NATIONAL PRODUCTIVITY COUNCIL

Productivity

Vol. 37 April–June 1996 No. 1

Focus : Learning Organisation

SSI Growth in Indian States

Learning Organisation & Society

Pre-requisites for Learning Organisation

Learning Organisation & Technology Management

TQM Approach to Organisational Learning

Economics of Biodiversity

Maximising Water Use Efficiency

Economics of Sub-contracting

Labour & Capital Productivity Estimates

Guidelines for Contributors

Scope and Coverage

PRODUCTIVITY is the principal journal of the National Productivity Council of India. The Journal aims at disseminating information on concepts of and data on productivity and its growth in India and elsewhere. It also aims at disseminating knowledge on techniques and methods of productivity improvement through effective management of all types of resources. Thus, contributions from a large spectrum of disciplines are accepted for publication. Only those manuscripts that present the results of original research and analysis are acceptable to the Journal. The managerial/policy implications of the study should be highlighted separately towards the end of the paper.

Format of Manuscripts

Contributions should be of about 5,000 words length. Tables, illustrations, charts, figures, exhibits etc. should be serially numbered and typed in separate pages and should not be mixed with the main text. The text should be addressed to the Editor, **PRODUCTIVITY**, National Productivity Council, Utpadakta Bhawan, Lodi Road, New Delhi-110 003.

About the References

Only those references which are actually utilised in the text should be included in the reference list. In the text, references should be cited with the surname of the author(s) alongwith the year of publication and the page number, all in brackets. If there are more than one reference by the same author during any year, the year may be subscripted with 'a' or 'b'. For instance, reference may be given at the end of the sentence as: (Szendrovits, 1988a, p. 337). Sources of data need to be given below each table unless otherwise mentioned in the text. Reference list should be alphabetically arranged. Each reference should carry the surname of the author, followed by other names, the title of the paper in quotes, the name of the journal underlined, volume and issue numbers and the year of publication. In the event of a book, the title should be followed by the publisher's name and year of publication. In the event of a report from an organisation, the name of the organisation may be cited in the place of the author.

Accompanying Material

The manuscripts should be accompanied by:

1. An abstract of the paper not exceeding 100 words.
2. A declaration that the paper is original and has not been submitted elsewhere for publication.
3. A note about the author(s) not exceeding 50 words.

Subscription

Inland	:	Annual Rs. 800
		Single Copy Rs. 200
Foreign	:	Annual Airmail US $ 80
		Annual Surface Mail US $ 75
		Single Copy Airmail US $ 20
SAARC Countries	:	Annual Airmail US $ 40
		Annual Surface Mail US $ 30
		Single Copy Airmail US $ 10

Productivity will be sent to all subscribers within each quarter. The Journals Division, New Age International (P) Ltd., may be contacted in the event of non-receipt within one month from the quarter.

All business correspondence to be addressed to:

THE JOURNALS DIVISION,
NEW AGE INTERNATIONAL (P) LTD.,
4835/24, Ansari Road, Daryaganj,
New Delhi 110 002.

Telex : 031-66507 WEL IN
Cable : WILEY EAST
Phones : 3261487, 3278348, 3267996
3288149

ISSN 0032-9924

Productivity

A QUARTERLY JOURNAL OF THE NATIONAL PRODUCTIVITY COUNCIL

Vol. 37 • April–June 1996 • No. 1

PUBLISHING FOR ONE WORLD

NEW AGE INTERNATIONAL (P) LTD., PUBLISHERS

New Delhi • Bangalore • Mumbai • Calcutta • Guwahati
Hyderabad • Lucknow • Madras • Pune • London • Bangkok

NEW AGE INTERNATIONAL (P) LIMITED, PUBLISHERS

NEW DELHI	:	4835/24, Ansari Road, Daryaganj, New Delhi 110 002
BANGALORE	:	No. 35, Annapurna Building, Basavangudi, Bangalore 560 004
MUMBAI	:	128/A, Noorani Building, Block No. 3, First Floor, L.J. Road, Mahim, Bombay 400 016
CALCUTTA	:	40/8, Ballygunge Circular Road, Calcutta 700 019
GUWAHATI	:	Pan Bazar, Rani Bari, Guwahati 781 001
HYDERABAD	:	1-2-412/9, Gaganmahal, Near A V College, Domalguda, Hyderabad 500 029
LUCKNOW	:	18, Madan Mohan Malviya Marg, Lucknow 226 001
MADRAS	:	20, IInd Main Road, Kasthuribai Nagar, Adyar, Madras 600 020
PUNE	:	Flat No. 2, Building No. 7, Indira Co-op. Housing Society Ltd. Indira Heights, Paud Fatta, Erandawane, Karve Road, Pune 411 038
LONDON	:	Wishwa Prakashan Ltd., Spantech House, Lagham Road, South Godstone, Surrey, RH9 8HB, U.K.

ISSN 0032-9924

Published, on behalf of the National Productivity Council, by H.S. Poplai for New Age International (P) Ltd., 4835/24, Ansari Road, Daryaganj, New Delhi 110 002. Typeset by Pagitek Graphics, 7F West Guru Angad Nagar, Laxmi Nagar, Delhi and printed at Chaman Offset Printers, 1626 Suiwalan, Daryaganj, New Delhi 110 002.

Printed in India.

Production : S.K. Saxena

Contents

Sources of SSI Growth in Indian States: An Exploratory Analysis ... 1
—NPC Research Division

The Learning Organisation & Society: An Epistemological & Ontological Analysis ... 13
—Palmer B. Johnnie

Pre-requisites for Learning Organisations ... 21
—Aruna Mankidy

Learning Organisations: The Role of Executive Leadership ... 25
—Manuel Mendonca & Rabindra N. Kanungo

TQM's Approach: A Model for Organisational Learning ... 34
—Greg Bounds

TQM & Organisational Learning ... 44
—Subrata Chakraborty

Enhancing Learning Productivity: The PAPLANE, An Action-based Management Game ... 53
—R.C.M. Yam, H.M. Izumi, K.S. Chin & Nesa L'abbe Wu

The Learning Organisation & Technology Management ... 62
—P.N. Rastogi

Sustainable Development: Creating Agents of Change ... 70
—Jack Luskin

Learning Organisation & Consumer Satisfaction: The Nigerian Experience ... 73
—Seth Accra Jaja

Culture & Its Consequences for Creativity & Innovation Management ... 84
—R.D. Pathak, Tudoor Rickards & D.M. Pestonjee

Organisational Structure & Effectiveness: A Case Study ... 94
—D.K. Srivastava & Rehana Ghadially

Marketing Orientation in Indian Business Organisations ... 106
—K.S. Gupta & Krishna Murari

Economics of Sub-contracting—The Case of Handloom Industry ... 113
—A.C.K. Nambiar

Technical Efficiency in the Spinning Mills of Kerala ... 118
—P.S. Mohana Kumar & N.C. Pillai

Impact of Fertiliser Decontrol on Consumption: A Statewise Analysis ... 125
—A. Narayanamoorthy

Dynamics of Improved Agricultural Technology—An Economic Analysis ... 134
—P.N. Sankaran

Maximising Water Use Efficiency in Tank & Well Irrigated Areas ... 139
—S.D. Sundar Singh, Sri Sankari, C. Swaminathan, N. Asokaraja & A. Mohamed Ali

Economics of Biodiversity: Some Methodological Issues ... 143
—M. Ravichandran & Cheelam Balasundaram

Small Farmers' Agri-business Consortium: A Case of Dharwad District in Karnataka ... 147
—M.J. Bhende & H.G. Hanumappa

Labour & Capital Productivity Estimates for Indian Economy (1951 to 1994) ... 157
—NPC Research Division

Water Pollution from Leather Processing Industry ... 165
—NPC Environment Division

Book Review ... 168

Special Report

Sources of SSI Growth in Indian States: An Exploratory Analysis

NPC Research Division

The present study attempts to identify and evaluate the roles of major factors responsible for small industry growth across the Indian states. Based on a detailed analysis the study favours a selective approach in terms of both industries and areas to foster small industries development especially in the backward areas. The study assumes significance in the background of the competitive race among Indian states in regard to extending concessions and subsidies of various kinds to small industries.

Prepared by N.K. Nair, Director (Research) & Iswar Pradhan, Assistant Director (Research) of the National Productivity Council, Lodi Road, New Delhi-110 003. Modified from a larger study conducted by National Productivity Council in 1995 at the instance of the Development Commissioner (Small Scale Industries), Government of India.

The present study attempts to identify and evaluate the roles of major factors responsible for small industry growth across the Indian states. The need for such a broad based understanding arises from the observed large differences in performance of the small scale sector across industry groups and also the Indian states (NPC Research Division, 1995b). It was found that, although the traditional segments of the SSI sector has been revealed to have performed lower than their counterparts from the modern segments, there are emerging industries within the former, e.g., handicrafts and, to a lesser extent, sericulture and village industries. Vast differences in performance exist even among the various industries within the modern segments also. Another important feature of SSI development is the observed high disparities in small industry development among states of India.

Status of SSI development is assessed here in terms of employment and output criteria, as used by the Pande Working Group and the Shivaraman Committee respectively for measuring the level of industrialisation in Indian states (Government of India, 1980). Number of persons engaged per lakh population (employment criterion) in 1987-88, varies among major states from 1076 in Punjab to 164 in Assam, the all India average being 462. (table 1). The per capita net value addition (output criterion) has been found to range from Rs. 337 in Maharashtra to Rs. 25 in Assam, in 1987-88, with an all India average of Rs. 129. The output criterion has a higher co-efficient of variation (of 71 per cent) than the employment criterion (the co-efficient of variation being 50 per cent). The states are classified in to three categories viz. highly developed, moderately developed and least developed in table 2. Gujarat, Haryana, Karnataka, Maharashtra, Punjab and Tamil Nadu are found to be the highly developed states in SSI development. The least developed states in this respect are Assam, Bihar, Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh.

Table 1: Inter-state Comparison on SSI Development

State	Per Capita Net Value Addition of SSI Sector (Rs.) in 1987-88	Number of Employees per Lakh Population in 1987-88
Andra Pradesh	140.40	443.06
Assam	24.91	164.16
Bihar	29.51	224.24
Gujarat	135.89	710.23
Haryana	284.97	690.11
Himachal Pradesh	86.57	522.62
Jammu & Kashmir	113.72	568.41
Karnataka	224.29	574.68
Kerala	81.18	605.67
Madhya Pradesh	111.56	257.70
Maharashtra	337.21	482.92
Orissa	59.11	231.25
Punjab	284.22	1076.03
Rajasthan	49.75	300.20
Tamil Nadu	180.96	1002.38
Uttar Pradesh	42.93	268.48
West Bengal	77.67	489.45
All India	129.28	461.86
Co-efficient of Variation (%)	70.50	50.28

Note: (a) The units which are operating outside the purview of SIDO, Ministry of Industry are not covered during the Second Census by DC(SSI); and (b) data for some SSI units either could not be collected or found inadequate/unsuitable to include in the Census results. Hence, depending on the extent of contribution by the uncovered units, the relative position of Indian states may change. However, in the absence of a complete database covering all the small units across the states, the Second Census result could be taken as indicative.

Source: Based on Census of India, (1991) and DCSSI (1992).

Table 2: State-wise Status of SSI Development

Highly Developed States	Moderately Developed States	Least Developed States
Gujarat	Andra Pradesh	Assam
Haryana	Himachal Pradesh	Bihar
Karnataka	Jammu & Kashmir	Madhya Pradesh
Maharashtra	Kerala	Orissa
Punjab	West Bengal	Rajasthan
Tamil Nadu		Uttar Pradesh

Note: States performing better than all India level in both the output as well as employment criteria are grouped as highly developed. States performing lower than all India level with respect to both the criteria are grouped as least developed. States performing better than all India level in only one criterion are grouped under moderately developed category.

Source: Based on Table 1.

Why did some industries or some states perform better than the others in SSI development? The explanation at the theoretical level may include the differences in comparative and competitive advantages enjoyed by them. The distinction between comparative and competitive advantages is that while the former arises from the factor endowments and therefore inherent in the economy, the latter can be engendered, nurtured and shaped or even destroyed by policy initiatives by the government (Porter, 1990). A careful study of the factors that enable SSI development could be beneficial to both the developed and the less developed groups of industries and states while formulating their future course of action. The sources of advantages at the industry level could be classified under 'production advantages', where as those at the level of states under 'locational advantages'.

Sources of advantages at the industry level could be classified under 'production advantages', where as those at the level of states under 'locational advantages.

Production Advantage

The production advantage shows the inherent factors which offer opportunities for cost efficient production at the small scale level. These opportunities may arise from four sources viz. (i) nature of the product; (ii) nature of the production process; (iii) nature & extent of market; and (iv) nature & extent of infrastructure facilities required.

a) Nature of the Product[1]: Sometimes, the unique nature of product tends to lower the cost of production at the small scale level. If the raw material is perishable or/and bulky in nature, its processing at local levels can reduce transfer, storage and handling costs, which may arise if such raw materials are shifted to a distant central place for large scale production. A decentralised production set-up can substantially reduce the disadvantages due to weight, bulk, perishability and handling in case of their transfer to distant places. Enterprises using such raw materials tend to be located in places of proximity to primary resources in order to reduce the transfer cost. In such cases, the potential gains from large scale production do not compensate fully the higher transfer cost of the raw material. Examples are: ghee, cheese, bread, pastry, saw milling, stone cutting and finishing, bricks, tiles etc.

1. Some parts of the present discussion are adapted from Staley & Morse (1965).

There are some final products which are bulky, heavy, difficult to handle, or perishable. Product transfer cost, therefore, tends to exceed transfer cost of material inputs, favouring plant location near the markets or consumption centres. Transfer cost of the finished products is high in relation to potential scale economies as well. The production process accounts for a moderate to substantial share of total costs but involves relatively simple mixing, assembly, or physical operations offering only low or moderate advantage to large scale production. Incentive to gain this moderate advantage by serving several markets from a central plant is inhibited, in greater or less degree, by the cost of product transfer. The examples of such products are: manufactured ice, ice cream, furniture and fixture, concrete products like pipe, tank, beams, other construction materials etc.

There are some activities which favour small size enterprise, due to the individualised requirements of a variety of a industrial, institutional and business customers, often calling for quick execution, and which can, in many cases, be met most efficiently by small shops where proprietors have face to face contact with their customers. Labour costs are an important element in their processing charges because of the versatile skills required on specialised small lot orders. Establishments of this type are rather widely dispersed, located in many different centres of commercial, manufacturing, and institutional activities in order to keep timely contact with their customers. The principal examples of such activities are: printing, publishing, typesetting, computer programming, metal fabrication, repair services etc.

b) Nature of Production Process: Specialization and division of labour are the fundamental factors for production at optimum cost and meeting the quality standards. Specialised nature of production of certain products arises from the skills available at the household level, mostly through the process of inheritance. Many products from artisan enterprises, crafts and village industries belong to this group. There are certain products which require high labour involvement like metal forging, welding, moulding and other fabricating works, cloth dyeing etc. Most of the industries in this group are located near the large scale industrial units. Reflecting the advantages of specialisation of small scale industries in labour intensive products, an increasing number of inter-firm linkages with large industries are being noticed the world over. Some of the inter-firm relationships lead to sub-contracting linkages with large scale units or even other forms of transactions in the market.

c) Nature and Extent of Market: Small size of the market provides, sometimes, natural advantages to small scale production. Many items in the hosiery and garment industries, leather products like, handbag, purse, leather garments, shoes etc. require highly differentiated products to different groups of consumers owing to variations in their tastes and preferences in terms of size, quality, design, price etc. Labour intensity and, sometimes, non-standardisation of products set production advantages in favour of the small scale producers. Frequent changes in consumer tastes are yet another factor for flexible production systems at the small scale level. Many products, even though manufactured at the small scale/household levels on account of economic reasons, are increasingly marketed by large scale marketing organisations. Sometimes small size of the market requires small lot/batch production due to seasonal demand for the product, localisation of certain products in terms of tastes and preferences.

An increasing number of inter-firm linkages with large industries are being noticed the world over.

d) Nature and Extent of Infrastructure Facilities Required: Certain minimum level of infrastructural and other operational facilities are required for industries to operate in a particular locality. However, the extent, intensity and criticality of various facilities would vary depending upon the type of industry. For example, there are high growth potential small industries under hosiery & garment, gems & jewellery, leather products, electronics, engineering, food processing etc. which may require assured resource back up in terms of high quality infrastructure, uninterrupted finance, training, techno-managerial consultancy etc. Industries of this type tend to cluster in and around the localities with assured supplies of such inputs. On the other side, there are industries especially from the traditional segments, which can sustain even with relatively low infrastructural facilities. Since, the minimum threshold of facilities required vary from industry to industry, there would be varying comparative disadvantages encountered by various industry groups depending upon the bottlenecks in infrastructure and other facilities in a locality.

Locational Advantage

The scope for cost efficient production at the small scale level will be dictated by the production advantage already given in the preceding paras. The actual development of SSIs in a particular region, however, would ultimately depend upon the prevailing

local conditions; every state will have its own scope for production at small levels. Hence, the SSI development potential of each state is likely to vary over a wide range.

A vibrant SSI sector development may result depending upon the natural demand and supply conditions alone or in conjunction with concerted governmental initiatives and directions.

The governmental policies aimed at encouraging, assisting, directing and/or protecting SSIs are also an important factor influencing the production scope of SSIs in any state. A wide network of facilitating institutions/agencies has been in operation to support small industries at various stages of their development. The common objective of all these measures is to achieve development of SSIs faster than that which may arise in the natural course. However, the degree of success or effectiveness of individual measures may vary from industry to industry and from state to state. The locational advantages may be grouped under those favouring either demand, supply, or both. The demand and supply factors are determined by the socio-economic conditions prevailing in the concerned state. Policy measures could be deliberately fostered by the government to optimise SSI development. Thus, a vibrant SSI sector development may result depending upon the natural demand and supply conditions alone or in conjunction with concerted governmental initiatives and directions.

Demand Side Factors

Demand is the driving force behind the production of any commodity. The ultimate test of profitable continuance of industries is decided by the availability of demand. The demand for small scale industrial products primarily arises from the following four sources:

(i) Final demand by consumers
(ii) Intermediate demand by producers
(iii) Government Purchases
(iv) Exports

The first two groups of demand are determined by the general socio-economic conditions of the locality. The third group of demand is determined by governmental policies and programmes relating to the procurement of SSI products. Demand from the fourth source is exogenously determined. Out of the four groups of demand sources, two viz. purchases by the central government and exports do not vary among the states in India. The major factors which could cause variation in demand among the states of India are outlined in table 3.

(i) Final Demand by Consumers: Final demand by consumers is a major source of market for SSI products. Hence its determinants at the state level may explain, to a great extent, the variations in SSI development across the Indian states. Major indicators of demand by consumers may be stated as size of the population, the level of per capita income and their tastes and preferences for industrial products in general and SSI products in particular. Population wise the dominant states are Uttar Pradesh (16%), Bihar (10%), Maharashtra (9%), West Bengal (8%), Andhra Pradesh (8%), Madhya Pradesh (8%), Tamil Nadu (7%) and so on in that order in 1991. The per capita income levels show wide variations among the states which may be a major explanatory factor for the varying rates of industrial development experienced by these states. The per capita income in 1990-91 shows Punjab, Maharashtra, Haryana, Gujarat, as above the all India level, where as the states of Bihar, Uttar Pradesh, Orissa, Jammu and Kashmir, Assam, Madhya Pradesh are far below the all India level.

The extent to which people spend their income on consumption of industrial goods depends on their life styles which are constantly influenced by demonstration effects of various kinds. In the absence of detailed data on all the relevant variables, proxy measures like degree of urbanisation and work participation rates in the secondary and tertiary sectors could be taken as indicators. The urbanisation rate is higher in the major states like Maharashtra, Gujarat, Tamil Nadu, Karnataka, and Punjab, where as at the lower end, there are states like Himachal Pradesh, Assam, Bihar, Orissa, Uttar Pradesh and so on.

The extent to which people spend their income on consumption of industrial goods depends on their life styles which are constantly influenced by demonstration effects of various kinds.

Increasing work participation by people in secondary and tertiary sectors may be hypothesised to have a favourable effect on industrial products through consumerism. This is because:

Table 3: State-wise Demand Indicators

State	Population in 1991 ('000)	Per Capita NSDP at Current Prices 1990-91 (Rs.)	Urbanisation (per cent) in 1991	Workers to Total Population 1991 (%)	Sec. & Tertiary Workers to total Workers 1991 (%)	Per Capita (Rural) Agricultural Annual income 1987-90 Avg. (Rs.)	Agriculture's Net Value Added to NSDP 1987-90 Avg. (Rs. crores)	Gross Cropped Area 1990-91 ('000 Hectors)	% of Cropped Area Irrigated 1990-91	Per Hectare Average Value Added 1987-88 (Rs.)	Value of Output (Factory Sector) 1989-90 (Rs. crores)	No. of Enterprises 1990 ('000)
Andhra Pradesh	66508	4731	26.9	45.1	28.75	1240	6031	13192	40.7	4549	13653	2460
Assam	22414	3932	11.1	36.1	26.01	1318	2625	3797	15.1	6998	2981	481
Bihar	86374	2650	13.1	32.2	17.64	948	7113	10485	40.0	6827	11343	–
Gujarat	41310	5850	34.5	40.2	40.24	1576	4266	10361	28.0	4361	24080	1493
Haryana	16464	7516	24.6	31.0	41.16	2878	3572	5919	71.6	6321	8023	453
Himachal Pradesh	5171	4790	8.7	42.8	30.72	1135	536	984	17.0	5519	879	180
Jammu & Kashmir	7719	3872	23.8	–	–	–	777	1066	40.9	7314	386	–
Karnataka	44977	4631	30.9	42.0	32.63	1740	5405	11759	22.1	4462	10104	1704
Kerala	29098	4032	26.4	31.4	51.98	1341	2873	3020	12.7	9517	5906	1222
Madhya Pradesh	66181	4021	23.2	42.8	22.46	1317	6696	23880	18.6	2983	12206	1865
Maharashtra	78937	7598	38.7	43.0	38.49	1695	8205	21866	11.4	3779	49816	2625
Orissa	31660	3596	13.4	37.5	24.17	1259	3452	9594	24.1	3718	4763	1099
Punjab	20282	8423	29.5	30.9	43.92	3929	5615	7502	94.0	7594	12178	633
Rajasthan	44006	4035	22.9	38.9	28.37	1291	4383	19380	24.0	2448	7196	1175
Tamil Nadu	55859	4619	34.2	43.3	38.19	1064	3915	6632	43.6	5738	24067	–
Uttar Pradesh	139112	3557	19.8	32.2	26.99	1310	14608	25480	58.0	5763	22123	2641
West Bengal	68078	4794	27.5	32.2	43.51	1264	6239	8662	22.1	7472	14062	2795
All India	846302	5015	25.7	37.5	32.63	1522	94807	185477	33.3	5234	230659	21697

Source: CMIE, (1994).
Census of India, (1991).

(i) People's participation at work would reduce their leisure time. There would be changes in life style towards increasing reliance on household appliances and ready to consume items for household and personal use; automobiles for faster movement between home and place of work, readymade garments, washing machines etc., for instance.

(ii) Contact with people from various strata of society may result in demonstration effects on working people; boosting demand for telephones, television receiving sets, radio etc.

The effect of consumerism on the life of workers would be felt more in the case of those in the secondary and tertiary sectors than in the case of their counterparts in the primary sector due to wide variations in the life styles at the work place and also their higher affordability. Higher proportion of labour in the secondary and tertiary sectors thus could be expected to generate higher demand for SSI goods and services due to both higher incomes as well as demonstration effects.

The work participation rates (all sectors) do not seem to depict a clear pattern across the states to explain differences in small industry development. However, the work participation rate in secondary and tertiary sectors support the stated hypothesis; the industrially developed states have higher proportion of workers in the secondary and tertiary sectors than in the case of less developed states.

(ii) Intermediate Demand by Producers: SSI products are demanded by producers for being further

processed in their units. These include machinery, parts, components, systems, sub-systems, job- work, tools, implements etc. The sources of demand in this case may be grouped under: agricultural sector and industrial sector.

Agricultural sector is not merely a source of resources (whether food, raw materials, labour or financial saving) but also generates a growing demand for agricultural and industrial products. Studies point out that agricultural growth and productivity are keys to the development and sustenance of industrial progress even in predominantly agricultural economies. Modern agricultural technology requires an immense supply of purchased inputs such as fertilizers and pesticides and also increased control of water as well as communication with sources of new technology and markets. The consequent commercialisation of agriculture calls for vast investments in rural infrastructure (e.g. roads, electricity etc.) which provide for growth stimulating investments leading to demand generation for products from the SSI sector also. Demand patterns are likely to be skewed towards non-agricultural goods and services. Mellor (1979) estimates that a 4 per cent rate of growth in agricultural sector is likely to stimulate growth in non-agricultural sectors to the extent of 10-15 per cent. The percentage of land area that can be provided with assured supplies of water, often imposes limits on the levels that can be realised by technological changes in agriculture (Raj, 1990). Hence the extent of demand for industrial products from the agriculture sector would depend upon gross cropped area, percentage of irrigated area to cropped area and land productivity (yield rates). In terms of gross cropped area, states having more than one crore hectares are Uttar Pradesh, Madhya Pradesh, Maharashtra, Rajasthan, Andhra Pradesh, Karnataka, Gujarat and Bihar. Cropped area alone perhaps can not ensure affordability of industrial products unless supported by agricultural earnings. Agricultural earnings would, however, depend to a great on the assured water supply proxied by proportion of area irrigated, and productivity. The states having high percentage of irrigated cropped area are Punjab (94%), Haryana (72%), Uttar Pradesh (58%), Tamil Nadu (44%) and so on. The major states at the lower end in this respect are Maharashtra, Kerala, Assam, Madhya Pradesh, West Bengal and Karnataka. As regards land productivity, the leading states are Kerala, Punjab, West Bengal, Jammu and Kashmir and so on, where as the major states having low land productivity are Rajasthan, Madhya Pradesh, Orissa, Maharashtra etc. A noticeable feature here is that the industrially developed states like Maharashtra, Karnataka and Gujarat have low irrigation rates and low levels of land productivity in comparison to others. But the per capita agricultural earnings of these three states are at higher levels than the national level. Perhaps, the reason may be higher labour productivity and/or better land-man ratio;

Agricultural growth and productivity are keys to the development and sustenance of industrial progress even in predominantly agricultural economies.

both of which would result in demand for higher mechanical inputs in agricultural operations.

Industrial sector itself is a major customer of products from the small scale industries. With the objective of reducing unit cost of production, large scale units usually concentrate on their 'core' activities which usually include design, marketing, assembly and the production of some key components. They sub-contract or source externally a significant range of inputs, components and services. Sub-contracting enables a symbiotic coexistence of large and small industries in their respective areas of specialization. The parent firm derives advantages due to reduced costs, easy implementation of flexible manufacturing system (FMS), and technologies like just-in-time (JIT), insulation from market fluctuation etc., where as, the sub-contracting firm enjoys benefits like assured market, managerial and technological assistance, etc. (NPC Research Division, 1995a). The output of factory sector can be taken as a proxy for industrialisation in a particular state and hence flow of demand for SSI products. Maharashtra has been found to be highest industrialised state with the highest value of output in 1989-90 followed by Gujarat, Tamil Nadu, Uttar Pradesh etc.

Maharashtra has been found to be highest industrialised state with the highest value of output in 1989-90 followed by Gujarat, Tamil Nadu, Uttar Pradesh etc.

The profile of demand indicators show wide disparities across states of India. Size of the state, although an important factor, is not a sufficient condition to generate substantial demand unless supported by higher earnings. States like, Madhya Pradesh, Uttar Pradesh and Bihar, although, are large in terms of geographical area and population, do not reveal any significant demand base because of low purchasing power. Industrially developed states like, Punjab, Maharashtra, Karnataka, Gujarat, Tamil Nadu etc. are found to have strong demand base in agriculture, industrial and final consumer sectors.

Punjab, Tamil Nadu, Uttar Pradesh, Andhra Pradesh have a broad based demand generated from the agricultural sector, while Maharashtra, Karnataka, and Gujarat have substantial demand base also in the industrial sector. The lower positions of major states like Bihar, Orissa and Madhya Pradesh in the demand side may explain, to a great extent, their less successful experience in the development of small industries. This deficiency in the domestic demand for SSI products in these states could have been overcome if there was a deliberate slant towards export markets, which is missing in their policies and programmes. It needs no reiteration here, that the industrial future of the local demand deficient states, will rest on how effectively they can exploit the expanding opportunities in the international markets, which are now opened up as a sequal to the liberalization measures and structural reforms.

The industrial future of the local demand deficient states, will rest on how effectively they can exploit the expanding opportunities in the international markets.

Supply Side Factors

The supply side conditions determine the advantages through their impact on cost of production, product quality and transfer cost. If the supply conditions of a particular locality/state is superior to its neighbouring one, industrial development (even with the existence of local demand bottlenecks) becomes plausible. These supply side factors may broadly be classified into (i) human resources (ii) physical natural resources (iii) others including infrastructure, labour climate, financial resources etc. The various supply indicators are shown in tables 4-6.

(i) Human Resources: Most of the problems relating to the development of industries ultimately rest on the people, in terms not only of size but also the composition and quality. The contribution of human factor to the success of industries includes, entrepreneurship, skilled and semi-skilled labour, socio-cultural milieu etc. Entrepreneurship is one of the basic requirements for industrial development. An entrepreneur is a dynamic agent of change, or the catalyst who transforms the physical, natural and human resources into corresponding production possibilities (Schumpeter, 1961). Right entrepreneurship makes it possible to exploit the available opportunities for higher business gains. These business gains besides fuelling existing demand, add further to the investment potential, thereby, creating higher employment, output and growth. Entrepreneurship being an individual based characteristic is mostly determined by factors like:

- socio-economic status
- education and knowledge
- organisational skills
- information base
- innovation orientation
- progressive values.

Table 4: State-wise Supply Indicators (Human Resources)

State	Population 1991 ('000)	Literacy Rate 1991 (%)	Death Rate (per '000 persons) 1989-91	Population Below Poverty Line (%) 1987-88
Andhra Pradesh	66508	44.1	9.3	31.7
Assam	22414	52.9	11.0	22.8
Bihar	86374	38.5	10.8	40.8
Gujarat	41310	61.3	9.0	18.4
Haryana	16464	55.9	8.4	11.6
Himachal Pradesh	5171	63.9	8.8	9.2
Jammu & Kashmir	7719	–	7.6	13.9
Karnataka	44977	56.0	8.6	32.1
Kerala	29098	89.8	6.0	17.0
Madhya Pradesh	66181	44.2	13.1	36.7
Maharashtra	78937	64.9	7.8	29.2
Orissa	31660	49.1	12.3	44.7
Punjab	20282	58.5	8.0	7.2
Rajasthan	44006	38.6	10.0	24.4
Tamil Nadu	55859	54.6	8.7	32.8
Uttar Pradesh	139112	57.7	11.9	35.1
West Bengal	68078	57.7	8.3	27.6
All India	846302	52.1	10.1	29.9

Source: CMIE, (1994).

Although the entrepreneurial skill varies from individual to individual, its concentration in some societies compared to others shows that specific factors may explain differences in achievements. Studies show that the emergence of entrepreneurs in a society depends closely upon interlinked economic, social, psychological, religious and cultural attributes. With the inability to assimilate such a detailed profile of entrepreneurial factors

Table 5: State-wise Supply Indicators (Physical Resources)

State	Gross Cropped Area 1990-91 ('000 Hctr)	% of Cropped Area Irrigated 1990-91	Avg. Value Added Per Hectare 1987-90 (Rs.)	Mineral Resources (in mln. tonnes)				
				Coal Jan. '94	Iron Ore	Limestone	Dolamite	Bauxite
					April 1992			
Andhra Pradesh	13192	40.7	4549	10838	54	14295	130	592
Assam	3797	15.1	6998	295	8	703		
Bihar	10485	40.0	6827	64601	3087	705	47	61
Gujarat	10361	28.0	4361			8555	682	108
Haryana	5919	71.6	6321			48	7	
Himachal Pradesh	984	17.0	5519			3603		
Jammu & Kashmir	1066	40.9	7314			741		2
Karnataka	11759	22.1	4462		2421	17253	325	27
Kerala	3020	12.7	9517		36	26		8
Madhya Pradesh	23880	18.6	2983	40281	2186	9450	1667	141
Maharashtra	21866	11.4	3779	6277	182	2778	223	87
Orissa	9594	24.1	3718	46527	2602	1212	1171	1442
Punjab	7502	94.0	7594					
Rajasthan	19380	24.0	2448		8	9793	136	1
Tamil Nadu	6632	43.6	5738		1	838	2	18
Uttar Pradesh	25480	58.0	5763	1062		1338	224	9
West Bengal	8662	22.1	7472	26442		35	293	
All India	185477	33.3	5234	196892	11977	76446	4967	2525

Source: CMIE, (1994).

across the states of India due to non-availability of the required data base, an outline in terms of the broad indicators can be expected to offer some explanations.

The three major states viz. Orissa, Bihar and Madhya Pradesh, although having a large population, are found at the lower side of the quality of human resources judged in terms of literacy rate, mortality rate and incidence of poverty. The most populous state, Uttar Pradesh also lies close to them in this regard. Even though there exists no direct evidence to the absence of entrepreneurship in these states, the predominance of tribal and illiterate population may be a constraint on the conversion of available entrepreneurial potential into successful enterprises.

The three major states viz. Orissa, Bihar and Madhya Pradesh although having a large population, are found at the lower side of the quality of human resources judged in terms of literacy rate, mortality rate and incidence of poverty.

There appears a reverse flow of talent and capital into India from the non-resident Indians (NRIs) as a sequal to the economic reforms initiated from 1991 onwards. The NRIs, once viewed as a drain to the resources of the nation, are now seen as a significant source of skill, technology and capital. However, the gains from this as of now seem to be uneven, as Punjab, Gujarat, Maharashtra, Kerala, Karnataka, Tamil Nadu and Andhra Pradesh have been particularly fortunate in tapping the resources of the expatriates, both financial and intellectual (Times of India, Dt. 4.12.1995). Serious efforts have been initiated at least at the ministerial level in recent period to attract NRIs especially in the underdeveloped states like West Bengal, Bihar and Orissa.

(ii) Natural Resources: Raw materials are the basic requirements of industries. The supply of raw materials ultimately depends upon the resource base i.e. agricultural and other natural resources. In terms of gross cropped area the major states are Uttar Pradesh, Madhya Pradesh, Maharashtra, Rajasthan and so on. Size alone may not guarantee agricultural surplus unless accompanied by higher productivity. The major states having higher land productivity are Punjab and West Bengal, where as the major states having higher agricultural labour productivity are Punjab, Haryana, Karnataka, Maharashtra and Gujarat.

The availability of major mineral resources viz. coal, iron ore, limestone, dolomite, bauxite etc. used by industries show concentration in a few states, but most of

Table 6: State-wise Supply Indicators (Other Factors)

State	Infrastructure Facilities						Fund Availability			Labour Climate
	Railway Route Length (in Km) per '000 sq. km. area 1992-93	Road Length (in Km) per '000 sq. km. area 1992-93	Motor Vehicle/ '000 persons 1992-93	Persons per Telephone Set 1992-93	Per Lakh Persons News & Periodicals circulation '91 (nos.)	Power Deficit 1991-92 as % to Reqrmt.	Per capita Deposit of Scheduled Com. Bank Mar '93 (Rs.)	Per Capita Cummulative Assistance by Fn. Inst. 1993 (Rs.)*	Per Capita Deposit of Co-operative Banks 1990-91	Man-days Lost to Total Man-days 1990 (%)
Andhra Pradesh	18.38	500	24.81	137	3.46	6.7	2024	1231	72.87	0.19
Assam	31.45	820	11.69	342	1.10	–	1139	293	63.37	0.53
Bihar	30.57	488	12.24	504	3.94	29.7	1232	269	52.51	0.22
Gujarat	26.94	382	53.07	67	5.78	4.3	3799	3112	475.12	0.34
Haryana	33.90	587	37.80	104	1.20	2.0	2972	1606	270.95	0.68
Himachal Pradesh	4.78	403	14.14	102	0.91	0.7	3484	1981	590.91	–
Jammu & Kashmir	0.40	95	19.19	188	3.04	10.8	2783	740	–	–
Karnataka	16.11	659	33.38	94	4.93	23.6	2877	1414	190.79	0.13
Kerala	26.45	3173	22.93	71	19.17	3.3	3920	760	291.47	0.48
Madhya Pradesh	13.50	239	25.17	180	5.86	5.6	1375	749	160.22	0.13
Maharashtra	17.73	673	37.81	122	9.74	4.5	8033	2840	670.48	1.36
Orissa	12.86	1254	13.60	301	3.39	7.0	1098	806	47.45	0.17
Punjab	42.12	1010	72.23	71	8.49	6.2	6104	1554	488.13	0.29
Rajasthan	16.77	194	22.08	166	4.00	1.4	1569	964	103.54	1.75
Tamil Nadu	30.93	1284	30.78	133	7.18	4.8	3274	1690	266.86	1.09
Uttar Pradesh	30.23	625	15.24	274	5.48	10.3	1755	607	102.95	0.73
West Bengal	43.10	649	14.00	658	3.76	9.0	3396	714	58.76	2.58
All India	19.01	544	27.30	112	6.37	7.8	3125	1704	–	–

Note: * Institutions covered here are: IDBI, IFCI, LIC, GIC, IRBI, SFCs and SIDCs.

Source: CMIE, (1994).
NPC Research Division (1994).

them are not industrially developed. Except limestone the availability of which is widely dispersed across the Indian states, all the other minerals have been concentrated mainly in Madhya Pradesh, Andhra Pradesh, Bihar, Orissa, Maharashtra, West Bengal and Uttar Pradesh. Yet, most of them are industrially underdeveloped. This implies that the availability of mineral resources is not a necessary condition for small industries development. It is also important to note that many such minerals are uneconomical to be exploited at the level of small enterprises because of technology related reasons.

(iii) Others: Variations in transport facilities (including railways) among the major states do not show a pattern to infer that industrially developed states have better transport connection than that in the other states. The hilly states, however, are at a critically lower level in this respect. This, gives an impression that better transport connections although may not provide direct impetus to industrialisation, its absence or presence below a certain minimum level would be detrimental to industrial development. The extent of availability of motor vehicles and telephone facilities across the states shows that developed states like punjab, Maharashtra, Karnataka etc. are perceptibly better equipped in this aspect compared to the major underdeveloped states like, Assam, Bihar, Orissa, West Bengal, Uttar Pradesh and Madhya Pradesh. Among the remaining infrastructure indicators like, power availability and newspaper and other periodicals in circulation among the states reveal a broad pattern confirming that developed states are better placed than the underdeveloped ones.

Most of the problems of small scale industries are ultimately related to the problem of finance, in terms not only of the absolute amount of funds at the disposal of

Availability of mineral resources is not a necessary condition for small industries development.

the industry but also of its timely availability. The per capita fund availability from three sources viz. deposits in commercial banks, assistance by financial institutions and deposits in co-operative banks can broadly indicate the finance availability, particularly to the locally based SSI sector. However, the timely availability would depend upon the quality of delivery mechanisms at the local level. There exists a large gap in per capita availability of finance among the developed and underdeveloped states. This may, however, be traced back to the differences in the income levels among the Indian states.

Thus the profile of supply side indicators corroborates the association of lower performance of underdeveloped states, compared to that of the developed states, in many respects, with low level of industrialisation. Underdeveloped states like, Bihar, Orissa, Madhya Pradesh and Uttar Pradesh although have certain advantages due to their size and availability of mineral resources, are weak in infrastructure and finance related factors leading to constrained industrial development in general and SSI development in particular. Agricultural development which has a major role to play in industrialisation process is conspicuous by its lack of dynamism in these states when compared to Punjab, Haryana, Tamil Nadu, Gujarat, Maharashtra and Karnataka. The evidences presented here point towards the conclusion that the efforts to achieve socio-economic development through the substitution of agricultural development by small and rural industries may not meet with anticipated success and, in most of the cases, may be even counterproductive.

Efforts to achieve socio-economic development through the substitution of agricultural development by small and rural industries may not meet with anticipated success and, in most of the cases, may be even counterproductive.

Competitiveness

Competitiveness ranking of select 15 States of India earlier arrived at by the National Productivity Council also leads to similar conclusions (table 7). Competitiveness is defined in this study in terms of a broad list of factors relating to infrastructural development, human resource development, size of the market and other socio-economic indicators. It revealed the lower end positions of Bihar, Uttar Pradesh, West Bengal and Madhya Pradesh. The ranking shows Punjab as the most competitive followed by Kerala, Haryana, Gujarat, Karnataka, Tamil Nadu, Maharashtra and so on (NPC Research Division, 1994).

Table 7: Competitiveness Ranking of Indian States

States	Human Development Index	Infrastructure development Index	Competitiveness Index
Punjab	100.0	100.0	100.0
Gujarat	75.6	69.0	73.2
Haryana	82.8	66.0	76.4
Rajasthan	32.3	57.0	48.1
Assam	41.0	56.0	56.1
Karnataka	50.9	48.0	67.9
Kerala	94.8	47.0	81.8
Orissa	21.8	46.0	56.3
Tamil Nadu	51.0	40.0	59.3
Maharashtra	68.6	39.0	58.9
Andra Pradesh	34.6	38.0	56.4
Madhya Pradesh	17.0	36.0	44.4
Uttar Pradesh	14.3	18.0	30.5
West Bengal	46.8	13.0	41.3
Bihar	10.7	7.0	27.0

Note: Competitiveness is estimated from a broad list of factors relating to human development, infrastructure development and other socio-economic development.

Source: NPC Research Division. (1994)

Policy Implications

Constrained by the internal as well as external factors, small industries may not develop to the desired extent which a society seeks to achieve. The internal factors result from limited knowledge, skill, resources and risk bearing capacity of the entrepreneurs, due to which the small size units are most vulnerable. The external factors are the results of socio-economic and business environment prevailing in the local community. Hence, a reasonable degree of support, at least in the initial stages of their development, may help in overcoming many of the obstacles in the process of small industries development. Success of the institutional support mechanisms, depends on the extent to which clear cut directions are offered through judicious combination of the demand factors with the resource endowment of a particular region.

In tune with this, various protective and promotional measures have been introduced by the central as well as state governments for achieving the assigned objectives by the small scale sector. The protective measures, which are specific to products or to the scale of production or

to location, have been formulated with a view to support the small units against the competitive threats from the large scale units, where as the promotional measures have been intended to improve the efficiency and viability of the small enterprises. Although the protective and promotional measures are broadly applicable all over the country, the aspects which are of special interest here are those with variations at the state level. The major areas where differences in state policies for SSI promotion may exist, can be:

(a) Fiscal and monetary

- concessions/deferment in sales tax
- seed capital/margin money assistance schemes
- capital investment subsidies

(b) Infrastructure

- creation and promotion of industrial estates, growth centres
- transport subsidies
- power subsidies
- hire purchase schemes for allotment of land/sheds in industrial areas
- priority in allocation of various facilities such as power connection, water connection etc.

(c) Marketing

- priority in state government's purchase
- existence or otherwise of state sponsored marketing organisations.

(d) Techno-managerial

- training to entrepreneurs
- consultancy and technical support services

The structure of state government support policies and incentives in the Indian states fairly cover all the four areas of promotional measures (Sarma & Diwan, 1994). Excepting minor differences in the operational parameters used, most of the subsidies/incentives could be considered as similar among Indian states (NCAER & FNS, 1993). However the extent of subsidies and incentives granted to SSI sector vary over a wide range between the industrially backward and developed areas of the states; higher incentives/subsidies being earmarked for backward areas. For example, the capital investment investment subsidy ranges from 15 to 25 per cent of fixed investment (subject to outer ceilings) in the states depending upon the industrial status of the areas. Similarly, exemption/deferment in sales tax also varies over the regions of the state between 5 and 10 years. Such favourably biased policy treatments are being consciously and deliberately organised to facilitate industrial development of the backward areas. The administrative unit for such treatment is normally taken as a district or part of it in some cases, but rarely the state as a whole. These subsidies and incentives, although remain similar across Indian states, wide differences, however, are found to exist in terms of the effectiveness with which they are implemented. The factors which govern the effectiveness can broadly be classified as those relating to (a) industrial and business environment (demand-supply conditions) as the necessary condition; and (b) efficiency of the implementing institutions/agencies as the sufficient condition. The ultimate impact of these factors on industrial development would be governed by the interaction between them. This probably explains, to a large extent, why the policy measures are successful in some states where as, they are not so in some others.

These subsidies and incentives, although remain similar across Indian states, wide differences, however, are found to exist in terms of the effectiveness with which they are implemented.

An examination of the causes of differences in the development of SSIs in Karnataka, Gujarat and Maharashtra (developed states) on the one hand and Madhya Pradesh (less developed state) on the other shows the relevance of factors like, development bureaucracy's zeal while implementing the support measures, existence of infrastructural facilities, entrepreneurial talents and business culture, quality and dependability of labour, availability of a pool of investors, supportive role of the governments etc. (NPC Research Division, 1995c). The governments in these three developed states seem to have realised that their role may be more usefully directed at providing better social, physical, financial and infrastructure facilities rather than carrying out micro management of specific industries/projects. As a result of the availability of better facilities, many natural clusters of small scale units could be fostered in these states; software and electronics industries in Karnataka, ship-breaking activities and diamond industries in Gujarat for instance. Compared to the efforts and initiatives by the front line agencies like the District Industries Centre (DIC) and Zilla Udyog Mitra (ZUM) etc. in Gujarat,

Maharashtra and Karnataka, many of the implementing agencies at the grass-root level in Madhya Pradesh are poorly equipped to implement effectively the policy measures. For example, the District Industries Centres (DICs) introduced in 1977-78 to serve as a focal point of SSI development at the district level has been reduced to a bureaucratic unit for the routine activities like registration, disbursement of incentives and subsidies and reference of cases to the various specialised agencies/ institutions. Much of the essential support activities like techno-managerial consultancy, economic investigation etc. have been either non-existent or reduced to very low levels (NPC Research Division, 1995c). The performance of many other implementing agencies/institutions involved in the promotion of small industries at the grass-root level may also be included in the same category, although with varying degrees. The network of implementing agencies/institutions in most of the backward states seems to be poorly equipped for an active participation in SSI development.

Conclusion

Development of SSIs has been unsuccessful among many states in India, even after the deliberate attempts to promote them for more than four decades. While there are states, whose success in realising SSI development provides learning cases for industrially backward states, they also offer role models for many nations.

A selective approach in terms of both industries and areas would prove to be more effective.

Analysis done in this paper shows that, development potential of small industries in a particular locality is closely interlinked with developments in many aspects-ranging from social, demographic, institutional, economic etc. to policy in terms of financial, technological and infrastructural support. Given the widespread differences in these areas, the SSI sector may perform differently in different states of India. In such a situation, efforts on the part of the underdeveloped states to foster small industries of all types and in all localities based on a single criteria of investment with a view to providing positive incentives and infrastructural support may not yield the desired result. A selective approach in terms of both industries and areas would prove to be more effective.

In the case of states with inadequate demand for SSI products, the thrust should be on industries that have assured demand from outside the state (including export markets). A large number of units from hosiery and ready made garments, leather products, electronics, engineering, food processing, chemical and pharmaceuticals, auto parts, electrical appliances etc. could be considered as industries with a broad based demand in all the states, in addition to the export markets. At the same time, such industries are highly dependent on some basic infrastructure, finance and certain other techno-economic facilities. As observed from the supply side analysis such facilities are neither readily available, in many of the demand constrained states, nor it could be created throughout the state, at least in the short run. Hence, the best possible option could be to select few centres/locations to promote the desired facilities.

References

Census of India (1991) "Final Population Totals: Brief Analysis of Primary Census Abstract."

Centre for Monitoring Indian Economy (CMIE) (1994) "Basic Statistics Relating to States of India," September.

DC(SSI) (1992), "Report on the Second All India Census of Small Scale Units", Government of India, New Delhi.

Government of India (1980), "Report on Industrial Dispersal", National Committee on the development of Backward Areas (Shivaraman Committee), New Delhi.

Mellor, J.W. (1979), "The New Rural Development Strategy", Paper Presented at the Joint VNITAR/EDI Seminar on Economic Development and Its International Setting, Washington DC. excerpted in Gerald E. Meier (1984) "Leading Issues in Economic Development", Oxford University Press, New York.

National Council of Applied Economic Research (NCAER) & Friedrich-Naumann-Stiftung (FNS) (1993), "Structure and Promotion of Small Scale Industries in India-lessons for Future Development", New Delhi.

NPC Research Division (1994), "Competitiveness Ranking of Indian States", Productivity, Vol. 35(2).

NPC Research Division (1995a), "Subcontracting: Emerging Issues in the Indian Context", Productivity, Vol. 35 (4).

NPC Research Division (1995b), "Small Sector in India: Role & Performance", Productivity, Vol. 36(1).

NPC Research Division (1995c), "Growth Profile of SSIs in Madhya Pradesh", sponsored by DC(SSI), Ministry of Small Industry, Government of India, New Delhi.

Porter, Michael E. (1990), "Competitive Advantage of Nations", Free Press, New Delhi.

Raj, K.N. (1990), "Some Question Concerning Growth, Transformation and Planning of Agriculture in the Light of Experience in Mexico, Taiwan, and India", in K.N. Raj "Organisational Issues in Indian Agriculture", Oxford University Press, New Delhi.

Schumpeter, J.A. (1961), "The Theory of Economic Development: An Enquiry into Profits, Capitalk, Interest on the Business Cycle", Harvard University Press, Cambridge.

Staley E, & Richard Morse (1965), "Modern Small Industry for Developing Countries", McGrow-Hill, New York.

Times of India (1995), "Banking on a Drain", Dt. 4th December, Pg.10.

□

The Learning Organisation & Society: An Epistemological & Ontological Analysis

Palmer B. Johnnie

The paper examines the issues confronted by the learning organisation and society and develops the epistemological and ontological argument that organisations can learn, because they have cognitive systems. The survival of the learning organisation depends on how it explores and masters its environment and acquires experience over time. The author concludes that the learning organisation should be experimental, identify stimuli using its metasystems to assemble responses, redesign its inner environment and attempt to achieve a dynamic balance.

Palmer B. Johnnie is Senior Lecturer in Industrial Relations, Personnel Management and Organisational Behaviour in the Faculty of Management Sciences at the Rivers State University of Science and Technology, Port Harcourt, Nigeria.

Organisations are inextricable components of the plural society which we not only inhabit but also transact in. For organisations to continue to function and remain relevant in society they have to adopt both defensive and offensive (Nystrom et al, 1976; Starbuck, 1976; Weick, 1969) mechanisms in fashioning an appropriate learning methodology. As individuals attempt to acquire repertoires of knowledge through learning in organisations, and the society at large, the organisations should also attempt, perhaps more vigorously, to learn at a more rapid rate than individuals, in a society where the only permanent phenomenon has become change itself. Learning at the level of the modern organisation has therefore become a very potent and virile instrument for organisational survival and continuity.

The inability to learn and to correctly enact and react in their environments, with sufficient understanding of the society at large, had continuously led to the high mortality rate of organisations in some countries, particularly in developing societies. This problem is unlikely to be abated soon, unless modern organisations continue to reinforce their existing learning capabilities and develop newer and stronger learning apparatus by iteratively mapping their environments and using these maps to positively alter their societies.

Learning Organisation & Society

The concept of learning organisation or organisational leaning raises a few fundamental questions as

The inability to learn and to correctly enact and react in their environments, with sufficient understanding of the society at large, had continuously led to the high mortality rate of organisations in developing societies.

to whether or not organisations as entities left on their own can do anything by way of learning. Can organisations learn when they do not have brains and minds of their own? Or as Hedberg (1981) would ask: do organisations only learn and remember through their current members? Hedberg went on to say that the literature on organisational learning mostly avoids these questions. Although the concept of organisational learning or the learning organisation is used widely, the empirical evidence has mostly come from laboratory studies conducted in respect of individuals and animals.

In their studies, March and Olsen (1976) have described the learning cycle as a stimulus–response situation in which individual actions lead to organisational actions and this evokes response from the environment. These actions are later reported back into the organisation which affect "individuals, cognitions and preferences and so influence future actions". The views expressed here both by Hedberg (1981) and March and Olsen (1976) seem to suggest that organisations cannot learn because they are not living organisms but are mere constructs without brains. It is people who learn. Organisations cannot do anything because they have "no properties aside from those which channel through people" (Hunt, 1980). Cyert and March (1963) went as far as to argue that organisations cannot have goals, it is only people and coalitions of people that can have goals. But Hedberg (1981) pointed out that although organisations do not have brains, they have what he described as cognitive systems and memories. He made out a convincing argument that individuals develop their "personalities, personal habits, and beliefs over time, organisations develop world views and ideologies". The argument is also advanced that organisational members come and go, leadership changes from time to time but organisations' memories preserve certain behaviour patterns, mental maps, beliefs and values over time. The learning organisation can preserve certain behaviour patterns, reframe its mental maps, re-enact its beliefs and values by simply relying on historical facts and antecedents. Examples of these are standard operating procedures which are produced from ideas accumulated over time and which becomes behaviour repertoires made available to incoming members of organisations to inherit. As argued by Blau (1969) and Cohen (1974) "customs and symbols are bearers of organisation's traditions and norms; they help people to perpetuate organisation's social pattern".

The learning cycle as a stimulus–response situation in which individual actions leads to organisational actions and this evokes response from the environment.

