadership is the natural expression of the fully functional personality that inspires, organizes, inspires, empowers, deploys, measures, and rewards the human capital by allowing it to work at the best potential in conjunction with other sub-systems in the environment. By fully understanding the corporate realities, Bennis' (1996) *A leader of leaders* "stay ahead of the reinvention curve, constantly developing their organization's architecture in response to environmental changes so that the architecture facilitates the creation of intellectual capital. On the other hand, the myopic perceptions of a boss leaves an organization neither ashore nor afloat.

Second, a few interlopers cannot lead pilgrims on the journey of reinventing an organization. A leader assembles a critical mass of key stakeholders. This then

acts as a flywheel effect, where enough key players get involved and enrolled that it creates a momentum to carry the process forward by the manager and his employees.

(2) A manager copes with complexity; a manager maintains the status quo. A leader manages change; a leader has the potential to reinvent the company - metamorphose a company. Change programmes treat symptoms, not underlying conditions. Reinvention is not changing what is, but creating what isn't. The difference between the effects of reinvention and change is best described through an analogy. A butterfly is not more caterpillar or a better or improved caterpillar; a butterfly is a different creature. To reinvent, the leader uncovers the hidden context of an organization.

Thus, management is complemented and enhanced by the characteristics of an effective leader. For success in the 21st century, the leadership must embody certain beatitudes. The leadership beatitudes encompass the entire gamut of the characteristics of an effective leader as well as the skills of an efficient manager. The one without the other is diminished, if not negated altogether.

Leadership = Leader + Manager

This equation goes with a caveat: Figure 1 is a visual summary of a few commonalities that exist between an effective leader and an efficient manager. The classical functions of planning, organizing, staffing, coordinating, reporting, budgeting, and problem-solving form the common domain.

With these core themes in perspective, the stage is now set to explore the leadership beatitudes.

(3) The new leadership dons the mulberry hat.

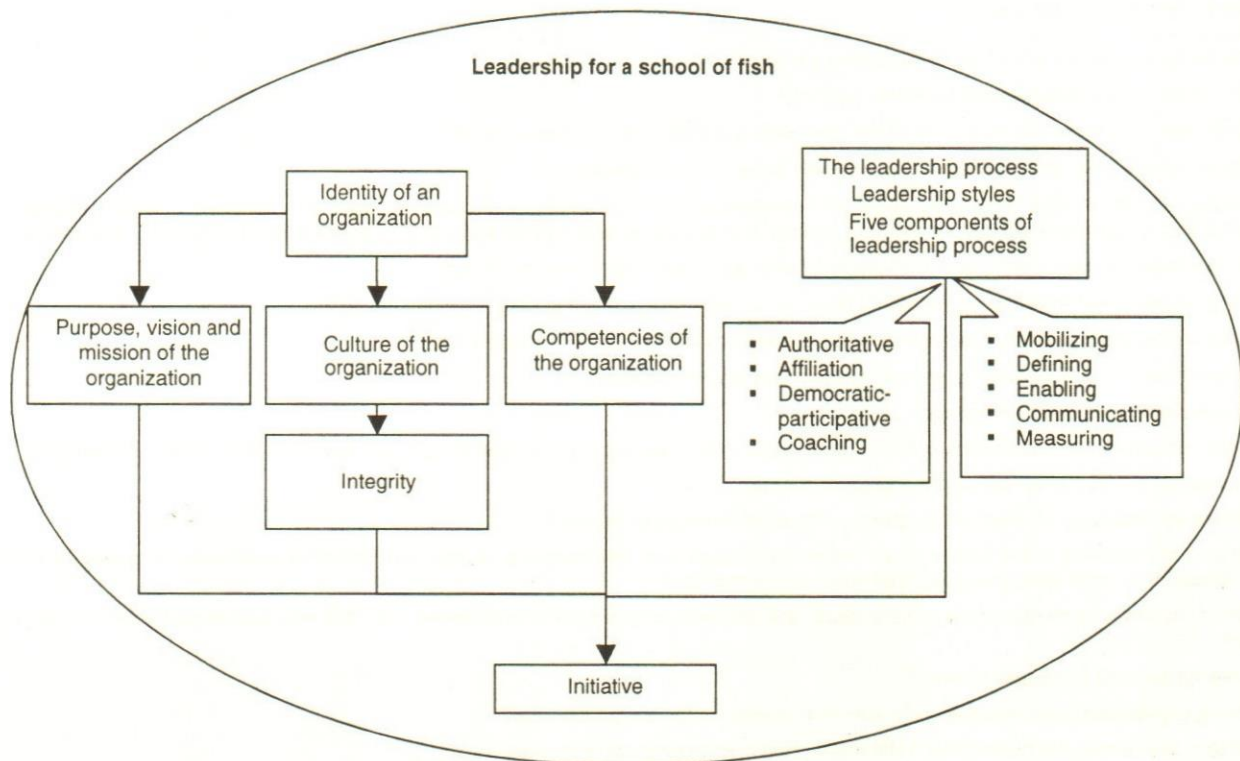


Fig. 2. Manifesto for leadership for a school of fish

The "inveterate" captains have been humbled. In the future state, management's role will evolve beyond its classical functions of planning, organizing, staffing, directing, controlling, reporting, budgeting and problem solving. Likewise, the functions of the enterprise manager will stretch beyond today's traditional leadership tasks, defined by John P. Kotter (1990) as visioning, aligning, and motivating. The new navigator must have a "global mindset," which is different from a narrow and restrictive "domestic mindset." Stephen H. Rhinesmith (1993) displays such a shift. A global leader has to manage competitiveness through knowledge by driving for a bigger, broader picture; manage complexity through fruitful conceptualization by accepting the balance of contradictions; manage adaptability through flexibility by trusting people and process over organizational structure; manage teams through sensitivity by not only valuing but also leveraging diversity to broaden the wealth and depth of intellect and perspectives; manage uncertainty through judgement - radical, if necessary - by realizing, accepting, and flowing with change; and manage learning through reflection by seeking to be open and direct.

(4) Manifesto for leadership for a school of fish. Effective leadership should be making things happen. The foremost mandate of leadership, which is:

- Defining and establishing a company's *identity* that is reflected through *purpose*, vision and mission of the business entity, and that creates a *culture*, which stimulates renewal and growth
- Acculturating a leadership *process* in the management cadre to translate the purpose into practice, and to develop competencies of the *people* in the organization
- Nurturing *initiatives* of the people to tap the well-springs of intraneurship
- Relentlessly pursuing a *culture of integrity*, which builds relationships, breeds trust, generates commitment, and serves as the basis of organizational control (Fig. 2)

Specifically, the leaders should comfortably address the key questions listed in Table 4. The checklist insists on a mind:

- Perpetually ready to revolt against its own conclusions
- Prepared for a constant, graceful scepticism
- That is open
- That is rationally curious and optimistic

Table 4: The checklist for a leader

- Do we have clear picture of our organization's mission and goals?
- Do we tell our people how the business is doing?
- Does everyone know the objectives of the business, and their role in achieving them?
- Do we have a clear plan setting out how we will achieve our objectives?
- Do we insist on a mind perpetually ready to revolt against its own conclusions; a mind prepared for a constant, graceful criticism; a mind that is open; a mind that is rationally curious and optimistic; and a mind that can judge processes, procedures, and people?
- Do we stress on consistency and conformity to what we have been following so far?
- Have we left linear thinking, conventional thinking, grand strategy thinking, and formulaic thinking?
- Have we replaced perfectionist organizational thinking by radical experimental thinking?
- Has monistic way of thinking given way to pluralistic way of thinking?
- Do we have faith in human beings?
- What is ingrained in our delivery culture: "get it right, then keep it going," or "get it right and make it better, better, and better?"
- Has existential authority replaced ex-officio authority?
- Are we still focusing on devotion to growth instead of devotion to service?
- What is the essence of the culture of our organization: corporate discipline (i.e., a culture of reflective obedience) or corporate spirit (i.e., a culture of learned willingness and individual accountability)?
- Which dictum is in charge in the organization: "the only way to gain control is to have it," or "the only way to gain control is to give it up?"
- Have we defined our target market?
- Do we incorporate business goals into personal objectives for every individual?
- What is the strategy of managerial betterment: adversarial/competitive or supportive?
- Do our people add value to every process they touch?
- Are all our people involved in the continuous improvement of processes?
- What is the criterion for performance measurement: tyranny of numerical accountancy or the judgement of the customer?
- Do we regularly survey customers to find out what they think of our products and our services, and act on the results?
- Are our people regularly appraised on their performance and does remuneration take account of performance?
- Do we use a balanced scorecard of key measures to help us monitor performance?
- Are our managers (process, expertise, enterprise, and self-managers) empowered: are decisions taken by the people who do the work?
- Do our processes compare favourably with the best in class?
- Do we know the profitability of individual customers (internal as well as external), products, services and locations?
- Are our products and services contemporary?

- That can judge processes, procedures and people
- Giving preponderance to results over science, reason, technology
- That can bear the light of a new millennium

In sum, the premium set on human side of management is at par with that on corporate management. It is worth to investigate further what the "Triple I's" comprise of.

Identity of a business organization

A school of fish maintains an *identity*, the school's identity, based on an express *purpose* (for example, security, search for food). Maintaining this unified iden-

tity, all the fish that are part of a school move together. The manoeuvres of the school exemplify a *culture* (e.g., team-orientation and delivery-based) that builds on relationships (or collegiality) among the members of the school. Every fish in the school *trusts* its surrounding members to charter its response. The *pride* of the school is their personal *commitment* to the school's common cause. This commitment, which derives its motivation from mutual trust, then forms the basis for unified movement of the school. The unified response is a manifestation of the school's *integrity*.

Similarly, as an organization moves along, it must keep a vigil on the compass that points to the *identity* of the business organization. At the core of identity is understanding of an organization's distinctiveness. From that knowledge flows the essential course-setting work of:

- Developing a new business model and aligning senior management around it
- Resetting the business fundamentals

Given the enormous significance of *identity* of an organization to its survival and success, it is in order to ponder over its two components in detail. The two factors are: the purpose of the organization, and corporate culture.

(i) Purpose of an organization

Responsibility for defining and establishing a firm's identity includes etching a vision of the future based on the primary purpose of the organization. The purpose of an enterprise is the essential function it serves for its customers; the focus is on value that it generates for the customers. While focusing on the microcosms of the storm one can lose sight of one's destination - the purpose of the journey ("the purpose, vision, and mission of the business organization"). Like an inner compass check, the purpose of the organization steers clear of cobwebs in an African safari. The role played by vision, mission and purpose is best portrayed by Warren Bennis' now-famous metaphor of Schumacher's balloon man, who holds a fistful of strings attached to balloons each representing an entrepreneurial unit. The balloons have their own individual buoyancy and are not controlled, but instead are held together by the balloon man.

Establishing the purpose

The new leader who seeks to manage change must consider a series of questions given in Table 5 that elicits the basic nature of a company's business. These questions are exemplified by a set of micro-variables given in Table 5. These variables were elaborated in an earlier paper (Sabat, 1998).

Institutionalizing the purpose in the organizational mindset

It is not enough to merely have a strongly defined sense of purpose. The vision should find resonance with the employees. What the managers should aim while defining and communicating the objectives of the business is to mobilize the human capital by establishing a sense of personal significance in the hearts and minds of every employee. Simultaneously, everyone must not only understand but also appreciate the objectives of the business and be committed to achieving them.

Second, the leaders must possess the capacity to articulate the purpose, vision and mission clearly. This

Table 5: Purpose, vision, mission of the business entity

a. The checklist about the basic nature of business

- What is this *business* for?
- What is the business' purpose?
- What are its fundamentals?
- Where do we need to go?
- How do we get there ahead of the competitors?
- What are we doing here?
- What is the process for?

b. Micro-variables describing the basic nature of business

- Standards of excellence
- Management credo for striving for relentless betterment
- Vision and purpose
- Clarity of goals and specific objectives
- Commitment of people to organizational and societal objectives
- Defining the operational processes
- Devotion to growth or service?

requires "living" or embodying all that you communicate, day in and day out.

Third, people should be empowered to pursue the mission through an appropriate course of action. For this, the vision should be anchored in corporate culture, in organizational realities, in organizational chassis, so that it becomes a template for decision-making. This takes us to the second aspect of establishing *identity* of an organization - creating and sustaining an organizational culture, which breeds trust, generates commitment, and serves as the basis of organizational control. This will aid the pursuit of *integrity*.

(ii) Success culture

To reset the business fundamentals, there must be a committed effort to revitalize the company through initiatives that create a context for renewal and growth. Such initiatives culminate in a success culture that thrives on delivery culture. However, you cannot transform a mule into a racehorse by merely placing it in a racecourse. A cultural change requires challenging deep-seated beliefs, habits, and practices.

Successful organizations generate a sense of commitment, a sense of purpose, and an intense desire to strive to meet the needs of their customers. Get things right first time, every time - this is the philosophy of delivery culture. Specifically, organizational culture should foster both human virtues (openness, trust and trustworthiness, self-respect and mutual respect, co-

operation, accountability, as well as willingness to judge and be judged, and reward and be rewarded) and work values (competency, decisiveness, boldness and valiance, among other things). Not only should the leaders identify these values but also cultivate, and "live" at all levels of the organization, at all times.

The controlling variables that make this task a formidable challenge are given in Table 6. To overcome the challenge, the leaders must assess the resources and external environment, and strive to generate an internal environment of willingness and mutual confidence. Such an environment will assist in pursuing *integrity*, which, in turn, lays the foundation for trust. Trust can be the only meaningful basis to follow the rubric of association, collaboration, and co-operation to create and deliver value to all stakeholders. Understanding these relationships pays off, in inspiration, support, and morale, the ultimate moral conditions of success.

Table 6: Micro-variables of corporate culture

What kind of culture do we want?	
• Directness and openness	• Ethics (adversarial versus supportive)
• Learning culture	• Capability to adopt, adapt and implement changes
• Corporate spirit of learned willingness and individual acceptability	• Chaos handling capability of the firm
• Employee participation	• Cultural diversity of workforce
• Team commitment	• Faith in human beings
• Risk and initiative-taking culture	• To judge and willingness to be judged
• Strategic mindset of managerial betterment (adversarial/competitive and/or supportive)	• Performance unto the highest competence
• Organizational thinking (radically experimental and discontinuous or perfectionist)	• Corporate discipline (or reflexive obedience)
	• Extent of enabling the people
	• Trust and be trustworthy
	• Organizational flexibility

The leadership process

In conjunction with purpose and its common culture, the fish in the school take appropriate *initiatives* to steer clear the school of the dangers in their environment. Then there is also a "lead fish" that assumes additional responsibilities in the school. These responsibilities are in addition to those relating to being a member of the school.

Further, as the school changes its direction of

movement, the baton of leadership is coasted along to the fish at the front in the new direction of movement. Over a period of time, taking cognizance of imminent realities, the school grooms many fish to lead - should the environmental conditions demand this.

Similarly, the new wave of integration and its consequence - process-centred way of doing business - encompasses changing people's beliefs, attitudes, and values. Like any programme of reinvention, this wave must involve and alter the perceptions and behaviour of people, in an extended form. By its very nature, successful reinventions demand a proactive mindset. Inculcating a proactive mindset is a task harder to rationalize and communicate than reactive mindset, where one can point to specific events, which have occurred and are having a clear effect on the business. The leadership process creates a new context to reinvent the organization. The role played by leadership to create the necessary context is based portrayed by Goss *et al*'s metaphor of changing the colour of light in a room to alter what we see, and not changing the objects in the room.

Sadly, the initial concentration of radical change programs has been on tackling the "hard" issues. For example, business process reengineering focused on corporate reengineering ignoring reengineering management. But there is an equal premium on human side of management. Unless organizations acquiesce to the fact that people do not resist change per se, but the way they are treated in the change process and the roles they play in the effort, they are undeniably destined to be doomed to extinction in their change management efforts (Armentrout, 1996; Cooper and Markus, 1995; Ligus, 1994; Zimmerman, 1995). The need of the hour is to dramatically improve business results, and do it while earning the hearts and minds of the people (Arendt *et al*, 1995; Strebel, 1996; Teal, 1996). This connotes: the peg of the gyrating top are the new five components of leadership process and the leadership styles.

(i) Five management components of leadership process

Every business has core management processes: defining, mobilizing, empowering, communicating and measuring. The issue of corporate performance measurement is addressed in an earlier paper (Sabat, 2000). The issues of leadership process and performance that are to be addressed are given in Table 7a. The variables that exemplify these issues are listed in Table 7b. Rosabeth Moss Kanter (1989) has identified seven similar "skills and sensibilities" essential for managers if they are to become what she labels "business athletes."

Table 7: The leadership process

a. The nuances of the leadership process	
How do the leaders do their work?	
<ul style="list-style-type: none"> • How do we get the kind of processes we want? • How do we get the performance we need from our people? • How do we set norms and standards, or measure results? • What are the leadership styles and managerial processes that are ingredients of a corporate success culture? 	
b. Micro-variables of the leadership process	
<ul style="list-style-type: none"> • Mobilizing (influence, motivation, persuasion) • Defining • Enabling/empowering • Communicating – Clear and authentic • Measuring – Customer-service orientation • Change implementation leadership • Relationship management 	<ul style="list-style-type: none"> • Dissemination of authority, control and accountability • Interpersonal understanding • Increased risk and initiative-taking • Fair and just compensation • Commitment of the people to the organizational goals • Customer service orientation • Creative conflict resolution • Rewards and recognition to individuals and teams • Change and implementation leadership

(ii) Leadership styles

A combination of four leadership styles is to be used to effect the transition to success culture: authoritative, affiliation, democratic-participative and coaching. These leadership styles are elaborated in an earlier paper (Sabat, 1998). People should work under the rubric of association, collaboration, and co-operation with everyone in the organization, as part of a community of shared aspirations, ideals, and trust. This will beget inspiration and support as well as raise morale of the people. Further, leaders should promote people with achievement orientation, analytical thinking (hierarchical, time-sequential, and causal order), customer service orientation, risk- and initiative-taking, team orientation, discontinuous thinking, and professional competence. The new leaders will have to evolve beyond classical management functions to embrace the additional management responsibilities that are defining, mobilizing, enabling (or empowering), communicating and measuring. Therefore, following equation gives a visual summary of the concept of leadership in the 21st century:

$$\begin{array}{c}
 \text{(New leadership agenda)} \\
 \downarrow \\
 \left[\begin{array}{c} \text{[Identity + Initiative + Integrity]} \\ + \\ \text{[Defining + Mobilizing + Empowering +} \\ \text{Communicating + Measuring]} \end{array} \right] \\
 \uparrow \\
 \text{(New management processes of leadership)}
 \end{array}$$

Leadership =

What we infer is the new leadership has to abandon the past—that is, consistency, conformity, figuratively; linear thinking, grand-strategy thinking, formulaic thinking, conventional thinking, simplistically. More specifically, leadership has to replace perfectionist organizational thinking by radical experimental thinking, the creed “Get it right, then keep it going” by the credo “Get it right and make it better, better and better,” the feeling of despair about people by faith in human beings, ex-officio authority by existential authority, tyranny of numerical accountancy by the judgement of the customer, an adversarial/competitive strategy of managerial betterment by a supportive strategy, devotion to growth by devotion to service, monistic way of thinking by pluralistic way, corporate discipline by corporate spirit (that is, a culture of reflexive obedience by a culture of learned willingness and individual accountability), and the dictum “the only way to gain control is to have it” by “the only way to gain control is to give it up.”

Issues of people

The school of fish maintains a self-regulated disciplined venture. To this end, maybe peer pressure to conform to standards set by members of the school is the driving force.

(i) Competencies of people

A new workplace emerges, placing increased em-

Table 8. The competencies of people

a. The questions about competencies of people What kind of people should work in the organization?	
<ul style="list-style-type: none"> • What kind of people do we want to work with? • How can we find them? • From where can we source them? • How do we get them to want to work with us? • How do we know they are the kind of people we want? 	
b. Competencies of people	
<ul style="list-style-type: none"> • Directness and openness of people • Interpersonal savvy • Leadership qualities • Managerial potential • Teamwork qualities • Capacity of independent thought • Team commitment (team orientation and team co-operation) • Thinking (discontinuous radical, and analytical) • Resourcefulness and adaptability • Sense of responsibility • Reliability 	<ul style="list-style-type: none"> • Maturity • Judgement • Decision-making ability of the people • Flexibility and willingness to change • Risk and initiative-taking • Self-confidence • Technological know-how • Achievement orientation • Communication ability • Rewards and recognition to individuals and teams • Degree of innovation • Portability

phasis on productivity, performance and return on investment. If businesses are to respond to the challenges of the new global reality with new business strategies, then we need to build high performance in the workplace while linking workforce competencies with business strategies.

Charles L. Winslow and William L. Brammer (1994) highlight two critical steps in this process. From this emanates the issues that are to be addressed by leaders. These issues are given in Table 8a. The variables that exemplify these questions are listed in Table 8b. Anthony P. Carnevale (1991) goes a step further to list the 16 skills, or competencies, required of workers in the new economy. The competencies required of participants in the new economy forge into a formidable set - learning to learn skills; technical and general competence; communication skills; adaptability (problem-solving and creativity) and portability; and people skills (group skills and influencing skills). In short, the high-performance, competency-based workplace requires emphasis on learning as the key to future competitive success. The leaders have to not only possess these premium skills themselves but also hire people, who

possess these skills, to work in association, cooperation, and collaboration with one another.

(ii) *Nurturing initiative*

In conjunction with the cultural integrity and the identity of an organization, the competencies of people should be marshalled to nurture initiative and creativity of people. For this, the foremost leadership mandate is to foster *generative learning* as a complement to *adaptive learning*, with more emphasis on the former, to create a learning organization (Senge, 1990). The prevailing view of learning organizations emphasizes adaptability. But increasing adaptability is only the first stage in moving toward learning organizations. Generative learning, unlike adaptive learning, requires new outlook about managing business. It requires seeing the systems that control events. When businesses fail to grasp the systemic source of problems, they tend to cure the ills by reading symptoms rather than eliminative underlying causes.

Sloan's "management machine" had erroneously assumed that the entire generative capacity of the organization lay at the top as if the rest of the people in the organization were like barnacles of a ship, accumulated only to be jettisoned if and when required. The new leadership has to jettison this view that was apt for an erstwhile "corporate machine" functioning in an industrial age. It has to learn how to create an environment that actually embraces change, not as a threat but as opportunity while gathering people around them. To unleash creativity throughout the organization, leadership must be willing to create an environment where constructive criticism and constructive discordance is reared. This is because the main enemies of constructive change are orthodoxy and dogma. Leadership has to deploy the creativity of the workforce by encouraging it to think about new possibilities, and to create new inventions of their own competencies (Smith, 1997). Individual autonomy and freedom as well as initiative should be truly valued and encouraged at every level in the organization.

There is one caveat: creative energy of people should be unleashed within the overarching purpose, vision and mission of the organization.

Transactional and transformational leadership: Yin and Yang

One more dimension of the battle is to be sorted out. On a different plane, a total leader is the synergy of two fundamental styles of leadership: transactional and transformational. Transactional leaders motivate others

to believe in desired ways by offering rewards that satisfy the self-interest of followers. There is an exchange of mutually valued things, a transaction between leader and follower, such as higher pay and benefits for higher productivity. Effective transactional leaders are adept at utilizing the subtle power of encouragement for improved human relations, with corresponding enhanced performance as a consequence. Transformational leaders motivate others to act not out of self-interest but out of commitment to a higher ideal or transcendent goal. Through this relationship, the motivation and maturity of both the leader and the follower are raised to higher levels. Transformational leaders have been characterized as charismatic, inspirational, able to stimulate others intellectually, and capable of showing individualized consideration.

The seeming dichotomy between transactional and transformational leadership is best unified using the Eastern Taoist unified notion of Yin and Yang. Yin is the feminine, receptive, responsive, subtle aspect of each person, whereas yang is the masculine, outgoing, creative, assertive aspect of the person. A complete personality is the synergy of Yin and Yang, each coloring the individual to varying extent. On a similar plane, the total leader should have the ability to be both transactional and transformational as is appropriate to the specific situation. In sum, leadership is a unitary concept subsuming a seeming dichotomy.

Conclusion

For two centuries people have founded and built companies around Adam Smith's principle of division of labour. Responding to the new corporate realities, emergence of the wave of integration demands the retirement of those antediluvian principles and to adopt a new set to reinvent the business concerns that can survive and prosper in the post-industrial business age. In this era of integration, individuals, organizations, and society increasingly see the need for greater harmony and balance among contradictions. Future organizations will be network organizations: Amoeba-shaped, information-based, agile, adaptable, team-based, globally diverse and self-controlling.

Whereas we sound a death knell to the hitherto sacrosanct principle of division of labour and herald the epoch of integration, the myopic perceptions of a boss should give way to the new leadership roller coaster. The clear realistic possibility is leadership and management must go together as complementary components of the new leadership engine.

To deliver on the full promise of integration, the

businesses should be like the school of fish rapidly adaptable to changing environment, swift, flexible, lean, innovative, trust-based team-oriented entrepreneurial community, and dedicated through delivery culture.

The newest responsibility of the leader is to establish the *identity* of the organization, to nurture creativity and *initiative* of people by building a culture based on *integrity* and trust. The leader should lead, organize, inspire, deploy, measure, and reward the new work the wave of integration creates. Therefore, the management processes must focus on mobilizing, enabling, defining, measuring and communicating. The total leader should have the ability to be both transactional and transformational as is appropriate to the specific situation.

Much change will undoubtedly occur as the typhoon progresses. Hegel's famous dialectic (history bumps along on triangular wheels of change, thesis, antithesis, and synthesis) will play out again as we move in corporate thinking from management based primarily on authority to one convoluting individual autonomy and freedom concomitant with personal responsibility.

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The worse the news, the more effort should go into communicating it.

— Andrew S. Grove

Human Resource Management in a Lean Manufacturing Environment

Nitin Upadhye, Suresh Garg & S G Deshmukh

Human asset is one of the biggest strengths of any organisation. It has been demonstrated by Japanese industries that with the right type of participative management, an organisation can become competitive in any environment. Top management must give due attention to the Human Resource Development Programme to gain long-term benefits. The role of the Human Resource Management (HRM) in the Lean Manufacturing system (LMS) is studied in this paper to demonstrate that better HRM policies help in implementation of LMS. The focus of LM is the customer, which can be possible only through HR-centric management practices.

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A firm is said to be technically inefficient if it is not able to reach maximum output given its available resources and technology (Kaynak and Pagan, 2003). Today all over the world, manufacturing companies are striving to sustain in the changing environment, which is dominated by advanced technology, global competition and increasing customer expectations. Today's market is more dynamic in nature and the customer has acquired the driving seat. The customer decides the fate of the manufacturer; he demands product variety with better quality at lowest possible cost with minimum lead-time (Gupta and Kashikar, 1997). Today an organisation can survive in the long run only if it develops capabilities to meet the requirements of the customer. One of the major challenges is to produce variety products with minimum lead-time, reduced inventory and world-class quality (Upadhye et al., 2004). HRM (human resource management) plays an important role in the design, acquisition, operations and upgradation of these capabilities.

Lean Manufacturing System

Lean Manufacturing System also known as Toyota Production System (TPS) was conceived of by Ohno and Shingo at Toyota. The goal of Lean Manufacturing is to reduce the waste in human effort, inventory, time to market and manufacturing space to become highly responsive to customer demand while producing world-class quality products in the most efficient and economical manner (Pavnaskar, Gershenson, and Jambekar, 2003). The term "Lean" describes Japanese systems, which comparative to mass production use fewer resources to achieve the output, which is better in terms of quality and satisfies the needs of customers. The main features of LMS are shorter manufacturing and new product development times, team-based work organisation with responsibility for quality and a smaller component supplier base providing Just-in-Time (JIT) deliveries. The LMS changes how people work. For

Table 1: Role of Human Resources Management in the implementation of LMS

Sr. No.	Author	Reported importance of Human Resource Management in the implementation of LMS
01	Amelsvoort and Benders, 1996.	Training cost may be considerable, in addition to which, the production processes may have to be interrupted or even stopped for training purpose. Such investments in human capital can be seen as a test of management's true commitment towards implementing self-directed work teams.
02	Fulletron, Mcwatters, Fawson (2003)	Firms are required to invest in additional training and capital expenditure. Training costs initially reduce the profit margin, but are expected to improve long-run productivity.
03	Kannan and Tirupati, 2000	A System approach towards manufacturing to simplify the flow of material through reorganizing machines, cellular manufacturing, creation of team structures and provision of cross training to the workforce.
04	Katayama and Bennett, 1996	Intelligent use of manual work can raise productivity to a level close to that of automated systems
05	Pavnaskar et al, 2003	Becoming Lean requires total dedication from personnel, adequate knowledge about the Lean manufacturing philosophies, tools and techniques.
06	Koregaonkar, 1992	Full-scale implementation of LM requires an increase in the level of technical skills and flexibility of workers. Training and development play a pivotal role for attitude change and skill development. The change in workers role is possible by employee's motivation, staffing, training and employee development, compensation and reward system.
07	Sanchez and Perez, 2001	Continuous improvement process requires the involvement of all production employees and the support of top management.
08	Schuring, 1996	Teams are an important element of Lean Manufacturing. Teams are held responsible for the correct execution of the standardized tasks in the process. Team members should help one another and notice others' mistakes.
09	Thompson and Wallace, 1996	Team training involves courses on effective group working, collective decision making and basic mechanical and electrical skills, with the role of the supervisors as that of the facilitator and in some cases that of line management with his teams taking routine task decisions.
10	Womack et al, 1990	In Lean organizations teams are assigned a crucial role and they emerge as the heart of lean factory.

most people, this will mean more challenging jobs, greater responsibilities and team working rather than narrow professional careers (Womack, Jones, and Roos, 1990).

Many researchers found that for the success of any improvement strategy it is necessary that top management must support training and improve employee relations. LMS requires very high motivation and trust between the workers and the company, without which its successful implementation cannot be achieved. Continuous training for all workers is a must to help them understand the philosophy, concept and techniques of LMS (Garg, Vrat and Kanda, 1994). The importance of HRM, as reported by various authors is presented in Table 1. Employees should be trained in the improvement philosophy and related techniques such as Statistical Process Control (SPC) to understand variations in processes, incoming material etc. Training and orientation of the workforce in the JIT concepts and improvements possible after its implementation are the two most effective solutions to providing workforce readiness and support (Ahmed, Tunc, and Montagno, 1991; Ansari and Modarress 1990; Lee and Ebrahimpour 1984; Walleigh, 1986). When a management is visionary

and strategic in its approach to technology and processes, and the related investments and efforts, all the implementation has to be only through people. Human processes which foster motivation; relationships, teamwork and cooperation help people to unlock the latent productivity (Athreya, 2002).

Kodali (2003) stated in his comparative study of Japanese and Indian manufacturing strategies that Japanese organisations believe in lifetime training. Training and development of employees is considered as a long-term investment and the focus is on developing broad skill. While Indian organisations focus on optimal training to meet immediate job needs, training and development are undertaken with hesitation and the focus is to develop narrow skills. The HRM practices in traditional and LMS environment are compared in Table 2.

In the LMS the non-value added activities are identified and eliminated on a regular basis with the help of suitable tools and techniques. To do this all the functions in the supply chain must work as a team. Elimination of non-value added activities or waste results in low lead-time with fewer resources at reduced cost to provide a variety product with better quality.

Table 2: HRM Practices in a traditional and LMS environment

Attributes	Traditional Environment	LMS Environment
Focus	To get the work, provides the bare minimum amount to HR practices just owing to the legal and financial rules and regulation. Priority is given to run the business any how, without considering long-term benefits.	To develop employees as a valuable asset. To encourage employees to utilize and improve their knowledge, hone their skills and develop attitude, which contributes to the overall growth of the stakeholders. Seeks training investment as a long-term investment.
Top Management	No HR policy, consider HR investment as a waste of money. Looking for short-term gains.	A clear vision and HR policies to support HRM in the organisation. Committed and devoted for the well being of employees. Consider employees as a business partner rather than a liability.
Training	Very rare, unplanned without considering the capabilities of the employee.	On a continuous basis. Based on the requirements of the job as well as the capabilities of the employee.
Training Methodologies	Learning while doing, chances of errors and may learn wrong practices.	Systematic. Classroom lectures support the work exposure.
Multi-skilling	Not appreciated, not focused	High focus, promotions and upgradations are based on number of skills learned.

In simple terms LMS can be defined as a total business approach designed to identify and eliminate forms of waste in the process of producing goods, service or a combination of both. Typical forms of waste are defects, rework, setup, inventory, waiting, transport etc. Identification of such activities, which do not add any value to the process, termed as waste, and those which directly add value to the process, termed as value adding activities, should be the focus of continuous improvement movement of the organisation. To eliminate the waste, which increases the cost but does not add value to the product, is an ongoing activity in lean organisations. Waste identification is not an easy task. A proper focussed approach and attention has to be provided for such activities. In the beginning it may look easy, but after removing the visible waste it is difficult to locate the hidden waste. For this the knowledge and skills of the workforce must be upgraded regularly. They should be well acquainted with the tools and techniques and latest technology. The continuous improvement leads to end product quality improvement, better overall organizational performance and improved employee morale and customer satisfaction. This not only strengthens the organizational financial conditions but is good for the environment too.

The global competition supports the customers to redefine the value of the product, and the organizations have to fit them in to the newer situations as early as possible. Customer demand for better products at a competitive price should not be considered as a threat, but should be taken as an opportunity for the organizations to identify and eliminate waste. Companies that cannot meet this demand will lose their place in the market and eventually go out of business. In short, lean

means providing customers the product or service they desire when they desire it and in the most effective manner possible. Lean means maximizing the power of human resources to minimize waste to better meet customer demand. The transformation from a traditional manufacturing organisation to a lean organisation is a very slow process and requires much patience at the management level. Proper training and active involvement of the people working in the system can increase the pace of transformation.

Customer demand for better products at a competitive price should be taken as an opportunity for the organizations to identify and eliminate waste.

Example of an Indian Industry

Tough competition is forcing Indian manufacturers to take initiatives for cost cutting and for producing world-class quality on time delivery. With the help of the Confederation of Indian Industries (CII), Automotive Component Manufacturers Association of India (ACMA) has formed a cluster of automobile parts making companies. These clusters aim to provide support for these companies to improve quality, reduce costs and become more competitive. They are applying Total Quality Management (TQM), Total Productive Maintenance (TPM), JIT, Business Process Reengineering (BPR) and Lean Manufacturing as tools to achieve the above goals. The company M/s XYZ Limited is a member of the cluster. The company is a customer-centric organisation. The management is fully devoted to this

goal and continuously engaged in world class benchmarking, LMS, TQM and TPM practices. The ISO-9002 and QS-9000 certification proves this point and in 1997 the company started companywide business process re-engineering to upgrade the products and processes and completed the pilot phase in 1999. To facilitate the above world class manufacturing strategies, appropriate steps were taken by management to modernize the manufacturing facilities.

Four years ago the top management observed that LMS is a complete advanced manufacturing philosophy and it will bring the same benefits to Indian industries as it did in Japan. They realized that to survive in this global market lean principles are a competitive weapon. They clearly visualize the external forces such as highly competitive market, government policies, low volume high variety products, the JIT status of Original Equipment Manufacturers (OEM), uncertainty of orders, and slow pace of infrastructure development in India. At the same time they have to overcome the internal factors such as high lead time/throughput time, low profitability, high rejection, delay in deliveries, high cost of quality, low employee morale, incompetent technology etc. A clear-cut strategic importance for quality and LMS developed an environment in the company right from top to the bottom. The employees know that they have to find out and eliminate waste on a regular basis to become truly a lean company. The team spirit guides the employees to achieve "first time right quality". The top management, inspired by the idea of LMS, studied lean practices under the lean gurus.

The company supplies its product to many automobile manufacturers in India as well as abroad. This 17-year-old company of Rs 120 crore turnover is a Tier 1 supplier of world repute. The demand for its wide range products varies as per the market fluctuation at the OEM's end. The company's products vary in shape, size and material as specified by the OEMs. It has ISO-9002 and QS 9000 certification. The company is a customer-centric organisation. The company is implementing TQM and LMS. The company designed and developed a human resources development plan to support the implementation of LMS. The human factor is well addressed in the company's philosophy:

- People are our true asset base.
- Promoting team-work and innovation
- Enhancing skills through training, providing employees with a career and not just a job.
- Use of world-class technology at design, shop floor and other areas.

- Maintain a reasonable profit and growth level keeping in view the commitments to customers, shareholders, employees and society.

This paper aims to find out the different initiatives taken by this leading Indian auto component manufacturing company to involve its workforce in the improvement programme. The motivated employees are working continuously to find and eliminate waste at every stage to become truly a lean company. The employees work with team spirit and help each other to achieve "first time right quality". TQM, JIT and LMS philosophies are properly woven in the culture of M/s XYZ. To implement these advanced manufacturing philosophies the top management works on:

- Training to all levels of workforce
- Cross functional teams
- Cell working based on pull system in place of push system
- Continuous improvement (Kaizen) and review of performance
- Two-way communication
- Improved process flow through value stream mapping
- Improve equipment reliability through TPM
- Setting concepts on Single Minute Exchange of Die
- Elimination of waste at all levels
- Use of Poka yoke, kanban system (JIT) concept

Lean Cell

To plan, execute and monitor the lean philosophy a lean cell was formed in the organisation. The lean cell reports directly to the Managing Director. The lean cell is a team of lean experts to support different functions. The

Table 3: Middle Management Groups

Team work	Importance to individual work and training	Training to teams as a whole
Project	Teams are permanent	Teams are need-based, inter-disciplinary, not following hierarchy
Decision Making	Top down	Participative
Role of supervisors	Controller of the on-going activities.	Facilitator
Employment	Uncertain	Life-time

Table 4: Skill Inventory Sheet

Sr. No.	Name	Age	Education	Experience		Known processes	Willing to learn new processes
				At XYZ	Total		
01	Sohan	32	I.T.I.	5	7	Turning, Milling	Grinding, H.T.
02	Rashid	28	10 th	8	–	Milling	Turning
03	Girdhari	35	8 th	12	14	Turning	Milling
04	Sagar	40	10 th	15	18	Heat treatment	Milling

lean cell created a sense of ownership among the Value Analysis Groups to own the problems in their area and seeking the solution to eliminate the waste. The lean cell regularly organizes training for the workforce, analyze and monitor the improvements, help the Value Analysis Groups, Quality Circles and implement TPM etc. To assess the training needs of the employees first of all their skill inventory was prepared. A typical example of such skill inventory sheet is shown in Table 3. Based on these sheets a company-wide training programme was chalked out to cover all the employees. The aim was to develop a multi skilled and flexible workforce. The training is focused to develop the workforce to know and perform different work in the manufacturing system. For example persons working on Center Lathe were trained on other machines such as grinding and milling machines. Those who were willing to learn other processes, training in other sections like Forging, Heat Treatment was also provided. The operators were provided on the job training and some theoretical knowledge was given to them through classes/lesson plan.