It follows that individuals may be agents through which organisations learn but the knowledge that is accumulated over time becomes the proprietary right of the organisation. As mentioned earlier organisations do not have brains and minds of their own; However, organisations can learn because they have cognitive systems which assist them to assemble facts and construct reality, develop world views and ideologies. Organisations are generally referred to as stages on which repertoires of plays written and stored previously are dramatised by individual actors. The individual actor cannot act unless there exists a stage on which he could act (Johnnie, 1993). In fact, the scripts are written by the organisation but individuals are merely assigned roles and become "socialised into a theatre's norms, beliefs, and behaviours".

Environment of the Learning Organisation

Our concept of the learning organisation or organisational learning is not complete until we discuss the environments in which learning takes place. The society in which we operate and transact is made up of a multiplicity of variables and is a dynamic force of social change. These changes are essentially governed by certain factors. One such factor is the political environment. Organisations exist in a political environment, the dynamism of which in developing societies is sometimes as turbulent as the hurricane, so much that it becomes impossible for organisations to assemble the necessary learning aids to learn and assimilate the political dynamics of the society. But the learning organisation must endeavour to defensively and offensively (Nystrom, et al, 1976; Starbuck, 1976; Weick, 1969) put together all the resources for learning so as to study and understand its environment. The learning organisation which aspires to control its environment is that which makes attempts to plan ahead based on past experiences. By so doing it will not only domesticate its environment but will keep it in perpetual captivity. This is the secret and basis of success stories of most multinational corporations.

Political Changes: Learning organisations are exposed to rapid political changes in society. Political actions could make or mar the activities of business organisations. Mere pronouncements made by certain strategic political individuals in a country could create serious shifts in the direction of business activities. Wars and rumours of wars have in the past, even positive political statements have sometimes brought about immediate changes in the activities and programmes of

the organisation. The learning organisation, as the name implies has a lot to learn in respect of the political dynamics of its operating environment; it has to understand the political direction, identify all the political environmental triggers in its operational domain and ensure that it stays within the same dynamic political wavelength. The learning organisation should have the power to identify problems and explore opportunities in order to develop new domains (Thompson, 1967) and identify actions to serve as triggers for organisational learning (Hirschman, 1970).

The learning organisation should have the power to identify problems and explore opportunities in order to develop new domains and identify actions to serve as triggers for organisational learning.

Economic Systems: The other environmental variable that impinges on the activities of the learning organisation is the over exploited and explored economic system. Most organisations survive against the turbulence of both the political and economic environments successfully because they have acquired experiences based on their strong capacity to learn and their ability to effectively play both the political and economic "chess game" by offensively and defensively writing scripts for themselves, studying these scripts closely and using knowledge gained from these scripts to perpetuate themselves and develop their world views and ideologies. The economic environments are not only becoming increasingly complex, but have become too sophisticated and seem to be moving at 'nuclear' pace. The learning organisation must constantly strive to attain intellectually powerful learning heights, or else, it may find itself in the "Obituary Column" of the Financial Times.

The learning organisation should see learning as the result of an experimental relationship between it and its environments. This means that the ideal learning environment falls on two extremes of a continuum – stable and turbulent. If learning environments remain stable for a long time, the process of experimentation through which organisations acquire more knowledge about their environments declines. But if on the other hand the environments shifts or change too rapidly, the learning process deteriorates. One important aspect of rapidly changing environment is the fact that the situation may stimulate meta learning – a situation in which "the people in organisations learn to identify patterns of environmental behaviour, but organisations in turbulent environments mostly find it very difficult to cope and survive (Emery & Trist, 1965)."

Extent of Change: Based on the rapidly changing environments in which organisations transact and operate, it may be necessary to ask the following questions. How rapidly do environments change or shift? And what pattern does this change assume with time? Bennis (1969) argued that the rate at which future changes will occur shall be so swift that the demands created by these changes "will cause the deterioration of rigid organisational structures – such as bureaucracies – and severely overloaded managerial systems". Katz and Kahn (1966) foresaw this and argued that organisations should pay a lot more attention to the environments of its operations by assessing the forces that will be emerging. Terrebery (1968) also argued in a similar manner and concluded that turbulent environments shall become a common feature in the future. The new wave of environmental complexity is likely to lead to a situation in which we shall experience an information-rich society that may threaten to overload the organisations' and the individual's information processing capacities (Simon, 1971).

Complex environments that are fast-moving in have become commonplace in societies and appear to provide extremely poor conditions for organisations to learn. But a large number of organisations have learned to cope with the uncertainty and information overload through structuring and restructuring, so as to reduce the use of information processing, as a way of coping with the fast changing and complex environments (Galbraith, 1973; Simon, 1971; Weinshall & Twiss, 1973). Based on effective environmental audit and scanning the learning organisation could reduce its information load by limiting its "time perspectives by attending to stimuli sequentially" (Cyert & March, 1963). It is also possible in information-rich environments for the learning organisation to use "buffers and regulations to smooth out environmental demands over time" (Thompson, 1967), and this will assist it in exploiting its environments which may be laden with unwanted information.

Based on effective environmental audit and scanning the learning organisation could reduce its information load by limiting its "time perspectives by attending to stimuli sequentially".

Socio Cultural Factors: An important environmental variable that enables the learning organisation in

acquiring knowledge and experience is the socio-cultural environment. All organisations are products and creations of society. And our society is replete with social institutions and cultural configurations and patterns that not only shape individual behaviours but those of organisations as well. The social institutions that regulate the activities of organisations are agents through which the control environment (government) attempts to establish codes of conduct. These social institutions exist to enforce the provisions or rules (laws) made by government to regulate the conduct and behaviour of organisations. For example, the Internal Revenue Department was created essentially to ensure that both company and personal taxes are collected as and when due. The Police was established to ensure that law and order does not breakdown in society, and to specifically protect lives and property of members of society and organisations. The activities of these public agencies rub-off on organisations generally, and the experience so acquired by these organisations, become a knowledge base from where the learning organisation prepares its scripts, form habits, concepts and propagates new philosophies, ideologies and world-views.

The cultural artefacts of a society are good yardsticks to guide and regulate the behaviour of the learning organisation. Some of the vibrant indices of a society's culture, among others, include language, religion, education and aesthetics. Language is one of the most potent forces that unites the people and the organisations that operate in their domain. Religion as an inseparable component of culture is also an important aspect which the learning organisation attempts to study and understand if it wants to service. The learning organisation is not human therefore, employees of the learning organisation have to vicariously learn on its behalf. The knowledge acquired which is deposited in the organisation may eventually become the source from which organisation manuals, procedures and rule books are produced. Thus organisations are repository of knowledge from where the members often take their learning cues.

Education is one of the most virile instruments of social change, mobilisation and organisation and has become an issue of importance in all societies – developed and developing. It is the only denominator through which individuals and organisations that are bound in the shackles of ignorance can free themselves. The enlightened organisation and its enlightened employees have many positive contributions to make towards the development of their environments.

Education gives man the relevant capacity to reason and appreciate the basis for existence and develops creative potentials to alter societal values and norms to suit the needs of the time (Johnnie, 1993)

By the same token, the learning organisation must have a purpose. It must not attempt to learn in a vacuum and must avoid the pitfalls of a repetitive, colourless and redundant learning exercise. The learning organisation must learn to develop its creative potentials to enable it alter societal values and norms to suit its operations and activities.

The learning organisation must have a purpose. It must not attempt to learn in a vacuum and must avoid the pitfalls of a repetitive, colourless and redundant learning exercises.

The appreciation of beauty, colour and other aspects of aesthetics in respect of the improvement of the products of a company by way of designing, packaging, labelling and marketing is an important strategy based on experiential learning of organisations. Experiences based on previous contacts with society equip organisations to appreciate the aesthetic preferences and design its products to please the target market. The learning organisation in today's dynamic and competitive world does not need to store knowledge for too long, as new knowledge is used as quickly as possible before it becomes obsolete.

Impact of Technology: Any discussion on environmental variables which does not mention technology is incomplete. One of the most volatile and unpredictable phenomena today is the technology syndrome. Modern technology is advancing at a pace faster than developments in almost all other spheres of life.

The increase in automation in modern organisations has assumed various forms. Barron and Curnow (1979) have argued that the introduction of sophisticated equipment is likely to improve and simplify the process of work for the worker. Argote et al (1983) went as far as arguing that the introduction of robots at work seems to be a threat for workers. Other scholars (Braverman, 1974; Nichols and Beynon, 1977; Gallie, 1978; Clegg and Dunkerley, 1980; Boddy and Buchanan, 1981; Buchanan and Boddy, 1982) have advanced very convincing arguments that technological advancement or technical progress in organisations have reached such a high point that nothing can possibly reverse this trend. In a fairly recent study, Buchanan and Boddy (1983) were able to identify how computerised control systems affect

One of the most relevant measures to be adopted by the learning organisation is to continuously study its technological environment and develop new niches that could serve as a basis for adopting either offensive or defensive survival strategy.

the activities of different categories of workers and workplaces.

The rate of technical change or progress is undeniably fast, and it is likely to be an exercise in futility for anyone to think that the current pace of technological growth could be abated. Rather, it would appear that future trends may be faster. One of the most relevant measures to be adopted by the learning organisation is to continuously study its technological environment and develop new niches that could serve as a basis for adopting either offensive or defensive survival strategy. The catch phrase for the learning organisation is "continuous learning". It must continuously learn, to be able to survive.

Why does the Learning Organisation Learn?

The literature on learning is frequently associated more with individuals than organisations. Learning occurs when individuals attempt to establish repertoires of responses or attitudes (Mowrer, 1960; Thorpe, 1956) by mapping events and actions to enable them understand their environments. But modern organisations also have to learn like individuals. A few reasons have been advanced to establish the tissue of connection between individual learning and organisational learning.

Learning cumulates, maintains and restructures knowledge. (Samstag 1973). Hedberg (1981) has argued that learning in stable environments is like mental brick laying, in which pieces of mental blocks or knowledge are laid on top of each other. Unfortunately, environments are not always stable and the learning organisation has to work harder in order to maintain the knowledge it has acquired earlier. This ongoing adjustment–repair work theory (Bonini, 1963; Cyert & March, 1963; March & Simon, 1958) has been given sufficient prominence in organisation theory literature.

Because the environment of the learning organisation is often exposed to constant changes, it must learn to tear down obsolete mental maps and start anew. The learning organisation which encounters environmental changes that threaten its survival (Hedberg, 1974) or which is able to discover new environmental niches (Starbuck & Dutton, 1973) may have to discard old behaviours and take on new ones. Piaget (1968) described learning as a continuous genesis, a generative process whereby we create and recreate by adding or deleting from our memory 'gestalts and logical structures' over time. The process of creating and recreating helps the learning organisation to restructure its knowledge of its environments.

The learning organisation must learn to liberate itself. Most organisations actually learn to enslave themselves. They operate in environments that do not afford them the opportunity to explore and name their reality, therefore have no scope for discovering and experimenting. This kind of learning could be described as the enslavement thesis making. Illich (1971) conclude that a de-schooling society might do less harm than societies where there seem to be too much learning taking place. Freire (1970a) characterised this kind of learning as the banking theory of knowledge. He argued that teachers deposit knowledge in the supposedly empty heads of students. Because of the student's inability to explore they remain captives of their environments. But the learning organisation which wants to liberate itself must learn to explore and name its reality by experimenting and discovering new ideas. The learning organisation must ensure that it acts, reflects and names its findings. By so doing, the learning organisation is able to manipulate and change its situations (Freire 1970b).

The learning organisation which wants to liberate itself must learn to explore and name its reality by experimenting and discovering new ideas.

The learning organisation should also learn to change and create its environments. Katona (1970) argued that the purpose of learning it so "improve performance and to master the environment". In Piaget's (1968) philosophy, 'reality is constructed anew each time a learner acquires a new concept or structure'. Chomsky (1966) added his voice by arguing that learning should not be imitative but generative–a learning process whereby learners create and master their environments. The learning organisation therefore must generate ideas from time to time, not only to name, change and understand its reality but also to sensitise members of its environments.

The Learning Organisation & Society: Prescriptions for Research

The essence of any discussion on the learning organisation should be to improve organisations. But our current knowledge about the learning organisation is reasonably weak, ad hoc, partial and at best incomplete; and the literature available makes a lot of generalisations and draws more often from individual learning. In view of this, a few prescriptive statements are necessary as a basis for formulating propositions for research. There appear to be two aspects where current knowledge about the learning organisation is not sufficiently strong. The first deals with the relationship between individuals and the learning organisation and unlearning. Hedberg (1981) questions the *raisen detre* for differentiating between the collective information processing in learning organisations and those of individual information processing. Clark (1972) has also asked: "how important are organisational sagas, myths (Johnson and Lundin, 1977; Mitroff and Kilmann, 1976), and habits (Simon, 1971) as memories which give consistent properties regardless of their temporary membership"? Hedberg (1981) went on to ask: "how do hierarchies, status systems and perceptual filters affect organisations' abilities to learn and unlearn"? If we are to answer these questions appropriately, then it is necessary to understand the fact that we require the development of a separate body of theories about how the learning organisation learns as a separate analytical category. This will also enable us have a deeper understanding of how individual learning is influenced in organisations.

The second aspect has to do with "studies and models of how organisations shift their theories of action—or myths—as they develop". There is little evidence to convince scholars, as Michael (1963) argued, as to how organisations' cognitive structures are challenged, altered, abolished, and reinstated as time progresses when learning environments change. This argument seems to have a very strong theoretical taste and value because, as Hedberg (1981) stated; " a theory of long-term behaviour in organisations must contain a theory of how organisations learn, unlearn and relearn". But if the learning organisation continues to acquire new knowledge by laying new mental blocks on old ones, it is likely that the accumulated mental blocks may become too heavy to carry and the learning organisation could experience stress and strain. This could eventually lead to organisational neurosis which may gravitate to organisational paranoia of a clinical proportion. It is therefore important, that as the learning organisation travels through time, it acquires knowledge but any knowledge that becomes obsolete has to be quickly unlearned, and possibly relearned if that particular knowledge becomes relevant again.

Thus organisational designers, managers and scientists can not envisage stable learning environments in the decade ahead. Rather, the period will be characterised by instability and traumatic shifts in the direction of the activities of organisations. These negative developments can be tackled by the following steps. These prescriptive statements should not be seen as the last word but they will go a long way to filling the void of uncertainity.

Important, that as the learning organisation travels through time, it acquires knowledge but any knowledge that becomes obsolete has to be quickly unlearned, and possibly relearned if that particular knowledge becomes relevant again.

First, the learning organisations should embark upon a new wave of promoting experimentation because there is so much uncertainty looming over their environment. Stable enviroments are unlikely to promote any form of knowledge seeking amongst organisations. But uncertainty with its negative impact seems to be a benchmark which encourages learning in organisations. And one of the best forms of learning is to continuously become experimental, as a rule. The learning organisation should de-emphasize analysing the past and the present but embark on exploring future.

Stable environments are unlikely to promote any form of knowledge seeking uncertainty with its negative impact seems to be a benchmark which encourages learning in organisations.

A second important prescription for the learning organisation is to expose itself to external variation. The learning organisation, as a rule must expose itself to a variety of stimuli, and learn to identify them using its metasystems to assemble responses. Self-organising becomes handy if outside sources of variations are constantly introduced because exposure keeps learning systems alert.

The learning organisation can improve performance by redesigning its environments. Both inner and outer environments provide design variables for improved organisational learning. The learning organisation, seldom can control the properties of its outer environments, but

is in a stronger position to be involved in design issues as a means of improving its inner environments.

The fourth recommendation is to embark upon a process of achieving "dynamic balances". This is a process whereby the learning organisation introduces an acceptable number of interacting processes at work that can keep organisations in dynamic equilibrium. This could be done by having a two-party system of governance whereby one group manages and the other attempts to formulate a convincing alternative strategy. If for any reason the opposition party presents a more convincing strategy before organisation members at election time, the opposition group wins and the two groups "trade positions". This system seems to have the advantage of recognising more than one frame of reference, and many ways of assembling responses as well. As White (1969) argued "such dialectical organisations would be less prone to be captured in their own old behaviours".

References

Argote L., Goodman P.S. & Schkade D. (1983), "The Human Side of Robotics: How Workers React to a Robot". Sloan Management Review, Spring.

Barron I. & Curnow R. (1979), "The Future with Microelectronics". London: France Printer.

Bennis W.G. (1969), "Changing Organisations", New York: McGraw-Hill.

Blau P. M. (1969), "Objectives of Sociology", In Robert Bierstedt (ed.). A Design for Sociology: Philadelphia: American Academy of Political and Social Sciences.

Boddy D. & Buchanan D. A. (1981), "Information Technology and the Experience of Work". Paper Presented to the EEC Conference on the Information Society Dublin, Ireland, November.

Bonini C. P. (1963), "Simulation of Information and Decision Systems in the Firm", Englewood Clifs, N.J. : Prentice-Hall.

Braverman H. (1974), "Labour and Monopoly Capital: The Degradation of Work in the Twentieth Century". New York: Monthly Review Press.

Bunchanan D. A. & Boddy (1982), "Advanced Technology and the Quality of Working Life: The Effects of Word Processing on Video Typists". Journal of Occupational Psychology, 55.

Buchanan D. A. & Boddy D. (1983), "Advanced Technology and the Quality of Working Life: The Effects of Computerized Controls on Biscuit-Making Operations". Journal of Occupational Psychology 56.

Chomsky N. (1966), "Cartesign Linguistics", New York: Harper & Row.

Clark Burton R. (1972), "The Organisational Saga in Higher Education", Administrative Science Quarterly, 17.

Clegg S. & Dunkerley D. (1980), "Organization: Class and Control". London: Routhledge and Kegan Paul.

Cohen A. (1974), "Two-dimensional Man", Berkeley: University of California Press.

Cyert R. M. & March J.G. (1963), "A Behavioural Theory of the Firm", Englewood Cliffs, N.J.: Prentice-Hall.

Emery F. E., & Trist, E. L. (1965), "The Causal Texture of Organisational Environments", Human Relations, 18.

Freire P. (1970a), "The Adult Literacy Process as Cultural Action for Freedom". Harvard Educational Review, 40.

Freire P. (1979b), "Cultural Action and Conscientisation", Harvard Educational Review, 40.

Galbraith J. R. (1973), "Designing Complex Organisations, Reading", Mass: Addison-Wesley.

Gallie D. (1978), "In Search of the New Working Class: Automation and Social Integration within the Capitalist Enterprise". Cambridge: Cambridge University Press.

Hedberg Bo L. T. (1974), "Reframing as a Way to Cope with Organisational Stagnation". Working Paper, International Institute of Management.

Hedberg Bo L. T. (1981), "How Organisations Learn and Unlearn". In Paul C. Nystrom and William H. Starbuck (eds.), Handbook of Organisational Design, Oxford University Press, Vol. 1.

Hirschman A. O. (1970), "Exit, Voice and Loyalty", Cambridge, Mass: Harvard University Press.

Hunt R. G, (1980), "Review of E. J. Miller and K. A. Rice's Systems of Organisation". Administrative Science Quarterly, 13.

Illich I.D. (1971), "De-Schooling Society", New York: Harper and Row.

Johnnie P. B. (1993), "Formal Education: A Paradigm for Human Resources Development in Organisations". The International Journal of Educational Management, Vol. 7, No. 5.

Jonson S. A. & Lundin R. A. (1977), "Myths and Wishful Thinking as Management Tools", In Paul C. Nystrom and William H. Starbuck (eds.) Prescriptive Models of Organisations. Amsterdam: North-Holland.

Katona G. (1970), "Organising and Memorising". New York: Columbia University Press.

Katz D. & Kahn R. L. (1966), "The Social Psychology of Organizations", New York: Wiley.

March J. G. & Olsen J. P. (1976), "Ambiguity and Choice in Organisations", Bergen: Universitetsforlaget.

March J. G. & Simon H. A. (1958), "Organisations", New York: Wiley.

Michael D. N. (1963), "On Learning to Plan and Planing to Learn", San Francisco: Jossey-Bass.

Mitroff I. I. & Kilmann R. H. (1976), "On Organisation Stories: an Approach to the Design and Analysis of Organisations through Myths and Stories". In Ralph H. Kilmann Louis R. Pondy, and Dennis P. Sleven (eds.) The Management of Organisation Design, Vol. 1. New York: Elsevier North-Holland.

Mowrer O. H. (1960), "Learning Theory and the Symbolic Processes", New York: Willey.

Nichols T. & Beynon H. (1977), "Living with Capitalism: Class Relations and the Modern Factory",. London: Routledge and Kegan Paul.

Nystrom P. C., Hedberg Bo L. T. & Starbuck William H. (1976), "Interacting Processes as Organisation Designs". In Ralph H. Kilmann, Louis R., Pondy and Dennis P. Slevin (eds.), The Management of Organisation Design, Vol. 1. New York: Elsevier North-Holland.

Piaget L. (1968), "Le Structuralisme", Paris Presses, Universitaires de France.

Samstag K. (1973), "Das Entwicklungsstufenmodell in der PIAGET-Diskussion", Ein Interpretationsver-such". In Walter Breunig (ed.) Das Zeitproblem im Lersnprozess: Muchen: Ehrenwirth.

Simon H. A. (1971), "Administrative Behaviour" (2nd ed.). New York: Macmillan.

Starbuck W. H. (1976), "Organisations and their Environments", In Marvin D. Dunnette (ed). Handbook of Industrial and Organisational Psychology: Chicago: Rand McNally.

Starbuck W. H. & Dutton J. M. (1973), "Designing Adaptive Organisations". Journal of Business Policy, 3.

Terrebery S. (1968), "The Evolution of Organisational Environments". Administrative Science Quarterly, 12.

Thompson V.A. (1967), "Bureaucracy and Innovation". Administrative Science Quarterly, 10.

Thorpe W. H. (1956), "Learning and Instinct in Animals", Cambridge, Mass: Harvard University Press.

Weick K. E. (1969), "The Social Psychology of Organising", Reading Mass: Addison-Wesley.

Weinshall T. D. & Twiss B. C. (1973), "Organisational Problems in European Manufacture", London: Longman.

White O. F. Jr. (1969), "The Dialectical Organisation-an Alternative to Bureaucracy", Public Administration Review, 29.

□

Pre-requisites for Learning Organisations

Aruna Mankidy

The process of learning is an essential part of all living organisms and an organisation attempting to service and succeed in a dynamic environment is no exception. Sensitivity to the environment, analysis of the changes and assimilation are the prerequisites for a learning organisation, states the author. The paper elaborates on the values vital to the activity of learning.

Aruna Mankidy is Member of Faculty, National Institute of Bank Management, Pune.

There is ample evidence in the world of living organisms wherein species which respond to changes in the environment by accommodating and modifying themselves are more successful in the art of survival. On the other hand, those organisms which cannot respond appropriately cease to exist. The effective ones, over a period of time develop mechanisms that would make them respond to changes. Drawing a parallel, in the corporate world too organisations are viewed as 'Organic Wholes'; learning organisations are those which avoid becoming extinct. These organisations make successful modifications to respond to the changes in their environment. Summarizing the literature dealing with organisational success, Singh and Bhandarkar (1990) mention the perspective of the success mentioned above as one of the following three categories. The organisation–environment interaction, according to them, can be measured through organisational health, response to constituencies, maximisation of external resources and the means–ends linkage. The Organisational health model comprises the views of organisational experts like Argyris, Katz and Kahn, Bennis and Selznick. The focus is on the organisation's ability to proact, shape and control its environment for its survival and growth (Singh & Bhandarkar: 1990). These successful organisations are constantly 'learning'. This successful continuity is not a miracle or the result of any genetic mutation, so to say. It is a result of conscious efforts. Therefore, if one desires, it is possible to focus on the processes that are involved in their efforts.

The Learning Process

One fundamental orientation that can be seen as characteristic of such organisations is the learning activity itself. Learning is primarily a process of acquiring, assimilating and internalising cognitive, motor or behavioural inputs for effective and varied uses when required, and leading to enhanced capability of further self-monitored learning (Pareek, 1994). The process thus, comprises all facets of human activity and assumes an 'active' role of the individual. All the perspectives of the

learning process except Skinnerism, highlight this aspect. In Skinnerism the individual is passive and is forced to indulge in activity. The initiation and control are external in this framework. However, all aspects including Skinner's approach presume a continuous interaction with the environment.

Learning is primarily a process of acquiring, assimilating and internalising inputs for effective and varied uses when required.

In the organisational context, the organisation can be seen as an entity which constantly requires inputs from the environment. These inputs are in terms of economic, political and social events or changes. No doubt, these are dynamic aspects of any society with constant subtle, obvious as well as conscious changes occurring. And an organisation will be required to respond to them.

There would obviously be differences of degrees in responding. The quickness and the appropriateness of such responses determine the success. This, in turn depends on how much assimilation and internalization of the input is done by the organisation. If the assimilation is not proper, there can be a mismatch leading to ineffectiveness. And when internalization is lacking, the changes introduced in the organisation will be superfluous and difficult to sustain. The most forced response comes when survival is in question and when an organisation fails to respond even at such critical stages, it has no choice but to wind up. Thus for learning process to occur, all its sub-components must be present. Ultimately, as the definition indicates, learning has to become a self-monitored process, implying that organisations do not wait till things are forced upon but should respond proactively.

Components of Learning

This process of learning can be observed to have three basic components, viz.: sensitivity to the environment (inputs), analysis of the changes and earlier experience (assimilation), and change in strategy to become successful and effective in the given circumstances (effective use). These are the requisites for any learning process and, therefore, their presence is essential for learning organisations.

Sensitivity to the environment: This is the most vital component as it involves not only observing the changes taking place but also anticipating some of the changes based on a comprehensive perspective of events. Ability to sense and understand the shifts is the starting point. The cruciality of this is aptly highlighted by futurist Barker (1985). He maintains that every era has some paradigms; the rules and regulations that determine the boundaries and the ways to be successful within these boundaries. But these paradigms keep changing or shifting. When paradigms shift everything goes back to zero. The past successes and experiences do not give any extra edge to exist among the new paradigms. Only those who perceive the shifts and respond to them become successful. Therefore, it is necessary to take note of and analyze the importance of the signals emanating from the environment to remain effective and avoid getting reduced to zero. Barker cites a number of examples of organisations that have not responded and therefore have failed to maintain their positions in the corporate world.

Analysis of the changes and earlier experience: Responding to the changes, by no means, implies total surrender to the changes. In fact, it means analysing the changes, identifying the positive and negative ones so that corresponding strategies can be developed. A conscious attempt to evaluate enhances the development of a perspective that helps to accept the positive or conducive aspects of the changes as well as resist the negative or impending dimensions. This forms the primary consideration for strategy development. Furthermore, analysis of the earlier experience—both success and failure—can be a pointer in this exercise. Infact, it provides parameters in terms of the organisational philosophy of business and management within which the changes have to be assimilated.

It is necessary to take note of and analyze the importance of the signals emanating from the environment to remain effective.

Planning the strategies to deal with the changes: As elaborated earlier, the strategies can be of two types: The first, taking advantages of the conducive changes, and the second, avoiding the negative impact of the undesirable changes. As such, the strategies sometimes can go beyond the immediate context and seek to hasten the process of change and/or stop the occurrence of undesirable changes.

Everyone could be said to be learning and one of the dimensions that makes the difference is the quickness in responding. The proverb "It's never too late to

learn" is true but more apt is the approach of "the early bird gets the worm." Therefore, being the first to act is necessary. If organisations wait to see how others respond, the opportunities may pass them by. Even the wait for changes to stabilize can be detrimental. In other words, the timing of the action required is prudential. Being the first is advantageous. It involves risk but it is this risk which gives the extra edge—the success to exist effectively.

Action Strategies

A number of examples are available which highlight the importance of being a learning organisation. These experiences reveal that the strategies are not the same, but the result is the same, i.e. continuous effectiveness. For example, the book "The Leading Edge" documents the account of companies that turned around (Potts & Behr, 1989). In covers the experience of General Electric, Martin Marietta, RCA, National Intergroup, AT and T, Coca Cola, Walt Disney, and General Motors, to name some. More than the account of each company, what is interesting and relevant here is that these companies have responded to the changes in their own environment. Their action strategies are not identical. They comprised : adoption of high technology, bringing in vibrancy within, seeking alliance—external and internal and strengthening of creativity from within. The crucial point in all these is the need to realign.

The book titled "Corporate Success and Transformational Leadership" is a similar exercise done in Indian context. (Singh & Bhandarkar, 1990) The authors have studied five organisations. The MMTC case focuses on the process of converting a bureaucratic monolith into a vibrant trading organisation. The IFFCO case examines the role of power equilization for industrial peace, NFL for achieving excellence through enquiry, exploration, and experimentation and WCL and TISCO deal with the role of the leader and culture building in evolving a healthy organisation. Even though the focus is on the role of the leadership style the criteria is organisational success and organisation building.

Another account of organisations responding to social changes is documented in the book titled, "The Difference that Work: Organisational Excellence Through Diversity' (Gentile: 1994). The book is not about diversity in business but about organisational responses to diversity in the workforce. As such, it focuses on the diversity of ethnic groups, gender, physically impaired and maladjustment like drug addiction or even AIDS. The most talked about organisation on this diversity issue is Bank of Montreal (Bank of Montreal Task Force Report : Nov 91, Sept 92, Nov. 92) wherein conscious thought and strategy development have taken place to utilize the diversity of the workforce available within the organisation as against viewing it as a threat. The point is that learning could be in any aspect of the organisation.

Vital Values

Even if some of these authors have emphasized the role of the leaders or individuals, unless the organisation as a whole had not adopted their mindset, the changes would have been difficult or even impossible. This brings us to another vital aspect of the learning organisation. The ultimate in the learning process is the capability to self-monitor the future learning. This is possible when the total organisation internalizes certain 'core values'. Unless organisations have consciously developed values that support the learning process, long term efficacy of the process is not feasible. It is these values which are generic and therefore can enhance getting out the specific context.

The ultimate in the learning process is the capability to self-monitor the future learning.

Implicit and essential to this process are the values like openness, receptivity for innovative ideas and the ability to absorb failures. Openness ensures sensitivity to the changes. It is a pre-requisite to remain tuned into the shifts taking place. It is a guard against rigidity that could lead to fossilization. Receptivity to new ideas is vital in spreading the net wider. No single individual can claim to be innovative and therefore, listening to and encouraging others to express their ideas can enhance the analysis and strategy development. Openness coupled with receptivity to others can develop the fabric of trust required for analyzing failures in a meaningful way. And lastly, the ability to absorb failures is a basic ingredient for risk taking. Unless there is this security, the assurance to absorb mistakes—being first would be impossible. Being the first always encompasses the danger of being wrong and one needs to be ready to face this possibility. The only rider that goes with the absorption of mistakes is that they are not repeated and in fact improved upon.

The successful accounts of five companies studied by Singh and Bhandarkar in the Indian context highlight this aspect. In their conclusions, the authors observe that all the five leaders made a cultural shift around

achievement, humanistic, democratic and ethical values. Their messages like "Speak Out", "Go Ahead and Try Out" were signaling Trust, Openness, Readiness for risk absorption. These leaders through their learning orientation were creating learning organisations.

References

Bank of Montreal (1992), "Task Force Reports on Advancement of Women", (Nov 91), Advancement of Aboriginals (Sept 92) and Employment of People with Diabilities, Nov 92.

Barker J. (1985), "Discovering the Future: The Business of Paradigm Shift", ILI Press (Subs. of Infinity Ltd. Inc.).

Gentile M. (Ed.) (1994), "Difference That Works: Organisational Excellence through Diversity," HBR Book.

Pareek U. (1994), "Beyond Management", 2nd edition, Oxford & IBH Publishing Co. Delhi.

Potts M. & Behr O. (1989), "The Leading Edge", Tata McGraw Hill Publishing Co. Ltd., Delhi.

Singh P. & Bhandarkar A. (1990), "Corporate Success and Transformational Leadership", Wiley Eastern Ltd.

□

Learning Organisations : The Role of Executive Leadership

Manuel Mendonca & Rabindra N. Kanungo

The learning organisation with its capacity for continuous change is ideally suitable for the complex and unpredictable economic, legal and political environment in which Indian organisations operate. This article, briefly reviews the characteristics of the learning organisation and explores the specific leadership role behaviour that will enable management to create and sustain learning organisations in the Indian environment.

Manuel Mendonca & Rabindra N. Kanungo are from McGill University, Faculty of Management, 1001 Sherbrooke West, Montreal, P.Q., H3A 1G5, Canada.

- "The Indian economy is like a sleeping giant which, if awakened, could by itself transform the face of the global economy" (Lee Kwan Yew, Former Prime Minister of Singapore, cited in India News, 1996, p.11).
- "By the turn of the century, I believe India will be one of the Most vibrant, important and powerful of all the Big Emerging Markets" (Jeffrey E. Garten, Under Secretary of Commerce for International Trade, US Government, cited in India News 1996, p.15).

In the context of India's economic potential, as revealed by these observations, the successful business organisations will be those which are prepared to respond to, and even anticipate, the inevitable challenges of globlization and rapid technological changes. However, in the new and turbulent environment, the nature of the organisation's response cannot be limited to mere incremental change in one or more of its subsystems. Rather, it should involve a radical transformation at the total organisational level – its culture and internal structures and processes, to support the appropriate business strategy. Implicit in the transformation is the need, at all levels, for ".... qualitatively different ways of perceiving, thinking, and behaving in organisations" (Cummings & Worley, 1993, p.520).

Stated differently, organisations need to adopt the paradigm of the "learning organisation" (Argyris & Schol, 1978; Senge, 1990; Issacs, 1993). This paradigm enables organisations to recognize the need for fundamental change, and to develop the capability for continual transformation or reorientation. As de Geus, the former Group Planning Coordinator of Royal Dutch Shell, observed: "The ability to learn faster than your competitors may be the only sustainable competitive advantage" (cited in Smye, 1994, p.3).

Major Characteristics

Schein (1993) has identified the conditions or situations generally common to organisations which operate in an turbulent environment. First, the need for almost instant and continuous learning in order to cope with environmental change. Second, organisational structures based on and facilitating the flow of knowledge and information. Third, a greater degree of specialization based on factors such as technology, products, markets, and so on. Fourth, the organisational units, resulting from specialization, tend to develop their own work cultures.

It is readily apparent that organisational effectiveness will be enhanced when ideas that are generated are freely communicated and shared across the boundaries of the various organisational units; when employees are involved in problem solving and decision making in matters related to their work. For this purpose, the organisation needs decentralization and flexible organisational structures, and a learning culture which is characterized by "... openness to experience; encouragement of responsible risk-taking; and willingness to acknowledge failures and learn from them" (McGill & Slocum, Jr., 1993, p.76). Employees, at all levels, are encouraged and helped to initiate actions and assess the consequences of these actions in the light of the job objectives. Such assessment contributes to the repertoire of knowledge and experience upon which employees draw in order to develop appropriate performance norms, strategies, and behaviours.

Organisational effectiveness will be enhanced when ideas that are generated are freely communicated and when employees are involved in problem solving and decision making in matters related to their work.

The learning that occurs is not an aimless generation of ideas. Free exchange of ideas does not take the form of futile, argumentative discussions among organisational members. The learning flows from and is guided by the organisation's clear and credible mission which is internalized by employees, and serves as the basis for employee commitment to the organisation – its beliefs and values, and its objectives, policies, and practices. The employees' profound and abiding commitment to the organisation's mission is a critical characteristic which distinguishes the learning organisation from the rule-based or control-oriented bureaucracy, and enables it to succeed and grow in the constantly changing environment.

The employees' profound and abiding commitment to the organisation's mission is a critical characteristic which distinguishes the learning organisation from the rule-based or control-oriented bureaucracy, and enables it to succeed and grow in the constantly changing environment.

The Role of Executive Leadership

The critical and pivotal role of executive leadership in the learning organisation is to create a climate and culture in which "...people are continually expanding their capabilities to shape their future – that is, leaders are responsible for learning" (Senge, 1992, p.83). The leadership roles discussed in literature are: task role, social role, participative role, and charismatic or transformational role (Kanungo & Mendonca, 1996, in press). We believe that the charismatic leadership role is most suitable for executives in the learning organisation because it goes beyond the day-to-day supervision and maintenance of the status quo. Clearly, the leader's focus cannot exclude or neglect the present. However, the leader's preoccupation with the present is with a view to developing and articulating future strategic goals or vision for the organisation, and leading organisational members to achieve these goals (Bass, 1985; Conger & Kanungo, 1988a, 1994; House, Spangler & Woyecke, 1991).

In the charismatic leader role, the leader-follower interaction is characterized by the transformational influence process (Burns, 1978; Bass, 1985; Conger & Kanungo, 1994). This process enables the leader to bring about change in followers' attitudes and values essentially through the formulation and articulation of an idealized vision, and through empowering techniques. The entire process – in particular, the empowerment techniques, are designed to increase the followers' self-efficacy beliefs that they are capable of working towards the goals in order to realize the idealized vision. The transformational process produces, simultaneously, two significant effects. It enables followers to internalize the leader's vision and to increase their self-efficacy beliefs. Consequently the followers' goal-oriented efforts and behaviours result primarily from their commitment to group goals. For these reasons, the effects of the transformational

influence mode on the followers is more enduring, permanent and self-sustaining.

What are the critical leader behaviours which cause organisational members to perceive their top management not merely as care-takers or administrators, but as transformational leaders? These behaviours are described in the Conger-Kanungo model of Charismatic or Transformational Leadership. We explore this model and then examine how executives in Indian organisations can exercise charismatic leadership to create a "learning organisation" in the context of the complex and unpredictable economic, legal and political environment that is characteristic of developing countries; and the "fit" of the model to the internal work culture in Indian organisations.

The Conger-Kanungo Model of Charismatic Leadership

The three stages of the model are presented in Figure 1. In stage one, followers perceive executives as individuals with a great desire to change the status quo, and a profoundly intense sensitivity to environmental opportunities and constraints, as well as, to their needs. The behaviors in stage two consist of: the formulation of an idealized future vision that is discrepant from the status quo, but shared by followers; and the ability to articulate this vision effectively using language and delivery style characterized by a genuine naturalness and, at the same time, deeply moving and inspirational. According to Senge (1992), learning organisations need creative tension which "... comes from seeing clearly where we want to be, our *vision*, and telling the truth about where we are, our *current reality*". The first two stages adequately meet this need.

Learning organisations need creative tension which "... comes from seeing clearly where we want to be, our *vision*, our *current reality*".

Finally, in stage three, executives are perceived to engage in exemplary acts that organisational members interpret as involving great personal risk and sacrifice. In addition, executives are seen to deploy innovative and unconventional means to achieve the vision. These further enhance the followers' commitment to the vision. We can, therefore, conclude that the exercise of charismatic leadership role behaviours by the management is critical to creating and sustaining learning organisations.

Charismatic Leadership : Relevance to External Environment

How relevant is the Conger-Kanungo model for Indian organisations? What behavioral components of each stage are critical for effective organisational leadership in India? For answers to these questions, we must first look at the types of environments faced by the leaders in Indian organisations in contrast to those faced by their counterparts in the developed countries.

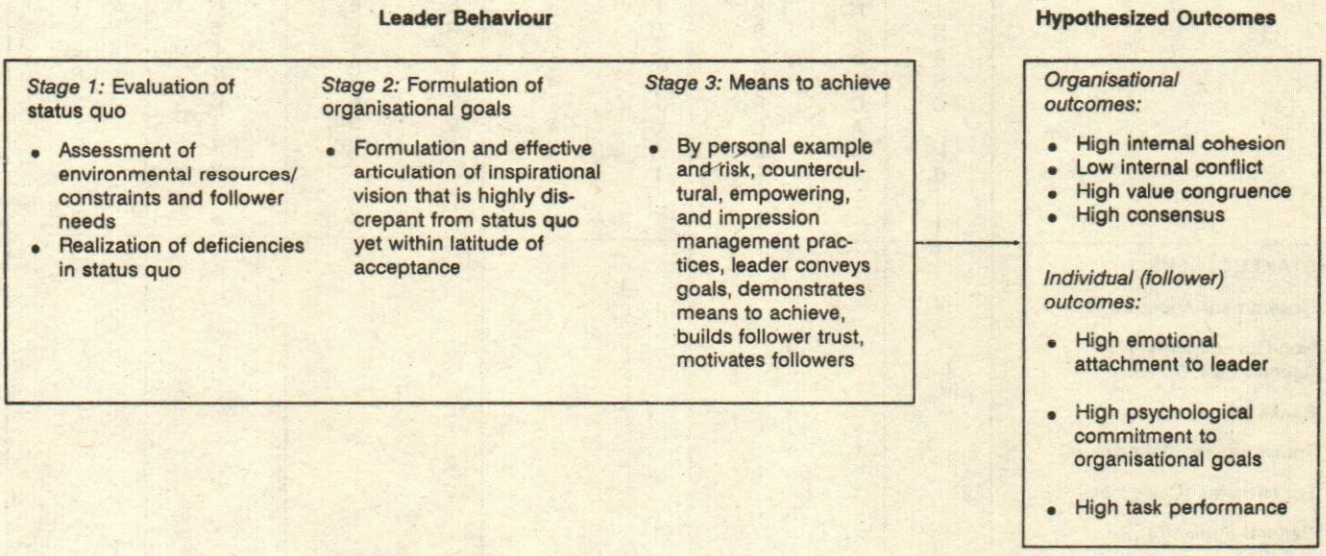


Fig. 1. Conger-Kanungo Model of Charismatic Leadership

Specifically, the environments of Indian organisations are characterized by: high complexity due to the presence of heterogeneous elements; low predictability due to the presence of unstable and turbulent elements; and low munificence due to the scarcity of needed resources. These types of environments pose a strong challenge for the leader to bring about organisational adaptation through appropriate changes in the status quo. Faced with instability and uncertainty, the leader cannot rely on well-defined rules and regulations or established procedures, but must resort to rather flexible and unconventional strategies and courses of action. In these environments, charismatic leaders who, by definition, are more proactive, entrepreneurial and change-oriented would seem to provide a better fit for the needs of the organisation than leaders who are more inclined to maintain the status quo. India is a developing country in which opportunities very often go unexploited, undeveloped, and unrealized. In such situations, it is the entrepreneurial executive who seeks, exploits, and develops these opportunities (Mendoza, 1977).

Faced with instability and uncertainty, the leader cannot rely on well-defined rules and regulations or established procedures, but must resort to rather flexible and unconventional strategies and courses of action.

In the context of the complex and unstable, often turbulent, environments of an Indian organisation, what types of strategic interventions should a charismatic leader make in order that the organisation adapts and successfully copes with its environment? As proposed in the Conger-Kanungo model, the leader must first assess the environment thoroughly. This step is very critical and time consuming. Past experience with program management in developing countries (Brinkerhoff, 1991) suggests that a leader needs to do the following. First, the leader should thoroughly assess the environmental factors that can either facilitate or hinder the achievement of organisational objectives. This involves identifying the stakeholders such as government agencies, banks, customers, employees, suppliers, and so on who have interest and control over the resources needed for the achievement of the organisation's objectives.

Once the stakeholders and resources, both tangible (e.g. finance) and intangible (e.g., knowledge) are identified, the second step for the leader is to determine the minimum conditions needed for the implementation of both the organisation's short and long term plans. Finally, the leader should formulate strategy options or action plans for effectively influencing the stakeholders to obtain the resources in their possession. For this purpose, it may be useful to develop a detailed matrix which relates all major stakeholders to transactions or activities. Such a matrix allows the leader to focus the required energy, effort, time and resources on appropriate targets in order to facilitate the attainment of organisational objectives. An

	TRANSACTIONS							
	FINANCING 1	PHYSICAL	RESOURCES 2	TECHNICAL	ASSISTANCE 3	SERVICE	DELIVERY 4	PUBLICITY 5	OTHER 6
STAKEHOLDERS									
Government Agencies (1)	√								
Non-Governmental Aid Agencies (2)			√						
Banks (3)	√								
Transportation Agencies (4)			√		√		√		
Beneficiaries (Customers) (5)							√	√	
General Public (6)								√	
Other (7)									

Fig. 2. Format of Stakeholder – Transaction Grid

example of such a matrix can be found in Brinkerhoff's (1991) simplified stakeholder-transaction grid. A format of the matrix is presented in Fig. 2.

The critical assessment of the environment would then enable the leader to develop a broad vision for the organisation. Such a vision would not only provide a higher purpose and direction, but would also allow the leader to establish a series of specific goals that are prioritized in a manner that their attainment would naturally lead to the realization of the vision. All efforts would, therefore, be directed to first pursue the most important and dominant goal as represented in the leader's vision. When the environment is complex and unstable, the leader has less control over external factors.

For this reason, the single-minded pursuit of a dominant goal at any given time is a more effective strategy than dissipating one's efforts, time and energy in the simultaneous pursuit of multiple objectives. Furthermore, the implementation of plans has to move in a gradual fashion starting with a pilot test on a relatively smaller scale project, and then moving on to a large scale operation. Paul (1986) cites the case of National Dairy Development Program of India ("Operation Food") as an example where the leader's strategies of focusing on the dominant goal and working through pilot testing were responsible for the program's success.

While responding to the environment, the leader must pay attention to creating and mobilizing public demand for the products and services offered by the organisation. Educating the public, customers, and other stakeholders with respect to what the organisation intends to offer is very critical in a developing country context. In the charismatic role, a leader must first articulate the vision to create a demand for the products and services, and then develop delivery strategies that are tailored to match the created demand. This involves promoting effective communication campaigns directed at stakeholders. In the case of Operation Flood in India, the villagers were first shown what the program could do for them and the demonstration eventually resulted in the formation of dairy cooperatives. Paul (1986) provides other examples of communication campaigns that were successful in mobilizing the public in the Philippines, Indonesia, and China.

Finally, developing a network structure is a critical activity for the leader in an environment characterized by resource scarcity and uncertainty in relation to markets and public demands. Through the network, the leader can establish a linkage with other support organisations and resource individuals. In addition, networking enables the leader to draw upon multiple sources of lateral influence for political, technical, and financial support, as well as for demand mobilization. In responding to the environment in the ways, just discussed, the leader's organisation assumes either a prospector or an analyzer business strategy rather than a defender strategy (Miles & Snow, 1978). The prospector/analyzer strategy requires the leader to seek challenges and opportunities in the environment, and encourages flexibility and risk taking which are consistent with the limits that can be tolerated by the organisation's operations. The critical role of developing a support network and a prospector/ analyzer strategy for leadership and institution building in the Indian context has been well documented (see for example Ganesh & Joshi, 1985).

Charismatic Leadership: Fit with Internal Work Culture

Besides the complex and unpredictable economic, legal and political environments of developing countries, a number of socio-cultural dimensions influence the leader's effectiveness in creating learning organisations. As suggested by Kanungo (1990; also see Kanungo & Conger, 1990), India tends to be high on power-distance (hierarchical social structure and authoritarian socialization practices), high on collectivistic orientation (extended kinship networks), and high on religious traditionalism leading to a moral and reactive rather than a pragmatic and proactive orientation. This constellation of socio-cultural features influences the nature of leadership and supervisory behaviour, and the leader-follower relationship. For this reason, the mode of implementing the charismatic leadership must build on the cultural facilitators and overcome the cultural constraints – more specifically discussed later.

India tends to be high on power-distance, high on collectivistic orientation and high on religious traditionalism leading to a moral and reactive rather than a pragmatic and proactive orientation. This constellation of socio-cultural features influences the nature of leadership and supervisory behaviour, and the leader-follower relationship.

First, the authoritarian socialization practices in India make the relationship between leaders and their followers more personalized rather than contractual. The nature of this personalized relationship can take two distinct forms: affective reciprocity; or manipulative ingratiation. A

relationship characterized by affective reciprocity manifests itself in the leader's affectionate and nurturance behaviour toward followers and in the followers' deference and loyalty to the leader. Furthermore, an affective reciprocity relationship often builds an inner strength and self efficacy among followers because of the supportive coaching influence of the leader. This type of relationship is conducive to achieving both personal and organisational objectives.

A relationship characterized by manipulative ingratiation, on the other hand, is manifested through a superficial affection for followers on the leader's part, but underlying it, is a basic distrust of the followers. In return, followers similarly exhibit a superficial loyalty but experience more deeply a sense of rejection of and animosity towards the leader. As a result, manipulative ingratiation develops in followers a fragile self-esteem and ego-defensive tendencies. This type of relationship only fosters the desire to achieve personal goals at the cost of organisational goals.

The affective-reciprocity type of relationship is observed among supervisors who exhibit nurturant-task leadership styles, (Sinha, 1980). However, the nurturant-task leadership process envisages the possibility of the leader regressing to the authoritarian mode.

This is so because, as the process gets under way, the leader might feel or sense a loss of control over the followers' action because of a lack of confidence and trust in them. On the other hand, as it will soon become clear, in the charismatic leadership process, the initiative for the development of the affective-reciprocity relationship originates and rests with the leader. The charismatic leadership process identifies the conditions under which the affective-reciprocity relationship is successful and the strategies the leader needs to adopt in order to promote and strengthen this relationship.

Thus, an essential condition is the development of the personal self-efficacy beliefs of the subordinates. For this purpose, the leader must first demonstrate confidence in the followers' ability to handle various tasks (Eden, 1990), and then utilize empowering strategies such as coaching, modelling, stating performance goals as worthy ideals, and encouraging and rewarding excellence in performance (Conger & Kanungo, 1988b).

The charismatic leader would not engage in strategies which characterize the manipulative-ingratiation relationship – for example, the use of "lording" strategies. In these strategies the nature of the leadership influence process is chiefly transactional – thus, the leader literally "extracts" follower compliance in exchange for rewards and sanctions; places an excessive emphasis on follower's performance failures to foster follower dependence; and conceals or restricts the flow of information to retain control over followers. The ultimate effect of lording strategies is to create the followers' dependence upon the leader and to ensure their personal loyalty without any regard and, often, at the total neglect of the organisation's objectives.

On the other hand, the leadership influence process which underlies empowering strategies, is transformational. As in all leadership, the followers do come to depend upon the charismatic leader, but such dependence is for the purpose of increasing their task competence and their personal growth and development. Moreover, the loyalty to the leader is motivated by their commitment to the organisation's vision and its objectives which they have internalized.

The second variable for leadership effectiveness is the collectivistic orientation among organisational members which creates a family ethos of embededness in kinship or social networks. This results in a strong "we-group" and "they-group" identity, and the associated feelings of trust of the "we-group members" and distrust for the "they-group members". In managerial and leadership practices, such attitudes can inevitably translate into nepotism or favouritism and discrimination in recruitment, selection, performance evaluation, and promotion. It does not take too long before the organisation experiences the dysfunctional effects of these practices. For example, the development among employees of the belief that rewards and outcomes, generally, are not contingent upon performance; and the even more serious consequence of employees experiencing feelings of powerlessness which invariably results in employee alienation (Kanungo, 1990). The problems faced by the leaders in such situations are: how to bring about the integration of organisational members who belong to various kinship or social groups; and, how to reduce worker alienation.

The problem of integration can be resolved by the use of a family metaphor for organisations – "this company is one big family in which we are responsible for each other". In addition, embededness can be enhanced through opportunities for active participation and team work. Of course, the foundation for these efforts is to ensure the process of open communications. The problem of work alienation can be reduced by the idealization of organisational and work values, through organisational socialization practices, and by setting up performance-contingent reward systems.

A sense of belonging to an organisation as a family is created among followers when they find that the leader is: impartial – that is, fair and firm; open, available

The strategies of using the family metaphor and empowerment techniques are the key to successful organisational transformation.

and accessible; concerned with improving their quality of work life; sociable and collegial with them and their families; and, respectful and supportive of the authority and position of others, particularly those in the second line positions of executive succession (Singh & Bhandarkar, 1990). The leader has to act as a role model and set examples through deeds and actions to demonstrate his or her desire and interest in integrating all employees as members of the "one" organisation. A recent study of chief executives of five Indian organisations (Singh & Bhandarkar, 1990) supports the contention that the strategies of using the family metaphor "Kutumbization" (that is, one undivided community) and empowerment techniques are the key to successful organisational transformation.

A list of behaviours necessary for charismatic leadership effectiveness in developing countries, consistent with the preceding discussion, is presented in table 1.

Table 1: Charismatic Leadership Behaviour for Developing Countries

1. Assess the Environment:
   - Identify factors that facilitate or hinder achievement of organisational goals
   - Assess minimum conditions needed for implementing short and long term goals
   - Prepare a stakeholder transaction matrix
2. Visioning and Responding to Environment:
   - Establish dominant goal and direct efforts to achieve it
     - Move from pilot testing to implementation on a large scale
     - Mobilize demand
     - Develop support network
3. Means to Achieve:
   - Establish affective reciprocity relationship
     - Confidence in follower's ability for task accomplishment
     - Nurturing follower self efficacy through coaching, modelling, encouraging and rewarding
     - Idealizing organisational and work values
   - Discourage manipulative ingratiation relationships
     - Avoid lording behaviour and 'pulling of ranks'
     - Avoid negativism
     - Avoid favouritism
   - Promote performance based reward system
   - Promote loyalty to organisation and work values rather than loyalty to people in position power
   - Recognize dependence of subordinates for developing task competence versus dependence for materials gain. Be supportive of subordinates in the former case
   - Use a family metaphor for organisations
     - be fair and firm to all members
     - be open, available and accessible
     - be sociable and collegial to members (use existing rites and rituals as occasions for relating to members)
     - show constant concern for improving quality of life of members as one would do for own self
     - groom second line in command
     - show respect and support for other's position and authority
     - promote information sharing, participation and communication

Finally, religious traditionalism noticed in India may operate as a cultural contingency variable for charismatic leadership effectiveness in creating learning organisations. The religious traditions in these countries are highly valued and often determine a leader's judgement of what path of action is morally right or wrong in a given situation. Such judgements have a strong influence in guiding the leader's behaviour. The influence of traditional religions and moral norms such as a concern for altruism, high caring and affiliative concerns, and low competitive and acquisitive concerns are often considered to be inimical to the business interests of organisations (Kanungo & Conger, 1990; Hofstede, 1980; Weber, 1958).