Middle Management Groups

The supervisory and middle management were divided in four groups named "Aarambh", "Utthan", "Lakshya", and "Ajinkya". A six-day training programme to develop some basic skills required to implement LMS (as per Table 4), was arranged for them. The middle management was also provided training in Failure mode effect analysis (FMEA), Quality Function deployment and Taguchi methods. The group members became experts in their course area after getting intensive training. Management asked volunteers from each group to come forward and provide training to the other employees in their expert area. By this method the total staff was trained in all the basic approach, and a feeling of teamwork and empowerment was developed among the staff members. The course material was translated into easy Hindi so the workers could easily understand it. A training team was formed to give training to the workers in the above areas.

The HRM and Lean Cell continuously work to iden-

tify the training needs of individual as well as cells. Lean cells identify the areas in which individuals need training. Experts/Consultants and Lean cell members organized training programmes and classes. Different quality circles are formed on the shop floor as well as Value Analysis Groups in each department. It is decided by the Lean cell, HRM, and the employees that the following qualities would be developed and nurtured among the team members:

- Knowledge
- Skill
- Attitude
- Discipline

The actions taken to improve the above qualities are shown in Table 5. At the same time training in the area of Statistical Process Control (SPC), total productive maintenance, one piece flow concept, kanban, 5 S, kaizen, quick changeover (SMED) and other tools and techniques of LMS, helped employees to take decisions based on management by facts rather than their assumptions.

Table 5: Expertise of four groups in Basic Approach to become Lean

Group	Training Area
Aarambh	Problem Solving Approach (PSA)
Utthan	Team Building Concept (TBC)
Lakshya	Customer Supply Focus (CSF)
Ajinkya	Business Process Re-engineering (BPR)

The ultimate aim of top management and the lean cell is to create a multi skilled work force. This makes the journey towards lean easy. A multi skilled workforce plays a major role to provide a variety jobs in this uncertain market, where rapid technology changes prove huge investment in automation a big risk. The VAGs meet once in a week to review the status of different activities. Employees are encouraged to give suggestions in their own areas. The Lean cell evaluates the

Table 6: Actions taken to improve the Human Resources

Quality	Action taken by the Management and Employees
1. Knowledge: a. Complete knowledge about own processes, machine, equipment etc. b. Knowledge about other processes. c. Knowledge about customers and supplier's processes and machines. d. Awareness about team/cell goals, objectives. e. Relationship between team goals and organisation goals. f. Linkage of team/organisation goals with customer satisfaction.	Action Plan: a. Process sheets, well-documented operations charts, training sessions and group discussions. b. Job rotation. c. Training sessions and group discussions. d. Two way communication, involvement of all members in the decision-making. e. Vision statement, mission statement, Quality policy, and direct interaction from top to bottom. f. Feedback from customer is displayed to all, and meeting of workers with customers about quality problems etc.
2. Skill: a. Excellence in own job. b. Improvement area identification, Analysis and problem solving. c. Communication/Presentation. d. Time Management. e. Conflict management. f. Team working	Action Plan: a. Documented processes, machines charts, and training. b. Training in PSA, VA, VE and Quality circles and VAG. c. Classes are taken to improve the communication and presentation skills. At the same time the employees are encouraged to prepare reports of the improvement reported in their areas as well as present it in on monthly basis. d. Planning charts/delegation. e. Group decisions. f. Job rotation, Quality Circles and teams, Get-together, departmental picnics.
3. Attitude: a. Commitment towards organizational goals. b. Ownership and accountability c. Team working.	Action Plan: a. Job satisfaction, growth opportunity, transparency and involvement in decision making. b. Empowerment. c. Appreciation.
4. Discipline: a. Attendance b. Cleanliness	Action Plan: a. Incentive schemes, certificates for 100 per cent attendance. b. 5 S charts on shop floor/offices.

suggestions from customer-supplier focus and decides the action plan. A short-term team follows the plan and implements the results. The Lean Cell exhibits achievements of teams on notice boards, which enable other employees to take inspiration. Members from other teams discuss their improvement, achievements, failures, and future plans with other teams.

Benefits

Better quality accompanied by lower production costs, higher and faster throughput, which results in on-time delivery are some of the benefits of proper implementation of JIT and other World Class manufacturing systems (Goyal and Deshmukh, 1992; Nakamura, Sakakibara, and Schroeder, 1998). The material accounts for 60-70 per cent of the operating

cost, the better cooperation between different functions helped the organization to find out the areas of less value addition/Muda. Employees started to identify Muda and eliminate it on a continuous basis with the help of the training provided to them on the various tools and techniques of the Lean Manufacturing System.

The result reflects the immediate benefits gained by the organization achieved through employee involvement in the LMS implementation. As LMS is a slow process, the benefits will be more visible in the long run. Other than the financial benefits the organization benefits on many more fronts. There is a tremendous feeling of belonging and also ownership of the work. The working environment is healthier than last year and team working has reduced fire fighting to a minimum

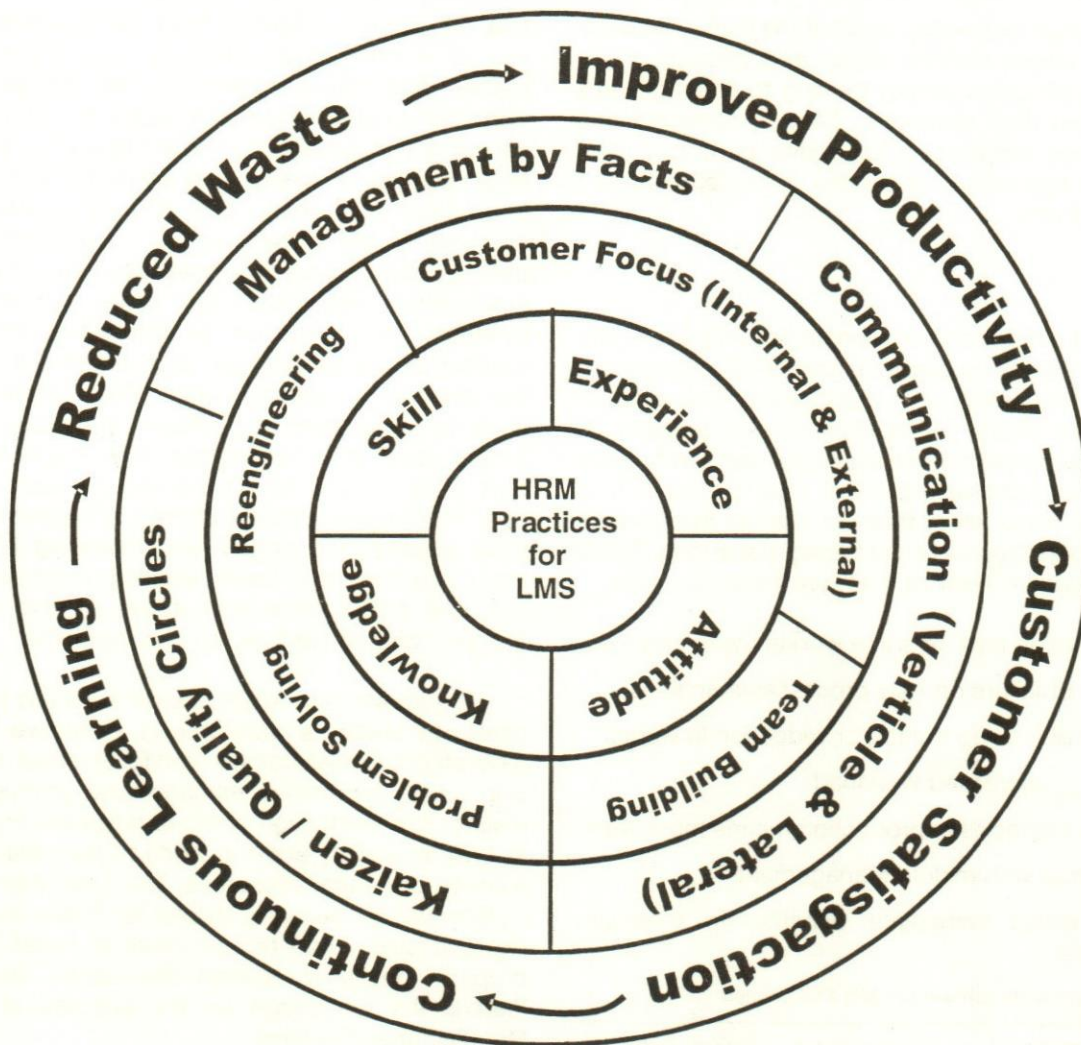


Fig. 1. HRM model of M/s XYZ Limited

level. Now supervisors can concentrate on some strategy issues as the workers perform their jobs seriously and with responsibility. The impact of this can be easily seen in the quality and lead-time of the products. Peer pressure has forced all employees to take part in teams. The improvement is made possible by the whole-hearted efforts of the employees of M/s XYZ Limited. The biggest achievement comes from the increased individual productivity. Every person is motivated to concentrate on waste, he thinks for one piece flow, works in cells/groups. To come to this stage a lot of HRM effort has been put in and as other improvement techniques training is also a never-ending job. The HRM model of M/s XYZ Limited is presented in Figure 1. The HRM practices at M/s XYZ Limited are aimed to implement LMS. The main focus is on customer satisfaction by reducing waste, improving productivity through continuous learning at all levels of workforce. A healthy working environment is created

and decisions are taken based on management by facts rather than on perception. Improvements are made through kaizen and quality circles and vertical and lateral communication helps to achieve it. People are encouraged to solve the problems in teams, always keeping customer (internal and external) in mind. Reengineering processes are used to eliminate non-value-adding activities. The HRM practices utilize the knowledge and experience of its workforce and hone their skills and develop a positive attitude throughout the organization.

The advantages achieved in the organization are summarized in Table 6. Applying small and simple suggestions from the workers reduce the machine cleaning time. Cross-functional teams work on different improvement areas to find out and reduce the waste in value stream. The company encourages its employees for active participation.

The top management supported the lean implementation. They clearly defined vision and mission of the organization, provided proper training to its employees and supported their decisions. They encouraged and motivated their employees for active participation in teams. They regularly monitor the improvements and provide directions.

Difficulties

The most difficult and challenging activity in any improvement strategy implementation is to change the mind-sets of the workforce. It is also a very crucial factor in the success of the whole improvement process. At M/s XYZ Limited even top management had a very good relationship with the workforce. It took almost 6 to 8 months to convince all of them to change their way of the work, which they were practicing since long. There were many reasons. Few of them are listed as under:

- Education level of some workers was very low,
- Fear of failure on new processes/machines,
- Fear of loosing the job or reduction in wages,
- Fear of increased workload.
- Less obstacles in production means more work,
- Mistrust with middle Management
- No direct immediate benefits (in monetary terms)

Table 7: Improvements achieved in M/s XYZ Limited

Area of Improvement	Previous status	Present status
Inventory turn over ratio	7	17
Production per shift	1000 units	1500
Machine shop defects	16,645 PPM	14,100 PPM,
Sales growth without any big investment	–	+ 30 %
Rejection in some areas	40%	1 %
Machine cleaning time on some machines	2 hours	5 minutes

It was also experienced that convincing and changing workers was difficult in initial stage, but once they got convinced they started taking interest in the whole improvement process. In some cases to convince and change staff and middle management was a little bit of a difficult task.

Conclusions

Looking to the global scenario one thing is sure

that the Indian industries have to transform themselves to a lean organization to face the competitive market. Our climatic conditions are not as in Japan. We have enough natural resources, so the automation cannot be a solution to India industries. We have a large number of skilled and unskilled labours, which is available at a cheap rate. A huge population is an obstacle in the growth of our country, but the industries can convert this weakness into a strength. Full automation may lead for higher prices of the products, and because of unemployment a large number of our population cannot afford it. Ultimately the producers have to suffer. The Indian industries have to work hard to achieve the goals by using proper tools and techniques, which are suitable to their work culture, conditions and available infrastructure. The implementation of lean principles requires a solid groundwork, proper understanding of the concept, and culture of team working, employee motivation and participation and above all the willingness and firm commitment of top management.

The above case study shows a way to other companies to utilize its workforce in a creative manner. A motivated and well-trained workforce under the leadership of a committed management produces better results. The elimination of Muda helps the organization, as well as society and the world to face the increasing scarcity of natural resources. The Lean Manufacturing System will be definitely helpful for Indian industries to improve quality and reduce costs at faster delivery. A properly designed Human Resources Development Plan is the foundation for the success of the Lean Manufacturing Systems.

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Why this reluctance to make the change? We fear the process of reeducation!

— Isaac Asimov

Changing Expectations of Working Women: A Survey on Night Shifts in India

S L Kaushal

This study has been conducted on a sample of 150 educated working women to investigate the occupationwise response and attitudes of working women towards the amendment in the Factories Act, 1948, that allow women to work night shifts. A tool was developed on a 5-point Likert scale method, and the data was analysed with the help of mean, SD and t - test etc. From the results it can be concluded that customer care executives, lawyers, and teachers, perceive night shifts favourably, while more or less all women employees indicate approval to work in night shifts.

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World over it is being recognised that women play a paramount role in the socio-economic development of a country. In fact, enhancing the status, position and living conditions of women can accelerate the pace of economic development of a country. Traditionally, a woman's place was at home and she moved within the narrow sphere of her kitchen, cookery, child bearing and rearing responsibilities. Catering to the relatives, in-laws and husband comprised her work and life activities. Moreover, outside work profile was confined to domestic help, secretarial, medical and teaching only.

But now the situation is changing. Modernization and westernization have altered the eating, wearing and living styles of people. The cost of living has gone up and so too has the search for resources and more sources of earning. Trade liberalization has created greater opportunities for educated, professional women as well as men. Crossing all traditional barriers and prejudices, women today work in large numbers be it in manufacturing, service and consumer industries, blue-collar or white-collar work. However, women who enter occupations traditionally reserved for males, have to struggle (Roe and Siegelman, 1964).

With globalisation, there has been an unprecedented spread of the services sector, more so in terms of outsourcing, which has created more employment avenues round the clock, especially for women. The increasing expectations and acquired skills has given women the chance to realize their own potential, exploit talents and exercise choices in terms of how she will live her life. Undoubtedly, women work and want to work to earn and be independent and self reliant. It gives women a way to actualize her self, gain self-esteem and confidence and ultimately attain gender equality. The fact of the matter is that women participation in remunerative work in the formal labour sector has increased significantly in the past decade.

There has been a continuous demand from women organisations to extend the working hours norms. Despite their dual responsibility, women exhibit great enthusiasm to work on equal terms. To achieve this women need to meet the changing standards and requirements of work behaviour, work environment, work potential, work adjustment etc. without undue strain or conflict. The dire need of the hour is to supplement economic reforms with labour reforms to improve efficiency, productivity, production so to meet demand orders in time. In a labour intensive economy like India globalisation has created a lot of pressure to reengineer business practices and rationalize human resources to be competitive. It has led to different hiring, training, compensation, maintenance and utilization norms in general and practices like flexi-time and flexi-work in particular, in tune with developed countries. Thus amendments in Company Law, Industrial Disputes Act and Factories Act, Trade Unions Act etc have been made in law provisions to keep pace with the changing world. A major amendment has been proposed in the Factories Act 1948 to allow women to work at night. But this requires a change in the concerned labour laws and more importantly attitudinal changes in the workforce in a country like India.

Working Women Population in India

As per the 1981 census, females work participation rates were nearly one-third of that of males. The female work participation rate was very low at 22.3% in 1991 against 51.6% for males. The census 2001 has shown a moderate rise of the female work participation rate at 25.6%. But it is certain that their number is increasing day by day. However, employment of women is concentrated in banking, IT, ITES, media, advertising, research and travel. These employ about 20-35 per cent women (Bansal). Lewis (1955) stressed that women benefit even more than men, as they gain freedom from the drudgery of housework. Employment outside the home makes women economically independent and enhances her social standing in both home and society. Her contribution to the family is then more visible, and she also has more voice, because of being less dependent on another (Dreze and Sen, 1995). Shankar (1980) concluded that there had been a remarkable rise in the number of working women in many white collar jobs. Bajaj (1995) found that working women have a higher status. Though the major reasons to go for employment remains economic, still enough women have gone for jobs due to psychological and social needs. Murari and Devi (2003) revealed that significant difference was observed in life satisfaction of working and non-working women. The results showed that employment had a beneficial effect on the life satisfaction of women. Singh

viewed that majority of women were working purely due to economic reasons, and 10% were working to use their knowledge. Gupta and Sruti (1982) found that dual responsibilities of the home and work call for multiple roles, which put great strain on working women. Padavic and Reskin (1990) found that the women experienced sexual harassment, paternalism and functional differentiation at the hands of their male coworkers and supervisors. They further concluded that problems like sexual harassment in the workplace result in lower productivity of women through absenteeism, job turnover and low morale.

Employment had a beneficial effect on the life satisfaction of women.

Ahuja reported that social, religious as well as economic discrimination prevail at the workplace, causing satisfaction/dissatisfaction. Moen (2000) in a study found that women in dual-earner arrangements had reported more stress and overload as well as lower levels of coping/mastery than men. Jain (2000) revealed that work motivation and family values vs family and career values had a negative relationship amongst doctors and bank clerks, while work motivation and career values were positively related but were not significant. Ojha and Rani (2003) indicated that working women significantly scored higher on life stress in comparison to non-working women. Hundal and Bawa (2003) explored that the intensity of psychological problems of professional women is higher than that of non-professional women. Gupta observed that majority of the working women receive full respect as mothers and feel satisfied with their work. But they pointed out that overwork in the office and at the home has a detrimental effect on their health and family matters. It is true that career plays an important role in women's lives, and 87% of them feel that job provides them a sense of independence and raises the status of women in the society.

However, Verbrugge (1986) found an important link between employment and negative health consequences in overload, referring to heavy job demands and multiple role strain. Mannan (1991) investigated the problems of working women in a city. He found that working women face problems like job strain, role conflict, sexual harassment, inadequate household help and financial dependence and other occupational hazards. Mc Daniel (1993) reported that stress arose from lower pay, less job security, lesser mobility prospects, pressures of combining work, home responsibilities and sexual harassment

Table 1: Occupationwise Mean Difference Significance of Working Women Towards Proposed Night Shifts (N = 150)

S.No.	Occupation	N	Mean	SD	Comparison Groups	df	't'
1.	Lawyers	18	108.83	18.73	1&2	28	2.676*
					1&3	38	.144NS
					1&4	49	2.826**
					1&5	50	6.627**
					1&6	47	4.841**
2.	Doctors/Nurses	12	103.5	16.30	2&3	32	2.523*
					2&4	43	.159NS
					2&5	44	9.294**
					2&6	41	7.508**
3.	Teachers	22	108.54	18.06	3&4	53	2.682**
					3&5	54	6.771**
					3&6	51	4.985**
4.	Bank Employees	33	103.18	19.95	4&5	65	9.453**
					4&6	62	7.667**
5.	Customer Care Exec.	34	122.09	20.68	5&6	63	1.786NS
6.	Misc.	31	118.52	21.56			

(NS = Not Significant at .05 level)

(* = Significant at .05 level)

(** = Significant at .01 level)

among working women in Canada. Krishna and Jessica (2005) observed that encouragement of spouse and children helps women to perform and achieve better in their profession. It makes them confident and helps than in coping with home and work demands.

Today the number of educated women has increased tremendously on the one hand and modernization and westernization has made them more career conscious on the other hand. The fact of the matter is that women's earning has a positive correlation with the children's health, nutrition levels and education. Studies have shown that Indian women contribute a much larger share of their earning to basic family maintenance than men. Thus increase in women's income translates more directly to better health and nutrition for children. Improving women's productivity, income and quality of life, implies a multidimensional contribution to overall growth and development.

Recently the Government had proposed certain changes in the labour laws in order to meet the expectations of women as well as the requirements of the industrial world. The present labour laws under the Factories Act 1948 provide that women can be deployed only from 6.00 am to 7.00 pm, but now government has proposed to allow women to work during night shifts in certain sectors.

The following objectives were formulated for the present study:-

- To investigate the occupationwise response and attitudes of working women towards night shifts.
- To point out the perceived benefits of the proposed amendment in the Factories Act, 1948 to working women.

Research Methodology

The sample of the present study consisted of 150 educated working women (in hospitals, courts, colleges, universities, banks, call centres, insurance) from Shimla (HP).

To assess working women's response towards night shifts a tool was developed on a 5-point Likert scale method i.e. those that strongly agree, agree, don't know, disagree and strongly disagree. It used both favourable and unfavourable statements reflecting certain perceptions/feelings/opinions about working during odd hours e.g. 7.00 PM to 6.00 AM. This tool consisted of 35 statements in all, covering major components viz., employment avenues, equal right to work, gender bias, flexibility in work, empowerment, sexual harassment, family related problems and traveling safety, childcare, stress and tension, dignity and honour of women etc.

After collecting the data scoring was done. 5,4,3,2, and 1 score were assigned to positive statements

Table 2: Age-wise Mean Difference in Significance of Working Women's Attitude Towards Proposed Night Shifts (N = 150)

Age Groups	NN	Mean	SD	Comparison Groups	df	't'
1: up to 30 years	76	113.47	20.65	1&2	122	1.105NS
2: (Between 30-40 years)	48	109.17	21.45	1&3	100	.038NS
3: (40+ and above)	26	113.65	20.93	2&3	72	.873NS

(NS = Not Significant at .05 level)

Table 3: Education Qualifications-wise Mean Difference in Significance of Working Women's Attitude Towards Proposed Night Shifts (N = 150)

Group	N	Mean	SD	Comparison Groups	df	't'
Group 1 (10th&Hr.Sec.)	12	114.58	17.56	1&2	60	.998NS
Group 2 (Graduation)	50	108.84	19.20	1&3	98	.165NS
Group 3 (P.Graduation)	88	113.66	22.21	2&3	141	1.34 NS

(NS = Not Significant at .05 level)

categories; strongly agree, agree, don't know, disagree and strongly disagree respectively. Scoring was reversed in case of a negative statement. Thus the sum score on the tool was considered an index reflecting the positive attitude of working women. The higher the score, the more positive the attitudinal behaviour. Maximum score on the tool was $35 \times 5 = 175$ and the lowest score was 35. The percentage weight, mean, standard deviation and t. values have been calculated to analyse the collected data.

Table 1 exhibits that customer care executives (M = 122.09), lawyers (M = 108.83), and teachers (M = 108.54), perceive the changes favourably. Further it shows the groupwise mean difference that (a) lawyers and teachers, (b) doctors/nurses and women bank employees, (c) women customer care executives and miscellaneous women workers did not show marked difference in their attitude towards the amendment in the Factories Act, 1948. However, significant difference in mean score of attitude of working women differed significantly based on their job status. On the basis of significant 't' values and mean scores of various groups it may be said that women lawyers had a more favourable attitude towards the amendment than doctors, nurses and women bank employees, while they had a less favourable attitude than women customer care executives and miscellaneous working women groups.

It is further inferred from Table 1 that doctors and nurses had a less favourable attitude than women customer care executives and miscellaneous working women. Women teachers had a more favourable attitude than women bank employees but a less favourable attitude in comparison to women customer care executives and miscellaneous working women

groups. Women bank employees had a less positive attitude than women customer care executives and miscellaneous working women groups. However, there was no significant difference in women customer care executives and miscellaneous working women in attitude towards the amendment in the Factories Act, 1948.

The perceptions of working women on proposed amendments were obtained and an age-wise analysis is given in table 2 as follows:

Table 2 shows that younger (M = 113.47) and older (M = 113.65) women were more in favour of late night shifts than middle aged women. This is attributed to younger women being more ambitious, energetic, and career conscious and to older women preferring to work extra to meet their economic needs. The women in the middle age bracket may show reluctance to night shifts due to domestic responsibilities like bearing and rearing kids. No 't' value came out to be significant (P.05). It means there was no significant difference in working women's attitude towards the amendment in the Factories Act, 1948, based on the age factor. Although an inspection of the means of the three groups gives the impression that working women who are 40 + years viewed the proposed amendment more positively than working women in the age group of between 30 + and 40 years, this was by chance. In fact, the age factor did not influence the attitude of working women towards the amendment.

Table 3 shows that matriculate (M = 114.56) followed by post-graduate (M = 114.56) women perceived working odd hours favourably than just graduate qualified. It could be attributed to the semi-skilled and skilled manpower requirements. But it is evident from table 3 that the obtained all the three 't' values did not reach the

level of significance (p.05). From this it may be inferred that there were no significant difference in working women's attitude towards the amendment due to variation in their academic qualification. But it can be said that education and skill improvement increases employment avenues.

Benefits of Working in Night Shifts for Women

A change can cause both positive and negative consequences. In order to analyze the perception of working women, the responses of Agree, Don't Know and Disagree were converted into percentages, and the same has been shown as follows:

Table 4: Response Analysis of Working Women on Benefits of Night Shifts at Work Place

Perceived benefit of labour law amendments	SA/A	DN	D/SD
Increase employment avenues for women	92%	5%	3%
Helpful to women working in services & I.T sector	87 %	11%	2%
Help in Empowering women	90 %	5%	5%
Decrease gender bias	60 %	17 %	23 %
Welcoming step towards equal right to work	89 %	4 %	7%
Help in getting better paying jobs for women	84 %	9%	7%
Encourage flexi-time in employment	80%	13 %	7%
Bring flexibility in work	84 %	12%	4%
Improve efficiency of the company	88%	7%	5%
Help organizations to meet their targets	80 %	11%	9%
Suitable to more ambitious working ladies	85 %	4%	11%

It is evident from the table 4 that the amendment in the Factories Act, 1948 will increase employment avenues (92%), will facilitate empowering women (90%), will decrease gender bias in employment (60%), is a welcoming step towards equal right to work (89%), will help in getting better paid jobs for women (84%), and will be helpful to working women in the services and I.T sector only (87%). Other working women felt that the amendment in the Factories Act, 1948 would encourage flexi-time in employment (80%), will bring flexibility in work (84 %), will improve efficiency of the company (88 %), will help organizations to meet their targets (80%), and will suit more ambitious working ladies (85%).

Conclusions

To conclude it has been observed that the number of working women is increasing day by day. Women today have more employment opportunities than ever before. From the results and findings it is concluded that customer care executives, lawyers and teachers, perceive night shifts favourably. It has been found that group wise mean difference (a) lawyers and teachers, (b) doctors/nurses and women bank employees, (c) women customer care executives and miscellaneous women workers did not show much difference in their attitude towards the amendment in the Factories Act, 1948 on working during odd hours. Thus it is inferred that more or less all women employees indicates an approval to work in night shifts.

A large majority of working women felt that the changed working hour norms will increase employment avenues for women, will be helpful to women in services and IT sector, will be helpful in empowering women, help in getting better paying jobs, encourage flexi-time in employment, will bring flexibility in work, will improve efficiency of the company, help the organizations to meet their targets, will decrease gender bias, will suit more ambitious working ladies and is a welcoming step towards equal right to work. However, a majority of the respondents opined that working at night by women should be made applicable to all organizations and demanded adequate safeguards.

It is heartening to note that women will have more choices. The fact of the matter is that women's income is becoming very necessary to households of all types in the face of globalisation and changing economic structures. The need of the hour is economic independence for women. Women appear to have overcome traditional prejudices in order to fulfill new work expectations.

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*A competitive world has two possibilities for you. You can lose.
Or, if you want to win, you can change.*

– Lester C. Thurow

Optimization of Process Sequence and Machine Selection

Satpal Sharma & Ajai Jain

Process sequencing and machine selection are both important areas of the process planning, which affect the quality of the product as well as the production time/cost. This study considers inter-machine transfer times to solve the problem of sequence optimization and machine selection. The optimum sequence corresponds to minimum total production time and the machines corresponding to the optimum sequence are selected with the assistance of the dynamic programming technique. A user interactive software is developed to execute the operation sequence and machine selection step.

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The highest efficiency in any production environment is obtained by manufacturing the required quantity of product by the most economical methods (process and machines), and to obtain it, the management employs process planning, the tool that coordinates all the activities to transform the raw material into a useful product in the most economical and competitive manner. The process planning is the sequence of steps and specifications required to convert a consumer requirement into an end product in the most economical way given the working conditions. It is also referred to as process engineering, material processing, manufacturing activity planning, operation planning and machine routing etc. Generally process planning activities involve machining processes but it is also applicable to other manufacturing processes such as stamping, deep drawing, forging etc.

Process sequencing and machine selection are both important areas of process planning that affect the quality of the product as well as production time/cost. Process sequencing is concerned with determining the order of various operations in which they are to be performed. The rules for operation sequence can be based on various aspects such as (a) sequence based on operation constraints, (b) sequence based on geometry constraints, (c) sequence based on tooling constraints (d) sequence based on geometric tolerancing constraints. The aim of the operation sequencing is to take a set of operation, to apply sequencing constraints and produce a suitable sequence of operations to manufacture a part, by selecting actual tools for each operation from the possible tools provided at the tool selection stage. The sequencing constraints provide a basis for grouping of operations by cut type, operation type as well as minimizing the number of tool changes within the available tool set up for machines.

A large amount of component and company information such as (a) component information e.g. geometry, dimensions, tolerances, material specifica-

tions etc., (b) regions of interest on the component, (c) stock specifications, (d) manufacturing environment information e.g. machines, cutting tools etc., (e) manufacturing methods information, are necessary to enable machine planning decision making.

Machine selection is dependent on different operations requirements; i.e. an optimization should be made on the part level and not on the individual operation level. An operation can be performed on more than one machine. Also, machine selection is dependent on system layout i.e. inter-machine transfer times. Thus, while taking into consideration the inter-machine transfer time, the total production time (i.e. sum of total machining time and total inter-machine time) will be different for different operation sequences. Therefore, it is necessary to solve the problem of sequence optimization and machine selection simultaneously. In the present work, an attempt is made to solve them using the dynamic programming approach.

Literature Review

Several researchers have paid attention to the problem of process sequencing and machine selections separately. For example, Katsundo Hitomi (1977) had developed a model for the optimization of multistage production systems with variable production times and costs. D.R. Hugues and R. Leonard (1983) proposed a model to select the optimum machine tool resource based upon cost per piece. Hsu-Pin (Ben) Wang and Richard A. Wysk (1988) had proposed a model for process planning extraction and formalization. J.J. Bisschop, H. Stegeman and M.E.A. Strikeword (1988) had proposed a model of the sequencing of point operations on a CNC machining centre. Lin Y. and Solberg J.J. (1991) also introduced a similar part process network based on AND-OR graphs. C. Koulamas (1993) had developed a model of operation sequencing and machining economics using heuristic technique and branch and bound method. Cheng-Jung (Thm) and Hsu-Pin (Ben) Wang (1993) had developed an optimal operation planning and sequencing by minimization of tool changeover. Dimitris And Micchel Prochet (1996) had developed a generic petri net model for process planning and sequence optimization.

Literature review reveals that, in the past, no attempt has been made by researchers to solve operation sequence optimization and machine selection simultaneously by taking inter-machine transfer times into consideration. Thus the problem can be stated as given below:

For a given part if operations and their precedence

relationship among the operations as well as machines that can perform the operations are known, optimize the operation sequence and machine selection using dynamic programming technique.

Methodology

Assume there are 'I' operations and 'J' number of machines for a part and all operations are performed on all machines. If no restrictions existed on the sequence of operation, the number of combinations to consider would be equal to $I \cdot J^I$ i.e. the product of I arrangements of operations with J eventualities of machines for each operation. This number rapidly becomes very large when the number of operations and machines are growing and therefore practically intractable. This is the case when all operations are performed independently and the sequence of machines can be changed independently.

This number can be further reduced by imposing the condition of operation precedence. The combinations of J machines are not taken into consideration to further simplify the problem. In such a scenario, the dynamic programming approach is suitable as the number of useful combinations to arrive at the desired optimum may be drastically reduced. However, present work considers only operation sequence combinations (i.e. I) based on operation precedence. It is important to mention that the adopted methodology is also applicable to such parts for which it is not possible to perform all operations on all machines.

Figure 1 shows the drawing of a nut that is to be manufactured. The various operations to be performed and their precedence relationship are shown in Table 1. The machining times of various operations on different machines and inter machine transfer times are shown in Tables 2 and 3 respectively.

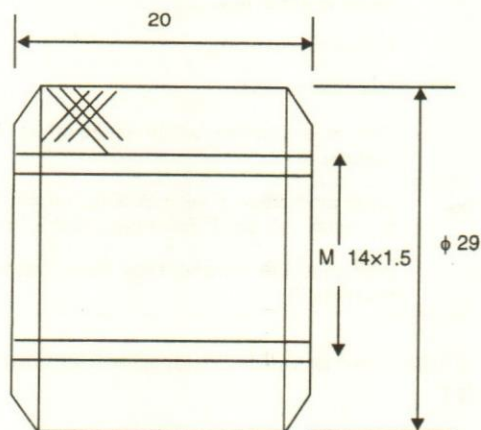


Fig. 1. Part Drawing of a Nut

The various possible sequences are— (a) 1, 2, 3, 4. (b) 1, 3, 2, 4. (c) 1, 3, 4, 2. (d) 3, 1, 2, 4. (e) 3, 1, 4, 2. (f) 3, 4, 1, 2. Table 4 shows the various notations and their description used to illustrate the methodology. The methodology is explained in the following steps:

Table 1: Precedence relationship

Operation	Operation code	Predecessor
Drilling	1	0
Threading	2	1
Knurling	3	0
Chamfering	4	3

Table 2: Machining time table

Machine No./ Operation No.	A	B	C	D
1	82	79.15	77.58	79.84
2	48.88	47.23	46.33	46.88
3	139	130.58	136.38	132.35
4	1.23	1.14	1.1	1.1

Table 3: Inter machine transfer time

Machine No./ Machine No.	A	B	C	D
A	0	2.25	3.63	4.75
B	2.25	0	1.38	2.5
C	3.63	1.38	0	1.13
D	4.75	2.5	1.13	0

Table 4: Notations and their description

Term	Description
$(T)_{I, J1}$	Machining time of operation I on machine J1 which is equal to J.
I	Operation number
J	Machine number
J1	This is a variable which is equal to machine number J.
$(S)_{I, J1}$	Total production time including transfer time up to operation I, up J1 machine which is equal to J.
$(T_{RN})_{J, J1}$	Inter machine transfer time from machine J to machine J1.

Step 1 - Calculation of optimum production time for last operation I

$$(S)_{I, J1} = (T)_{I, J1} \dots \dots \dots \text{eqn. 1}$$

Where I = Operation number and I = 1, 1-1, 1-2, 2, 1.

J1 = Machine number and J1 (=J) = A, B, C, J1.

The optimum production times for last operation (I = 4) using equation 1 are calculated as follows:

$$(S)_{I, J1} = (T)_{I, J1}$$

$$(S)_{4A} = (T)_{4A} = 1.23$$

$$(S)_{4B} = (T)_{4B} = 1.14$$

$$(S)_{4C} = (T)_{4C} = 1.1$$

$$(S)_{4D} = (T)_{4D} = 1.1$$

These values of $(S)_{4A}$, $(S)_{4B}$, $(S)_{4C}$ and $(S)_{4D}$ are updated in the optimum production time table (Table 5) and suffices of S (i.e. 4A, 4B, 4C, 4D) in the machine section table (Table 6). All times are in seconds.

Step 2 - Calculation of optimum production time for other remaining operations

The computation for other remaining operations i.e. I-1, I-2, I-3, 1 is carried out in the following manner—

$$(S)_{I-1, J1} = (S)_{I-0, J} + (T)_{I-1, J1} + (T_{RN})_{J, J1} \dots \dots \dots \text{eqn. 2}$$

For $(S)_{I-1, J1}$ term, J1 varies from A, B, C, J.

For $(S)_{I-0, J}$ term, J varies as A or B or C or J.

For $(T)_{I-1, J1}$ term, J1 varies as A, B, C, J.

For $(T_{RN})_{J, J1}$, J corresponds to previous machine selection and varies as A or B or C or J.

This equation becomes clear with the example part taken in the following discussion. Now integrate the operation 4 with different cutting times of operation 3 using equation 2.

Step 2(A) for operation 3

$$(S)_{I-1, J1} = (S)_{I-0, J} + (T)_{I-1, J1} + (T_{RN})_{J, J1}$$

(i) I-1 = 4-1 = 3, J = A, J1 varies from A to D (J1 = A), for term $(T_{RN})_{J, J1}$ J = A

$$(S)_{3A} = (S)_{4A} + (T)_{3A} + (T_{RN})_{1A}$$

$$(S)_{3A} = 1.23 + 139 + 0 = 140.23$$

(ii) I-1 = 4-1 = 3, J = A, J1 varies from A to D (J1 = B), for term $(T_{RN})_{J, J1}$ J = A

$$(S)_{3B} = (S)_{4A} + (T)_{3B} + (T_{RN})_{1B}$$

$$(S)_{3B} = 1.23 + 130.58 + 2.25 = 134.06$$

(iii) $I-1 = 4-1 = 3$, $J = A$, $J1$ varies from A to D ($J1 = C$), for term $(T_{RN}) J = A$

$$(S)_{3C} = (S)_{4A} + (T)_{3C} + (T_{RN})_{1C}$$

$$(S)_{3C} = 1.23 + 136.38 + 3.63 = 141.24$$

(iv) $I-1 = 4-1 = 3$, $J = A$, $J1$ varies from A to D ($J1 = D$), for term $(T_{RN}) J = A$

$$(S)_{3D} = (S)_{4A} + (T)_{3D} + (T_{RN})_{1D}$$

$$(S)_{3D} = 1.23 + 132.35 + 4.75 = 138.33$$

Out of these values of S_{3A} , S_{3B} , S_{3D} the minimum value is taken which is 134.06 corresponding to S_{3B} . This value is entered into the updated optimum production time Table 5 and suffix of S_{3B} is placed in the machine selection Table 6. The first digit of the element of machine selection table represents the operation number while the second digit represents the machine number. The element 3B of machine selection table represents that operation 3 should be performed on machine B.