It is argued that the tendency of leaders in India to be guided by moral rather than by pragmatic business considerations has a detrimental effect on public and private sector organisations, chiefly because it ignores or neglects the organisation's objectives. This argument, however is not entirely valid, and indeed highly questionable. Many leaders in India and elsewhere were effective primarily because of their ability to integrate traditional religious and moral values with practical considerations for achieving the future goals of their organisations (Woycke, 1990). Even in western industrialized countries, it is becoming increasingly evident that organisational leadership needs to have a moral and spiritual base (Kanungo & Conger, 1990; Kanungo & Mendonca, 1994) because without an ethical and altruistic perspective, the very survival of the business over the long term is in serious jeopardy.

Therefore, in order to be effective, charismatic leaders in Indian organisations need to provide moral leadership by integrating traditional religious values with pragmatic considerations. The traditional values can be incorporated in the idealization and articulation of future visions or goals. Furthermore, since these values are cherished by the people at large, the leader's commitment to and practice of these values would have two desirable effects. The first is that the leader's espousal of these values contributes to a greater follower acceptance of the leader's vision. The second effect comes from the leader's living of and by these values. The congruence of what is espoused and practiced by the leader enhances the leader's credibility and, what is equally important, the leader serves as a role model for the followers.

In order to be effective, charismatic leaders in Indian organisations need to provide moral leadership by integrating traditional religious values with pragmatic considerations.

In their study of transformational corporate leaders in India, Singh and Bhandarkar (1990 p. 317) concluded thus: " A dramatic illustration of this cultural imperative in recent times is Mahatma Gandhi who could unify and organize the diverse masses. Living by ideals is thus the value which is most cherished by people at large, and they desire to see these values more in their leaders, although they themselves may not necessarily practice them. In order to take care of the above, the change process must be characterized by role modelling, sincerity, and commitment on the part of the top management, and consistency between precept and practice".

It is recognized that religious traditionalism may create two opposite sets of belief or value systems that form the basis of desirable behaviours in some leaders, and undesirable behaviours in other leaders. Thus, in some leaders it may create a system of beliefs that includes beliefs in: heterogeneity and inequality among people – such as the belief in the caste and clan systems, and the "we-and they-groups"; and a belief in determinism, fate and destiny – for example, as influenced by the doctrine of Karma practiced in India. Other possible beliefs might include a preoccupation with the past or the absence of a futuristic orientation, or a sense of time being eternal or ever – present and never passing. Such beliefs make the leader ineffective in achieving organisational objectives. A leader who believes in 'inequality' often engages in patronage, favouritism and discrimination (Virmani & Guptam, 1991).

Fatalism and the lack of a futuristic orientation make the leader incapable of visioning and planning to achieve task goals within targeted time periods. While such dysfunctional effects can be observed in some leaders, there are other leaders in whom the same religious traditionalism is seen to produce an opposite set of beliefs that have positive effects. Influenced by traditionalism, these leaders develop a system of beliefs emphasizing (as all religions do) heterogeneity and equality among people, internal self-control while coping with environment (also an element of the Karma doctrine which requires that one be responsible for one's actions), and optimism for the future. These types of beliefs make the leader practise more effective transformational strategies of idealizing future visions, moral influence, role modelling and empowerment. Consequently, such beliefs are indeed indispensable for a leader who intends to create a learning organisation.

References

Argyris C. & Schol D. (1978), "Organisational Learning : A Theory of Action Perspective", Reading Mass: Addison-Wesley.

Bass B.M. (1985), "Leadership Performance Beyond Expectations", New York: Academic Press.

Brinkerhoff D.W. (1991), "Improving development program performance", Boulder, Colorado: Lynee Rienner.

Burns J.M. (1978), "Leadership", New York: Harper & Row.

Conger J.A. & Kanungo R.N. (1994), "Charismatic Leadership in organisations: perceived behavioral attributes and their measurement", Journal of Organisational Behaviour, 15.

Conger J.A. & Kanungo R.N. (1988a), "Behavioral dimensions of charismatic leadership". In J.A. Conger & R.N. Kanungo (Eds.), Charismatic leadership. San Francisco: Jossey-Bass.

Conger J.A. & Kanungo R.N. (1988b), "The empowerment process: Integrating theory and practice", Academy of Management Review, 13.

Cummings, Thomas G. & Worley, Christopher G. (1993), "Organisational Development and Change", Fifth Edition, St. Paul, MN: West Publishing Company.

Eden D. (1990), "Industrialization as a self-fulfiling prophecy: The role of expectations in development", International Journal of Psychology, 25.

Ganesh S.R. & Joshi P. (1985), "Institution building: Lessons from Vikram Sarabhai's leadership", Vikalpa, 10.

Hofstede G. (1980), "Culture's consequences: International differences in work-related values" Beverly Hills, CA: Sage.

House R.J., Spangler W.D. & Woycke J. (1991), "Personality and Charisma in the U.S. Presidency : a psychological theory of leader effectiveness", Administrative Science Quarterly, 36.

India News (1996), published by High Commission of India, Ottawa, Ontario, Canada, # 2/96.

Isaacs William N. (1993), "Taking Flight: Dialogue, Collective Thinking, and Organisational Learning", Organisational Dynamics, Autumn.

Kanungo, R.N. (1990), "Culture and work alienation: Western models and eastern realities", International Journal of Psychology, 25.

Kanungo R.N. & Conger J.A. (1990), "The quest for altruism in organisations". In S. Srivastva & D.L. Cooperrider (Eds.), Appreciative management and leadership, 288-San Francisco: Jossey-Bass.

Kanungo R.N. & Jaeger A.M. (1990), "Introduction: The need for indigenous management in developing countries". In A.M. Jaeger and R.N. Kanungo (Eds.), Management in developing countries, London: Routledge.

Kanungo R.N. & Mendonca M. (1994), "What leaders cannot do without: The Spiritual Dimensions of Leadership." In J.A. Conger (Ed.) Spirit at Work, San Francisco: Jossey-Bass.

Kanungo R.N. & Mendonca M. (1996), "Ethical Dimensions of Leadership", Thousand Oaks, CA: Sage Publications.

Kanungo R.N. & Mendonca M. (in press), "Cultural Contingencies and Leadership in Developing Countries", Research in the Sociology of Organisations, Special Issue, (expected August 1996).

Mendoza G.A. (1977), "The transferability of Western management concepts and programs: An Asian perspective". In S. Lawrence, J. Coleman, and J. Black (Eds.), Education and training for public sector management in developing countries. New York: Rockefeller Foundation.

McGill, Michael E. & Slocum, John W. (1993), "Unlearning the Organisation", Organisational Dynamics, Autumn, 67-79.

Miles R. & Snow C. (1978), "Organisational strategy, structure, and process", New York: McGraw-Hill.

Paul S. (1986), "The strategic management of development programs: Evidence from an international study". In J.C. Lekis, E.de Jesus, & R. Maru (Eds.), Beyond bureaucracy. West Hartford, CT: Kumarian Press.

Senge Peter M. (1990), "The Fifth Discipline: The Art and Practice of the Learning Organisation", New York, NY: Doubleday.

Senge Peter M. (1992), "The Leader's New Work: Building Learning Organisations" in John Renesch (ed.) New Traditions in Business: Spirit and Leadership in the 21st Century, San Francisco, CA: Berrett-Koehler Publishers, 81-93.

Schein Edgar H. (1993), "On Dialogue, Culture, and Organisational Learning", Organisational Dynamics, Autumn, 40- 51.

Sinha J.B.P. (1980), The nurturant task leader. New Delhi: Concept Publishing House.

Singh P. & Bhandarkar A. (1990), "Corporate success and transformational leadership", New Delhi: Wiley Eastern.

Smye Marti with Mckague, Anne (1994), "You Don't Change a Company by Memo: The Simple Truths about Managing Change", Toronto, Ont: Key Porter Books Limited.

Virmani B.R. & Guptam S.U. (1991), "Indian management", New Delhi: Vision Books.

Weber M. (1958), "The religions of India: The sociology of Hinduism and Buddhism", Glencoe, IL: Free Press.

Woycke J. (1990), "Managing political modernization: Charismatic leadership in the developing countries". In A.M. Jaeger & R.N. Kanungo (Eds.), Management in developing countries. London: Routledge.

□

Focus

TQM's Approach: A Model for Organisational Learning

Greg Bounds

Control is essential at each stage of a business process to ensure customer value. However the traditional method of control is not conducive to further improvement. The author describes the TQM's approach to control which inculcates the learning process and hence leads to continuous improvement.

Greg Bounds is an Instructor in the Executive MBA Programs of Queens College and the University of North Carolina, Charlotte, N.C. and also President and Senior Partner, Partners International, Inc., 441 Roselawan Place, Charlotte, N.C. 28211.

Managers are responsible for ensuring that a company or its units achieve specific purposes, including: providing customer value, guaranteeing employees jobs, and returning financial benefits to investors. They establish goals, devise strategies, organize work processes, staff human resources, and equip people with technology and work methods to accomplish goals. The important managerial role of ensuring that all resources are used consistently over time to achieve goals is called **controlling**.

Unfortunately, many companies tend to over-control their people with various constraints, rules, norms, and restrictions that encourage the status quo. Certainly, stability is important in executing business processes to deliver value to customers dependably and predictably. However, they must also continuously improve business processes to succeed in today's competitive environment. Companies around the world are shifting to a new managerial paradigm that is grounded in the tenets of Total Quality Management (TQM) and driven by organisational learning (Bounds, 1993). Companies that do not change their cultures to be consistent with this new paradigm are destined to be left behind by more determined competitors.

The important managerial role of ensuring that all resources are used consistently over time to achieve goals is called controlling.

The Traditional Approach to Control

The role of controlling has been described in management literature for decades (Fayol, 1949; Mockler, 1970). As illustrated in Fig. 1, there are four basic steps to the traditional controlling process.

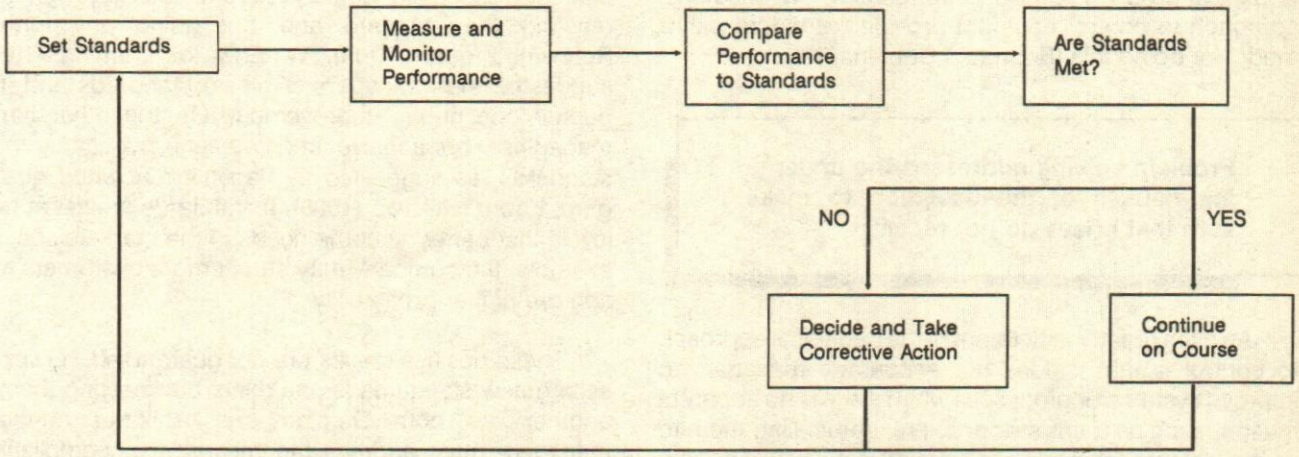


Fig. 1. The Traditional Control Process

Step 1: Set Standards, Plans, or Objectives. A standard generally represents a desired level of performance. Companies typically have standards for performance at all levels of management, such as strategic objectives for market share, departmental targets for overhead cost reduction, individual production quotas, and design and performance specifications for products and services. Standards may simply set an overall plan, a target like a due date, a range of acceptable performance around a target value, or only a minimum or a maximum value. Either way, standards set expectations and tell people what to achieve. Ideally, the standards throughout the company are interlocked and directed toward a common purpose or strategy. In theory, when everybody performs to standards, the coordinated action enables the company to achieve its purposes.

Step 2: Measure and Monitor Performance. Once the standards are determined, managers gather information to measure and monitor performance. This can be done by examining quantitative data collected through various measures which are then summarized in numerical reports. Managers may also verify these reports with non-quantitative information gathered in conversation with people or by directly observing events. Direct observation helps managers get a feel for what the numbers mean and make sure they do not become detached from the work of the company.

Step 3: Compare Performance to Standards. To evaluate performance, managers compare it against the standards identified in Step 1. In the traditional approach to control, managers use the rule of managing by exceptions, which means managers pay little attention to the numbers that conform to standard. Only the significant deviations, or exceptions, attract attention. Exceptions are easily spotted and it saves time to focus investigative efforts on events that are problematic, and ignore those that are not. Unfortunately, there is often a lot of subjectivity in deciding how to react to exceptions or deviations. Each manager may react differently to the same deviation. The same manager may even whimsically vary over time in how he reacts to the same deviation. Inconsistency can be frustrating for workers and hence must be avoided.

Step 4: Make a Decision and Take Corrective Action. After a manager has decided that a deviation is significant, he must decide what to do about it. Does he ignore it and hope it was a fluke or take corrective action to fix it? This final step in the traditional control process, taking corrective action, is where the actual controlling takes place. The success or failure of the controlling process hinges upon the actions taken by the manager to correct the cause of the deviation.

There are two different types of corrective action a manager might take in response to deviations: crisis management and problem solving. Crisis management, also referred to as firefighting, involves eliminating the immediate trouble or minimizing the bad consequences of a deviation from standard. Controlling in this sense means putting out the fire, but allowing the members that caused it to remain burning. Problem solving addresses the underlying causes of the deviation to make sure that

Crisis management involves eliminating the immediate trouble or minimizing the bad consequences of a deviation from standard.

crises do not recur. Ideally, managers should take the time to do real problem solving. Unfortunately, the traditional approach to control does not provide managers with a model for doing this (Bounds & Dobbins, 1993).

Problem solving addresses the underlying causes of the deviation to make sure that crises do not recur.

An even greater indictment of the traditional approach to control is that it does not encourage managers to improve systems or processes when there is no apparent reason, such as a crisis or problem, compelling them to do so. Yet this ongoing improvement is the key to providing competitive value for customers over the long term. This can be achieved through the accumulation of a lot of small changes to achieve incremental improvement or through large-scale and radical reengineering to achieve breakthrough improvements.

The traditional control process is designed to ensure that managers maintain a steady course to achieve their plans and standards. However, nothing about the traditional control process promotes ongoing improvement to ensure that a company keeps up with the changing standards in dynamic markets.

Shortcomings

The traditional control process sounds straightforward enough. However, just telling people what to do through standards does not ensure they will do it. There may be a lot of reasons why people, as individuals and as groups, do not meet standards, including personal motivation, lack of skills or technologies, or internal conflicts with other people or departments. For example, the standards for low-cost bidding imposed on the purchasing department may attract inferior suppliers and interfere with the production department's ability to meet standards for quality. As another example, workers may be given a quota that requires them to produce 50 units a day, with a defect level that does not exceed 10 per cent. However, when they work fast enough to achieve the production quota, they make mistakes and produce 12 to 14 per cent defectives. Under the current circumstances, without new methods or technologies, this quality standard is unrealistic. It is very frustrating for the workers who must try to comply. In setting standards, managers should carefully consider the impact on individuals, teamwork, and ultimately, customers.

Another problem is that standards encourage complacency, because employees are satisfied with just meeting the standard and not going any further. Renowned quality guru, W. Edwards Deming (1986) suggested that managers eliminate standards and just pursue continuous improvement. On the other hand, managers can achieve improvement by setting new standards, as suggested by Japan's renowned quality guru, Kaoru Ishikawa (1985). If standards are set at new levels that better meet the needs of the marketplace, for example, the company may attract more customers and achieve higher profitability.

These positive results are not guaranteed, however; setting new standards is one thing, but meeting them is another. As both Deming and Ishikawa suggest, managers must address the means of accomplishing improvement. TQM approach does this by encouraging managers to evaluate their outputs scientifically, test the value of their products and services with feedback from customers, and develop knowledge of the causes of variation and taking action to reduce variation and deliver improved value to customers. TQM approach encourages managers to go beyond the minimal requirements of current standards, and not just fix problems to return performance to normal. In other words, it goes beyond the "if it's not broke, don't fix it" mentality. TQM provides managers an approach to controlling which encourages continuous organisational learning. Here's how it works.

TQM's Control & Improvement Process

In today's business environment managers need a control and improvement process which incorporates some of the elements of the traditional control process along with a model of the performance process which emphasizes ongoing learning and improvement (Bounds et al, 1994). Let's look at the first component of this learning-based approach to control and improvement.

Control and improvement process incorporates some of the elements of the traditional control process along with a model of the performance process which emphasizes ongoing learning and improvement.

The Performance Process

The performance process consists of four basic building blocks: input transformation output and customer (or

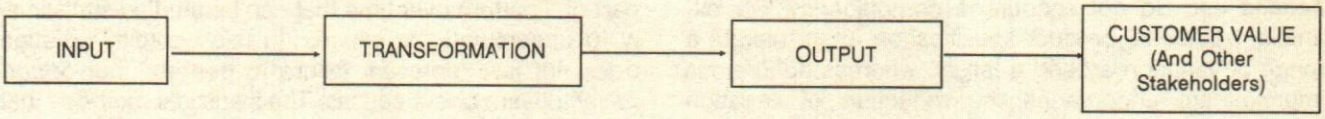


Fig. 2. The Performance Process

some other stakeholder). The process of performance shown in Fig. 2 suggests that every output has a customer, or some other stakeholder, whether internal or external to the company. The customer either makes use of the output, or in some way benefits or makes some sacrifice because of it. The output might be a product or service sold to a customer. It might also be a financial result, like sales revenue, operating costs, profitability, return on investment or dividends to stockholders. In the case of an internal customer, the output might be a subassembly, and engine block, a purchase order, or a quarterly financial report.

The output also has an identifiable transformation process that produced it. For example, the engine block is produced by a sequence of machining operations performed on a metal casting or through lost-foam casting. The engine production process is part of a larger transformation process that assembles a number of component parts into a finished automobile as its output. Before the transformation process can occur, however, various inputs have to be prepared. The strategy, structure, product designs, machinery, plant layout, policies, procedures for work, rules for conduct, materials, and human resources all have to be put in place before anything can be done to transform inputs into outputs for customers.

The other important point to realize is that the performance process described applies to business processes throughout the organisation. Furthermore, these business processes are mutually interdependent and supportive. Each one affects and is affected by others. They fit together to make up an entire system. In order to best accomplish control and improvement, managers must view their organisations as a complex system of interrelated parts.

This work of controlling and improving business processes throughout the company is a managerial responsibility. Mr. Masao Nemoto (1987, p. 17), President of Toyoda Gosei, and former Managing Director of Toyota Motor Company, once stated "If there is a will, the top management can take many appropriate actions. When it takes no action and tells the employees to shape up by saying 'do your best', then it has failed in discharging its responsibility to the company". Without this belief that improving the organisation as a system is a managerial responsibility, managers tend to enact the traditional control process. They focus their actions on pressuring people to do better in the transformation process. They ignore the constraints placed on workers by the larger system and upstream processes.

Without the understanding that variation is a natural part of any system or process, managers may wrongly think that since workers can occasionally hit the targets, they ought to be able to do so every time. Managers must realize that in order to reduce variation and approach perfection in any process, they must improve the larger system, including upstream processes and inputs. Such improvement requires knowledge and organisational learning.

The Learning Process

The basic elements of the **learning process**, which is the way managers use scientific thinking to develop knowledge about the causes of outcomes, include the following four steps, which are represented in the circles on Fig. 3.

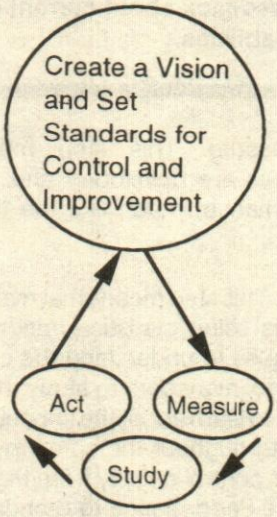


Fig. 3. The Learning Process

Step 1: Set Standards for Control and Improvement. This step requires managers to go beyond the traditional

approach to set standards that do not have waste embedded and do not encourage complacency. For example, traditional product specification often tolerate a range of variation around a target, whereas continuous improvement encourages the reduction of variation around a target. It also requires managers to revise targets to match evolving customers needs and dynamic marketplace realities.

Managers may set standards in the control and improvement process, however, they will do so differently than in the traditional approach. Managers should carefully consider the impact of quotas on workers and eliminate them if they are harmful. Managers will lead and inspire by articulating a vision for what the company can become. Specific quantitative goals and objectives are only established when managers also articulate the means of achieving them. Standards are no longer used as exhortations for workers to do better. They are not used as yardsticks to evaluate and judge individuals. Rather, they are used to communicate the leader's vision and to reveal opportunities to further improve systems and processes. Furthermore, standards are not set as lofty objectives independent of what the current business processes are capable of producing. Rather, they are realistic and based upon the feedback about current performance capabilities.

Standards are not set as lofty objectives independent of what the current business processes are capable of producing. Rather, they are realistic and based upon the feedback about current performance capabilities.

Step 2: Measure. This step means that appropriate measures are developed and data collected to assess performance, much like the traditional control process.

Step 3: Study. This step means that managers analyze the data, perhaps using statistical methods and other tools and techniques to understand the causes of variation. It also requires managers to study the relationships among measures to learn about the impact of their actions on performance throughout the company. This is a significantly different control activity from the traditional activity of "Compare Performance to Standards." It places a priority on learning rather than evaluating and assigning blame for deviations. Furthermore, it does not assume, like the traditional approach to control, that managers already know the cause of the deviation.

In this approach, managers view deviations as a part of a pattern over time that can be studied statistically to understand the causes. In this context, variation does not just represent failure to perform, but opportunity to learn about causes. The statistical methods that are referred to as Statistical Process Control (SPC), can help provide this understanding. SPC helps managers to distinguish when a deviation may be due to a special cause, or an unusual event, or due to common causes which are a normal part of the system (Deming, 1986). Statistics is not the only way to develop knowledge. But it does help to ensure that managerial decisions are grounded in empirical evidence, which is intelligently interpreted, and not just based on personal opinions or habits.

Step 4: Act. This step means taking corrective action on the basis of knowledge developed in Step 3. Depending on the situation, corrective action may mean crisis management, problem solving, or system improvement to attack root causes.

By combining the learning process and the performance process, we can create a model for the control and improvement process, as shown in Fig. 4.

Standards and measures may be established at each of the four blocks of the performance process as shown in Fig. 4. These should be communicated to relevant people throughout the company. Standards for suppliers specify the characteristics of products shipped from suppliers and receiving inspections help to ensure high quality inputs. Standards specify the procedures for doing the work that transforms inputs into outputs, and managers may observe the work process and monitor production data to ensure that the standards are met. Standards such as product specifications tell what output workers are supposed to produce, and in-process and end-of-line inspections may reveal whether or not those specifications are met. Finally, standards describe what the product is supposed to do for the customer, and managers may conduct customer satisfaction surveys to ensure that customer expectations are met.

In addition to setting standards and measuring at each of these four blocks, managers also take "corrective action" at each of these blocks. The action taken at any one block may be based on the information feedback from the study of measures at the point, or from the other points in the performance process. Ideally, the action taken is based upon the statistical study of measures to understand the causes of variation. Application of the Measure-Study-Act sequence at each of these four points constitutes four different aspects of performance control: preliminary control of inputs,

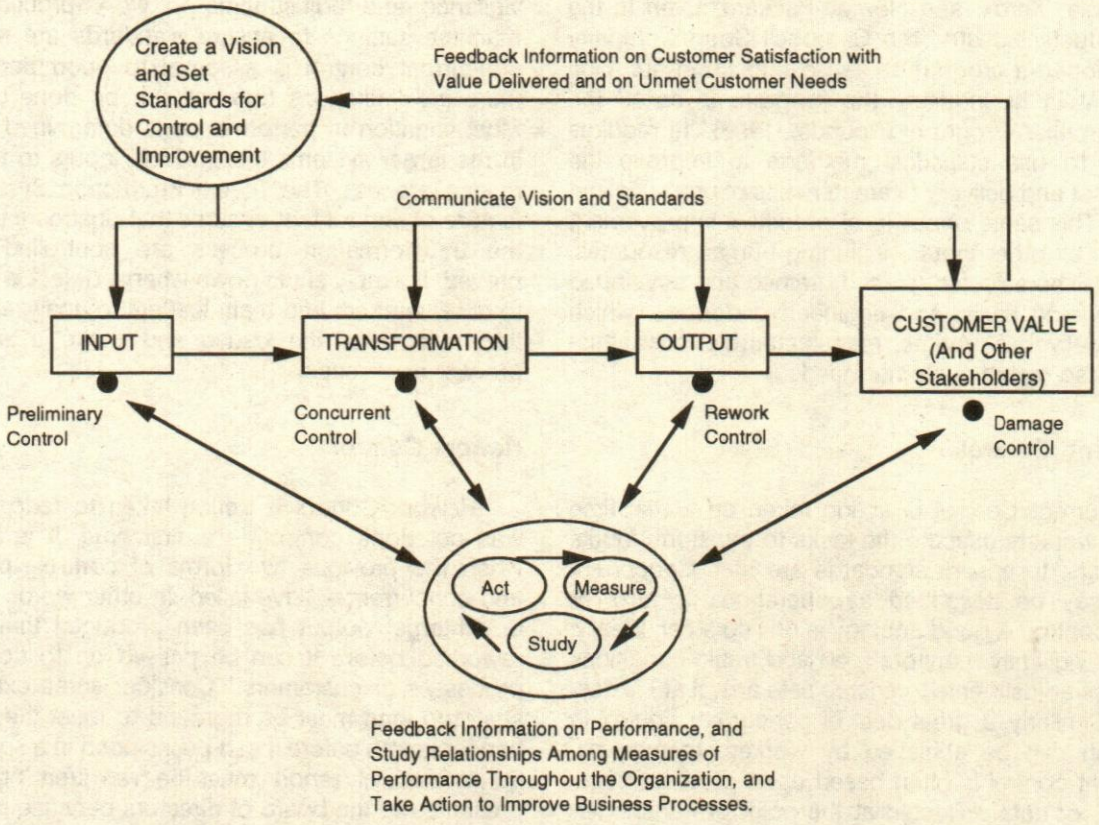


Fig. 4. TQM's Approach to Control and Improved Based on Organisational Learning

concurrent control of the transformation process, rework control to correct defective outputs, and damage control to smooth relations with customers who receive defective outputs. These approaches to control are listed in the order of their effectiveness in achieving control and improvement. Generally, the earlier a manager takes action in the performance process, the more effective (and the least costly) is the control. Preliminary control is the most effective and damage control the least.

Preliminary Control

Managers achieve preliminary control by making projections about the future, anticipating needed changes, and taking appropriate action. Preliminary control is both preventive, to avoid undesirable outcomes, and proactive, to achieve desired outcomes. The most important part of preliminary control is the job of improving the system of causes. It is here that managers attack the root causes of problems. By changing and improving inputs, managers exert a great deal of control over the performance of subsequent or "downstream" events, including transformation, output and customer value. Managers bear the responsibility to improve the materials, machinery, manpower, methods and measures used to produce outputs for customers. Sometimes workers may identify opportunities for improvements they can make to inputs while they are engaged in the transformation process of doing the work. With statistical charts to document the result of their actions, workers can be given autonomy to make limited changes and incremental improvements to their work processes. However, most of the inputs are put in place by managers (Gordon et al, 1994).

Managers achieve preliminary control by making projections about the future, anticipating needed changes, and taking appropriate action.

This proactive approach costs less and achieves higher quality than just letting suppliers send poor quality inputs and then using inspection to catch the defects before they are used in the transformation process. This approach is integral to the just-in-time (JIT) or lean manufacturing approach that has been

mastered by Toyota and adopted by many others such as Motorola, Xerox, and Hewlett-Packard. Even in the food products industry, the Campbell Soup Company has developed a program to improve its suppliers. One of the first in its industry, the program is called the Select Supplier Program (Bounds, 1996). It requires suppliers to use statistical methods to improve the quality, cost and delivery characteristics of products and services. This same principle of proactive improvement applies to all other inputs, including human resources, which must be selected, placed, trained and developed on an ongoing basis, and engineering designs, which must be delivered on time, manufacturable, cost effective and also match customer needs.

Concurrent Control

Concurrent Control is action taken on a real time basis, as workers execute the tasks to transform inputs into outputs, to ensure standards are met. Concurrent control may be described as operational control or steering control. A good analogy is driving a car. Ideally, the driver vigilantly monitors road and traffic conditions and makes adjustments to ensure safe arrival at his destination. Similarly, a great deal of concurrent control in production can be achieved by workers themselves. Concurrent control is often based upon process measurements, or data collected at the point of transformation. For example, workers in the paint room of a car manufacturer may monitor pressure gauges to ensure the smooth flow of paint to the sprayers. Statistical charts provide a useful tool for workers to accomplish self-control by spotting and reacting to special causes. However, sometimes concurrent control is achieved by the manager who directly monitors workers behaviour.

Concurrent control consists of fine tuning and making course corrections which makes sure that the work is executed according to the design, procedures, and steps determined at the stage of inputs. Corrective actions may involve making adjustments to machine settings, redistributing time and energy, or changing behaviour. Significant advances have been made in achieving concurrent control with advancements in computer controls and automated measurement devices which monitor and make adjustments to minimize variation. Automated control is particularly important in the complex manufacturing processes of products like chemicals at DuPont, oil and gas at Exxon, and paper at Georgia-Pacific.

Concurrent control also requires the worker or manager to take action to avoid an imminent crisis. For example, sometimes workers have to compensate for the inadequacy of inputs that come from the larger system. Poor quality raw materials often require increased vigilance and adjustments to work procedures and machine settings to ensure standards are met. While concurrent control is essential to good performance, there are limitations to what can be done through it. Most variation in performance is determined upstream in the larger systems that provide inputs to the performance process. The Toyota Production System has a feature of control that ensures that upstream inputs and the transformation process are controlled and improved. It simply shuts down when a defect is produced to allow workers and team leaders to analyze the situation, determine the cause and make a change to prevent recurrence.

Rework Control

Rework Control is action taken to redo work that was not done correctly the first time. It is necessary when the previous two forms of control – preliminary and concurrent – have failed. In other words, defective or off-target output has been produced that must be reworked before it can be passed on to downstream processes or customers. Consider some examples. A shaft too long must be reground to meet the specification for length before it can be included in a subassembly. A financial report must be rewritten before it is presented to the board of directors because its calculations were based upon some faculty numbers. Sometimes rework is not even possible. The output may have to be discarded or sold for salvage. In some cases, managers just have to accept the output and make the best of it. For example, financial results, like sales volume and profitability, are difficult to rework, despite the determined efforts of many creative accountants.

Managers should not rely exclusively on rework control to ensure the quality of their outputs. It is more costly to do things twice than it is to do it right the first time by ensuring preliminary and concurrent control. Relying on rework to control performance means wasted resources, unpredictable delivery schedules, and extra inventory as safety stock. And too often, defective products slip through inspection undetected and get into the marketplace to customers. This is particularly problematic with services, such as a manicure, a haircut, or an oil change, which are delivered as they are produced.

Damage Control

If defective or off-target output does get into the hands of customers (or other stakeholders), then managers have to engage in Damage Control, or take action to minimize the negative impact of a defect or

some other variation on customers. There are many ways they might do this, including apologizing, refunding money, replacing the defective product, performing the service again (a form of rework), and promising to do better in the future. The 5 year/50,000 mile warranty on new automobiles represents a form of damage control.

Other forms of damage control seek to minimize the perception of damage by the customer, which might be referred to as *image management.* For example, a young couple bought their first car, a Mazda station wagon, from a used car dealer, and noticed that the car smokes more than it should. Upon their return to the dealership, the car salesman insists "There is no need to be alarmed. It's not a Mazda if it doesn't smoke a little." Like political "Spin Doctors" who attempt to manipulate potentially damaging news about their party's candidate by putting a positive "Spin" on it, sales people and customer services representatives are often placed in this role of damage control. When the President of a company stands up before the Board of Directors, he or she may engage in damage control to soften the impact of the "bad" financial numbers in a quarterly report. Glance through an Annual Report of a Fortune 500 company on the downslide and you will find all kinds of damage control.

The most important point about damage control is that it happens when all the previous approaches to control, including preliminary, concurrent, and rework control, have failed. The damage has taken place, and all managers can do is hope to minimize it or get customers to forget about it, overlook it or accept it. To prevent failure in the future, they must take action on upstream systems and processes. The further upstream they can go in taking action, the better. At times, all four approaches to control are necessary. However, if managers devote more time and effort on preliminary control, less time and effort will be required downstream in the other forms of control.

Feedback Information

Feedback information, or data gathered on the performance process and feedback to managers, is critical for control and improvement. Feedback does not change what has been done in the past, but informs people about past performance and future customer needs. If analysed, feedback information can lead to learning about how to improve future performance. Feedback from the study of customer needs ensures that the right standards are set in the first place. Then feedback on performance reveals whether those needs were met.

Feedback information, or data gathered on the performance process and feedback to managers, is critical for control and improvement.

Notice in Fig. 4 that feedback flows in both directions, upstream and downstream, through the Measure-Study-Act sequence. This two- way flow ensures that corrective actions are taken based on feedback information from both upstream and downstream measures. For example, engineers designing a new manufacturing process as an input will study the impact of the new process on workers in the transformation process, the output products and services, and the customers who acquire and use these outputs. Engineers also notify workers of process changes and inform them about how best to conduct concurrent control during the transformation process.

The two-way flow of feedback information also implies that managers study the relationships between measurements at the various stages of the performance process. Statistical methods are available for investigating these relationships. Consider some examples : Cadillac division of General Motors, like all other automobile producers, conducts market tests of various prototype designs (Input) to see what customers value. Engineers study the effect of computer control algorithms (Transformation) on the physical characteristics of chemical products (Output) at DuPont. Georgia-Pacific sales people study the impact of variation in thickness and surface characteristics of particle board (Output) when another company laminates it to manufacture furniture (Customer Value). When managers take this approach to control, they use information to guide corrective actions. Their top priority is to control and improve the inputs that compose the system because all subsequent performance depends upon how well they do this job.

Improvement Without Statistical Analysis

Do managers have to use statistics in every case to make improvements? No. For example, a 15-minute-a-week meeting was established at Hughes Aircraft, where the only topic was quality. The employees cut workmanship errors 85 per cent and improved productivity in excess of 30 per cent in such areas as circuit card manufacturing. The gains did not come through applying statistics, but by thoughtful analysis of practices and personal work values. Such gains are often possible when work

conditions are dismal and there are big opportunities for improvement.

When American automobile producers started to seriously improve quality in the early 1980's, many big and immediate gains were easily achieved because there were so many obvious problems. Some managers have reported that defect rates were higher than 40 per cent in some plants. Under these circumstances, any attention to quality can yield improvements. It is like low-hanging fruit, easily picked. After initial successes, achieving continuous improvement is more difficult. It is here that the study of variation can contribute to further learning.

Even if managers do not personally use statistical methods to identify opportunities to improve, the theory of variation and the thinking process associated with it give a message about improving the common causes of variation. In brief, workers are stuck with the systems and business processes that managers provide them. Under these circumstances, the traditional approach to control can be not only unfair to workers, but humiliating, frustrating and even infuriating.

Sometimes collecting the numbers and conducting formal statistical analyses may be burdensome and even unnecessary to reveal improvement opportunities. A manager who is well trained statistically and educated (with knowledge of causes), can often decipher the solution quickly. However, he should exercise caution in jumping to conclusions. It is often hard to tell the difference between a situation where you can intuit the right answer and one where you only think you have the right answer. Statistical analysis can help provide the added insight needed to get the right answer. It is also important in documenting and confirming that changes have had their intended positive effects on performance.

Leadership & Shared Responsibility

Managers should not assume that they already have all the knowledge they need to manage performance. Feedback can be gathered throughout the performance process, and all employees should be engaged in learning to make improvements. System improvement is achieved by superiors and subordinates working collaboratively through both a top-down and a bottom-up approach. Both superiors and subordinates have important roles to play in achieving control and continuous improvement. (For an assessment tool that can be used to evaluate a company's progress in establishing a TQM-based culture, see Bounds, 1994).

System improvement is achieved by superiors and subordinates working collaboratively through both a top-down and a bottom-up approach.

System improvement is foremost a managerial responsibility. Specifically, the performance that results from a stable system is not improved by putting pressure on the individuals who work within the system. Rather, it is improved by taking action to change the system of causes, including the materials, machinery, methods of work, measurements, and human capabilities. Only managers have the authority and resources to fundamentally change the system. In this sense, the control and improvement process is a top down approach.

Here is what Ray Sata, CEO of Analog Devices, Inc., says about performance standards, improvement, organisational learning, and the role of leaders:

> "In my view, the underlying drive behind what has come to be called the management paradigm shift is the fact that the rate of change in technology and markets is exponential. Future shock has arrived, and we're living it everyday. That changes a great deal of what management is all about. At the same time, the standard for what constitutes successful performance in world markets has gone up by orders of magnitude....

"In the last analysis, the challenge is to accelerate our rate of learning. I look at improvement and learning as two sides of the same coin. Back in the 1980s, we thought we were making reasonable progress in learning and improvement. But as I look ahead, it is clear that we must accelerate our rate of improvement significantly in comparison with the past...."

"There are many dimensions to this transformation. The new knowledge and skills required to be an effective leader in the 1990s can be pretty daunting. The leader of the 1990s will be a facilitator of change—a learner and teacher, a coach and counsellor, a role model, a diagnostician, a designer of new systems and organisational structures, and a master of conversation."

"A special role for the leader at the top of the organisation is to be an iconoclast. The biggest impediment to change is your assumptions and beliefs; nothing fails like success. You have to identify the beliefs and assumptions that used to work but are now getting in your way. In companies with strong cultures,

The leader of the 1990s will be a facilitator of change—a learner and teacher, a coach and counsellor, a role model, a diagnostician, a designer of new systems and organisational structures, and a master of conversation.

that's hard knot to unravel. The leader must demonstrate through words and deeds that throwing out things that were once held sacred is not only OK but necessary."

"I'm excited and challenged by how much I have to learn to provide the leadership Analog Devices needs. Every day I learn a little bit more, and every day I learn just how much more I have yet to learn" (Bounds, Dobbins & Fowler, 1995, pp.551-552, 583).

Ray Stata's attitudes as a leader are central to his company's approach to organisational learning. He realizes that managers must change business processes on the basis of knowledge about the whole system. To develop knowledge about the system, managers must engage subordinates in learning and sharing of information. This means Organisational learning which is system-wide. No one individual, including the manager, knows everything about the system. But collectively, the knowledge of an entire team of people can be harnessed to develop the insights and solutions needed to make appropriate improvements. In this sense, it is a bottom up approach. Managers must lead, but they must also share the responsibility for control and improvement with other people in the organisation. They should even engage their people in helping to create the vision and standards, as well as enlisting them to improve the organisation's capability for achieving the vision and meeting the standards. They may engage their people in business process improvement by vesting them with authority for self-monitoring and self-control through the use of teams, and various techniques such as statistical charts.

In its re-engineering efforts, Xerox establishes what it calls "high-impact" teams which have cross-functional membership from a variety of levels within the organisation. Xerox provides these teams with "planned learning experiences" rather than just training and educational courses to prepare them for their reengineering efforts. Under this approach the level of knowledge and skill of the specific team is taken into account, and the learning experience is adjusted to their needs. Tools and techniques are provided as needed, just in time to be applied to a process. The team produces a "readiness checklist," identifying the knowledge and skill level of each team member in respect of relevant tools and techniques, and also describing the documented business processes to be addressed (Bounds & Hewitt, 1995).

As demonstrated at Xerox, this approach to control and improvement is a collaborative process, led by management and fulfilled by employees. Learning is not only the basis for this approach to control and improvement; this approach is a model for organisational learning. With the right leadership, and with guidance from the model presented in this article, managers can achieve both control and improvement in a learning organisation that lives by the tenets of Total Quality Management. Indeed, this model represents the foundational mind-set for any sustainable TQM initiative. All other initiatives that fall short of this comprehensive approach are destined for disappointment.

References

Bounds G. (1993), "Towards a New Management Paradigm," Productivity, October-December, 34(3).

Bounds G. (1994), "Assessing Progress in Total Quality Management," Productivity, October-December, 35(3).

Bounds G. (1996), "Cases in Quality, Burr Ridge", IL: Richard D. Irwin.

Bounds G. & Dobbins G. (1993), "Changing the Managerial Agenda", Journal of General Management, 18(3).

Bounds G., Dobbins G. & Fowler O. (1995), "Management: A Total Quality Perspective". Cincinnati, OH: South-Western Publishing Company.

Bounds G. & Hewitt F. (1995), "Xerox: Envisioning a Corporate Transformation". Journal of Strategic Change, January-February, 4(1).

Bounds G., Yorks L., Adams M. & Ranney G. (1994), "Beyond Total Quality Management". New York: McGraw-Hill.

Deming W.E. (1986), "Out of the Crisis", Cambridge, MA: Mass. Institute of Technology.

Fayol H. (1949), "General and Industrial Management". New York: Pitman.

Gordon M.E., Philpot J.W., Bounds G.M. & Long S.L. (1994), "Factors Associated with the Success of the Implementation of Statistical Process Control". The Journal of High Technology Management Research, Spring, 5(1).

Ishikawa K. (1985), "What is Total Quality Control? The Japanese Way". Englewood Cliffs, N.J.: Prentice-Hall.

Mockler R.J. (1970), "Readings in Management Control", New York: Appleton-Century-Crofts.

Nemoto M. (1987), "Total Quality Control for Management: Strategies and Techniques form Toyota and Toyoda Gosei", Englewood Cliffs, N.J.: Prentice Hall.

□

Focus

TQM & Organisational Learning

Subrata Chakraborty

The onset of unprecedented changes is compelling today's business organisations to search for a new management order. However, ways of managing, especially in the present changing environment, seem to evolve on a continuous basis through learning and diffusion. The present paper is devoted to identifying the major ideas of reformation suggested in the theories of Total Quality Management (TQM), understanding their implications in organisational functioning and then analyzing the basic concepts of Organisational Learning (OL) with a view to explore complimentaries between these two epoch making theories.

Subrata Chakraborty is Professor at the Indian Institute of Management, Prabandh Nagar, Lucknow-226013.

The advent of Deming era in the fifties has gradually brought in a new management technology. The traditional approach propounded by F.W. Taylor, which is product oriented, has been found to be increasingly wanting in coping with the current compulsions, and the present needs of business. The process oriented philosophy of Deming has been gaining ground throughout the world. This technology emphasizes the quality of the management processes as well as the work processes. However, to ingrain this new philosophy and to face an increasingly competitive world, business organisations of today require a substantive change of focus. The changes, apart from their quantum, are also multifarious, like, shifting from quantity to quality, from competition to cooperation, from management of results to improvement of processes, etc.

Changes: The Whys and Hows

The changes are such that making anyone of them can be a formidably difficult task unless an organisation, as a whole, is able to understand and appreciate the underlying philosophies behind the change needs and is in a position to participate collectively in effective initiation and management of the change processes. It requires considerable preparations both at organisational as well as at individual levels. To plan and bring about the needed changes employees as well as managers should be able to see things in the same light, especially when it comes to answering questions, like, why any change is necessary in the first place? What exactly is the nature of change? What are the specific change needs? In addition, the change needs appreciation as well as its identification ought to address issues related to specific changes needed in structural, operational and behavioural terms, because only then could meaningful change producing steps be worked out. Organisation-wide efforts of making change have their benefits too. Among other things, this permits the proposed action steps to be shared across the organisation in clearer terms. In fact there are three important aspects to this

entire business of bringing the required change. Firstly, permitting organisationwide recognition of the need to make change. Secondly, promoting collective willingness to move together in a direction that may produce the desired change. Thirdly, identifying the specific methods of making change. All these would mean that changes must not only have champions in every individual but the change processes must also be owned up in order to make any change purposeful. Organisationwide effort would have greater potential to address all these three issues. The more the number of people desiring change, especially when the desire arises out of their common concern for the organisation and its business, the faster would be the initiation and execution of change.

TQM, left to its own devices, may not necessarily find its root in organisational functioning unless some kind of cultural revolution takes place within the organisation.

The marketplace of today, being what it is, requires the continuous improvement of various business processes. This is precisely where Total Quality Management (TQM) principles provide methodological guidelines. But methodology alone does not make things happen because there could be many gaps between what is needed and what actually gets done. To bridge this gap, an organisation should be able to learn and relearn what needs to be done, when, and how. TQM, left to its own devices, may not necessarily find its root in organisational functioning unless some kind of cultural revolution takes place within the organisation. To bring about this much needed thought change or cultural revolution, an organisation needs to have certain abilities that promote learning at an organisational level. The crucially important ability here would be "to learn together" so as to be able to generate a greater synergy in what gets done. In this paper, an attempt has made to examine if concepts of Organisational Learning (OL) and those of TQM could be blended together to put TQM in action. More specifically, the issue under investigation is whether the philosophies of TQM and those of OL can really reinforce each other, and if yes, what is there in each of these that could work as binding forces and create building blocks for producing the desired synergy.

Essentials of TQM

TQM philosophy is built around three basic ideas of reformation (Chakraborty, 1995). These are: to become customer driven instead of being self focussed; to concentrate on the process rather than being preoccupied with results; and use workers' heads in addition to their hands. Of the three, the first one, which deals with becoming customer driven, probably reaffirms the purpose of business itself. In a sense, it is also a reminder to the business to seek a clearer answer to the perennial question, "What business are we really in?" Are we in the business of making money or are we here to cater to certain needs of the society, more specifically to those of the customers of our product/service? In other words, the issue in question is what should our priority be, customer value or producer cost. Any sincere attempt to find answers to these questions, in order to sort out the priorities, could expose us to stark realities viz., profit in business is only a consequence and not the root cause; and it is the customer who really defines quality for us and not we, who do it for him. Once the subtle messages contained in these are internalised, it becomes clear that it is the customer needs that actually create a product and not the technology or raw material. Therefore, business takes place primarily because of customer needs and not because of the producer's profit motives. The cardinal message here is: we are not in the business of finding a customer for a product, we are really in the business of finding a product for a customer. This is precisely the foundation stone on which the entire quality philosophy is built. Implication of this understanding would be wideranging, starting with how we assess customer needs and going right upto the way we align everyone of our organisational activities to meet these needs. What is more, none of these are one time exercises. Each one of the activities, starting from customer need identification to its ultimate fulfilment, are to be performed on a continuous and ongoing basis, in the changing world of today.

Once the underpinnings of this first idea get crystallized the second item of reformation, that is process instead of result, should begin to make sense. Notwithstanding its profundity, this idea of developing process focus, being a significant departure from what we have been used to for years, seems to create a considerable dissonance in our work organisations, more so after being tutored on things like MBO in an earlier decade. The MBO type approaches which produced

It is the customer needs that actually create a product and not the technology or raw material.

strong waves in the seventies have taught us, and quite emphatically too, that it is the result that counts; how you achieve it is not all that important, thus giving a clear signal that only results matter, processes do not. Hence, we have conditioned ourselves to believe that as long as results are positive, nothing could possibly go wrong. Thus, monitoring the end results and adjusting activities almost entirely on that basis not only became the *sine qua non* of doing business effectively but also came to be regarded as the best way of doing it.

Admittedly, this approach did deliver the goods in the past when competitive forces were either non existent or were too feeble to be of any consequence. But today, the business environment is quite different – competition not only intensifies by the day, its nature and complexion too keep continuously changing. As a result, making correct assessments of the consequences even after something has occurred is proving to be extremely difficult, leave alone estimating them, in any precise manner, *a priori*. However, the old methods of doing things have distinctively left behind their footmarks in the way we thought, planned and executed business. The earlier approaches, have left their impact on all of the three crucially important layers in our organisational management; the mindset, the management system and the daily activities. More often than not, the way we think guides our action. Therefore, to bring the required shift in emphasis from result to process, the change agenda ought to address all relevant issues pertaining to our change needs in each one of the three layers, the mindset being the most important one. What this would rally mean and how to workout the change steps should be the operational questions of our interest. However, before we take up these questions, the term process itself might require some elucidation, given the context of our use of this term.

Three crucially important layers in our organisational management; the mindset, the management system and the daily activities guide our action. Therefore, the change agenda ought to address each of the three layers.

Process: Definition & Dimensions

Process, for our purposes here, could be simply defined as a coordinated set of activities which meets customer requirements. In business, where the different requirements of a customer are to be met through a

The term process, in our context, is used to signify the means used for catering to customer requirements.

coordinated process – be it a manufacturing process or a management process – it would assume the meaning of an integrative set of steps, activities and infrastructure, and their combination, including how exactly these are put in place to cater to the customer's stated and implied needs. In other words, the term process, in our context, is used to signify the means used for catering to customer requirements. Thus, processes, or the process steps, assume significance because, it is through these, the results are achieved. In the earlier era, that had a result focus, we either failed to envisage this, or, did not consider it necessary to go into the various process elements, thus making the assumption that process must be perfect if the end result is good. In a situation of static equilibrium, this assumption probably does not cause great harm to business, hence our lack of appreciation of the effect of this assumption. That processes can be suspect even while results continue to remain good may, therefore, sound like an antithesis of what we generally believed so far. We, therefore, inadvertently remain guided by the notion that results are the best indicators of our current health, thus mixing up the cause with its effect. By bringing customer's view into the organisation, through analysis of various processes and subprocesses, the TQM philosophy attempted to change this earlier understanding. Also, among other things, the TQM philosophy cautions us against the possibilities of misalignment between the current needs of our customers and our own set patterns of thinking and/or of doing things. The process focus, indeed, helps us to remain in tune with what is currently needed. It, therefore, tries to bring more of a real time perspective as compared to the earlier result focus, which, being almost entirely *post facto* in nature was in a much greater risk of 'missing the bus'. In fact this process focus in TQM is one of the important offshoots of the realization that profit, being only a consequence, is not directly controllable. The quantum of profit can go up or down depending on how well the various process steps are planned and executed. Hence, attempts should be legitimately directed to control what can be actually controlled, the causes, and not what cannot be controlled, the effects. The only way one can exercise some control on the effect is by controlling the causes themselves. Hence, to put the TQM philosophy in action, this important realization has to dawn quickly enough in an organisation. Further, the same must find articulation by the top management so that it permeates down through every layer in an organisation, promoting and permitting people to think process.

Attempts should be legitimately directed to control what can be actually controlled, the causes, and not what cannot be controlled, the effects.

Associated with all these is an important human dimension too. In any work organisation, every person, no matter who he is, contributes in some part of the process. In actual practice, people are often found to be possessive about the steps and/or activities they perform. In a somewhat limited sense every such person tends to behave as a process owner. Eventhough this possessive attitude about work seems to get acquired fairly quickly, true feeling of ownership, in a broader sense, does not really develop all that easily. May be the possessive attitude arises out of one's own need of self defence more than anything else. Whatever the reasons may be, it is actually this attitude, which is often at the root of the so called provider oriented mentality. While there may not be anything seriously wrong about being possessive of one's own ways of doing things, the utility of each one of these activities in the overall context needs to be analysed with an open mind. Being contributors in some part of the process, everyone not only has the legitimate right to think and act on that particular part, but also has the commensurate responsibility of doing it better. Therefore, what could be of help is to create a desire in everyone's mind to ask purposeful questions, such as, whether the activities I do are worthwhile in meeting the requirements of my customer? How could I possibly do them better so as to meet the customer requirements more closely or completely? These questions, having significance for everyone in the organisation, are relevant to every individual irrespective of the level or the job title he holds. In fact answers to these questions could serve as the binding common thread across the various layers in an organisation.

Implications of Process Focus

The two questions indicated above are difficult for anyone to answer till such time clear linkages are established between individual activities, the final product/service, and the user needs. In most of our organisations, majority of the people being far removed from the end customer would hardly be aware of what really makes a customer buy the product, let alone how he actually uses it. Neither the reason for buying nor the specificities of use being clearly known to most people, visualization of what is required is not only difficult but could also appear to be somewhat an abstract exercise. To operationalise things, what usually gets done in the name of quality is the creation of certain standards which people are exhorted to meet. The purpose of the job, for a vast majority in the organisation, thus becomes one of meeting standards and not one of meeting customer needs. This often posed problems in effecting quality improvement in the earlier days. In many cases the problem got even more compounded as organisations attempted to serve moralistic sermons to their people, wrapping such sermons within a transcendental view of quality.

Organisations attempted to serve moralistic sermons to their people, wrapping such sermons within a transcendental view of quality.

It is precisely this linkage gap that has paved the way and facilitated the development of a broader understanding of the term "customer". Researchers as well as practitioners felt the need to look at a product/service through its various steps, beginning with its very conception and going right upto the final consumption. TQM approaches provided us with the necessary methods to cater to this particular need. Among other things, TQM has proposed the concept of internal customer and suggested that any activity performed by anyone in the organisation ought to have its customer—internal or external—or else the particular activity is unnecessary and the same need not be performed at all. Embedded in this concept is a simple yet powerful message. All activities must be necessarily driven by customer needs—internal or external. To put this idea in action, organisations should be in a position to assess in clear terms what exactly is the value being created where, who seeks this value, and what linkages this may have with the value needs of the end user. Put differently, to satisfy the need of the end customer, a person working at the last stage of value creation can only do his job purposefully provided he gets his supplies that can help him to do his bit. This analogy can very well be extended to every stage of value creation in order to cover every link that constitutes the total chain beginning with the end customer and going back to the supplier of an organisation. That is to stay, if customer requirements at every stage are precisely known and the deliverables are clearly identified, the whole process can be made to work through a chain of activities, each one catering to the requirements of the next. This way every person treats the one coming next in the chain as the customer and does what is needed to be done to

supply the deliverables desired by his customer. This means that each person, in the creation and delivery chain, plays dual roles: that of a customer as well as of a value supplier. It may be noted that the term value is used here to mean 'value realized' by the customer and not merely 'value put in' by the respective suppliers. It is this chain that has been frequently referred in literature as the value chain.

All activities must be necessarily driven by customer needs – internal or external.

To summarize, the implications of the process focus are as follows:

* Creation of a chain, starting from the customer going back to supplier, that can help underline the deliverables at each and every transfer point.
* Facilitating causal links between what is done as process steps and what gets produced as the output, through proper cause effect analysis.
* Promoting recognition of the need to monitor each step of the process and to examine if these are effective in adding customer desired value to the product.

Role of Internal Customers

The process focus in TQM has brought in certain new insights relating to the roles the individual could play in achieving customer satisfaction. The earlier belief that people, as individual specialists, contribute better and also play their roles most effectively when allowed to perform their own respective specialized tasks has been dispelled. In fact, a set of new understanding began to emerge about individual roles, including their effective discharge. Firstly, in the changed situation, each person is required to don two caps simultaneously, that of a planner as well as of a doer. Secondly, questions of the type "Whether to" becoming increasingly more significant over those of the earlier "How to", the type of understanding expected of a role is quite different from what we thought it to be like in the earlier days. Prior to TQM era, a specialist, by virtue of his being so, was perhaps not even expected to raise "whether to" types of questions, since there was no clear linkage between a specialist activity and customer desired attributes or the deliverables, rare exceptions being a limited few products/services which are primarily driven by highly specialized endeavors. Companies looked for and employed as subject matter or area specialists, in every business function with the understanding that the majority, if not all, of the tasks performed in business are essentially specialist endeavors, the total task being seen as the simple addition of outputs drawn from what was done by such individual specialists. There was neither any trigger that came from the external environment suggesting any need to broadbase the set of skills nor any inherent internal desire to look at the individual jobs using any framework other than what is generally available in those narrowly defined skills. Focus being overwhelmingly on the perfection of use of an acquired skill, and not on the utility of the work itself in the creation and delivery of the customer desired value, better knowledge of subject specialization, as opposed to integration of total process, was expectedly at a premium. Most managers, therefore, came to see their jobs to be primarily one of managing such skilled people. Managers often believed that it is people who are ultimately responsible for the quality of output, good or bad. Hence, superior people management skills came to be regarded as the key managerial skill. Engineers/technologists too were hired with more or less similar rationale, that is, ability to perform their own specialist tasks. These people, justifiably, saw their job to be essentially limited to things like product design or product manufacture, and measured success in their performance on the basis of abilities of using some latest models or methods. Similarly, for a salesperson, the job was actually the skill of palming off a product to a buyer, supremacy of performance coming from the quantum of sales executed. For manual workers, the job was virtually limited to doing what one was told to do since it was believed that these workers were specialized in using only their hands, not their heads. Therefore, as long as a worker could do what he was told to do the job was seen to have been well done and the concerned worker received high performance ratings. In this way jobs for everyone came to be defined rather narrowly, which seems to have suited both the individuals as well as their corporations. Thus, the utility of a job, in its overall context, hardly ever came to be questioned, the method of doing a thing became of paramount importance and the objectives of what is being done took a back seat.

Implications of process focus outlined earlier would suggest that not only are the job roles of individuals important, their connectivity is perhaps even more important, if not crucial for business success. To effectively perform these new dual roles, a person manning any part of the value chain would require different abilities – both in his capacity as an individual as well as in the capacity of an organisational team player. For example, let us

One has to develop the abilities to clearly discern the utility/futility of various action steps vis-a-vis the ultimate output needed.

consider the case of a gear manufacturer. It is one thing to perform, say, a rough turning operation on a piece of casting according to what the supervisor has told, and it is quite another to clearly visualize what people at the next operation, say, in finish turning, are expecting. Obviously, the latter way of working would demand finer understanding of things, one that is not confined to only how a part is made, or machine processed, but also how it facilitates/hinders the functioning of a total product paying due considerations to the constraints faced by the customers – internal as well as external. Secondly, each time one does the operation one has to keep the totality of need in view since mere repetition of the performance steps perfected once, or, for that matter, just doing what one is good at, may not always work. This is particularly true today when the needs of customers keep changing. Thirdly, one has to develop the abilities to clearly discern the utility/futility of various action steps vis-a-vis the ultimate output needed, that is, be able to perform some kind of value analysis of the process. And fourthly, one should be able to introspect, so as to decipher what is required and how that can be done best, on a continuous basis.

Given our earlier approach, which had very little linkage between individual and/or collective action with the output, except for quantity, our mental conditioning had been to overly rely on certain technology or finance dictated quantitative indicators only. In such a backdrop, again, the new requirements would appear as tall orders. Understandably therefore, many companies, did some kind of fence sitting and deferred actions till such time things became too hot. Once the significance of quality itself began to shift from one of order winning to a qualifying criterion, actions seem to have become overdue suddenly. At least that is the impression one gets looking at the euphoria associated with ISO 9000 certification and the present scramble to get the stamp. But once this first step gets taken and companies get their quality systems documented and certified, they may not be left with much of an option but go for the kind of changes proposed in TQM. The real question then would be, "how". An answer to this question could well be found in organisational learning models and methods, which hitherto remain somewhat unexplored for their potential in successful TQM adoption. In other words, whether organisational learning concepts and methods could be of help in creating the necessary changed mindsets and promote understanding of important concepts like internal customers is what needs careful analysis. Secondly, if they do, how OL and TQM could get meaningfully dovetailed would be a matter of considerable interest.

Organisational Learning

Before we get down to the discussion of various issues exploring the possible utility of organisational learning (OL) models in creating the required new mindset, a brief review of OL literature may be in order. OL has been defined variously giving an impression that a clear definition is perhaps yet to emerge (Garvin, 1993). However, by and large, scholars have agreed that OL is a process linked to knowledge acquisition and improved performance. Peter Senge (1990), the founding father of the concept, in his book 'The Fifth Discipline' describes the learning organisation as a place "where people continually expand their capacity

OL is a process linked to knowledge acquisition and improved performance.

to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together". Authors, like Nonaka (1991) too described a learning organisation on somewhat similar lines. Going by all these, it would seem that the objectives behind having a learning organisation do not in any way contravene those of TQM. On the contrary, the objectives of both TQM and OL appear to be quite compatible. The question however remains, how does one ingrain the required learning abilities in an organisation so that these are not only in sync with the TQM objectives but also provide positive reinforcement to them.

Perhaps one of the first things required in bringing about any change in any work organisation is to

The learning organisation as a place "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together".

generate commitment towards learning. Thankfully, the external impetus for change becoming stronger by the day, this commitment is literally being forced upon, at least on the top management of any organisation. The issue, therefore, becomes one of how to have it percolate down to the different layers of an organisation. How does the top management, by its articulation and action create an environment for learning and also make sure that organisational capability of "learning together" develop? For this purpose, the four perspectives, viz, the financial, the customer, and the internal business process suggested by Kaplan and Norton (1992, 1993, 1996) could be of benefit.

To effectively put the process idea of TQM in place, organisations will have to not only learn and relearn but also diffuse learning and do that enough to cater to the changing needs of customer by moving along the path of continuous improvement. However, the vestiges of learning touch upon some very basic aspects of human behaviour. If learning means seeing what you do in a new light, then the most fundamental pre-requisite would be the commitment to learn. Therefore, even before learning began, the organisation has to prepare itself by generating this commitment all through the organisation. The second fundamental change that would be necessary is learning how to learn together. Unless these two things happen it would not be organisational learning, eventhough individuals within an organisation may be learning. According to many authors, organisational learning refers to learning at the system rather than at individual level (Dixon, 1992; Nadler, 1989). Peter Senge (1990) describes it as the way the organisation recreates itself. According to Garvin (1993) a learning organisation is an organisation skilled at creating, acquiring, and transferring knowledge, and at modifying its behaviour to reflect new knowledge and insights. The question is where does one begin? Or, who learns first? Can every member of an organisation start learning simultaneously? In other words, the real issue for us is not "what is OL" but "how to effect OL" and how to do it such that the three transformations of TQM could be caused. The proponent of the concept, Peter Senge suggested the use of five component technologies : system thinking, personal mastery, mental models, shared vision and team learning. Nonaka (1991) observes that inventing new knowledge is not a specialized activity, it is a way of behaving, indeed a way of being, in which everyone is a knowledge worker. To effect the necessary changes, Garvin (1993) suggested a 3M model that brings clarity in matters of meaning, management and measurement of OL, which according to him are important before one could go about the task of creating a learning organisation.

A learning organisation is an organisation skilled at creating, acquiring, and transferring knowledge, and at modifying its behaviour to reflect new knowledge and insights.

Putting the Two Together

It would seem that our need is to create a productive system. The best design for a productive system would be one in which each part of the system embodies the goal of the overall system (Pasmore, 1995). To do this organisations would need a process of learning and redesigning, which, like the TQM process, must also be continuous rather than discrete.

The best design for a productive system would be one in which each part of the system embodies the goal of the overall system.

To mesh the TQM objectives with effective learning, what must be promoted in an organisation is "double-loop learning" (Argyris & Sohon, 1978; Argyris, 1982, 1991) that can produce a change in people's assumptions and theories about cause-effect relationships. In other words, what seems to be required is strategic learning that consists of gathering feedbacks, testing the hypothesis on which strategy was based, and making the necessary adjustments. This will have to take place at every work station, all through the organisation, by the spontaneous action of various work groups and individuals while they perform their respective individual tasks in any part of the process.

As indicated earlier, the process focus in TQM demystifies quite a few things and helps the persons manning different process steps to visualize what is needed by way of outputs. These persons would have a closer feel of what is expected by the customer and are more likely to apply their mind thinking about how to produce what is desired. Thus they should be in a position to gather feedback and also test the hypothesis on which their own strategy was based, to do the piece of job they have been doing. Perhaps, it is this loop of feedback and action that had been known by another name, plan-do-check-act (P-D-C-A) cycle suggested by Deming. Be that as it may, the point that may be worth a note is that customer focus, process improvement

and organisational effectiveness, are all outcomes of double-loop learning, where the relevance of doing a thing comes as much in question as the ways of improving the routine performance steps. The issue therefore boils down to one of promoting this double loop learning all through the organisation. More specifically, the need is to ensure that the relevance loop remains as much in operation as the performance loop so that not only the need–gap analysis gets made on an ongoing basis, but continuous improvement strategies are also worked out.

Continuous improvement in TQM involves three very important steps, process control, reactive improvement and proactive improvement (Shoji et al, 1993). Process control basically takes a deviation orientation and the effort is to locate the various sources of variation and control the common causes of variation so that deviation between what is desired and what is produced is minimised. Here, it is assumed that what is desired essentially remains fixed, thus creating an impression that as long as one can cater to what is currently desired, no improvement is actually called for. In reactive improvement, the focus is on locating weaknesses in the product/service before the customer does it. Reactive improvement, therefore, requires one to go into the various aspects of the use of a product by its user to identify what could possibly be done to make the product more useful to its customer. In fact, a dispassionate analysis of the Taguchi (1986) quality philosophy would indicate that the Taguchi strategy essentially attempts to put these two important steps, viz, process control and reactive improvement together through the use of S/N ratio. Proactive improvement, however, requires one to effect improvement looking at new opportunities. This step, therefore, has an opportunity orientation as opposed to the weakness orientation in the earlier one and the deviation orientation in process control. The concept of continuous improvement actually embraces all the three and the transformation ideas of TQM have been developed paying due recognition to all these.

Putting in symbols, organisational learning or the extent of it could be expressed as :

$$OL = LL \times PL \times GL \times PO$$

where *LL* is leadership learning

PL is linkages to process

GL is group learning

PO is payoffs for investing the time

Continuous improvement in TQM involves three very important steps, process control, reactive improvement and proactive improvement.

It is only likely that different steps could be performed at different layers in an organisation. However, in every step there may be needs of double loop learning since none of the steps can be effectively executed with pure "single loop" learning (Argyris, 1982). Finally, the ability of learning to learn together can also be derived from double loop learning, even though the kind of preparation needed for this would be different. For this purpose the "stages of knowledge", (Garvin, 1993; Jaikumar & Bohn, 1986) originally conceived in the context of manufacturing, can be of value since it suggests that knowledge can be arranged in a hierarchy, moving from limited understanding to a much more complete one.

After all these, how does one know whether OL is happening and that again of the desired type? OL does have distinctive characteristics (Barrow, 1993) which can be effectively used as blue prints to find out whether an organisation is preoccupied with the nuances of everyday work or it is able to redefine the purpose (Brooks, 1992).

Effective learning is not a matter of building the right attitude or motivation. Nor is creating new knowledge a matter of mechanistically processing objective information. What is really required is tapping the tacit and subjective insights and intuitions. Learning is essentially the product of the way people reason about their own behaviour and the TQM philosophy teaches people how to reason about their behaviour vis-a-vis their customers in today's customer driven world. Thus, the two work hand in glove, one providing the framework and the other contributing the detailed methodology to put the framework in action.

Learning is essentially the product of the way people reason about their own behaviour and the TQM philosophy teaches people how to reason about their behaviour vis-a-vis their customers in today's customer driven world.

References

Argyris, C. & Sohon, D.A. (1978), Organisational learning : a theory of action perspective. Reading, MA:Addison-Wesley.

Argyris, C. (1982), Reasoning, learning and action : individual and organisational. San Francisco : Jossey Bass.

Argyris, C. (1991), "Teaching smart people how to learn", Harvard Business Review, Vol. 69, no. 3.

Barrow, I.W. (1993), "Does total quality management equal organisational learning?", Quality Progress, July.

Brooks, A.K. (1992), "Building learning organisations : the individual–culture interaction", Human Resource Development Quarterly, Vol. 3, no. 4.

Chakraborty Subrata (1995), "What on earth TQM is all about", Images.

Dixon, N.M. (1992), "Organisational learning : a review of literature with implications for HRD, professional", Human Resource Development Quarterly, Vol. 3, no. 1.

Garvin, D.A. (1993), "Building a learning organisation", Harvard Business Review, Vol. 71, no. 4.

Jaikumar, R. & Bohn, R. (1986), "The development of intelligent systems for industrial use: a conceptual framework", Research on Technological Innovation, Management and Policy, Vol. 3.

Kaplan, R.S. & Norton, D.P. (1992), "The Balanced scorecard-measures that drive performance", Harvard Business Review, Vol. 70, no. 1.

Kaplan, R.S. & Norton, D.P. (1993), "Putting the balanced scorecard to work", Harvard Business Review, Vol. 71, no. 5.

Kaplan, R.S. & Norton, D.P. (1996), "Using the balanced scorecard as a strategic management system", Harvard Business Review, Vol. 74, no. 1.

Nadler D. (1989), "Business forum : making corporations smarter; failures can be productive" the New York Times, April 23.

Nanaka, I. (1991), "The knowledge creating company", Harvard Business Review, Vol. 69, no. 6.

Pasmore, W.A. (1995), "Social science transformed : the socio-technical perspective", Human Relations, Vol. 48, no. 1.

Senge, Peter M. (1990), "The fifth discipline", New York : Doubleday.

Shoji, S., Grahm, A., and Walden, D. (1993), "A new American TQM: four practical resolutions in management". Productivity Press, Portland, Oregaon.

Taguchi, G. (1986), "Introduction to quality Engineering." Tokyo : Asian Productivity Organisation.

□

Enhancing Learning Productivity : The PAPLANE, An Action-based Management Game

R.C.M. Yam, H.M. Izumi, K.S. Chin & Nesa L'abbe Wu

This paper presents an innovative management game, PAPLANE, as an interactive-based teaching aid for student-players. The game involves creating an organisation to carry out team objectives; embodies the organisational functions from product design to auditing and managerial reporting; and is overlaid on an unpredictable resource environment in which good players can learn to flow with the changes, to take advantage of what others feel are threats to their organisation. As opposed to a computer simulation, this action-based approach allows for the excitement and physical involvement that comes with designing and producing a "visible" and "tangible" product.

R.C.M Yam, H.M. Izumi & K.S. Chin are from City University of Hong Kong. Nesa L'abbe Wu is from Eastern Michigan University, USA.

It has been widely recognised that "Operations Management" is moving towards a concept of integration (McClain et al 1992; Toone, 1994; Kidd, 1994). The Marketing and Design functions are no longer independent entities which can meet both external demand and internal requirements of a new product decision. The designers cannot hypothetically toss over a design to be implemented by production without considering manufacturing capability and capacity. Moreover, to be qualified for a senior-level executive in the company, an operations manager must have "sound business judgement" and other higher-level integrative skills rather than the techniques in his/her own primary function. Most text books, training courses, and study programs in operations management can only provide knowledge and techniques in individual functional areas – not in an integrated and realistic approach (Denton, 1990; McClain et al 1992). "Experience" is the essential element that can develop the vision and skills in making integrated decisions at the senior/top levels (Burst, 1987; Flamholtz, 1987; Toone 1994). In addition to long-term job rotation and cross-functional committees, well-structured management games promise to provide such experience by simulating the real-life situations of an operations management environment.

To be qualified for a senior-level executive in the company, an operations manager must have "sound business judgement" and higher-level integrative skills rather than the techniques in his own primary function.

While there are many integrative management exercises on the market today, most are based on very

simplistic approaches (Burst, 1987; Denton 1990). They attempt to experimentally teach the importance and requirements of teamwork by providing simple games in which teamwork becomes essential for top competitive performance. While they are excellent for teaching specific aspects of teamwork requirements, they remove the complexities of the real world. As unrealistic "games", it becomes questionable whether participants are able to transfer the learning from the game to real life. This may be one of the key reasons that many training and development seminars are unable to gain transference of training back to the workplace. Whether problem-solving sets are learned through the associative learning process or the information processing model, the lack of reality causes poor transference (Pedler 1993; Brinkerhoff & Gill, 1994).

Under the associative learning process, problem solving sets are developed and the participants are conditioned to utilize teamwork approaches to complex problems through reinforcement of group performance. It is unlikely that this process is successful in creating long term change in workplace behaviour since seminars are often limited to weekends or a week at most. Extinction of teamwork behaviour is extremely rapid as insufficient reinforcement is provided.

Furthermore, if unrealistic "games" are used, there is very little ability to generalize any learning to the workplace due to the extreme differences in situational contingencies. It is unlikely that teamwork training and development seminars based strictly on associative learning of group behaviours allow for any transference of those behaviours to the workplace.

Under the information processing model of learning, problem solving sets are developed much quicker as seminar participants respond to successes and failures of certain behavioural patterns by forming subjective probabilities of outcomes associated with specific behaviours. But even with this process, the use of unrealistic "games" tends to result in poor transferability. The further the learning experience is away from workplace conditions, the more difficult it is to generalize learning. While information processing results in better learning of teamwork behaviours in training and development seminars, higher levels of transference obviously are achieved if the learning conditions are more realistic.

While information processing results in better learning of teamwork behaviours, higher levels of transference are achieved if the learning conditions are realistic.

Goals, Objectives & Guidelines

The game itself has four goals. First, it tries to show the participants the importance of strategic planning. It demonstrates the necessity of maintaining flexibility in strategic plans as well as the importance of integrating all levels of organisational operations in strategic planning. Second, it demonstrates the need for integrating quality management concepts into all phases of organisational operation (total quality management) in order to achieve planned objectives. Third, it is concerned with demonstrating the importance of utilizing appropriate techniques and tools to aid in the solution of complex problems. Fourth, it is concerned with demonstrating the importance of the context in which tasks are set, the relevance of each problem area to the overall objectives of the company, and the practical constraints on any attempts at a solution.

The authors realize that real-life experiences cannot be precisely duplicated in a management game. However, PAPLANE has been developed to portray a situation that is as close as possible to real-world situations. Given the above goals, the basic objectives of PAPLANE are:

- To present an overview of how to manage an operations system by integrating various functional areas of operations management in achieving the overall target.
- To provide hands-on experience with the concepts and techniques of operations management such as product selection and design, process planning, work study, job design, capacity planning, scheduling, material requirements planning, bidding, costing, quality control, etc..
- To demonstrate the consequences of various decisions on the profitability of a company.
- To provide an opportunity for participants to interact as a group in solving management decision-making problems.
- To indicate the importance of logical decision-making.
- To demonstrate the importance of contingency planning in a dynamic real-life environment.
- To provide direct experience with competitive scenarios.
- To demonstrate the importance of total quality management for achieving planned objectives.
- To demonstrate the importance of well-structured organisational processes for achieving organisational efficiency and effectiveness.

- To demonstrate the importance of good teamwork and joint decision making within a well-structured, but flexible, organisational culture.

One of the characteristics of efficient and effective organisations in the real-world is teamwork and joint decision-making (Schermerhorn et al 1991). This game, therefore, attempts to develop and hone the ability to deal with the problem of effectively organizing a group to undertake complex decision-making. Prior to playing this 2-day game, several small exercises are given to the participants in order to help them understand their own management character, learn how to fit into a group role, and how groups perform together.

There are several important factors in determining how individuals fit in and how the group works together, including the leadership style of the emergent leader, how each individual member of the group handles conflict amongst themselves, and how each relates with the others in the group. These "warm-up" exercises are essential to help individual participants merge with the group. Figure 1 shows the relationship of these warm-up exercises and PAPLANE. The exact nature is unimportant as there are many products on the market which provide these lessons (Baldwin & Williams, 1988; McGill 1992). As such, they are not discussed herein.

In designing the rules of the game, the following guidelines are adopted:

- Reference to an operations management framework as shown in Figure 2.
- A sufficiently clear framework to ensure that it is recognizably the same exercise whenever it is used.
- It takes place in differing stages, the progression often being influenced by the actions of the participants.
- It allows a priori identification of the criteria by which performance can be judged.
- It maintains a competitive nature.
- It balances the emphasis on learning from the game and success in the game.
- It requires a certain level of documentation, physical material, computation, and administrative/behavioural skill.

The PAPLANE Game: Overview

The objective of all participants in PAPLANE is to develop and implement an effective and productive operations system to win the game in a competitive

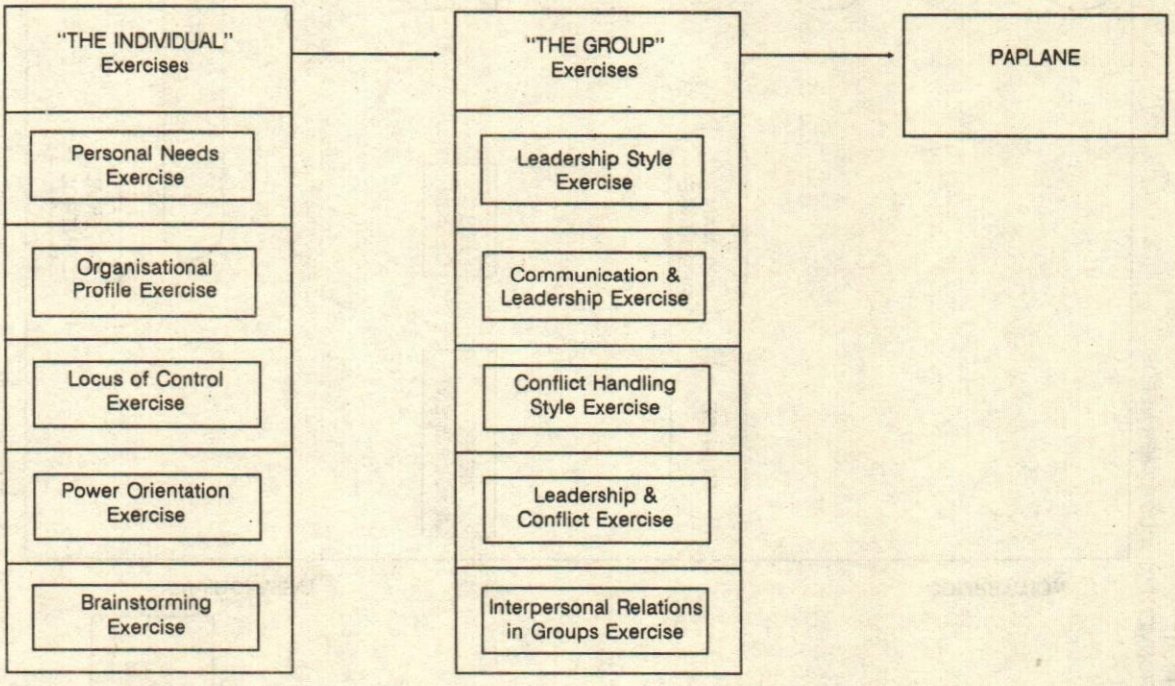


Fig. 1. "Warm-up" Exercises Prior to PAPLANE

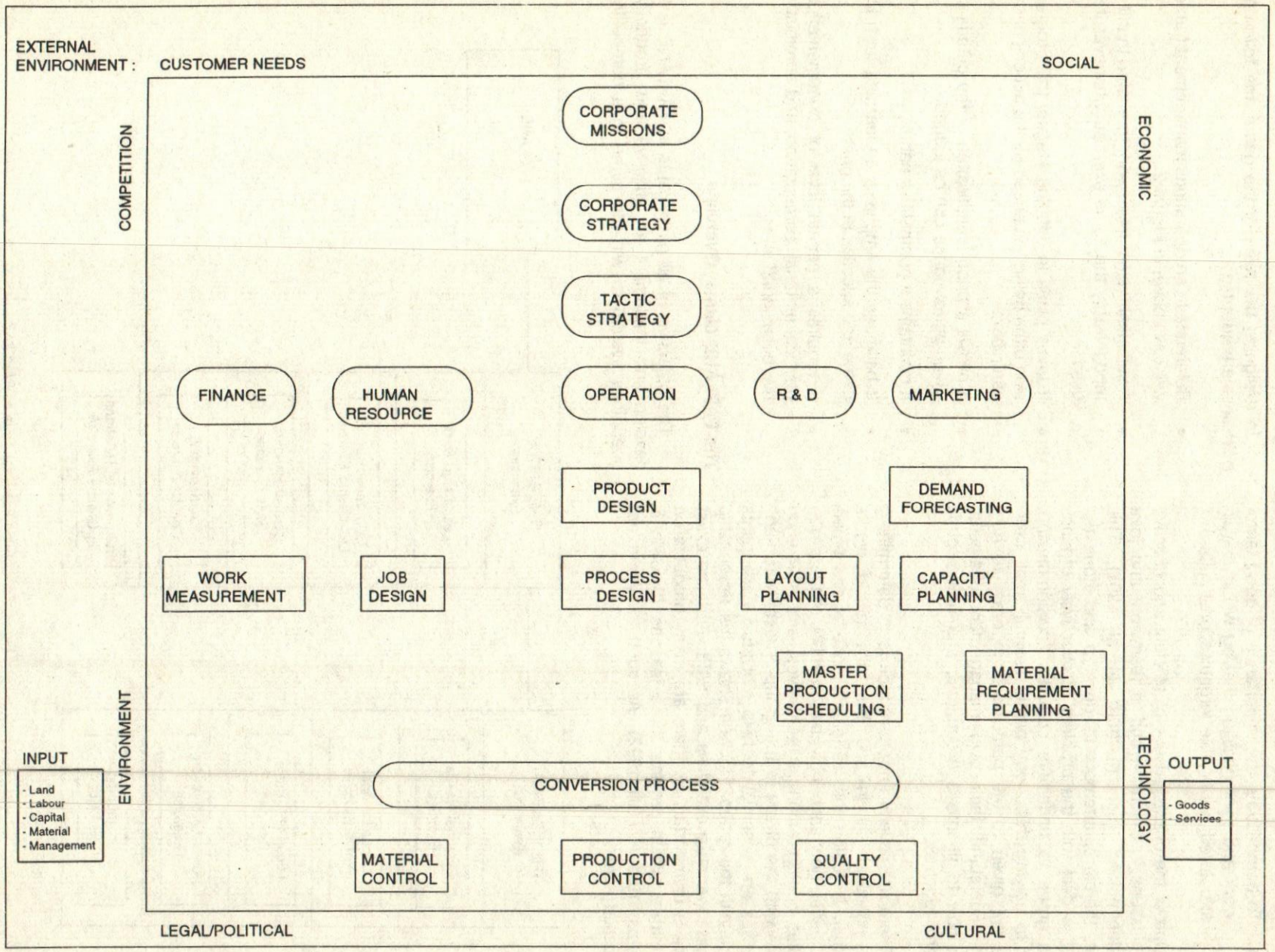


Fig. 2. Framework of Operations Management

situation. Winning, as in real life, involves attaining the most profit among the competitors. The pressure of the decisions brings out enthusiasm and a competitive spirit, which creates an enjoyable learning experience, throughout the game.

PAPLANE is played with two to six teams (companies). Participants are generally divided into teams of seven to ten members. The teams, each running a company, are separated from each other in the design, prototyping, and process planning phases. They join together in the bidding, production and fly-testing phases.

Company organisation is left to the participants allowing a team to adopt a committee management approach or to assign specific responsibilities to each team member, naming president, auditor, sales manager, purchasing officer, designer, and production worker etc. As with all other organisational aspects of this game, each team must explicitly record the chosen organisational structure. Each team must come up with its own strategy that must be explicitly recorded and followed throughout the game.

The PAPLANE consists of the following phases:

- Design and prototyping phase
- Process planning phase
- Bidding phase
- Contracting phase
- Material purchasing phase
- Negotiating phase
- Production phase
- Fly-testing phase
- Contract fulfillment and profit calculation phase
- Conclusion and presentation phase

Each company team is given a line of credit of $450 with the material supplier to buy raw materials for paper-plane production. There are nine possible basic designs of product. A different price will be paid for each type of product. Dimensional requirements, logo and the ability to fly over a specified distance are the criteria for acceptance of the products. The participants are required to design three types of airplanes and produce as many of those as possible. However, the number of planes to be produced must be contracted prior to production. A penalty is received for any airplane in the contract the participants fail to produce with the penalty relative to the sale price of the product.

The participants have to design and prototype the planes, cost out the materials, and prepare the budget according to the number of acceptable planes to be produced in a prescribed period of time. Each company team needs to design and set up a production system to produce the planes. Each plane is then test-flown to ensure that they are capable of flying the specified distance. As production materials may be in short supply, it is important to develop contingency plans. Participants do not have sufficient time to redevelop new prototypes nor to do a complete financial analysis.

The game involves creating/designing, planning, costing, budgeting, organising, structuring, operational/financial/strategic decision-making, controlling, and group interaction activities. The actual outcome, profit, of PAPLANE is affected by operating decisions, bidding strategies, response to the material shortage, production efficiency, product quality and reliability, and product mix. As such, which team will win the operational portion of PAPLANE cannot be determined until the final phases of the game.

Upon completion of the operational portion of the game, PAPLANE enters an analytical portion. This part of the game is as, if not more, important as the operational portion. Game participants are to reflect upon their performance and consequences of their actions and decisions if the game is to have any lasting impact. It is the knowledge of "why" they faced certain consequences which helps participants to restructure their cognitive schema to enable them to "learn" from the exercise. Self-reflection and analysis is the basis for understanding and change upon which this game is founded.

It is the knowledge of "why" they faced certain consequences which helps participants to restructure their cognitive schema to enable them to "learn" from the exercise. Self-reflection and analysis is the basis for understanding and change upon which this game is founded.

However, self-reflection requires information as much as analysis of external events. Unfortunately, participation in an activity-based exercise often results in excessive involvement to the detriment of objectivity. As such, each group needs to appoint an observer for itself at the beginning of the game. The role of the observer is to watch group behaviour in every phase of the game

and to act as a repository for objective data to be used in the analysis and reporting on the behavioural processes of the group at the conclusion and presentation phase. In the analysis, the group should conduct a self-evaluation and self-criticism which assesses the reasons for their concluding performance. This knowledge, in turn, allows them to develop a self-development program to ensure their individual growth as managers and team members in the real world.

Judgement of Results

The winner of the operational portion of the game is the company (team) with the most profit. It should be, however, emphasized that the purpose of playing PAPLANE is not to win but to learn from the experience, although winning can be considered as one measure of learning. The suggested judging scheme for determining the overall game winner is based on three criteria, namely; 40 percent on profit, 40 percent on the performance in a critique session, and 20 percent on the quality of documents and auditing procedures required in the game. The critique session held at the end of the game is often the most beneficial and stimulating aspects of the experience. The critique session has the following parts:

- Self-critique by each company team on their group processes as well as individual behaviours accompanied by reasons for their behaviours and consequences of those behaviours
- Outline of the strategy each company would adopt if another game was scheduled
- A self-development plan for each team member based upon the learning from the exercise
- Instructors' feedback on the game results and general observations
- Discussion of the training value of the game in terms of each participant's decision making in reality.

Instructors' Role

PAPLANE is normally run by a minimum of three facilitators who know the rules of the game. Facilitators need to become well acquainted with PAPLANE's overall objectives and structure in order to determine the depth and width of knowledge that they wish the participants to acquire in each step. At the planning stage of the game, the facilitators must meet with each of the company teams to clarify rules, review progress, and offer help. In order to control the game's pace, facilitators need to impose several deadlines for submitting documents to avoid some groups procrastinating or falling behind. The facilitators' involvement in this game is significant because it is essential to let the participants know the strengths and weaknesses of their performance and what should be done for improvement during and after the game.

Behavioural & Learning Components of the Game

In playing the PAPLANE, the participants are required to make most of the complex and interactive decisions facing companies in the unpredictable, competitive world of real life. It provides an opportunity for the participants to practise their conceptual knowledge and techniques learned in various functional subjects of Operations Management. At the same time, it shows the limitations of the knowledge and those techniques when things go all wrong and the well-laid plans "blow-up". As compared with computer simulations, the action-based approach in PAPLANE allows the excitement and physical involvement that comes with designing and producing a "visible" and "tangible" product. The tiredness and stress which accompanies the need to redo plans upset by unexpected changes in the resource environment as well as the desire of the participants to do a "good" job and "win" enhances the ability of the game to break down or "unfreeze" past values, beliefs, and attitudes. In the cracks opened by the stress and fatigue, game facilitators have the chance to insert new values, beliefs, attitudes, and behaviours.

New ideas and behaviours are reinforced through the actual work of designing, prototype-making, binding, production and test- flying the product. The live experience with consequent rewards for good decision making reinforces the lessons provided by the facilitators. This action-based approach has been found to be an appropriate vehicle for obtaining attitudinal change which will hopefully lead to further behavioral changes. Participants learn why they did well or performed poorly as they review not only their own performance but their performance relative to that of others. They find out that just doing a good job in itself is no longer good enough in this competitive world. They must learn to become the best.

A great majority of participants reported that they had found the game worthwhile. A typical comment is as follows:

> "The PAPLANE is quite an active assimilation of real production/operations system. We can go through the processes from the constitution of product idea

to the final completion of the product. PAPLANE does give us a "touch" of all managerial aspects in interactive operations management system and in a so competitive world."

Overall, PAPLANE accomplishes its objectives and is particularly effective in stressing the importance of formulating a company-wide operations strategy and integrating decisions in various functional areas. The game really allows the participants to explore the basic concepts and techniques in Operations Management and examine the decision makings in terms of their interrelationship and consequences by actions.

Encouraged by the successes with the graduate engineering management students at the City University of Hong Kong in the past three years, the game has been modified for an undergraduate course in Production Operations Management at Eastern Michigan University. Here the game is carried out throughout the semester.

As the students learn the various concepts, principles and techniques of product design, process planning, job design, work measurement, layout, capacity planning, production scheduling, materials requirement planning, material control, production control and quality control, they are engaged in the game by acting out these various functions in a timely fashion. Though their pace is much slower than that experienced by the graduate engineering management students at the City University (three days), they too experience the pressures that one encounters in a real life professional situation. Therefore, as the game develops they too portray attitudinal changes leading to distinct behavioral modification, their attitude and behaviour change drastically: they exhibit respect towards group members, concern for following rules, a genuine interest in applying learned material and a professionalism in executing the required functions of the game. They come away from the game with the distinct impression that in a real competitive life situation one must strive for the very best; that mistakes are not tolerated and that the available tools and principles they have learned must be carefully adopted to the situation at hand for the successful completion of the task. They also realize that business success is the result of a group effort, where the group players assume distinct responsibilities and carry these out with the approval of the other team members.

Business success is the result of a group effort, where the group players assume distinct responsibilities and carry these out with the approval of the other team members.

References

Baldwin J. & Williams H. (1988), "Action Learning : A Trainer's Guide", Blackwell, Oxford, England.

Brinkerhoff R.O. & Gill S.J. (1994), "The Learning Alliance : System Thinking in Human Resource", Jossey-Bass, San Francisco, California.

Burst A. (1987), "The Management Game", Viking Pub., New York.

Denton D. K. (1990), "The Production Game", Addison- Wesley, Reading, Massachusettes.

Flamholtz E. (1987), "The Inner Game of Management : How to Make the Transition to a Managerial Role", AMACOM, New York.

Kidd P.T. (1994), "Agile Manufacturing : Forging New Frontiers", Addison-Wesley, Workingham, England.

McClain J.O., Thomas L. J. & Mazzola J.B.(1992), "Operations Management", Prentice-Hall, Englewood Cliffs, New Jersey.

McGill I. (1992), "Action Learning : A practitioner's Guide", Kogan Page, London.

Pedler M. (ed.) (1993), "Action Learning in Practice", second edition Gower Pub., Aldershot, England.

Schermerhorn J.R. & Hunt J.G. & Osborn R.N. (1991), Managing Organisational Behaviour, fourth edition, John Wiley, New York.

Toone R.P. (1994), "Manufacturing Success: How to Manage your Competitive Edge", Prentice-Hall, Englewood Cliffs, New Jersey.

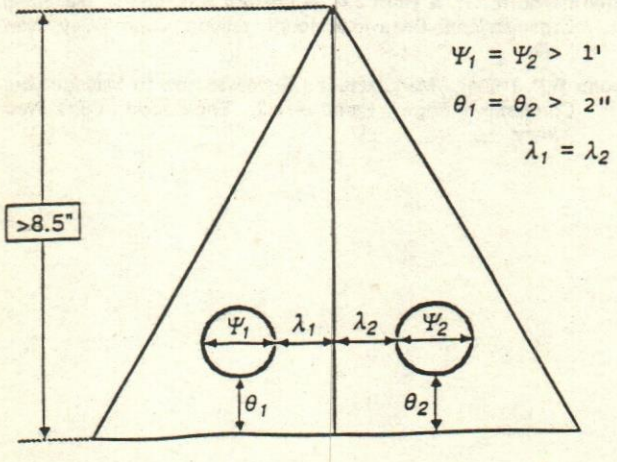
Appendix A

Brief Description of Game (as adopted at Eastern Michigan University)

The game will start with the design phase, when your team is supplied with production equipment and test materials, and ends with the profit calculation phase. Before starting the game you must define your organisational structure and need to appoint an observer. The observer should monitor all stages of the game and will be responsible for reporting on the behavioural processes of the group during the report stage (as part of the final presentation). You also need to appoint two auditors. The financial auditor is responsible for checking and signing off on the financial statements of another team. The quality auditor will evaluate the quality of another team. He or she will have to check the whole production output of another team to make sure that production is according to specifications and that they have produced the correct number of planes according to contract.

The Design and Testing Phase

You are required to design a minimum of three types of airplanes and test-fly your designs. You have to determine how many planes of each type 2 or 3 members will be able to produce during the 20 minute production period. You must contract for a minimum of 10 units of each type of airplane. You must determine a product mix strategy which provide you with the greatest profit given your limited resources. Make sure that you keep at least one good prototype design of each product, which will be submitted to your quality auditor when mass production starts. The design of the planes should take into consideration that the planes must all be at least 8.5" long and able to fly 25 horizontal feet. In addition to the flight capabilities and length of the plane, each plane must be emblazoned with your company logo. This logo must be equidistant from the center fold of the plane as shown in the figure.



1

Fig.

The Bidding Phase

You will be given a chance to submit a closed and bid on the "bid plane". You will need to submit a report prior to the bidding phase which describes your bidding strategy and the basis for that strategy (the justification).

The Work Measurement and Time Study Phase

This phase is critical for the determination of your contract with the government. Because of the time that is involved in doing this phase, you will be given a full evening to take your measurements. Plan ahead so that you are ready to work with your group on this task. Your instructor will not be present that day; so you are totally on your own. Prior to the work measurement and the time study you will receive a professional stop watch for this task.

The Contracting Phase

Based on your Design and Work Measurement Reports you can now prepare your written contract for the government. It is handed in together with your Work Measurement Report.

The Materials Purchasing Phase

Based on your contract you will submit your Materials Purchasing Orders. If there are enough materials to fill all of your requests, then you may purchase those materials from the supplier, using your $450 line of credit. You will be issued a receipt for the materials you purchase. (Sorry, there will be no returns!). Depending upon the aggregate demand, some of the materials may be in short supply. If this is the case, you will need to figure out some way of dealing with this contingency and in this case you will be allowed to re-negotiated with the government your contract. So, come to class prepared with various alternate plans because you will have limited class time to prepare an alternate plan.

The Production Phase

Once all teams have done their contracting and purchasing the production phase will begin. You will have exactly 20 minutes to produce and all members of your

group will produce simultaneously. At the end of twenty minutes, you must stop all production.

The Testing and Contract Fulfillment Phase

Only finished inventory which pass the flight test will be counted towards your contract fulfillment. You may designate your own test pilot. If you produce less than the contracted amount, one-half the selling price of the missing planes will be the penalty. Therefore, if you are missing one $30 plane, your profits will be penalized $15.

The quality auditor will be given time after production is completed to check your production to ensure that all of your planes meet the design and length specifications (min. 8.5" in length). Your assigned test pilot(s) will then be given 10 minutes to fly the planes over a line twenty-five (25) feet from the flight deck. During this test flight each flight will be observed and counted by the quality auditor assigned to your team.

The Profit Calculation Phase

After receiving a statement of your acceptable planes, you will need to calculate your profits and turn in a financial statement to the financial auditor assigned to your team. These financial statements will be posted on the "score board" along with the prototypes, contracts, quality audit statement, and other written documentation.

You will be required to submit your Audited Financial statements (before production and final statement), your Audited Quality Statement (giving the number of quality planes, etc..) and Variance Analysis.

Table 1 presents the materials and their prices;

Table 1 : Materials, Product Mix and Equipment

MATERIALS PRICE LIST	
Flimsy Paper	$1/sheet
White Paper	$2/sheet
Coloured Paper	$3/sheet
Paper Clips	$3/clip
Straws	$5/straw

There are several different types of airplanes which may be created. Their selling prices vary depending upon complexity and aesthetic quality. Table 2 gives the product price list.

The following is a list of production equipment which you may need and can use: scissors, tape, glue, ruler, markers. You may construct your own equipment or jigs to facilitate production.

PRODUCT TYPES		PRODUCT PRICES	
		MIN. 7 FOLDS	MIN. 9 FOLDS
ONE SHEET (A4)	White Paper	$12	$13
	Coloured Paper	$14	$15
	Flimsy Paper	$15	$26
TWO SHEETS (A4)	2 × White Paper Only	$20	$24
	2 × Coloured Paper Only	$24	$28
	2 × Flimsy Paper Only	$27	$30
	Flimsy + White Paper	$24	$28
	Flimsy + Coloured Paper	$26	$28
Bid Plane: One Sheet of A4 Paper (any kind) + One Paper Clip + One Straw		BID	BID

Reports Requirement

As the game progresses, each group must submit various reports:

- Organisational Structure with a brief job description of each member.
- Design Report and Bid Justification.
- Work Measurement and Time Study Report.
- Initial Sales Contract Report/Financial Statement/Materials Purchasing Order.
- Final Sales Contract Report/Financial Statement/Materials Purchasing Order
- Pre-production Quality Statement
- Post-production Quality Statement (after test flight) Variance Analysis
- Per-production Financial Statement
- Post-production Financial Statement Variance Analysis
- Concluding remarks by group observer on group processes and effectiveness, group structure, communication processes, leadership style of group members, degree of team participation, type of coordination system, technology problems (if any), design flaws (if any), organisational problems (e.g. structural, communications, leadership, etc.)

Presentation of Results

At the end of the game each group will give a detailed presentation. Instructor will make specific assignments.

Focus

The Learning Organisation & Technology Management

P.N. Rastogi

This paper outlines briefly the nature, essence, and rationale of the paradigm of the learning organisation. Its quientessence lies in the creation of organisational capabilities for developing and deploying the system's knowledge resource base in a continuing and focused manner. These organisational capabilities are also crucial for a company's management of technology in a fast changing world. The nature, management, and facilitation of the development of technological capabilities made possible in the learning organisation are synoptically explored and explicated in this context. The paradigm of managing strategy and technology in a learning organisation is highlighted.

P.N. Rastogi is Professor in the Indian Institute of Management, Lucknow.

The complexity, uncertainty, and turbulence of today's business environment imply that an organisation can not really visualise any coherent picture of its long term future. When the future is essentially unknown, an organisation can not pro-actively put in place structures and devices, or systems and procedures, to control long term consequences or results. How then an organisation may cope with the environmental volatility/ incessantly confronting it? How may it channel its high levels of continuing tension and anxiety about survival and growth towards creative and constructive directions of purposive endeavour?

The Paradigm of Learning Organisation

When the future is unknown, the only feasible option open to a management is to generate new perspectives, engage in sustained questioning, search for creative insights and alternatives, and utilize knowledge and learning toward envisioning and creating a desired future. This exercise also requires the management to continually examine and recalibrate its assumptions, and develop holistic and ecological views of the relationship between the enterprise and its environment. The exercise further requires the organisation to be oriented toward coping with environmental volatility by continuously generating and using knowledge through collective learning. Knowledge and learning, creativity and innovation, constitute the organisation's key resources for facing an uncertain future. They help expand the organisation's capacity to manage change, respond effectively, effect improvements, and develop flexibility and resilience. The organisation is refocussed around knowledge and learning as its central organising principle.

A learning organisation is a holistic system that integrates problem-solving, internal knowledge, innovation, experimentation and external information. It is "skilled at creating, acquiring, and transferring

knowledge, and at modifying its behaviour to reflect new knowledge and insights" (Garvin, 1993). Learning organisations are effective not only at creating and/or acquiring new knowledge, but also in applying that knowledge to continually improve their tasks and activities. Rapid realization of new technology into products is a core competency of a learning enterprise.

A learning organisation is a holistic system that integrates problem-solving, internal knowledge, innovation, experimentation, and external information.

The rationale of the learning organisation paradigm lies in the premise that without learning new and better ways of doing, working, and organising, an organisation cannot improve or accomplish anything. Developing a product, inventing a process, evolving a technique, enhancing the efficiency of an operation, and solving a technological problem, involve knowledge and learning. In the absence of new knowledge and learning, individuals and organisations can only do more of the same, i.e., continue to repeat old practices.

Bases of Organisational Learning

Organisations acquire knowledge from both internal and external sources. They require it for use in both current and future tasks and operations. In terms of these sources and uses of knowledge, the bases of organisational learning i.e., creation and use of knowledge, may be seen to comprise the following five critical categories of activities (Rastogi, 1995a):

* *Problem-Solving* relating to current operations.
* *Integration of Internal Knowledge* across functions, projects, and programmes.
* *Development of Technology* to build for the future.
* *Innovation and Experimentation* toward improved structures, policies, methods, procedures, and decision-making.
* *Monitoring of environment and integration* of external flows of *information.*

All of the above five categories or subsystems of knowledge are distinct. Each of them has its own primacy of focus. All of them are however, meaningfully interrelated across the entire spectrum of enterprise operations. They are mutually aligned and effectively coordinated in the design of a learning organisation. It is their alignment and coordination toward facilitating the achievement of organisational goals, that distinguishes an enterprise as a learning organisation.

Process of Knowledge Creation

The foregoing bases of knowledge and their alignment, and coordination, may be seen as the constitutive elements of a process of organisational knowledge creation within corporations. Such a process of knowledge creation has been elaborated along a set of propositions (Nonaka, 1990) as follows:

* The source of organisational knowledge is the knowledge created by individuals within the organisation. Knowledge creation by individuals is promoted by the aims (thoughts) of organisational members, and by the autonomy given to them.
* The exposure to fluctuation or chaos encourages back-to-basics learning by organisational members and makes possible the creation of information and knowledge.
* The establishment of groups promotes the development of shared tacit knowledge, and provides opportunity for the creation of group-level concepts. Development of both shared tacit knowledge, and group-level concepts, is enabled and fostered by creative dialogue among the group members.
* Through the creation of group-level concepts, personal knowledge of individuals is amplified in the direction of creating organisational knowledge.
* The irreversibility, the activation, and the organisational trust and self-control of organisational knowledge creation are dependent on the redundancy of information.
* The effectiveness of organisational knowledge creation depends on requisite variety within the organisation.
* Organisational knowledge is legitimized through the organisation's shared and existing values.
* The creation of a diffuse network of meanings systematizes individual knowledge into organisational knowledge. This systematization is strategic in nature, and serves as a basis for resource allocation in the organisation.
* Organisational knowledge is not a one-time product of knowledge creation. It becomes a

source for creating new and additional organisational knowledge. In other words, the explicit knowledge and tacit knowledge of an organisation have a recurring and mutually reinforcing relationship that is beneficial in nature.

* The truth of organisational knowledge depends on the height of the aspirations of the organisation's leaders and its members

These propositions concerning organisational knowledge creation are rather broad, general, and abstract. A clearer picture of the process of a manufacturing context is outlined next.

Stages of Knowledge and Learning – A Framework

A conceptual framework of knowledge acquisition to identify the role and requirements of learning in manufacturing environments, has been posited by Jaikumar and Bohn (1986). Once all stages of knowledge are complete i.e., when all aspects of the production process are understood, the process can be translated into and operated in terms of well-defined operational procedure(s). The process by which one acquires knowledge to develop clear procedural systems, is also applicable to service activities with appropriate contextual modifications. The conceptual framework also provides an orderly structure for evaluating organisational progress along the stages of learning and knowledge acquisition. The framework consists of eight stages as follows (Jaikumar & Bohn, 1986):

* Recognition of prototypes – the ability to distinguish a good product.
* Recognition of attributes and relationships within prototypes – the ability to identify and define some conditions under which process gives good output.
* Discrimination among and across attributes and relationships – the ability to see which attributes and/or relationships are important or critical to success.
* Measuring the important attributes and/or relationships – the measure may be qualitative and relative.
* Locally controlling attributes – repeatable performance, process designed by expert technicians can perform the operational procedure.
* Recognition and discrimination of contingencies – the production process can be mechanised and monitored.
* Controlling contingencies – the ability to measure and cope with contingencies – the process can be automated.
* Understanding procedures and controlling contingencies – the process completely understood and translated into clearly defined operational procedures.

These eight stages can be divided into three categories: primary development focusing on identification and measuring; secondary development focusing on discovering relationships; and complete procedure embodying total system control. The first five stages come under primary development. They are concerned with understanding the basic structure of the underlying process. The next two stages i.e., sixth and seventh come under secondary development. Secondary development is concerned with the process of refinement which proceeds in terms of coping with the emerging contingencies. The third category involving the last stage is concerned with the complete procedurization of the knowledge of production process.

Structure & Devices for Organisational Learning

A learning organisation is built by reducing and eliminating impediments to learning, by creating and promoting knowledge sharing systems, by creating commitment to learning for improvement, and by moving the acquisition, production, and use of knowledge toward the top of the organisational agenda. In the context of changing toward a learning organisation, a company may create and use a number of structures and devices for this purpose. These structures and devices may be listed as follows:

* Cross-disciplinary teamwork
* Organisational collaboration through various forms of small group activities

A learning organisation is built by reducing and eliminating impediments to learning, by creating and promoting knowledge sharing systems, by creating commitment to learning for improvement, and by moving the acquisition, production, and use of knowledge toward the top of the organisational agenda.

- Removal of internal barriers through cross-functional integration or process-based management
- Redefining of the firm's outer boundaries to include suppliers, customers, and strategic alliance partners as insiders, and tapping them systematically for ideas and insights
- Effective feedback and performance measurement systems which deliver strategically relevant information in real time
- Benchmarking of best practices, not only of the direct competitors, but also of anyone from whom something useful can be learned or adopted
- Training and deployment of the firm's 'environment interface' personnel (delivery, sales, repair, and market research etc.) as sources of customer feedback and market information
- Strategic use of temporary personnel assignments and rotations between business units, and with suppliers, customers, and strategic alliance partners
- Travel by "lower level" workers as a conscious learning tool both to benchmark competitors, and to enhance morale, and the systematic sharing of results with co-workers upon return
- Extension of training concept to include lifelong learning for everyone, with stress on group learning experiences
- Focus on practices likes TQM and JIT including *Kaizen*
- Spectrum of activities and structures encompassed by the management of technology
- Creation of, and participation in, 'learning forums' activities and so on.