Similarly, considering machining times of operation 4 corresponding to machines B, C and D respectively for one loop and calculations are carried out in the same manner as shown above for one loop. The minimum (optimum) production times and corresponding suffixes of S are updated in the optimum production time table (Table 5) and machine selection table (Table 6) respectively.

Step 2(A) for operation 2

For further integration of operation 3 with operation 2, the optimum production times of operation 3 in the updated optimum production time tables are taken and integrated with machining times of operation 2. Inter machine transfer time is taken from machine corresponding to the previous optimum production time (updated in the production time table). Thus integration of previous optimum production times (134.06, 131.72, 133.06, 133.45 and inter machine transfer times from 3B, 3B, 3B, 3D from machine selection table respectively) with machining times of operation 2 on machines A, B, C and D respectively are calculated using equation 2 as shown below:

$$(S)_{I-2, J1} = (S)_{I-1, J} + (T)_{I-1, J1} + (T_{RN})_{J, J1}$$

(i) $I-2 = 4-2 = 2$, $J = A$, $J1$ varies from A to D ($J1 = A$), for term $(T_{RN}) J = B$

$$(S)_{2A} = (S)_{3A} + (T)_{2A} + (T_{RN})_{2A}$$

$$(S)_{2A} = 134.06 + 48 + 88 + 2.25 = 185.19$$

(ii) $I-2 = 4-2 = 2$, $J = B$, $J1$ varies from A to D ($J1 = B$), for term $(T_{RN}) J = B$

$$(S)_{2B} = (S)_{3A} + (T)_{2B} + (T_{RN})_{2B}$$

$$(S)_{2B} = 134.06 + 47.23 + 0 = 181.29$$

(iii) $I-2 = 4-2 = 2$, $J = B$, $J1$ varies from A to D ($J1 = C$), for term $(T_{RN}) J = B$

$$(S)_{3C} = (S)_{4B} + (T)_{3C} + (T_{RN})_{2C}$$

$$(S)_{3C} = 134.06 + 46.33 + 1.38 = 181.77$$

(iv) $I-2 = 4-2 = 2$, $J = B$, $J1$ varies from A to D ($J1 = D$), for term $(T_{RN}) J = B$

$$(S)_{2D} = (S)_{3A} + (T)_{2D} + (T_{RN})_{2D}$$

$$(S)_{2D} = 134.06 + 46.88 + 2.5 = 183.44$$

Out of these values, the minimum (optimum) production time is 181.29 corresponding to S_{2B} and this is updated in optimum production time Table 5 and 2B in the machine selection Table 6. Calculations are carried out in the same manner for the remaining loops. The final updated production time table and machine selection tables are shown as Table 5 and Table 6. If at any stage of integration there exist two optimum production times which are equal then the further optimum production times are calculated in the same manner considering the two optimum production times separately which are updated in two optimum production time tables I and II (optimum production time table I and optimum production time table II) and corresponding machines are updated into two machine selection tables (machine selection table I and machine selection table II). The previous calculations up to tie point will remain same (optimum production times and machine selection), only further calculations will be carried out considering the two optimum production times. Out of the two optimum production timetables, the table corresponding to minimum production time is selected and corresponding machine selection table is selected.

Step 2(A) for operation 1

For further integration of operation 3 with operation 2, the optimum production times of operation 3 in the updated production timetables are taken and integrated with machining times of operation 2. Inter-machine transfer time is taken from machine corresponding to the previous optimum production time (updated in the production time table). Thus integration of previous optimum production times (134.06, 131.72, 133.06, 133.45) and inter-machine transfer times from 3B, 3B, 3B, 3D from machine selection table respectively) with machining times of operation 2 on machines A, B, C and D

respectively are calculated using equation 1.02 as shown below:

$$(S)_{I-3, J1} = (S)_{I-1, J} + (T)_{I-1, J1} + (T_{RN})_{J, J1}$$

(i) $I-2 = 4-2 = 2$, $J = A$, $J1$ varies from A to D ($J1 = A$), for term $(T_{RN}) J = B$

$$(S)_{2A} = (S)_{3A} + (T)_{2A} + (T_{RN})_{2A}$$

$$(S)_{2A} = 134.06 + 48.88 + 2.25 = 185.19$$

(ii) $I-2 = 4-2 = 2$, $J = B$, $J1$ varies from A to D ($J1 = B$), for term $(T_{RN}) J = B$

$$(S)_{2B} = (S)_{3A} + (T)_{2B} + (T_{RN})_{2B}$$

$$(S)_{2B} = 134.06 + 47.23 + 0 = 181.29$$

(iii) $I-2 = 4-2 = 2$, $J = B$, $J1$ varies from A to D ($J1 = C$), for term $(T_{RN}) J = B$

$$(S)_{3C} = (S)_{4B} + (T)_{3C} + (T_{RN})_{2C}$$

$$(S)_{3C} = 134.06 + 46.33 + 1.38 = 181.77$$

(iv) $I-2 = 4-2 = 2$, $J = B$, $J1$ varies from A to D ($J1 = D$), for term $(T_{RN}) J = B$

$$(S)_{2D} = (S)_{3A} + (T)_{2D} + (T_{RN})_{2D}$$

$$(S)_{2D} = 134.06 + 46.88 + 2.5 = 183.44$$

Out of these values, the minimum (optimum) production time is 181.29 corresponding to S_{2B} and this is updated in optimum production time table 5 and 2B in the machine selection Table 6. If at any stage of integration there exists two optimum production times which are equal then the further optimum production times are calculated in the same manner as discussed earlier under step 2 (A) for operation 2.

Table 5: Optimum production timetable

Machine No. Operation No.	A	B	C	D
1	260.25	257.91	259.25	259.04
2	181.29	178.95	180.29	180.33
3	134.06	131.72	133.06	133.45
4	1.23	1.14	1.1	1.1

Table 6: Machine section table

Machine No. Operation No.	A	B	C	D
1	1C	1C	1C	1C
2	2B	2B	2B	2D
3	3B	3B	3B	3D
4	4A	4B	4C	4D

(a) Operation sequence 1, 2, 3, 4

Hence the optimum production time is 257.91.

Perform operation 1 on machine C., Perform operation 2 on machine B., Perform operation 3 on machine B., Perform operation 4 on machine B.

The other operation sequences can be analyzed in the same manner. The final results of other operation sequences are shown in Tables 7 to 16.

Table 7: Optimum production timetable

Machine No. Operation No.	A	B	C	D
1	261.9	257.91	258.35	259.04
3	182.94	178.95	179.39	180.33
2	50.11	48.37	47.43	47.98
4	1.23	1.14	1.1	1.1

Table 8: Machine section table

Machine No. Operation No.	A	B	C	D
1	1C	1C	1C	1C
3	3B	3B	3B	3D
2	2A	2B	2C	2D
4	4A	4B	4C	4D

Table 9: Optimum production timetable

Machine No. Operation No.	A	B	C	D
1	261.9	257.91	258.35	259.04
3	182.94	178.95	179.39	180.33
4	50.11	48.37	47.43	47.98
2	48.88	47.23	46.33	46.88

Table 10: Machine section table

Machine No. Operation No.	A	B	C	D
1	1C	1C	1C	1C
3	3B	3B	3B	3D
4	4A	4B	4C	4D
2	2A	2B	2C	2D

(b) Operation sequence 1, 3, 2, 4

Hence the optimum production time is 257.91.

Perform operation 1 on machine C., Perform

operation 3 on machine B., Perform operation 2 on machine B., Perform operation 4 on machine B.

Table 11: Optimum production timetable

Machine No. Operation No.	A	B	C	D
3	263.28	259.29	256.97	258.65
1	131.32	127.33	125.01	126.69
2	50.11	48.37	47.43	47.98
4	1.23	1.14	1.1	1.1

Table 12: Machine section table

Machine No. Operation No.	A	B	C	D
3	3B	3B	3B	3B
1	1C	1C	1C	1C
2	2A	2B	2C	2D
4	4A	4B	4C	4D

Table 13: Optimum production timetable

Machine No. Operation No.	A	B	C	D
3	263.28	259.29	256.97	258.65
1	131.32	127.33	125.01	126.69
4	50.11	48.37	47.43	47.98
2	48.88	47.23	46.33	46.88

Table 14: Machine section table

Machine No. Operation No.	A	B	C	D
3	3B	3B	3B	3B
1	1C	1C	1C	1C
4	4A	4B	4C	4D
2	2A	2B	2C	2D

Table 15: Optimum production timetable

Machine No. Operation No.	A	B	C	D
3	263.15	259.25	256.97	258.65
4	131.19	127.29	125.01	126.69
1	130.09	126.19	123.91	125.59
2	48.88	47.23	46.33	46.88

(c) Operation sequence 1, 3, 4, 2

Hence the optimum production time is 257.91.

Perform operation 1 on machine C., Perform operation 3 on machine B., Perform operation 4 on machine B., Perform operation 2 on machine B.

(d) Operation sequence 3, 1, 2, 4

Hence the optimum production time is 256.97.

Perform operation 3 on machine B., Perform operation 1 on machine C., Perform operation 2 on machine C., Perform operation 4 on machine C.

(e) Operation sequence 3, 1, 4, 2

Hence the optimum production time is 256.97.

Perform operation 3 on machine B., Perform operation 1 on machine C., Perform operation 4 on machine C., Perform operation 2 on machine C.

(f) Operation sequence 3, 4, 1, 2

Hence the optimum production time is 256.97.

Perform operation 3 on machine B., Perform operation 4 on machine C., Perform operation 1 on machine C., Perform operation 2 on machine C.

Table 16: Machine section table

Machine No. Operation No.	A	B	C	D
3	3B	3B	3B	3B
4	4C	4C	4C	4C
1	1C	1C	1C	1C
2	2A	2B	2C	2D

Table 17: Comprehensive results of various operation sequences

Operation sequence	Optimum production time	Machine selection
1, 2, 3, 4.	257.91	C, B, B, B.
1, 3, 2, 4.	257.91	C, B, B, B.
1, 3, 4, 2.	257.91	C, B, B, B.
3, 1, 2, 4.	256.97	B, C, C, C.
3, 1, 4, 2.	256.97	B, C, C, C.
3, 4, 1, 2.	256.97	B, C, C, C.

Table 17 shows the comprehensive results for the considered operation sequences for the part shown in figure 1. This table clearly shows that the for the minimum production time the optimal sequence (1, 2, 3, 4) or (1, 3, 2, 4) or (1, 3, 4, 2) and corresponding machines are (C, B, B, B) or (C, B, B, B) or (C, B, B, B) respectively.

Figure 2 shows the flow chart of the adopted methodology. The adopted methodology is coded in C under windows environment and executed on Pentium III (700 Mhz) computer. It is a user interactive software. Initially, the user enters the number of operations, their predecessor as well as machines on which the various operations can be performed. The programme generates all operation sequences and displays this to the use for verification. User has the choice to select any one of the operation sequences for which one wants to carry out the machine selection. Subsequently, machining times and inter-machine transfer times are entered into the system in an interactive manner. Again machining times and inter-machine transfer times are displayed to user for verification. These times are stored in an array in the programme. One the programme is executed, the optimum production time table and machine selection tables

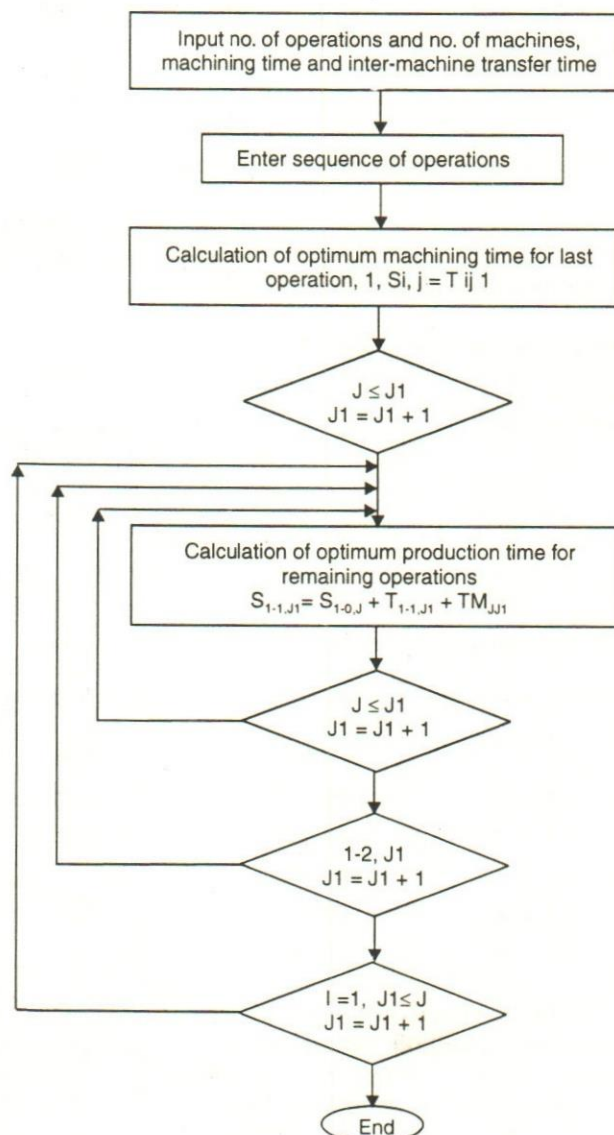


Fig. 2. Flow chart

are displayed to the user. If during execution of the programme, there exists dual value of the optimum production times, the programme shows two optimum production time tables (optimum production time table I and optimum production time table II) and correspondingly two machine selection tables (machine selection table I and machine selection table II) respectively and corresponding to minimum production time, the optimum production time table and corresponding machine selection table is selected. It also shows the various machines on which different operations will be performed for the given operation sequence for optimum production time.

Conclusion

This paper discusses the operation sequence optimization and machine selection and attempts to solve it by dynamic programming approach. The application of the adopted methodology has been demonstrated with the help of three case studies. The methodology developed is general in nature. Although the first two case studies assume that the various operations to be performed on the part should be carried out on all machines, but it is also applicable to cases in which some of the operations can be performed on few machines as depicted by case study III. Thus, the present work can easily be fitted as a module in a generative process planning system.

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Work Posture Assessment of an Engine Bearing Manufacturing Line for Productivity Improvement

Ajay Batish & T.P. Singh

Empirical verification of the existence of positive relationship between the ergonomic design of workplaces and the achieved productivity levels is not easily established, due to the difficulty involved in changing production procedures in a real workshop for research purposes. In this paper, an engine bearing manufacturing company with ISO 9001 and QS 9000 certification was selected, and its productivity results were analyzed after implementing improvement in work processes on the basis of the results and ergonomic evaluation by means of RULA.

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The aim of this study is to investigate the contribution of the ergonomic design of the workplace to the increase in productivity measured in terms of production volumes, quality and machine downtime. The study was carried out in organisations manufacturing engine bearings and bushings for almost all reputed original equipment manufacturers. The organisations selected were QS 9000 and/or ISO 9001 certified firms, which ensured that adequate quality and other productivity records were readily available.

The initial ergonomic analysis was carried out employing the RULA (Rapid Upper Limb Assessment) method. The method breaks down the various activities carried out in the workplace into tasks. The movements of each task of the elements are evaluated by dividing the body into segments. Once all the individual movements have been evaluated, the results are integrated so as to obtain definitive scores for each part of the body, which in turn give rise to an overall ergonomic score or evaluation of the task carried out, ranging from value 1 (acceptable movement) to 7 (changes immediately required). By conducting this process for each task, the tasks which need most urgent action with regard to ergonomic improvement in the workplace design, are identified.

After identifying the tasks with ergonomic problems, a series of improvement actions were then undertaken and implemented, analyzing whether significant improvement in productivity levels take place in parallel as a result of these ergonomic improvements. Also, the results showed that the productivity issues were more predominant for the tasks which had ergonomic problems, than for the rest of the tasks.

Table 1: Resultant operator stress factor for potentially stressful tasks for Bearing Line

Operation/Function	Potentially stressful task	RULA Score	Resulting operator stress factor
Loading of coil on decoiler	Placing the three strip supports on the floor	5	Awkward posture Sustain exertion
	Pulling the loose end of the strip up to the Straightener	6	Forceful exertion
Forming and Coining of parts	Loading of parts into the Magazine Feeder	5	Awkward posture Contact stress
	Set up of 4 single point cutting tools on each of the two chucks	5	Constrained work space Awkward posture
Face and Chamfer of bearings	Holding of two half bearings in the fingers so as to load as a circular bearing	5	Contact stress Forceful exertion
	Loading of bearings on the lower half of the shuttle	5	Awkward posture Sustain exertion
Hole piercing	Set up of die and punch	5	Constrained work space
	Injuries due to accidents at hole piercing	6	Repetitive job Forceful exertion
Lip Punching	Loading of parts with correct orientation into lip punching die	6	Repetitive job Forceful exertion
Wire brushing of the bearing back	Unloading of parts into the pan after wire-brush	5	Awkward posture Contact stress
ID Broaching and Height Broaching	Set up of master nest block and the broach cutters	6	Very forceful exertion Twisting of wrists
	Loading of parts into the die block	5	Contact stress

Empirical Analysis

The study was carried out on the bushing production line by carrying out direct observation of the tasks carried out on the line. The job carried out at each station was broken down into tasks, and further into observable elemental operations. These elemental operations were subsequently evaluated using the RULA methodology. Raw score of observations and calculations carried out for the bushing line to arrive at a grand score using RULA methodology (McAtamney & Corlett 1993) were recorded in the score sheet wherein each operation function was broken down into tasks and then the postures of the workers were studied by video recording and direct observation of the worker's operations performing each task. Thus, applying the RULA methodology to analyze the job or job task at the workplace for ergonomic assessment in order to determine the ergonomic problems, those tasks that had a grand score of more than 5 (those that need most urgent action) were identified. A breakdown of tasks needing immediate changes or an in-depth study was thus carried out. The main causes of the ergonomic problems for those tasks that had a grand score of more than 5 are presented in Table 1.

The past data on productivity and quality indicators were collected from the relevant records, which would form the basis for measuring any quantitative improvement as a result of the improvement actions on the identified problems.

The productivity and quality data for Bearing Line is as shown in Table 2.

Analyses and Development of Appropriate Controls for Problem Tasks

Efforts to develop appropriate controls included suggestions by employees performing the job in question and the team members who performed the analysis. Engineering controls were generally preferred because they eliminate or reduce employee's exposure to potentially hazardous conditions. These controls included changing the workstation layout or tool design, or changing the way the materials, parts, and products are transported to reduce hazards. However, wherever it was difficult to fix the problem using engineering controls, administrative controls of work place modifications were also suggested. Administrative controls include work practices and policies to reduce or prevent employee exposure to hazards, such as scheduling rest breaks, rotating workers through jobs that are physically tiring, training workers to recognize ergonomic hazards, and providing instructions in work practices that can ease the task demands or burden. Concurrent improvements to work practices ensure that employees understand the ergonomic benefit of the changes and promote proper use of the equipment. Work practice modifications may include proper use of work procedures—train operators in the principles of ergonomics to allow them to understand the proper techniques to

Table 2: Productivity and Quality data (Existing) for Bearing Line including plating shop (Average of Jun-Dec, 2002)

	Blank	Form/Coin	Face/ Chmfer	Hole Punch	Lip Punch	Grooving	ID Broach	Height Broach	Plating***
Output per shift	9200	10800	8200	7900	7900	3500	4700	4700	8050
Output per month per machine in Lac pieces	6.90	8.10	4.10	3.95	3.95	1.75	2.35	2.35	6.04
Average output/month	6.56 lac parts per month								
Cycle time norm (1 part per min)	0.029	0.029	0.065	0.039	0.052	0.068	0.065	0.065	-
Set up time norm min.	20+20	35	40	25	25	18	40	40	45
Downtime %	4.2	4.6	8.4	3.6	2.4	5.8	6.6	5.4	4.5
Average Rejection per month (Parts)	2800	4500	5650	950	900	1200	7450	6500	4400
% Rejection to good output	0.41	0.66	0.82	0.14	0.13	0.18	1.08	0.94	0.64
Number of reworked parts	2040 Burr	-	4450 Chf.	-	-	3143 Chf.	7672	6418	-
Rework % age	0.38	-	0.82	-	-	0.58	1.41	1.18	-
Percentage of lots needing 100% sorting/month	-	3.5	6.2	2.0	1.4	-	4.4	26.3*	45**
Sales returned per month Rs lacs	-	-	-	0.15	-	0.36	-	1.42	0.94
Warranty claims	-	-	-	0.2	-	-	-	0.14	0.68
Accident rate - Major	-	-	-	0.5	0.5	-	-	1	-
Accident rate	2	1	4	6	4	2	7	11	3
Absenteeism rate per cent	9	11	17	16	19	9	24	21	18

use while performing tasks. Familiarity with these procedures can reduce operator exposure to ergonomic risk.

Assessment of Bearing Lines

The analysis of ergonomic problem tasks that have been identified after the assessment by RULA for the bearing line is as under:

1. Blanking, Forming and Coining of parts

(i) Task Description: Loading of parts into the Magazine Feeder

The operator at this station is required to load the stacked parts after blanking into a vertical magazine feeder while simultaneously looking at the coining operation, as misfed part into the die can cause accidents, which generally results in damage to the tooling. Replacement of tooling was reported to be expensive and usually takes 3 to 4 weeks. The operator loads the parts with his left hand as shown in figure 1, and simultaneously looks at the coining operation.

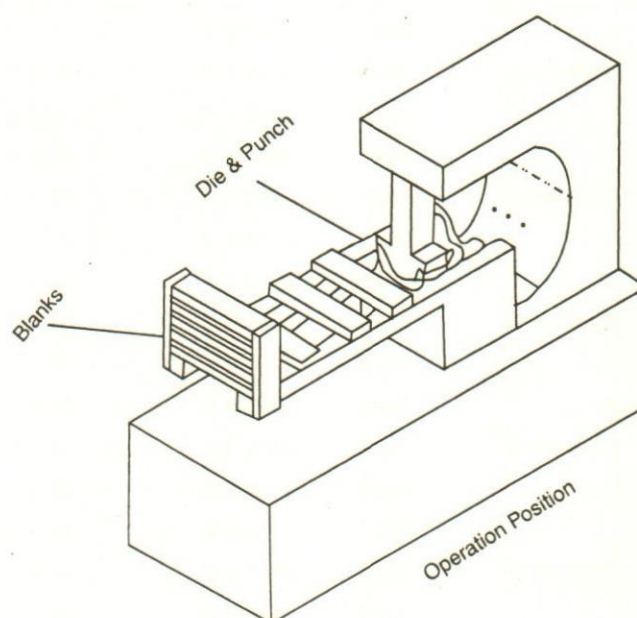


Fig. 1. Forming and Coining of bearings

Ergonomic Deficiencies identified for this task:

The position of the operator as shown in figures 1 and 2 with respect to the feeder results in a neck flexion angle of 45° along with side bending of the neck, which results in an uncomfortable posture. Also, the loading of parts is done with the left hand with lower arm flexion of 90° +, resulting in a high RULA ranking needing immediate attention.

Controls Implemented: After brainstorming, the following controls were implemented:

The work position of the operator has been re-located from existing sideways with respect to the press to the front of the press as shown in figure 3. Thus, the sideways neck bending of the operator to enable him to always look into the die block for any wrong-feeding of parts into the coining die block has been eliminated. A wooden platform of height 9 inches has been provided at the new feeding station to reduce the arm flexion angle to 60°, minimizing the discomfort caused due to loading of parts into the feeder.

The change in the location of the loading station on the press also resulted in another advantage. The

operator at the earlier loading station had to travel a distance of 44 feet after every 15 minutes to inspect the back geometry of the bearing by applying blue colour on the back and then inspecting the back contact percentage under load. The operators working on the press had suggested that the blue checking gauge be shifted closer to his workstation. The gauge however, could not be shifted, because the same gauge is used at all the subsequent operations also, although, the checking frequency at the subsequent operations is at set-up only.

Benefits Accrued/Expected: The revised cycle time for the process reduced from 0.029 minutes to 0.026 minutes for one part. The fatigue allowance was re-calculated at 14 per cent against 20 per cent earlier. See Table 3.

Table 3: Productivity improvement after implementation of controls at forming & Coining

Operation	Fatigue allowance		Cycle time for one part (Mins)		Output per shift	
	Before	After	Before	After	Before	After
Form/ Coin	20%	14%	0.029	0.026	10800	12400

Table 4: Affect of use of fingertips while loading parts into face and chamfer machine

	Shift	No. of loadings per shift on each face pad*	Rotating or sliding out of bearings out of the fingers		No. of loadings per shift	Rotating or sliding out of bearings out of the fingers	
			Loading without fingertips			Loadings with fingertips	
			No of parts	Percentage		No of parts	Percentage
Operator 1	Day 1	2248 × 2	34 ÷ 2	1.51	2180 × 2	8 × 2	0.37
	Day 2	2605 × 2	21 ÷ 2	0.81	2470 × 2	2 × 2	0.08
	Day 3	2422 × 2	42 ÷ 2	1.73	2050 × 2	3 × 2	0.15
Operator 2	Day 1	2087 × 2	26 × 2	1.24	2280 × 2	6 × 2	0.26
	Day 2	2450 × 2	48 × 2	1.96	2440 × 2	6 × 2	0.24
	Day 3	2175 × 2	31 × 2	1.42	2180 × 2	1 × 2	0.05
Operator 3	Day 1	2710 × 2	19 × 2	0.70	2610 × 2	9 × 2	0.34
	Day 2	2108 × 2	27 × 2	1.28	2540 × 2	4 × 2	0.16
	Day 3	1904 × 2	40 × 2	2.10	2450 × 2	5 × 2	0.20
Operator 4	Day 1	2540 × 2	25 × 2	0.98	2250 × 2	1 × 2	0.40
	Day 2	2480 × 2	18 × 2	0.72	2755 × 2	2 × 2	0.07
	Day 3	2350 × 2	38 × 2	1.62	2380 × 2	7 × 2	0.29
Operator 5	Day 1	2440 × 2	33 × 2	1.35	2305 × 2	—	0.00
	Day 2	2310 × 2	19 × 2	0.39	2480 × 2	1 × 2	0.04
	Day 3	2550 × 2	24 × 2	0.94	2610 × 2	—	0.00
		35379 × 2	445 × 2	1.26	35980 × 2	55 × 2	0.15

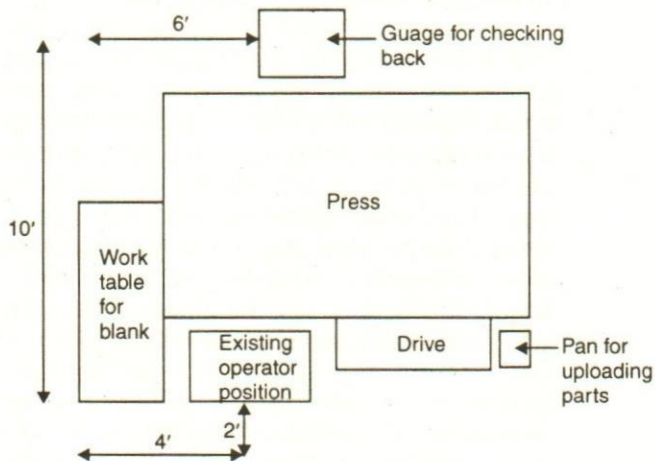


Fig. 2. Existing operator work position on Form and Coin Press

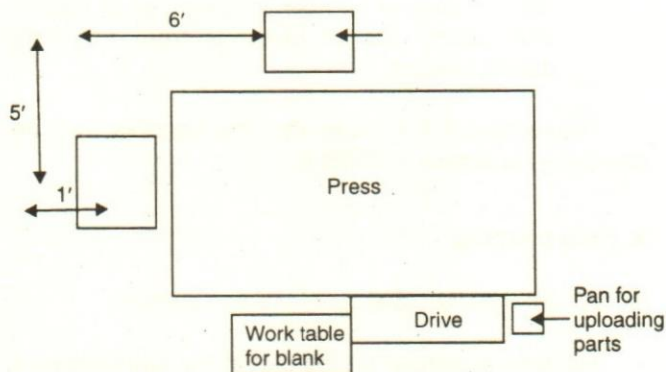


Fig. 3. Proposed operator work position at Forming and Coining

2. Face and Chamfer of bearings

Task Description: Holding of two half bearings in the figures so as to load as a circular bearing.

For loading the parts in the face and chamfer shuttle two half shells are assembled between the fingers and then loaded as a full circular shell in the loading shuttle.

Ergonomic Deficiencies identified for this task:

While assembling the parts between the fingers, the wrist thus get flexed and twisted while the forearm is pronated which may irritate tendon attachments at the epicondyle. The loading of parts in this way is a highly repetitive task and risk of developing hand or wrist disorder is significantly increased for operators performing this task. Also, since the parts are handled between the fingers and the thumb in extended posture, contact stresses are induced at the thumb, index and the middle fingers because of the repeated pressure exerted against the skin. This results in pain and detrimental stress to the hand and also, many times

the parts rotate or slide out of the hands of the operator.

Table 5: Number of Injuries, lost mandays and Compensation Cost

Year	No. of accidents/ MSD'S reported		Number of lost mandays		Compensation cost paid
	Major Injuries	Minor Injuries	Restricted days	Lost days	
1998-99	2	32	240	127	Data not available
1999-00	1	44	187	88	
2000-01	1	41	96	104	
2001-02	1	55	164	78	
2002-03	3	28	115	166	

Table 6: Affect on output without helper, with helper and after mistake proofing

Day	Production output per shift					
	Without helper		With helper		After installation of Light-sensing device	
	Opera- tor 1	Opera- tor 2	Opera- tor 1	Opera- tor 2	Opera- tor 1	Opera- tor 2
Day 1	3460	2980	5715	6118	5825	5740
Day 2	3175	2450	6080	5822	6053	5954
Day 3	3108	2716	5540	5734	5274	5509
Day 4	2614	3115	5366	5584	5775	5815
Day 5	3247	3048	5820	5924	5826	5670
Total	15604	14309	28521	29185	28753	28688
Average	3120.8	2861.8	5704.2	5837.0	5750.6	5737.6

Table 7: Sequence of tasks while loading and unloading on broaching machines

Task	Location	Posture Assessment
Pick up part for loading	Right of the operator using right hand	Neck bending sideways and neck flexion angle of $>20^\circ$ Other body parts in normal position ^o
Load part into the die block	Uses right hand and presses two control switches simultaneously	Neck flexion 20° Body posture normal
Unloading of parts	Unloading pan placed on the left of the operator Uses left hand	Right hands picks up next part for loading Left hand removes the finished part
Put in unloading pan	Uses left hand	The unloading pan is 1.5 feet sideways on the left as shown in figure because of machine drive Operator has to turn asymmetrically at an angle of 75° to place the part

Table 8: Productivity improvement after implementation of controls at ID & Height broach

Operation	Fatigue allowance		Cycle time for one part (Mins)		Output per shift	
	Before	After	Before	After	Before	After
ID/Height Broach	16%	13%	0.065	0.059	4700	5150

Table 9: Revised RULA Score after the implementation of controls – Bearing Line

Operation/Function	Potentially stressful task	Revised RULA Score
Loading of coil on de-coiler	Placing the three strip supports on the floor	3
	Pulling the loose end of the strip up to the Straightener	3
Forming and Coining of parts	Loading of parts into the Magazine Feeder	3
	Set up of 4 single point cutting tools on each of the two chucks	5
Face and Chamfer of bearings	Holding of two half bearings in the fingers so as to load as a circular bearing	4
	Loading of bearings on the lower half of the shuttle	3
Hole piercing	Set up of die and punch	3
	Injuries due to accidents at hole piercing	3
Lip Punching	Loading of parts with correct orientation into lip punching die	2
Wire brushing of the bearing back	Unloading of parts into the pan after wire-brush	3
ID Broaching and Height Broaching	Set up of master nest block and the broach cutters	5
	Loading of parts into the die block	4

Controls implemented: The following controls were implemented:

- Equalizer plates were installed on the machine.
- Acute contact pressure and the resultant mechanical stress on the hand can be reduced by elimination of sharp edges on the bearings. This would mean that the machining or shearing tools used in the previous operations are sharp and do not leave any burr or sharp edges on the parts.
- The operators were advised to wear fingertips although it would be necessary to study the affect of these on gripping of bearings between the fingers. While fingertips did increase friction, they did negatively affect hand forces by adding

to the force necessary to oppose the resistance of the fingertips. Although, it was anticipated that there would be a decrease in the grip strength because of the fingertips, on the other hand, increase in the ability to prevent bearings from rotating or sliding out of the hand was expected. A study was conducted on five facing and chambering operators over a period of three shifts for each operator to investigate the affect of fingertips on handling of parts between fingers for loading into the shuttle. The study was conducted assuming that the use of fingertips has no significant affect on the grip strength in this case. Each of the five operators was observed continuously during the shift for three consecutive days. Table 4 shows the results of the experiment and as can be observed, the use of fingertips resulted in a significant drop of number of instances of rotation and sliding out of bearings from the hand during loading.

The revised RULA score after the controls were implemented is shown in Table 9.

3. Hole piercing

(i) Task Description: Set up of die and punch

The hole is pierced on the part at the specified location using a universal die block in which the necessary set up is made on the press, both for the angular as well as for the axial location of the hole as specified location using a universal die block in which the necessary set up is made on the press, both for the angular as well as for the axial location of the hole as specified in the part drawing.

System Integration

The information collected from the preliminary study and detailed observational analysis of bearing production lines has been used for developing and generalizing the various course of action for implementation using qualitative modeling. The development of this model has been a team effort. The team comprised of executives and supervisors from the engine bearing industry as well as the researcher and his supervisor. A questionnaire was prepared based on the outcomes of literature review, survey and detailed observational studies and was deliberated upon in a brainstorming session attended by all experts. Based on the comments receive from experts during the session qualitative modeling was completed. The outcome of the qualitative modeling is a phasewise implementation strategy proposed to be adopted by the

manufacturing industry for productivity enhancement through integrated work system and job design.

Description of the Manufacturing Facility

Engine Bearings are used in all types of engines and mechanisms for supporting and controlling the motion of the rotating, sliding of reciprocating parts. Bearings are designed to serve the purpose with minimum friction, power loss and generation of heat and are aided in serving these requirements through suitable lubricants.

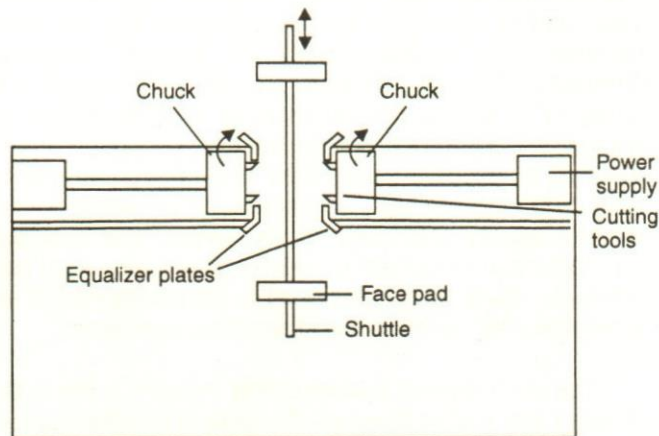


Fig. 4. Face and Chamfer Machine—Equalizer Plates have been installed.

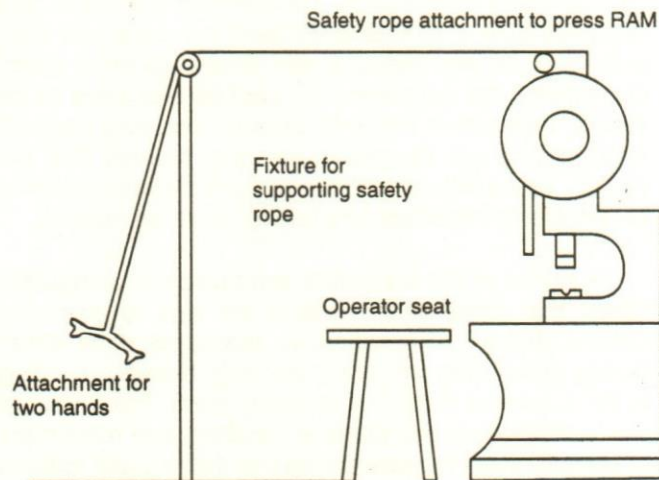


Fig. 5. Safety Arms attached to Hole Piercing Press

Classification of Bearings

Depending on the type of application the engine bearings can be classified as crankshaft bearings, connecting rod bearings, camshaft bearings and bushings. In any engine, a complete set comprising of the above classifications are used. A complete set for an engine contains varying quantities of these parts depending

upon number of cylinders. These bearings are generally used as split halves and a combination of one lower and one upper part during assembly generates the complete bore. The engine bearings are precision components, manufactured in extremely close tolerances, and under normal operating conditions the bearing and moving parts it supports, do not touch and the two are separated by a thin oil film of about 0.002/0.003 mm.

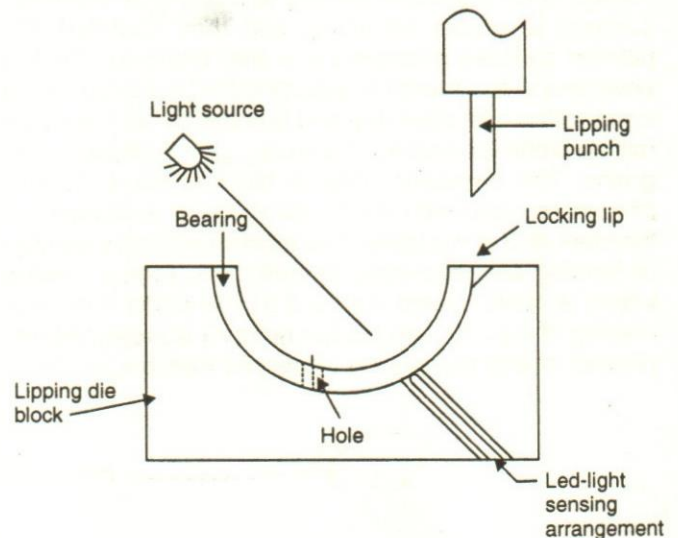


Fig. 6. Incorrect Loading of bearing-Hole reversed with respect to Lip.

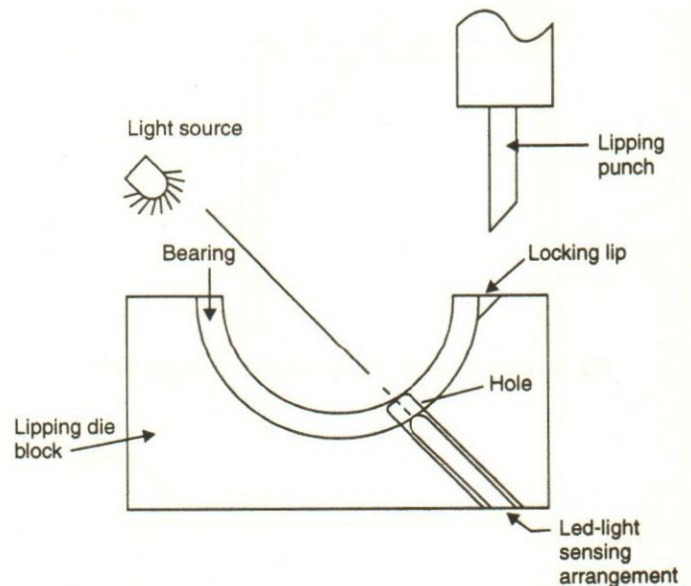


Fig. 7. Installation of Mistake Proofing Device

Manufacturing

The process of manufacturing of these parts is highly specialized considering the intended application of the bearings. The parts are manufactured using a bimetallic

strip, which consists of a bearing alloy bonded through sintering to mild steel strip. The I.D. surface of the bearing possesses the necessary bearing material properties like embed ability, strength, and corrosion resistance. The bearing material used is generally non-ferrous alloy like Cu-Pb-Sn or Al-Sn or Lead based Babbitt material. The alloy is manufactured using the powder metallurgy process where in ingots of the basic raw material are melted in an induction furnace and slurry is atomized, pumped to dryers for drying and then classified into powder particles of desired size after blending. The fine powder is then sintered at around 850° C to form a strong bond with a mild steel strip and is finally rolled in a rolling mill to achieve desired thickness and compaction of grains. The bimetallic strip is blanked on a suitable pneumatic press with identification stamp embossed on the steel side of the blank. The blanks undergo a number of forming and machining operations to form a bearing which is finally plated with a 0.015 to 0.020 mm thick coating of lead, tin and copper before it is inspected and packed in sets comprising of desired matching parts.

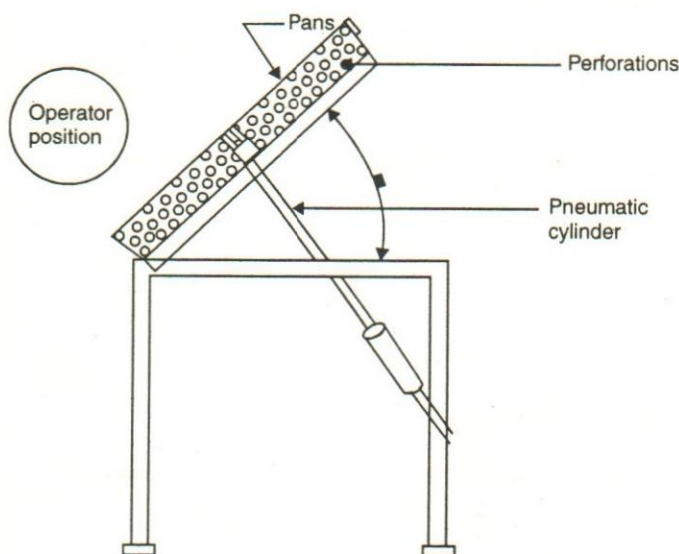


Fig. 8. Loading station inclined at ID and Height Broach

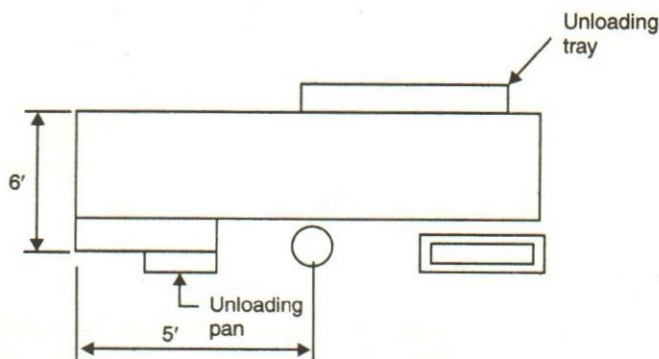


Fig. 9. Intermittent unloading tray on broaching machines

These are many features of this kind of industry, which make it highly complex. The type of machinery and equipment used in such an industry ranges from large induction furnaces and other specialized equipment in the powder plant to 25 to 30 feet long sintering furnaces along with Nitrogen-Hydrogen generation plant to prevent oxidation of strip during sintering besides heavy duty rolling mills and slitting machines. The equipment in the production shops includes power presses, special purpose machining centres, broaches and milling machines, and a state of the art tool room. Plating shop includes an automatic plater with specialized loading racks for bearings besides the tin flash facilities. The manufacturing of powder, sintered bimetallic strip and plating are grouped under the category of special processes since it is impossible to inspect the output without destructive testing, strict adherence to process parameters like temperature, current, time, speed etc. is necessary to achieve the desired quality and productivity levels. The process parameters are qualified by way of experimentation periodically. Close tolerances need to be maintained at all other shearing, forming and machining operations.

The other distinct feature of this industry is the large product mix that is handled. To compete in the market as well as to have a larger market share, these companies manufacture parts for all types of engines. These companies, thus, manufacture close to 1500 different part numbers each month. The packing is done in sets comprising of 2 to 6 different part numbers and non-availability of any one of these, means all other parts, comprising the set cannot be packed and have to be stored. Because of the large product mix, very frequent changeovers are necessary meaning thereby that job design, task analysis and overall work system design is an extremely important function for such an industry.

A review of the scrap rate and customer complaints reveal that most of the rejects are due to damages caused due to mishandling, or mix-up of parts either during processing or during packing, thereby resulting in the customer receiving defective parts. The layout of machines/equipment, material handling and movement of parts through the production line, tooling and fixtures control, identification of parts to prevent mix up, setup times, changeovers and multi-skilling of employees is required to, at an angle of 45° to reduce the neck flexion angle to 10°. This arrangement also resulted in reducing the stress caused by sideways bending of neck.

To eliminate or reduce the stress caused by the unloading of parts into the pan placed on the left of the operator, another intermediary unloading station was fabricated on the top of the slide of horizontal broach, which could accommodate up to 500 parts as shown in

figure 9. The operator after unloading the parts from the die block was asked to place them on the tray provided on the top of the slide and subsequently unload the parts after every 30 to 45 minutes into the pan placed on the left hand side. This has helped reduce the fatigue caused because of asymmetrical turning for putting of each single part into the pan placed on the left hand side. To further eliminate the stress factor, the operators were provided with a 20 inch long magnetic catcher, which could lift 40 to 50 parts at one time and release these parts into the unloading pan after demagnetizing.

Benefits Accrued/Expected: After implementation of the above controls the fatigue allowance was re-calculated using Page's fatigue determination table. The revised allowance allocated was 13 per cent as against 16 per cent existing. The resultant improvement in the cycle time led to an increase in output per shift to 550 parts per shift. See Table 8. The revised RULA score is shown in Table 9.

Productivity enhancement through ergonomic provisions

Table 10 summarizes a brief account of provisions/controls actually implemented in part or full after the analysis of job postures using RULA methodology. From the demonstrated reduction in cycle times, setup times or improvement in work method etc., an assessment of productivity increase at each station on the production lines have been made and tabulated. The difference in productivity before and after implementation of controls has been used to predict the overall effect on productivity after the controls are implemented in full. Output per month has been calculated both for the earlier existing system and after the ergonomic improvement of the workplace as under:

$$Om = \left(\frac{0.95Tas - nTsu}{Tcy + Af} \right) \times (1 - RR) \times Ns \times Nwd$$

Where,

Om is the output per month; Tas is the available time per shift; Tsu is the setup time per shift; n is the number of setups per shift; Tcy is the cycle time of one operation; Af is the fatigue allowance per cycle; RR is the rejection rate calculated in fractions; Ns is the number of shifts per day; Nwd is the number of working days in a month.

The factor of 0.95 is the down time multiplier to net off the available time with regard to a considered down time of 5 per cent.

Table 10: Productivity Improvement through implemented provisions – Bearing Line

Output Station	Output/month- pcs lac		Number of shifts	Rejection %		Other Benefits
	Earlier	Now		Earlier	Now	
Blanking	6.83	8.55	3	0.41	0.25	–
Forming and Coining	8.04	9.28	3	0.66	0.25	–
Face and Chamfer	8.13	8.75	2	0.82	0.60	Reduced contact stress on fingers
Hole Punching	3.60	4.30	2	0.14	0.05	No accidents
Lip Punching	7.19	8.59	2	0.13	0.05	Mistake proofing
ID Broach	6.91	7.57	2	1.08	1.00	–
Height Broach	6.91	7.57	2	0.94	0.90	–

From the output values of each work centre shown in Table 10, output of various lines has been worked out. For this the sequence of operations carried out in each line to convert the bimetallic strip into finished product is considered. The output of the line is determined by the output of the work centre having least output (bottleneck work centre). As can be seen in Table 4, the existing bushing output (before the implementation of controls) was 6.83 lakh parts, constrained by the output from blanking, which had the minimum output. After the implementation of controls, the production is expected to go up to 8.55 lakh parts.

Conclusions

The aim of this study was to empirically analyze the existence of a positive relationship between an ergonomically designed bush manufacturing workplace and its result in terms of productivity. By means of application of the RULA methodology for estimating the adaptation of the workplace to the operator, deficiencies were detected in the work method and improvements were consequently pointed out and implemented. A new work procedure was thus designed that implied lower levels of effort and movement. Once implemented, the productivity and quality records were used to compared the earlier data with each method.

An improvement in the levels of productivity values achieved was observed, as a result of which it can be concluded that ergonomic improvement of the workplace contributed positively to enhancement of productivity, either directly, by simplifying the process,

or indirectly, by reducing the levels of mental and physical fatigue. Ergonomic design may, thus be put forward as an effective tool for improving not only the working conditions in firms, but also results in terms of productivity and quality.

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That writer does the most who gives his reader the most knowledge, and takes from him the least time.

— Charles Caleb Colton

Appraising Organisational Climate for Managing Organisational Role Stress

Anirudh Pandey & K.M. Taruna

This study was conducted on a small sample of a public sector organisation. The results imply that other organisations should alter their existing climates. This would help them to reduce stress and also gain a competitive advantage.

Human life is viewed by behavioural scientists as a continuous dynamic process of interaction and adjustment between the individual and the environment. Research indicates that it is unique in case of each individual. Perception of the same environment differs from individual to individual, and has a major effect on human behaviour. In the present scenario of globalization of business and industry, the impact of personal and cultural variations appear to have a great potential in creating differences and need attention.

When individuals join organisational roles, they are exposed to the same set of goals, structure, leadership style, treatment of people and strategies adopted by the organisation for attaining the organisational goals. Each individual gives his own meaning to these factors. The sum total of these meanings given by individual members to the various attributes of the organisation on the whole is called 'organisational climate'. Organisational climate is defined as the perceived attributes of an organisation and its sub-systems as reflected in the ways an organisation deals with its members, groups and issues (Pareek, 2004). Organisational climate has an enormous influence on organisational effectiveness, role efficacy and role stress.

Seeing strong links between organisational climate and motivating forces, Litwin & Stringer (1968) developed a framework of organisational climate based on six motives: Achievement—characterized by need for excellence; Expert Influence—by concern for making an impact on people; Extension—by concern for others; Control by concern for personal power; Dependency—by concern for assistance of others; and Affiliation—by concern for establishing close personal relationships.

After a comprehensive review of existing research, Pareek (2004) reported links between dominant climates and structures of the organisations. He found

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the six motives characterizing dominant organisational climates of organisations i.e., Achievement characterizing business and industrial organisations; Expert Power-university and research organisations; Extension-community service organizations; Control-bureaucratic government organisations; Dependency-traditional or one man organisations; and Affiliation-social clubs.

On the other hand, stress is defined as a dynamic condition in which an individual is confronted by an opportunity, constraint or demand related to what he/she desires and for which the output is perceived to be both uncertain and important (Robins, 2004). An explanation of this definition would indicate that stress is related to a desire within an individual for achieving something important being uncertain in one's interaction with the environment. Another point of relevance is that the same environment may be taken/perceived as an opportunity, constraint or demand depending upon the individual and perceived environment.

Pandey (1997) developed an acronym for demystifying the concept of stress. It explains the phenomenon as to how the same stress can be perceived by two individuals in complete contrast to each other, by a negative perception of stress and a positive perception of stress.

S = Speed	S = Speed
T = Tension	T = Tension
R = Reaction	R = Reaction
E = Effective	E = Effective
S = Suspended	S = Sure
S = Stress = Distress	S = Success = Eutstress

It would be rational to think that negative or positive perception of the constant environmental changes would be influenced by the desire/motive/need behind achieving something important in the existing environment. Again, what is important and what is not important for the individual or for the organisation would also depend on dominance of needs/motives of the individual and the organisation. Therefore, there appears to be a strong link between desires/motives/needs and feeling of stress and in the degree of its intensity. In order that the employees perceive the global scenario of competition with a positive mindset, most of the companies are paying increasingly greater attention to creating a supportive climate by carrying out wellness programmes for the employees.

In addition, in the present scenario of advanced information technology, to become successful and gain

competitive advantages, traditional organisations are transforming into learning organisations preferring generative learning over adaptive learning and are characterized by a holistic framework, strategic thinking, a shared vision, empowerment, information flow, emotional maturity, learning and synergy. There appears to be a need for the organisations to align the climates which may enable employees to take the changes as an opportunity for growth and prosperity rather than as an obstacle. However, research evidence on the subject appears to be inconclusive. For example, Ivancevitch and Matheson (1980) after a number of reviews of literature have pointed out emphatically that the evidence bearing a relationship between climate factors and stress is speculative and needs to be empirically tested.

An attempt was therefore made to undertake an empirical study on "Appraising Organisational Climate for Managing Organisational Role Stress". The main objectives of the study were as follows:

1. To identify dominant, back up and dormant climates of the participants.
2. To find out three highest stressors in respect to each participant through micro-analysis, and to calculate percentages of individuals afflicted by each of the ten stressors with regard to the first highest, the second highest and the third highest stressor.
3. To take a survey feedback to test the authenticity of responses both on climate and stressors.
4. To find out the relationship between stressors and climates.
5. To suggest the ways to align the climate to reduce stress and succeed in the present scenario of advanced technology.

Methodology

Three interactive HRD workshops on "Appraising organisational climate for managing stress" were conducted on 57 participants. The number of participants was 16 on the first and the second days, and 15 on the third day. The workshops were conducted under standard conditions from 10 a.m. to 1 p.m. and 2 p.m. to 5 p.m. with a break of one hour for lunch on all the days.

Majority of the participants had to their credit B. Tech or B.E. Degrees. Some of them had M. Tech. degrees also. Few of them had acquired even Masters degree in Management during their service period. All of them were male and were working as electrical engineers. They ranged in age from 37 to 58 years. They

had initially joined as class I officers and were holding the positions of Deputy General Managers/General Managers after availing two or three promotions in their cadre.

Design of the Workshop

In the first stage, participants were acquainted with the concept of stress and organisational climate. They were given an opportunity to speak on the challenges facing the organisations. Most of the participants had a negative meaning of stress. They were introduced to the new concept of stress i.e. the positive aspect of stress and also to the bearing of organisational climate on it. They were introduced to the methods for measuring stress and climate. During this session, they were introduced to ORS (Organisational Role Stress) and MAOC (Motivation Analysis of Organisation-Climate) developed by (Pareek 1997). Brief descriptions of the two tools are given below.

Description of Organisational Role Stress (ORS)

The O.R.S. scale was used to measure ten role stressors and overall Role Stress. It is a five-point scale (0 to 4), containing five items for each role stressor and a total of 50 statements. Thus the total scores on each role stressor ranges from 0 to 20 and on ORS from 0 to 200. The responses are given on the answer sheets. To get the total scores for each Role Stressor, the ratings given are added together horizontally (for five items in respect of each stressor).

About Ten Role Stressors

Inter Role Distance (I.R.D.): This stressor is experienced when there is a conflict between organisational and non-organisational roles.

Role Stagnation (R.S.): It is the stressor that arises when one feels that there is no opportunity for one's career progression. It is a feeling of being stuck in the same role for a comparatively long period of time.

Role Expectation Conflict (R.E.C.): This type of stressor is generated by different expectations by different significant persons about the same role and the role occupants ambivalence as to whom to please.

Role Erosion (R.E.): This type of stressor is the function of role occupant's feeling that some functions which should properly belong to his role, are transferred or performed by some other role. This can also happen when the role occupant performs functions but the credit for them goes to someone else.

Role Overload (R.O.): This stressor is experienced when role occupant feels that there are too many expectations from the significant roles. There are two aspects of this stress; the quantitative overload and the qualitative overload.

Role Isolation (R.I.): This stressor is experienced when the role occupant feels that certain roles are psychologically closer to him while others are at a much greater distance. The main criterion of the distance is the frequency and ease of interaction. When linkages are strong then isolation will be low and in absence of strong linkages the role isolation will be high.

Personal Inadequacy (P. In.): This type of stressor arises when the role occupant feels that he does not have the necessary skills and training for effectively performing the functions expected from his role.

Self-Role Distance (S.R.D.): When the role a person occupies goes against his or her self concept then he feels S.R.D. This stressor is essentially a conflict arising out of mismatch between the person and his job.

Role Ambiguity (R.A.): This stress refers to the lack of clarity about the expectation of role which may arise out of lack of information or understanding, it may exist in the relation to activities, responsibilities.

Resource Inadequacy (R.In.): This type of stressor is evident when the role occupant feels that he is not provided with adequate resources for performing the functions expected from him. The scale is reported to have been widely used Saiyadain (2003). It has sufficient psychometric properties. Construct validity of the test for our group in question ranged from 0.138 to 0.564 significant at 0.01 to 0.001 levels.

Motivation Analysis of Organisational Climate (MAOC)

It was designed to study organisational climate with special reference to motives. These are supposed to be changed in the course of interaction of the individual with the organisation. The instrument employs 12 dimensions of organisational climate and the six motives described elsewhere. It consists of 12 categories, each of which includes six statements. Each of these categories corresponds to one of the 12 climate dimensions and each of the six statements represents one of the six motives. Respondents work out individually to rank order the six statements within each separate category according to their perception of how much each statement is like in their organisation (or unit, branch, division or department within the organisation). Ranks are converted into numbers according to proce-

cedure given in the manual (Pareek, 1997). These numbers/scores can range between 12 to 72. Then the respondent refers to the conversion table and writes the corresponding MAOC Index Number which can range between 0 to 100. The first two highest of these indices are called dominant, the second two highest as back up and the lowest two are taken as dormant climates or motives. The scale is reported to possess sufficient psychometric property and is widely used in HRD workshops.

Procedure: Each participant was asked to read the instructions carefully and silently, while the facilitator read the instructions aloud. When the participants gave their confirmation regarding understanding of the methods to be followed for filling up the questionnaire, they were asked to fill up the questionnaire. The facilitator kept an eye on the participants while they filled up their responses, so that no question was left unresponded or unanswered. The participants were then asked to score their responses themselves and write the same on their answer sheets and keep the same with them. Subsequently after a break of five minutes MAOC was administered and scored by the participants themselves. Procedure adopted in administration and scoring of the ORS were scrupulously followed in this test also. Here, respondents were asked to segregate their dominant, backup and dormant scores to assess the comparative strengths of various motives/climates.

In the second stage the facilitator checked their scores personally by personally visiting each individuals desk, without collecting their answer sheets. Then the facilitator guided them to find out three dominant scores among the 10 dimensions of ORS segregate their dominant, backup and dormant stressors. The same procedure was followed in identifying dominant, back up and dormant motives.

In the third stage, the facilitator deeply discussed about the three main stressors and the two dominant motives for the group. The facilitator adopted the basic quality of empathy, warmth, genuineness, listening, responding without irritating and providing feedback. The facilitator formed eight dyads on each day and carried out group discussion.

In the fourth stage a brainstorming session was conducted to verify appropriateness of the dominant motives in reducing stress and succeed in the present set up of environmental changes. With group consensus, the facilitator suggested that the group change their motives hindering individual and organisational progress and also their style of coping with stress.

Results

Comparative strengths of Motives

In order to see comparative strengths of various dimensions of the organisational climate, Means and SDs of climate indices of the six motives were calculated. These are presented in Table 1.

It can be noticed from the table that value of mean in respect to control climate was the highest (58.86). It was followed by value of mean for Dependency (57.91). There appears to be no significant difference between the two means. Based on these values of means, control and dependency can be taken as dominant motives for the group. Values of means in respect of expert influence and affiliation ranked as third and fourth (47.61 and 47.24) may be taken as backup motives, as they are almost similar. Values of means in respect to of extension and achievement motives being the lowest (42.72 and 42.13) were significantly lower to control and dependency. These were taken as dormant motives for the group.

Table 1: Comparative strengths of various dimensions of the organisational climate

Motives	Means	Ranks	S.D.'s
Achievement	42.83	VI	11.27
Expert Influence	47.81	III	10.83
Extension	42.72	V	11.63
Control	58.86	I	14.81
Dependency	57.91	II	10.56
Affiliation	47.24	IV	11.46

Comparative Strengths of Stressors

Table 2 presents comparative strengths of various stressors on individual members of the group arrived at through micro-analysis.

It can be seen that Inter Role Distance was found to be the highest stressor for 10 per cent of the participants and the third highest stressor for 5 per cent of them.

- Role Stagnation was found to be the highest stressor for 5 per cent of the participants, while it was found to be the second highest for 20 per cent and the third highest for 20 per cent of the participants.
- Role Expectation Conflict was found to be the highest stressor for 5 per cent of the participants, the second highest for 15 per cent

Table 2: Comparative strengths of stressors

Stressors	Percentage of participants			
	Highest	Second Highest	Third Highest	Total
Inter Role Distance	10%	Nil	5%	20%
Role Stagnation	5%	20%	20%	45%
Role Expectation Conflict	5%	15%	5%	20%
Role Erosion	50%	5%	15%	70%
Role Overload	5%	Nil	Nil	5%
Role Isolation	10%	20%	15%	45%
Personals Inadequacy	5%	5%	10%	20%
Self Role Distance	Nil	5%	10%	15%
Role Ambiguity	Nil	Nil	Nil	0%
Resource Inadequacy	15%	15%	20%	50%

and the third highest for 5 per cent of the participants.

- Role Erosion was found to be the highest stressor for 50 per cent, the second highest for 5 per cent and the third highest for 15 per cent of the participants.
- Role Overload was found to be the second highest for only 5 per cent of the participants.
- Role Isolation was found to be the highest stressor for 10 per cent the second highest for 20 per cent and the third highest for 15% members of the group.
- Personal Inadequacy was found to be the highest stressor for 5 per cent, second highest for 5 per cent and the third highest for 10 per cent members of the group.
- Self Role Distance was found to the highest stressor in none the second highest for 5 per cent and the third highest for 10 per cent members of the group.
- Role Ambiguity was found to be non-dominant. Neither it was first highest or second highest or the third highest for any member of the group.
- Resource Inadequacy was found to be the highest stressor for 15 per cent the second highest for 15 per cent and the third highest for 20 per cent members of the group.

Based on this micro-analysis, it can be noted that:

- (i) Role Erosion was the most dominant stressor for 70 per cent members of the group.

- (ii) Resource Inadequacy was the second dominant stressor. It affected 50 per cent members of group.

- (iii) Role Isolation and Role Stagnation were the third highest stressor each affecting 45 per cent members of the group.

Analysis of Authenticity of Responses Through Survey Feedback

For checking the authenticity of responses given by participants on O.R.S. every individual/(one by one) was given an opportunity to stand up and report his three dominant (highest) scores among the ten scores and also two dominant scores on climate. He was asked to define the stressor, how it related to his work and how much he agreed with his score. Discrepancies were noticed in 15 per cent to 20 per cent of cases in understanding the conceptual framework of stressor and their relevance to the responsibilities of their roles. Such individuals (one by one) were given an opportunity to again read the relevant items related to their roles and correct their scores themselves. The same procedure was followed in respect to organisational climate. This could be possible due to the presence of two more facilitators assisting the facilitators in the workshop.

Some matters for concern were:

1. *Role Erosion:* After brainstorming sessions, participants attributed various reasons for escalation of the three highest stressors/dominant stressors. For example, for Role Erosion (RE) being the highest stressor through micro analysis (afflicting 70%), participants stated that the importance of their role was eroded very recently due to conversion of their organisation from state government to a public undertaking.

2. *Resource Inadequacy:* As regards Resource Inadequacy which has been rated to be the second highest stressor (afflicting 50%) through micro-analysis, the participants attributed the inadequacy of financial resources hindering updating and keeping pace with latest developments. The participants also attributed government department's failure to pay arrears as a major reason in financial resource crunch.

3. *Role Isolation:* In regard to this dimension rated as the third highest stressor (afflicting 45%) through micro analysis, the participants attributed the government policy of transferring the incumbents from their place of posting to some other places due to which they become isolated from their family, social group and organisational groups.

4. *Role Stagnation*: As regards this dimension, some of the participants had very high qualifications. In addition to their engineering/technical qualifications, they had earned higher management degrees from prestigious institutes but had not been given due consideration for the same in the department.

Relationship of Stressors and Motives

Achievement related negatively with R.E.C. ($r = -0.43$) at 0.01 level

Achievement related negatively with R.A. ($r = -0.46$) at 0.01 level

Expert Influence negatively related with R.S. ($r = -0.38$) at 0.05 level

Expert Influence negatively related with R.E.C. ($r = -0.42$) at 0.01 level

Expert Influence negatively related with P.In. ($r = -0.38$) at 0.05 level

Expert Influence negatively related with R.A. ($r = -0.38$) at 0.05 level

Expert Influence negatively related with O.R.S. ($r = -0.38$) at 0.05 level

Control related positively with R.S. ($r = 0.44$) at 0.01 level

Control related positively with REC ($r = 0.45$) at 0.01 level

Control related positively with P.In. ($r = 0.33$) at 0.05 level

Control related positively with S.R.D. ($r = 0.48$) at 0.01 level

Control related positively with R.A. ($r = 0.45$) at 0.01 level

Control related positively with R.I.N. ($r = 0.34$) at 0.05 level

Control related positively with O.R.S. ($r = 0.45$) at 0.01 level

Dependency positively related with I.R.D. ($r = 0.39$) at 0.05 level

Dependency positively related with R.E.C. ($r = 0.42$) at 0.01 level

Dependency positively related with R.A. ($r = 0.44$) at 0.01 level

Matters for Concern

Positive and significant relationships of Control with

P.In, S.R.D., R.A., R.In and O.R.S. and of Dependency with I.R.D., R.E.C., and R.A. tend to indicate the possibility of increase in the intensity of feeling of stress relating to above mentioned seven stressors with the increase in the strength for the two motives of control and Dependency. By and large, our results are in congruence with Sen (1982), Surti (1982), and Khanna (1986). Keeping in view the fact that Control and Dependency were found to be the dominant motives for the group and that the two motives had positive and significant link with seven stressors and ORS, it can be postulated that in order to reduce the intensity of the feeling of stress relating to the seven stressors and ORS, emphasis on the two motives by the participants are to be moderated and appropriated. According to Pareek (1997)—a control climate seems to lower role efficacy, job satisfaction, organisational commitment, organisational attachment, total effectiveness and foster relatively high level of stress. Beyond the empirical conclusions derived by Pareek, our results are also supported by the findings of a recently conducted study on leadership (Saxena, 2004). In this study, prevailing organisational climate and culture of the Indian organisations were found to be the greatest hindering factors while attempts were made towards developing transformational leadership.

Negative but significant relationships of achievement with R.E.C., R.A., and of expert influence with R.S., R.E.C., P.In., R.A., and O.R.S. tend to indicate that with the increase in the strengths of the said two motives, there is every likelihood that intensity of feeling of stress related with above mentioned stressors and ORS would decrease. Keeping in view that achievement motive was found to be the least preferred motive (sixth rank in hierarchy) by the participants and the empirical findings that the said motive contributes to effectiveness, satisfaction and a sense of internality, the results seem to suggest the need of enhancement in the strength of this motive. As regards expert influence having been accorded the third rank in hierarchy and its potential to enhance organisational attachment together with reduction of intensity of stress, this seems to suggest that with its enhancement, satisfaction and effectiveness would increase. These results offer empirical support to our hypothesis of appropriating the intensity of motives/climates according to requirement. On the whole, these results seem to place an indent on the organisations to make an appraisal/audit of their existing organisational climates for various groups of employees and re-align and moderate them to reduce stress from the workplace and enhance their productivity.

Conclusions and Suggestions

Organisations today are transforming into learning organisations preferring generative learning over adap-

tive learning and are adopting a holistic framework, strategic thinking, a shared vision, empowerment, information flow, emotional maturity, learning and synergy. They fail to assess how these are being perceived at the individual levels. Due to such a lacking on the part of organisations, employees feel stressed. The study although conducted on a small sample of a public sector organisation gives an insight that there is a need of appraising/moderating their prevailing organisational climates. The results imply that other organisations should come forward to go in for appraisal and alternation of their existing climates. This may help organisations to reduce stress from the job place and develop capability in them to gain a competitive advantage. Specifically, the findings of the study are as follows:

1. Achievement and Expert Influence were found to be the dormant motives for the select group of senior level managers. They are supposed to be the role models for the subordinates working under them. HRD interventions should be designed and organized to make these motives dominate organisations.
2. Role Erosion, Resource Inadequacy, Role Isolation and Role Stagnation were found to be dominant stressors in the context of a specific set of role, age, education and experience of the participants. The stressors may differ in other set ups. There is a need to check the stressors in respect of each member of the organisation.
3. Strengths of need for achievement requires to be enhanced to suit to the present scenario of competition.
4. Higher emphasis accorded by higher rank managers on control and dependency is to be reduced and transferred to achievement and expert influence.
5. HRD interventions towards diagnosing organisational climate and their relationship with organisational role stress and stressors need to constantly watched.

6. Development of commitment to the organisation seems to have strong potential to change and align the climate towards reducing stress.
7. Organisations have to transform them into learning organisations from traditional organisations. This will go a long way to reduce stress and align their climate.

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Dreams are renewable. No matter what our age or condition, there are still untapped possibilities within us and new beauty waiting to be born.

— Dale E. Turner

Culture as a Source of Competitive Advantage

Madhuchhanda Mohanty

The present paper is an effort to identify the relationship between corporate culture and the competitive advantage, and it questions whether culture is a source of competitive advantage. Some successful Indian companies have been analysed to see how their cultural uniqueness contributed to their position in the corporate world.

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Competitive advantage has become one of the buzzwords for every aspect of business in the global economy. Deep structural shifts in markets and in economic values are profoundly altering the nature of wealth and its owner. Technology has brought access to a colossal amount of information to the desktop everywhere. Innovation in real time analysis is the order of the day.

Such unrelenting changes blur the view of corporate leaders. They need the benefit of the best thinkers in order to focus on the right global strategies. Though India has made steady progress towards merging into the global market and economy, it may not be adequate to become a global player. A change in priorities needs to occur for corporation as well as for defining policy framework to realize India's potential. New opportunities and technologies have transformed the Industrial economy into an electronic one. Thus there is a need to dwell upon how to adopt strategies to succeed in the digital world. As global competition is shifting from an infrastructure intensive to a knowledge intensive environment, we need to know how to capitalize on our human capital and its pool of knowledge to design and develop the organization for tomorrow. The organizations that have the competitive advantage over others will be the leader. There are various factors which act as competitive advantage, and one such factor is culture.

Culture and its Role in Organisation

Culture refers to the complex whole which includes knowledge, belief, art, morals, laws, customs and other capabilities and habits acquired by an individual as a member of an organization. It is reflected in the way that people in an organization perform tasks, set objectives and administer resources to achieve them. It affects the way that they make decisions, think, feel and act in response to op-

portunities and threats. Culture also influences the selection of people for particular jobs, which in turn affects the way that tasks are carried out and decisions are made. Culture is so fundamental that it affects behaviour unconsciously. Managers do things in a particular way because it is expected behaviour.

How does culture influence the organization?

In the first place, culture creates the types of people who become members of an organization. Culture trains people along particular lines, tending to put a personality stand upon them. Thus, we have Indians, Japanese, Americans, British, Germans and so on. It is not that all people are alike in a particular culture. For people have their own idiosyncrasies and are influenced by heredity, cultural experiences, sub-cultural experiences, family experiences and unique personal experiences. When people with different cultural backgrounds promote, own and manage organizations, they themselves tend to acquire distinct cultures. Thus, the culture of the Tata Group of companies is different from that of the enterprise owned and managed by the Birlas.

Secondly, the attitude of workers towards work is the result of their cultural background. Our workers are known to have a deep-seated apathy towards work. Work is dissociated from results in the belief that results are pre-ordained. Tasks are performed without any interest, dedication or pride. Worse, there is indiscipline at all levels, nagging suspicion of fellow workers, basic mistrust of authority and poor man-management relationships.

Thirdly, time dimension has its roots in culture. Time orientation refers to people's orientation – past, present, or future. In some societies people are oriented towards the past. In others, they tend to be more focused on the present. Still others are futuristic in their outlook. Societies that focus on the present care more for employees on the rolls. Employees are hired and maintained as long as they are useful to the organization and are dispensed with once they cease to be so. Employees training and development, job security, social security and loyalty to the organization are unusual. The American society is an example of this.

Japan is an example of a futuristic society. The Japanese have long-term future-oriented time horizon. When Japanese firms hire employees, they are retained for a long time, even for life. The firm will spend a great deal of money to train them, and there is a strong, mutual commitment on both sides. Societies oriented towards the past, tend to value the acquired heritage. Concepts and actions of the past continue to guide current plans and strategies.

Finally, work ethics, achievement needs and effort-reward expectation, which are significant inputs determining individual behaviour, are the results of culture.

The word ethics is associated with moral principles. In the context of an organization, ethics implies hard work and commitment to work. A strong work ethics ensures motivated employees whereas the opposite is true when work ethics is weak.

Achievement needs, too have a behavioural implication. A person with a high need to achieve tends to seek a high degree of personal responsibility, set realistic goals, take moderate risks and use personal performance feedback in satisfying his or her need to achieve.

It is too well known that a perfect match between effort and reward will produce better performance from an individual. When the individual perceives that he/she has been treated unfairly the performance suffers. This phenomenon is the result of culture.

Corporate Culture

Corporate culture has been defined as "an interdependent set of beliefs, values, ways of behaving, and tools for living that are so common in a community that they tend to perpetuate themselves, sometimes over long periods of time. This continuity is the product of a variety of social forces that are frequently subtle, bordering on invisible, through which people learn a group's norms and values, are rewarded when they accept them, and are ostracized when they do not" (Kotter and Heskett, 1991).

The root of corporate culture is the organization's belief and philosophy about how its affairs ought to be conducted and the reasons why it does things the way it does. A company's culture is manifested in the values and business principles that the management preaches and practices, in its ethical standards and official policies, in its stakeholder relationships (especially its dealings with employees, unions, stockholders, vendors and the communities in which it operates), in the traditions the organization maintains, in its supervisory practices, in employees' attitudes and behaviour, in the legends people repeat about happenings in the organization, in the peer pressures that exist in the organization's politics, and in the chemistry and the vibrations that permeate the work environment. All these sociological forces, some of which operate quite subtly, combine to define an organization's culture (Thompson and Strickland II, 1995).

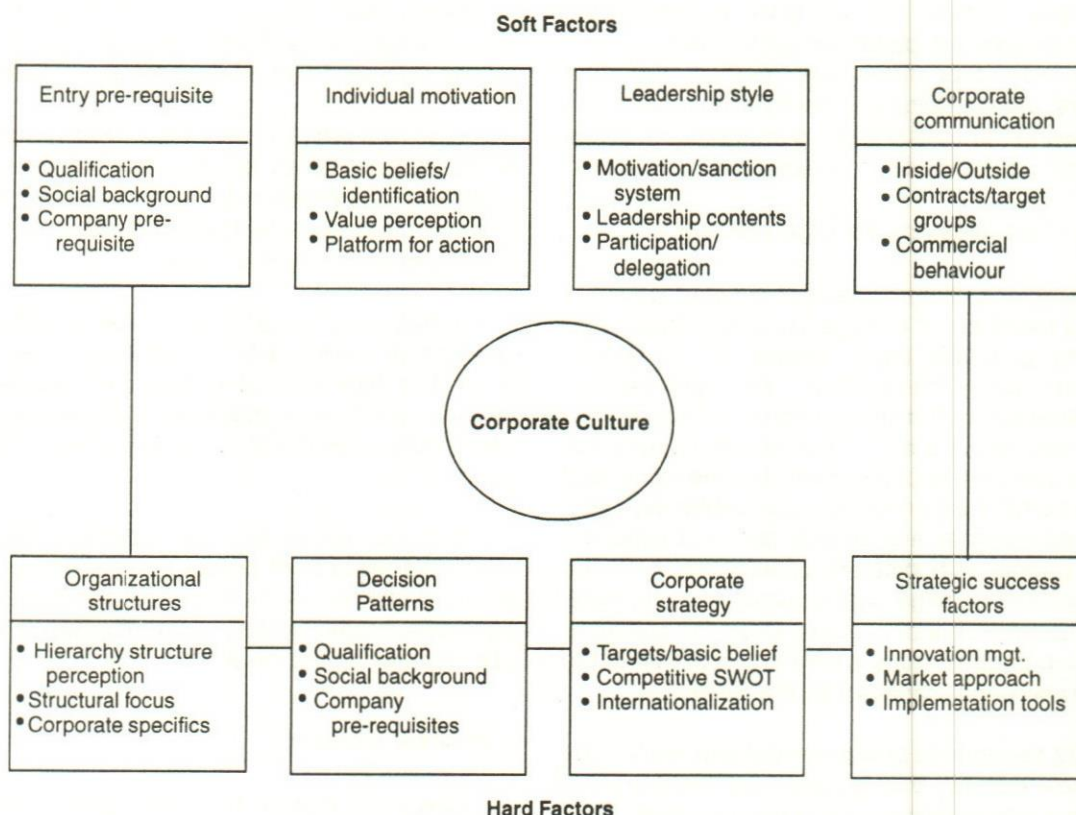


Fig. 1. Factors affecting corporate culture

Beliefs and practices that become embedded in a company's culture can originate from one influential individual, work-group, department or division, from the bottom of the organizational hierarchy or the top. Very often, many components of the culture are associated with founder or other early leaders who articulated them as a company philosophy, a set of principles, which the organization should rigidly adhere to, company policies, a vision, a business strategy, or a combination of these.