Learning Organisation & Technology Management

In terms of the fundaments of the learning organisation paradigm, the point of departure for technology management is the creation and continuing enrichment and updating of an interrelated set of the corporate technology knowledge bases. The latter may be categorized along seven distinct domains as follows (Yamanouchi, 1995):

Domain A consisting of knowledge relating to new discoveries such as the discovery of high-temperature superconductive materials.

- Domain B consisting of the development and systematization of public domain knowledge stimulated by the scientific and/or technological knowledge present in domain A. Domains A and B also indicate the relevance and importance of creating and developing techno-scientific knowledge through national and/or cross-national consortia for collaborative research.
- Domain C consists of knowledge pertaining to generic technology i.e., existing technology belonging either to public domain or individual companies. Generic technologies concern analysis, measurement, simulation, and control of materials, processes, and processing methods.
- Domain D consists of knowledge relating to core technology[1] which is a proprietary management asset of the company.
- Domain E consists of the proprietary product technology knowledge of the company.
- Domain F consists of the proprietary engineering technology knowledge of the company.
- Domains D, E and F may together be deemed to represent the market-driven technology knowledge of a company. Product technology is contained in products, core technology is continued in product technology, and the generic technology underlies both.
- Domain G consists of environmental technology relating to pollution control, and fulfilment of its social responsibility by a company in the light of global and local environmental concerns. It also represents an area of interfirm cooperation in R & D.

The foregoing categorization of technology knowledge bases brings out the relative role and importance of competition and cooperation in the development of technology. Domains D, E, and F are areas in which interfirm competition elevates the level of technology. Domains A, B, C and G, on the other hand, are areas where interfirm cooperation can benefit all the involved firms through precompetitive sharing of research.

1. Core technology of a company refers to knowhow or technology that is, or, can be applied in its various fields of existing business operations. It stands at the core of the company's strategy development.

Technology Strategy Planning in/for the Learning Organisation

The nature, dimensions and rationale of a firm's technology strategy are primarily governed by its business strategy. A number of related basic considerations however, also need to be kept in view in this context. These considerations or factors may be outlined as follows:

* Life-cycle stage of the technology(ies) deemed necessary for a specific productline or business area
* Appraisal of the competitive position of in-house technology(ies) from a global perspective
* Competitive appraisal of multiple technologies in terms of their respective life-cycle position on the one axis, and their competitive strength on the other
* Identification of the time horizon for technology strategy planning in terms of viewing the future from the present, or viewing the present from the future
* Centering technology strategy(ies) around the firm's core technology with core technology groups at the hub.

In the context of the learning organisation perspective, the technology strategy planning must create and develop knowledge bases for accumulating companywide technology and knowledge assets, and for retrieving and effectively employing such assets according to product innovation, and business development goals. They should help guide and support the advanced research and development of functions and components in key domains of product/process/system innovation.

In the same context, a firm also needs to classify and evaluate companywide technologies along the dimensions of technological competitive strength, and the degree of its business sector strategic importance. Such a scheme of evaluation may be outlined as in fig. 1.

Such a format is useful for aligning and coordinating the organisation wide information flows pertaining to the firm's management and development of its technology base and capabilities with special reference to its core and key technologies. The analytical scheme may be elaborated further to highlight the strategic centripetal force(s) of the firm's technology strategy and roadmap or its absence.

DEGREE OF STRATEGIC IMPORTANCE	Low		High
High	Key Technology to be Strengthened on a priority Basis	Key Technology to be Strengthened	Core Technology
	Technology to be Reassessed	Put-on-hold Technology	Leading Technology
Low	Discardable Technology	Transferable Technology	Put-on-the-shelf Technology

TECHNOLOGICAL COMPETITIVE STRENGTH

Fig. 1. Strategic Evaluation of Company wide Technologies

The Key Factor

The learning organisation perspective in the present context underscores the key factor that technological knowledge and know-how in an organisation are accumulated by key individuals in specific technology domains, or by the groups and structures that include them. Their tacit knowledge and expertise cannot be accessed or transmitted through research reports or data bases. A learning organisation in this context thence focusses on a purposeful creation of a human network of technical people for the company wide integration of its technological resources. Such a network may be created as part of the firm's core technology programme or even independently. Other supportive devices for facilitating organisation wide diffusion and sharing of knowledge through exchange and dialogue may be: inhouse expert maps categorized by technology fields, inhouse technology forums and symposia, or inhouse centres for technical personnel to enable them to share perspectives, insights, and information. 3M's technical forums, Toshiba's chief technologist forum , NEC's group activities centred on key technology managers, and Cannon's core technology working groups, provide some relevant examples in this context.

A learning organisation focusses on a purposeful creation of a human network of technical people for the company-wide integration of its technological resources.

Organisational Learning for Product Development

The ability and speed with which an organisation can learn from observation and experience, depends among other things on its ability to acquire, accumulate,

access, and use information for problem-solving. Modes of learning in the context of product development comprise the following (Rastogi, 1995b):

* Learning from experience such as revisiting past difficulties that in hindsight appear to be avoidable
* Preserving and sharing information
* Examining the bases of past decisions and the authority of those responsible for them
* Speed of feedback from multiple design-build-test cycles, especially during the production of prototypes and dies, is critical to organisational learning
* Use of multi-cycle concurrent engineering, and virtual design methods, by which knowledge of existing products and processes can be used to project the future development of products within existing product families
* A well-designed pattern of rotation among project personnel within the company can facilitate learning opportunities across successive generations of products within a product family.

A firm may undertake all the foregoing, and similar or related actions to enhance its product development capability. The success of these actions would depend on its understanding of the role and significance of information and knowledge in the product development process. More importantly however, the success would depend on the skill and vision of organisation personnel who manage, and are responsible for carrying out these actions.

The Core competences of a Firm

In addition to product development, another pivotal theme of technology management is that of core competences and capabilities.

The concept of core competences of a firm denotes a sharply honed combination of its individual technologies and production skills that underly its different product lines (Hamel & Prahalad, 1990). The number of such core competences that a firm can develop is extremely limited. The firm has to excel in them in an unmatched manner, in order to be competitively effective. Core competences represent the collective learning of the organisation, regarding how to coordinate diverse production skills, and integrate multiple streams of technologies. Sony's capacity to miniaturize, or Philip's optical media expertise, are two such examples. Casio's skill to produce a miniature ratio no bigger than a business card, involves harmonizing of know-how in miniaturization, microprocessor design, material science, and ultra-thin material casing – the same skills it applies in its miniature card calculators, pocket TVs, and digital watches.

Core competences represent the collective learning of the organisation, regarding how to coordinate diverse production skills, and integrate multiple streams of technologies.

Competencies are enhanced as they are increasingly applied and shared. They do not deteriorate over time, unlike physical assets. But they need to be nurtured and assiduously cultivated. Cultivating them, however, does not mean precipitate increases in R & D expenditure by a firm, or its becoming more vertically integrated[2]. Core competences essentially involve harmonizing and integrating diverse streams of technology. As such, however, they also involve harmonization and integration of the organisation of work, and delivery of value to customer[3].

Core competences powerfully influence the strategic thinking of a company. The latter has, first of all, to conceive of itself as a portfolio of competencies, and not as a portfolio of businesses or strategic business units. Conceiving the company in terms of core competencies widens the domain of innovation, and leads to a consistent conceptualization of its 'strategic

2. World-class research in, for example, lasers or ceramics can take place in corporate laboratories without having an impact on any of the businesses of the company.

3. Among Sony's competencies is miniaturization. To bring miniaturization to its products, Sony must ensure that technologists, engineers, and marketeers, have a shared understanding of customer needs, and technological possibilities. In NEC, digital technology, especially VLSI and systems integration skills, is fundamental. In the core competencies underlying them, disparate businesses of this firm, become coherent. It is Honda's core competence in engines and power trains that gives it a distinctive advantage in car, motorcycle, lawn mower, and generator businesses. Canon's core competencies in optics, imaging, and microprocessor controls, have enabled it to enter, and even dominate, markets as seemingly diverse as copiers, laser printers, cameras, and image scanners. Philips worked for more than fifteen years to perfect its opticalmedia (laser disc competence. It could not have imagined all the products that would be spawned by its optical media competence. Other examples of core competencies include mechatronics (fusion of mechanical and electronic engineering), video displays, bio-engineering, and microelectronics (Hamel & Prahalad, 1990).

architecture'. The latter is a road map of the future that identifies which core competencies a firm needs to build, and their constituent technologies.)

The strategic architecture of an enterprise starts from the identification of a core competency concept (e.g., miniaturization) or a technology (e.g., mechatronics) that can be used as the basis for competitive advantage(s) across the entire organisation and its strategic business units. The core competency is used to dominate 'core products' (e.g., engines, compressors, semiconductor chip); which in turn lead to mastery in end-products. The firm also uses alliances to build its core competencies, and learns from its alliance partners in the process.

A related concept is that of core capabilities. The latter is based on the development and use of technology for services (Quinn, 1992). For this, "corporate activities need to be disaggregated into manageable intellectual clusters or knowledge-based service activities". According to Quinn, most of the processes which add value to materials, derive from them. Manufactured products today can be easily bypassed, back-engineered, cloned, or slightly surpassed in performance. A company should thence focus on those particular skills, service activities, or knowledge elements in the value chain, it can be the 'best' in order to have a competitive advantage, its customers deem critical. Information technology is apt to play a useful supportive role in this context.

Corporate activities need to be disaggregated into manageable intellectual clusters or knowledge-based service activities.

The paradigm of the learning organisation is characterized by a few highly distinctive and radical premises which serve to define a new approach toward managing the strategy and technology of companies. These premises may be briefly recapitulated as follows:

* On account of the high levels of complexity, uncertainty and unpredictable discontinuities of the global business environment, organisations cannot really anticipate or, hope to know and understand, their relatively long term future.
* They cannot therefore effectively plan for the future on the basis of what has worked well in the past.
* They should thence try to change the environment, generate new competitive space, and create a desired future in terms of lofty goals that test and stretch, augment and expand, their capabilities and resources to farthest limits.
* Knowledge (including core competencies and capabilities) is the most valuable crucial resource in this context. Organisations must therefore design themselves as 'laboratories for learning' in terms of acquiring, generating, sharing, and using, knowledge resources continuously toward innovation and performance enhancement.
* Acquisition, sharing and use of knowledge resources must involve all members of the organisation. This can be done only on the basis of deeply shared values, vision, trust, and commitment among them.

Hundreds of organisation members continuously scanning and interpreting the environmental signals; creating, sharing, and using the best practices and methods of work; developing and widening core competencies and capabilities for both the present and the future; and engaged in a relentless collective pursuit of excellence and achievement, provide an organisation with the best available option for mastering change and shaping the future.

In terms of the foregoing distinguishing features of a learning organisation, the nature and broad dimensions of its approach toward managing strategy and technology may be sketched as follows:

* Changing the environment to fit the firm, rewriting the rules of industry and competition.
* Developing superior products/services based on best-in-the-world core competencies and capabilities for accomplishing the above.
* Focus of technology management toward developing core competencies for creating future new products and markets, besides leveraging the existing competencies across new products and markets.
* Primacy of orientation toward strategic readiness or maneuverability of the organisation for coping with emerging situations in terms of its flexibility and rapidity of response.
* Periodic renewal of competitive advantage(s) as the guiding objective in contrast with the earlier emphasis on preserving existing advantage(s).

* Focus toward creating new markets instead of remaining locked in existing markets.
* Investing in evolving or emerging opportunities instead of investing in fixed assets.
* Organisation design based on knowledge-bearing horizontal information flows, boundarylessness, collective learning, and the acquisition, development and deployment of knowledge for coping with and mastering change.
* Firms to consciously organize themselves as "laboratories for learning". They should make systematic efforts toward mapping, challenging, and improving the mental maps that their people use to see, understand, and act on the dynamic complexity all round them (Senge, 1990).

Knowledge as the Most Basic Economic Resource

The concept of learning organisation is basically related to the fact that knowledge constitutes the most basic economic resource today. Its importance far exceeds that of the capital or raw materials. Technology, for instance, is essentially knowledge or knowhow only. Productivity and innovation similarly represent basically the application of knowledge to work. Globally competitive firms are those which have the insight and foresight to mobilize and allocate knowledge to new productive uses. Organisational learning as the means of acquiring and generating knowledge and skills (i.e., operational knowledge) thence becomes a key internal driver of the externally focused enterprise strategy.

Knowledge constitutes the most basic economic resource today. Its importance far exceeds that of the capital or raw materials.

Factors such as cost and quality which were once the source of commanding competitive advantage, have been reduced to being the mere minimum entrance requirements for staying in the global competitive game. Organisation learning thus has the crucial and continuing responsibility for capitalizing on knowledge as the source and base of a leading competitive edge. "The rate at which individuals and organisations learn may be the only source of sustainable strategic advantage" (Stata, 1989). Organisational knowledge and learning thence replace control as the major concern, and the basic test of, apex level management and leadership.

"In an economy where the only certainty is uncertainty, the one sure source of lasting competitive advantage is knowledge. When markets shift, technologies proliferate, competitors multiply, and products become obsolete virtually overnight, successful companies are those that consistently create new knowledge, disseminate it widely throughout the organisation, and quickly embody it in new technologies and products. These activities define the knowledge-creating company, whose sole business is continuous innovation" (Nonaka, 1991).

The fundamental thesis here is that firms will be increasingly differentiated by their ability to leverage knowledge and intellect in creating greater value, than by an exclusive focus or reliance on exploiting physical assets and monetary resources.

References

Argyris C. & Schon D. (1978), "Organisational Learning", Addison-Wesley, Reading MA.

Garvin D. (1993), "Building a Learning Organisation", Harvard Business Review, July-August.

Hamel G. & Prahlad C. (1990), "The Core Competence of the Corporation", Harvard Business Review, May-June.

Hamel G. & Prahlad C. (1994), "Competing for the Future", Harvard Business School Press, Boston, MA.

Jaikumar R. & Bohn (1986), "Post-Industrial Manufacturing", Harvard Business Review, Nov.-Dec.

Nonaka I. (1990), "A Theory of Organisational Knowledge Creation (in Japanese)", Tokyo.

Nonaka I. (1991), "The Knowledge -Creating Company", Harvard Business review, Nov.-Dec.

Quinn J. (1992), "Intelligent Enterprise", The Free Press, New York.

Rastogi P.N. (1995a), "Organisation as a Laboratory for Learning", Productivity, Jan.-March.

Rastogi P.N. (1995b), "Management of Technology and Innovation", Sage Publishers, New Delhi.

Senge P. (1990), "The Fifth Discipline", Doubleday, New York.

Stata R. (1989), "Organisational Learning—the key to Management Innovation", Sloan Management Review, Spring.

Yamanouchi T. (1995), " A New Study of Technology Management", Asian Productivity Organisation, Tokyo. □

Sustainable Development : Creating Agents of Change

Jack Luskin

Increasing numbers of the world's industries are progressing toward being more environmentally sustainable. They are shifting from traditional business ethics, values and cultures to new and sometimes unpredictable systems of operation. They are being pulled by internal forces (conscience) , and pushed by external forces (consumerism, environmentalism, government regulations, and voluntary standards such as ISO 14,000). This shift in paradigms to a new way of doing business is neither easy nor quick and is often painful. There are many questions that the firms will be faced with and many decisions to be made during this transition. The author presents five issues, selected after a brief review of the literature, that will serve as a jumping-off point for tackling this issue.

Jack Luskin, Sc.D. is from the Lowell Centre for Sustainable Production, University of Massachusetts, Lowell.

In 1991 the Business Council for Sustainable Development, comprising business leaders from around the world, issued their Declaration. In it, they recognised that "economic growth and environmental protection are inextricably linked, and that the quality of present and future life rests on meeting basic human needs without destroying the environment on which all life depends." (Schmidheiny, 1992)

This was not a new concept even in 1991. It was first made popular in the World Commission on Environment and Development's (1987) report "Our Common Future". What was different, however, was the recognition by an international body of business leaders that significant changes would be necessary for industry to embrace sustainable development.

Is there a Need for Change?

Progress toward sustainable development makes good business sense because it can create competitive advantages and new opportunities. But it requires far reaching shifts in corporate attitudes and new ways of doing business. To move from vision to reality demands strong leadership from the top, sustained commitment throughout the organisation, and an ability to translate challenge into opportunities.

Schot and Fisher (1993) summarize three future industrial trends: First, firms (multi-nationals with greater than 5000 employees) are formalizing the legitimacy of environmental concerns. Second, firms are accepting responsibility for the solution of environmental problems, and third, a few firms are moving beyond the focus of compliance only. This last trend is based on the belief that leadership in environmentally sound business is necessary, and can lead to a competitive advantage. Firms in this category tend to be open to public scrutiny and public participation.

Question: How do businesses ensure that change is justifiable, and not just a popular fad, such as quality circles, TQM, re-engineering, etc.? (In a recent survey by Kepner Tregoe "...42% of North American companies surveyed engaged in 11 or more change initiatives in the past five years.")

What about "Organisational Learning"?

Organisations need to realize that "sustainable" change is a difficult and long term process. According to David Rejewski of the White House Office of Science and Technology, "If sustainable development amounts to a new frame of reference and a new model of reality, then it will face a wide array of socio-cultural and organisational barriers to adaptation that confront any new paradigm."

According to Senge (1990) Director of the Systems Thinking and Organisational Learning Program at MIT's Sloan School of Management, we need to give up the illusion that separate unrelated forces govern how our world operates. Once freed of this notion, organisations can become "learning organisations." Senge believes that "...learning disabilities are tragic in children, but they are tragic in organisations. Because of them, few corporations live even half as long as a person..."

Learning organisations, accept necessary change as part of their culture. In learning organisations employees are sensitive to changes in the world and in response are continually learning and upgrading their skills.

Learning organisations, according to Senge accept necessary change as part of their culture. In learning organisations employees are sensitive to changes in the world and in response are continually learning and upgrading their skills. In moving toward a learning culture, Senge notes it is not necessarily that members of an organisation resist change, rather that they resist being changed.

Question: Can organisational change be sustainable and positive?

If so, can sustainable, positive be part of an organisation's culture or must change be a series of unrelated and isolated experiences?

Is there only one Model for the Organisational Change Process?

While there is literature on organisational change, much of what is written suggests that successful change follows a sequence. According to John Kotter, Konosuke Matsushita Professor of Leadership at the Harvard Business School, there are eight steps in transforming an organisation:

- Establishing a sense of urgency
- Forming a powerful guiding coalition
- Creating a vision
- Communicating the vision
- Empowering others to act on the vision
- Planning for and creating short-term wins
- Consolidating improvements and producing still more change
- Institutionalizing new approaches.

When beginning the process of change, special attention might be paid to forming a powerful guiding coalition. In identifying potential members of this coalition, consideration should be given to those external to the organisation.

Question : How does organisation choose the change process that is best suited to that organisation?

Is the Company a Rugged Individual or Community Member?

According to the Declaration of the Business Council for Sustainable Development:

The world market is moving toward deregulation, private initiatives, and global markets. This requires corporations to assume more social, economic, and environmental responsibility in defining their roles. We must expand our concept of those who have a stake in our operations to include not only employees and

The world market is moving toward deregulation, private initiatives, and global markets. This requires corporations to assume more social, economic, and environmental responsibility in defining their roles.

work organisations that qualify as learning organisation include the Strategic Organisations whose mission is socio-economic development rather than profit maximisation. Strategic organisations are the Apex Spear-Head and Human Growth Organisations committed to the development of the sectors in which they operate. They are characterised by their resource dependence on the government, a focus on development role within unfamiliar and non-routine task (Jaja, 1995). The other group of learning organisation whose focus is more on local or ethnographic phenomenon in both sourcing of production input and distribution of their output are the Non-Farm Industrial Work Organisations. This last group is characterised by their knowledge on local sourcing of raw materials, consumer needs and their general business environment.

Learning organisations have favoured rural modernisation in Nigeria for several reasons: they have quickly absorbed large number of rural surplus labour; they have rapidly increased rural income growth; they have helped specialisation, changed the production structure, and raised social productivity; their expansion has helped build rural market towns; and their development has been accompanied by changes in people's traditional ideas such as concepts of time, market, competition, accounting, and entrepreneurship which the traditional self-sufficient agrarian African society of the past did not understand. (Fureng 1988; Adamu 1966).

Many issues have to be addressed in developing learning organisations. These include: providing capital to set up enterprises; making arrangements to ease shortage of energy and raw materials; improving technologies to increase productivity; tapping local talent to develop skills; and educating people on how to change their perceptions of risk, trading, wealth, and so on. Several models for the development of learning organisations have been promoted in Nigeria. Public Ownership Model (POM_1) and the Private Ownership Model (POM_2) have been more prevalent, but various forms of Mixed Ownership Model (MOM) have also been supported. Under the POM_2, the principal initiators in the development of learning organisations are individual entrepreneurs. The government's role is mainly to implement appropriate policies to create a congenial environment for the development of the enterprises. At present, investors own two types of private industry: the individual private enterprise (IPE) set up through joint investment by individuals. The latter is also called a Public Limited Liability Company. In some areas, an MOM represented by parallel development of private enterprises and public enterprises, has been used. Elsewhere, an MOM which combines POM_1 and POM_2 in a variety of forms, is being tried. Because rural areas are so varied across the country, the selection of the model has been left as the responsibility of investors.

The extent to which learning organisations satisfy their consumers is worth a study, given their specialised knowledge and skill within their area of operation. The questions to be answered are:

* How do learning organisations ensure that products satisfy the need of consumers?
* To what extent have their methods succeeded in achieving this goal?
* What are the ontological phenomena that are responsible for the observed situation?

Consumer Satisfaction

The major assumption is that, there is a significant relationship between the functioning of learning organisations and degree of consumer satisfaction. The pilot survey reveals that learning organisations in Nigeria are yet to fulfil their mission, mainly because of the following reasons:

- Poor product management strategies
- Inability to carry out Consumer Education Programmes
- Poor characteristics account for their inability to satisfy consumers in Nigeria.
- The generally poor response of learning organisations to consumer satisfaction as compared with those of their counterparts in US, Japan, South Korea and China.

Product Management Strategies

The degree to which learning organisations are able to adapt to their business environment, among other strategies, depends on: the ability in establishing new organisational goals and objectives where previous ones are no longer feasible; incorporation of changes brought about by an immediate reaction to sudden problems likely to affect the overall operations of the firm without immediate consideration of the long run effect of such action; carrying out marketing audit; examining the past achievements and failures of the organisation; and examining the economic environment of the organisation with a view of adapting to it; and efficient and effective product management.

The degree to which learning organisations are able to adapt depends on the ability in establishing new organisational goals, incorporation of changes and efficient and effective product management.

There is enormous pressure on learning organisations in Nigeria to formulate and implement strategies that can enable them sell their products at equitable profits to themselves and benefits to society. Marketing strategies that can accomplish this goal will cover product packaging, product branding and introduction of new product line. The organisation's competitive size and position in the market; its resources, objectives and policies; target market buying strategies; and character of the economy are also equally important. Bolen (1982) identified three reasons for opting for a good competitive marketing strategy: finding ways to make the total market share of the learning organisations grow large; protecting current market share of specific learning organisations; and maintaining and expanding the marketing share at a profit to the organisation and benefit to society.

One general factor which tends to condition the implementation of marketing strategies by learning organisations across cultural boundaries is the state of the economy. Hence, the level of success achieved by a given learning organisation depends on how it can forecast the socio-economic system. This is because, economic anthropologists have brought comparative perspective to learning organisations (Wolf, 1966; Mandel, 1985). Two sets of questions must be answered here: how are production, distribution and consumption organized in different African societies? and what motivates individuals in different cultures to produce, distribute and consume? Learning organisations which can not successfully answer these two questions are likely to be unsuccessful in their marketing strategy in a competitive marketing system.

Further, any learning organisation that claims to have sufficiently placed its products and performed other functions, but neglects the accrual benefits to society is likely to end badly. Most learning organisations have either closed down or diversified into other lines of business. Surprisingly, this phenomenon is not limited to the indigenous learning organisations or those small in size, but, extends to the multinationals and large learning organisations. In fact the problem is more with the latter. This is because, the small learning organisations which are merely indigenous tend to adjust easily to ethnocentric situation in the short-run, a business practice which the multinationals cannot easily adapt because of their concentric management structure; and their ethnocentric, polycentric and geocentric policies.

However, notwithstanding the ability of a given learning organisation in responding to changes in a given ethnocentric situation, economic anthropologist assumes that as learning organisations rationally make decisions on the basis of the profit motive, the consumers do the same when they shop around for the best value. Thinking along this line, Kottack (1987, p. 128) contended that:

> The motives of individual consumers differ across culture... *Learning Organisations should therefore compare the motivations, beliefs, and values* that influence personality formation of consumers that cause them to behave differently in different cultures, as this is a way of adapting to ethnocentric demands (emphasis added).

This suggests that in order to rationally allocate scarce resources and maximize competitive strength, learning organisations should be familiar with what can influence consumers in different cultures and adapt to them accordingly. Such an analysis demands a real, rather than an imaginary exercise of market segmentation.

Obviously, an understanding of the people's culture will reveal the ethnocentric characteristics of the consumer population such as geographical location, age, sex and degree of loyalty towards a particular commodity. These elements serve as the more important basis for market segmentation. However, management in Nigerian learning organisations have tended to undermine this fact. It is worth emphasising therefore that, in pursuing their strategic marketing effort through market segmentation, learning organisations should ensure that:

> .... any variable that forms a basis for market segmentation should encourage division of the market into homogenous segments that tend to respond differently to the firm's promotional activities; measurability; accessibility to the firm's promotional activities; and increased profits from segmentation (Nwokoye 1981, p. 45).

In analyzing an economy, learning organisations should recognize the fact that though Nigeria is a Federation, there is evidence that some communities are still operating pre-scientific, pristine system of living. Such knowledge will enable learning organisations to

determine a price for a given product for a given class of consumers. This is not to suggest that, the impact of price bargaining is not influenced by turn over considerations, discount structures, and chain discounts (Marcus 1975; Ibok 1978). It is also well known that, the network of market coverage, degree of channel control, product characteristics, market or consumer characteristics, and producers's characteristics determine the extent to which learning organisations accomplish their mission of societal satisfaction (Nwokoye 1981). In order to achieve a comfortable position in the total market therefore, learning organisations have taken measures to ensure consumers satisfaction by giving them free samples, price-off, premium and special sales. This trend lends support to Sandage and Fryburgers (1984) argument that, most learning organisations have often contributed to societal satisfaction and welfare through trade promotion by offering buying allowance, free goods, co-operative advertising, sales contests, trade fair, and sponsoring sporting activities.

For learning organisations operating in African countries to be progressive, they must be familiar with the basic ethnographic orienting exchanges. Dalton (1976) enumerated these as market exchange, redistribution and reciprocity. Market exchange is applicable to Nation states; redistribution exchange relate to exchange in Chiefdoms, a form of socio-political organisation more complex than the tribal society, but less than the Nation state. The exchange of reciprocity has to do with exchange in tribal societies. These principles are often referred to as the organisational process of purchase and sale at money price (Leed 1974). It is therefore conclusive that the characteristic of market exchange is bargaining. This is because consumers and learning organisations try to get their business risk and money's worth, respectively. However, some researchers believe that in the Communist states, though money serves as a medium of exchange the means of exchange justifies the end (Vayda 1968; Piddocke 1969). Vayda (1968, p. 117) succinctly explained this in these words:

> We know that in Western Societies individual behaviour is influenced by motivations and incentives that differ from our own. We also know that many groups lack the unitary exchange system that money makes possible, and we understand how exchange systems help people adapt to their environments. This is why the means justifies the end in our economic system.

For learning organisations operating in African countries to be progressive, they must be familiar with the basic ethnographic orienting exchanges.

Consumer Education & Consumer Satisfaction

Education is, and should be seen as comprehensive as all aspects of human life (Lucas 1969; Yudkin 1967). Consumer education in our context therefore, is the process by which learning organisations make their consumers know what is desirable about their product or service. In referring to learning organisations as not having given sufficient consumer education to Nigerians, as Quinton (1973) also believes, we lean strongly on Saunders (1970, p. 73) observation that this will make their mission accomplishment difficult. However, as Bloom (1968) noted, in contemporary society, there are opposing views about the practice of consumer education. As Downie (1974) posited, there is no general agreement about what the consumer should learn either in relation to use or in relation to product life cycle; nor is it clear whether consumer education ought to be directed more towards the physical or core product than towards the utility derivable by consumers from the use of the product or service. All consumer education programmes by learning organisations must be directed toward those attributes of the products that are beneficial in the consumer's interest whether they are good or bad.

The important contribution of consumer education is its contribution to the 'Quality of Life' of the consumer. The other is consumer discipline – the judicious use of a given product by the consumers. There will be no abuse of products against manufactures advice and directions. This is because as Peter (1966, p. 267) points out:

> 'Discipline', etymologically speaking, is rooted in a learning situation; it conveys the notion of submission to rules or some kind of order.... Whenever we think about rules or a system of order from the point of view of their impression on a mind or minds, it is appropriate to talk of 'decision'. 'Discipline' is thus a very general notion which is connected with conforming to rules if all that the marketer is trying to do ..... is not to make excessive profit.

In the context of consumer education, more usually, it is used to refer to the maintenance of general condition of usage without which the product cannot satisfy the consumer. It is connected with consumers being persuaded to buy and to accept rules forbidding them from specific methods of not putting the product into use. Without such general conditions of consumer education, consumer satisfaction cannot

be ensured. One point which stands out clear is that, the inability of Nigerian learning organisations to render effective consumer education tends to deny consumer autonomy. This is because, as Dearden et al (1972, p. 453) observed, "what the consumer thinks and does in important areas of his life cannot be explained without reference to his own activity of the mind". This implies that, the explanation of why the consumer thinks and acts as he does in these areas must include a reference to his own choices, deliberations, decisions, reflections, judgements, planning or reasoning.

Similarly, the accomplishment of what marketers want to intend, under the description embodied in consumer's intention, is necessarily a satisfaction, and his satisfaction is greater when the marketers intend is what they accomplish. Empirical substantiation of this is abundantly available in human action from the earliest years (Bruce et al 1973). Even the youngest consumers enjoy 'doing it for themselves' and resent being 'bossed'. Autonomy therefore, implies the ability and determination to regulate consumer's life by rules which the consumer has accepted for himself presumably because the reasons are both apparent, convincing and known to him.

Referring to the social base of the community in developing consumer education schemes, management of learning organisations in Nigeria must recall what Elliot (1971, p. 150) emphasised:

> We should not suppose that because our present concept of consumer creativity collects together a number of highly important matters, it must be pretentious or inflated. It is simply a focus of human hopes and aspirations. In reflecting upon it, we relate the ideas of freedom, founding, innovation, progress and autonomy to consumer education.

Characteristics of Organisational Life

The primary purpose of marketing is to create profitable exchange relationships between an organisation and the consumer public. The manner in which a given learning organisation undertakes the formulation and subsequent implementation of its marketing strategy is very vital. One factor on which the success of the marketing strategy depends is the basic characteristics of the learning organisations. This is effected through complex and inter-related analytical processes (Abell & Hammond 1979). Vanil (1976) calls this the definition of the character of learning organisation. This has been accepted by a host of researchers (Brown 1970; Kerim 1975). This argument must have influenced Abell (1979) and Day (1979) to contend that learning organisations should define their business in terms of the type of consumers they wish to serve. This is because, lags between decision and effective action are recognized, along with the possibility that predictions of what the market will be are not perfect: maximization becomes maximization of expectation (Nelson and Winter 1982).

The primary purpose of marketing is to create profitable exchange relationships between an organisation and the consumer public.

Kerim and Peterson (1981) noted that, the definition of an organisation's business, in turn, specifies the market niche(s) that a learning organisation will seek to occupy and compete in. The authors concluded by contending that, such definition ultimately affects the growth prospects for opportunities in the context of identified environmental opportunities, threats, and organisational capabilities. However, it seems that poor environmental and market exchanges and the inability of Nigerian learning organisations to properly understand their characteristics have led many of them to fail. A Managing Director of one learning organisation narrated his experience of how the macro-environmental changes in the Nigerian economy marred the characteristics of his organisation, in this words:

> As giant indigenous entrepreneurs, we operate over 40 full line stores. But, we are caught up in a fast changing Nigerian business environment where petty traders and road side' businessmen are winning over more and more of our traditional customers, leaving us to scramble to find our market niches. By this our original identity was completely battered.

Associated with organisational characteristics is the question of specifying the purpose of the organisation and identifying organisational opportunities. This presupposes that actions which guarantee good character is a foundation for goal achievement. But most Nigerian Learning Organisation have failed in: the provision of quality goods and services; identification of the kind of information needed by them, their consumers and competitors; having a product offering which has combined features that set the organisation high; and identification of changing consumer needs and buying pattern. This must be founded on grounded rationality as was examined by Williamson's (1975)

market hierarchies framework. Examining the alternative views, Williamson (1975, p. 7) contended :

> I am more concerned with tracing out the ramifications of bounded rationality. I expressly introduce the notion of opportunism and am interested in the ways that opportunistic behaviour is influenced by economic organisation; and I emphasize that it is not uncertainty or small numbers individually or together, that occasion market failure but it is rather the joining of these factors with bounded rationality on the one hand, and opportunism on the other, that gives rise to exchange difficulties.

Experience has shown that most Nigerian learning organisations could not properly identify and explain the business they are into. They have also failed to successfully describe the purpose of their business. Learning organisations which are unable to define their business or purpose of their organisation are likely to keep their organisations in a very weak marketing situation when it comes to designing, formulating and implementing their marketing strategies. This is because, the management of such learning organisations lacks the ability of directing the goal and objectives of their organisation. But, the management of learning organisations must remember that:

> At any point of time, the current operating characteristics of firm and the magnitudes of their capital stocks and other state variables, determine input and output levels. Together with market supply and demand conditions that are exogenous to the firms in question, these firms' decisions determine market prices of inputs and outputs. The profitability of each individual firm is thus determined (Nelson and Winter 1982, p. 19).

Organisational opportunities and strategies direction result from matching environmental opportunities with organisational capabilities, acceptable level of risks, and resource commitment.

It is well known that, in defining the character of the learning organisation and specifying its purpose, it will be able to identity its opportunities in the environment. This is because, as Kerim and Peterson (1980, p. 7) have shown, organisational opportunities and strategies direction result from matching environmental opportunities with organisational capabilities, acceptable level of risks, and resource commitment. The authors went on to argue that three questions capture the essence of the decision making process at this stage: what might we do? what can we do best? and what must we do?

The ability of developing reformational and recovery strategy in the process of defining its organisational character, as Biggadike (1970, p. 109) observed falls into four categories: an attempt to marshal resources necessary to fit market success requirements with technical or marketing capabilities; shift of priorities to markets where the match between success requirements and organisational capabilities is strongest; cut back efforts in a market where it has been 'over thanked' and operate for a short-run profit; and immediate elimination of offerings through liquidation or sale of the organisation. But poor organisational characteristics arising inadequate financing pattern and sources, layout patterns and flexibility, site physical characteristics, general requirement of the behaviour of the individual stores, and the buying behaviour of the 'political' consumers have tended to make Nigerian learning organisations behave negatively in this direction. But it must be noted that, the legacy from the firm's past is appropriate, at best, to the range of circumstances in which the firm customarily finds itself, and is viewed as unresponsive, or inappropriate, to novel situations or situations encountered irregularly. Firms are regarded as expanding or contracting in response to disequilibria with no presumption that the industry is near equilibrium (Nelson & Winter 1982).

Further, reformation and recovery strategies from the corner stone of adaptive behaviour of effective learning organisations (Porter 1979; Koontz 1976). Changing markets and competitive behaviour require periodic, if not sudden, adjustments in strategy (Hartley 1976; Kerim et al 1978; Biggadike 1979). Hence, marketing audit and control are fundamental to the development of reformation and recovery strategies. As Kotler et al (1977, p. 35) concluded, "a marketing audit is a comprehensive, systematic, independent, and periodic examination of a company's or business units marketing environment, objectives, strategies, and activities with a view of determining problem areas and opportunities and recommending a plan of action to improve the organisation's marketing performance". In order to effectively discharge the reformation and recovery therefore, learning organisations should establish new goals and objectives for their organisations where previous ones are no longer feasible; and incorporate changes brought about by immediate reaction to sudden problem which is likely to affect the overall operations of the firm.

Task Differentiation

There is a consensus among researchers that an appreciation of organisational behaviour and structure must commence with the evaluation of differences in the organisation based on the volatility and interaction of people, tasks, technology, organisation structure and environment (Handy, 1979; Lucey 1987; Porter & Lawler 1968). This lends support to the views expressed in studies on the development in the theory of organisations' adaptability and behaviour as a means of accomplishing their set objectives (Lawrence & Lorsch 1967; Burns & Stalker 1968; Woodward 1970).

Comparison (figure 1) indicates that US learning organisations are more likely to satisfy the consumer public than do their Nigerian counterparts. On FUSTD, while the relative formality of the firm in relation to hierarchy, rules and procedures is high among most US learning organisations, the same is more informally structured and low among most Nigerian counterparts. On MTOTD, while managerial expectation about the time required to produce results from their efforts among US learning organisations is long term, the perceived expectation among Nigerian organisations is short term. On MOOTD therefore, US learning organisations adopt a more acceptable scientific and high technological approach in managing deadlines, cost reduction, and efficiency against the Nigerian firms which favour the use of mystical and theological knowledge in resolving such organisational issues. On INOTD, US organisations lay moderate emphasis on establishing personal relationships as compared with task performance, vis-a-vis Nigerian organisations in which it is high. ON ENVTD, US organisations enjoy a high degree of certainty when compared with Nigerian organisations which are operating in a high degree of uncertainty.

US learning organisations enjoy a stable environment with high certainty and predictability; high functional specialization; detailed differentiation of duties and responsibilities; hierarchical control, authority and communication with largely vertical interactions; authoritarian styles with clear superior/subordinate relationships and emphasis on loyalty and obedience; and low rate of innovation. While Nigerian learning organisations are operating in an uncertain environment with low level of predictability; low functional specialization; less structured management with more adjustment and redefinition of roles; lateral communications with a network of control and authority; more consultation with ancestral spirits and supernatural for information and advice rather than independent decisions and instructions; and a rapid rate of innovation. These conclusions are similar to those drawn by Burns and Stalker (1968) in their U.K. study of a number of electronic firms.

Similarly, while it is most appropriate for Nigerian learning organisations, on the basis of configuration, culture and information – to use flat structures which has to do with relative small size, few levels of authority and management, short chain of command and broad span of control, they have resorted to using the tall structure which is favoured by the US learning organisations. US learning organisations favour relative large size; numerous levels of authority and management; narrow span of control; long chain of command; and more formality, specialization and standardization. The imitation of this less favourable structure by Nigerian learning organisations accounts for their inability to satisfy consumers. This leads us to the conclusion that the organisational culture of characteristics of Nigerian learning organisations are poor in terms of managerial quality, management styles, organisation structures, distributive influence, competitive organisational relationship, time orientation, organisational values, and environmental choice.

Nigerian Organisations' adaptability to economic factors in the world market has been comparatively low when compared to Japan, South Korea, China and US (fig. 2). Whitley (1990), like most researchers narrated that, the economic success of Japanese business organisations over the past half century has highlighted the viability of the alternative to Nigerian organisation's structures and practices (Kagono et al 1985; Maurice et al 1986). The dismissal of the Japanese management practices in Nigerian markets is becoming increasingly untenable. Comparisons have been made between UK and French, German and US learning organisations with the Japanese isomorphic organisational characteristics (DiMaggio & Powell 1983) on the assumption that distinctive social institutions, cultures and structures significantly influence organisation structures that develop in different societies (Sorge 1983; Stinchcombe 1983; Hickson et al 1979; Child & Tayeb 1983; Hofstede 1983). The basic difference is merely based on complex theoretical and epistemological issues such as the possibility and desirability of a general theory of learning organisations structure.

As Liebenberg (1982) and Jacobs (1985) argued, the crucial components in Japanese management practice, such as authority and thrust system, cannot be directly transferred to Nigerian learning organisations even in Nigerian – Japanese joint ventures as that between Japan-Korea clearly demonstrates. A feature of Japanese learning organisations and Chinese Family Business (CFB) which is lacking among Nigerian learning organisations seems to be a concentration on a limited range of business activities and the homogeneity of skills and resources (Cusumano 1985; Imai & Itami 1984). The second distinctive characteristic is the high

degree of managerial autonomy enjoyed by shareholders in Japanese learning organisations as against those of Nigeria where this is low (Aoki 1987; Dore 1986; Futasugi 1986; Lawriwky 1984). The third feature of large Japanese learning organisations which is lacking among their Nigerian counterparts is the relatively decentralized system of initiating decisions and the emphasis on obtaining a consensus before acting (Kagono et al 1985).

In contrast with Japanese RBOs, like South Korean Chaebol, Nigerian learning organisations stock a variety of stock (Orru et al 1988; Cho 1987; Jones & Sakong 1980). Another distinctive feature which existed in Nigerian learning organisations, like their South Korean Chaebol counterpart, but absent in Japan is the strong connection between ownership and control (Jacob 1985; Michell 1988; Yoo & Lee 1987). Unlike in Japan and CFB were authority was essentially dyadic and diffused between managers and owners, in Nigeria owners maintain absolute control. Similarly, though the Nigerian patrimonial ethos in employment practice encourages employer–employee commitment, it does not exhibit a high level trust nor encourage the use of initiative (Liebenberg 1982; Cumings 1987; Kim 1979). However, there is such personal connection in Japanese learning organisations and CFB and a high level of rational, emotional commitment and thrust which in lacking in Nigerian counterparts (Hamilton & Kao 1987; Gold 1986).

Theoretical and Practical Implications

Despite all the necessary encouragement intended by government and other responsible agencies learning organisations have failed to satisfy consumers with their products in Nigeria. The major reasons are that Nigeria learning organisations among other things, had failed to effectively manage the elements of their marketing distribution system–the application of their marketing strategies is far from internationally accepted marketing conventions. Nigerian learning organisations also have poor characteristics of organisation life when compared to those of Japan, South Korea, China, and United States. They rate poorly in terms of task differentiation dimensions; enterprise specialisation and development; there is absence of well defined authority, loyalty and system of division of labour; and a low level of enterprise co-ordination. Hence Nigerian learning organisations have failed to meet the expectation of their consumers.

One point which need to be emphasised is that the intensity of market competition has shifted from amongst large learning organisations to smaller ones. But, the smaller learning organisations seem to be outliving the larger ones. The percentage market coverage of large learning organisations in African countries is low when compared to the situation in USA, Japan, Germany, Italy and France. This gives room for patronage of small time learning organisations who place less emphasis on the observed quality standard. There is the urgent need for the large learning organisations to improve services in order to assist in the promotion of the UN campaign for the advancement of Quality of Life in African countries. The scarcity of merchandise in African countries has resulted in fake (low quality) products even by the multi-nationals. As Tinter (1941) noted, many business organisations in Nigeria have substituted preference function maximisation to profit maximisation. Only good marketing practices will bring about improved quality control which will promote consumer satisfaction.

There is need to de-emphasise the system whereby large learning organisations depend more on mere sales turnover without due consideration to operational socio-cultural and economic environment, as this can lead to a decay.

As Ahiauzu (1986) concluded the behaviour of African organisations and their operational processes are culture bound. In fact, the degree of efficiency and effectiveness in the formulation and implementation of a marketing strategy very much depends on how learning organisations are able to adapt to their socio-cultural and economic millieu. However, some points must be highlighted:

- The most central thing about the Nigerian learning organisations is that, it is the producers who determine what the consumer should need and use. This is not only an irony in current world marketing practices, but also a rape on natural human consciousness.
- The present state of socio-economic and political environment of Nigeria enables learning organisations to possess a distinctive advantage against the choice opportunities of consumers. This sort of situation induces a feeling of inferiority among consumers and seems inappropriate for the much discussed societal marketing orientation.
- The present practice in the Nigerian marketing scene, coupled with the depressed state of the economy tends to make consumers conceive the notion that all knowledge which is worthwhile about a product can only be acquired by the few consumers who are exceptionally rich.

The most central thing about the Nigerian learning organisations is that, it is the producers who determine what the consumer should need and use. This is not only an irony in current world marketing practices, but also a rape on natural human consciousness.

- The maxims which emerge about the organisational practices of learning organisations are that the connection between decision and action is problematic; the locus of decision making can be diffused; action without a decision is possible; action can occur without consensus; exogenous events can trigger decisions; and decisions are made within a context and help to influence the context for future decisions.

Conclusion

It is conclusive that at the indigenous level, societal marketing orientation is at present absent. However, there are three major things which require attention if this situation is to be improved: ensuring abundant supply of raw material at an affordable price to learning organisations; an improved organisation of other factors of production required to make production to meet demand; and the need to pursue an increase in per capita income (PCI) which at present in one of the

DIMENSION	US Firms	Nigerian Firms
FUSTD	High	Low
MTOTD	Long term	Short term
MOOTD	Scientific/High Technology	Mystical/Theoretical
INOTD	Moderate	High
ENVTD	High Degree of certainty	Considerable Degree of uncertainty

Note: FUSTD Functional Structure of Task Differentiation.
MTOTD Managerial Time Orientation of Task Differentiation.
MOOTD Managerial Objective Orientation of TD.
INOTD Interpersonal Orientation of TD.
ENVTD Environmental Influence on TD.
Source: Adapted and modified from Lucey T. (1987).

Fig. 1. Task Differentiation Dimension Ratings: A Comparison between US and Nigeria Learning Organisations.

	DOMINANT ECONOMIC FACTORS IN WORLD MARKET	JAPAN	SOUTH KOREA	CHINA	US	NIGERIA
1.	**Enterprise Specialisation and Development**					
	– Business Specialisation	High	Low	High	High	Low
	– Relational Contracting,	High	Low	Medium	High	Low
	– Evolutionary Strategies	High	High	Medium	High	Low
2.	**Authority, Loyalty and Division of Labour**					
	– Personal Authority	Low	High	High	Low	Low
	– Enterprise Loyalty	High	Medium	Medium	High	Low
	– Role Individualism	Low	Low	Low	High	Low
3	**Enterprise Co-ordination**					
	– Horizontal Co-ordination	High	Low	Medium	Medium	Low
	– Vertical Co-ordination	High	High	Low	High	Low

Source: Adapted and modified from Whitley, R.D. (1990).

Fig. 2. International Comparison of Dominant Economic Factors in World Market and Consumer Satisfaction by Learning Organisations

lowest in Africa. As a country in need of accelerated development, attention on the foregoing will encourage the growth of the socio-economic values which we aspire to build, and promote good health for all in the year 2000. In this way, Nigeria's learning organisations would emerge as viable organisations.

References

Abell B.G. & Hammond C.L. (1979), "Marketers' Attitude Towards the Marketing Concept", Journal of Marketing (October).

Aoki M. (1987) , "The Japanese Firm in Transition", in Yarmamura, K. and Yasuba, Y. (eds.) The Political Economy of Japan I. The Domestic Transformation (Standford: Standford University Press).

Adamu A.D. (1966), "The Future of Consumer Behaviour", (New York: John Willey and Sons).

Ahiauzu A. I. (1986), "The African Thought System and the Work Behaviour of the African Industrial Man", International Studies of Management and Organisation, Vol. 16, No. 2

Biggadike C.D. (1970), "The Trouble Future of Retailing", Business Horizon, (August)

Biggadike (1979), "Understanding Consumer Behaviour", New York: McGraw-Hill.

Bloom, C.W. (1968), "Contemporary Marketing", Illinois, Dryden Press.

Bolen W.H. (1962), "Contemporary Retailing", Englewood Cliffs, New Jessey: Prentice-Hall.

Brown G.W. (1970), "Thoughts on Grounded Theory", Sociology, Vol. 7.

Bruce S.K. et al (1973), "Young Entrepreneurs", Venture (October).

Burns T. & Stalker G.M. (1968), "The Management Innovation", (London: Tavistock).

Child J. & Tayeb M. (1983), "Theoretical Perspectives in Cross-National Organisational Research", International Studies of Management and Organisation, 12.

Cho D. (1987), "The General Trading Company", (Lexington, Mass: D.C. Health).

Cumings B. (1987), "The Origins and Development of the North East Asian Political Economy", in Deyo F.C. (eds.) The Political Economy of the New Asian Industrialisation Ithaca, New York: Cornell University Press.

Cusumano M.A. (1985), "The Japanese Automobile Industry: Technology and Management at Nisan and Toyota", Cambridge, Mass: Harvard University Press.

Dalton M. (1976), "Men Who Manage", New York: Wiley and Sons.

Day R.L. (1979), "Simultation of Consumer References", Journal of Advertising Research, Vol. 5 (September).

Dearden F. Massey W. & Wind Y. (1972), Market Segmentation Englewood Cliffs, N.J.: Prentice-Hall.

Dimaggio P.J. & Powell W. W. (1983), "The Iron Cage Revisited: Institutional Isomorphism and Collective Rationality in Organisational Fields", American Sociological Review, 48.

Dore R. (1986), "Flexible Rigidities", Standford: Standford University Press.

Downie J. (1974), "Organisational Intelligence", New York: Holt, Rinehart and Winston Inc.

Elliot T.S. (1971), "Tradition and the Individual Talent", Points of View.

Fureng D. (1988), "Rural Reform, Nonfarm Development and Rural Modernisation in China", An EDI Seminar Paper, No. 38.

Futasugi Y. (1986), "Japanese Enterprise Groups Kobe: School of Business Administration", Kobe University.

Gold T.B. (1986), "State and Society in the Taiwan Miracle", New York: Sharpe.

Hamilton G. & Kao, C.S. (1987), "The Institutional Foundation of Chinese Business: The Family Firm in Taiwan", Programme in East Asian Culture and Development, Working Paper Series, No. 8, California: University of California.

Handy C. (1979), "Gods of Management: Who They Are: How They Work and Why They Fail", London: Pan Books.

Hartley K. (1976), Forms of Formal Organisation London: Routhledge and Kegan Paul.

Hickson D., McMillan C.J. Azumi K. & Horvath D. (1979), "Grands for Comparative Organisation Theory: Quicksands or Hard Core?", in Lammers, C.J. and Hickson D. J. (eds.), Organisational Alike and Unlike London: Routhledge and Kegan Paul.

Hofstede G. (1983), "The Cultural Relativity of Organisational Practices and Theories", Journal of International Business Studies, 14.

Ibok N. (1978), "The Changing Markets in Nigeria", Daily Times, October 29.

Imai K. & Itami H. (1984), "Interpretation of Organisation and Market in Japan's Firm and Market in Comparison with the U.S.", International Journal of Industrial Organisation, 2.

Jacobs N. (1985), "The Korean Road to Modernisation and Development", Urbana: University of Illinois Press.

Jaja S.A. (1995), "The Functioning and Behaviour of Strategic Organisations in Nigeria: A Focus on Boundary and Growth Management": Unpublished Ph.D, Por Harcourt; Nigeria: Faculty of Management Sciences, University of Science and Technology.

Jones L. & Sakong H. (1980), "Government, Business and Entrepreneurship in Economic Development: The Korean Case", Cambridge, Mass: Harvard University Press.

Kagono T., Alonaka I., Sakakibara K. & Okumara A. (1985), "Strategies Vs. Evolutionary Management", Amsterdam: North Holland.

Kerim B. (1975), "Marketing Role on Scientific Management", Chicago: AMA.

Kerim B.; Heskett P.C.; & Haller M.J. (1978), "Cultural Influences in Marketing Revolution", Journal of Marketing, January.

Kerim B. & Peterson S. (1981), "The New Forms of Formal Organisations", Chicago: Aldine.

Kim K. (1979), "Men and Society in Korea's Economic Growth", Seoul: Second National University Press.

Koontz H. (1976), "Management", New Delhi: McGraw-Hill.

Kottack C.P. (1987), "Cultural Anthropology", New York: Random House.

Lawrence P.R. & Lorsch J.W. (1967), "Organisation and Environment", Boston: Harvard University Press.

Lawriwky M.L. (1984), "Corporate Structure and Performance", London: Croom Helm.

Leed R. (1974), "What Hunters do for Living, Or How to make out a Scare Resources", in Cohen, Y. (ed.) Man in Adaptation: The Cultural Present Chicago: Aldine.

Liebenberg R.D. (1982), "Japan Incorporated and the Korean Troops: A Comparative Analysis of Korean Business Organisations", Unpublished MA Thesis, Hawaii: Department of Asian Studies, University of Hawaii.

Lucas J. (1969), "Business Associations in Northern Nigeria", Unpublished Ph.D Dissertation Indiana: Indiana State University.

Lucey T. (1987), "Management Information Systems", Hants: DP Publications Limited.

Mandel M.I. (1985), "Marketing", Englewood, N.J.:Prentice-Hall.

Marcus H. (1975), "Firms' Exit Rates and their Determinants", Journal of Industrial Economics, 16.

Maurice M., Seller F. & Silvestre J.J. (1986), "The Social Basis of Industrial Power", Cambridge Mass: M.I.T. Press.

Michell T. (1988), "From A Developing to a Newly Industrializing Country: The Republic of Korea 1961-82", Geneva: International Labour Organisation.