Over time, these cultural underpinnings come to be shared by company managers and employees and then persist, as new employees are encouraged to adopt and follow the professed values and practices. A company's culture is a product of internal social forces; it represents an interdependent set of values and behavioural norms that prevail across the organization (Sunita Singh – Sengupta, 1998).

The organizational world is awash with talk of corporate culture and for good reason. Culture has become a powerful way to hold a company together against a tidal wave of pressures for disintegration, such as decentralization, layering, and downsizing. At the same time, traditional mechanisms for integration – hierarchies and control systems, among other devices, are proving costly and ineffective. Culture, then is what

remains to bolster a company that lacks values, direction and purpose. Culture in one word is community. It is an outcome of how people relate to one another. They are built on shared interests and mutual obligations and thrive on cooperation and friendships (Rob-Goffee and Gareth Jones, 1996).

Corporate culture is a product of some hard and soft factors (fig.1) which create and sustain it over time, which influence the action and decision taken by the organization and is reflected through two dimensions (Fig. 2) goal accomplishment and members satisfaction. A framework (Fig. 3) is proposed by taking the above concept into consideration.

The Indian Scenario

Indian organizations are characterized by soft work culture (Singh-Sengupta, 1989,1990,1995a; Sinha, 1990) where workers enjoy surplus power and the managers experience a sense of powerlessness. Such aberration in normative power distribution is more noticed in public sectors as compared to the private owned (Singh-Sengupta, 1991). The Chalta Hai Culture still has its existence. However, the picture in private organizations is not as gloomy. Managers use their authority to a considerable degree. This does not mean

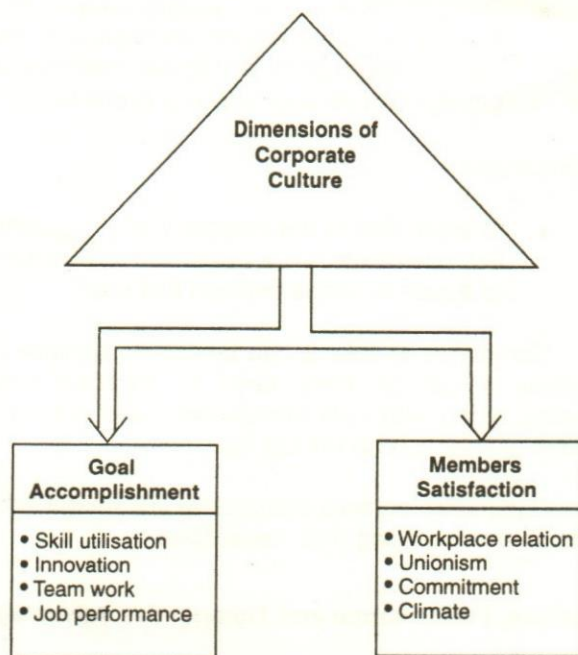


Fig. 2. Dimension of Corporate Culture

that unionism is weak in private organizations. It is very much there but since working in private firms does not give job security, a compliance behaviour is reported.

Once established, a company can be perpetuated by continuity of leadership, by screening and selecting new group members according to how well their values and behaviour fit in, by systematic indoctrination of new members in the culture's fundamentals, by the efforts of the senior group members to reiterate the core values in daily conversations and pronouncements, by the telling and retelling of company legends, by regular ceremonies honouring members who display cultural ideals and by visibly rewarding those who do not. In Procter and Gamble (P&G), applicants for entry-level position undergo an exhaustive application and screening process. The interviewers who will identify the candidates who will best fit in at P&G, are trained extensively via, lectures, videotapes, films, and role plays. The candidates are thoroughly interviewed to adjudge their suitability to fit in organization's culture. P&G values rationality and seeks applicants also who think rationally. All these practices count for success at P&G.

However, crises and new challenges evolve into new ways of doing things. Arrival of new leaders and turnover of key members often spawn new or different values and practices that alter the culture. Diversification into new business, expansion into different geographical areas, and rapid growth that adds new employees can all cause a culture to evolve. For example, once the Maruti car was introduced in the Indian market, it shook up the otherwise sedate passenger car market, and forced other companies to take a more productive stance. Similarly, the economic reforms initiated during the 1990s, as well as the opening up of the global market, forced many companies to attempt changing their cultural orientation.

The culture of any organization is determined by the social milieu in which it is functioning, the history of the organization, the values and beliefs system of the employees, the state policy and the informed groups from where one extracts power. Amongst these, the state policy seems to be the deciding factor as it influences the output of any organization directly. As the policy of the government changes, accordingly the thrust of the company changes. Globalisation has assumed importance in almost every sphere of Indian economy. It brings with it the challenges of change that have a significant management connotation. To compete in the international market the Indian organizations have to transform their work culture into a synergetic one (Singh-Sengupta, 1995). The behaviour of the employees has to be according to the requirements of the organization.

Although it is common to speak about corporate culture in the singular, companies typically have multiple cultures (subcultures). Values, beliefs, and practices can vary significantly by department, geographic location, division, or business unit. A company's subculture can clash, or at least not mesh well, if different organizational units have not yet been assimilated or if different organizational units have conflicting managerial styles, business philosophies, and operation approaches (Sunita Singh Sengupta, 1998).

Company cultures vary widely in the degree to which they are embedded in company practices and behavioural norms. A company's culture can be weak and fragmented in the sense that subculture may exist,

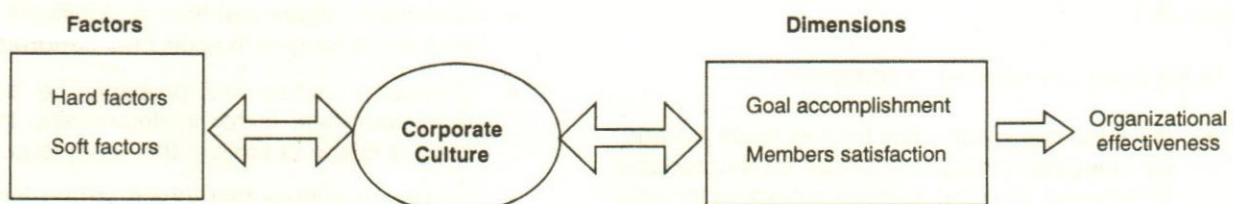


Fig. 3. A Framework of Corporate Culture

with only a few values and behavioural norms. In such cases, organizational members typically have no deeply felt sense of company identity; they view their company as merely a place to work and their job only as a way to make a living. On the other hand, a company's culture can be strong and cohesive in the sense that the company conducts its business according to a clear and explicit set of principles and values, that management devotes considerable time to communicating these principles and values to organizational members and explaining how they relate to its business environment, and that the values are shared widely across the company by senior executives and rank-and-file employees alike. Strong culture companies typically have creeds or values statements and executives regularly stress the importance of using these values and principles as the basis for decisions taken and actions throughout the organization. In strong culture companies, values and behavioural norms are so deeply rooted that they do not change much even a new CEO takes over – although they can erode overtime if the CEO ceases to nurture them (Sunita Singh Sengupta, 1998).

Many Indian companies like MMTC, SAIL, and ACC, saw major changes occurring after new Chief Executive Officers (CEOs) took over.

The Indian organizations have to shift their focus from complacency to competition, from internal orientation to an international approach, from soft work ethics to total work commitment and from traditional management practices to pioneering innovative management practices.

Competitive Advantage

Competitive advantage is a process of identifying developing and taking advantage of enclaves in which a tangible and perceivable business advantage can be achieved. It refers to the ability of an organization to formulate strategies that place it at a favourable position relative to other companies in the industry. Michael Porter has developed his work on industry analysis to examine how a company might compete in the industry in order to create and sustain competitive advantage. In simple terms there are two basic choices:

Choice One

Is the company seeking to compete?

- By achieving lower costs than its rivals are and, by charging comparable prices for its products or services, creating a superior position through superior profitability.

- Through differentiation, adding value in an area that the customer regards as important, changing a premium price, and again creating a superior position through superior profitability?

Choice Two

- In what area is the company seeking competitive advantage? In a broad range of segments or a narrow range perhaps just one?

Combining all this, it can be told to achieve competitive advantage firms need to maintain product quality, along with cost effectiveness and putting customer satisfaction on the top list.

Companies achieve competitive advantage through effectively leveraging their capabilities.

Culture, Performance and Competitive Advantage

Every organization has its own culture. Organizational culture is the product of the organization's features – its people, its success, and its failures. Organizational culture reflects the past and shapes the future. It is the job of the top management to adjust proactively to the culture of the organization. For example, objectives can be achieved in several acceptable ways. This idea is called equifinality, which means; there are usually multiple paths to objectives. The key to success is picking the path that best fits the organization's culture.

A close culture strategy match that energizes people throughout the company to do their jobs in a strategy-supportive manner adds significantly to the power and effectiveness of strategy execution. Strong culture promotes good long-term performance when there is a good fit and hurts performance when there is little fit.

Kotter and Heskett (1992) conducted four studies between August 1987 and January 1991 to determine whether a relationship exists between corporate culture and long-term economic performance. The findings suggested;

- Corporate culture can have a significant impact on a firm's long-term economic performance.
- Corporate culture will probably be an even more important factor in determining the success or failure of firms in the years to come.
- Corporate culture that inhibit strong long-term financial performance are not rare; they develop

easily, even in firms that are full of reasonable and intelligent people.

- Although tough to change, corporate culture can be made more performance enhancing.

Considerable research has focused on the possibility of a link between culture and performance. Such research has shown that to influence performance, organizational culture must be strong. In other words, approval or disapproval must be expressed to those who act consistently or inconsistently with the culture, respectively, and there must be widespread argument on values among the members. Only if these conditions prevail is a link between organizational culture and performance observed. (Y.Weiner, 1998)

William G. Ouchi analyzed the organization culture of three group of firms, which he characterized as typical U.S. firms, typical Japanese firms, and Type Z firms. He argued that the culture of Japanese and Type Z firms help them outperform typical U.S. firms.

Tom Peters and Robert Waterman, in their best seller "In search of Excellence", focused even more explicitly than Ouchi on the relationship between organizational culture and performance. They chose a sample of highly successful U.S. firms and sought to describe the management practices that led to their success. Their analysis rapidly turned to the cultural values that led to their successful management practices. When they say they are in search of excellence, they define excellence, in part as consistently high performance. These authors are seeking cultural explanations of financial success. This economic analysis treats organization culture as one of the variety of tools that managers can use to give some economic advantage to the organization.

Dave Ulrich and Dale Lake in their 1990 book "Organizational Capability: Competing from the Inside Out" present a strong case for improving a company's competitive position by developing employees' commitment to the company's success. Because all corporations have access to the same technology, capital, and strategic capability, the authors argue, competitive advantage must come from employees and their ability to work together. New behaviour such as communication skills, acquiring border knowledge of the business, and willingness to subjugate "empire-building" tendencies for the larger good of the organization, must be learned and practiced. While not easily learned, these behaviours are critical in gaining competitive advantage through the organization (Warren Withelm, 1992).

Barney (1986) has examined the relationship between culture and superior financial performance, argu-

ing that firms record either below normal return (insufficient for long term survival in the industry), normal return (enough for survival, but no more) or superior result which are more than those required for long-term survival. Superior results come from some form of competitive advantage and generating the success.

Culture can, and does generate sustained competitive advantage and hence long-term superior financial performance when three conditions are met;

- The culture is valuable. The culture must enable things to happen which themselves result in high sales, low costs or high margins.
- The culture is rare.
- The culture is imperfectly imitable i.e., it cannot be copied easily by competitions.

Hence, if the cultural factors are infact transferable easily to other organization, can they be the source of superior financial performance? Valuable and rare culture may be difficult if not possible to imitate. For one thing, it is very difficult to define culture clearly particularly in respect of how it adds value to the product/service. For another culture is often tied to historical aspects of company development and to the beliefs, personality and charisma of a particular strategic leader.

Cases of Some Indian Organizations

An attempt has been made to discuss how the existing corporate culture in some Indian organizations has given them competitive advantage over others in order to establish a relationship between culture and competitive advantage.

Sahara India Limited

"Sahara India Pariwar" was established by Subrat Ray Sahara the Managing Worker and Chairman of the company. He started his journey in 1978 from Gorakhpur with just Rs. 2000 as his asset base and three workers with "Sahara parabanking", the first Public Deposit Mobilization Company in the private sector.

His vision is propelled by the belief that "emotion" is the key to success. He defines emotion as and the key that generates required enthusiasm for performance of duties towards others from other's reasonable point of view with strong and sharp sense of duty. Such emotional involvement towards the organization in day-to-day work properly balances the quality, cost and time demands, which give the desired productivity.

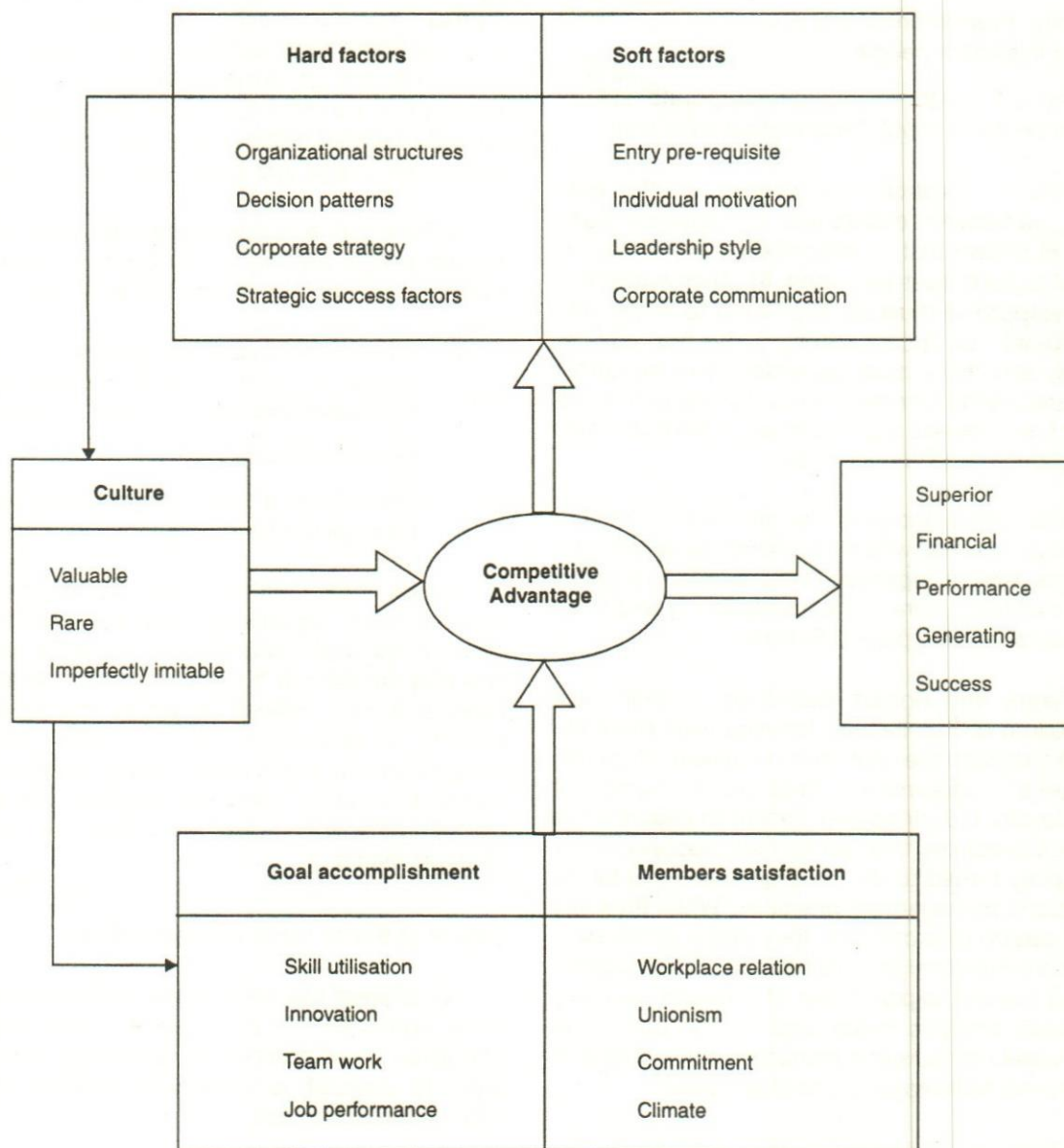


Fig. 4. Relationship between culture and competitive advantage: A Model

From just three workers, an asset base of Rs. 2000, 42 depositors in all and single establishment, the organization has transformed to over Rs. 20,000 crore asset base, more than 6 lakh workers, over 3.2 crore depositors i.e., one out of every 31 Indians, 1635 establishments and a host of other business ventures which include Housing, Media and Entertainment, Aviation, Consumer Products and the upcoming venture of Information Technology. The organization has traversed a journey, which is a lesson for many business organizations.

Some unique cultural features of the company are as follows; -

- One always comes across such remarks as

"We are a family, not just a business organization. We do not act for a company; we work for ourselves, for the growth of our *pariwar*" when talking to a Sahara "karma yogi". That's what sets them apart from rest of the business groups. For, they are guided by "*Emotions*" in an age when "*Professionalism*" is considered to be the key to success. Emotional Involvement decides the degree of productivity. Without emotions you can never give or achieve 100%. "*Professionalism*" is "*Emotionalism*", declared the chairman of the company.

- When approached by a trade union, the Karma

yogi Karyakarta said "you do not need Netas in a family, you need guardians". It is this spirit that moves every Karma yogi at Sahara India Pariwar. They say, "nobody has ever felt the need of a trade union in our family and it does not exist. It is hard to believe that a company with so much at stake could continue to function smoothly without any trade union, even without an owner. There are no employees. All are "members" of an emotionally integrated family. All promoter shareholders, directors and Partners are from the workers' rank and have taken an oath through a notary affidavit in the court of law that neither they nor their family members can ever share the profit or assets of the company. Why will one require a trade union when they get 25 per cent to 50 per cent raise in their gross salary without asking?

- A trade union is simply not needed in an organization where "No Discrimination" is practiced in every aspect. All the members of the organization always travel economy class including the Chairman-cum-Managing worker on foreign trips because they wanted "togetherness". With such a no-discrimination attitude and emotional bonding, it is truly an emotionally integrated family, a family of over six lakhs workers.
- The company has propounded, crafted, and followed the incomparable philosophy of "Collective Materialism" that was brought to the world's notice by BBC in the year 1993, in their programme *India Business Week*. They have always focused on continuous collective growth through collective sharing and caring. That evolved into their Corporate Philosophy. It is this philosophy that has given way to revolutionary corporate guidelines like "Manpower is always superior to money power".

Maruti Udyog Limited

Maruti Udyog Limited (MUL) was established in February 1981 through an act of Parliament, to meet the growing demand of a personal mode of transport caused by the lack of an efficient public transport system. Suzuki Motor Company was chosen from seven prospective partners worldwide. This was due not only to their undisputed leadership in small cars but also to their commitment to actively bring to MUL contemporary technology and Japanese management practices (which had catapulted Japan over USA to the status of the top auto manufacturing country in the world).

The unique features of organizational culture of the company are as follows;

- In MUL employees are considered to be their greatest strength and asset. It is this underlying philosophy that has moulded their workforce into a team with common goals and objectives. Their employee-management relationship is therefore characterized by; Participative Management.
 - Teamwork and Kaizen.
 - Communication and information sharing.
 - Open office culture for easy accessibility.
- To implement this philosophy, they have taken several measures like a flat organizational structure. There are three levels of responsibilities ranging from the Board of Directors, Division Heads to Department Heads. Other visible features of this philosophy are an open office, common uniforms (at all levels), and a common canteen for all. There are no cubicles in the office. The Directors and Divisional managers sit in the open halls along with their subordinates. This arrangement makes communication easier and removes the element of hush – hush and secrecy, which often breeds an atmosphere of conspiracy and intrigue in companies. Everybody right from the chairman down to the lowest paid employee wears the same uniform and eats in the same canteen. This structure ensures better communication and speedy decision-making processes. It also creates an environment that builds trust, transparency and a sense of belonging amongst employees.
- In MUL, there is a strong emphasis on adopting certain norms of work and quality consciousness. There is no question of compromise on issues like Zero defect production, cost cutting, coming in time and system discipline. Maruti Suzuki owners experience fewer problems with their vehicles than any other car manufacturer in India (J.D. Power IQS Study 2004). It scored the highest across all seven parameters: least problems experienced with vehicle serviced, highest service quality, best in-service experience, best service delivery, best service advisor experience, most user friendly service and best service initiation experience.

The highest satisfaction ratings with regard to cost of ownership among all models are all Maruti Suzuki vehicles. The company has made it to the top 10 automotive brands in "Most Trusted Brand survey

2003". *Business World* ranked them as the country's five most respected companies and the country's most respected automobile company in the year 2004.

Tata Steel

Established in 1907, Tata Steel is Asia's first and India's largest integrated private sector steel company. The company commenced production in 1911 with a capacity of 0.1 million tonne of mild steel. By 1958, its capacity increased to 2 million tones. Over the years Tata Steel acquired several companies. Today, Tata Steel produces a wide range of products. In the early 1980s the company initiated a modernization programme for its steel plants. By the mid-1990s, Tata Steel was Asia's first and India's largest integrated steel producer in the private sector. By 2000, eight divisions of Tata Steel had been ISO-14001 certified. By April 2001, Tata Steel became the most profitable steel company in India. The Company has been conferred the Prime Minister's Trophy for the Best integrated steel plant five times from the Indian Ministry of Steel. It was the first Tata Company to win the JRD Quality Value Award, categorizing its operations as "world class" under the Tata Business Excellence Model. It has been ranked among the top four world-class steel companies by World Steel Dynamics, USA, for the past four years. It was also awarded Asia's Most Admired Knowledge Enterprise Award-2003 by Teleos, an independent Knowledge Management company of South Korea. The company's success is attributed to many factors especially to its focus on operational excellence, its branding initiatives and above all the unique organizational culture.

- J.R.D. Tata is the man whose vision and philosophy has created the culture of Tata Steel. His supportive and consultative role, his belief in professionalism, and assumption that only honesty and fair dealings will pay has made the vast Tata empire what it is today. "Get the best people and set them free" was the spirit of the late J.R.D. Tata and this belief shaped the culture of the Tata Conglomerate. It is one of the few companies that maintain townships for its employees even after retirement. It provides a professional and congenial working environment. It has been maintaining cordial employees relations and has one of the longest zero-strike record in Indian corporate sector. It is an ethical organization whose value system that seeks to ensure fairness, honesty, transparency and courtesy to all its constituents and society at large.
- The company has always tried to maintain a good quality of life for its employees. The com-

pany, ahead of any legislation, introduced provident fund, maternity leave, eight-hour working day etc. Similar spirit will continue to guide our future efforts in improving the quality of life of their employees. It is their belief that upholding these values will continue to be the reason for our enduring success and respectability.

- They believe a lot is dependent on the individual spirit and enthusiasm of the employees to realize their vision.
- They recognize and endorse the importance of knowledge a source of innovation and competitive advantage. They wish to leverage all their associations within and outside the company to harness the ideas and provide the means for exchanging and growing knowledge. The company has started efforts to create an atmosphere where free exchange of knowledge is available to its 46000 plus employees and has created the infrastructure to enable this exchange.
- Value-based management to make the core business EVA positive will be highly dependent on innovation. Active and visible encouragement for innovation seeking behaviour will be provided to one and all. A culture of taking calculated risks will be nurtured by allowing the freedom to take those risks without the fear of reprimand for failure.

Cultural values of Tata Steel are reiterated in its Human Resource policy, which is as follows;

- It recognizes that its people are the primary source of its competitiveness.
- It is committed to equal employment opportunities for attracting the best available talent and ensuring a cosmopolitan workforce.
- It will pursue management practices designed to enrich the quality of life of its employees, develop their potential and maximize their productivity.
- It will aim at ensuring transparency, fairness and equity in all its dealings with its employees.
- Tata Steel will strive continuously to foster a climate of openness, mutual trust and teamwork.

Consistent with the vision and values of the founder Jamsedji Tata, Tata Steel strives to strengthen Indian's industrial base through the effective utilization of staff and materials. The means envisaged to achieve this are

high technology and productivity, consistent with modern management practices. Tata Steel recognizes that while honesty and integrity are the essential ingredients of a strong and stable enterprise, profitability provides the main spark for economic activity. Overall, the company seeks to scale the heights of excellence in democratic values. Regarded globally as a benchmark in corporate social responsibility, coupled with its record of 75 years of industrial harmony, Tata Steel's commitment to its employees and the community remains the bedrock of continued sustainability.

Conclusion

The cases of Indian organizations throw some light on how culture can be a source of competitive advantage. Culture and competitive advantage are unquestionably linked. Certain changes in competitive advantage will force cultural change on the organization. Equally it can be argued that certain strategic changes will only be viable if they can be complemented by corresponding culture changes and the difficulties involved may prove to be a limiting factor. Organizations today face increasing competition and more critical scrutiny from investors; managers have been confronted with greater challenges in securing organizational survival and competitive advantage. Today's managers face a conflicting set of demands – they are expected to minimize costs while increasing quality and fostering innovation and creativity. Consequently, they have sought strategies and practices to meet outside pressures. Companies aiming at the spirit of high performance have to be people-oriented. They have to identify the core beliefs or values of their organizations and strive to further those values as the uniqueness of that organizational culture to thrive in today's competitive global market place.

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There is not a road ahead. We make the road as we go. Maybe the journey is not so much a journey ahead but into presence.

— Nellie Morton

Productivity & Efficiency of Urban Cooperative Banks in Uttar Pradesh

Amit Shrivastava

Urban Cooperative banks (UCBs) are a group of 79 banks in Uttar Pradesh. The productivity and efficiency of these banks do not match with the advanced banking environment. Almost all employees feel that modification and modernisation of procedures are required in UCBs. This study shows that it is necessary for employees to be empowered so that they feel more involved in the process of increasing productivity and in improving customer care.

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So long as the capital-deficient, less developed urban cooperative banks (a group of 79 banks with 177 branches), continue suffering from inadequacies of their economic environment and lack of technical know-how, their productivity and efficiency cannot catch up with their counterparts in the advanced banking environment. They have, as such, to adopt, as widely as possible, the modern low-cost techniques used in cooperative banks.

The banking sector, thus, has to increase its credibility and credit worthiness to ensure the adequacy of capital, technology, training and development for their increased efficiency and productivity. Among the practical programmes of rapid and rich banking, therefore, simultaneous improvements in the productivity and efficiency of production factors and organizations should undoubtedly get the top-most priority.

In urban banks of UP, productivity and efficiency problems assume paramount importance. Here, we need a proper combination of higher productivity per employee efficiency and maximum total output with lowest cost, with the object of serving the national objectives of "Growth with stability". Thus, in a fast expanding urban cooperative banking system like in Maharashtra, Gujrat etc, an increase in productivity can be a powerful element of urban banking policy, for increasing a bank's wealth and in raising the standard of working.

The broad objective of this study was to do a systematic inquiry about the strategic responses of the UCBs of UP to the banking reform process. More specifically, the objective of the study was to:-

- Understand the problems of employees and officers
- Record, compare and contrast strategic responses of select banks of UP.

- Examine the behaviour of customers.
- Interviews with office bearers, senior executives and with key middle managers were the most valuable source of information for this study. These interviews provided information of many 'missing links' that were not addressed in the annual reports.

Secondary documentary sources were availed to gather information about regulatory changes in the banking sector. The annual reports of NAFCUB, New Delhi, other statistical records, journals and books on cooperative banks were also referred to as a secondary source of information.

Productivity through other per employee indicators

It has been proved by empirical studies in a number of industries, both in India and abroad, that good industrial relations and policies of motivation help in the improvement of productivity and quality of service. In order to test this, there was a need to carry out a survey to find out the productivity of some branches of UCBs in Uttar Pradesh.

But insufficient data was made available by the branches. With the computerisation of some branches, the waiting time for customers for certain operations had declined and customers were better satisfied. In order to find out about productivity, some regular customers who had been with the bank for five years or more, were contacted. They had the following responses.

Results of survey on bank productivity

Agree

Has the time taken in deposits of funds declined in 2004 compared to 1997-98?	85%
Has the time taken to issue a draft been reduced?	10%
Has the time taken to make entries in a passbook reduced?	97%
Are the bank employees more courteous than before?	37%
Has the overall service of the bank has improved?	50%

The discussions with some of them clearly suggests that time taken in various operations has been reduced over the last few years, which may be considered an improvement of productivity. But this seems largely due to computerisation, rather than a percep-

tible change in the attitude of employees towards work. The employees are said to be as lethargic as before.

While improvement in productivity is due to a change in process thanks largely to computers, most of the branches are still working without computers. When there is a peak season of deposits or payment, customers have to stand in long queues, sometimes for an hour or more, which is very irritating to customers. All in all when services to customers of UP urban banks are compared to other state's urban banks, the productivity is unsatisfactory and customers often complain.

When discussions were held with managers of selected branches, they said their hands were tied, that they were not free to adopt modern techniques and that thus they were not motivated to increase productivity. They said that even if they wanted to increase productivity, they were not able to do so.

Reaction of employees

When employees were contacted to find out about their levels of job satisfaction, their policies and plans for motivation, and how they felt about productivity, they had the following reactions.

Almost all employees felt that procedures in UCBs were stereotyped and needed total modification through computers, ATM, electronic transfer and e-banking. They felt that if modern techniques are adopted, it should be possible to reduce operations in the commercial banks. This, however, would only be possible when the central office changed procedures.

The second reaction was that productivity cannot be measured in terms of the number of entries handled per day or per month. Productivity is greatly dependent upon the number of customers that visit a branch for various operations.

Further, in the opinion of employees, norms should not be similar for big and small branches. In less developed urban areas, customers are not well equipped to deal with banks. Therefore, staff is required to help them in filling various forms for deposits, withdrawals, issuance of drafts etc. Hence the productivity, calculated in terms of number of transactions handled within a day, will vary between developed branches and less developed branches.

The productivity also depends upon the procedure. In some branches of urban cooperative banks, for issuance of drafts, the teller system has been adopted in which the same person accepts the cash and prepares

the draft. In such a teller system, the time taken to issue a draft was less than in places where old procedure is still in vogue. In some big branches there are note-counting machines where time taken to deposit cash is less than in branches where counting is done manually.

Similarly, there are branches where cheques can be dropped in a box along with the form, but there are other branches where cheques have to be handed over to the clerk and receipted, which takes longer.

Improvements Needed

To improve the productivity of bank employees and provide more job satisfaction, a number of steps are needed, including the computerisation of bank work.

Urban banks must study their present process of operations, which they have been following for years. With an increase in the level of education amongst employees and greater awareness amongst customers, there is a need for a detailed study of processes by experts, which should include a comparison with other banks in India and abroad. Even if one compares a cheque deposit form, there are differences. There are certain banks which have only one form for current account and savings account, while other banks have separate forms.

In urban banks, customers are highly dissatisfied with the system of the issuance of a draft. One is required to get a form from a stationery counter, then fill it up, deposit the cash with the cashier and then deposit the form with a draft-issuing clerk, who asks the customer to come back after two to three hours, and thus half the day is wasted. But as already stated there are some banks that issue drafts through teller system, which save a lot of time.

In case of payment of cheques in some urban banks, there is a teller system for payment in selected branches. In this system the same bank employee takes the cheque from the customer and makes a payment. The customer is not required to go from counter to counter. This saves time both for the bank and the customer. But this system has been adopted by only a few branches. If the teller payment system is adopted in all branches for payments up to Rs. 10000, it will increase the productivity of employees and save the time of the customers.

In case of loan applications at present there is no time limit for disposal of applications and employees take their own time. If a responsible time limit is fixed for the appraisal of a loan application, appraisal of credit worthiness of customers forwarding the applications to

a higher officer and total time limit for the disposal of a loan application is fixed, it will help every one and improve banks employees' productivity.

Most of the bank employees face job dissatisfaction because their job is monotonous: They have to handle the same type of job day in and day out. If the seating arrangement of employees is interchanged from time to time, it will have a number of advantages. It will reduce boredom, train staff to handle many types of jobs and will help to reduce fraud and increase their potential.

The urban bank has a scheme of training based on the results of performance appraisal, but there are many employees who are not sent for training because the manager finds it difficult to spare that employee. Thus, if someone is important he/she is denied the opportunity for growth. The system, therefore, needs to be improved and anyone who is selected must be sent for training.

Also, many employees do not take training seriously. They waste their time because in most of the training programmes there are no examinations after the training. If there is system of formal exams or giving marks, it is likely that employees would take the programmes more seriously.

The employees also do not feel satisfied from training. First, they feel that many trainers do not know how to train. Further, employees expect that after training there will be a promotion, but most of the time this does not happen and this leads to frustration.

Innovation is an important motivation in most organizations. But it is almost completely absent in banks, where employees are not allowed to work in any other manner except a set process. If they have any suggestions these have to be forwarded to the central office for acceptance. However, in the matter of assessment of loan applications, the supervisors, credit officers and managers can use innovative systems, but they avoid this so that they are not held responsible if something goes wrong.

At present employees of banks work for the bank only because they have to earn their living. If they are properly trained about social conditions in urban and rural India and are impressed that they are doing good social work for the country, they will be more satisfied and interested in the job.

In the urban banks, except promotion, there is no system of incentives for reward. In many factories if a group of persons produce more than the target, they are rewarded but such a system is almost absent in

banks. The various types of targets are fixed for each branch. When they are achieved, there is hardly any incentive except for a few words of appreciation and praise. But when the targets are not achieved, employees are asked for explanations about the poor achievement and this becomes a negative point in their appraisal report.

In the urban banks, except promotion, there is no system of incentives for reward.

In order to motivate employees, a more positive approach of reward is called for. When targets are exceeded by 10% or more, some monetary reward should be given. Similarly when a target falls short by 10% or less, no explanation should be asked from employees. Moreover, it is necessary that targets for various activities should be fixed in consultation with concerned employees rather than being superimposed. Not only will the employee feel a greater sense of involvement in the bank work, but he will then not claim that the targets were unrealistic.

There is need to make counter work more interesting through greater use of computers. If this is done, those employees working in rural branches will be motivated to improve their performance, as it will brighten their prospects for advancement and promotion.

Bank work is too monotonous. Facilities for recreation are also required. Urban banks have a policy of promoting sports and indoor games and have a provision for books and magazines for staff and their family members. But it has been observed that, except in very large branches, no space is made available for sports and recreation. In smaller branches the allocation of funds is too meagre and with this amount it is not possible to subscribe to even a few newspapers, magazines and journals.

The concept of regular meetings between staff and manager is a part of the system, but these have become rituals. It is necessary to activate them and there must be a larger allocation of funds for recreation and sports facilities.

Banks have provided many facilities to its employees, such as cheap interest loans for house construction, loans for purchase of consumer durables, marriage and education of children, which motivates employees to be better and work better. But again, this only motivates those that need to avail such facilities.

Conclusion

Inefficiency in delivering the service to customers has a direct bearing on the bank's success. Therefore, all possible efforts should be made to motivate employees to deliver their best. It is necessary that employees should be empowered so that they feel more involved in increasing the productivity and serving the customers better. The system of quality circle has proved very successful in the industry, which should be developed in banks in a big way. These circles may give suggestions for better customer care, fraud prevention, cost reduction, storage of records, use of solar energy etc. Those employees whose suggestions are accepted should be well rewarded, so that others may be motivated to become more involved.

Research Survey Questionnaire Subject

Productivity & Efficiency of Urban Cooperative Banks in Uttar Pradesh

- Do you think, Training & Development programmes may improve productivity ()
- Whether the salary & wage structure reflects the attitude of employees and officers ()
- Not reflects attitude of employees & officers ()
- May reflect attitude of employees & officers ()
- Productivity is directly related with -
- (A) Wages () (B) Attitudes ()
- (c) Satisfaction () (D) All ()
- Computerisation may save the time ()
- Computerization may increase expenses ()
- Should the employee give a fixed time to complete a work ()
- Should the employees follow set working structure ()
- Are other activities (except banking work) for the officers & employee required ()
- Whether the bank is capable to recover its loans/ advances ()
- Not capable to recover its loans/advances If security is good ()
- If efficient employees are available ()
- If new technology is adopted ()
- What kind of facility, employee required? -----
- Friendly atmosphere between employees and officers is required (Yes/No)

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Anyone who thinks it won't be difficult for a woman to get elected president of the United States should go home, take a nap, wake up refreshed, and think again.

— Bob Herbert

Sugar Industry in Uttar Pradesh: Performance and Prospects

S.P. Singh

Based on the primary data collected from 36 sugar mills of different plant sizes under private, cooperative and government ownership for the period 1991-92 to 2003-04, this paper examines the performance and prospects of the sugar industry of Uttar Pradesh. The paper finds that the performance of sugar mills of all the three sectors has remained dismal during the last 13 years. However, the private sector has fared relatively better than the other two sectors. The private sector mills were able to limit the losses due to better management practices and vertical integration of their units.

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The sugar industry is the largest organised agro-based industry of Uttar Pradesh. It provides direct employment to about 70,000 people and indirectly supports the livelihood of three million sugarcane growers (Banerjee and Srivastava, 1996-97).

Over the years, the sugar industry has been facing both internal and external challenges. Even after a decade of economic reforms, the industry continues to be under stiff government control and regulation. There is a control right from the procurement of sugarcane to the marketing of sugar and its by-products. World Bank (1996) estimates that if the existing sugar policies continue in India, they could cost the economy around \$2 billion a year by 2004. The licensing policy regime did not allow capacity expansion of the existing mills and thus restricted them to avail economies of scale. However, after delicensing of the industry in 1998, the entrepreneurs got incentives to set up new plants of large sizes and expand production capacity of the existing mills.

Apart from these domestic issues, distorted production and trade policies followed by some developed countries have also been adversely affecting the competitiveness of the industry. Studies have shown that widespread interventions and controls have created an inefficient pattern of world production, consumption and trade of sugar (Borrell and Duncan: 1992; Devadoss and Kropf: 1996; Larson and Borrell: 2001; and Oxfam: 2004). This paper is written to examine the performance of the sugar industry of Uttar Pradesh and assess its future prospects. The paper is based on the primary data collected from 36 sugar mills of different plant sizes under private, cooperative and government ownership spread over the western, central and eastern regions of the state.

Trend in Installed Capacity and its Utilisation

Plant size has a significant impact on the efficiency

and productivity of sugar mills. Sugar plants with larger size enjoy better economies of scale and are able to generate profit. Increase in the plant capacity up to a certain level is found to be positively associated with the competitiveness of the industry (Datta and Gupta, 2001). Past policies of regulation and control did not allow the sugar mills to expand freely their plant capacity. Consequently, a large number of sugar mills in the state are at sub-optimal and unviable capacity.

Table 1 shows that during the last decade, installed capacity (IC) per mill in the industry has significantly increased from 2006 TCD in 1991-92 to 3682 TCD in 2003-04, registering an annual compound growth rate of 5.81 per cent. After delicensing of the sugar industry in November 1998, entrepreneurs are being encouraged to set up new mills or expand the capacity of the existing mills. As a result, a number of new sugar plants of varying capacities have been set up and the existing plants have substantially increased their capacity. This policy change has positively impacted the average IC. However, the growth has not evenly occurred in all the three sectors. The increase is found to be highest in the private sector, followed by the cooperative sector. During the last 13 years, the IC grew at the rate of 7.34 per cent per annum in the private sector. Average mill in the cooperative sector expanded its IC by 4.04 per cent per annum. The government sector mills could not considerably enhance their IC as is apparent from the estimated growth rate shown in the table.

The table also presents information about the capacity utilization (CU). A perusal of the table reveals that CU does not evince any trend in its percentage. Except for the government sector mills which demonstrate a positive and significant growth in the CU, in all the other cases, growth rates are not statistically significant. As CU, among others, depends on the availability of sugarcane whose supply is dependent on various factors such as weather conditions, price in the open market, payments of old dues, prices and productivity of competing crops, these parameters can create sugar cycle and affect the CU.

Trend in Employment

The per factory average number of employees as well average number of employees per 100 TCD IC for the last 13 years are shown in Table 2. It is evident from the table that number of employees has declined from 933 in 1991-92 to 886 in 2003-04, registering a negative growth rate of 1.2 per cent per annum. Looking at the sector-wise manpower employed in the industry, it is observed that per factory average employees are highest in the private sector, followed by the cooperative

sector. During 2003-04, an average mill in the private sector had 893 employees as against 758 employees in the cooperative sector and 680 employees in the government sector. Rate of employment reduction is found to be highest in the private sector. Estimated ACGRs reveal that the number of employees in the private, cooperative and government sectors has decreased by 1.84 per cent, 0.89 per cent and 1.82 per cent per annum, respectively.

It is significant to note that the sugar industry has been continuously reducing the surplus manpower. However, the problem of overstaffing still persists. If the international standard is considered, the total manpower strength of even large plants of up to 10000 TCD and above should have total employee strength of less than 250. However, this could be feasible only when the mills are equipped with latest production technology along with fully computerized information system.

Average number of employees per 100 TCD IC is also worked out to know the employment intensity in the three sectors of the industry. The results clearly evince that the ratio of employees to IC is highest in the government sector, followed by the cooperative sector. In 2003-04, an average mill in the private sector employed only 15.79 employees per 100 TCD IC, while an average mill in the government sector employed 39.12 employees, which are about two and a half times that of the private sector. This shows that private sector mills are more efficient in manpower utilization. Although all the three sectors recorded negative growth in the employment per 100 TCD IC, the decline is more pronounced in the private sector. Labour cost is the major constituent of total cost of sugar production. By rationalizing the manpower utilization, a mill can substantially reduce the production cost.

Labour cost is the major constituent of total cost of sugar production.

Duration of Crushing Season and Number of Days Lost

Duration of crushing season is one of the vital factors in the performance of the industry. Both long as well as short durations of crushing season adversely affect the industry. While long duration affects the economic working of the industry due to high down time and lower recovery, the short duration leads to higher overhead expenses. Based on the regional agro-

Table 1: Average Installed Capacity and its Utilisation

Year	Private Sector Mills		Co-operative Sector Mills		Government Sector Mills		Total	
	Installed Capacity (TCD)	% Utilisation	Installed Capacity (TCD)	% Utilisation	Installed Capacity (TCD)	% Utilisation	Installed Capacity (TCD)	% Utilisation
1991-92	2537.50	83.33	2125.00	85.86	1414.05	78.11	2005.95	82.80
1992-93	2850.00	96.69	2142.86	92.27	1531.85	79.86	2128.70	89.49
1993-94	2855.00	94.43	2142.86	97.32	1531.85	85.93	2172.60	93.12
1994-95	3005.00	96.68	2271.43	98.72	1531.85	85.41	2269.66	94.21
1995-96	3829.17	95.22	2321.43	93.48	1531.85	83.06	2604.68	91.16
1996-97	4400.00	103.09	2425.00	96.29	1656.85	87.89	2911.31	96.41
1997-98	4669.23	98.29	2473.21	99.38	1721.85	87.26	3041.72	95.72
1998-99	4764.29	94.16	2669.64	97.49	1721.85	91.20	3191.93	94.61
1999-00	5000.00	102.20	3080.36	86.52	1721.85	92.69	3387.66	93.70
2000-01	5615.38	93.16	3098.21	89.82	1721.85	92.38	3610.64	91.68
2001-02	5282.14	94.69	3125.00	89.55	1735.39	91.92	3578.04	92.68
2002-03	5330.00	96.49	3098.21	84.77	1721.85	89.81	3603.68	90.57
2003-04	5658.33	92.90	3098.21	90.05	1738.19	91.93	3681.78	91.50
Average	4292.00	95.49	2620.88	92.42	1637.01	87.50	2937.57	92.13
ACGR (%)	7.34*	0.32	4.04*	-0.49	1.63*	1.29*	5.81*	0.33

* Significant at 1 per cent level of significance.

Table 2: Average Number of Employees per Factory and per 100 TCD Installed Capacity

Year	Average number of Employees per Factory				Average number of Employees per 100 TCD Installed Capacity			
	Private	Coop.	Govt.	Total	Private	Coop.	Govt.	Total
1991-92	1156	866	849	933	45.55	40.75	60.02	46.51
1992-93	1099	861	875	925	38.54	40.16	57.14	43.44
1993-94	1084	859	859	925	37.96	40.09	56.05	42.58
1994-95	1080	851	838	915	35.94	37.47	54.72	40.30
1995-96	1031	845	822	900	26.92	36.40	53.64	34.57
1996-97	1068	842	822	916	24.27	34.72	49.61	31.46
1997-98	1022	848	796	895	21.90	34.30	46.25	29.44
1998-99	998	857	795	893	20.96	32.08	46.17	27.96
1999-00	1019	837	783	887	20.38	27.18	45.49	26.17
2000-01	1044	823	763	884	18.60	26.56	44.31	24.50
2001-02	906	818	743	841	17.16	26.18	42.81	23.49
2002-03	913	775	714	812	17.13	25.01	41.47	22.54
2003-04	893	758	680	788	15.79	24.47	39.12	21.39
Average	1024	834	795	886	26.24	32.72	48.98	31.87
ACGR (%)	-1.84*	-0.89*	-1.82*	-1.20*	-8.55*	-4.74*	-3.39*	-6.63*

* Significant at 1 per cent level of significance.

climatic conditions, a season of 150-180 days duration is considered optimal. In Uttar Pradesh, the period from November to March (about 150 days) is considered an ideal one from the point of view of sugar recovery. From

April onward, the recovery shows a downward trend and in June it comes down to lowest level (Sinha, 1988). Table 3 reports the duration of crushing season of the three sectors for the last 13 years. As is obvious from

Table 3: Average Duration of Crushing Season and Number of Average Hours Lost

Year	Average Duration of Crushing Season (Days)				Number of Average Days Lost			
	Private	Coop.	Govt.	Total	Private	Coop.	Govt.	Total
1991-92	230.33	218.69	212.20	219.57	33.11	33.78	34.38	33.80
1992-93	151.58	145.67	145.10	146.97	23.20	19.27	31.17	23.97
1993-94	142.29	132.46	128.10	134.07	19.47	12.96	20.27	17.02
1994-95	176.73	164.07	160.20	166.65	26.92	20.12	22.59	22.85
1995-96	209.52	218.78	201.60	210.92	36.19	33.03	37.12	35.22
1996-97	155.81	170.44	162.40	163.13	30.51	19.50	24.65	24.76
1997-98	139.80	147.13	142.10	143.20	25.49	14.93	23.50	20.95
1998-99	135.48	137.24	127.10	133.92	20.65	14.99	18.08	17.89
1999-00	160.90	149.65	128.30	147.83	18.93	22.76	17.78	20.07
2000-01	143.89	141.40	126.90	138.36	18.27	16.95	16.02	17.16
2001-02	165.12	159.20	138.11	157.67	22.68	17.90	17.81	19.24
2002-03	179.84	170.47	158.00	170.88	17.32	24.20	20.32	20.56
2003-04	134.40	122.79	111.25	124.18	16.24	12.80	11.90	13.80
Average	163.51	159.85	149.34	158.26	23.77	20.25	22.74	22.10

Table 4: Reasons for Working Days Lost in Average Factory in the Sugar Industry

Year	Mechanical Faults (Days)				Cane Shortages (Days)				Others Reasons (Days)			
	Pvt.	Coop.	Govt.	Total	Pvt.	Coop.	Govt.	Total	Pvt.	Coop.	Govt.	Total
1991-92	12.94	17.34	11.68	14.47	7.77	3.98	3.90	4.90	12.41	12.47	18.80	14.43
1992-93	9.78	9.51	12.51	10.51	6.01	3.35	5.40	4.65	7.41	6.42	13.26	8.81
1993-94	7.82	4.52	5.08	5.65	7.91	2.60	5.77	5.09	3.74	5.85	9.42	6.27
1994-95	13.12	8.65	8.14	9.85	9.13	2.67	5.00	5.33	4.67	8.80	9.45	7.67
1995-96	21.43	16.82	14.22	17.66	8.38	3.12	5.55	5.61	6.38	13.09	17.35	11.95
1996-97	14.61	8.29	9.22	10.83	6.63	3.04	3.77	4.54	9.27	8.17	11.65	9.39
1997-98	12.52	5.11	6.11	7.98	12.87	3.45	3.79	6.85	0.10	6.37	13.60	6.12
1998-99	7.23	6.48	4.90	6.34	6.15	3.03	4.60	4.59	7.27	5.48	8.59	6.96
1999-00	6.52	10.28	3.67	7.17	9.01	3.82	4.54	5.84	3.40	8.66	9.56	7.06
2000-01	5.50	7.62	5.22	6.19	6.35	3.31	3.05	4.33	6.42	6.02	7.75	6.64
2001-02	8.94	7.77	6.16	7.55	6.54	2.33	2.97	4.06	7.19	7.80	8.69	7.63
2002-03	7.02	11.23	6.42	8.34	4.79	2.05	2.55	3.22	5.51	10.93	11.35	9.00
2003-04	3.76	4.29	3.79	3.98	6.17	2.22	2.08	3.62	6.31	6.29	6.03	6.20
Average	10.09 (42.5)	9.07 (44.8)	7.47 (32.9)	8.96 (40.5)	7.52 (31.6)	3.00 (14.8)	4.07 (17.9)	4.82 (21.8)	6.16 (25.9)	8.19 (40.4)	11.20 (49.3)	8.32 (37.7)

Note: Figures in parentheses are percentages to the respective total days lost.

the table, there exist wide fluctuations in the duration. It ranges from a minimum of 124 days in 2003-04 to maximum of 219.57 days in 1991-92. One of the main causes of this fluctuation is surplus or deficit in the cane supply that may be due to variations in sugarcane acreage, yield, price and monsoon. In the industry, the crushing duration had been below 150 days during 7 years; above 180 days during 2 years; and between 150-180 days during the four years of the study period.

However, the average crushing duration of 13 years is above 150 days.

Duration of crushing season is one of the vital factors in the performance of the industry.

Sector-wise figures of the duration indicate that the average duration for 13 years is largest in the private sector, followed by the cooperative sector. The Government sector has the shortest average duration. In case of the private sector, we find that the largest duration was in 1991-92 and the shortest was in 2003-04. In six out of 13 years, the sector has the average duration in the range of 150-180 days.

Working days of the sugar factory are lost due to various reasons like strike, lockout, breakdowns due to technical faults, sugarcane shortages, shutdown due to general cleaning and maintenance, bad weather, etc. Sectorwise per factory losses of working days in the industry have been worked out and the figures are shown in Table 3. The table evinces that there exists a wide variation in the days lost across years and sectors. In the industry as a whole, number of days lost was lowest during 2003-04 and highest during 1995-96. In case of the private sector, the figures range from 16.24 days in 2003-04 to 36.9 days in 1995-96. More or less a similar trend is observed in case of working days lost in other two sectors.

We have also gathered information on reasons of working days lost in the industry. The reasons are grouped into three categories—mechanical faults, cane shortages and other reasons like lockout, strike, shut down due to routine cleaning and servicing of plant. Sectorwise and year-wise data on working days lost presented in Table 4 indicate wide fluctuations in the figures across years as well as sectors. An average factory lost about 9 days due to mechanical faults, about 5 days due to cane shortages and about 8 days due to other reasons.

Looking at the sector-wise figures, it is found that an average mill in the private sector lost 10 days due to mechanical faults, 7.5 days due to non-availability of cane and 6 days due to other reasons. In the cooperative sector mill, number of days lost due to mechanical fault, cane shortages and other reasons were about 9, 3 and 6 days, respectively. An average mill in the government sector shut down quite often due to reasons other than mechanical faults and cane shortages. In case of days lost due to cane shortages, we observe highest percentage in the private sector, followed by the government sector. Cane shortages seem to be the main problem of private sector mills. These mills have expanded their IC much faster than the mills of other two sectors. After delicensing of the industry, private entrepreneurs got incentives to set up new sugar plants of big sizes. On the recommendation of the Mahajan Committee (GOI, 1998), radial distance for setting up a new plant has reduced to 15 kms. This might have affected the cane supply to the private sector mills of IC ranging

between 5000 TCD to 10000 TCD. Our results show that in the private sector, about one-third working days lost were due to shortages of sugarcane supply, while percentages of working days lost due to cane shortages in cooperative and government mills were 14.8 and 17.9, respectively.

Trend in Sugar Productivity

We have estimated sugar output per 100 TCD IC and per employee. A perusal of Table 5 reveals that there is no growth in the sugar output per 100 TCD IC. In the private sector, the growth is not found significantly different from zero, while the cooperative sector experiences a statistically significant negative growth (-2.34). The government sector, though, records a negative growth in the output, but it is not statistically significant. This clearly indicates that the industry could not improve the utilization of IC over period of time. Wide variations in the sugar output per 100 TCD IC are also noticed across years and sectors. On average, the output ranges from 11914 tonnes per 100 TCD IC in 2003-04 to 16446 tonnes in 1991-92. The overall inference that emerges from the analysis is that the partial physical productivity of fixed capital (taking installed capacity as a proxy variable for fixed capital) in the industry has remained stagnant or even declined during the 13 years of the study period.

Average productivity of a worker depends not only on education, skills, and experiences but also on several other determinants like quality of fixed assets, technological level, quality of raw materials and other inputs and also on the number of workers. Thus, per worker productivity of sugar in any mill can be increased by improving the human capital base of the worker through formal and informal training and providing him access to latest technology and quality inputs. This process of labour productivity enhancement is significant in the context of income and employment generation. Improvement in the labour productivity through this process would increase wages and salaries in the industry which, in turn, pushes up the income and employment in other industries and sector by creating additional demand for their products or services. Labour productivity can also be increased by producing the given level of output using lesser number of

Productivity of a worker depends not only on education, skills, and experiences but also on quality of fixed assets, technological level, quality of raw materials and other inputs

Table 5: Sugar production per 100 TCD IC and per Employee (in tonnes)

Year	Sugar production per 100 TCD IC				Sugar production per employees			
	Private	Coop.	Govt.	Total	Private	Coop.	Govt.	Total
1991-92	15792	17486	15195	16446	347	429	186	354
1992-93	12599	12780	10639	12238	327	318	148	282
1993-94	11644	12171	10867	11697	307	304	154	275
1994-95	14842	14767	12818	14409	413	394	182	358
1995-96	15132	17830	15380	16107	562	490	229	466
1996-97	13406	15206	12999	13911	552	438	202	442
1997-98	12053	14169	12125	12715	550	413	204	432
1998-99	11935	11630	10911	11696	570	363	188	418
1999-00	14263	10897	11201	12684	700	401	189	485
2000-01	12751	11791	12040	12348	686	444	199	504
2001-02	14976	13126	12013	14093	838	501	230	600
2002-03	16324	13145	13808	15035	953	526	260	667
2003-04	12356	10918	12145	11914	783	446	236	557
Average	13698	13532	12472	13484	584	420	201	449
ACGR(%)	0.08	-2.34**	-0.35	-0.70	9.34*	2.51**	3.17*	6.36*

* Significant at 1 per cent level of significance

** Significant at 5 per cent level of significance

workers. This happens when a factory modernizes its plant and uses more labour displacing technology. This process of labour productivity enhancement may be significant for the factory in reducing production cost but it may not be desirable in a society where plenty of human resource remains idle due to non-availability of employment. Therefore, when productivity growth is the outcome of the expansion of output with existing or even more number of workers and the productivity gains are shared by the workers, then this can lead to a situation in which everyone benefits.

As is evident from Table 5, there has been tremendous growth in the labour productivity in the sugar industry. On average, labour productivity grew at the annual compound growth rate of 6.36 per cent for the last 13 years. The highest growth is found in the private sector. An average employee in the industry produced 449 tonnes sugar per season between the period 1991-92 and 2003-04, the highest productivity being achieved during 2002-03. The productivity level varies from 275 tonnes in 1992-93 to 667 tonnes in 2002-03. A sector-wise comparison of the labour productivity evinces a substantial difference across sectors. For instance, average per employee production in the government sector is nearly one-third that of private sector. The private sector records a remarkable 9.34 per cent annual growth in the labour productivity whereas the government and cooperative sectors attains 3.17 and 2.51 per cent annual growth rates, respectively.

Table 6: Impact of Number of Employees per Factory on Labour Productivity

Sector	Constant (intercept a)	No. of employees per factory (slope b)	(R ²)	F-value
Private	2911.93* (356.12)	-2.27* (0.347)	0.78	42.98*
Cooperative	1439.15* (396.42)	-1.22** (0.475)	0.32	6.61**
Government	558.85* (76.26)	-0.45* (0.096)	0.64	22.19*
Total	2419.15* (352.80)	-2.22* (0.398)	0.72	31.25*

* Significant at 1 per cent level of significance

** Significant at 5 per cent level of significance

If we look at the employment trend in the industry, we observe that increase in the labour productivity is mainly due to a sharp reduction in the employment growth (see Table 2). In order to identify up to what extent employment change in the industry affects labour productivity, regression analysis is conducted by taking per employee production of sugar as a dependent variable and number of employee per factory as independent variable. Regression results are shown in Table 6.

The results reveal that labour productivity in the sugar

industry is inversely related to the level of employment. All the slope coefficients are statistically significant and have negative value. The most significant effect of the number of employees on labour productivity is observed in the private sector. For instance, a unit increase in the employment would make 2.27 units decrease in the labour productivity in this sector. Similarly, for the industry as a whole, labour productivity would decrease by 2.22 units when per factory employment is enhanced by a unit. A perusal of the table reveals that labour productivity in the private sector is highly affected by the change in per factory employment level.

Trend in the Net Sugar Recovery

Net sugar recovery percentage (NR) of cane crushed depends on the sucrose content in sugarcane and the efficiency in its extraction. Sucrose content is dependent on varieties of sugarcane (early or late ripen varieties), method of cane harvesting, time duration between harvesting and crushing, etc. Sugarcane is a perishable commodity. If it is not crushed within 12 to 24 hours, its sucrose content declines, affecting the NR. Supply of fresh and clean sugarcane seems to be the vital factor in the improvement in the NR. This fact is quite obvious when we compare the NR of Uttar Pradesh to Maharashtra. In Uttar Pradesh, sugarcane harvesting is done by the farmers themselves as per the purchase order issued by the mill. Contrary to this, in Maharashtra it is performed by the mill itself. An average mill in Maharashtra achieves NR much higher than what is achieved by an average mill in Uttar Pradesh.

Other factors that determine NR are duration of crushing season, quality of inputs, technical efficiencies etc. In India, the sucrose content averages 12 per cent which is not good when compared to countries like Brazil and Australia. While extracting sugar from the sugarcane, entire sucrose content of the cane is not extracted. Some percentage of sucrose remains in bagasse, in molasses and in filter cake, etc. The NR, therefore, depends on how efficiently the mill gets the sugar from the sucrose available in sugarcane. Thus, with better quality of sugarcane seed and better harvesting practices, sucrose content in cane could be increased beyond the average of 12 per cent and with use of modern technology and best managerial practices, the sugar extraction rate could also be improved. There is substantial scope for improvement in productivity both in terms of yield as well as sugar contents and recovery by adopting better harvesting practices and close coordination of sugar mills with farmers. Table 7 presents data on the sector-wise NR attained by an average mill in the industry during the last 13 years. For the entire industry, average of 13 years NR is estimated

to be 9.14 per cent which is much lower than the average NR attained by the sugar industry in other states like Maharashtra, Karnataka, Gujarat and Andhra Pradesh. For instance, during the above stated period, sugar industry in Maharashtra has obtained 11.20 per cent average recovery (Indian Sugar, May 2005, p. 153).

Coming to the sector-wise comparison of NR, we notice a wide variation in it. As expected, the private sector attains the highest average NR, followed by the cooperative sector. The government sector achieves only 8.68 per cent average NR which is about one per cent point lower than the recovery achieved by the private sector. Three points emerge from the perusal of the data. First, there has not been any improvement in the NR between the years 1991-92 and 2003-04. Second, the recovery varies from year to year but variation is very low. Third, there is significant difference in the recovery levels of the three sectors.

Table 7: Sector-wise Average Net Sugar Recovery in the Industry (in %)

Year	Private Sector Mills	Co-operative Sector Mills	Government Sector Mills	Total
1991-92	9.31	9.25	8.53	9.04
1992-93	9.84	9.58	8.88	9.42
1993-94	9.27	9.33	8.99	9.21
1994-95	9.45	9.49	8.98	9.33
1995-96	8.93	8.54	8.15	8.56
1996-97	9.60	9.12	8.73	9.18
1997-98	9.61	9.46	8.99	9.38
1998-99	8.99	8.88	8.33	8.77
1999-00	9.57	8.85	8.61	9.04
2000-01	9.86	9.30	8.75	9.35
2001-02	9.49	9.04	8.44	9.09
2002-03	9.58	8.88	8.43	9.03
2003-04	9.80	9.21	9.06	9.38
Average	9.48	9.15	8.68	9.14

Impact of Duration of Crushing Season on the NR

As already discussed, duration of crushing season (DCS) significantly influences the NR. In order to examine up to what extent it affects the NR, we have conducted regression analysis using cross-sectional data of the 36 sugar mills. The data used in the analysis is average of three years, i.e., 2000-01 to 2002-03. In order to assess the impact of sectors and regions, we use two dummy variables, one representing private sector and other representing Eastern Region (ER). The regression model is described as follows:

$$NR = \alpha + \beta_1 DCS + \beta_2 D1 + \beta_3 D2 + \mu$$

Table 8: Average profit earned per factory and per 100 TCD Installed Capacity (in Rs. Lakhs)

Year	Average Profit Earned per factory				Average profit earned per 100 TCD Installed Capacity			
	Private	Coop.	Govt.	Total	Private	Coop.	Govt.	Total
1991-92	20.39	-233.14	-299.96	-190.64	0.80	-21.21	-10.97	-9.50
1992-93	176.19	-16.80	-253.77	-42.60	6.18	-16.57	-0.78	-2.00
1993-94	376.58	191.38	-71.53	168.53	13.19	4.67	-8.93	7.76
1994-95	113.84	163.31	-33.63	90.84	3.79	2.20	-7.19	4.00
1995-96	-93.52	-241.30	-321.01	-214.18	-2.44	-20.96	-10.39	-8.22
1996-97	91.46	-291.28	-473.58	-206.07	2.08	-28.58	-12.01	-7.08
1997-98	494.18	112.88	-481.63	86.17	10.58	27.97	-4.56	2.83
1998-99	357.05	-184.39	-562.06	-84.30	7.49	-32.64	-6.91	-2.64
1999-00	-15.52	-331.56	-555.10	-280.93	-0.31	-32.24	-10.76	-8.29
2000-01	290.85	-666.36	-461.52	-274.68	5.18	-26.80	-21.51	-7.61
2001-02	22.62	-710.37	-667.88	-367.90	0.43	-38.49	-22.73	-10.28
2002-03	-147.71	-1753.51	-1368.72	-1037.23	-2.77	-79.49	-56.60	-28.78
2003-04	609.46	-694.99	-381.66	-160.87	10.77	-21.96	-22.43	-4.37
Average	176.61	-358.16	-456.31	-193.37	4.27	-21.85	-15.06	-5.71

Where:

NR = Percentage of net sugar recovery

DCS = Duration of crushing season (in days)

D_1 = Dummy for ownership (1 for private, 0 otherwise)

D_2 = Dummy for region (1 for Eastern Region, 0 otherwise)

α, β_1, β_2 and β_3 are parameters to be estimated; and

μ is the random unobserved disturbance with zero mean and a constant variance.

Estimated Regression is as follows:

$$NR = 6.23^* + 0.018^* DCS + 0.643^* D_1 - 0.253^{**} D_2$$

$$(0.337) \quad (0.002) \quad (0.114) \quad (0.125)$$

$$R^2 = 0.82 \quad F\text{-value} = 55.67^*$$

Note: Figures in parentheses are standard errors of the respective coefficients.

The above equation is highly significant in terms of goodness of fit. Value of R^2 indicates that 82 per cent variations in the NR are explained by the explanatory variables included in the model. F-value is also statistically significant and demonstrates that the combined effect of all the explanatory variables on NR is significant. The value of estimated regression coefficient shows that NR is significantly affected by the change in DCS. On an average, NR would increase by 0.018 per

cent point with the one per cent point rise in DCS. The value of dummy intercept D_1 shows the significant difference in NR of the three sectors. The private sector mills have positive impact on enhancing the NR in the industry. As compared to the cooperative and the government sectors, the private sector has the higher percentage of NR. Estimated value of dummy variable D_2 is negative and statistically significant. It captures the impact of sugar mills of ER on NR. The results suggest that sugar mills in the ER are not better performers in terms of attaining NR when compared to the mills located in the western and central regions. In the state, most of modern sugar mills are located in the western and central regions and majority of old and outdated sugar plants are located in the ER (GOI, 2002). This could be the reason for relatively low NR in the ER.

Trend in Profit

The sugar industry has been facing a financial crisis due to heavy losses. The cyclical pattern of sugar production, i.e., two years of high production, followed by two years of low production, raises the inventory level of sugar output and as a result, arrears of sugarcane prices to the growers increase. Hence, the farmers shift to other crops, creating cane shortages to the industry in next year. In both the cases, the industry suffers due to the erratic supply of sugarcane.

We have estimated average profit/loss per factory and per 100 TCD IC and figures are reported in Table 8. It is found that during 11 out of 13 years of the study

period, the industry incurred losses. The loss was largest during year 2001-03, followed by year 2001-02. Comparing the profitability of sugar mills of the three sectors, we notice that private sector earned profit during 10 out of 13 years of the study. Highest profit was earned during 2003-04, followed by year 1997-98. However, profit figures do not evince any trend. There is a large variation in the profit of an average mill in the private sector. The figures range from loss of Rs. 147.71 lakhs in 2002-03 to profit of Rs. 609.46 lakhs in 2003-04. The cooperative sector incurred losses during 10 out of 13 years, highest loss being incurred during year 2002-03, followed by year 2001-02. Only during the years 1993-94, 1994-95 and 1997-98, the sector earned profit.

The worst performers are the government mills. All these mills are sick and have been referred to the Board of Industrial & Financial Reconstruction (BIFR). It is evident from the table that average mill in the government sector has been running in substantial loss during the period under study. Highest loss was recorded during year 2002-03. We can also draw similar inferences from the figures of profit earned per 100 TCD IC. As expected, ratio of total profit to 100 TCD IC, was highest in the private sector. The private sector earned highest profit during 2003-04, closely followed by the year 1997-98. The cooperative sector mill attained highest profit per 100 TCD IC during 1997-98 and highest loss during year 2002-03. The government sector incurred highest loss per 100 TCD IC during year 2002-03, followed by year 2001-02. Thus, on an average, the year 2003-04 has remained good and years 2001-02 and 2002-03 bad for the industry. The private sector mills fared better than the mills of other two sectors. They planned and implemented their expansion better. Although, they too have suffered from the high cane price, they were able to limit the losses due to better management practices and vertical integration of their units. Contrary to this, high fixed cost, diseconomies of small scale size, outdated and less motivated staff and lack of investment in modernization have affected the performance of the government mills.

Future Prospects of the Industry

The future prospects of the sugar industry seems to be bright. All demand side drivers, such as increase in per capita income, urbanisation, changing consumer tastes and preferences, increasing diversified use of sugar and its byproducts, etc, indicate that the industry would achieve remarkable growth in future. Policy-induced factors, such as delicensing and decontrol of sugar sector, incentives for setting up new sugar and cogeneration plants and expansion of the existing plants, etc. would encourage the entrepreneurs not only to expand production capacity to achieving economies

of scale but also motivate them to diversify their activities. However, major worries of the industry in future may be related to supply side constraints. There is a limited scope of bringing more area under sugarcane cultivation. About 60 per cent of cultivated land is unirrigated where sugarcane cultivation cannot be economically viable. Even in the irrigated regions, water scarcity may adversely affect the acreage under it. Food security is another factor that may indirectly affect the acreage under sugarcane. With the increase in population, demand for cereals will go up.

To maintain food security, the government may make policy intervention in terms of raising MSP for cereals or may bring legislation to prevent the conversion of food crops' area into sugarcane cultivation. All these supply side likelihoods indicate to the gray side of the industry. However, the silver lining in Uttar Pradesh is that still more than 50 per cent sugarcane production is used for traditional sweeteners like "Gur" and "khandsari". This reveals that appropriate sugarcane price policy may attract additional supply of sugarcane to the industry in future.

The Tuteja panel on the sugar industry (GOI, 2004) suggests that radial distance between the existing mill and the new one should be increased from 15 kms to 25 kms for sustaining a plant of 5000 TCD. For a plant beyond 500 TCD, extra supply of sugarcane for the mill should come from enhancement of productivity of sugarcane. In this context, recent decline in per hectare yield of sugarcane needs serious attention of government as well as sugar mills. During our survey of sugar mills, we observe that most sugar mills in the state do not have a R&D department. Cane development activities of sugar mills are not found to be satisfactory. Hence, if the sugar mills in the state desire to achieve economies of scale, they have to focus not only on improving the productivity of sugarcane but also on evolving a better sugarcane harvesting technique so that sucrose content of sugarcane may not be adversely affected.

In the wake of neo-liberal trade regime, the future market of sugar would be more volatile and sensitive to the change in the global market. In this changing environment, the industry has to diversify its activities. In future, a mill has to make strategic alliances with other related industries and should have produced a range of low, medium and high value products, whose output caters to the needs of the times. For example, if demand for sugar declines, a mill can directly produce ethanol from the sugarcane, as has been practiced in Brazil. Almost all byproducts of sugar may be put to beneficial use by applying cost-effective modern technologies. These technologies may comprise state-of-art

equipment, processing technology, computer systems and automation, and performance evaluation technology. The sugar industry of the future can be visualised as an integrated producer, not only for sucrose, but for important high-value products, whose quantities may be adjusted as per the market demand.

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If you don't make mistakes, you aren't really trying.

— Coleman Hawkings

Forced Migration of Labour: A Study of the Rickshaw Pullers of Allahabad

Bhaskar Majumder

The paper deals with workers in the informal sector, with a focus on the 'forced migration of labour' that reflects the rootlessness of people. The paper opines that since most of the rickshaw pullers of Allahabad provide support income for their respective families, they do not continue to search for other employment opportunities. This holds good particularly for those migrating from rural regions for whom 'local' occupations, that is agriculture and land-based activities, provide the major source of income. The rickshaw pullers in a small city like Allahabad remain in this job by 'choice under economic compulsions'.

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An individual becomes a worker by doing any job/work independent of the time rule (labour hour) and collects/produces products for herself (including her family). Capitalism converts a worker into a labourer willing to sell labour power (a commodity) to the buyer (another individual or owner/collector of non-labour resources) at the prevailing (or agreed upon) price (wage rate). Labour (hour) becomes the root or cause of all products, that is the time expression of labour power embedded in a labourer. The labour hour gets concrete shape in products and services. Institutions convert a social category into an economic category, and hence a worker becomes a 'labourer'.

An individual starts working in a paid job (wage-employment) independent of his own will, and dependent on prevailing laws, customs, practices etc., as shown by institutions. In absence of any laws for the workers, the labour market remains informal, that is, where workers operate without written accounts and labour contracts. Most of these workers in the informal sector are self-employed, often assisted by unpaid family workers. Following ILO, the informal sector excludes agriculture for practical reasons. The workers are self-employed in the informal sector in the sense that they directly receive the rewards of their labour (ILO, 2000, p. 194).

The paper deals with the case of rickshaw pullers, where the choice of joining this job is often involuntary, in the sense that it happens in a condition of helplessness. Tips and income characterize what these workers earn by piece-rates by coverage of a specific distance. The workers are mostly employed by the owners of rickshaws but not paid by the latter. In this sense, it may be argued that they do not fit into the category of self-employment. However, they conform to the ILO definition in the sense that they receive from those whom they provide a service to.

The paper focuses on 'forced labour migration'.

'Forced' labour is mainly an urban phenomenon, when the worker feels compelled to leave his roots (village and land-linked activities), at least temporarily, to migrate to urban regions in search of a job.

Urbanization: Inflow and Exodus of People

Urbanization is known as a process of agglomeration of population that gets settled within a narrow boundary relative to the size of settled population showing high density of population per square kilometre. Natural increase in population, shift of existing urban boundary, and reclassification of areas known earlier as villages lead to formation of towns/cities. Composition of towns/cities shows urban regions.

The offshoot of urbanization will be reflected in net migration of population in a frame of rural-urban inflows and outflows of population, setting up of industries in urban boundaries, increasing percentage of population waiting at the gates of the industries, deruralization, formation of both formal and informal labour market with increasing reserve army of labourers. In conventional literature, urbanization is measured by certain parameters like density of population, percentage of population engaged in secondary and tertiary occupations, production of land-delinked goods, improved infrastructure, easy communication etc.

A particular location may be attractive to some individuals to use the location economically and hence attract population for ultimate settlement. These locations may be resource rich, linked by railways, by ports etc. and hence become the centre of attraction for at least economic purposes. Movement of people from the periphery is a corollary. The probability of getting jobs, wage-differential and hence higher standard of living, better education and health act as a 'pitcher plant' in the urban economy (Majumder, 2004.). A city is a constituent of this urban economy.

The carrying capacity and vibrancy of a city is understood by the size of the settled population in a city, the quality of the people in terms of understanding the scope and nature of work, and the actual frequency of people moving in and moving out. This, at the same time, shows mobility of workers in search of economic occupations. That a city is economically attractive is partially proved by the influx while the exodus shows the search for outside jobs by some of the settled people. For a city that can attract people from outside, it will be *prima facie* difficult to understand why people move out. One reason could be wage-differential, while there may also be non-economic parameters like heredity-cum-caste determined jobs, prevalence of caste division of

labour etc. Potential workers settled inside the city may be reluctant to be engaged in a particular type of job because of cultural taboo.

We are concerned in this study on influx of people from outside the city. This influx covers a geographic distance that is both short and long. The 'short-distance influx' is generally characterized by workers entering the city in the morning and going back at the end of the same day or at the end of the week. The 'long-distance influx' is the 'long-stay' type of worker associated with going home after money/saving is accumulated. The circulation of labour by periodic migration has been elaborately recorded in the context of south Gujarat (Bremen, 1996).

Nature of Occupation and Labour of Locality

Because of push and pull factors, the population gets settled in the urban region. Though in a primarily land (agriculture) dependent economy people would prefer to remain locally confined, economic compulsions often make them unsettled. This unsettlement leads to migration of many types including 'forced' one. Urbanization is a consequence of both voluntary and forced migration of settled population from earlier settled village economy.

Most of the population of both working and non-working ages (children and aged) in the countries like India depend on agriculture for mere survival. Even when they say they are engaged in non-agricultural activities, these are locally confined with limited mobility and linked to land.