Nelson D. & Winter C. (1982), "Research into Consumer Behaviour Science", London: Edward Arnold.

Nwokoye N.G. (1981), "Modern Marketing for Nigeria", London: Macmillan.

Orru M., Biggart N. & Hamilton G. (1988), "Organisational Isomorphism in East Asia: Broadening the New Institution", Programme in East Asian Culture and Development Research Working Paper, Social No. 10.

Peters R.S. (1966), "Ethics and Education", London: George Allen and Unwin.

Piddocke R.O. (1969), "Society and Formal Organisations", Berkeley: University of California.

Porter M. (1979), "Competitive Strategy: Technics for Analysing Industries and Competition", Chicago: NMA.

Porter L.W. & Lawler E.E. (1968), "Managerial Attitudes and Performance", Homewood: Irwin.

Quinton J.B. (1973), "The Real Goal of Maintenance Engineering", Factory (June).

Sandage S.D. & Fryburgers, P.N. (1984), "Participation in Enterprise Management: Bogged Down Concepts", Economic and Industrial Democracy in Nigeria, Vol. 2, No. 1.

Saunders P.B. (1970), "The Need for Consumerist Activism in Nigeria", MANTECH Vol. 5 No. 1 March.

Sorge A. (1983), "Cultural Organisations", International Studies of Management and Organisations", 12.

Stinchcombe A. L. (1983), "Economic Sociology", New York: Academic Press.

Tinter A. (1941), "The Otherwise of Organisation", New York: Vantage Press.

Vanil S.B. (1976), "Pitfalls in Marketing", Princeton, N.J.:Princeton University Press.

Vayda A.P. (1968), "Economic System in Ecological Perspective: The Case of the Northwest in Fried", M. (ed.) Readings in Anthropology, Vol. 2.

Whittley R.D. (1990), "Eastern Asian Enterprise Structures and the Comparative Analysis of Forms of Business Organisation", Organisation Studies, 11.

Williamson O. Wachter M.I. & Harris J.E. (1975), "Understanding the Employment Relations: The Analysis of Idiosyncratic Exchange", Bell Journal of Economics, 6.

Woodward J. (1970), "Industrial Organisation: Behaviour and Control", London: Oxford University Press.

Wolf E. (1966), "Peasants Englewood, Cliffs, N.J.:Prentice-Hall.

Yoo S. & Lee S.M. (1987), "Management Style and Practice in Korean Chaebols", Californian Management Review, 29.

Yudkin M.E. (1967), "New Organisation Order", New York: Calbin Press.

□

Survey

Culture & Its Consequences for Creativity & Innovation Management

R.D. Pathak, Tudoor Rickards & D.M. Pestonjee

Culture is a well recognised but hardly well-researched theme in creativity and innovation literature. This article invites the attention of behaviourial scientists to this promising area of inquiry and points to some of the implications of examining the relationship and consequences of macrolevel culture on creativity and innovation management. It is proposed that creative and innovative processes need to be examined in the context of the work group, the organisation and national culture and sub-cultures in order to escape from traditional problems of over-generalisations, and apparent contradictions in empirical findings from differing contexts.

R.D. Pathak is Visiting Fellow, Manchester Business School & Professor & Chairman of Management Programmes, Institute of Management Studies, Devi Ahilya University, Indore. Tudoor Rickards is Director, Creativity Research Unit Manchester Business School, University of Manchester, Manchester. D.M. Pestonjee is L&T Professor of OB Indian Institute of Management, Ahmedabad-380 015.

There is no shortage of definitions for culture. An early, all encompassing view (encompassing 164 definitions) offered by Kroeber & Kluckhohn (1952) was culture as having to do with the way human societies organise social behaviour and knowledge. But culture as a useful concept for theory development in the social sciences remained elusive; it remained more a description of bundles of attributes than an integrated whole with predictive power (McGrath et al, 1992a).

What is Culture

As Payne (1992) very aptly pointed out, the meaning of culture varies according to the perception. However, he identified three important points about the concept of culture from Morgan's (1986) seminal work:

- It is only one way (image) of looking at the process of organizing.
- The central core of the concept involves ideology, beliefs and values.
- These ideologies, values and beliefs, and the patterns of behaviour that flow from them, are created and perpetuated through linguistic and other symbolic means embedded in social structures and systems.

Payne (1992) further pointed out that whilst culture is essentially a collective concept, it is absorbed by individuals with varying degrees of accuracy and intensity which have the effect of modifying culture itself. Kluckhohn and Strodbeck's (1961) approach to culture is also relevant from the point of view of understanding the link between creativity and culture. They thought of national culture as a fairly consistent set of value orientations developed in response to two universal facts: there are a limited number of common societal problems, there are a limited number of known responses.

A major advance (which has attracted the attention of many researchers along the lines suggested by Kluckhohn and Strodbeck was by Hofstede (1980) through empirical analysis of self-report inventories. Culture characteristics, he demonstrated were to be found in four dimensions, each of which had distinctive implications for behaviour. Like Kluckhohan and Strodbeck, Hofstede suggested that culture could be traced to responses to common human problems. The four dimensions which create his underlying framework are:

* *Power distance*: Management of inequality between people
* *Individualism*: The relationship between individuals and collectives
* *Uncertainty avoidance*: Stance toward the future
* *Masculinity*: Allocation of roles between the sexes.

Culture can be examined at various levels of any social system i.e. group, organisational and society. While, for a long time the focus of culture studies has been at the national or societal level (Hofstede, 1980) and at the corporate/organisational level (Deal & Kennedy, 1982; Schein, 1985); in recent years, Weiss and Delbecq (1988) have advanced the notion of regional cultures – just as a given corporation may contain many subcultures, several regional cultures may be present in a given nation.

What is Creativity?

Creativity is the ability to discover new relationships, to look at subjects from new perspectives, and to form new combinations from old concepts (Evans, 1991). Welsch (1980) on the basis of a survey of the literature commented that "creativity is the process of generating unique products by transformation of existing products. These products must be unique only to the creator, and must meet the criteria of purpose and value established by the creator". The context of this definition makes it clear that the primary focus of creativity is novelty and relevance to the creator, and that social acceptance may or may not follow. Rhodes (1961) proposed that creativity be viewed as a four dimensional phenomenon of 'person, product, process, and press (environment)'. Rickards (1991) predicated that a systems view will become a major issue for theorists concerned with creativity and innovation within a decade. Within a broad systems approach, he concluded that creativity and innovation can be treated as complex problem-solving behaviours, at individual and social levels. (cf. Osborn, 1963; Parnes, 1967; Van Gundy, 1981; Isaksen & Treffinger, 1985; Van Gundy, 1987).

Creativity is the ability to discover new relationships, to look at subjects from new perspectives, and to form new combinations form old concepts.

Creativity Innovation & Invention

Creativity is a personal problem-solving process of a non-routine kind whereas innovation is a social problem-solving process of a non-routine kind (Rickards, 1991). More recently researchers have also found it valuable to distinguish between invention, essentially discovery process, and innovation, a process whereby commercially valuable changes reach the market place. Bujis (1990) suggested that invention involves 'coming up with something new' and innovation is the successful introduction of that new idea. Rickards (1985) had suggested that innovation is a process through which new and valuable ideas are put into practice leading to system wide adjustments.

Woot (1971) brought out the relationship between vision, innovation, creative capacity and entrepreneurship by pointing out that "**initiative and creative capacity** are the kingpins of the act of **entrepreneurship.** The role of the enterprise is to devote itself to the difficulties of **economic creativity**, of change and **innovation,** making all the decisions necessary to stimulate their occurrence. The particular characteristics of this **creative** activity are the **vision** of possible points of initiative and **innovation**, the influence needed to start it and the acceptance of adequate responsibilities, and the effort necessary to surmount the difficulties and the risk of change. This **creative capacity** is the foundation of the act of **entrepreneurship** without which it would fail (emphasis added).

Earlier Greenfield & Strickon (1979) had pointed out that "no single dimension or aspect is emphasized as the essence of entrepreneurship. Instead, the approach is multidimensional in that entrepreneurship, which is seen as one aspect of continuous variation, innovation and selection, is part of the ongoing process of human life". Stewart (1991) also concluded that the entrepreneur displays an opportunistic creativity that makes it hard to pin her (entrepreneurship) down in a definitional framework.

Intrapreneurship which involves the ways and methods by which the organisation identifies new ideas, products, and philosophies.

The entrepreneurial capability within an established corporation has been called intrapreneurship which involves the ways and methods by which the organisation identifies new ideas, products, and philosophies (Pinchot, 1986). According to Rule & Irwin (1988), an organisation can develop a more intrapreneurial culture by establishing an intrapreneurship program in which senior managers focus on:

- Generating new ideas
- Supporting idea development
- Screening new ideas to allocate resources
- Encouraging flexibility
- Rewarding the contributors, and
- Providing leadership

The Research Gaps

Since 1980, many important studies on cultural differences have been published but one aspect of this cross-cultural research viz., the relationship between culture at a macro level (i.e. societal or national as well as at regional levels) and creativity, innovation and inventiveness in a society[1] has not attracted serious academic attention.

Findlay and Lumsden (1988) after analysing a number of studies (Lieberman, 1977; Walberg, Rasher and Parkerson, 1979; Amabile, 1983; Smith & Simon, 1984; Simonton, 1975 a, b, c, 1977, 1984) which were concerned with the influence of various social factors on creativity and innovation concluded that there have been few serious attempts to provide explicit models of the impact of social and cultural factors on the cognitive mechanisms of creative thought. Further, with some exceptions, there has been little concern about how social factors are themselves influenced by patterns of creativity and innovation. Raina (1992) concluded that research studies have not provided significant sociological insights as to how creativity fostered the cultural change process and in turn has been facilitated by such changes.

Brannen (1991) in a recent article pointed out that although literature on cultural change could contribute greatly to our understanding of how culture might play an important role in the successful implementation of technological innovations, none of the studies had directly investigated this issue. Earlier, Van Gundy (1987) after reviewing close to 100 books and articles on organisational creativity and innovation, concluded that the majority of empirical creativity research was limited to studies of intragroup creativity (e.g. the literature on brainstorming) and personality traits or characteristics of individuals. Similarly, Stein (1987) concluded that literature of creativity was concerned with the characteristics of the individual and not those of the working environment in which creativity manifested itself.

Earlier, Kuczynski (1982) had observed that most research was characterised by an individualistic attitude to creativity i.e. emphasis upon the psychological process of creativity and an analysis of the so-called creative personality while ignoring its historical, social and philosophical determinants. Sternberg (1988) maintained that a comprehensive theory of creativity would ultimately be as much a theory of environments as of the person.

Raina (1992) was, however, more forthright in his critique, and pointed out that workers in the field have lacked the courage and the vision to engage themselves in any serious study on how the concepts of creativity have changed over time and how various civilizations and philosophies have defined and approached creativity. Most Western research, according to him, was marked by a radical exclusion of the study of creativity in other cultures, especially the diverse and composite cultures in developing societies. For example, Rickards (1992) while reviewing a book which summarises fifty years of creativity research observed that while the author has tried hard to reveal the global nature of the movement today, the material inevitably showed its cultural origins and dominance through virtual absence of non-American materials and citations.

The trends in cross-cultural management papers published in 24 journals during the decade 1971 to 1980, also reveal that less than 5 per cent of organisational behaviour articles published in top American management journals focused on cross-cultural issues (Adler, 1983). MacKinnon (1987: p.128), had pointed out that "there is still need for plenty of research before we

1. For example, the subject index of Hofstede's recent book 'Cultures and Organisations' published in 1991 and incorporating the results of research into cross-cultural differences up to 1990, does not include the terms creativity, innovation, and inventiveness. Recently, Payne (1992) pointed to two important dimensions of culture missing from Hofstede's categories, namely, creating a rewarding environment; and innovation and progressiveness.

will have adequate or very complex understanding of the role of educational, social and political factors in facilitating or inhibiting creative potential." He suggested that the study of creativity will have to become cross-cultural to extend its theoretical scope, concluding with a very pertinent observation that the definition and testing of creativity may be as much based on the same kind of culture-bound presuppositions and biases as are the definitions and testing of intelligence. If this is a valid critique, then research in creativity, although rather intensively pursued during the last quarter century might well benefit from considerable reformulations and extensions.

The purpose of studying creativity in different cultures, according to Gardner (1988), is to come up with the most plausible account of the impact of various factors and most especially to achieve some understanding of how these various cognitive, personality and social factors interacted at specific points in an individual's life. Only when numerous case studies have been carried out does it become plausible to propose models of the creative manager, the creative natural scientist, or (should it prove possible) the creative person in general.

Torrence (1984) after compiling a bibliography with support from workers in over twenty different countries concluded that almost every country in the world was concerned about stimulating and developing the creativity of its gifted, and talented children, and that each country had something important and unique to offer to the rest of the world. Recently voices from other cultures have been heard. For example, Goonatilake (1987), pointed out that non-western modes of mental processing had increased the arsenal of initiatives available and opened several windows for a large number of inventions. Maruyama (1991) had contrasted the notion of Japanese creative interactivity with the American culture of individual initiative.

The Emerging Scenario

One of the first investigators to study the relationship of culture and creativity in a scientific manner was the anthropologist G. Kroeber (1944) who noted that not only have clusters of geniuses appeared irregularly over time, but when they did, it was almost always in one particular field of endeavour. He also suggested that cultural improvements tended to start in one small area and then swept through the culture. Thus he concluded that cultural conditions are crucial factors for creativity. Kroeber's important work was followed up by Sorokin (1951) but Gray did further outstanding work (1958, 1961, 1966) and compiled a curve of creativity for Western Civilization which in his opinion agreed with Kroeber's main findings i.e. "genius emerges in clusters, that such blossomings occur several times during a civilisation, that such peaks are rare and do not characterize most of a civilization's course, and that these peaks are of unequal duration" (1966). Gray also maintained that Kroeber did the spade work without seeking explanations. In order to find these explanations, Gray (1966) advanced his 'epicyclical theory' in which history is seen as a series of concurrent cycles: an overall economic cycle, a social cycle, and a political cycle[2]. Confirming his theory from the study of Western Civilisation, Gray demonstrated that favourable economic, social and political factors promote creativity. However, as Arieti (1976) commented the works of Kroeber and Gray despite opening new paths of enquiry had inherent limitations i.e. of considering people as inevitable mechanisms or measures of cultural expression. Although these workers seemed to consider great persons as the makers of clusters of high civilization, they saw these persons as having been shaped exclusively by economic, social and political factors. And yet, even when the three cycles – economic, political and social coincided, few rose to the highest ranks of creative achievement.

Earlier White (1949) had placed a similar emphasis on culture, reducing the role of the individual almost to that of a passive representative of what would inevitably have been brought about. White had drawn two significant conclusions: No invention or discovery could take place until the accumulation of culture had provided the elements – the materials and ideas – necessary for the synthesis, and when the requisite materials had been made available by the process of cultural growth or diffusion and given normal conditions of cultural interaction, the invention or discovery was bound to take place. While White did recognise that cultural patterns received their fulfilment in the lives and works of a few persons, he did not explain the nature of this synthesis. It was Barnett (1953) who cogently showed that many socio-cultural variables are operative in the creative and innovative processes. These included: the accumulation and concentration of ideas and tools and collaboration of effort, governmental funding, the relationship between science and technology, the experimental persistence of effort (as in science laboratories), the expectation of change, the competition of rivals, the deprivation of essentials coupled with the imminence of repercussions from

2. Gray's description of a cycle includes subcycles – e.g. a political cycle includes four subordinate political cycles. Each of these three cycles goes through four different stages: the formative, the developed, the fluorescent, and the degenerate. Further, stages of the economic, social and political cycles recur at different speeds.

"dominant" innovations, the sheer existence of wants and their correlates, the pressure of religion and religiosity, the advocacy of change and the power or prestige of the advocates, and the configurational character of the socio-cultural system, which tends to move in a fluctuating line.

Arieti proposed two contrasting viewpoints on the relationship between creativity and culture. At the start of his major book on creativity he stated (Arieti, 1976: 5) "any creative product has to be considered from two points of view: that is, as a unity, in itself; and as part of a culture either a specific culture or the general cultural patrimony of mankind". Later in the same text, after making a critical review of the major theories of creativity, he observed: "But even the psychostructural and the general system theories leave many aspects of the problem untouched; namely, those related to the specific characteristics of the socio-cultural climate that favours creativity and the specific modalities of the cultivation of creativity" (Arieti, 1976: 34). His two main conclusions are– Some societies and cultures have enhanced and some others inhibited creativity; although the creative process is an intrapsychic phenomenon, it is part of an open system. The magic synthesis (Creativity) does not occur without input from the external world, and it is greatly facilitated by a proper climate or milieu (Arieti, 1976: 312). Arieti concluded from his review of literature that some cultures have promoted creativity far more than others. He labelled these cultures and/or societies which facilitate creativity as 'creativogenic'.

Creativity does not occur without input from the external world, it is greatly facilitated by a proper climate or milieu.

Findlay & Lumsden (1988), however, suggested a more viable research proposition and pointed out that the degree to which the ability to create and innovate has evolved depended on the complexity of the problem domain faced by the organism in its interaction with the environment. Complexity, in this instance, measured the number and predictability of problems confronted over time and the degree to which potential solutions could be applied across broad ranges of problems. This perspective also suggested that differences in the set of problems faced by different organisms may well entail different kinds of creativity for problem solution (A similar point was made by Jerison, (1985), regarding the evolution of intelligence).

Commenting on these propositions, Amabile & Cheek (1988) suggested that it might be useful to consider the possibility that the process of innovation, at the level of organisations or cultures, was analogous to the process of creativity, at the level of individuals. Their three conclusions most significant for the issue under consideration here were: a number of seemingly minor factors in the immediate social environment can lead to decrease in artistic, verbal and problem- solving creativity. Among these factors are expected external evaluation, surveillance, competition, and restricted choice in task approach or materials. These factors, they maintained, need not operate at the level of general culture but may vary from one immediate social situation to the next, and from one moment to the next. These extrinsic constraints may influence creativity by undermining intrinsic task motivation and increasing extrinsic motivation. It is possible to produce temporary modifications in both motivational orientation (intrinsic/extrinsic) and level of creativity by leading individuals to focus cognitively on either the intrinsically interesting or the extrinsically rewarding aspects of their work.[3]

Richardson (1988) collected a series of papers together into an interesting collection of reports from various (mainly western) cultures. His own contribution celebrated 'the historic boundlessness of the creative spirit', and drew attention to the culture milieu from which sprung a florescence of creativity – the Greek Nation States, the Renaissance, 19th Century Vienna etc.

Magyari-Beck (1988) advocated a new science for providing a proper framework for the examination of cultural development and creativity, as well as related phenomena of 'creatology'. He described creatology as an interdisciplinary approach drawing on psychological, sociological, cultural, anthropological and philosophical disciplines. He argued that, as no one is free from cultural constraints, the possibilities of a given culture or civilization limits the creative products or innovations which arise within it. Cultures and civilizations, according to him, differed from each other in their capacities in the same way as individuals. The culture which was able to answer the general challenges of a world period could be called the leading culture of that period. Other cultures (satellite cultures) were (at least temporarily) following the leader. In a more recent essay, Magyari Beck (1992) considered economy as an important section of any culture and pointed to some important concepts of a future economic treatment based on creativity, and incorporating concepts like bounded

3. These conclusions have emerged from the research of Amabile 1985, Amabile & Gitomer, 1984; Amabile, Hennessey & Grossman, 1986.

rationality, satisfactory solutions, badly-structured problems etc.[4]

Csikszentmihalyii (1988) addressed the question of society, culture, and personal interaction within a systems model of creativity. According to this model, the creative individual took the information provided by the culture and transformed it. If the changes were deemed valuable by society, they would be included in the domain in which the individual worked, thus providing a new starting point for another generation. The actions of all three systems i.e. person, domain (symbol system), and field (social organisation of domain) – were necessary for a creative performance to occur. He further emphasized that each of the three main systems – person, field, and domain – is affected one another. Hence, his model balanced the person centered perspective on creativity[5] by showing that the person is part of a system of mutual influences and information.

Tijmstra and Casler (1992) of EAP Paris, argued that an ability to read and understand cultural orientation across a broad spectrum of people and businesses in Europe was the hallmark of a European manager, who needed to be creative, to recognise and adjust to diverse patterns of thought, judgement, perception and behaviour and to be able to work with many different people, members of different 'national' and organisational cultures. Randlesome (1992) in an interesting article on East German managers reported the research results of a study carried out by Mulder & partner, management consultants, to ascertain whether, despite all the fragmentary evidence to date, there was an untapped pool of top management talent in the east of the reunited country. Out of 250 East German managers, only seven qualified for becoming management board members in West German companies. The other 243 remained unacceptable in the west on account of their lack of market knowledge, confidence, creativity, initiative and mental flexibility. Similarly, Woot (1971) while writing on the goals of economic organisations had concluded that the firm that wanted to do business on a European scale, had to exhibit the three dimensions of creativity, participation and concentration. Chung (1991) discussed intercultural problems in the context of globalisation and suggested creating 'cross-cultural synergy' to enrich innovative potential. Patterson (1990) had cautioned that all social systems must find ways to overcome the NIH (not invented here) syndrome. Examples of approaches to innovation that can create this cross- cultural synergy are: Japanese experience in production coupled with American know-how in marketing; or European analytical ability coupled with Asian depth and wholeness of vision to improve strategic planning; or Japanese service and friendliness coupled with European rationality.

A recent empirical study examining the influence of culture on inventiveness is by Shane (1992). His study examined the percapita number of invention patents granted to nationals of 33 countries in 1967, 1971, 1976, and 1980 and compared the figures with an index of value of power distance (social hierarchy) and individualism, compiled from a survey of 88,000 employees at IBM undertaken by Hofstede in the late 1960s and early 1970s. The results showed that individualistic and non-hierarchical societies produce more per capita patents than other societies. The conclusions of this study were based on correlations between rates of invention and national values i.e. it cannot say how much of invention can be explained by values as opposed to economic factors. Further, the study failed to examine culture and inventiveness dynamically by looking at the relationship between changes in values and changes in rates of inventiveness. Also the relationship between values and innovation remained unstudied. Despite these limitations, this research by Shane (1992) was important in so far as it accepted and demonstrated that culture played a significant part in the invention process. Earlier, Findlay & Lumsden (1988), had reported that in the societies they had studied, innovation was inversely correlated with levels of cultural institutionalisation.

Individualistic and non-hierarchical societies produce more per capita patents than other societies.

In another recent article, Cox and Blake (1991) noted that if people of differing gender, nationality, and racioethnic origins hold different attitudes and perception on issues, then cultural diversity should increase creativity and innovation at a team level. Research by Nemeth (1986) suggested that persistent exposure to minority viewpoints stimulated creative thought processes. Cox (1991), concluded that the most direct and effective way to promote the influence of minority-

4. These concepts were taken from the writings of H. Simon. However, other economists (Schumpeter and Keynes, for example) have also outlined notions and systems of notions related to creativity.

5. The Ptolemaic view of creativity, in which the person is at the center of everything, resulted in an elitist approach to creativity with the assumption that creativity is what some people have inherently got. Thus it is axiomatic that training cannot enhance what is not there in the first place. The systems approach, on the other hand, holds a universalist approach to creativity with the assumption that the trainer or facilitator can set a climate for enhancing everyone's creativity within a given context.

culture norms on organisational decision making is to achieve cultural diversity at all levels of organisation.

Brannen (1991) in a case study of the Japanese TPC Company, where Japanese managers had managed an American workforce towards increased productivity, provided an example of how cultural issues may be involved in implementing a technological innovation. In this case, the Japanese management's possibly tacit assumptions about culture allowed identification of barriers that otherwise might have stood in the way of success. Child's (1990) review of 30 joint ventures within the republic of China revealed distinctive differences in the approach of parent companies from each country. While US-owned ventures were found to attempt most strongly to introduce the procedures and policies obtaining within the parent company (resulting in substantial difficulties within a number of ventures, particularly in the fields of informal communication, training and decision making); Japanese companies were found to discard many practices characteristic of home-based Japanese organisations, and to have adopted a much more centralised and autocratic system of decision making. The European-owned joint ventures were reported to be intermediate between the Japanese and American-owned ventures, in so far as they frequently attempted to introduce Western procedures, but were more likely to compromise with Chinese expectations in situations where their attempts went astray.[6]

China-born and, U.S. educated Steve Hui, President and Chief Executive Officer (CEO) of Everex Systems Inc, was reported (Xiona, 1990) as saying that he tried to blend the best virtues of three cultures at his company – the best aspects of the Chinese family business, Japanese organisation and discipline, and American flexibility and creativity.

Dewhirst (1989), mentioned three aspects of managerial behaviour in Australia and the US which appeared to be significantly influenced by cultural differences:

- Entrepreneurship and innovation
- Participative management
- Managerial patience and persistence.

In a recent article, Franke, Hofstede & Bond (1991) pointed out that cultural values, measured from western and eastern perspectives, are factors in economic performance that explained over half the cross-national variance in economic growth over 2 periods for samples of 18 and 20 nations. They argued that as business becomes more international, profiles of national culture could become tools for strategic choices in corporate boardrooms. For example, in a study of the effects of a manager's home culture on the marketing decisions of Chinese and Western (Canadian) executives (N = 145), the findings confirmed that home culture has predictable, significant effects (Tse et al, 1988). The findings suggested that culture makes a difference in problem identification and in the objectives motivating choice. Using a multinational logit model and controlling for other effects, Kogut and Singh (1988) provided the empirical support for the hypothesis that the choice of entry mode is influenced by national culture. This study suggested that when economic choice is compared across countries, cultural characteristics are likely to have profound implications. The authors concluded that no matter how superior the current multinational corporation may be in replacing the skills of traders by the international extension of organisational boundaries, the management of these firms is likely to be influenced by the dominant country culture. Earlier, Jenner (1982) had provided empirical evidence of how US and Australian managers could be expected to devise distinctively different business policies.

In his recent work, Weiss (1988) focussed on the effects of regional cultural characteristics on industrial, entrepreneurial, and general management practices in eight countries. His analysis suggested that not all societies fostered entrepreneurial activity with equal effectiveness (Shapero & Sokol, 1982; Birch, 1987; Birley, 1987). Earlier, Shapero and Sokol (1982) had also pointed out that business formation rates varied from society to society possibly because different cultures carried different beliefs about the desirability and feasibility of beginning a new enterprise. Other recent studies have also lent support to this view. Huisman (1985) conducted an extensive survey of entrepreneurial activity across cultures, and concluded that values influenced entrepreneurial behaviour. Wittman (1989), Scully (1988), and Klundert (1986) each developed economic models that related economic growth to cultural artefacts, such as democratic and open political structures, or with regional dynamism versus passivity. Cole (1985) demonstrated the advantages of using macro-political processes to explain microprocesses in organisations. For instance approach to organisational change, according to him, helps us see the forest for the trees in a way that traditional research approaches have often failed to do. For business and wealth creation, McGrath et al (1992 a,b) suggested that culture does make a difference. It may be mentioned here that researchers seeking to explain the genesis of

6. Child (1990) also mentioned studies where Japanese willingness to adapt to whatever they judged to work best in local circumstances has been noted e.g. Fruin (1983) for the USA, White & Trevor (1983) in Britain, and Yoshino (1976) in South-East Asia.

entrepreneurship have broadened the scope of enquiry from one that was psychologically centered to one that incorporated a view of cultural beliefs and values (Huisman, 1985; Peterson, 1988; El-Namaki, 1988; Alange and Scheinberg, 1988; McGrath et al., 1992 a, b).

Implications for Future Creativity Research

Cultures at micro (organisational) and macro (societal, national, regional) levels provide the context in which creative problem solving occurs. Understanding of how cultures differ would help avoid designs of organisational level interventions for creative problem solving which are counter-cultural. Through education and experience, organisational members inherit a cultural paradigm which inculcates in them assumptions and convictions (values) about appropriate thoughts and actions in given situations. A contextual approach to creativity and culture transcends universalist modes and overgeneralisations, and recognises that creative people are not all alike (e.g. McWhinney, 1992).

Understanding of how cultures differ would help avoid designs of organisational level interventions for creative problem solving which are counter-cultural.

A new and significant focus for research effort could lead to the design of suitable organisational-level interventions for facilitating problem-solving through a better understanding of cultural differences.

An extensive review of the cross-cultural training literature (Black & Mendenhall, 1991) suggests that HR managers are mistaken in their assumption that good management is good management worldwide. Research of Jaeger (1986) suggested that while practitioners of Organisation Development should take great care in the analysis and selection of intervention techniques, they must be bold and innovative in the search for new intervention technologies appropriate to the culture in which they will be operating. Perhaps, a longitudinal-processual approach to the study of organisations, as suggested by Pettigrew (1979), could help in identifying culturally appropriate interventions for facilitating problem-solving. At the Creativity Research Unit of Manchester Business School, eastern and western perspectives on creativity are being examined and experiments designed with different problem solving processes and techniques and with culturally varied groups so as to arrive at a set of interventions for facilitating creative problem solving in eastern and western contexts. Workers at the Denver Center for Creative Studies have also reported interest in comparing and contrasting theories of creativity in eastern and western traditions (Wonder & Blake, 1992). Such studies may be the harbingers of a refocusing of research attention for creativity and cultural investigations.

Acknowledgement

Authors acknowledge the valuable comments and suggestions on the earlier drafts of this paper from Professor(s) Roy Payne (formerly Dean of MBS), Richard Klimoski, Susan Jackson and M. Csikszentimihalyi. Support from Professor R. Whitely, Chairman OB Area; Professor T. Cockerill, Director; Mr. A. Pearson, Dean of the Faculty; Mr. A. Foster, Librarian and Dr. M. Hamper, Bursar & Development Manager of the Manchester Business School is also duly acknowledged as also the excellent secretarial support from Debie Toth and Joanne Simpson.

References

Adler N.J. (1983), "Cross-cultural management research: the Ostrich and the trend". Academy of Management Review, 8, 2.

Alange S. & Scheinberg, S. (1988), "Swedish entrepreneurship in a cross-cultural perspective". Paper presented at the eighth annual babson college entrepreneurship research conference. Wellesley, MA.

Amabile T.M. (1983), "The Social Psychology of Creativity". New York: Springer-Verlag.

Amabile T.M. (1985), "Motivation ad creativity: Effects of motivational orientation on creative writers". Journal of Personality and Social Psychology. 48.

Amabile T.M. & Gitomer J. (1984), "Children's artistic creativity: Effects of choice in task materials". Personality and Social Psychology Bulletin, 10.

Amabile T.M. Hennessey, B.A. & Grossman, B.S. (1986), "Social influences on creativity: The effects of contracted–for reward". Journal of Personal and Social Psychology, 50.

Amabile T.M. & Cheek J.M. (1988), "Microscopic and macroscopic creativity". In Finlay, C.S. and Lumsden, C. (Eds.) The Creative Mind. London: Academic Press.

Arieti S. (1976), "Creativity: The Magic Synthesis". New York: Basic Books.

Barnett H.G. (1953), "Innovation: The Basis of cultural change" New York: McGraw Hill.

Birch D.L. (1987), "Yankee Doodle Dandy". Inc., 8, (July).

Birley S. (1987), "New ventures and employment growth". Journal of Business Venturing, 2.

Black J.S. & Mendenhall M. (1991), "A practical but theory- based framework for selecting cross-cultural training methods". Human Resource Management, 28, 4.

Brannen M.Y. (1991), "Culture as the critical factor in implementing innovation". Business Horizons, Nov-Dec.

Bujis J. (1990), "Creativity and innovation in Europe: A project and its implications. Working paper at the international research conference on creativity, Aug. 10-14, Buffalo, U.S.A

Chung Z.T. (1991), "Culture: A key to management communication between the asian-pacific area and Europe". European Management Journal, 9.

Child J. (1990), "The Management of Equity Joint Ventures in China". Beijing: China – EC Management Institute.

Cole R.E. (1985), "The Macro politics of organisational change: A comparative analysis of the spread of small group activities." Administrative Science Quarterly, 30.

Cox T.J. (1991), "The multicultural organisation". Academy of Management Executive, 5, 2.

Cox T.J. & Blake S. (1991), "Managing cultural diversity: Implications for Organisational competitiveness". Academy of Management Executive 5, 3.

Csikszentmihalyi M. (1988), "Society, culture and person: A systems view of creativity". In Sternberg, R.J. (Ed.), The Nature of Creativity. Cambridge, New York: Cambridge University Press.

Deal T. & Kennedy A. (1982), "Corporate Cultures". Reading, Mass: Addison-Wesley.

Dewhirst H.D. (1989), "Management in Australia: No worries". Survey of Business, 25, 2, 3-6.

El-Namaki M.S.S. (1988), "Encouraging entrepreneurs in developing countries". Long Range Planning (UK), 21, 4, 98-106.

Evans J.R. (1991), "Creativity in MS/OR: Creative thinking, a basis for MS/OR problem solving". Interfaces, 21, 5, 12-15.

Findlay C.S. & Lumsden C.J. (1988), "The Creative Mind". London: Academic Press.

Franke R.H., Hofstede, G & Bond, M.H. (1991), "Cultural of economic performance: A research note". Strategic Management Journal, 12.

Fruin K. (1983), "Company, Clan ad Community". Cambridge, MA.: Harvard University Press.

Gardner H. (1988), "Creative lives and creative works: A synthetic scientific approach". In Sternberg, R.J. (Ed.), The Nature of Creativity. New York: Cambridge University Press.

Goonatilake S. (1987), "Inventions and the developing nations". Impact of Science on Society.

Gray C.E. (1958), "The epicyclical evolution of graco-roman civilization". American Anthropologist, 60, 13-31.

Gray C.E. (1961), 'An epicyclical model for western civilization'. American Anthropologist, 63.

Gray C.E. (1966), "A measurement of creativity in western civilization". American Anthropologist, 68.

Greenfield S.M. & Strickon A. (1979), "Entrepreneurship and social change: Towards a populational, decision-making approach". In Greenfield, S.M., Strickon, A. and Aubey, R.T. (Eds.), Entrepreneurs in Cultural Context. Albuguerque: University of New Mexico Press.

Hofstede G. (1980), "Culture's consequences: international differences in work related values. Beverly Hills, CA: Sage Publications.

Hofstede G. (1991), "Cultures and Organisations: Software of the Mind. Berkshire, UK: McGraw Hill.

Huisman D. (1985), "Entrepreneurship: Economic and cultural influences on the entrepreneurial climate". European Research, (Netherlands), 13 (4).

Isaksen S.G. & Treffinger D.J. (1985), Creative Problem Solving: The Basic Course. Buffalo, N.Y.: Bearly.

Jaeger M.A. (1986), "Organisation development and national culture: Where is the fit?". Academy of Management Review 11, 1.

Jenner S.R. (1982), "Analysing cultural stereotypes in multinational business: United States and Australia". Journal of Management Studies, 19, 3.

Jerison J.J. (1985), "Philosophical Translations". London: Royal Society, B308.

Kluckhohn F. & Strodbeck F.L. (1961), "Variations in Value Orientations". Evanston, IL: Row Peterson.

Klundert T.V. (1986), "Economic resilience: A two country analysis", Economist (Netherlands), 134, 1.

Kogut B. & Singh H. (1988), "The effect of national culture on the choice of entry mode". Journal of International Business Studies, 19, 3.

Kroeber A.L. (1944), Configurations of Cultural Growth. Berkeley: University of California Press.

Kroeber A. & Kluckhohn. F. (1952), "Culture: A Critical Review of Concepts and Definitions". Cambridge, MA: Peabody Museum.

Kuczynski J.J. (1982), "Creativity as a Practical Philosophy. Paris: Unesco.

Lieberman J.N. (1977), "Playfulness: Its Relationship to Imagination and Creativity". New York: Academic Press.

MacKinnon D.W. (1987), "Some critical issues for future research in creativity". In Isaksen, S.G. (Ed.), Frontiers of Creativity Research: Beyond the Basics. Buffalo, NY: Bearly.

Magyari-Beck I. (1988), "New Concepts about Personal Creativity". In Rickards, T. and Moger, S (Eds.), Creativity and Innovation Year Book. Manchester: Manchester Business School.

Magyari-Beck I. (1992), "Creativity and economic psychology". Creativity and Innovation Management, 1, 3.

Maruyama, M. (1991), "Japanese reaction to management problems in Europe: Cultural aspects". European Management Journal, 9, 2.

McGrath R.G., McMillan I.C. & Scheinberg S. (1992a), "Elitists, risk-takers, and rugged individualists? an exploratory analysis of cultural differences between entrepreneurs and non-entrepreneurs". Journal of Business Venturing, 7.

McGrath R.G., MacMillan I.C., Yang E.A. & Tsai W. (1992b), "Does Culture endure, or is it malleable? Issues for entrepreneurial economic development". Journal of Business Venturing, 7, 441-58.

McWhinney W. (1992), 'All Creative People are not alike". In Novelli, L. Jr. (Ed.), Collected Research Papers: 1992 International Creativity and Innovation Networking Conference. Greensboro, N.C.: Center for Creative Leadership.

Morgan G. (1986), "Images of Organisation". Beverley Hills, CA.: Sage.

Nemeth C.J. (1986), "Differential contributions of majority and minority influence". Psychological Review, 93.

Osborn A.F. (1963), "Applied Imagination". New York: Scribner's.

Parnes S.J. (1967), "Creative Behaviour Guidebook". New York: Scribner's.

Patterson M.L. (1990), "Accelerating innovation: A dip into the meme pool". National productivity review, 9.

Payne R. (1992), "Some thoughts on culture and the role of the personnel function". Academy of Management Conference, Bradford, Yorkshire.

Peterson S. (1988), "Understanding and encouraging entrepreneurship internationally". Journal of Small Business Management, 26, 2.

Pettigrew A.M. (1979), "On studying organisational cultures". Administrative Science Quarterly, 24, 570-81.

Pinchot G. (1986), "Intrapreneuring: Why you don't have to leave the Corporation to Become an Entrepreneur". New York: Harper & Row.

Raina M.K. (1992), "Ethnocentric confines in creativity research. In Isaksen S.G., Murdock, M.C., Firestein, R.L. and Treffinger, D.J. (Eds.), Understanding and Recognising Creativity: The Emergence of a Discipline. New York: Bearly.

Randlesome C. (1992), "East german managers: From Karl Marx to Adam Smith'. European Management Journal.

Rhodes M. (1961), "An analysis of Creativity". Phi Delta Kappa, 42.

Richardson J. (1988), "Windows on Creativity and Invention". Maryland: Lomand.

Rickards T. (1985), "Stimulating Innovation". London: Frances Pinter.

Rickards T. (1990), "Creativity and Problem-Solving at Work". Aldershot: Gower.

Rickards T. (1991), "Innovation: Woods, trees and pathways". R&D Management, 21, 2.

Rickards T. (1992), "Book of the quarter". Creativity and Innovation Management.

Rule E.G. & Irwin D.W. (1988), "Fostering entrepreneurship: The new competitive edge". Journal of Business Strategy. 9, 3.

Schein E.H. (1985), "Organisational Culture and Leadership: A Dynamic View". San Francisco: Jossey-Bass.

Scully G.W. (1988), "The institutional framework and economic development". Journal of Political Economy, 96.

Shane S.A. (1992), "Why do some societies invent more than others?'. Journal of Business Venturing, 7.

Shapero A. & Sokol. L. (1982), "The social dimensions of entrepreneurship". In Kent, C.A., Sexton, D.L. and Vespers, J.H. (Eds.), (Encyclopedia of Entrepreneurship. Englewood Cliffs, NJ: Prentice-Hall.

Simonton D.K. (1975a), "Sociocultural context of individual creativity; A transhistorical time-series analysis". Journal of Personality & Social Psychology.

Simonton D.K. (1975b), "Interdisciplinary creativity over historical time: A correlational analysis of generational fluctuations". Social Behaviour and Personality, 3.

Simonton D.K. (1975C), "Age and literary creativity: A cross-cultural and transhistorical survey". Journal of Cross- cultural Psychology, 6.

Simonton D.K. (1977), "Creative productivity, age and stress: A biographical time-series analysis of 10 classical composers". Journal of personality and Social Psychology, 35.

Simonton D.K. (1984), "Genius, Creativity and Leadership: Historiometric Inquiries". Cambridge, Massachusetts: Harvard University Press.

Smith P.K. & Simon T. (1984), "Play in Animals and Humans". Oxford: Blackwell.

Sorokin P.A. (1951), "Social Philosophies of an Age of Crisis. Boston: Beacon Press".

Stein M.I. (1987), "Creativity research at the crossroads: A 1985 perspective". In Isaksen, S.G. (Ed.), Frontiers of Creativity Research: Beyond the Basics. New York: Bearly.

Sternberg R.J. (Ed.), (1988), "The Nature of Creativity: Contemporary Psychological Perspectives". New York: Cambridge University Press.

Stewart A. (1991), "A Prospectus on the anthropology of entrepreneurship". Entrepreneuship Theory and Practice, 16, 2.

Tijmstra S. & Casler K. (1992). "Management learning for Europe". European Management Journal, 10, 1.

Torrence E.P. (1984), "International contributions to the study of creativity". In Crabbe, A.B., et al. (Eds.), New Directions in Creativity Research". Ventura, CA: Ventura country superintendent of schools office.

Tse D.K., Lee K., Vertinsky I. & Wehrung, D.A. (1988), "Does culture matter? A cross-cultural study of executives' choice, decisiveness, and risk adjustment in international marketing". Journal of Marketing, 52.

Van Gundy A.B. (1981), "Techniques of Structured Problem Solving". New York: Van Nostrand Reinhold.

Van Gundy A.V. (1987), "Organisational creativity and innovation". In Isaksen, S.G. (Ed.), Frontiers of Creativity Research: Beyond the Basics". Buffalo: Bearly.

Walberg H.J., Rasher S.P. & Parkerson J. (1979), "Childhood and Eminence", Journal of Creative Behaviour, 13.

Weiss J.W. & Delbecq A (1988), "Regional cultures and high- technology management: route 128 and silicon valley". In Weiss, J.W. (Ed.), Regional Cultures, Managerial Behaviour and Entrepreneurship, New York: Quorum Books, 9-21.

Weiss J.W. (1988), "Regional Cultures, Managerial Behaviour, and Entrepreneurship". New York: Quorum Books.

Welsch P.K. (1980), "The Nurturance of Creative Behaviour in Educational Environments: A Comprehensive Curriculum Approach". Unpublished doctoral dissertation, University of Michigan.

White L.A. (1949), "The Science of Culture". New York: Farrar, Straus.

White, M. & Trevor, M. (1983), "Under Japanese Management: The Experience of British Workers". London: Heinemann.

Wittman D. (1939), "Why democracies produce efficient results". Journal of Political Economy, 97.

Woot de P. (1971), "The goals of economic organisations". International Studies of Management and Organisation, 1.

Wonder J. & Blake J. (1992), "Creativity East and West: intuition is Logic?". In Novelli, L. (Ed.), Collected Research Papers: 1992. International Creativity and Innovation Conference. Greensboro, N.C.: Center for Creative Leadership.

Xiong X. (1990), "Asian-American entrepreneurs enrich silicon valley tradition". Electronic Business, 16, 21.

Yoshino M.Y. (1976), "Japan's Multinational Enterprises". Cambridge, MA: Harvard University Press.

□

Feature

Organisational Structure & Effectiveness: A Case Study

D.K. Srivastava & Rehana Ghadially

In the present study, a multivariate model of organisational effectiveness was examined taking organisational structure, communication process and locus of control of executives as antecedent variables. The study tested some aspects of contingency theory of organisational performance in the Indian context. Two criteria, namely, organisational adaptability and organisational performance were taken to measure effectiveness of organisations. The results support the relationship between organisational structure and organisational effectiveness according to contingency theory in large organisations only.

D.K. Srivastava is Assistant Professor, O.B. Area, National Institute of Industrial Engineering, Mumbai-400 087. Rehana Ghadially is Professor, H.S.S. Department, Indian Institute of Technology, Mumbai-400 076.

Organisational theorists have long been concerned with the assessment of the performance of organisations. Organisational effectiveness is a hypothetical construct for assessing the overall functioning of the organisation including its goal, survival health and development. Various criteria of effectiveness have been proposed – firstly, at the organisational level like achievement of goals, viability as a system, satisfaction of stockholders and contribution to socio-economic development of the society. Secondly, the criteria at the individual level include absenteeism, employee turnover, motivation, psychological well-being, etc. With so many criteria, it is unlikely that organisational effectiveness could be reduced to a single measure of indicator (Khandwalla, 1985). Steers (1977) suggested that multivariate measures or techniques have distinct advantage over univariate measures or techniques in that they generally represent attempts to study in a more comprehensive fashion the major sets of variables involved in the effectiveness construct and suggest how these variables fit together.

Organisational effectiveness is a hypothetical construct for assessing the overall functioning of the organisation including its goal, survival health and development.

Organisational effectiveness is generally regarded as a dependant variable, that is as an outcome of organisation's contextual, structural, strategic and process variables. A major gap in research firstly, is how the configuration of context, management styles, goals, structure, organisational culture and processes affect different criteria of effectiveness (Khandwalla, 1985). Secondly, the models that predict one indicator of effectiveness such as profitability may not predict another

criterion such as quality of working life and occasionally there may be conflicting prescriptions (Dubin, 1976). Any criterion of effectiveness like satisfaction, profit, etc. has multiple determinants. Hence, it is desirable to assess the relationship between multiple determinants and multiple criteria of effectiveness simultaneously. Organisational effectiveness is influenced by a large number of micro and macro variables. Some of the macro variables include contextual, structural, strategic and process variables.

A major gap in research firstly, is how the configuration of context, management styles, goals, structure, organisational culture and processes affect different criteria of effectiveness

Review of Literature

Organisational contextual variables include the general culture in which an organisation operates, norms of a particular industry, legal-political environment of the organisation, the type of organisation, its ownership, etc. They are largely exogenous to the organisation, that is they are beyond the control of the organisation and operate as durable constraints to which the organisation needs to adjust.

Strategic variables are those endogenous to the organisation that have an extensive and long standing impact on the organisation. They include the organisation's goals, its growth, competitive turnaround strategies and the style of its top management, etc. These strategic variables tend to influence the structure, function and performance of the organisation.

Organisational structure consists of features that characterise a bureaucratic form of organisation, such as formal communication, hierarchy of authority, division of labour, rules, and specialization of function (Weber, 1974), alternative models of departmentalization, routines and performance programs and durable and formal mechanisms for reducing decision-making uncertainty, for facilitating the continuation of diverse activities in the organisation and for integrating and coordinating these diverse activities (Khandwalla, 1977).

A wide variety of organisational processes may be important determinants of organisational effectiveness. An organisational process is a sequence of steps by which some initial input or starting conditions are converted into some terminal output or conditions. These include communication, leadership, conflict resolution, organisational change, etc. Some others are the socialization processes by which members acquire the norms and values of the organisation (Feldman, 1976).

Organisations are composed of individuals. Hence several aspects of individual differences and individual behaviour are important for the understanding of the organisational functioning. Therefore, personality variables have been investigated which include need for achievement, introversion-extroversion attitudes, authoritarianism and locus of control etc. These variables affect the motivation, job involvement and job performance of the employees which determine the performance of the organisation. Among all these variables, only organisational structure has received the attention of researchers. The central issue has been how to design an organisation so that it can achieve maximum effectiveness.

The contingency theory provides a framework to analyse the design of organisations. There is evidence to suggest that organic structure permits rapid organisational response to changing external forces in an unpredictable environment while mechanistic structures are better suited to predictable environment where rapid organisational responses are not typically required (Burns & Stalker, 1961; Lawrence & Lorsch, 1967). As such, one would expect that organic structure will be effective for firms operating in hostile environment, whereas mechanistic structure will be relatively more effective for firms in benign environment. This expectation is empirically supported (Khandwalla, 1977). The study of twenty British firms by Burns & Stalker (1961) identified environment as an important factor influencing performance. Some studies tested the relationship between organisational structure, environment and performance (Negandhi & Reiman, 1973; Baseman & Jones, 1974). In these studies, environment was operationalised in terms of market competition while structure was measured by the degree of decentralization. Effectiveness was measured in terms of the financial performance of the organisation. Negandhi & Reiman (1973) found that

Organic structure permits rapid organisational response to changing external forces in an unpredictable environment while mechanistic structures are better suited to predictable environment.

decentralization was related to behavioral as well as objective measures of performance under competitive and non-competitive market conditions. Baseman & Jones (1974) found similar results in their study of twenty Mexican manufacturing firms but only with respect to behavioral measures of effectiveness. These studies indicate the significance of external environment for organisational design. Two important dimensions of the environment relevant for organisational structure are variability and complexity (Child, 1972, 1975). Variability refers to the degree of presence of changes in the environment which are difficult to predict, involve important departures from previous conditions and are likely to generate considerable uncertainty. Complexity refers to the degree of diversification and differentiation in the external environment in which the organisation operates. Both these dimensions are particularly significant in developing countries in view of the fast socio-economic changes in the environment of such societies. In India, the external environment of the organisations is uncertain and complex because it has a mixed economy and government regulations and intervention change rapidly. Thus the contingency theory recognizes the complexity of situation and accepts that issues in different organisations may require different kinds of treatment. Obviously, the appeal of contingency is high because it matches the realities of the situation.

Two important dimensions of the environment relevant for organisational structure are variability and complexity.

Some attempts have been made to test the contingency theory of effectiveness in Indian context. Maheswari (1978) examined the effect of various decision styles on effectiveness. The results indicated that participative style did not share strong positive relationship with organisational effectiveness. Compared with participative style, the relationship of entrepreneurial style is stronger and more significant. The findings supported the view that effective organisations are more likely to be characterized by the entrepreneurial style than the bureaucratic style of decision-making. Ram (1980) studied the relationship between managerial orientation, environment and performance of banks in India. The results indicated that organic-managerial orientation leads to high performance. In this study, the unit of analysis was the organisation. These studies show that the contingency model of organisational effectiveness is valid in the Indian context.

Effective organisations are more likely to be characterized by the entrepreneurial style than the bureaucratic style of decision-making.

Organisational effectiveness is related to organisational structure. Hence, it is desirable to study the influence of bureaucratic and non bureaucratic structure on organisational effectiveness. Organisational structure has various indicators. Among these, formalization, centralization, task routineness and participation in decision-making are significant indicators of bureaucratic factors. Therefore, these variables have been selected to identify highly bureaucratic and less bureaucratic structures. A highly bureaucratic structure has the following characteristics:

* Specialization of functions
* The abstract nature of each task which is pursued with techniques and purpose more or less distinct from those of the organisation as a whole
* The use of formal procedures for coordination
* Hierarchical structure of control authority and communication.

On the other hand, a less bureaucratic structure has the following characteristics:

* Realistic nature of total task which is set by the total situation of the organisation
* Informal network of control, authority and communication
* Lateral rather than vertical communication between people of different ranks resembling consultation rather than command
* The content of communication consisting of information and advice rather than instruction and command.

A large number of variables have been used by researchers for measuring effectiveness. The criteria at the organisational level include variables like utilization of environment, achievement of goals, etc. Indian studies using organisational level criteria are limited. In this study two organisational level indicators of effectiveness have been considered i.e. organisational adaptability and organisational performance. Organisational performance is a significant criterion of organisational effectiveness and

has been used in many studies. Adaptability is necessary for long term survival. These two conditions together contribute to the growth of the organisation and can be used to assess the effectiveness of any organisation.

Some studies have considered organisational adaptability a criterion of effectiveness (Angel & Perry, 1981; Steers, 1975). Organisational adaptability refers to an organisation's ability to change according to changes within the environment and maintain growth. Adaptability of the organisation is influenced by the organisational structure. In addition to adaptability, researchers have used various economic indicators of organisational performance which include variables like growth rate, return on investment, etc. Khandwalla (1977) included growth rate of sales or revenue, employee morale, job satisfaction and commitment to organisation's objectives, public image, goodwill, financial assistance and long run level of profitability in the assessment of organisational performance. These criteria of performance are largely determined by the economic forces in the environment of the organisation. The structural characteristics influence organisational performance by aiding its adaptation to the environment. Therefore, organisational performance is related to organisational characteristics. Child (1974) examined the relationship between organisational structure and organisational performance and found that companies having high performance were less bureaucratic.

These studies have some limitations as firstly, they have not taken a multivariate view of effectiveness as it is determined by a configuration of structural and contextual variables, goals and management styles, etc.. Secondly, these studies have ignored personality variables as determinant of organisational effectiveness. They indicate that the contingency theory should be able to predict the performance of organisations in the Indian context. However, the environment of Indian organisations is complex and dynamic due to rapid changes in economic policies, which are likely to have an impact on organisational performance.

Statement of Research Problem

Researchers have analyzed the relationship between various determinants and the criteria of organisational effectiveness in bivariate and multivariate models. However, most studies have not taken structural, process and personality variables together. Therefore, firstly, there is a need to study organisational effectiveness, taking into account these three sets of variables because an individual's behaviour in the organisation is influenced by interaction among them. Secondly, it is desirable to identify the relative importance of such variables in influencing the various criteria of organisational effectiveness. In this study, a multivariate model has been taken which includes these three sets of variables as antecedents of effectiveness. Organisational structure is intended to regulate the behaviour of the individuals so that organisational goals can be achieved. It is the setting in which organisational activities are carried out. It minimizes the influence of individual variations on the organisation and regulates the behavior of the individuals according to the role expectations of the organisation. Organisational processes result from the structure and lead to it. Structural characteristics and individual characteristics interact to produce the output in the organisation. Therefore, personality characteristics of individuals should be considered along with structural variables and process variables in the research on organisational effectiveness. Firstly, these variables operate together within the organisation and influence the behaviour of individuals in the organisation. Secondly, organisational structure and processes require changes depending upon the internal and external conditions of the organisation for the development of individuals and organisation.