In localized economies of countries like India family bonding works more than the mobility of the individual in the working age. The family as a whole provides income security. It is a collective/accommodative economy where family priorities come ahead of the individual's self-priorities. Decisions of migration fit in this frame. Often people settled locally move out in a state of limited knowledge about job opportunities. This limited knowledge is derived from past practices of the same individual or the practices of her past generations, or the information provided by the local mobile neighbours and friends and relatives. The small underdeveloped locality (village) offers limited social safety and insignificant economic safety. The individual, depending on the socio-cultural characteristics of both the localities 'moving out' and 'moving in', moves with and without families. While the society-cum-culture works as bondage for the individual, non-development of the local economy drives the individual out. The individual moved out thus may become an economic individual when she 'moves in' to an economic job

While the society-cum-culture works as bondage for the individual, non-development of the local economy drives the individual out.

elsewhere. In most of the cases for the marginalized sections of the locally settled people, it is the survival instinct of the individuals and families that matter in taking decisions regarding economic activities, often under compulsions.

Objectives, Methodology, Coverage and Sample for the Study

During mid-2005 we conducted a study on the nature of labour in the informal sector taking rickshaw pullers as a case (Majumder, 2005). The study was exploratory aimed at unearthing the roots and reasons for migration of workers to ultimately work as rickshaw pullers. The study zone was the city of Allahabad including its outskirts in Uttar Pradesh, India. The city has five administrative regions in terms of direction, namely, east, west, north, south, and central. We took a sample of 50 rickshaw pullers distributed equally over these five regions. In each of the regions within the city of Allahabad, we covered as far as practicable all the 'mohallas' (colony) where the rickshaw pullers are settled by residence. In total we covered 40 'mohallas' distributed over the five regions 'tolerable unequally' (14.0 per cent of 'mohallas' at the minimum to 20.0 per cent at the maximum per region) considered over all the five regions. We also covered eight owners of rickshaws (owners of 'Khataals' known by arrangement of many rickshaws in a particular location). Some of the rickshaw pullers do not stay in the city, who come from adjoining villages. In the sample of 50 rickshaw pullers, the floating/moving pullers are seven in number, or 14.0 per cent of total sample rickshaw pullers.

Following the pilot visit and information from secondary sources (like Allahabad Nagar Nigam), we came to know that there is no proper rickshaw stand in the city, so that the rickshaw pullers choose their own location based on convenience and interest. We covered the major locations or informal rickshaw stands while collecting primary information. By social categories we covered all the castes and communities like the scheduled castes (SC), the other backward castes (OBC), the people in general castes, and the Muslims. We also took care of the rickshaw pullers by their age distribution.

Migration of People: Past Occupations-cum-Ownership over Means of Production

We found that most of the rickshaw pullers (60 per cent) pulling rickshaws in the city of Allahabad have their roots in UP, 14 per cent of them are from MP, 10 from Bihar, 12 per cent from West Bengal, and 2 from both Rajasthan and Jharkhand. The basic reasons why people at the bottom of the economic ladder migrate to other regions is linked to past/initial occupation and their ownership over means of production.

The distribution of the main occupations shows that most of the households of the rickshaw pullers are engaged as non-agricultural labour (50 per cent). The other occupations include agriculture (cultivation and agricultural labour), carpentry, masonry, and basket making. For the households from Bihar, Jharkhand and Rajasthan, rickshaw pulling is the main occupation. Of all the rickshaw pullers from UP in the sample, most (50 per cent) are mainly engaged as non-agricultural labourers, seen from households' major occupation point of view.

For the migrant rickshaw pullers from Madhya Pradesh (MP), the major household occupation is agricultural labour and non-agricultural labour. Generally for the migrant rickshaw pullers, income-support bases like works of a mason, carpentry, basket making are absent. For migrants from West Bengal and Rajasthan, even agricultural occupations are absent as main occupations for the households. Thus, the migrants, with the exception of MP, either get engaged in non-agricultural occupations and/or migrate to cities like Allahabad to pull rickshaws. Initial income-poverty and hence necessity to have support income, drives people out to search for jobs like rickshaw pulling.

The distribution of main occupations of the population from the sample reveals that rickshaw pulling is the main source of income for most of the pullers. There are also activities that support family income like cultivation, agricultural and non-agricultural labour, small business, traditional work, driving vehicles other than rickshaws, pulling trolleys, service, animal husbandry etc. In some occupations we found female participation, like cultivation, non-agricultural labour, traditional work and bidi works. Pulling rickshaws, trolleys, and driving remains a male job.

Only 12.67 per cent of the population from the sample reported supplementary occupations. Non-agricultural labour and cultivation cover most of those occupations. We also found agricultural labour, hawking and traditional work. Thus, rickshaw pulling as a source

of households' income is reported to be inadequate for survival. The rickshaw pullers need to enhance their income by other occupations.

Most of the rickshaw pullers are not involved in occupations other than pulling rickshaws. Most of those who seek other jobs are from within UP for enhancement of family income. 26 per cent of the rickshaw pullers are also involved in wage work. Of those involved in wage work, 76.92 per cent are from UP. The other kinds of jobs that the rickshaw pullers do include 'working under contractor' (casual labour), working as vendor (selling vegetables, fish, and fruits), and wage labour (part time) in hotels. The rickshaw pullers depend mainly on pulling rickshaws for income. The other jobs, if available, supplement their family income.

Of all the sample rickshaw pullers, 64 per cent are landless. Of the entire rickshaw pullers migrating to the city of Allahabad from within UP, 56.66 per cent are landless; 80 per cent from Bihar are landless, 83.33 per cent from West Bengal are landless, while it is 57.14 per cent for MP. Except for 13.33 per cent of the rickshaw pullers migrating from within UP, no one owns more than three acres of agricultural land. Except for two rickshaw pullers from UP and one from Bihar, no one owns more than two acres of agricultural land. Landlessness and marginal landholding (less than 2 acres) is a major factor to drive the population out from the root. These people become rootless when they are forced to migrate.

Of all the rickshaw pullers settled in the state of UP, the district of Allahabad is the root for 60 per cent. The rest have migrated from their districts like Banda and Chitrakoot in the Bundelkhand region, and from districts like Pratapgarh, Balia, Kaushambi, Raibareli, Jaunpur and Fatehpur in east UP. In our sample, thus, the rickshaw pullers migrated from relatively underdeveloped regions like east UP and Bundelkhand, and not from relatively better off regions like west and central UP. We, however, did not find any direct link between underdevelopment of a region and out-migration.

Only 14 per cent of the rickshaw pullers in the city of Allahabad do not stay in the city and go back to the adjoining villages at the end of the day. As much as 40 per cent of the pullers stay alone in the city, while 26 per cent stay with family in the city. The rest manage to stay with other rickshaw pullers, and 'known relatives' staying in the city.

Except for one rickshaw puller who migrated from Rajasthan to the city of Allahabad and started pulling rickshaws, others are in the habit of moving in and

moving out by different time gaps. In the sample, for 16 per cent of the rickshaw pullers, the movement is indefinite; 20 per cent of the pullers go home once in a quarter; 18 per cent go fortnightly, 14 per cent go monthly; 10 per cent go yearly. The rest come from the adjoining villages and hence commute daily. The rickshaw pullers, thus, maintain links with native places by their movements with varying frequency. There is no state-specificity in movements of rickshaw pullers by specific frequency. The fact is that the rickshaw pullers generally maintain links with their roots even after they have migrated.

Reasons for Migration under Uncertainty

We observed that the people who migrated to the city of Allahabad did so in a condition of uncertainty from the regions within UP and outside. The reasons for migration by region are as follows:

- Normally people who work as rickshaw pullers want to hide their identity. Hence, they do this job far from their native place. We found some rickshaw pullers who hid their original names and adopted new names because of social stigma.
- The city of Allahabad is linked to the rest of India as an important pilgrimage centre. People from different areas come to the city for a holy dip in the Sangam (confluence of Ganga, Yamuna and Saraswati), and often decide to stay there and earn their livelihood.
- The metro cities are generally costly (in terms of cost of living index) and more unknown. The people who move by compulsion to earn an income and save a significant part of it to remit at home cannot afford to do so for a long time in metro cities. Hence, they prefer a relatively small city like Allahabad where they feel comfortable, know the city better, and hence get stabilized in joining the job of rickshaw pulling.
- People move to another place generally when culture is similar in terms of language, food habit etc. Most of the people who move into the city from the districts in UP and boundary states know Hindi as a 'market language'. The culture of the city is generally accommodative, silent, and 'non-traffic-rule imposing'. The people who migrate under uncertainty internalize it easily.
- The original 'settled migrants' bring with them their friends and relatives who are believed to have been living in miserable conditions.

- Geographical structure of the city helps stable living for the rickshaw pullers. The Gangetic belt provides common space for 'misery-free' living by access to common facilities for the otherwise vulnerable sections of the society.

The reasons for migration by occupation may be derived from the following observations. The labourers joining the job of rickshaw pulling are from the unorganized sector. We found in the study that generally the landless agricultural labourers, marginal farmers, labourers from construction sector, labourers working in tea stalls and hotels, labourers working in private factories, unemployed and seasonally employed people enter into the city to ultimately work as rickshaw pullers. The responses that we got from the sample rickshaw pullers reveal 'reluctant stay' in the job because of drudgery, social oppression, inhuman working conditions, hostile external (police and public administration) environment and low earning-cum-low living standard. In spite of this, there occurred migration in favour of 'involuntary employment'. The reasons, as responded, are the following:

- Lesser income in other occupations or in their past occupations or salary cut in past job done led to migration.
- The agricultural labourers migrate to the cities during off-agricultural seasons every year.
- In the urban job of rickshaw pulling, the possibility of earning income remains throughout the year and the income depends mainly upon 'own labour' without any capital cost involved.
- The opportunity cost for many labourers at local level is virtually zero. In other words, they have no alternative employment, so that they migrate to the city like Allahabad. Having no other skill, they work as rickshaw pullers.

The opportunity cost for many labourers at local level is virtually zero. Having no other skill, they work as rickshaw pullers.

- The migrants need not invest capital when they are absorbed as manual workers, viz, in rickshaw pulling. Hence the people at the bottom of the economic ladder migrate to join the job.
- The rickshaw puller is tied only to the owner-cum-rickshaw that he is supposed to pull. Thus,

social division of labour here boils down to simplest and bottommost male manual labour-based division of labour with no dependence on coordination in work. The puller controls and maintains the rickshaw that he pulls, and is in no way responsible for what other pullers do. This simplest form of working draws a number of job seekers from rural areas.

- Because of the survival instinct of big families in rural regions, which returns on land cannot support, many people migrate to cities and ensure support income by joining the job of rickshaw pulling.
- Urban culture attracts many people who come to the city to join any form of urban employment to stay in the urban region.
- Traditional practices or the past practices of the elder members in the family in the job of rickshaw pulling works as a pull factor in migration of other male members to join the job of rickshaw pulling.
- The job of rickshaw pulling being based only on manual labour at virtually zero capital cost, the individual learns it easily by doing it for a short duration.

Nature of Rootlessness or Self-Exploitation

As we observed, the rickshaw pullers take to this form of earning out of a condition of helplessness, which shows 'involuntary employment'. The very little income from the major sources or occupation forces the people to search for alternative jobs for support income. Often for some this job becomes the major source of family income. However, for most of the households of the sample rickshaw pullers, it is agriculture and related activities (including non-agricultural jobs in rural region) that are major sources of income.

It is not working with dignity that attracts potential rickshaw. The rickshaw pullers seem to decide their own working hours. However, reducing working hours per day or reducing number of days to pull rickshaws per month means for him a proportionate reduction in income and saving. The puller cannot afford to do this. Hence, the puller exploits himself. Family responsibility reinforces this self-exploitation.

Rickshaw pullers generally have no time to think about other jobs, even if those jobs exist. Getting shifted from one job today to another job tomorrow may not really show the mobility of the workers. Mobility in the

informal sector for the marginalized sections of the workers is a misnomer.

Concluding Comments

Pulling rickshaws is a 'choice' under compulsion. Often it aims at supporting family income. It is so far only a male job. Thus, generally men leave their homes and family for a short or medium term and come to the city either with knowledge about their choice to get rickshaws to pull, or get rickshaws to pull under circumstances not known earlier. Because of many reasons pulling rickshaws may not be a choice for the pullers for an indefinite period.

According to this study, most of the rickshaw pullers pulling rickshaws provide support income to the family, hence, the pullers do not continue to search for other employment opportunities. This is true particularly for those migrating from rural (agriculture or land-based oc-

cupations) regions for whom 'local' occupation (agricultural or land-based occupations) provides major income and attachment. Off-season migration for some and jobless forced migration for others force men to come to the city to begin rickshaw pulling. The rickshaw pullers in a small city like Allahabad remain rational by 'choice under economic compulsions' in accepting and remaining stable in rickshaw pulling.

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The excellence of a gift lies in its appropriateness rather than in its value.

— Charles Dudley warner

Employment, Income and Expenditure Pattern of Migrant & Local Agricultural Labour in Punjab

Varinder Pal Singh, V. K. Sharma & Sukhpal Singh

The results of this study on labour of Punjab show that family labour among permanent migrant agricultural labourers remained employed for 492 days, followed by permanent local with 485 days, casual local with 367 days and casual migrant agricultural labourers with 335 days. The saving for the future due to scarce employment opportunities was the only reason for low expenditure on food items and non-food items by casual migrant agricultural labourers.

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Agricultural development in Punjab is closely associated with the changes in the level and structure of agricultural employment. It reflects the composite effect of market forces and technical factors influencing demand for human labour in the agricultural economy of the state. In the late 1960s and early 1970s, the introduction of the modern production technology for wheat and rice unleashed the forces of change that influenced productivity, production and employment. Increase in production was accompanied by greater labour absorption in the production process through increase in cropping intensity and use of HYV seeds, pesticides, weedicides, fertilizers, expansion in irrigated area and higher land productivity (Grewal and Kahlon 1974). This resulted in widespread adoption of wheat-paddy rotation which was quite labour intensive in nature. The adoption of labour intensive technology has drawn a large volume of labour mainly from the backward areas of Uttar Pradesh and Bihar (Singh 1992). Since local labour was not sufficient to meet the increased labour requirements especially during the peak season in agriculture, migrant labour made significant contribution in terms of increasing the production of different farm enterprises by participating in the agricultural operations.

Now labourers come to Punjab even from far off places like Orissa, West Bengal, Madhya Pradesh and Nepal for gainful employment. In agriculture, migration was highest from Bihar which was 75.31 per cent followed by Uttar Pradesh (14.81%), Nepal (3.71%) and 6.17 per cent from other states of India (Singh and Singh 2003). The number of agricultural labourers in Punjab has increased significantly during the period 1961-2001. It was 3.35 lakh during 1961 and 14.99 lakh during 2001, which was 10 and 16.31 per cent respectively of total number of workers in the state (Government of Punjab). During 2002-03, the number of migrant

agricultural labourers was estimated to be about 8.05 lakh which was 53.70 per cent of agricultural labourer's population in Punjab (Singh 2003). In this way, migrants have a significant place in the composition of the labour force in Punjab. Therefore, it seems imperative to have a look at their employment, income and expenditure pattern in comparison to local agricultural labour.

Methodology

The study was conducted in Ludhiana district of Punjab state and pertains to the agricultural year 2003-2004. This district was selected due to higher concentration of migrant agricultural labourers in this district. Three stage random sampling techniques with block as first stage sampling unit, village as second stage and ultimate respondents as the third stage sampling units were adopted for the study purpose. Two blocks were selected randomly for the study purpose. One cluster of three nearest villages from each block was selected. From each cluster, 10 casual and 10 permanent migrant agricultural labourers as well as 10 casual and 10 permanent local agricultural labourers were selected. Thus, in total 40 migrant agricultural labourers and 40 local agricultural labourers were selected from six villages for a detailed analysis. The data regarding the employment, income and expenditure were collected from the respondents.

Extent of human labour employment

Table 1 reveals that the number of days of family labour available was maximum among casual local agricultural labourers (913 days) followed by permanent local (17 days), casual migrant (12 days) and permanent migrant agricultural labourers (698 days). Out of the total availability of family labour, the family labour remained employed for 492 days among permanent migrant agricultural labourers followed by permanent local, casual local and casual migrant agricultural labourers with 485, 367 and 335 days, respectively. The maximum utilization of family labour was among permanent migrant agricultural labourers with 70.49 per cent followed by permanent local, casual migrant and casual local agricultural labourers with 67.64, 47.05 and 40.20 per cent, respectively. On the other hand, casual local agricultural labourers remained unemployed for 546 days (59.80 %) days because they were mostly employed during peak agricultural seasons and also due to the reduction in employment opportunities brought by migrant agricultural labour, followed by casual migrant, permanent local and permanent migrant agricultural labourers with 377 (52.95%), 232 (32.36%) and 206 (29.51%) unemployed days, respectively. Similarly, results of another study show that family

labour among agricultural labourers in Punjab remained employed for 61.64 per cent days (Kaur, 2003).

Table 1: Extent of human labour employment among agricultural labourers, 2003-2004.

(Man days/ year)

	Category	Available labour	Employed labour	Unemployed labour
I	Migrant Casual			
	Men	493	232(47.06)	261(52.94)
	Women	219	103(47.03)	116(52.97)
	Total	712	335(47.05)	377(52.95)
II	Migrant Permanent			
	Men	493	438(88.84)	55(11.16)
	Women	205	54(26.34)	151(73.66)
	Total	698	492(70.49)	206(29.51)
III	Local Casual			
	Men	639	298(46.64)	341(53.36)
	Women	274	69(25.18)	205(74.82)
	Total	913	367(40.20)	546(59.80)
IV	Local Permanent			
	Men	511	418(81.80)	93(18.20)
	Women	206	67(32.52)	139(67.48)
	Total	717	485(67.64)	232(32.36)

Note: Figures in parentheses are percentages to available labour in respective category.

Extent and pattern of human labour employment in different enterprises

As may be viewed from Table 2, the employment of permanent migrant agricultural labourers was maximum with 492 days followed by permanent local, casual local and casual migrant agricultural labourers with 485, 367 and 335 days, respectively. Out of total employment, maximum employment was under hiring out labour in agriculture, which was maximum in permanent local agricultural labourers with 401 (82.68%) days followed by permanent migrant, casual migrant and casual local agricultural labourers with 392 (79.68%), 215 (64.18%) and 203 (55.31%) days, respectively. The largest section of migrant labour had been employed in agriculture before migration to Punjab and more often they not only demanded lower wages but were also docile (Gill, 1982). Among agricultural labourers the maximum employment was under hiring out labour in agriculture which was 69.79 per cent in Punjab (Kaur 2003).

Contribution of the non-farming sector to total employment was maximum in casual local agricultural labourers, with 32.97 per cent followed by casual

Table 2: Extent and pattern of human labour employment of agricultural labourers in different enterprises, 2003-2004.

(Man days/ year)

Category	Crop enterprise	Dairy	Hiring out labour in agriculture	Non-farming sector	Total
I. Migrant Casual					
Men	–	10(4.26)	182(77.44)	43(18.30)	232(100)
Women	–	51(51.00)	33(33.00)	16(16.00)	103(100)
Total	–	61(18.21)	215(64.18)	59(17.61)	335(100)
II. Migrant Permanent					
Men	–	4(0.91)	369(84.25)	65(14.84)	438(100)
Women	–	31(57.41)	23(42.59)	–	54(100)
Total	–	35(7.11)	392(79.68)	65(13.21)	492(100)
III. Local Casual					
Men	2(0.67)	12(4.03)	177(59.40)	107(35.90)	298(100)
Women	2(2.90)	27(39.13)	26(37.68)	14(20.29)	69(100)
Total	4(1.09)	39(10.63)	203(55.31)	121(32.97)	367(100)
IV. Local Permanent					
Men	2(0.48)	11(2.63)	371(88.76)	34(8.13)	418(100)
Women	3(4.48)	34(50.75)	30(44.77)	–	67(100)
Total	5(1.03)	45(9.28)	401(82.68)	34(7.01)	485(100)

Note: Figures in the parentheses are percentages to total employment in respective category of agricultural labourers.

Table 3: Pattern and magnitude of household income of agricultural labourers from different sources, 2003-2004.

(Rs. Per annum)

Category	Source of income	Crop enterprise	Dairy	Hiring out labour in agriculture	Non-farming sector	Total
I	Migrant Casual	–	3290 (10.73)	22169 (72.30)	5204 (16.97)	30663 (100)
II	Migrant Permanent	–	2065 (5.44)	30090 (79.34)	5772 (15.22)	37927 (100)
III	Local Casual	1350 (4.06)	2304 (6.93)	19188 (57.71)	10407 (31.30)	33249 (100)
IV	Local Permanent	1250 (3.27)	2810 (7.35)	31093 (81.36)	3066 (8.02)	8219 (100)

Note: Figures in parentheses are percentages to total income in respective category of agricultural labourers.

migrant, permanent migrant and permanent local agricultural labourers, with 17.61, 13.21 and 7.01 per cent, respectively. In dairy, maximum employment was among casual migrant agricultural labourers with 61 days (18.21%) days followed by permanent local, casual local and permanent migrant agricultural labourers with 45 days (9.28%), 39 days (10.63%) and 35 days (7.11%), respectively. No women were employed in the non-farming sector among permanent agricultural labourers. But among casual agricultural labourers, women labour employment in the non-farming sector was maximum amongst casual migrant agricultural labourers with 16 days (16.00%) days followed by casual local agricultural labourers with 14 days (20.29%) days. The obvious reason for their involvement was to boost their family income.

Pattern and magnitude of household income

The contribution of different sources towards per household income of different categories of agricultural labourers has been presented in Table 3. It was observed that permanent local agricultural labourers earned maximum income (Rs. 38219) due to availability of employment almost throughout the year and income from non-farming sector especially dairy enterprise. The permanent migrant, casual local and casual migrant agricultural labourers earned Rs. 37927, 33249 and 30663, respectively. The income of casual migrant agriculture labourers was minimum due to less employment opportunity. Income derived from hiring out labour in agriculture was maximum among permanent local agricultural labourers with Rs. 31093 followed by per-

manent migrant, casual migrant and casual local agricultural labourers with Rs. 30090, 22169 and 19188, respectively. Contribution of income from hiring out labour in agricultural to total income was maximum in permanent local agricultural labourers with 81.36 per cent followed by permanent migrant, casual migrant and casual local agricultural labourers with 79.34, 72.30 and 57.71 per cent, respectively. Income from dairy was maximum among casual migrant agricultural labourers with Rs. 3290 (10.73%) followed by permanent local, casual local and casual migrant agricultural labourers with Rs. 2810 (7.35%), 2304 (6.93%) and 2065 (5.44%), respectively. Other studies Sharma and Kumar (2003), Rangi et al (2001) concluded that permanent labour was better off as compared to casual labour in terms of annual income

Migrant agricultural labourers do not have any income from crop enterprise, whereas casual local agricultural labourers received Rs. 1350 (4.06%) from crop enterprise followed by permanent local agricultural labourers with Rs. 1250 (3.27%). Contribution of income from non-farming sector to total income was maximum among casual local agricultural labourers with 31.30 per cent followed by casual migrant, permanent migrant and permanent local agricultural labourers with 16.97, 15.22 and 8.02 per cent, respectively.

Distribution of household income

In order to know the distribution of household income of different categories of agricultural labourers in the study area, concentration of household income was studied by working out the share of each decile group and the same has been presented in Table 4. It is clear from the table that the bottom 50 per cent of casual migrant agricultural labourers shared 39.63 per cent, while the top 50 per cent shared 60.37 per cent of the total income earned by this category. This trend clearly shows that the distribution of household income was skewed and concentrated more on the upper half. The lower 50 per cent of migrant permanent agricultural labourers shared 32.27 per cent, while the top 50 per cent shared 67.73 per cent of the total income earned by this category. Among casual local agricultural labourers, the lower 50 per cent households shared 33.48 per cent and the upper 50 per cent shared 66.52 per cent of the total household income earned by this category. The 50 per cent of permanent local agricultural labourers shared only 36.26 per cent while the upper 50 per cent shared 63.74 per cent of the total household income earned by local permanent agricultural labourers.

The above trends show the skewed distribution of

income among all categories of agricultural labourers. However, the distribution of income among casual migrant agricultural labourers was relatively fair to other categories of agricultural labourers. The Ginni coefficients were also calculated to confirm the results observed according to decile groups. The lowest Ginni coefficient was 0.1526 representing the relatively fair distribution of income among migrant casual agricultural labourers. Ginni coefficients for permanent local, casual local and permanent migrant agricultural labourers was 0.1885, 0.2278 and 0.2412, respectively. Thus the distribution of income was more skewed among permanent migrant agricultural labourers.

Table 4: Distribution of household income of agricultural labourers, 2003-2004

Decile group	Cumulative percentage of household income of			
	Migrant agricultural labourers		Local agricultural labourers	
	Casual	Permanent	Casual	Permanent
10	6.85	5.33	5.22	6.1
20	14.10	10.90	11.02	12.79
30	21.86	17.15	17.85	19.57
40	30.42	24.31	25.31	27.86
50	39.63	32.27	33.48	36.26
60	49.15	41.59	43.10	46.14
70	59.44	52.30	53.51	56.57
80	70.10	64.84	65.71	67.97
90	82.15	80.70	80.88	82.50
100	100.00	100.00	100.00	100.00
Ginni coefficient	0.1526	0.2412	0.2278	0.1885

Per household consumption of food items and non-food items

As given in Table 5, the annual per household expenditure on food items and non-food items was maximum among casual local agricultural labourers with Rs. 21524 followed by permanent local, permanent migrant and casual migrant agricultural labourers with Rs. 17093, Rs. 15136 and Rs.15127, respectively. The saving for the future due to less employment opportunities was the only reason for low expenditure on food items and non-food items by casual migrant agricultural labourers. Casual migrant and permanent local agricultural labourers spent a major share of the total expenditure on milk and milk products with Rs. 3025 and Rs. 2976, respectively, whereas, casual local and permanent migrant agricultural labourers spent major share of their total expenditure on cereals.

Table 5: Per household consumption expenditure on food items and non-food items of agricultural labourers, 2003-2004.

(Rs. Per annum)

Sr. No.	Items	Migrant agricultural labourers		Local agricultural labourers	
		Casual	Permanent	Casual	Permanent
1.	Cereals	2751	2941	3939	2858
	(a) Wheat	1273	1345	3531	2616
	(b) Rice	1376	1464	212	129
	(c) Maize	102	132	196	113
2.	Pulses	867	713	934	626
3.	Milk and milk products	3025	2736	3301	2976
4.	Vegetables and fruits	1059	1119	1950	1623
5.	Edible oils	724	793	1065	898
6.	Sugar and gur	799	779	1013	871
7.	Tea leaves	468	491	623	391
8.	Liquor tobacco poppy etc.	513	523	745	529
9.	Condiments and spices	449	468	629	469
10.	Fish meat and eggs	73	80	97	69
11.	Miscellaneous	421	453	475	436
	Sub Total (A)	11149	11096	14771	11746
B. Non-food items					
1.	Clothing and footwear	962	977	1485	1175
2.	Fuel and lighting	828	855	2230	1693
3.	Soap, washing powder and tooth paste	561	576	764	584
4.	Social ceremonies	436	357	425	335
5.	Education	250	403	640	510
6.	Medical services	274	274	405	311
7.	Tailor	239	202	266	223
8.	Conveyance	62	62	80	73
9.	Miscellaneous (Grinding traveling, postage stamps etc.)	366	334	458	443
	Sub Total (B)	3978	4040	6753	5347
	Grand Total (A + B)	15127	15136	21524	17093

In case of non-food items, the major expenditure by permanent and casual migrant agricultural labourers was on clothing and footwear with Rs. 977 and Rs. 962 respectively, followed by fuel and lighting with Rs. 855 and Rs. 828, respectively. Casual and permanent local agricultural labourers spent maximum on fuel and lighting with Rs. 2230 and Rs.1693 respectively, followed by clothing and footwear with Rs. 1485 and Rs.1175 respectively.

Household consumption distribution

The distribution of household consumption expenditure on both food items and non-food items among

various categories of agricultural labourers has been presented in Table 6. The lower 50 per cent of casual migrant agricultural labourers shared 42.14 per cent of the total consumption expenditure by this category, while the top 50 per cent shared 57.86 per cent. Thus the distribution was slightly skewed and concentrated more on the upper half. The top 50 per cent of permanent migrant agricultural labourers shared 65.69 per cent, while the lower 50 per cent shared 34.31 per cent. Among casual local agricultural labourers, the lower 50 per cent shared 39.11 per cent while the upper 50 per cent shared 60.89 per cent. The lower 50 per cent of permanent local agricultural labourers shared 33.90 per cent while upper fifty per cent shared 66.10 per cent.

Therefore the distribution was again skewed and concentrated more on the upper 50 per cent among all categories of agricultural labourers.

Table 6: Distribution of household consumption expenditure of agricultural labourers, 2003-2004.

Decile group	Cumulative percentage of household consumption expenditure of			
	Migrant agricultural labourers		Local agricultural labourers	
	Casual	Permanent	Casual	Permanent
10	6.00	5.73	5.38	5.14
20	13.59	11.48	12.48	10.36
30	22.74	17.26	20.13	15.60
40	32.26	24.72	28.63	23.80
50	42.14	34.31	39.11	33.90
60	52.23	43.89	50.25	45.89
70	62.40	56.34	61.64	58.48
80	73.49	69.65	73.48	71.76
90	86.07	83.88	86.22	85.50
100	100.00	100.00	100.00	100.00
Ginni coefficient	0.1182	0.2055	0.1454	0.1991

It can be concluded from the above discussion that inequality in the distribution of household consumption expenditure was minimum among casual migrant agricultural labourers as compared to other categories of agricultural labourers. The Ginni coefficients for casual migrant, casual local, permanent local and permanent migrant agricultural labourers was 0.1182, 0.1454, 0.1991 and 0.2055, respectively. Thus the distribution of household consumption expenditure was relatively fair among casual migrant agricultural labourers followed by casual local, permanent local and permanent migrant agricultural labourers.

Conclusion

The maximum utilization of family labour was among permanent migrant agricultural labourers with 70.49 per cent followed by permanent local, casual migrant and casual local agricultural labourers with 67.64, 47.05 and 40.20 per cent, respectively. Out of total employment, maximum employment was under hiring out labour in agriculture which was maximum in permanent local agricultural labourers with 401 (82.68%) days followed by permanent migrant, casual migrant and casual local agricultural labourers with 392 days (79.68%), 215 days (64.18%) and 203 days (55.31%) respectively. Permanent local agricultural

labourers earned maximum income (Rs. 38219) due to availability of employment almost throughout the year and supplementing their income from non-farming sector as well as dairy enterprise. The permanent migrant, casual local and casual migrant agricultural labourers earned Rs. 37927, 33249 and 30663, respectively. The distribution of income among casual migrant agricultural labourers was relatively fairer than other categories of agricultural labourers. The annual per household expenditure on food items and non-food items was maximum among casual local agricultural labourers with Rs. 21524 followed by permanent local, permanent migrant and casual migrant agricultural labourers with Rs. 17093, Rs. 15136 and 15127, respectively. The saving for future due to less employment opportunities was the only reason for low expenditure on food items and non-food items by casual migrant agricultural labourers. The local agricultural labourers spent more on education than migrant agricultural labourers. The distribution of household consumption expenditure of food items and non-food items was relatively fair among casual migrant agricultural labourers followed by casual local, permanent local and permanent migrant agricultural labourers. It was observed that more than two-thirds of the total consumption expenditure was on food items among all categories of agricultural labourers. Migrant agricultural labourers spent more on food than local agricultural labourers.

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Intersize and Spatial Analysis of Productivity Gaps in Paddy Crop

Tejpal Singh, V.K. Sharma & H.S. Kingra

Productivity gaps and differences in the use of inputs in paddy crops were noticed in the cotton belt of Punjab in comparison to the central zone. Four villages in Punjab were selected for this study. It was found that resources are used rationally, and that the productivity of various resources used at the existing level did not differ from the optimum level.

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Paddy is the major crop during the kharif season in Punjab, occupying about 26.14 lakh hectares with a total production of 9656 thousand metric tones. About 66.19 per cent (1730 thousand hectares) of the total area is sown under this crop in the central zone of Punjab state due to its favourable environment condition of production (Statistical Abstract, 2005, Punjab). At the same time due to the successive failure of the cotton crop in the south western region of the state, the paddy crop emerged as the second major kharif crop in this zone which occupied 9.03 per cent (224 thousand hectare) of the total area during 2002 and 14.05 per cent (355 thousand hectare) during 2003. But some productivity gaps and differences in the use of inputs in paddy crop have been noticed in the cotton belt of Punjab in comparison to the central zone.

Methodology

The present study was conducted in the south western zone of Punjab and Bathinda district was randomly selected for the study purpose. Two blocks Rampura phul and Nathana were selected and two villages from each block were selected randomly. Thus, the data was collected from four villages and from each of the selected village, twenty farm holdings spread over medium (7-14 acres) and large (>14 acres) size categories with an equal number were selected at random. Thus in all 80 farm holdings constituted the sample size for this study. As this study was conducted in the cotton-dominated belt, the paddy growing farmers of small categories were very few, hence the analysis based on few observations over small size category was not logical to include in the study. The primary data for the Kharif season of the agricultural year 2002 was obtained from the farmers through personal interview method.

In order to achieve the first objective of the study, simple averages and percentages were used. T-test was

also carried out to find out that whether productivity from paddy crop differs across size categories as well as blocks or not. Functional analysis was carried out for achieving the second objective of the study. Gross value product (Y) for paddy crop on the farm were taken separately as a dependent variable and the expenditure on seeds and seed treatment material in Rs (X_2), manure and fertilizers in Rs (X_3), Irrigation charges in hours (X_4), plant protection measures in Rs (X_5), machinery charges in Rs (X_6) hired human labour in hours (X_7), family labour in hours (X_8), total human labour in hours (X_9) and biochemical inputs ($X_2 + X_3 + X_5$) in Rs (X_{10}) were taken as the explanatory variable affecting GVP. Both the linear and log linear functions were fitted to the data for paddy crop. The co-efficient obtained from the functional analysis were further used to work out the gaps in MVP at the optimum and the existing level. The form of the function used is as under:

$$Y = a_0 + b_1x_1 + b_2x_2 + \dots + b_n x_n \quad \text{(Linear function)}$$

$$Y = a X_1^b X_2^{B2} \dots X_n^{bn} e^u \quad \text{(Power function)}$$

Where Y is the dependent variable

a_0 and a are the intercept terms in the above equations respectively

X_1 through X_n are explanatory variables and b_1 through b_n are the regression coefficients respectively.

e^u is the random variation

Computation of marginal value product

The MVP of the various inputs (X_i) in the case of power functions is worked out as under:

$$MVP = b_i \frac{\text{G.M. of } Y}{\text{G.M. of } X}$$

Where, b_i - regression coefficient and G.M.-Geometric mean

T-test

For testing the differentials in the productivity between size groups/blocks, t-test as under was used:

$$t = \frac{\bar{X}_i - \bar{X}_j}{\sqrt{\frac{(n_i - 1)\sigma_i^2 + (n_j - 1)\sigma_j^2}{n_1 + n_2 - 2}}}$$

Here \bar{X}_i - is the average product value on ith size group of farms and

\bar{X}_j - is the average product value on the jth group of farms respectively.

$i, j = 1, 2, 3$ size groups.

Economic Optima

The basic criteria of efficient resource use are that MVP of the input should cover the factor cost i.e.

$$MVP(X_i) = P_{xi} = \text{price of } X_i.$$

When $MVP(X_i) = P_{xi}$, the productivity is optimum and resources are used efficiently.

Results and Discussion

The results of the analysis carried out have been discussed in sequence of the objectives given in the paper. The detailed discussion is as under:

Productivity of paddy crop

The average productivity for paddy crop according to blocks as well as different size categories of farms have been incorporated in Table 1. The results of this table revealed that an average farm at the district level obtained Rs 14824 per acre as productivity during the period under study. So far as the blocks were concerned the average productivity for paddy crop was Rs 14931 in Rampura Phul block against the average productivity of Rs 14717 per acre in Nathana block.

The analysis across size-wise categories at the district level revealed that large farm families recorded the highest magnitude of Rs 15007 per acre from paddy crop. The lowest magnitude observed was Rs 14640 on medium farms. The inter block analysis with respect to size groups highlight the highest productivity on large farms with Rs 15044 in Rampura Phul block followed by Nathana Block with Rs 14971 respectively. Thus, the farm families of Rampura Phul block higher productivity from paddy crop in comparison to the Nathana block.

Testing of differences in productivity of paddy crop

The difference in productivity of paddy crop between size groups as well as between blocks has been tested with t-test. The results given in Table 2 revealed that the difference for productivity between medium and large turned out to be non-significant between blocks and size groups in the study area. Thus the analysis showed that there is no significant difference in the productivity between size groups as well as blocks.

Therefore the technology for paddy crop followed by different size groups in respective blocks seems to be of similar nature.

Mean level use and partial productivity of different inputs

The results of mean level use and partial productivity of different inputs over different size categories of farms has been given in Table 3. This showed that average productivity per acre from paddy crop was highest on large farms with Rs 15007 per acre followed by medium farms with Rs 14640. The partial productivity for seed and seed treatment (X_2), irrigation (X_4) and family labour (X_8) were highest on large farms with Rs 114.91, Rs 73.98 and Rs 105.02 in the above order. In case of medium farms, the partial productivity for manure and fertilizers (X_3), plant protection measures (X_5), Expenditure on farm machinery (X_6) hired human labour (X_7) and total human labour (X_9) and biochemical inputs (X_{10}) were highest with Rs. 13.90, 7.78, 11.34, 86.40, 47.23 and Rs 4.75 in the above order.

Functional Analysis

So far the analysis pertaining to the contribution of different inputs to the GVP of paddy crop (Table 4) in case of pooled situation, revealed that the area under crop (X_1) and hired human labour (X_7) turned out to be positively significant at 1 per cent level of probability, where as irrigation expenditure (X_4) was found to be significant but with negative sign. This implies that one unit increase in the use of these variables added Rs 14764.10 and Rs .0299 to the GVP of paddy crop, but in case of irrigation the increase in use reduced the GVP by Rs 3.292. Thus the GVP of paddy in Bathinda district can be increased by making higher use of area under crop (X_1) and hired human labour (X_7). At the same time, there is need to decrease the expenditure on irrigation (X_4) as its use reduces the GVP. R^2 -adjustment turned out to be 97.29 per cent, which reflects that the variables included in the equation, are well representative.

With respect to the regression analysis for paddy crop in Rampura Phul block, the results and that the variables included in the equation, are well representative.

With respect to the regression analysis for paddy crop in Rampura Phul Block, the results showed that a unit change in the variables like area under crop (X_1) and family labour (X_8) increases the GVP for paddy crop by Rs 17543.5 and Rs 10.9252 whereas biochemical inputs (X_{10}) turned out to be negatively significant. With

regression co-efficient 0.8855, which indicated that one rupee spent on this variable would add Rs 0.8855, which is less than cost. Hence its use is excessive and need reduction. In case of Nathana block area under crop (X_1) turned out to be positively significant and inputs like irrigation (X_4) and total human labour (X_9) turned out negatively significant at 5 per cent level of probability, which shows excessive use of these two inputs. One unit change the area under crop adds Rs 17460.00 to the GVP for paddy whereas one unit increase in inputs like irrigation and total human labour (X_9) reduced GVP by Rs 12.0875 and Rs 1.2350, respectively. Therefore it is evident that GVP for paddy crop can be increased by increasing area under crop (X_1) and reducing the use of inputs like irrigation (X_4) and total human labour (X_9) in Nathana block.

The results of the production function for paddy crop over different size groups (Table V) revealed that only the area under crop (X_1) and bio-chemical inputs (X_{10}) turned out to be significant at 1 and 5 per cent level of probability on medium farms as well as on large farms. The rest of the inputs turned out to be non-significant. The value of R^2 adjusted explained 89.95 per cent for medium and 94.17 per cent of the total variation for large farms, which authenticated that the variable picked up for selected equation was quite representative. On the whole, it emerged from the above discussion that area under paddy should be increased in both the blocks to increase GVP from paddy crop. Bio-chemical inputs used (X_{10}) used needs to be reduced in Rampura Phul block whereas total human labour (X_9) and irrigation (X_4) in Nathana block needs to be curtailed.

Economic Optima

The blockwise results incorporated in table VI revealed that the testing of differences of MVP of factor-to-factor cost for paddy crop showed that none of the parameters worked out in both the blocks turned out to be significant. Thus, all the inputs are being used rationally and hence there is no gap in productivity of inputs at existing as well as optimum level. A similar type of technology seemed to be practiced in both the blocks.

Table 1: Average value productivity of paddy crop across different size groups in the South Western zone of Punjab State 2001-02.

		(Rs/acre)		
S.No.	Category	Blocks		
		Rampura phul	Nathana	Overall
1.	Medium	14817	14462	14640
2.	Large	15044	14971	15007
	Overall	14931	14717	14824

Table 2: The differences in the productivity for paddy crop in the South Western zone of Punjab State 2001-02.

Combination of Size Categories	Difference Productivity (Rs)	Pooled standard error	t-values	Table values
Medium with large	-367 ^{NS}	1319.95	0.2780	1.674
Combination of Blocks				
Rampura Phul Block with Nathana Block	285 ^{NS}	1318.40	0.2162	1.674

Table 3: Mean level use and partial productivity of different inputs for paddy crop South Western zone of Punjab State 2001-02.

Variables	Mean level use		Average value product (Rs)	
	Medium	Large	Medium	Large
X1 Area under crop (acres)	7.26	16.90	14640.00	15007.00
X2 Seed and seed treatments (Rs)	1041.09	2207.04	102.09	114.91
X3 Manures and fertilizers (Rs)	7644.68	23732.54	13.90	10.69
X4 Irrigation (Hrs)	1538	3428	69.15	73.98
X5 Plant protection measures (Rs)	13667.89	37792.21	7.78	6.71
X6 Expenditure on machines (Rs)	9369.00	23842.00	11.34	10.64
X7 Hired human labour (Hrs)	1230	5163	86.40	49.12
X8 Family labour (Hrs)	1020	2415	104.20	105.02
X9 Total human labour (Hrs)	2250	7598	47.23	33.38
X10 Biochemical inputs (Rs)	22353.66	63211.79	4.75	4.01
Y Gross value product (Rs)	106286.40	253618.00		

The results of size-wise analysis given in Table 7 in respect of paddy crop for studying the gaps in productivity at the existing as well as optimum level, revealed that with the exception of bio-chemical inputs (X₁₀) over medium farms, none of the parameters worked out for different inputs turned out to be significant which means that all the inputs are used at the optimum level over medium and large farms and hence did not depict any gap in their productivity at the existing and optimum level.

On the whole the analysis highlighted that the resource for paddy crop was being used efficiently and hence there is no gap in the productivity of resources at

Table 4: Results of the production function and their related statistics for paddy crop in South Western zone of Punjab State 2001-02.

	Rampura phul	Nathana	Pooled for blocks
1. Intercept	-20219.2 (2.456)	9847.62 (1.255)	-891.973 (0.168)
2. Regression coefficients for:			
X1 Area under crop (acres)	17543.5 ^{xxx} (9.811)	17460.1 ^{xx}	14764.1 ^{xxx} (8.212)
X2 Seed & Seed treatments (Rs)	-	-49.2710 (1.362)	-12.9490 (1.149)
X3 Manures & fertilizers (Rs)	-	1.5124 (0.695)	-0.0016 (0.001)
X4 Irrigation (Hrs)	1.3140 (0.385)	-12.0875 ^{xx} (2.088)	-3.2917 ^{xx} (2.064)
X5 Plant protection measure (Rs)	-	1.1329 (0.757)	0.1228 (0.146)
X6 Expenditure on machines (Rs)	0.4929 (0.537)	1.1920 (0.737)	1.5913 (1.887)
X7 Hired human labour (Hrs)	-1.0193 (0.446)	-	0.0299 ^{xxx} (3.014)
X8 Family labour (Hrs)	10.9252 ^{xx} (2.767)	-	1.8699 (0.308)
X9 Total human labour (Hrs)	-	-1.2350 ^{xx} (2.334)	-
X10 Biochemical inputs (Rs)	-0.8855 ^{xx} (2.395)	-	-
R ² (Adjusted)	0.9847	0.9486	0.9729

Figures in parentheses are the t-values for respective coefficient in the study area

x, xx, xxx indicate significance at 10, 5 and 1 per cent level of probability.

the existing as well as optimum level in the block and size categories. Therefore if we want to improve upon the productivity of resources for paddy crop a breakthrough in technology is required. The existing technology is being used by the farmers at the optimum level for this crop in the study area.

Conclusion and policy implication

From the foregoing discussions it is concluded that though the productivity of paddy crops differs in magnitude from the visual observation, the t-test applied reflected no significant difference in productivity across blocks as well as size groups during the period under study. This trend showed that technology used for paddy crop percolated in the study area. Further the study highlighted that the productivity of various resources

Table 5: Results of the production function for paddy crop over different size groups of farm in the South Western zone of Punjab State 2001-02.

Type of equation selected	Linear regression	Linear regression
1. Intercept	-4218.53 (0.603)	4170.61 (0.220)
2. Regression coefficients for:		
X1 Area under crop (acres)	15863.70 ^{xxx} (5.164)	13353.00 ^{xxx} (3.708)
X4 Irrigation (Hrs)	-8.0594 (1.132)	-12.5207 (0.755)
X6 Expenditure on machines (Rs)	1.3703 (1.268)	1.7648 (1.029)
X8 Family labour (Hrs)	-	-46.6212 (0.348)
X9 Total human labour (Hrs)	-0.0570 (0.011)	-
X10 Biochemical inputs (Rs)	0.2302 ^{xx} (2.262)	2.2014 ^{xx} (2.415)
3. R ² (Adjusted)	0.8995	0.9417

Figures in parentheses are the t—values for respective coefficient for respective blocks in the study area

x, xx, xxx indicate significance at 10, 5 and 1 per cent level of probability

Table 6: Ratio of MVP of factor of factor cost for different blocks for paddy crop in the South Western zone of Punjab State 2001-02.

Variables	Rampura phul	Nathana
X1 Area under crop (acres)	3.8984 ^{NS} (1788.1130)	3.8800 ^{NS} (7478.8410)
X2 Seed & Seed treatments (Rs)	-	-49.2710 (36.1680)
X3 Manures & fertilizers (Rs)	-	1.5124 (2.1767)
X4 Irrigation (Hrs)	0.0526 ^{NS} (3.4098)	0.4835 ^{NS} (16.1134)
X5 Plant protection measure (Rs)	-	-
X6 Expenditure on machines (Rs)	0.4929 ^{NS} (0.9174)	1.1920 ^{NS} (1.6174)
X7 Hired human labour (Hrs)	-0.1019 ^{NS} (2.2841)	-
X8 Family labour (Hrs)	1.9252 ^{NS} (3.1818)	-
X9 Total human labour (Hrs)	-	-0.1235 ^{NS} (0.6418)
X10 Biochemical inputs (Rs)	0.8855 ^{NS} (0.3346)	-

Figures in parentheses are the standard error for the respective ratios of MVP of factor to factor cost

x, xx, xxx indicate significance at 10, 5 and 1 per cent level of probability

used at the existing level did not differ from the optimum level. Thus resources are used rationally and further real-

Table 7: Ratio of MVP of factor of factor cost for different size categories of farms for paddy crop in the South Western zone of Punjab State 2001-02.

Variables	Size Categories		
	Medium	Large	Overall
X1 Area under crop (acres)	3.5253 (3071.7970)	2.9673 (3601.3940)	3.2809 (1797.8440)
X2 Seed & Seed treatments (Rs)	-	-	-12.9490 (11.2741)
X3 Manures & fertilizers (Rs)	-	-	-0.0016 (1.1656)
X4 Irrigation (Hrs)	-0.3224 (7.1165)	-0.5008 (16.5801)	-0.1317 (1.1932)
X5 Plant protection measure (Rs)	-	-	0.1228 (0.8418)
X6 Expenditure on machines (Rs)	1.3703 (0.0802)	1.7649 (1.7158)	1.5913 (0.8431)
X7 Hired human labour (Hrs)	-	-	0.6630 (0.1990)
X8 Family labour (Hrs)	-	-4.6621 (134.1350)	0.1870 (6.076)
X9 Total human labour (Hrs)	-0.0057 (5.4107)	-	-
X10 Biochemical inputs (Rs)	0.2302 ^{xxx} (0.1018)	2.2014 (0.9116)	-

Figures in parentheses are the standard error for the respective ratios of MVP of factor to factor cost.

x, xx, xxx indicate significance at 10, 5 and 1 per cent level of probability

location of these resources would not lead to improvement upon the productivity with the existing level of technology. Therefore, a breakthrough in technology is required if we want to improve upon the productivity of paddy crop in the study area.

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Book Review

Making Innovation Work: How to Manage It, Measure It, and Profit from It by **Tony Davila, Marc J. Epstein, and Robert Shelton** Wharton School Publishing/Pearson Education, 2006, ISBN: 0131497863 (Hb.), pp. xxvi + 334, USD 29.99.

Could there be a more forward-looking leadership in any organization, which has not all along nurtured a nagging subcutaneous urge, irrespective of the attained scores on practice in successive periods, about how to excel in their professional expeditions to performance summits? While on this journey, they got on to first productivity, then the quality bandwagons, and have for long now heard the call for innovation. The earlier two have become basal in the process, offerings of which have been more or less almost commoditized. The aspects of innovation are currently viewed as much laden with prospects, as perhaps the unique advantage proposition, which alone could see us through in these rubble tracks, and help markets distinguish wheat from the chaff. Now, what to do to reinforce the organizational *innovatibility*, to make innovation happen sure shot in the place we are in! Now, amidst all such innovation-thirsty managers, what if some work you suddenly view, which reassures to say, well listen, remains there nothing as much to worry about, as it remains for good management practices!

Davila, Epstein, and Shelton's mint-fresh outlays in *Making Innovation Work* supercharges you with just such a comforting reassurance, and amours you to see with their innovative wares how you should create a unique competitive space for your own organization which can call the shots, can come in the lead, way ahead of your other co-combatant warrior organizations aspiring for similar spatial advantages. The text makes you eminently aware of the complicated nature of the problem that it is, takes you on the guided tour of the innovation arena, and shares its insights while convincing you about the efficacy of the greatly straight-forward sharp weaponry in its arsenal revealed in the shape of its Seven Innovation Rules.

These rules remain in the centre of focus in the three perspectives, which set the angle of looking at the tasks of enterprise management aligned to innovation. You get to ponder, in substance, on innovation as a management process; innovation that requires measuring and rewarding; and companies that can use innovation to redefine their industry. Going forward with the authors, you find that indeed 'there is no silver bullet for innovation, no one formula or structure for innovation that will work for every organization. However, there are clear ways in which companies can improve their innovation results, create value, and grow.' Admittedly, the authors have presented their work as a 'how' focused, not a strategy focused book, that *practically* 'provides context, framework, tools, and operating guidelines,' as a set of 'approaches to tailor innovation to a companies particular situation, business strategy, culture, technological acumen, and appetite for risk.'

Innovation as management process

For good management practices to bear innovative fruits, these require to be so oriented, first of all, in the components of company strategy, organization structure, systems of leaning, of execution, and of prioritizing resource utilization. From the moment you regard innovation as a management process, the requirement arises to address it with a matching strategy. At a given point of time, the specialized *innovatics* in the form of the innovation agenda of every company, should reflect its own and unique eco-systemic circumstances, depending upon where it finds itself then, and where it wants to see itself next. The adopted strategy, equally robust case-wise, could as well be offensive or defensive: Play-to-Win, or Play-Not-to-Lose. Success of either should depend upon the internal and external factors, where a company finds itself in, its risk appetite, and how it must dynamically adjust its innovation focus and its quantum along the passage of time, with due weightage to the results realized, like any other vibrant and living organism responds in its own system context.

It is always a critical management question, therefore, how a company must continuously adapt itself, and deploy its resources in meeting the competing demands. 'Creativity' and the derivative 'value capture' will require a mature mix. Much would depend on how one promotes the other, how the company internalizes the urge to be innovative, and goes for a specific organization structure. Several related issues of outsourcing, or of networking inside and outside, for bringing about innovation will require a resolution in the same vein. Essentially, at the end of the day, it boils down to how you innovate equals and what you innovate, say the authors.

A well-meditated strategy of innovation warrants a well-grounded system for that to fructify. Formal systems, as the authors profess, are essential to 'increase the efficiency of the innovation process', 'create the (supporting) lines of communication', 'coordinate between projects and teams', learn to be 'better at innovating, and align the objectives of various constituencies'. Systems should be the enablers of idea management on one hand, and on the other hand, of picking up skills for zeroing on those which enhance, or are built on their core competence. As a result of the quest ad continuum, the set of system parameters should so evolve dynamically as would correspond to the preferred innovation strategy and portfolio of the time, convincingly resolving all the 'dualities' of the process of innovation from 'concept to commercialization'. There arises the necessity of learning primarily 'to become better at innovating'. Every learning bit is a subject matter of solicitation, so would be the innovation learning to become available only to the seekers. It is *innovationally* superior any way to otherwise, to always develop present initiatives on the outcomes of past decisions, success or failures, in disregard of the die-hard detractors or 'simply cynics'.

Learning and innovation being both sides of the same coin, just a willingness to learn is meeting the innovation bill past halfway through, maybe leaving only its implementation part for the second innings. Only the focused learning alone leads you to decide the 'what next' issues so crucial for your phase transformation, by immediate actions, improved by further systemic learning in 'delivering value', 'refining the current model', building competencies', and 'crafting strategy' for organization-wide innovation. Learning pro-action should be to reduce the blind quadrant, and manage the other three for the visualized innovational advantage, in different stages, dynamically over the entire life cycle of the maturing process, and of the process of renewal or redefinition in an industry by gross innovation initiatives of the organization, where the whole is synergistically greater than the sum of its parts.

Apart from the changing technology, the innovation, therefore, has also to be about new business models. Depending on whether the change in these two areas are small or significant, authors classified innovations in three types – incremental, semi-radical, or radical. Disruptive innovation relate to the 'significant' space, which potentially tilts the competitive balance in the industry. At any time, innovation portfolio of the organization should include all these three types of innovations in some proportion, which requires 'leveraging' the internal sources of change, and focusing on their linkages. Causing change in the business model can be through a revised value proposition for the outcome, the input supply chain, and the customers in target, whereas the three-way technology change can be from the areas of products and services, the process, and their *innovationistic* enablers. This model of innovation management comes in context for their Seven Innovation Rules, relating to: innovation leadership, mentality modification, business focus reorientation, commercial considerations, negativity counteraction, knowledge partnership, and *incentivization*, which form the basis of the innovation strategy at the core. Applications will require to be careful of multiplying creativity with commerce, execution expertise that being of utmost importance for innovations to make those available for sensory appreciation thereby, providing leadership to cause, moderate motion with stability, act on diagnosis, institute processes for dynamic portfolio selection, and thereby get to raise the industry bar to ultimately the better *performantial* advantage of your organization.

Companies can use innovation to redefine their industry

Getting innovations to see the light of the day requires an enabling culture from a supportive mindset of the top management to begin with. The overall *innovatism* reflected in their innovation outlook, in envisioning and in situational responses can create the culture that either makes or mars. Creating a culture conducive to innovation is a subject matter of leadership pro-action in all the crucial areas of enterprise management. Sharp decision-making with mature finesse matters much in resolving the conflicting innovation prerogatives. The entire innovation spectrum needs keeping a well thought-out continuous balance, biased towards their prospering mechanism running well oiled then and thereafter. Innovations may appear simple after they were carried out, but these would certainly have been felt as much complex prior to the events. Occasional serendipitous or weird outcomes notwithstanding, these can only arise from the innovation oriented good processes of enterprise management, therefore. And, those are for careful attention indeed, as

not all measures will be for generating equally massive and sharp innovations, not every time. It ought better be for a controlled convergence than by the impulsive reactions at random.

What is it that distinguishes the barren from the enabling chemistry? The authors give a set of seven clear rules for the innovation practice, laid over the complete spectrum of managerial prerogatives from strategy, through to structure, leadership, and management systems, to the issues of people, to make the task controllable to the advantage of the organization. The extent and depth of the reach to the causal factors of innovation should generate the maximum potential energy of the enterprise. Good management call outs implore the managers to be effective on all these counts to make happen continuous innovation in their organizations.

Innovation requires measuring and rewarding

Agreeing that innovation is a management process like any other familiar ones, the appropriate parametric measurement methods for this become powerful facilitators in enhancing the outcomes manifold. The Balanced Scorecard should be one such, the authors considered, for deriving a better business model for innovation, which would help 'integrate innovation into companies basic business mentality'. However, measurements at various levels of the organization will vary; say as in project levels, both in metrics and in content. As normal with any measurement process, the manager must be very conscious and alive to the 'barriers' to the process for their immediate eradication, lest receiving wrong signals. Specific safety measures are essential, of which the text elaborate and adequately sensitize the reader point-wise. There is no two opinion that intelligent incentivization can generate reinforcement motivation for innovation, more so when those reflect certainty, spontaneity, equity, and clarity. Innovation performance can also be addressed likewise via designing an appropriate innovation reward scheme, based on clear metrics on goals versus achievement, and their unambiguous evaluation on defined counts. Incentive issues are quite delicate and sensitive for any organization, prone to complications multiplying in matters of their quantification and timeliness. Unless, therefore, administered intelligently with caution, it can do more harm than good, because justice should also require to be seen for the mind wares in review. Nevertheless, the dangers of its darker and least-talked-the-better sides should also be in frame, like it questionably discouraging risk-taking, damaging intrinsic motivation, and the ability of taking failures in stride on one hand, and maladies of indiscriminate reward going 'unchecked and unbalanced' on the other. At times, therefore, other

than in the short term, a recognition and long-term profit-share reward system can be more powerful and meaningful than momentary incentives for celebrating innovations by their award.

Using the Book in Practice

A great strength of the text lies in its ability to simplify the engrained complexities in the development and presentation of the concepts and its derivative action rules. The authors' ability to simplify such a complex phenomenon of psycho-sociology and techno-commerce, speaks volumes about their solid background expertise gained through years of research in the matter, their thorough awareness of the ground level realities, and about their mastery of the techniques with which to solve the staring problems being faced by the organizations at the apparent road-ends. By re-drawing the combat strategies with your 'good management practices', and armed with the precise *innovatistic* Action Rules, your will to excel can be confident to circumnavigate the apparent road blocks, to cross over to the future in glory. In the growing set of current innovation literatures, the text positions itself in this slot, targeted predominantly to the blue world of practice where the innovation matters to the hilt. Areas for further research concerns outgrowing from the text as of interest to innovation practice, organizational or academic, might include: One, Timing of innovation types, and its ROI-guided type-wise stoppage/makeover - switchover/reinforcement rules; Two, resolving the duality of internal orientation for changing of technology and business model, and that of external orientation requirement for market manoeuvring with such changes.

Success of a management text relies much on its attractiveness for adoption by the persons engaged in action. The text is richly interspersed with many research bites, CEO actions, CEO sanity checks, etc., and case studies for the readers to further ponder over. It has very powerful messages to convey, and so it did in greatly simplified, easily actionable terms. This book can indeed stake a claim for a prominent space on the side-desks of the busy CEOs and their senior managers, management researchers, and practicing consultants alike, who have everything to do about ushering innovation in the organizations they work with.

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News & Notes

Asia-Pacific Human Development Report 2006

The Asia-Pacific HDR presents statistics on international trade and human development for the countries of Asia and the Pacific and, for comparative purposes, other regions of the world. The grouping of countries into regions follows the classification of the World Bank's World Development Indicators. The data are presented for three points of time – 1982, 1992 and 2002 – a period during which trade liberalization deepened in the countries of Asia-Pacific.

Using these three data points helps to capture trends in social and economic indicators over a relatively long period. The latest year for which most of the countries of the Asia-Pacific have data on most indicators is 2002, although for some countries later data are available for 2003. Where data for some indicators are not available for the exact time points, the nearest reference points are reported and footnoted in the tables.

Developing countries covered and regional classifications are as below:

East Asia & Pacific

1. Cambodia
2. China
3. Fiji
4. Indonesia
5. Malaysia
6. Mongolia
7. Papua New Guinea
8. Philippines
9. Thailand

10. Viet Nam

South Asia

11. Bangladesh
12. Bhutan
13. India
14. Maldives
15. Nepal
16. Pakistan
17. Sri Lanka

Regions

1. East Asia & Pacific
2. Europe & Central Asia
3. Latin America & Caribbean
4. Middle East & North Africa
5. South Asia
6. Sub-Saharan Africa
7. Least Developed Countries (UN classification)
8. World

Note: Countries of the Asia-Pacific region that are not covered in the Annexures because of unavailability of data on most indicators include Afghanistan, Brunei, Cook Islands, Democratic People's Republic of Korea, Iran Islamic Republic, Kiribati, Lao PDR, Myanmar, Nauru, Niue, Palau, Marshall Islands, Federated States of Micronesia, Samoa, Solomon Islands, Timor-Leste, Tokelau, Tonga, Tuvalu and Vanuatu.

Table 1: Basic Indicators

Regions	Total population (millions)			Rural population (% of total)			GDP per capita (constant 2000 US \$)		
	1982	1992	2002	1982	1992	2002	1982	1992	2002
1. East Asia & Pacific	1402.5	1643.5	1839.2	77.5	69.7	61.8	297.2	562.1	1075.4
2. Europe & Central Asia	434.1	465.7	471.9	40.5	37.0	36.3	–	1921.3	2159.2
3. Latin America & Caribbean	372.4	453.3	525.3	33.7	28.1	23.8	3386.7	3424.9	3720.6
4. Middle East & North Africa	185.1	236.5	305.8	50.7	47.6	41.4	1355.0	1414.7	1660.5
5. South Asia	942.6	1160.5	1401.5	77.1	74.5	72.0	247.0	335.8	468.7
6. Sub-Saharan Africa	403.8	543.3	689.2	76.4	70.9	64.2	559.3	490.0	514.6
7. Least Developed Countries	423.4	550.1	660.4	84.1	78.3	75.6	251.9	240.5	283.3
8. World	4585.4	5423.6	6199.7	60.0	56.1	51.7	3921.1	4585.1	5282.4
East Asia and Pacific									
1. Cambodia	7.2	10.4	13.2	87.5	86.8	82.0	–	–	305.9
2. China	1008.6	1165.0	1280.4	79.0	71.0	62.3	208.2	475.9	1106.0
3. Fiji	0.7	0.7	0.8	61.9	56.8	49.1	1773.1	1885.5	2142.5
4. Indonesia	154.2	184.3	211.8	76.2	67.4	56.9	417.0	691.6	844.3
5. Malaysia	14.5	18.8	24.3	56.4	47.9	41.2	1989.7	2881.6	3944.4
6. Mongolia	1.8	2.2	2.4	46.7	43.0	43.3	314.8	300.0	406.2
7. Papua New Guinea	3.2	4.3	5.4	86.6	86.8	82.1	555.3	616.0	598.1
8. Philippines	50.4	64.0	79.9	60.3	49.1	39.8	1009.1	876.6	1024.0
9. Thailand	48.6	56.2	61.6	82.6	81.1	79.8	864.3	1657.6	2110.0
10. Viet Nam	55.7	69.0	80.4	80.6	79.0	75.0	–	250.6	443.7
South Asia									
11. Bangladesh	89.9	108.9	135.7	84.1	79.5	73.8	243.4	283.9	373.4
12. Bhutan	0.5	0.6	0.9	95.9	94.1	92.3	293.6	449.5	654.0
13. India	718.4	882.8	1048.6	76.4	74.0	71.9	234.2	322.5	477.4
14. Maldives	0.2	0.2	0.3	76.3	74.2	71.5	–	–	2237.7
15. Nepal	15.2	20.1	24.1	93.0	90.2	87.4	150.5	186.1	225.8
16. Pakistan	87.4	113.6	144.9	71.4	68.9	66.2	356.2	496.4	532.0
17. Sri Lanka	15.0	17.4	19.0	78.5	78.7	76.5	472.0	615.6	879.5

Note: Blanks refer to non-availability of data for the countries/regions.
Source: World Bank 2005.

Table 2: Human Development Index – Trends

	1980	1990	2000	2003	2003 HDI rank (out of 177)
East Asia and Pacific					
1 Cambodia	–	–	0.541	0.571	130
2 China	0.558	0.627	–	0.755	85
3 Fiji	0.686	0.724	–	0.752	92
4 Indonesia	0.530	0.625	0.680	0.697	110
5 Malaysia	0.659	0.721	0.790	0.796	61
6 Mongolia	–	0.673	0.657	0.679	114
7 Papua New Guinea	0.445	0.481	0.529	0.523	137
8 Philippines	0.687	0.720	–	0.758	84
9 Thailand	0.652	0.714	–	0.778	73
10 Viet Nam	–	0.617	0.695	0.704	108
South Asia					
11 Bangladesh	0.364	0.419	0.506	0.520	139
12 Bhutan	–	–	–	0.536	134
13 India	0.438	0.513	0.577	0.602	127
14 Maldives	–	–	–	0.745	96
15 Nepal	0.333	0.423	0.499	0.526	136
16 Pakistan	0.386	0.462	–	0.527	135
17 Sri Lanka	0.649	0.705	–	0.751	93

Notes: HDI 0.800 and above = High human development;
HDI below 0.500 = Low human development.

HDI 0.500 – 0.799 = Medium human development;
Source: UNDP 2005a.

Table 3: Indicators of Poverty, Income Inequality and Undernutrition

Regions		MDG Population below poverty \$1 a day (% of total)	MDG Share of income or consumption (%) -poorest 20%	Ratio of richest 20% to poorest 20%	Gini Index	MDG Population undernourished (% of total)		MDG Children underweight (% under age 5)
		1990–2003	1996–2002	1996–2002	1996–2002	1990–92	2000–2002	1995– 2003
1	East Asia & Pacific	14.9	–	–	–	–	12.0	–
2	Europe & Central Asia	3.6	–	–	–	–	7.9	–
3	Latin America & Caribbean	9.5	–	–	–	13.0	10.7	7
4	Middle East & north Africa	2.4	–	–	–	–	6.5	–
5	South Asia	31.3	–	–	–	25.0	21.7	47
6	Sub-Saharan Africa	46.4	–	–	–	32.0	31.9	31
7	Least Developed Countries	–	–	–	–	34.0	35.0	–
8	World	–	–	–	–	–	16.5	–
East Asia and Pacific								
1	Cambodia	34.1	6.9	6.9	40.4	43.0	33.0	45
2	China	16.6	4.7	10.7	44.7	16.0	11.0	10
3	Fiji	–	–	–	–	–	–	8
4	Indonesia	7.5	8.4	5.2	34.3	9.0	6.0	26
5	Malaysia	<2.0	4.4	12.4	49.2	3.0	2.0	12
6	Mongolia	27.0	5.6	9.1	30.3	34.0	28.0	13
7	Papua New Guinea	–	4.5	12.6	50.9	–	–	35
8	Philippines	14.6	5.4	9.7	46.1	26.0	22.0	31
9	Thailand	–	6.1	8.3	43.2	28.0	20.0	19
10	Viet Nam	–	7.5	6.0	37.0	31.0	19.0	33

(Contd.)

Table 3: Indicators of Poverty, Income Inequality and Undernutrition (Contd.)

Regions	MDG Population below poverty \$1 a day (% of total)	MDG Share of income or consumption (%) -poorest 20%	Ratio of richest 20% to poorest 20%	Gini Index	MDG Population undernourished (% of total)	MDG Children underweight(% under age 5)
	1990-2003	1996-2002	1996-2002	1996-2002	1990-92	1995-2003
South Asia						
11 Bangladesh	36.0	9.0	4.6	31.8	35.0	48
12 Bhutan	-	-	-	-	-	19
13 India	34.7	8.9	4.9	32.5	25.0	47
14 Maldives	-	-	-	-	-	30
15 Nepal	37.7	7.6	5.9	36.7	20.0	48
16 Pakistan	13.4	8.8	4.8	33.0	24.0	38
17 Sri Lanka	7.6	8.3	5.1	33.2	28.0	29

Note: Whenever data for a particular year are not available, data for the most recent year are used. Gini coefficients for Malaysia and Thailand are calculated from income surveys. For all other countries, Gini coefficients are calculated from consumption expenditure surveys.

Sources: UNDP 2005a; World Bank 2005.

Table 4: Indicators of Access to Safe Drinking Water and Sanitation Facilities

Regions	MDG Improved water source (% of population with access)		MDG Improved sanitation facilities (% of population with access)	
	1990	2002	1990	2002
1 East Asia & Pacific	71.0	77.6	29.7	48.7
2 Europe & Central Asia	-	91.3	86.4	82.0
3 Latin America & Caribbean	82.2	88.9	68.1	74.5
4 Middle East & north Africa	87.3	87.8	69.4	74.8
5 South Asia	69.8	83.7	16.5	34.6
6 Sub-Saharan Africa	48.8	58.2	32.3	36.0
7 Least Developed Countries	51.4	59.4	23.0	35.7
8 World	75.0	81.7	43.2	54.3
East Asia and Pacific				
1 Cambodia	-	34.0	-	16.0
2 China	70.0	77.0	23.0	44.0
3 Fiji	-	-	98.0	98.0
4 Indonesia	71.0	78.0	46.0	52.0
5 Malaysia	-	95.0	96.0	-
6 Mongolia	62.0	62.0	-	59.0
7 Papua New Guinea	39.0	39.0	45.0	45.0
8 Philippines	87.0	85.0	54.0	73.0
9 Thailand	81.0	85.0	80.0	99.0
10 Viet Nam	72.0	73.0	22.0	41.0
South Asia				
11 Bangladesh	71.0	75.0	23.0	48.0
12 Bhutan	-	62.0	-	70.0
13 India	68.0	86.0	12.0	30.0
14 Maldives	99.0	84.0	-	58.0
15 Nepal	69.0	84.0	12.0	27.0
16 Pakistan	83.0	90.0	38.0	54.0
17 Sri Lanka	68.0	78.0	70.0	91.0

Sources: UNSTATS website- http://unstats.un.org/unsd/mi/mi_goals.asp

World Bank 2005.

Table 5: Indicators of Maternal and Child Health

Regions	Life expectancy at birth total (years)		MDG Infant mortality rate (per 1000 livebirths)		MDG Children under age 5 mortality rate (per 100,000 people)		MDG Maternal Mortality Ratio* (adjusted per 1,00,000 live births)	MDG Malaria cases*(per 100,000 people)	MDG MDG Tuberculosis cases (per 100,000 people)		Prevalence of HIVtotal* (% of population aged 15-49)
	1992	2002	1990	2000	1990	2000	2000	2000	1990	2002	2003
East Asia & Pacific	67.5	69.4	43	31	59	39	-	-	-	-	0.2
Europe & Central Asia	68.4	68.5	40	25	49	30	-	-	-	-	-
Latin America & Caribbean	68.8	70.7	43	27	54	32	190	-	99	65	0.6
Middle East & North Africa	65.2	68.6	60	-	81	-	-	-	-	-	-
5 South Asia	59.6	63.0	86	66	129	91	540	-	171	168	0.7
6 Sub-Saharan Africa	48.9	45.8	111	105	185	179	920	-	142	263	7.3
7 Least Developed Countries	50.0	51.1	115	99	182	156	-	-	-	-	4.4
8 World	65.5	66.7	64	54	95	80	400	-	119	128	1.1
East Asia and Pacific											
1 Cambodia	54.9	54.0	80	95	115	135	450	476	1,579	769	2.6
2 China	69.0	70.7	38	32	49	40	56	1	325	264	0.1
3 Fiji	66.7	69.5	25	18	31	22	75	-	145	44	0.1
4 Indonesia	62.7	66.7	60	35	91	48	230	920	860	699	0.1
5 Malaysia	70.8	72.8	16	8	22	9	41	57	334	139	0.4
6 Mongolia	63.6	65.5	78	60	108	75	110	-	613	242	0.1
7 Papua New Guinea	52.7	57.2	74	70	101	95	300	1,688	744	501	0.6
8 Philippines	66.5	69.8	41	30	62	40	200	15	937	491	0.1
9 Thailand	68.8	69.2	31	25	37	29	44	130	414	213	1.5
10 Viet Nam	65.7	69.7	38	23	53	30	130	95	563	238	0.4
South Asia											
11 Bangladesh	56.4	62.1	100	54	149	82	380	40	741	506	-
12 Bhutan	56.0	63.2	107	77	166	100	420	285	626	201	-
13 India	60.1	63.4	80	68	123	94	540	7	503	343	0.9
14 Maldives	61.1	69.2	79	59	111	80	110	-	542	53	-
15 Nepal	55.9	59.9	100	69	145	95	740	33	636	322	0.5
16 Pakistan	59.7	63.8	100	81	130	108	500	58	377	379	0.1
17 Sri Lanka	71.6	73.8	26	16	32	20	92	1110	182	88	0.1

Note: *Data for 1980s and 1990 are not available for these columns.

Sources: UNSTATS website - http://unstats.un.org/unsd/mi/mi_goals.asp
World Bank 2005.

Table 6: Indicators of Health Services

Regions	MDG Births attended by skilled health personnel (%)*	MDG Immunization DPT (% of children aged 12-23 months)		MDG Immunization Measles (% of children aged 12-23 months)		MDG Tuberculosis cases cured under DOTS**(%)	Health Expenditure per capita** (current US\$)
	1994-2003	1992	2002	1992	2002	2002	2002
1 East Asia & Pacific	86.0	84.9	84.5	82.3	82.3	-	
2 Europe & central Asia	-	81.3	92.1	84.0	93.2	-	151.8
3 Latin America & Caribbean	82.0	77.3	89.2	82.7	92.4	82.0	217.9
4 Middle East & North Africa	-	84.7	91.8	84.7	92.0	-	98.9
5 South Asia	38.0	54.9	70.8	53.0	67.1	85.0	25.8
6 Sub-Saharan Africa	41.0	49.1	54.5	50.2	57.5	71.0	31.9
7 Least Developed Countries	34.0	48.6	64.2	50.3	64.6	-	36.2
8 World	62.0	70.7	77.3	69.7	76.4	82.0	523.7
East Asia and Pacific							
1 Cambodia	32.0	32.0	54.0	33.0	52.0	92.0	32.0
2 China	97.0	91.0	90.0	87.0	84.0	96.0	63.0
3 Fiji	100.0	97.0	92.0	91.0	88.0	85.0	94.0
4 Indonesia	68.0	64.0	70.0	65.0	72.0	86.0	26.0
5 Malaysia	97.0	94.0	96.0	83.0	92.0	79.0	149.0
6 Mongolia	99.0	81.0	98.0	84.0	98.0	87.0	27.0
7 Papua New Guinea	53.0	62.0	49.0	70.0	56.0	67.0	22.0
8 Philippines	60.0	80.0	79.0	81.0	80.0	88.0	28.0
9 Thailand	99.0	85.0	96.0	74.0	94.0	75.0	90.0
10 Viet Nam	85.0	88.0	75.0	90.0	96.0	93.0	23.0
South Asia							
11 Bangladesh	14.0	66.0	85.0	69.0	77.0	84.0	11.0
12 Bhutan	24.0	86.0	86.0	86.0	78.0	93.0	12.0
13 India	43.0	56.0	70.0	51.0	67.0	85.0	30.0
14 Maldives	70.0	98.0	98.0	98.0	99.0	97.0	96.0
15 Nepal	11.0	49.0	72.0	58.0	71.0	88.0	12.0
16 Pakistan	23.0	42.0	68.0	52.0	63.0	77.0	13.0
17 Sri Lanka	97.0	88.0	98.0	82.0	99.0	80.0	32.0

Notes: * Whenever data for a particular year are not available, data for the most recent year are used.

** As data for these indicators are not available for 1980s or 1990s, the latest years are reported.

Sources: UNDP 2005a;

UNSTATS website - http://unstats.un.org/unsd/mi/mi_goals.asp;

World Bank 2005.

The full report "ASIA-PACIFIC HUMAN DEVELOPMENT REPORT 2006" can be accessed by visiting the site www.undprcc.lk/rdhr2006

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