Organisational structure is intended to regulate the behaviour of the individuals so that organisational goals can be achieved.

A number of processes operate in the organisation, communication, leadership, decision-making and conflict–resolution etc. Communication, the exchange of information and transmission of messages is the very essence of an organisation. The transmission of energy (the accomplishment of work) depends upon the communication between people in the subsystem and between subsystems. Two dimensions of communication, accuracy and openness have been selected in the study. Among the personality variables, locus of control has been selected as it influences the amount of effort exerted by individuals for performing their job. Spector (1982) suggested that the basic distinguishing characteristic between internals and externals should have significant effect on their behaviour in the organisation. Firstly, internals tend to believe that they can control the work setting through their behaviour, they attempt to exert more control than would externals, provided that control is perceived to lead to desired outcome or rewards. Internals perform better in learning and problem solving situation because of their better use of information. Internals display greater job motivation because they believe that their efforts will lead to reward. Internals are likely to perform better because they

hold greater expectancy that effort will lead to good performance and good performance to reward. Locus of control has been found to be related to motivation (Organ & Green, 1974), job performance (Lawler, 1968), job involvement (Reitz & Jwell, 1979) leadership (Runyon, 1973), job characteristics (Sims & Szilagy, 1976) and employee's job tenure (Harvey, 1971).

The relationship between organisation structure, processes and personality is very complex. An attempt has been made in this study to investigate how these variables determine effectiveness. Bureaucratic-nonbureaucratic dimensions of structure, communication and locus of control have been selected as independent variables. Two criteria of effectiveness i.e. organisational adaptability and organisational performance have been taken as dependent variables. The schematic representation of the research problem has been given in fig. 1.

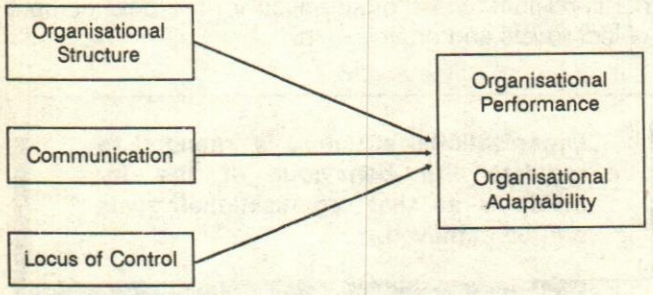


Fig. 1. Schematic Representation of Research Problem

This study has two objectives: the first is to examine the multivariate model of effectiveness which suggests that organisational structure, communication and locus of control determine organisational effectiveness (fig. 1). The second objective is to test the relationship between organisational structure and effectiveness according to contingency theory. The following hypo-theses are proposed:

* Nonbureaucratic structure under dynamic and heterogeneous environment will lead to high performance.
* Nonbureaucratic structure under dynamic and heterogeneous environment will lead to high adaptability.
* Communication will be positively related to organisational adaptability and organisational performance.

In this study, bureaucratic structure is characterized by high formalization, centralization, routine tasks and low participation in decision making. Non-

Bureaucratic structure is characterized by high formalization, centralization, routine tasks and low participation in decision making.

bureaucratic structure is characterized by low formalization, decentralization, nonroutine tasks and high level of participation in decision making. It is assumed that organisations operate in a dynamic and competitive environment.

Methodology

The respondents of this study were managers at different levels from four organisations in automobile and chemical industries as there are very few studies on organisational effectiveness in this sector. Two large automobile organisations (employee strength between 5000-7000), one from Delhi and the other from Bombay and two small organisations (1500-2000 employees) – one automobile and one chemical from Delhi were selected. The size of the organisation influences characteristics like centralization and formalization which determine the structure of the organisation. Size is also likely to influence the performance of the organisation. Therefore, two small and two large organisations were selected.

The sample size for this study was three hundred and twelve executives at junior and middle levels. A stratified random sample was selected. The respondents were selected from every department of the organisation so that the sample could be representative. Their level of education varied between high school and post graduation. Except for ten females, all of the respondents were males.

All variables were measured by the self-report method. Scales follow the Likert type scaling. The reliability (internal consistency method) has been calculated, using the formula cited in Nunnally (1969). The following scales have been used for measurement of variables:

Organisational Structure

It was measured by a questionnaire developed by Hage and Aiken (1967). The scale consists of nineteen items, each with a width of four points. It measures four dimensions of organisational structure which include formalization, centralization, participation and task routineness comprising six and five items in the first two and four items each in the next two. The lowest and

highest possible scores on the scales are; participation four to sixteen, formalization six to twenty four, centralization five to twenty, task routineness four to sixteen. Total score varies between nineteen and seventy six. A low score indicates low magnitude of the variable being measured. Dewar, Whetton & Boje (1980) examined the validity of these scales and found that participation in decision-making and centralization had fair convergent and discriminant validity. Task routineness scale had acceptable convergent and discriminant validity. However, formalization scale had low validity. These scales have been used in the Indian setting and found to be reliable (Tiwaree, 1986). The reliability coefficient in the present study for the four dimensions of organisational structure are as follows: centralization .54, formalization .75, participation .77, task routineness .48. In the present study, there is reverse scoring on participation scale. The above mentioned four dimensions have been considered together to operationalize organisational structure. A high score on organisational structure scale indicates bureaucratic form of structure and low score indicates nonbureaucratic structure.

Locus of Control

Levison's (1981) scale which has been applied in the Indian culture (Bhandarkar & Singh, 1986) has been used to measure locus of control. It has twelve items with a six point width. The lowest score is six and highest seventy two. A low score indicates internal locus of control and high score an external locus of control. It has three dimensions, namely, internal control, powerful others and chance. The reliability coefficient of the scale is .73. Singh & Chaudhary (1984) examined the validity of three dimensions by item-total correlation. For internal control, it varied between .41 & .56, for powerful others between .41 and .58 and for chance between .32 and .79. All correlations were significant at one percent level. These authors reported that item total correlation, test retest reliability and internal consistency of three dimensions were fairly high.

Communication

Reilly and Roberts (1977) developed a questionnaire to measure communication. It measures two dimensions of communication i.e. openness and accuracy. The scale has ten items – five each for each dimension. The scale follows a seven point rating. The minimum score is five and maximum thirty five on both the dimensions. The reliability coefficient of communication accuracy is .70 and communication openness .79. Reilly & Roberts (1977) using Principal Component Analysis and Variances Rotation Techniques examined the validity of the two dimensions. It was found that the scales had fair validity. In the present study, two dimensions, accuracy and openness have been considered together to operationalize communication.

Organisational Adaptability

It was measured by Mott (1972) scale which has four items with a six point rating. Lowest score can be four and highest twenty four. A low score indicates a low level of adaptability and high score, a high level. The scale has fair validity. The reliability coefficient of the scale is .73.

Organisational Performance

Subjective and objective measures have been used to assess the performance of organisations. Reiman (1982) reported that subjective evaluation of an organisation's competence was an excellent predictor of subsequent survival and growth of the organisation. Des and Robinson (1984) reported the validity of assessing performance through subjective measures. The measures included sales growth, attraction and retention of high quality of human resources, product quality and consumer service. Khandwalla's (1977) scale was taken to measure the subjective performance of the organisation. It measures five factors or organisational performance which include growth rate of sales, employee morale, public image, financial strength and long run level of profitability. It has five items. The lowest score is five and the highest thirty five. A low score indicates low organisational performance. Khandwalla (1977) examined the validity of this scale in his study of Canadian firms by measuring the degree of agreement on the responses of two executives. Correlation between the responses of the two executives was 0.59 in his study. The reliability coefficient of the scale is 0.78.

Results

In the present study, four organisations were analyzed separately by stepwise multiple regression analysis which indicates the relationship of non-bureaucratic structure, communication and locus of control with the adaptability and performance of the organisations. Multiple regression analysis, has been used to identify the relative importance of each independent variable and also to test whether the three independent variables can predict the performance and adaptability of the organisation. Intercorrelations among variables were examined. Multicolinearity was not present in the data. In this study, A and B are the small organisations and C and D the large ones.

Table 1 presents a multiple regression analysis of organisational adaptability with organisational structure,

communication and locus of control for the four organisations. In organisation A communication is positively related and locus of control is negatively related to adaptability. All independent variables explain 36.39 per cent of variance. In organisation B, no independent variable is significantly related to adaptability. However, all independent variables explain 7.25 per cent variance in adaptability. In organisation C, all variables are significantly related to adaptability. Communication and locus of control are positively related and organisational structure is negatively related to adaptability. All independent variables explain 32.79 per cent of variance. In organisation D, organisational structure is negatively related to adaptability and communication and locus of control are positively related. All independent variables explain 23.68 per cent of variance.

It is clear from the results that organisational structure, communication and locus of control are significant predictors of organisational adaptability in large organisations. In case of small organisations, these three variables are not related to organisational adaptability.

Table 1: Multiple Regression Analysis of Organisational Adaptability

Organisation A

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Loc. of Con.	−.50657	−.43169	.16994	.25662	6.452	.0177
Communication	.41036	.33330	.16266	.10504	4.199	.0511
Org. Struc.	−.1690	−.05036	.16717	.00231	.091	.7657
Constant	21.099	Multiple R = .60330			R Square = .36397	
Variance Explained	= 36.39%	F(3,25) = 4.766			(N = 29)	

Organisation B

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Communication	.24528	.18385	.15387	.06016	1.528	.2371
Org. Struc.	−.22134	−.12943	.15325	.01084	.713	.4019
Loc. of Con.	−.02852	.04098	.13178	.00157	.097	.7570
Constant = 17.75		Multiple R = .26940		R Square = .07257		
Variance Explained = 7.25%		F(3,57) = 1.48681		(N = 61)		

Organisation C

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Communication	.51397	.50101	.08949	.26398	31.344	.0000
Org. Struc.	−.32363	−.18231	.08926	.02722	4.172	.0436
Loc. of Con.	.05047	.22753	.08489	.03670	7.183	.0086
Constant = 6.11118		Multiple R = .5726		R Square = .32790		
Variance Explained = 32.79		F(3,103) = 16.75026		(N = 107)		

Organisation D

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Communication	.41784	.37294	.08767	.17459	18.096	.0000
Loc. of Con.	.18728	.21765	.08352	.04006	6.792	.0104
Org. Struc.	−.25383	−.15873	.08826	.02223	3.234	.0748
Constant = 11.78373		Multiple R = .48671		R Square = .23688		
Variance Explained = 23.68%		F(3,111) = 11.48531		(N = 115)		

Table 2: Multiple Regression Analysis of Organisational Performance

Organisation A

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Loc. of Con.	-.45849	-.36378	.17267	.21022	4.438	.0453
Communication	.42973	.36589	.16527	.12435	4.901	.0362
Org. Stru.	-.19672	-.09835	.16935	.00881	.335	.5678
Constant = 30.543		Multiple R = .58598			R Square = .34337	
Variance Explained = 34.33%		F(3,25) = 4.3577			(N = 29)	

Organisation B

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Communication	.31961	.39427	.15006	.10215	6.904	.0110
Loc. of Con.	.01864	.08782	.12852	.00890	.467	.4971
Org. Stru.	-.09742	.09970	.14945	.00689	.445	.5074
Constant = -21.515		Multiple R = .34342			R Square = .11794	
Variance Explained = 11.79%		F(3,57) = 2.5403			(N = 61)	

Organisation C

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Communication	.45009	.32936	.09269	.20258	12.627	.0006
Loc. of Con.	-.34486	-.21822	.08793	.05536	6.160	.0147
Org. Stru.	-.34610	-.16044	.09244	.02108	3.012	.0856
Constant = 26.422		Multiple R = .52823			R Square = .27902	
Variance Explained = 27.90%		F(3,103) = 13.2877			(N = 107)	

Organisation D

Independent variables	Corr.	Beta	SE Beta	Unique Variance	F	Sig. F
Communication	.30148	.24258	.09299	.09089	6.806	.0103
Org. Stru.	-.25632	-.19563	.09361	.02806	4.367	.0389
Loc. of Con.	.12058	.15137	.08858	.02255	2.920	.0903
Constant = 25.468		Multiple R = .37621			R Square = .14153	
Variance Explained = 14.15%		F(3,111) = 6.09			(N = 115)	

Organisational structure, communication and locus of control are significant predictors of organisational adaptability in large organisations.

Table 2 presents the multiple regression analysis of organisational performance with organisational structure, communication and locus of control for the four organisations. In organisation A, communication is positively related and locus of control is negatively related to organisational performance. Organisational structure is not related to performance. All independent variables explain 34.33 per cent of variance. In organisation B, communication is positively related to organisational performance. Organisational structure and locus of control are not related to performance. All independent variables explain 11.79 per cent of variance. In organisation C, organisational structure and locus of control are negatively related

to organisational performance while communication is positively related. All independent variables explain 27.90 per cent of variance. In organisation D, organisational structure is negatively related to organisational performance whereas communication and locus of control are positively related. All independent variables explain 14.15 per cent of variance.

Table 3 presents the predictors of organisational performance for the four organisations. Table 4 presents the predictors of organisational adaptability in the four organisations. It is clear that the three independent variables, i.e. organisational structure, communication and locus of control are related to organisational adaptability and organisational performance in case of large organisations. However, in the case of small organisations all three variables are not related to the dependent variables. Therefore, it can be said that three independent variables are better predictors of organisational adaptability and organisational performance for large organisations.

Table 3: Predictors of Organisational Performance

Organizations	Significant Predictors
A	Communication
B	Communication and Locus of Control
C	Organisational Structure, Communication and Locus of Control
D	Organisational Structure, Communication and Locus of Control

Table 4: Predictors of Organisational Adaptability

Organizations	Significant Predictors
A	None
B	Communication and Locus of Control
C	Organisational Structure, Communication and Locus of Control
D	Organisational Structure, Communication and Locus of Control

Discussion

The hypothesis that nonbureaucratic organisational structure under dynamic and heterogeneous environment will lead to high organisational adaptability was supported in the case of two large organisations (tables 1 and 4). In the case of both the small organisations, organisational structure was not related to organisational adaptability. The relationship between organisational structure and organisational adaptability of large organisations is in accordance with previous studies which indicate that nonbureaucratic organisations function adequately in a dynamic environment (Lawrence & Lorsch, 1967; Burns & Stalker, 1961). There is a continual redefinition and adjustment of tasks so that the organisation can match with external conditions. There is a greater coordination of activities among individuals and between various departments of the organisation. The work groups are integrated and there is an exchange of ideas and information about mutual problems. Mott (1972) found that such characteristics facilitated adaptability. Another reason for high adaptability is high organisational commitment of the employees in the nonbureaucratic structure (Srivastava, 1991). Committed employees engage in spontaneous and innovative behaviour on behalf of the organisation. Angel & Perry (1981) also found that organisational commitment is positively related to organisational adaptability.

Organisational commitment is positively related to organisational adaptability.

It was found that organisational structure was not related to organisational adaptability in the two small organisations under study. In small organisations there is less structuring of activity and hence organisational processes like communication and the individual's personality characteristics and environment may be more important determinant for adaptability. Secondly, the relationship between organisational structure and adaptability is influenced by contextual variables like type of organisation, its ownership, legal, political constraints and strategic variables like goals of the organisation and top management styles.

The hypothesis that nonbureaucratic organisational structure under dynamic and heterogeneous environment will lead to high organisational performance was supported in the case of both the large organisations (Refer tables 2 and 3). In the case of both the small organisations nonbureaucratic structure was not related to organisational performance. The relationship between nonbureaucratic structure and organisational performance of large organisations is in accordance with earlier studies which indicate that the performance of non-

Performance of nonbureaucratic organisations is high in a dynamic environment.

bureaucratic organisations is high in a dynamic environment (Kasperson, 1985; Donaldson, 1987). Lawrence & Lorsch (1967) suggested that an organic structure achieved high organisational performance because of high integration through participative decision-making and transfer of employees between departments and redefinition of an individual's role according to the requirements of the organisation. A nonbureaucratic structure has high participation in decision-making which improves the integration of employees within the organisation. Khandwalla (1973) concluded that participative management ideology improves organisational performance by increasing the motivation of members to work for the organisation. Zangi (1987) suggested that an organic structure had high innovation. A nonbureaucratic structure has greater information processing capacity which facilitates innovation. In a nonbureaucratic organisation, employees experience greater job satisfaction, and organisational commitment. Long (1980) found that positive attitudes like satisfaction and commitment increased organisation performance. Thus, higher performance of nonbureaucratic structure can be attributed to participation in decision-making, innovation, better coordination and entrepreneurial style of the top management. The results provide partial support for the structural contingency theory in case of large organisations in the Indian context.

Higher performance of nonbureaucratic structure can be attributed to participation in decision-making, innovation, better coordination and entrepreneurial style of the top management.

The results indicated that independent variables of the study explained 25 percent of variance in organisational performance. A large amount of variance remained unexplained. It should be noted that organisational performance is determined by variables like product price, quality of product and market structure etc. Bain (1956) suggested that profitability of the firm was determined by market structure. Gale & Branch (1982) found that the firm's position as indicated by the market share was a powerful predictor of the profitability of the firm. Martin (1973) proposed that performance could be determined by variables like firm structure, advertising, research and development and demand conditions. These variables have not been considered in the present study, therefore, R square is low.

It should be noted that the organisational structure was not a significant predictor of organisational performance in small organisations in the present study. Covin & Slevin (1989) also found that organisational structure was not a significant predictor of firm performance in small organisations. It is likely that organisational context variables like legal, political environment, type of organisation, nature of product and technology are more important in predicting the performance of small organisations.

The hypothesis that communication is positively related to organisational adaptability was supported in the case of two large and one small organisation (table 1). In the other small organisation, communication was not related to organisational adaptability. The communication process characterized by a high level of accuracy and openness facilitates horizontal and vertical flow of information. The members can process the message quickly and effectively. Firstly, it can deal with work related uncertainty more effectively than centralized communication patterns. Secondly, it provides an opportunity for feedback and error correction. These factors can facilitate adaptability. Communication was positively related to organisational performance in the case of every organisation (table 2). The communication process through a continuous flow of information and its interpretation makes an organisational activity possible which leads to conversion of input into output in the organisation. Therefore, accuracy and openness in communication facilitate organisational performance. Mott (1972) has reported a positive relationship between perceived adequacy of communication from subordinates and organisational effectiveness. Secondly, communication contributes to goal clarity and goal acceptance among employees (Orpen, 1978). Both factors are likely to enhance organisational performance.

The results indicated that internal locus of control leads to low organisational adaptability in large organisations (table 1). In the case of one small organisation, internal locus of control led to high organisational adaptability. In the other small organisation, it was not related to organisational adaptability. Internal locus of control led to high organisational performance in one large and one small organisation. In one small organisation it was not related to organisational performance. In the other large organisation external locus of control led to high organisational performance (table 2). Thus the relationship between locus of control and adaptability and performance is not conclusive.

The findings of the present study indicate that organisational structure, communication and locus of control are significant predictors of organisational adaptability and organisational performance in the case of large organisations. However, in the case of small organisations these variables can not predict the adaptability and performance of the organisation. It implies

that structure-performance relationship is influenced by the size of the organisations in Indian context. Therefore, it can be argued that contingency view of organisational performance is applicable to only large organisations. However, such a conclusion cannot be drawn from this study because the sample size is small.

Organisational structure, communication and locus of control are significant predictors of organisational adaptability and organisational performance in case of large organisations.

References

Angel H.L. & Perry, J.L. (1981), "An empirical assessment of organisational commitment and organisational effectiveness", Administrative Science Quarterly, 26.

Bain J.S. (1956), "Barriers to New Competition", Harvard University Press, Boston.

Baseman F.G. & Jones, R.E. (1974), "Market condition decentralization and organisational effectiveness", Human Relations, 27.

Bhandarkar A. & Singh, P. (1986), "Managerial stress: Study in cyclic perspective", ASCI Journal of Management, 16(1).

Bhat V.P. (1984), "Conceptual models of qualitative and quantitative types of decentralized organisations", Abhigyan, Spring.

Burns J. & Stalker G.M. (1961), "The management of innovations", Tavistock Publications, London.

Chaudhary P.N. (1986), "Determinants of locus of control; Stepwise regression analysis", Indian Psychological Review, 30(4).

Cheng L.C. (1984), "Organisational coordination, uncertainty and performance: An integrative study", Human Relations, 37(10).

Child J. (1972), "Organisational Structure, environment and performance: The role of strategic choice, Sociology, 6.

Child J. (1974), "Managerial and organisational factors associated with company performance", Journal of Management Studies, 11(3).

Child, J. (1975), "Managerial and organisational factors in company performance Part II A contingency analysis", Journal of Management Studies, 12.

Covin, J.G. & Slevin, D.P. (1988), "The influence of organisational structure on the utility; An entrepreneurial top management style", Journal of Management Studies, 25(3).

Covin J.G. & Slevin, D.P. (1989), "Strategic management of small firms in hostile and benign environment", Strategic Management Journal, 10.

Des G.G. & Robinson, R.B. Jr., (1984), "Measuring organisational performance in the absence of objective measures; The case of privately held firms and conglomerate business unit", Strategic Management Journal, 5.

Dewar R.D. Whetton, & Boje, D. (1980), "A re-examination of reliability and validity of Hage and Aiken measure of centralization", formalization and task routineness", Administrative Science Quarterly, 25(1).

Donaldson L. (1987), "Strategy and Structural adjustment to regain fit performance; In defense of contingency theory", Journal of Management studies, 24(1).

Dubin R. (1976), "Organisational effectiveness; some dilemmas of perspective", Administrative Science Quarterly, (25).

Duncan R.B. (1973), "Multiple decision-making structures in adapting to environmental uncertainty, Human Relations, 26.

Feldman D.C. (1976), "A contingency theory of socializations", Administrative Science Quarterly, 21.

Gale B.J. & Branch B.S. (1982), "Concentration versus market share: which determines performance and what does it matter", Anti Trust Bulletin, Spring.

Hage J. & Aiken M. (1967), "The relationship of centralization to other structural properties", Administrative Science Quarterly, 12.

Harvey J.M. (1971), "Locus of control shift in administrators", Perceptual and Motor Skill, 33.

Khandwalla P.N. (1973), Viable and effective organisational design of firms, Academy of Management Journal, 16.

Khandwalla P.N. (1977), "Design of organisations", Harcourt Brace Ivancecich, N.Y.

Khandwalla P.N. (1985), "Organisational effectiveness", Post- 1976 survey of Indian Work Working Paper I.I.M. Ahmedabad.

Kasperson C.J. (1985), "An exploration of the relationship between performance", decision-making and structure, Human Relations, 38(5).

Lawler E.E. (1968), "A correlational analysis of the relationship between expectancy attitudes and job performance", Journal of Applied Psychology, 32.

Lawrence P.R. & Lorsch, J.W. (1967), "Differentiation and integration in complex organisations", Administrative Science Quarterly, 12.

Lawrence P.R. (1967), "Organisational and environment: Managing differentiation and integration", Homewood Ill Irwin.

Levinson H. (1981), "Differentiating among internality, powerful others and chance, Research with locus of control construct, Vol. 1, Academic Press, N.Y.

Long R.J. (1980), "Job attitudes and organisational performance under employee ownership", Academy of Management Journal, 23(4) March, J.G. (1958) Organisations, Wiley N.Y.

Maheswari B.L. (1977), "Internal change agent experiences in MBO implementation", ASCI Journal of Management, 6.

Maheswari B.L. (1978), "Decision style and effectiveness", ICSSR Research Abstract Quarterly IX 1 & 2.

Martin S. (1973), "Market firm and economic performance", Monograph Series in Finance and Economics", Center for the Study of Financial Institutions, Graduate Business School, New York University.

Miller D. (1982), Top executive locus of control and its relationship to strategy making, Structural and environment, Academy of Management Journal, 25(2).

Miller D. (1983), "The correlates of entrepreneurship in three types of firms", Management Science, 29.

Misra R. (1982), "Some determinants of organisational effectiveness", Productivity, 23.

Mott P.E. (1972), "Characteristics of Effective Organisation", Harper & Row, N.Y.

Negandhi A.R. & Reiman Q.C. (1973), "Task environment, decentralization and organisational effectiveness", Human Relations, 26.

Nunnaly J.C. (1969), "Psychometric Theory", Mc-Graw Hill, N.Y.

Organ D.W. & Green C.N. (1974), "The perceived powerfulness of job behaviour; antecedents and consequences", Academy of Management Journal, 17.

Orpen C. (1978), "Interpersonal communication processes as determinant of organisational goals, Management and Labour Studies. (4).

Ram V.A. (1980), "Contingency Theory; An empirical test of some postulates", Productivity, 21(2).

Reilly III C.A. & Roberts K.H. (1977), "Task Group Structure Communication and Effectiveness in Three Organisations, Journal of Applied Psychology, 62(2).

Reiman B.C. (1982), "Organisational competence as a predictor of long run survival and growth", Academy of Management Journal, 25(2).

Reitz H.J. & Jwell L.N. (1979), "Sex, locus of control and job involvement; a six country investigation", Academy of Management Journal, 22.

Runyon K.E. (1973), "Some interactions between personality variables and management styles", Journal of Applied Psychology, 57.

Singh, B.N. & Chaudhary, P.N. (1984), "Hindi adaptation of Levinson's multidimensional measure of locus of control", Indian Psychological Review, 26(2).

Singh P. & Das G.S. (1977), "Management style of Indian managers", ASCI Journal of Management, 7.

Sims H.P. & Szilagy A.D. (1976), "Job characteristics relationships: Individual and structural moderators", Organisational Behaviour and Human Performance, 17.

Spector P.E. (1982), "Behaviour in organisation as a function of employees' locus of control", Psychological Bulletin, 41(3).

Srivastava D.K. (1991), "Organisational effectiveness: Role of organisational structure and process and personality", Unpublished Ph.D. Dissertation, HSS Department, IIT Bombay.

Srivastava S.K. (1991), "Job satisfaction among private and public school teachers", Perspectives in Psychological Researches, 5.

Steers R.M. (1975), "Problems in Measurement of Organisational Effectiveness", Administrative Science Quarterly, 20.

Steers R.M. (1977), "Organisational effectiveness: A behavioural view", Goodyear, Santa Monica, California.

Taylor S.C. & Bowers D.G. (1974), "Survey of organisation", New York, I.S.R., University of Michigan, Ann Arbor.

Tiwaree B.M. (1986), "A comparison of sick and non-sick organisations", Unpublished Ph.D. Dissertation, Department of Psychology, Allahabad University, Allahabad.

Weber M. (1974), "The theory of social and econornic organisations (Eds.) T. Parsons and Translated by A.M. Henderson, Oxford University Press, N.Y.

Zangi A. (1987), "How organic is your organisation; Determinants of organic/mechanistic tendencies in a public accounting firm", Journal of Management Studies, 24(2).

□

Feature

Marketing Orientation in Indian Business Organisations

K.S. Gupta & Krishna Murari

In the changing business scenario in India, marketing orientation in a business organisation has become the key to success for survival and growth as it leads to greater customer satisfaction and organisational commitment. The present study is an attempt to measure the level of marketing orientation in Indian business organisations. Marketing orientation depends on marketing intelligence generation, dissemination and respon- siveness to it.

K.S. Gupta is Manager (Export Marketing) in Aircraft Division and Krishna Murari is Engineer (Methods) in Helicopter Design Bureau, of Hindustan Aeronautics Limited, Bangalore.

Many researches have been carried out on marketing in India in the last two decades. These studies cover many fields such as marketing environment systems and institutions, consumer behaviour, marketing functions and management, and marketing in special sectors like Agriculture, Banking, etc. The diversity of topics not withstanding, most of these studies are either restricted to commodity and market description or to piece-meal investigations for theoretical/conceptual framework and behaviour phenomena. Researches on the economic, social and legal environment have very little marketing implications or marketing perspective and pay very little attention to the impact of the changes in environment on customers.

The extent of adoption and implementation of the marketing concept by business firms in the U.S. has been analysed by Hise (1965), Vizza Chambers & Cook (1967), Barksdale & Darden (1971), McNamara (1972), Lusch, Udell & Laczniak (1976).

Benefits to be derived by adopting the marketing concept and guidelines to implement it have been dealt with by Wakefield (1958), Felton (1959), Allen (1959), Levitt (1960), Lear (1963), Veibranz (1967), Levitt (1969), Webster (1988), Narver & Slater (1990), Bell & Emory (1971), Lundstorm (1976), Sache and Benson (1978), Stampfi (1978), Houston (1986), Shapiro (1988), Kohli & Jaworski (1990) are conceptual papers questioning the desirability and feasibility of adopting the concept.

Most of the above studies indicate the consumer sophistication, the strength of organised consumerism and increased competition with high stake in retaining or gaining market shares, as the compelling forces in the adoption of the marketing concept.

Methodology

During literature survey, no specific study or research could be found on the marketing orientation in

the business organisations in India for the last decade. To fill the lacuna a study was undertaken with the following objectives:

* To find out the state of marketing orientation in Indian business organisations.
* To find out the correlation between marketing orientation and intelligence generation. The starting point of marketing orientation is marketing intelligence which deals with organisation-wide generation of awareness pertaining to current and future customer needs and preferences.
* To find out the correlation between marketing orientation and intelligence dissemination. Responding effectively to a market need requires the participation of virtually all the departments in an organisation. Effective dissemination of marketing intelligence is important to make an organisation market oriented.
* To find out the correlation between marketing orientation and responsiveness. Responsiveness is the action taken in response to the intelligence generated and disseminated. An organisation can generate intelligence and disseminate it: but, unless it responds to market needs, very little is accomplished.
* Review of the activities in business organisations in relation to the development of marketing orientation, generation of marketing intelligence, intelligence dissemination and organisation-wide responsiveness to it.

For the collection of the required primary and secondary data to carry out the study, out of the two categories of methods namely observation and communication the latter was selected.

* Collection of secondary data was by literature survey.
* Preparation of the questionnaire for primary data was based on conceptual papers and the studies carried out in the west to find out state of marketing orientation in Indian business organisations.
* Collection of specific data was through the questionnaire.
* After a study of the response, preparation of questionnaire was carried out for structured interview of selected respondents who have scored highest or lowest score overall in the same organisation as well as in different organisations, to collect information on organi-sational culture and structure factors suitable for marketing orientation.
* Conducting the structured interviews of selected respondents.

Marketing Orientation

"Marketing" has a specific significance in modern management of business and industry and is one of the important managerial concepts. Unless it is properly understood and put into practice in the right way, many of the businesses and industrial enterprises would collapse.

For firms in more competitive industries the major occupation is to provide a product which appeals to the customer, and continues to do so. Their function is mainly one of satisfying particular human 'wants' by providing products or services which are appropriate to the needs of customers. Such a firm is said to be marketing oriented as it is sensitive to changing markets and to the increased competitiveness of rival firms. It fosters product research and development, creates innovation and takes the market's pulse at intervals to detect changes in taste or fashion. The importance of the customer to marketing oriented firms is that the customer alone makes a project viable.

Marketing oriented firms fosters product research and development, creates innovation and takes the market's pulse at intervals to detect changes in taste or fashion.

Narver and Slater (1990) suggest, "The marketing orientation of an organisation involves three behavioural components: customer orientation, competitor orientation and interfunctional coordination; and two decision criteria—long term focus and profitability." Philip Kotler (1988) believes, "The marketing concept rests on four main pillars, namely, market focus, customer orientation, coordinated marketing, and profitability." Kohli & Jawaorski (1990) state, "we use the term "marketing orientation" to mean the implementation of the marketing concept. Hence, a market-oriented organisation is one whose actions are consistent with the marketing concept."

The marketing concept is a philosophy of business which states that the customer's want of satisfaction is

the economic and social justification of a company's existence. Consequently, all company activities in production, engineering, finance as well as in marketing must be devoted first to what the customer's wants are, and then to satisfying those wants while still making reasonable profit. This philosophy introduces the marketing man at the beginning rather than at the end of the production cycle, and integrates marketing into each phase of the business.

The marketing concept is based on two fundamental beliefs:

* All company planning, policies and operations should be oriented towards the customer.
* Profitable sales volume should be the goal of a firm.

Marketing Intelligence, Intelligence Dissemination and Responsiveness

Using a theories-in-use approach described by Zaltman, LeMasters, & Heffring (1982), Kohli & Jaworski (1990) define market orientation as composed of the following three sets of activities:

* Organisation-wide "generation of marketing intelligence" pertaining to current and future customer needs.
* "Dissemination of the intelligence" across departments.
* Organisation-wide "responsiveness to marketing intelligence". The responsiveness component is defined as being composed of two sets of activities – response design (i.e., using market intelligence to develop plans) and response implementation (i.e., executing such plans).

Intelligence Generation

It pertains to customer needs and preferences at present and in future. It also includes the analysis of the exogenous factors such as government regulation, technology, competitors and other environmental forces. Environmental scanning activities are subsumed under market intelligence generation. It can be generated through a variety of formal and informal means such as collection of primary data or consulting secondary data, informal discussion with trade partners, discussion with customers, analysis of sales reports, analysis of world-wide customer data bases, formal marketing researches, etc. It is not the responsibility of the marketing department alone but the other departments also have to take active part in it. For example, R & D department may obtain information from seminars, etc.

Intelligence Dissemination

In a successful marketing oriented organisation, all the departments participate effectively to respond to the market. For an organisation to adopt to market needs, market intelligence must be communicated, disseminated, and perhaps even sold to the relevant departments and individuals in the organisation. Effective dissemination of market intelligence is important because it provides a shared basis for concerted actions by different departments.

Effective dissemination of market intelligence is important because it provides a shared basis for concerted actions by different departments.

Responsiveness

An organisation can generate market intelligence and disseminate it effectively; but, unless it responds to market needs, there will not be any corresponding result. Hence, responsiveness is the most important element of marketing orientation. Responsiveness of market intelligence takes the form of selecting target markets, designing and offering products and services, producing, distributing and promoting the products in a way that elicits favourable customer response.

Marketing Oriented Organisation

When an organisation follows the marketing concept it becomes marketing-oriented. In order to make a marketing programme successful, a company has to adopt a "marketing mix" suited to its customers' wants, competition, social and legal controls and other environmental factors/forces. The phrase "marketing mix" is used to describe the combination of the following four elements which prepare a successful marketing programme. All these must be directed towards the satisfaction of customer wants (Jerome Mc. Carthy, 1964):

* The product (including packaging and brands)
* The channel of distribution
* The pricing policies and practices

* The promotional methods.

Shapiro (1988) defines a market driven organisation as an organisation possessing three critical characteristics:

* Information on all important buying influences permeates every corporate function.
* Strategic and tactical decisions are made interfunctionally and interdivisionally.
* Divisions and functions make well-coordinated decisions and execute them with a sense of commitment.

Measurement of Marketing Orientation

A questionnaire was prepared based on the study carried out by Kohli and Jawarski (1993) and was given to 28 executives at junior and middle management levels undergoing Management Programme (Technical) (MPT) training in Indian Institute of Management, Bangalore for their responses. Copies of the questionnaire were also sent through these executives to their organisations to collect further responses. The questionnaire was also sent to known persons in few industries and their response was recorded. A total of 140 participants from 12 organisations participated in the study. These participants were from junior and middle management levels and working in different fields such as design, production, maintenance, marketing, finance, etc. Data collection through questionnaire was followed by Structured Interview from 28 executives undergoing training in IIM, Bangalore to gather further information about the organisational structure in their respective organisations, the status of the marketing department, future plans. etc.

In the questionnaire Marketing Orientation is measured by a 32-item scale. Of these, ten pertain to market intelligence generation, eight to intelligence dissemination and fourteen to responsiveness. Of the fourteen responsiveness items, seven tap the extent to which an organisation develops plans in response to market intelligence (response design) and the remaining seven assess the actual implementation of these plans (response implementation). Items that tapped the three components are interwoven with issues related to the needs and preferences of customers and end users. In the questionnaire, each item is scored on a 5-point scale, ranging from "strongly disagree" and "strongly agree".

The data obtained from the responses to the questionnaire were analysed in two categories—as those from private sector participants and those from public sector ones.

The scores obtained from two categories were averaged to derive a complete measurement of the focal organisational characteristics. The scores for marketing orientation were computed by equally weighting and adding the corresponding item scores. As a result, the marketing orientation score is the unweighted sum of the three components of generation, dissemination and responsiveness. Out of the total 140 participants 56 were from the private sector in the age group of 27 to 35 years having the qualification of Bachelor of Engg./Master of Engg. with experience varying from 4 to 14 years. 84 participants were from public sector in the age group of 23 to 37 years with the qualification of Bachelor of Engg./Master of Engg. experience varying from 10 to 13 years. Results are tabulated in table 1.

Table 1: Results based on Responses from all the Participants

Statistical Characteristic	Results		
	Private	Public	Cumulative
Mean score of marketing orientation	111.714	97.818	103.222
Variance	407.238	380.343	416.065
Standard Deviation	20.180	19.502	20.397
Range	81-140	67-124	67-140
Correlation between Marketing Orientation and Intelligence Generation	0.960	0.930	0.945
Correlation between Marketing Orientation and Intelligence Dissemination	0.941	0.830	0.844
Correlation between Marketing Orientation and Responsiveness	0.968	0.929	0.949

Note: Maximum possible score is 160 as each question in the questionnaire carries maximum score 5.

Findings from Secondary Data

Literature survey reveals the following:

* Leaders of the market feel that customer satisfaction is fast becoming a key differentiator.
* For a few companies like Videocon, understanding consumer needs, their buying capacity, developing suitable products will be the strategy.
* Several companies are adopting customer intimacy programs that are redefining the way

they do business. For example, Philips India regularly asks panels of housewives to help it design its domestic appliances.

Secondary data show the following:

* Getting closer to the customer is the strategy adopted in 38 per cent of the organisations.
* Formal systems to understand customer needs exist in most of the organisations.
* Interaction with the customer exists at different levels of the organisation but there is no regular customer interaction in most of the organisations.
* CEOs meetings with customer is not a common practice.
* Training, reviews of performance standards, surveys, complaint management, employees' opinion survey and marketing research are the tools in use to get closer to the customer.
* These findings indicate that many organisations have marketing orientation and they feel that customer satisfaction must get the top priority in strategy formulation.

Findings From Primary Data

Findings from primary data can be summarised in two categories:

* Findings based on response to the questionnaire.
* Findings based on structured interviews.

Findings from Questionnaire Responses

Responses to the questionnaire have been categorised into two groups namely those common to both the public and private sector and those which are not common.

Findings Common to Public and Private sector

* Regular meetings are conducted with the customers in many organisations but there is low interaction at the lower level.
* Inhouse marketing is medium but end users poll for quality has been given no/very low attention.
* About 50 per cent of the organisations try to keep pace with customers' product preference.
* Periodic reviews are carried out to seek changes in business environment and to detect the fundamental shift, but people in the organisation hardly talk about competitors' tactics.
* Customer information is circulated at different levels in many organisations but the data on customer satisfaction is not being circulated properly. Interdepartmental coordination for customer satisfaction and communication are medium.
* Although there is awareness about the importance of customer needs for product development, still most respondents feel that business plans are technology driven.
* Departments are not working to the same goals.
* Tackling customers' complaints and quick response to competitors' strategies need attention.

Findings not Common to Public and Private Sector

Following are the points which are not common.

* The state of marketing orientation is low in the public sector while it is medium in the private sector.
* Periodic reviews are carried to find out changes in business environment and to detect the fundamental shift in majority of private sector organisations but it is less common in public sector companies.
* Planning to respond to changes in the business environment is made reasonably in coordination with different departments in the public sector; the situation is not the same in private sector.
* Interdepartmental coordination for customer satisfaction is high in private sector but low in public sector.
* Principle of marketing segmentation for new product development is used reasonably well in private sector, but is neglected in public sector.
* Although there is awareness about the importance of customer need for product development, business plans are technology driven in majority of public sector units companies but the private sector gives importance to both.

Findings from Structured Interviews

Findings from the structured interviews are subjective as the number of participants is not sufficient.

The following are the salient findings in the organisations of the participants who have scored 80 per cent of the maximum score (160) in the questionnaire.

* The management realises that customer needs are more basic than particular products.
* More attention is given towards product planning and development activities to make merchandising more effective.
* More emphasis is given to research and innovation.
* An integrated view of the firm's operation and the interdependence of different departments is realised.
* The management realises that its interests and the society's are one and the same and that the future profit of the company should come through the satisfaction of human needs and wants.
* Overall performance is in improving the organisation due to its orientation towards the customer.
* Participants feel that due to the greater market orientation of an organisation, employees have:
  - Greater *espirit de corps*
  - Greater job satisfaction
  - Greater organisational commitment.
* Due to market orientation, customers have more satisfaction and repeat business from customers.

Conclusion

Findings reflect that the state of marketing orientation is low in public sector and medium in the private sector. Efforts are needed to improve the situation by monitoring the changes in the business environment, customers' tastes and attitudes; responding to the changes; making departments work toward the organisational goals in place of individual goals; increasing interdepartmental coordination; quick responses to customers' complaints and conducting regular meetings with customers.

Marketing orientation is low in public sector and medium in the private sector. Efforts are needed to improve the situation by monitoring the changes in the business environment, customers' tastes and attitudes; responding to the changes; increasing interdepartmental coordination.

There is a high degree of correlation between marketing orientation and intelligence generation, marketing orientation and intelligence dissemination and marketing orientation and responsiveness.

Leaders of the market feel the importance of marketing orientation and plan their strategy for instilling it in their organisations. Different programs are being run to get closer to the customers. Still a lot more is to be done to bring optimum marketing orientation in Indian business organisations.

References

Allen, Louis A. (1959), "Integrated Marketing: The Customer Knows Best", Dun's Review & Modern Industry, Vol. 73, January.

Barksdale H.C. & Bill Darden (1971), "Marketers' Attitude Towards the marketing Concept", Journal of Marketing Vol. 35, October.

Bell, Martin L. & C. William Emory (1971), "The Faltering Marketing Concept", Business Horizon, Vol. 22, June.

Felton Arthur P. (1959), "Making the Marketing Concept Work", Harward Business Review, Vol. 37, July-August.

Hise Richard T. (1965), "How Manufacturing Firms Adopt the Marketing Concept?" Journal of Marketing, Vol. 29, July.

Houston F.S. (1986), "The Marketing Concept, what it is and what it is not", Journal of Marketing, Vol. 50, April.

Kohli, Ajay K. & B.J. Jaworski (1990), "Market Orientation: The Construction, Research Proposition, and Managerial Implications", Journal of Marketing, Vol. 54, April.

Kohli, Ajay K. & B.J. Jaworski (1993), "Marketing Orientation: Antecedents and Consequences", Journal of Marketing, Vol. 57, July.

Kotler, Philip (1988), Marketing Management, Prentice-Hall of India Pvt. Ltd.

Lear, Rober W. (1963), "No Easy Road to Market Orientation", Harward Business Review, Vol. 41, Sept.-Oct.

Levitt T. (1960), "Marketing Myopia", Harward Business Review, Vol. 38.

Levitt T. (1969), "Marketing Mode", New York: McGraw Hill Book Company.

Lundstorm, William J. (1976), "The Marketing Concept: The Ultimate in Bait and Switch", Business Horizon, 19, December.

Lusch, Robert F., Jon G. Udell & Gene R. Laczniak (1976), "The Practice of Business", Business Horizon, 19, December.

Mc Carthy, E. Jerome (1964), "Basic Marketing", Homewood Il, Richard D. Irwin Inc.

Mc Namara, Carlton P. (1972), "The Present Status of the Marketing Concept", Journal of Marketing, Vol. 36, January.

Narver J.C. & S. F. Slater (1990), "The Effect of Market Orientation on Business Profitability", Journal of Marketing, Vol. 36.

Narver J.C. & S.F. Slater (1994), "Does Competitive Environment Moderate the Market Orientation – Performance Relationship", Journal of Marketing, Vol. 58, No. 1, January.

Sache, William S. & George Benson (1978), "It is time to discard the Marketing Concept", Business Horizon, Vol. 21, August.

Shapiro, Benson P. (1988), "What the Hell is "Marketing Oriented?" Harward Business Review, Vol. 66, November-December.

Stampfl, Ronald W. (1978), "Structural Constraints: Consumerism, and Marketing Concept", MSU Business Topic, 26, Spring.

Veibranz A.C. (1967), "Marketing's Role in Company Growth", MSU Business Topic, 15.

Viswanathan, Anand (1994), "Caring for Customer", Business Today, October.

Vizza, R.F., T.E. Chambers & E.J. Cook (1967), "Adoption of the Marketing Concept – Fact or Fiction", New York: Sales Executive Club Inc., Research Report.

Wakefield, John E. (1958), "Marketing Concept: Three Steps are necessary to put it to work", Printer's Inc., 264, September.

Webster, Frederick E., Jr. (1988), "Rediscovering the Marketing Concept", Business Horizon, Vol. 31, May-June.

Zaltman, Gerald, Karen LeMasters & Mickael Heffring (1982), "Theory Construction in Marketing", New York: John Wiley & Sons, Inc.

□

Feature

Economics of Sub-contracting – The Case of Handloom Industry

A.C.K. Nambiar

Though sub-contracting practice is widespread in Indian industries, our understanding about the nature of the system specially in the traditional industrial sector is limited. This paper examines the issue with reference to the handloom industry of Kerala. The study notes that the strategy was employed in the industry to disorganise factory based production with the enactment of the Factories Act. Over the years, a hierarchial supplier system has evolved and the small units end up getting exploited by the former factory units.

A.C.K. Nambiar is from the Department of Economics, University of Calicut.

In a competitive market environment, industries are in constant search for cost effective methods of organising production. One strategy widely practised in the modern industrial system is subcontracting in which a company (called a contractor) places an order with another company (the sub-contractor) for the production of parts, components, sub-assemblies, or assemblies to be incorporated into products to be sold by the contractor. Such orders may include the processing, transformation or finishing of materials or parts by the sub-contractor at the request of the contractor (UNIDO,1974). Apart from the potential efficiency advantages of sub-contracting over vertical integration (World Bank, 1989), since the governments and developmental institutions extend a variety of incentives to small scale industries, the strategy turns out to be more economical to large firms. India has had a long tradition as far as small scale sector development is concerned and indications are that sub-contracting practices in all forms of its manifestation exist in the industrial sector in the country. An estimate shows that in the 1981-82 to 1990-91 period the number of units assisted by the sub-contracting exchanges established by the Small Industries Development Organisation have grown 243 per cent (National Productivity Council Research Division, 1995). Indications are also that component sub-contracting in some of the sectors has gone up to 100 per cent. Though the system is thus widely practised by the industries in the country, our understanding about it – whether there is a symbiotic co-existence of

Apart from the potential efficiency advantages of sub-contracting over vertical integration, since the governments extend a variety of incentives to small scale industries, the strategy turns out to be more economical to large firms.

large and small industries or is it only a strategy to disorganise production to elude labour welfare obligations – is limited. This study based on a micro level analysis of handloom industry highlights that, over the years, sub-contracting system has evolved in the handloom industry to exploit the productive factors of household based small units.

The study is with reference to the handloom industry of Cannanore District, Kerala. The district is known for the production of export varieties of handloom cloth. The highest concentration of handlooms within the state is also in Cannanore district[1]. The study covered 182 sample units belonging to various categories drawn by stratified random sample method. Two questionnaires were prepared to collect data and by personal interview method. The required data was collected with 1989-90 as the reference year.

The Sub-contracting System

In the private sector which accounts for the largest share of total looms in the study area[2], production takes place against advance orders placed with the local handloom units by the exporting firms located in metropolitan cities. The terms in respect of per metre price, product specifications, delivery schedule etc. are negotiated and finalised for each variety of product by the two parties in advance. The local units undertaking the production order (for convenience designated here as 'Principal Units') are old and in terms of the size of turnover are large units. Most of them also possess sizeable manufacturing facilities. However, now a days they have dispensed with most of the manufacturing activities and work orders are passed on to other units. Thus a three/four tier hierarchial structure for production has come to exist. Accordingly when orders for product supply is got by a Principal unit, it is distributed to a few units directly operating under it at a specified rate and hence the practice can be characterised as a type of product sub-contracting. An advance is provided by the Principal units. The second category of units (here designated as 'Contracting Units') assemble the raw materials and undertake the dyeing work within their workshed. The dyed yarn is then distributed to a number of units operating under them at a specified price per metre for conversion into cloth. In this transaction, raw materials are accounted as sales to the third party by the contracting units and on delivery of the goods, after deducting the raw material cost, the balance is payable. The third category of units convert the dyed yarn into cloth by undertaking the operations of warping, pirn winding and weaving. Sometimes a small part of the yarn in warp form is passed on to a fourth category by the third category to carry out the operations of pirn winding and weaving on a piece rate basis. However, for the purpose of our analysis we treat the two categories as the same 'Sub-Contracting Units' as they have the identical characteristics that they are a dependent category of small household units with only partial manufacturing facilities and are more vulnerable to exploitation. The products produced in this arrangement reach the principal units on a weekly basis and a part payment is received by all the categories of units from the parent unit. Final accounts are settled at the time of two local festivals usually falling in April and September. Out of the various manufacturing processes stated, pirn winding and weaving are the most labour intensive and hence the same is today passed on to the household based sub-contracting units. While the bulk of the production orders are executed by the principal units by restoring to this strategy, manufacturing activities on a peripheral scale are undertaken by some of them within their own factory shed to retain the status of a manufacturing unit.

Sub-contracting: Origin & Implications

Till the early 1950's, factory based production of handloom products was more popular in the area. Thus there were a number of units in the area employing over 300 persons. A set back to this factory based production occurred firstly with the passing of the Factories Act, in 1948[3]. Secondly, there was the development of trade unionism and collective bargaining in the industry. The area was more prone to this on account of the large concentration of handloom workers and the factory units were more vulnerable to labour problems. It is pertinent to note here that unionised collective bargaining succeeded in implementing minimum wage and variable dearness allowance with a clause for periodical revision

In factory units, in accordance with the Factories Act, benefits are applicable. In view of this, the factory units felt it ideal to disorganise production.

1. Estimates shows that 44.60 per cent of total looms of the state are concentrated in Cannanore district. See Directorate of Industries and Commerce (1976), pp.85-86.

2. The Co-operative coverage of handlooms in 1986 placed at 5878 works out to this figure. See The Director of Handlooms (1986), p.5.

3. Specifically to rehabilitate the workers thrown out of factories around this time the first industrial type co-operative unit was started in the region. See Directorate of Commercial Publicity (1965), p. 31.

by the early 1970's. Apart from this the labour is entitled to other benefits of paid holidays, bonus, welfare fund contributions etc. in all units irrespective of size. In factory units, in accordance with the Factories Act, other benefits are applicable. In view of all this, the factory units felt it ideal to disorganise production. In the early 1950's itself the strategy was employed. Workers were offered free looms and marginal financial assistance to set up their own small units. Fresh recruitment of workers was also halted in the factory units. Many workers gave up factory work and set up their own units. While some established full facilities for manufacturing, others set up only partial facilities such as warping, winding and weaving or winding and weaving.

Given the partial facilities, some units can function only if dyed yarn is made available and others if dyed yarn in warp form is made available. In required forms then work orders were provided by the factory units and over a period of time the factory units succeeded to scaling down the manufacturing activity to the desired level, particularly the labour intensive manufacturing process. Thus in the early years of disorganisation, all the small units were directly attached to the then factory units which are the present principal units. The factory units also then undertook some of the less labour intensive operations of dyeing and warping on a significant scale. This structure, however, underwent changes subsequently. In the early 1970's, the industry witnessed a boom with the introduction of a crape variety which enjoyed flourishing export market. There was mushroom growth of handloom units in the area to execute the work orders as even the small units were then able to realise a high profit margin. However, the prosperity lasted only for a few years and the established manufacturing capacity in the small scale sector became redundant. This further strengthened the position of the principal units. Here it also needs to be mentioned that work orders received by the principal units stretch to lakhs of metres for a pattern and they found it convenient to concentrate on marketing and do away with most of the less labour intensive manufacturing operations too. The existence of a large number of small units with full manufacturing facilities, some of them redundant, facilitated this. Thus there emerged the contracting units and those units with partial manufacturing facilities gradually got delinked from the principal units and came under the contracting units. The arrangement not only relieved the principal units from labour problems but also assured a more profitable operation since work orders can be executed at competitive rates. It can be noted that a good number of the manufacturing units at the lower end are family labour based looking upon the industry as a source of livelihood. They employ women and children and work day in and day out. The rationality of fair price realisation and profitability are only secondary considerations to them. The existence of such units can often lead to a competition for work of the distress type among them. The principal and contracting units are well aware of the vulnerable position of the manufacturing units and fully exploit them. The present hierarchical supplier system has evolved to accomplish this.

Work orders received by the principals units stretch to lakhs of metres for a pattern and they found it convenient to concentrate on marketing and do away with labour intensive manufacturing operations.

The principal contracting units are well aware of the vulnerable position of the manufacturing units and fully exploit them.

Economics of Sub-Contracting

To get an insight into the exploitative practices in the industry, the price cost margin realised by the three categories are compared. Five products produced during the reference year by way of sub-contract by five principal units were selected. With a sample cutting collected from the principal category, the units engaged in the production of the variety were identified in the course of the field work. As a number of units belonging to the various categories were involved in the production of the variety the price realised and the cost (wage rate and other labour benefits imputed at statutorily payable rate) was collected from each category of units including the principal units. This data forms the basis for the analysis of the price cost margin. Before we examine the margin, let us have a look at the cost structure given in table 1. It can be seen that on an average, the per metre cost including production and marketing worked out to Rs. 25.04. The cost structure indicates that slightly higher than one half of the cost was accounted by materials. Next in importance is the labour cost which worked out to 30.79 per cent. Thus the material and labour cost accounted for 83.46 per cent of total cost. The balance 16.54 per cent constitutes the depreciation, transport, administration, interest, bank charges, commission and other costs. In accordance with the existing production and marketing structure, each category participates in certain manufacturing and marketing activity, bears the cost and realises a price. The spread of the cost

Table 1: Cost Structure per metre

Items of Cost	Cost (Rs.)	Percentage
Yarn	10.20	40.73
Dyes and chemicals	2.90	11.58
Firewood	0.90	3.59
Labour	7.71	30.70
Transport	0.52	2.07
Repair and maintenance	0.74	2.95
Depreciation	0.60	2.40
Interest and bank charges	0.45	1.80
Brokerage and commission	0.63	2.51
Administration	0.32	1.28
Others	0.07	0.29
Total	25.04	100.00

Table 2: Cost, price spread categorywise

(Rs.)

Category	Cost (2)	Price (3)	Margin (col. 3-2)
Principal units	3.31 (13.22)	4.55	+1.24
Contracting units	14.33 (57.23)	14.88	+0.55
Sub-contracting units	7.40 (29.54)	6.17	–1.23
All	25.04 (100.00)	25.60	+0.56

and price is now examined (table 2). 57.23 per cent of the total cost was incurred by the contracting units, 13.22 per cent by the principal units and the balance 29.54 per cent by the sub-contracting units. The price realised bears no relation to the cost and the figures are self explanatory as far as the exploitative nature of the production organisation is concerned. As is observable from the table, while sub-contracting units incurred a per metre cost of Rs. 7.40 the per metre price realised was Rs. 6.17 leaving a negative margin of Rs. 1.23 per metre. At the same time the contracting units and the principal units enjoyed a positive margin over the relevant cost and the same worked out to Re. 0.55 and Re. 1.24 per cent metre, respectively. In one industry the per metre margin over cost worked out to Re. 0.56. It can be argued that this is fully cornered by the principal units. Apart from this, their size of margin has been further boosted up by passing work orders to other units on retaining a margin of Re. 0.86 per metre. In an identical way, the contracting units after retaining a margin of Re. 0.55 per metre passed on the work orders to the sub-contracting units and the sub-contracting units feel the pinch, unable to realise even at least a cost equivalent price. As implied, the net effect is that the labour employed in the category is denied of the stipulated wage and other benefits, not to speak of a profit on their capital. This is nothing short of exploitation. Some of the principal units argue that the sub-contracting practice has evolved to reduce the labour cost which is high in the area as there is a price constraint. Our evidence, however, clearly does not lend any support to such a contention as price realised per metre on an average, apart from being capable of sustaining the stipulated wage and other benefits, generates a reasonable margin of Re. 0.56 per metre[4].

The net effect is that the labour employed in the category is denied of the stipulated wage and other benefits, not to speak of a profit on their capital.

The dimensions of exploitation can also be gauged by looking at the disparity in the level of factor earnings (labour and capital) that prevails among various categories in the industry. To show this the average daily earnings of labour categorywise is shown in table 3. As different categories are engaged in different manufacturing process and hence labour return is not strictly comparable, as earlier stated, on a limited scale all the manufacturing processes are undertaken by some of the principal and contracting units. Such a comparable data is shown in the table. Thus average daily earnings of labour in the industry comes to Rs. 25.84. Categorywise labour in the principal and contracting category earned a comparable wage level of Rs. 32.10 and Rs. 29.76, respectively,

Table 3: Categorywise average per day labour earnings

Category	Labour earnings (Rs.)
Principal units	32.10
Contracting units	29.76
Sub-contracting units	15.00
All	25.84

Table 4: Categorywise return on total capital

Category	Return (percentage)
Principal units	+12.96
Contracting units	+11.09
Sub-contracting units	–7.44
All	+5.61

4. A per metre margin of Re. 0.56 would mean that an average annual per loom output of 1500 metres yields Rs. 840. This woks out to 14 per cent of Rs. 6000 which is a reasonable level of per loom investment.

whereas in the sub-contracting category, the level of daily labour earnings was as low as Rs.15. It is significant to note that the stipulated wage entitled to labour is what is on an average labour earned in the principal and contracting category. Most conspicuously, in the sub-contracting sector, which accounts for the largest employment, the prevailing wage level was half the stipulated wage.

Coming to the return on capital, the categorywise figures are shown in table 4. It can be seen that the industry is operating on a profitable basis as the return on total capital worked out to 5.61 per cent. However, across the categories, as can only be expected, the return on capital varied considerably. The highest return was in the principal category, 12.96 per cent, followed by contracting category, 11.09 per cent. At the same time the sub-contracting category sustained a loss on capital of the order of, 7.44 per cent. The emerging conclusion is that the sub-contracting practice has evolved in the industry to squeeze the productive factors of small units and is nothing short of a perverted strategy.

Acknowledgement

This paper is a part of a research project on handloom industry sponsored by the ICSSR, New Delhi.

References

Director of Handlooms (1986), "Report of the Survey on Primary Weavers Co-operative Societies in Kerala", Government of Kerala, Trivandrum.

Directorate of Commercial Publicity (1965), "Report of the Working Group on Handlooms", Ministry of Commerce, Government of India, New Delhi.

Directorate of Industries and Commerce (1976), "Report on Census of Handlooms", Trivandrum.

National Productivity Council Research Division (1995), "Sub-contracting: Emerging Issues in the Indian Context", Productivity, January-March 1995.

UNIDO (1974), "Sub-contracting for Modernizing Economies", United Nations, New York.

World Bank (1989), "Overview of Japanese Industrial Technology Development", Industry and Energy Department Working Paper, Industry Series No. 6, March.

□

Feature

Technical Efficiency in the Spinning Mills of Kerala

P.S. Mohana Kumar & N.C. Pillai

The objective of the present paper is to examine the relationship between the nature of ownership, firm-size and technical efficiency in production by using a two factor Cobb-Douglas frontier production function in the spinning mills in Kerala. The method of estimation permits the recovery of a firm–specific index of technical efficiency. Inter-sectoral differences in Total Factor Productivity (TFP) are also examined with the help of dummy variables. Models are estimated pooling time-series and cross-section data. The sources of technical efficiency are also investigated. The important explanatory variables selected were capacity utilisation, wage rate, and presence of well equipped Research and Development (R&D) department. The study reveals that firm-size and efficiency are not significantly correlated whereas within each of the four ownership categories there exists differences in technical efficiency.

P.S. Mohana Kumar & N.C. Pillai are from the Science & Technology University, Cochin.

In today's context of liberalisation, globalisation and free market economy, our industries are facing stiff competition to stay afloat. The Government and assisting agencies are currently reassessing their strategies, paying greater attention to the potential contribution of private firms, co-operatives and other non-governmental organisations. It would be desirable to ensure that surplus from public enterprises originates from an increase in productivity and decrease in costs of production rather than from higher administered prices or through large doses of subsidy.

From a policy point of view, it is interesting to distinguish the inefficient firms from the efficient firms and to determine whether inefficient firms share some common set of characteristics. The framework of analysis adopted in the present study is to compare the inter sectoral performance of spinning mills in Kerala by ownership and by firm-size. Ownership-wise the mills are grouped as National Textile Corporation (NTC), Co-operative and Kerala State Textile Corporation (KSTC) mills and private mills. By firm-size, mills are grouped as small mills (spindles 12000 < 26000) and medium mills (spindles 26,000 < 50,000).

The study is based on data relating to 21 mills covering a period of 10 years i.e. from 1982-83 to 1991-92. To have a larger number of observations and more degrees of freedom, cross-section and time-series data were pooled together for estimates.

Measurement of Productive Efficiency

Best practice studies started with one in 1948 by A.P. Groose on open hearth steel furnaces. In this and later on in Salter (1960) the term was reserved for a specific 'technique' rather than for the whole production function. Farrel (1957) was the first to use a best practice function as an empirical concept. Most of the best practice or frontier production studies are related

to the analysis of productive efficiency/inefficiency. The concept of frontier and best practice relations are due respectively to Farrell and Salter. Farrell (1957) introduced the concept of technical efficiency along with that of frontier or best practice production function, which defines for a set of observations the maximum output attainable from a given vector of measured inputs.

Before the emergence of best practice concept, efficiency measurement by average productivity of labour or capital or total factor productivity index was thought to be adequate. Technical efficiency is the ratio of actual output to the corresponding level of output shown by the production frontier i.e. the ratio of actual to maximum potential output. Technical inefficiency is defined as the amount by which the actual output falls short of the maximum possible output on the frontier. It measures the extent to which a firm fails to obtain the maximum output from its inputs, as judged by how far its output-input ratio falls short of the most efficient of the firms in the sample that use factors in the same proportion as they do.

"The TFP differential between actual and potential (or best practice) output is defined conventionally as technical inefficiency" (Little et al, 1987). The concept of technical efficiency is closely related to that of total factor productivity (TFP). Nishimizu and Page (1982) rightly pointed out that the amount by which the actual output is less than potential output is formally equivalent to the difference between TFP based on best practice and that based on actual practice. Since differences in technical efficiency between firms are equivalent to the differences in TFP, the production frontier provides a useful tool for analyzing the relative productive efficiency of individual economic units. Deviations from best practice are ascribed to technical inefficiency.

Two alternative approaches to the specification of the frontier have come into prominence, namely deterministic and stochastic. A deterministic frontier production function envisages an optimal relationship between inputs and outputs, unaffected by random events and statistical noise such as measurement errors. Thus the actual level of the output of a firm lies below the frontier only due to the existence of technical inefficiency in the production process. This implies the assumption that all random factors are under the control of the firm. The stochastic frontier approach accommodates exogenous shocks like power shortage, raw material supply breakdowns, machine and equipment failure in addition to measurement errors. The specification of the error term comprises two components, one normal and the other from a one sided distribution.

Stochastic frontier is considered superior because it gives a less biased measure of efficiency. The main disadvantage of this model is that the frontier being stochastic, it is not possible to obtain estimates of efficiency for each observation or each firm. The best that one can do is to obtain an estimate of mean inefficiency over the sample.

There are two competing paradigms on how to construct frontiers viz. Mathematical programming and Econometric techniques.

The main advantage of mathematical programming or "Data Envelopment Analysis" (DEA) is that it does not impose any explicit functional form on the production function to be estimated. But the calculated frontier may be warped if the data are contaminated by statistical noise. It can estimate only deterministic frontier and it produces 'estimates' which have no sdtatistical properties such as standard errors or 't' ratios.

The econometric approach can handle statistical noise, but it imposes an explicit, and possible overly restrictive, functional form technology. This approach is capable of estimating deterministic as well as stochastic frontier and provides estimates with statistical properties.

The Present Model

Econometric estimation of frontier production function has been done to estimate the efficiency of a firm or industry. Majority of the studies (Page, 1984; Goldar, 1985; Little, et al 1987; Bhavani, 1990; Goldar & Agarwal 1992) have estimated the relative technical efficiency using deterministic frontier. Following them the present study also adopts a deterministic frontier frame-work.

Composed error model is considered to be a more sophisticated approach to the analysis of technical efficiency. Jondrow et al (1982) Greene and Mayes (1991) recommended the use of a composite error term stochastic frontier production function. These models require the estimation method of maximum likelihood when the assumed distribution of inefficiency component of error term is truncated at a point other than the mode. Olson et al (1980) and Jondrow et al (1982) had used mode as the truncation point and thus applied half the normal distribution to the inefficiency error component. They had derived the average technical efficiency and firm level technical efficiency based on the moments of composite error term. The efficiency index so obtained is found upward biased on account of the assumption of mode being the truncation point. On the

tions and hypotheses which require further research.

basis of these arguments Goldar and Agarwal (1992) The model is expanded introducing time element

The coefficients of sectoral dummy variables give the level of efficiency vis-a-vis the excluded category. The co-operative sector is 56 per cent less efficient than the private sector (excluded category): KSTC 18 per cent and NTC 22 per cent less efficient than the private sector. The coefficient of the small sector is –0.134 which shows that small mills are 13.4 per cent less efficient than medium mills (excluded category).

Conclusions

The absence of a significant relationship between firm-size and technical efficiency shows that neither a positive nor a negative case can be made for the mills with less than 26,000 spindles and mills with less than 50,000 spindles. Within each of the four ownership categories there exists differences in technological efficiency. A statistically significant difference (at 5 percent level) is observed only between private and co-operative sectors. Firm Level technical efficiency indices reveal that the four technically efficient mills belong to private sector. The important factors which influence technical efficiency are identified as capacity utilisation, wage rate and the presence of a well equipped Research and Development (R & D) department.

The important factors which influence technical efficiency are identified as capacity utilisation, wage rate and the presence of a well equipped Research and Development (R & D) department.

The difference in technical efficiency among various sectors is not substantial except in the case of the co-operative sector. This is because on the average, the mills in Kerala are much below best practice technologies. The technical efficiency indices show that the scope for output gains with existing input quantities and combinations is rather limited. Measures to shift the frontier upwards through introduction of sophisticated technology and modernization are recommended. But modernization through technological progress and employment objective do not go together. Policy framers shall also look into the employment loss as a result of gain in output due to these measures.

Acknowledgement

This paper is based on the Ph.D. dissertation "Analysis of Resource Use Efficiency of Spinning Mills in Kerala" undertaken at Cochin University of Science and Technology. The authors express their gratitude to Prof. T. Krishnakumar, Institute for Social and Economic Charge, Bangalore and Dr. Bishwanath Goldar, Institute of Economic Growth, New Delhi, whose comments contributed much to the clarity of exposition of econometric ideas.

References

Bhavani A (1990), "Theoretical Efficiency in India Modern Small Scale Sector: An Application of Frontier Production Function", The Indian Economic Review, 26.

Farrell M.J. (1957), "The Measurement of Productive Efficiency", Journal of the Royal Statistical Society, Vol 120 P Part III.

Goldar B.N. (1981), "Some aspects of Technological Progress in Indian Manufacturing Industry", Ph.D. dissertation, University of Delhi.

Goldar B.N. (1985), "Unit size and Economic Efficiency in Small Scale Washing Soap Industry in India", Artha Vinjana March.

Goldar B.N. & R.N. Agarwal (1992), "Technical Efficiency in the Indian Engineering Industry", Productivity, Vol. 32 No.4, Jan-March.

Green A & Mayes D (1991), "Technical Inefficiency in Manufacturing Industries", The Economic Journal 101, May.

Jondrow J., C.A.K. Lovell, I.S. Materov & P. Schmidt (1982), "On the Estimation of Technical Inefficiency in the Stochastic Frontier Production Function"., Journal of Econometrics, Vol. 19.

Little I.M.D., Dipak Mazumdar & John M. Page (1987), "Small Manufacturing Enterprises—A comparative Analysis of India and other countries".

Neriove Marc (1967), "Recent Empirical Studies on the CES and Related Production Functions", in Murray Brown (ed), The Theory and Empirical Analysis of Production, NBBR.

Nishimizu M. & J.M. Page Jr. (1982), "Total Factor Productivity Growth, Technological Progress and Technical Efficiency Change: Dimensions of Productivity change in Yugoslavia 1965-1978". Economic Journal, 92 December.

Olson, J.P. Schmidt & D.M. Waldman (1980), "A Monte Carlo study of Estimators of Stochastic Production Function", Journal of Econometrics, Vol 13.

Page John M. Jr. (1980), "Technical Efficiency and Economic Performance: Some Evidence from Ghana", Oxford Economic Papers, (32) July.

Page John M. Jr. (1984), "Firm size and Technical efficiency Applications of Production Frontiers to Indian Survey Data", Journal of Development Economics, 16.

Pitt, Mark M. & Lunge Pei Lee (1981), "The Measurement and sources of Technical Inefficiency in the Indonation Weaving Industry", Journal of Development Economics, 9.

Ramaswamy (1993), "Technical Efficiency in Modern Small Scale Firms in Indian Industry: Applications of Stochastic Production Frontiers", Discussion Paper No. 88, Indira Gandhi, Institute of Development Research, Goregaon (E) Bombay.

Salter W.E.G. (1960), "Productivity and Technical Change", Cambridge University Press.

□

Feature

Impact of Fertiliser Decontrol on Consumption : A Statewise Analysis

A. Narayanamoorthy

It is already corroborated by studies and macro-level data that fertiliser decontrol which was introduced on August 1992 in two components namely Phosphate (P) and Potash (K) has reduced the consumption of fertiliser and sharply widened the NPK ratio in an unfavourable way at all India level. However, the impact of decontrol has not been focused at state level so far. The present study analyses how the decontrol's impact varies across the states.

A. Narayanamoorthy is a Research Associate in Gokhale Institute of Politics and Economics, Pune-411 004.

Fertiliser decontrol which was introduced on August, 1992 in two components namely phosphate (P) and potash (K) has led to drastic changes in the consumption of fertiliser in Indian agriculture. For the first time after 18 years the consumption of fertiliser recorded a negative growth [CMIE, 1993]. Not only has the consumption of fertiliser reduced – per hectare as well total – but the NPK ratio has also deteriorated unfavourably compared to even the initial period of green revolution (GOI, 1993; Narayanamoorthy, 1994a & 1995; Sinha, 1995; Tandon, 1995). Since the consumption of fertiliser is determined by many factors, policy makers and researchers had the opinion, that decontrol of P and K fertiliser will not affect the consumption significantly. But they have been proved wrong. However, the impact may not be the same across the states, since fertiliser consumption varies with the level and sources of irrigation (Vaidyanathan, 1993), area under food and non-food crops of the states (NCAER, 1991) etc. Needless to say, these factors vary widely across the states.

Fertiliser decontrol has led to drastic changes in the consumption of fertiliser in Indian agriculture.

Studies, so far, have analysed the impact of decontrol on the consumption of fertiliser and NPK ratio at the national level [Reddy & Sarma, 1994; Sinha, 1995; Tandon, 1995; Prasad, 1995]. Studies are not available on the impact of fertiliser decontrol across the states incorporating the main factors which are responsible for fertiliser consumption in Indian agriculture. The present study tries to understand the impact of fertiliser decontrol on the consumption of fertiliser, both at the national as well as the state level.

Objectives & Method of Approach

The main objective of the present study is to understand how the impact of decontrol varies across the states and also to identify the states affected largely because of decontrol. How does the impact varies across the states in relation to their irrigation intensity and sources of irrigation namely groundwater (GW), canal and tanks? Is there any relationship between the area under food crops, and the cropping intensity of the states and the consumption of fertiliser due to the introduction of decontrol.

Two specific years namely 1991-92 and 1992-93 have been taken to study the impact of the decontrol on the consumption of fertiliser. The year 1991-92 is considered for the situation before decontrol and 1992-93 for after decontrol. The analysis is based on 'before and after' approach. The basic source of fertiliser data used has been collected from the published reports of fertiliser statistics (1992-93) of Fertiliser Association of India (FAI). Other data related to different sources of irrigation, area under food crops etc. have been compiled from the CMIE reports [CMIE, 1993 & 1994]. Although it is a two years study, it has also used the earlier data related to fertiliser consumption to support the facts wherever necessary.

Impact of Decontrol at National Level

Consumption of fertiliser has been continuously increasing since independence in Indian agriculture without any wide fluctuations. However, it increased much faster after the introduction of New Agricultural Technology (NAT). The average rate of growth of consumption was relatively more in the initial period of the NAT compared to the latter. For instance, the consumption was only .78 million tonnes(mt) in 1965-66, which increased to 3.4 mt. in 1976-77 and 12.7 mt. in 1991-92. The average percentage growth was about 28 per annum between 1965-66 and 1976-77, while the same was only 13.7 per cent between 1977-78 and 1990-91. However per hectare consumption has increased from just 5.1 kg/hec. in 1965-66 to 20.4 kg/hec. in 1976-77 and reached an all time high of 70 kg/hec. in 1990-91. Though there were wide fluctuations in Gross Cropped Area (GCA), rate of rainfall and climatic conditions, consumption of fertiliser – both per hectare as well as total NPK – has increased without any reduction (See table 1).

Owing to the decontrol, the prices of fertiliser especially Potash (k) and Phosphate (p) have increased roughly by about 245 and 120 per cent respectively. This has also created problems like non-availability of P and K fertiliser in required amount at the right time in many parts of the country because of hoarding. As the Economic Survey of 1993-94 (GOI, 1994) indicates decontrol has reduced the consumption of fertiliser – to 121.5 lakh tonnes in 1992-93 when compared to the immediate previous year (1991-92) figure of 127.5 lakh tonnes. That is, within one year of decontrol, fertiliser consumption has come down by about 6 lakh tonnes. The total reduction in terms of percentage was about 4.7. However, the rate of reduction is substantial in P and K fertilisers, since it was introduced mainly on these two components. For instance, during the *rabi* season (October-March) of 1991-92, the consumption of nitrogen was 4.36 million tonnes (mt), phosphate 1.79 mt. and potash 0.68 mt. But during the *rabi* season of 1992-93, i.e., after decontrol, the consumption of NPK was in the order of 4.61 mt. 1.39 mt. and 0.30 mt. respectively. In terms of percentage, N has increased marginally by five per cent, while the consumption of P and K has reduced by 23 and 55 per cent respectively within one year after decontrol. This has made two drastic changes on the consumption side: firstly, it has reduced the per hectare consumption of fertiliser after a long gap; secondly, owing to the sharp rise in the prices of P and K, farmers have reduced the consumption of these two components which has widened the NPK

Table 1: Intensity of drought and consumption of fertiliser

Year	Area affected*		Category	Total consumption (000 tonnes)	Per hec. consumption (in kg.)
	million hec.	%			
1971	42	12.8	Moderate	2256 (1982)	13.6 (12.2)
1972	139	42.3	Severe	2657	16.1
1979	124	37.7	Near severe	5118 (4286)	29.2 (24.9)
1982	104	31.6	Near severe	6064 (5516)	34.6 (31.5)
1986	60	18.3	Moderate	8474 (8211)	47.4 (46.5)
1987	155	47.2	Severe	8645	48.9

Note: * – indicates total geographical area. Figures in parentheses are consumption before the indicated year.

Source: CMIE (1993), FAI (1993).

Owing to the decontrol, the prices of fertiliser especially Potash and Phosphate have increased and created problems like non-availability in required amount at the right time in many parts of the country because of hoarding.

ratio adversely. For instance, the NPK ratio was 7.2:1.8:1 in 1960-61, but this has come down to 6.0:2.4:1 in 1990-91 because of the tremendous development of extension network and farmers awareness. But the decontrol has again widened the NPK ratio as 9.5:3.2:1 in 1992-93 from the ideal ratio of 4:2:1 (table 2).

Table 2: NPK ratio and per hectare fertiliser consumption

Year	NPK Ratio	NPK/hec	CI	GCA
1955-56	10.8:1.3:1	0.9	114.0	147.3
1960-61	7.2:1.8:1	1.9	114.7	152.8
1965-66	7.5:1.7:1	5.1	114.0	155.3
1970-71	6.5:2.0:1	13.6	117.6	165.8
1975-76	7.7:1.7:1	16.9	121.6	171.3
1980-81	5.9:1.9:1	31.5	123.4	172.6
1985-86	7.0:2.5:1	47.4	126.9	178.8
1990-91	6.0:2.4:1	70.0	na	181.0
1991-92	5.9:2.4:1	69.7	na	181.5
1991-92*	6.4:2.6:1	na	na	na
1992-93	9.5:3.2:1	69.4	na	na
1992-93*	15.1:4.6:1	na	na	na

Note: * – indicates rabi season.
CI – cropping intensity GCA - gross cropped area.
Source: GOI (1994); CMIE (1993).

The *rabi* season of 1991-92 must be compared with that of 1992-93 to understand the problem of decontrol more clearly, since fertiliser decontrol was introduced after the former. NPK ratio has been given separately for the *rabi* seasons in table 2. It is clear that the ratio changed from 6.4:2.6:1 in the *rabi* of 1991-92 to 15.1:4.6:1 during 1992-93, illustrating the drastic impact of decontrol on the NPK ratio.

Some researchers (Reddy et al, 1994) and policy makers[1] ague that the price of nitrogen (N) can be increased to certain level to reduce the imbalance of NPK ratio. According to them, because of the sharp rise in the price of P and K, farmers have increased the consumption of N which ultimately widened the NPK ratio. However, past experience of nitrogen use in Indian agriculture did not confirm their argument. Consumption of fertiliser has been continuously increasing right from independence. For instance, consumption of nitrogen has increased about 11 per cent between 1980-81 and 1981-82 and about 26 per cent between 1987-88 and 1988-89 (CMIE, 1993). Are these changes because of decontrol? Changes in the cropping pattern especially in the area of paddy and wheat, and area under high yielding varieties do often affect the consumption of fertiliser substantially. Studies show that these two crops alone consume about 60 per cent of the fertiliser in Indian agriculture (NCAER, 1991). Hence, price rise in the nitrogen component will not change the existing ratio of NPK.

It is clear from the above analysis that decontrol of P and K fertiliser has reduced the consumption of fertiliser and changed the NPK ratio drastically. However, the reduction of fertiliser consumption and changes in NPK ratio may not be the same across the states and different zones.

Impact of Decontrol on Different Zones

States are different in terms of climatic conditions, irrigation intensity, cropping pattern, market conditions etc. The consumption of fertiliser varies depending upon these factors. Area under irrigation and area under food crops – mainly paddy and wheat – are the two main factors which determine the consumption of fertiliser to a considerable amount[2]. Hence, these two factors have been taken to understand the impact of fertiliser decontrol on consumption. The zone-wise consumption of fertiliser (total as well as per hectare) and the NPK ratio before and after the decontrol is reported in table 3. Among the four zones, per hectare consumption reduction is more in the south zone compared to the national average and other zones. This large reduction in per hectare consumption of fertiliser is because of less increase in the consumption of nitrogen fertiliser in the south zone compared to the other zones. For instance, after decontrol, the increasing rate of nitrogen fertiliser is only 1.5 per cent in the south zone while it varies from 3.5 to 10 per cent in the remaining zones. This further shows that the reduction is more in the zone where area under irrigation to GCA and ratio of food crops to GCA are less. However, in our analysis, total (NPK) reduction of per hectare consumption is not an important problem, since decontrol has made greater impact on the consumption of P and K fertiliser only.

Area under irrigation and area under food crops – mainly paddy and wheat – are the two main factors which determine the consumption of fertiliser.

1. Notably, FAI Chairman and Union Minister for Chemical and Fertilisers in their recent statement indicated that the decontrol has increased the consumption of Urea (N); hence price rise is inevitable in Urea to restore the NPK ratio. See Fertiliser News (1995) for their complete speeches.

2. For more details on crop-wise consumption of fertiliser, see NCAER (1991) and FAI (1993).

Table 3: Zone-wise consumption of fertiliser and NPK ratio

Zone	Percentage		Fertili./ha. (in kgs.)			NPK ratio	
	GIA	FCs	CI	BD	AD	BD	AD
East	27.7	79.6	144	50	49	3.7:1.5:1	7.1:2.4:1
North	64.7	78.7	154	104	101	24.2:7.3:1	50.2:11.7:1
South	32.6	58.1	119	101	94	3.0:1.5:1	4.3:1.9:1
West	17.6	66.5	120	45	44	6.2:3.2:1	10.3:4.2:1
INDIA	33.0	70.0	130	70	67	5.9:2.4:1	9.5:3.2:1

Note: Except fertiliser data, others are related to 1989-90.
GIA – ratio of gross irrigated area to GCA.
FCs – ratio of food crops area to GCA.
BD – before decontrol, AD – after decontrol.
CI – cropping intensity.
Source: FAI (1993).

Table 4: Season-wise and zone-wise percentage change in fertiliser consumption in 1992-93 over 1991-92

Zone	Kharif				Rabi				Total			
	N	P	K	T	N	P	K	T	N	P	K	T
East	13	–3	–21	4.3	7	–12	–57	–8	10	–9	–42	–2.9
North	2	–7	–20	–0.3	4	–25	–73	–5	3	–20	–50	3.5
South	–0.4	–6	–10	–4.0	3	–18	–49	–11	2	–11	–29	–7.3
West	5	–4	–18	–0.1	11	–28	–58	–8	7	–15	–36	–3.6
INDIA	3	–5	–15	–0.8	6	–23	–55	–8	5	–14	–35	–4.5

Note: figures rounded to the nearest integer.
Source: FAI (1993).

In the NPK ratio, among the different zones, the worst affected zone is the north where the ratio has changed from 24.2:7.3:1 in 1991-92 to 50.2:11.7:1 in 1992-93. This is because of the fact that after decontrol, P and K reduced sharply but no reduction has occurred in N, hence there is a heavy imbalance in the NPK ratio. It is important to note here that north zone comprises agriculturally advanced states (AASs) like UP, Punjab and Haryana. These three states contribute a substantial amount of foodgrains in India's foodgrains production.[3] If the wide imbalance of NPK ratio is allowed to continue for some more years soil health will deteriorate (Sekhon, 1994) and subsequently production of foodgrains will come down sharply more particularly in these AASs.

The total reduction of NPK consumption is less compared to P and K components at all India level. Per hectare reduction of NPK is also not substantial after the decontrol among different zones. However, one cannot explain the impact of decontrol on consumption of P and K fertiliser clearly with this total reduction of NPK. Data on component-wise reduction will be more useful to understand the dimension of decontrol. For this, zone-wise and component-wise percentage changes after decontrol were calculated. The relevant results are given in table 4. Among the two seasons, total reduction is more pronounced in the *rabi* season (7.7 per cent) compared to *Kharif* (0.8). It is because decontrol was introduced during the *kharif* season of 1992-93. Between the P and K fertilisers, the reduction was substantially higher in K fertiliser. Since the decontrol has increased the price of K much higher than P. Moreover, for the first time in India, farmers had to pay more than twice the price for phosphate than nitrogen and also for the first time, potash became costlier than nitrogen (Tandon, 1995).

Among the four zones, reduction of P and K is substantially higher in the north zone compared to the other three zones. Though the irrigated area and cropping intensity is substantially higher in the north zone[4], it

3. These three states contribute about 38 per cent of foodgrains production in the India's total, while they accounted for only 24 per cent in the foodgrains area in 1991-92 (FAI, 1993).

4. North zone accounted for nearly 44 per cent in India's gross irrigated area in 1989-90, while its cropping intensity is 154 per cent which is about 18 per cent higher than the national average and 29 per cent higher than south and west zones.

could not restrict the massive reduction of P and K fertiliser. On the other hand, reduction is less in the south zone eventhough their irrigated area is less compared to the north. Area under food crops is less in the south zone which does not allow them to reduce the consumption largely, since net remuneration is relatively higher in non-food crops. Moreover, when the area under food crops (FCs) is less, one cannot expect heavy reduction in the consumption of fertiliser, since consumption of fertiliser by non-FCs is less compared to food crops.[5]

Zone-wise and season-wise NPK ratio before and after decontrol have been computed to understand the problem of NPK ratio. The relevant results are given in table 5. It is clear that the ratio of NPK has become more widened in all the four zones especially in the *rabi* season after the decontrol. Among the four zones, both seasons of north zone reflect the duration showing that the north is the worst affected zone because of decontrol.

The north is the worst affected zone because of decontrol.

Table 5: Zone-wise NPK ratio before and after decontrol

Zone	Before Decontrol		After Decontrol	
	Kharif	Rabi	Kharif	Rabi
East	3.9:1.5:1	3.6:1.5:1	5.7:1.8:1	8.9:3.1:1
North	22.5:4.5:1	25.4:9.4:1	28.4:5.2:1	99.2:26.3:1
South	2.8:1.7:1	3.3:1.3:1	3.1:1.8:1	6.7:2.1:1
West	6.0:3.1:1	6.3:3.3:1	7.7:3.7:1	16.6:5.6:1
INDIA	5.4:2.3:1	6.4:2.6:1	6.6:2.5:1	15.1:4.6:1

Source: FAI (1993).

Impact of Decontrol on Different Sources of Irrigation

So far the zonewise consumption pattern of fertiliser and the NPK ratio after decontrol have been analysed. The degree of impact of decontrol may not be the same for all states within a particular zone, since irrigation intensity, area under food crops and cropping intensity are not similar. For instance, within the East zone, the area under irrigation is relatively more in Bihar compared to Assam and Orissa. Likewise, sources of irrigation – canal, groundwater and tank – are also widely varied. Available studies corroborated that yield enhancing inputs like fertilisers etc. are also widely varied between the sources of irrigation (Vaidyanathan, 1993, 1994)[6] Hence, it would be useful to analyse the consumption pattern of fertiliser by taking into account the different sources of irrigation. For this, we have taken all the three – canal, groundwater, tank – major sources of irrigation including GIA of different states for analysis.

States have been divided into two groups based on the level of irrigation in each source.[7] The states above the national average (ANA) are treated as one group and those below the national average (BNA) as another group. This classification is done based on the recent available irrigation data, 1991 (CMIE, 1994). After grouping the states, impact has been measured in terms of percentage change in each fertiliser component by using consumption data of fertiliser before and after decontrol. The results of fertiliser decontrol based on the sources of irrigation are presented in table 6.

Since fertiliser is a costly input, consumption of fertiliser is more where assured irrigation and yield certainty is more (Narayanamoorthy 1990 & 1994). Moreover, in India, consumption of fertiliser is higher in the states where GIA is more. However, decontrol has made the consumption pattern move in the opposite direction. That is, reduction of P and K fertiliser is more in ANA states of GIA compared to the BNA group. This implies that reduction of P and K fertiliser is more in the highly irrigated states compared to less irrigated ones.

Reduction of P and K fertiliser is more in the highly irrigated states compared to less irrigated ones.

In the groundwater area (GWA) also, reduction of P and K is more in the states where groundwater ratio is above the national average. For instance, the consumption of P and K has by reduced about 18 and 41 per cent

5. Among the non-food crops the consumption of fertiliser is relatively more in crops like sugarcane, cotton and groundnut however, area under these crops is much less compared to food.

6. A recent nationwide survey conducted by NCAER (1991) on consumption of fertiliser has estimated that irrigated area consumes about 69 per cent of total fertiliser. An earlier survey conducted by NCAER during mid-seventies also showed that 86 per cent of the fertiliser absorption was on irrigated crops (cited in Dhawan, 1988).

7. For this analysis only 15 major states have been considered, which have been named in tables 6 and 7.

Table 6: Reduction/increase of fertiliser 1992-93 over 1991-92 based on source of irrigation

Category	Name of states	N	P	K	T	NPK ratio 1992-93
GIA:						
ANA state [>33%]	AP, Bihar, Haryana, UP, Punjab, TN	4.2	–15.6	–36.6	–3.6	(8.9:3:1) 14.7:4.0:1
BNA state [<33%]	Assam, Gujarat, WB, Karnataka, Kerala, MP, Maharashtra, Orissa, Rajasthan	5.6	–12.9	–32.9	–5.4	(4.2:1:1) 6.2:2.7:1
GWA:						
ANA state [> 51%]	Gujarat, Maharashtra, Punjab, Rajasthan, UP.	4.2	–18.2	–41.5	–3.6	(10.6:3.8:1) 19.1:5.3:1
BNA state [<51%]	AP, Assam, Bihar, Haryana, Karnataka, Kerala, MP, Orissa, TN, WB.	43.	–11.1	–31.8	–5.1	(4.1:2.0:1) 6.3:2.5:1
CIA:						
ANA state [>35.7%]	AP, Assam, Haryana, Karnataka, Orissa, Punjab	0.8	–14.3	–31.8	–5.9	(3.1:1.5:1) 4.7:2.0:1
BNA state [<35.7%]	Bihar, Gujarat, MP, Kerala, Maharashtra, Rajasthan, TN, UP, WB	7.1	–14.3	–35.7	–3.5	(5.1:2.1:1) 8.6:2.8:1
TIA:						
ANA state [>6.8%]	AP, Karnataka, Kerala, Maharashtra, Orissa, TN, WB	2.8	–10.6	–32.3	–7.0	(3.1:1.5:1) 4.7:2.0:1
BNA state [<6.8%]	Assam, Bihar, Gujarat, Haryana, MP, Punjab, Rajasthan, UP.	6.1	–17.6	–43.0	–2.1	(16.1:5.9:1) 30:8.5:1

Note: Figures in parentheses are NPK ratio of 1991-92.
Figures in box brackets are national average ratio of irrigation in each source.
Source: computed from FAI (1993) and CMIE (1994).

Table 6a: Reduction/increment in fertiliser consumption in 1992-93 over 1991-92 based on area under good crops and cropping intensity

Category	States	N	P	K	T	NPK ratio 1992-93
Food Crops						
ANA state [>69%]	Assam, Bihar, MP, Orissa, Punjab, UP, WB	6.6	–16.7	–42.0	–2.8	(9.9:3.6:1) 18.2:5.1:1
BNA state [<69%]	AP, Gujarat, Haryana, Karnataka, Kerala, Maharashtra, Rajasthan, TN	3.3	–12.3	–31.4	–5.8	(4.3:2.0:1) 6.4:2.6:1
Cropping Intensity						
ANA state [>130.4]	Assam, Bihar, Haryana, Kerala, Orissa, Punjab, UP, WB	5.0	–16.2	–39.8	–3.3	(9:3:1) 15.7:4.2:1
BNA state [<130.4%]	AP, Gujarat, Karnataka, MP, Maharashtra, Rajasthan, TN	4.5	–14.0	–31.9	–5.6	(4.4:2.2:1) 6.8:2.8:1

Note: as in table 6.
Source: as given in table 6.

respectively in the ANA group of GWA, whereas the same is only about 11 and 31 per cent respectively in BNA. It is to be expected that reduction of P and K fertilisers would be less in the states where assured irrigation source like groundwater is more. But the results of decontrol fail to confirm this expectation. However, one cannot simply ignore the results of GWA, since productivity of crops, total contribution of foodgrains and other benefits largely come from it.[8] Importantly, consumption of P and K was already (before decontrol) very low in these states. Further reduction will lead to a drastic impact on soil health and subsequently on the productivity of crops.

Canal irrigated area (CIA) results are slightly different from the results of GWA. In the GWA, reduction of

8. An estimate shows that groundwater irrigation accounts for 75-80 per cent of the value of irrigated production in India (cited in Moench, 1994). Likewise, productivity is much higher in GWA than canal and tank irrigated area (see: Dhawan, 1988 and Shah, 1993).

Table 7: Categorisation of ANA and BNA states according to reduction of fertiliser consumption in 1992-93 over 1991-92.

Category	Phosphate	Potash	Total (NPK)
ANA state	Assam, Bihar, Manipur, Meghalaya, Mizoram, Sikkim, HP, JK, Punjab, UP, Chandigarh, Delhi, Karnataka, Pondicherri, MP, Gujarat, Goa, Daman & Diu, Maharashtra.	Assam, Bihar, Meghalaya, WB, Haryana, HP, JK, Punjab, UP. Chandigarh, AP, Delhi, Pondicherri, Maharashtra, Rajasthan.	Assam, Meghalaya, Sikkim, Tripura, HP, JK, Chandigarh, Karnataka, Kerala, TN, Pondicherri, Maharashtra, Goa.
BNA state	Orissa, Tripura, Haryana, AP, Kerala, TN, Rajasthan.	Orissa, Sikkim, Tripura, Karnataka, Kerala, TN, Gujarat, MP, Dadra & Nagar Haveli.	Bihar, WB, Haryana, Punjab, UP, AP, Gujarat, MP.
States increasing trends	Arunachal Pradesh, Nagaland, WB, AN Islands, Dadra & Nagar Haveli.	Arunachal, Manipur, Nagaland, AN Islands, Goa, Daman & Diu, Mizoram.	Arunachal, Manipur, Delhi, Orissa, Mizoram, Dadra & Nagar Haveli, AN Islands, Rajasthan, Nagaland.

Note: For categorisation all the states and union territories have been included.
Source: FAI (1993).

both P and K fertilisers are more in the ANA states, but it is not true in the case of CIA states. That is, there is no difference noticed in the reduction of P fertiliser between ANA and BNA states of CIA. However, in the consumption of K fertiliser, the reduction is nearly four per cent higher in BNA states of CIA compared to the same irrigation group of ANA states.

The results related to tank irrigated (TIA) states show something different from the other two sources of irrigation. As seen earlier, reduction of P and K fertiliser is substantially more in the ANA states of both GIA and GWA. However, this pattern is reverse in the case of TIA where reduction of P and K is more in BNA states. Most of the ANA states of TIA are from the south zone hence reduction of P and K fertiliser is less compared to the other three zones as indicated already. Moreover, area under food crops is also less in these states, hence decontrol could not lead to heavy damage in the P and K consumption as in the other states.

Other than sources of irrigation, two important fertiliser determining factors namely ratio of food crops area to total cropped area and cropping intensity were also taken for analysis. Food crops like paddy and wheat together consume about 60 per cent of the fertiliser consumption in India. Available results and macro level data have shown that the consumption of fertiliser is substantially higher wherever the cropping intensity is also more.[9] Hence, these two variables are taken to understand the impact of decontrol on the consumption of P and K fertilisers. As expected, the reduction is substantially higher in ANA states of food crops (FCs) compared to the BNA states. That is, the consumption of P and K fertiliser has decreased about 17 and 42 per cent respectively in ANA states of FCs, while the same is only 12 and 31 per cent respectively in BNA states. Likewise, cropping intensity analysis also shows that the reduction is more in ANA states than the same group of BNA states. Thus reduction of P and K fertiliser, after decontrol was introduced, is much higher in agriculturally advanced states (AAS) like Punjab, Haryana and UP (see also table 7).

If the reduction of fertiliser consumption is uniformly same in all the three—N, P, K—components, there will not be any change in the existing ratio of NPK consumption and will not make heavy damage in soil health and productivity in future. But, this is not happening after decontrol in India agriculture. That is, consumption of nitrogen fertiliser has increased by about four per cent as usual, but there has been a 'heavy reduction in the P and K fertiliser. As a result, the NPK ratio has widened sharply from the ideal ratio of 4:2:1. However, the changes in the NPK ratio after decontrol cannot be similar for different states because states are different in terms of irrigated area, area under food and non-food crops etc. To understand this, NPK ratio was calculated separately for BNA and ANA states before and after the decontrol based on the sources of irrigation, etc. Results related to NPK show that in all cases (except TIA states)—GIA, GWA, FCs and CI—NPK ratio has changed sharply in the ANA states group compared to BNA (see: last column of table 6 and 6a). The reason for less change in the NPK ratio of ANA states of TIA is that almost all the ANA states belong to the south zone where reduction of P and K fertiliser is relatively less compared to the other three zones as indicated already.

Decontrol has not only reduced the consumption of P and K fertiliser in the agriculturally advanced states, but also dismantled the NPK ratio.

9. For instance, per hectare consumption of fertiliser ranges from 112 to 168 kgs. in high cropping intensity (CI) states like Punjab and Haryana, but it is very less in low CI states.

This also implies that decontrol has not only reduced the consumption of P and K fertiliser in the agriculturally advanced states, but also dismantled the NPK ratio.

State-wise Analysis

After the analysis of how the decontrol changes the consumption pattern of fertiliser at different zones, group of states in relation with sources of irrigation etc., it would be useful to know the impact of decontrol at individual state level. For this, we have calculated component-wise percentage change for fertiliser and NPK ratio before and after decontrol. The results are reported in table 8.

The results show that the quantum of reduction between P and K fertiliser consumption is not uniform across the individual states. For instance, in K fertiliser, the highest reduction is found in UP (57 per cent), while in P fertiliser the reduction was highest in Assam (27 per cent) and not in UP. Although the reduction is not uniform across the states between P and K, the reduction is more pronounced in K fertiliser in almost all the major states (see table 7). The reduction of K fertiliser ranges from 22 to 58 per cent between the states, while the same varies from 1.8 per cent to 38.2 per cent in P fertiliser. Taking the agriculturally advanced states like Punjab, Haryana, UP and AP separately, the results are more surprising. All these states have crossed the national average

Table 8: Statewise reduction/increment in fertiliser in 1992-93 over 1991-92.

States	N	P	K	T	Ratio 1992-93	GIA	FCs
Assam	–17.4	–38.2	–38.9	–27.1	3.1:0.9:1 (2.3:0.9:1)	15.1	71.8
Bihar	11.2	–22.9	–55.4	–1.3	22.6:4.8:1 (9.1:2.8:1)	40.1	89.9
Orissa	13.0	–5.8	–24.8	3.5	6.7:1.8:1 (4.5:1.5:1)	24.1	73.9
West Bengal	9.5	1.1	–40.3	–3.2	4.5:2.3:1 (2.5:1.3:1)	22.1	74.9
Haryana	–1.2	–12.2	–51.0	–4.4	185:56.5:1 (92:31.6:1)	71.6	68.9
Punjab	2.3	–19.0	–40.1	–3.6	88.4:24.1:1 (52:17.8:1)	94.0	75.6
UP	5.2	–23.4	–57.1	–3.1	36.8:7:1 (17:4.6:1)	58.0	91.5
AP	2.4	–09.7	–36.9	–4.3	12.5:5:1 (7.7:3.5:1)	40.7	58.8
Karnataka	–6.2	–17.9	–27.3	–13.9	3.5:2:1 (2.7:1.8:1)	22.1	59.8
Kerala	3.1	–07.5	–21.9	–9.6	1.2:0.7:1 (0.9:0.6:1)	12.7	19.5
Tamil Nadu	7.8	–01.8	–27.6	–4.7	2.5:0.9:1 (1.7:0.7:1)	43.6	58.6
Gujarat	8.7	–16.5	–34.2	–2.3	12.6:5:1 (7.6:3.6:1)	28.0	45.7
MP	8.8	–15.2	–25.1	–2.1	14.3:7.3:1 (9.8:6.4:1)	18.6	74.9
Maharashtra	0.8	–17.9	–38.9	–10.4	6.0:2.3:1 (3.7:1.7:1)	11.4	66.1
Rajasthan	19.7	–03.4	–38.1	11.2	69:26.8:1 (35.6:17.2:1)	24.0	65.3
India	33.3	04.7	–14.4	–35.0	9.5:3.2:1 (5.9:2.4:1)	33.3	69.0

Note: Figures in parantheses indicate NPK ratio of 1991-92.
FCs - ratio of food crops area to GCA in 1990-91.
GIA - ratio of GIA to GCA in 1990-91.
Source : FAI (1993).

reduction of K and P fertiliser. This also further supports the earlier results that reduction of P and K is more significant in the agriculturally advanced states compared to less developed states such as Orissa, West Bengal, Kerala, Rajasthan etc. The NPK ratio has also sharply widened in the agriculturally advanced states than the less developed states. For instance, the decontrol has heavily damaged the NPK ratio particularly in states like Haryana (changed from 92:32:1 to 185:57:1), Punjab (from 52:18:1 to 88.4:24:1) and UP (from 17:5.1:1 to 37:7:1).

Introducing quality extension service and withdrawing the decontrol are the feasible ways to achieve balance in the consumption of NPK fertiliser and attain the production target of foodgrains.

Conclusion

The results of the study have shown that the impact of fertiliser decontrol is not uniform across the states and different zones. Majority of the agriculturally advanced states have crossed the national average reduction of P and K fertiliser. Among the four zones, heavy reduction in P and K consumption is noticed in the north zone however, per hectare consumption of NPK fertiliser has reduced more in the south zone. Among the two seasons—*Kharif* and *rabi*—the reduction is more in *rabi,* both in total as well as in P and K consumption. In the NPK ratio, the worst affected zone because of decontrol is the north and the least is the south. Sharp reduction has occurred in the consumption of P and K fertiliser, mostly in states which are above the national average in terms of gross irrigated area, groundwater area, canal irrigated area, food crops and cropping intensity. Agriculturally advanced states like Punjab, Haryana, UP and AP are the worst affected states both in P and K consumption and NPK ratio. If the existing situation is allowed to continue soil health will deteriorate and subsequently productivity of foodgrains will come down sharply. Policies must be formulated to increase the existing low use of P and K fertiliser. Price rise in the nitrogen (urea) component will not make any impressive change in the existing ratio of NPK and can never help increase the consumption of P and K fertiliser. Introducing quality extension service for all types of farmers and withdrawing the decontrol of P and K fertiliser are the two feasible ways available to achieve balance in the consumption of NPK fertiliser and attain the production target of foodgrains.

References

CMIE (1993), Basic Statistics Relating to Indian Economy: India, August.

CMIE (1994), Basic Statistics Relating to Indian Economy: States, September.

Dhawan B.D. (1988), "Irrigation in India's Agricultural Development Productivity, Stability, Equity", Sage Publications, New Delhi.

Dhawan B.D. (1991), "Role of Irrigation in Raising Intensity of Cropping", Journal of Indian School of Political Economy, Vol. 3 No. 4, October-December.

FAI (various issues), "Fertiliser Statistics", New Delhi.

FAI (1995), "Fertiliser News", January.

GOI (1994), "Economic Survey, 1992-93, Ministry of Finance, Economic Division, New Delhi.

Moench, Marcus (1994), "Groundwater Policy: Issues and Alternatives in South Asia", Natural Heritage Institute, San Francisco, USA.

Narayanmoorthy A. (1990), "Case Study of a Successful Paddy Cultivator in Pudukottai District, Tamil Nadu", Indian Journal of Agricultural Economics, Vol. 45, No. 3, July-September.

Narayanmoorthy A. (1994), "Impact of Farmer's Education, Age and Experience on Fertiliser Use and Yield", Productivity, Vol. 34, No. 4, January-March.

Narayanmoorthy A. (1994a), "Fertiliser Decontrol and Beyond", Southern Economists, Vol. 33, No. 12, October 15.

Narayanmoorthy A. (1995), "Is Urea Decontrol Needed?", Mainstream, Vol. 33, No. 17, March 18.

NCAER (1991), "Study of Fertiliser Consumption and Quality Seeds, Fertiliser Consumption Main Report, Vol.I, July, New Delhi.

Prasad, Ravindranath (1995), "Senseless Subsidy", Business India, May 22-June 4.

Reddy, Ananda & Sarma (1994), "Fertiliser Consumption Pattern: The Key Policy Issues", Business Line (The Hindu), March 23.

Sekhon G.S. (1994), "Use of Fertiliser Phosphorus and Potassium in Developing Sustainable Systems of Crop Production", Fertiliser News, Vol. 39, No. 12, December.

Shah T. (1993), "Groundwater Markets and Irrigation Development, Political Economy and Practical Policy", Oxford University Press, Bombay.

Sinha, Yashwant (1995), "Fertiliser Caught in a Policy Muddle", Financial Express, January 26.

Tandon H.L.S. (1995), "The Fertiliser Marry-Go-Round", Financial Express, May 9.

Vaidyanathan A. (1993), "Fertiliser in Indian Agriculture", LSV Memorial Lecture, Institute of Social and Economic Change, February.

Vaidyanathan A. et al., (1994), "Impact of Irrigation on Productivity of Land", Journal of Indian School of Political Economy, Vol. 6, No. 4, October-December, pp. 601-645.

□

Feature

Dynamics of Improved Agricultural Technology – An Economic Analysis

P.N. Sankaran

Though the implications of improvements in biological technology relating to seasonal crops have been analysed and documented in the Green Revolution context, the case of perennials remain unexplored and weakly understood. This paper attempts to bring out, apart from the employment, productivity and income effects, the socio-economic significance of technology upgradation in rubber plantation in terms of land relations and scale parameters. Dynamic implications of improved technology is analysed in the framework of HYV adoption vis a vis nonadoption. It supports the capital bias argument in rubber production technology, small holder productivity and on the policy side the rationale of land reforms.

P.N. Sankaran is Chief, Decentralised Planning, Kerala State Planning Board, Thiruvananthapuram.

Technology upgradation in agriculture has several socio-economic implications. Though improvements in production technology generally involve increasing capital intensity (Jeffrey, 1993) there are situations as in agriculture where it leads to expansion of productive employment (Bhatty, 1978) and economic viability of small-holder farming in terms of employment, production, productivity and income. The positive impact of technology changes on dynamic farming vis-a-vis traditional agriculture has implications for the analysis of economies of scale in general and the rationale of land reforms in particular.

The positive impact of technology changes on dynamic farming vis-a-vis traditional agriculture has implications for the analysis of economies of scale in general and the rationale of land reforms in particular.

Hence it is worthwhile to analyse the implications of technological changes in plantation for land relations, productivity and yield. Among the major plantations in the country, rubber has registered the highest and consistent growth rate in terms of productivity and to some extent in area cultivated (Commerce, 1979; Kannan & Pushpangadan, 1990). Therefore, the rubber plantation has been chosen for the assessment of the socio-economic implications of technology change.

In agriculture, which is basically a biological process, a distinction may be drawn between mechanical and biological technology. The former provides the means through which non-human power could be productively utilised, in place of human power. Biological technology improves production by means of which the intake of nutrients by plants is in-

creased. This can occur either by increasing the effective supply of nutrients available to the plant[1] (through, for example, fertiliser) or by making it possible for the plant to utilise larger amounts of available nutrients (through improved seeds) or both (Bhatty, 1978). Since improvements in plant productivity are usually viewed as improvements in land productivity, innovations in biological technology may be taken as 'embodied' in land.

Implications of technology change in the rubber plantation industry is studied with reference to a static individual adoption model[2] of improved agricultural technology in terms of seed/plant varieties and related inputs to capture its implications for productivity and yield. Individual (farm level) adoption is defined as the use of a new technology in long run equilibrium, when the farmer has full information about the new technology and its potential. In the tradition of most adoption research, the adoption decision has been viewed in dichotomous terms – adoption/non-adoption[3]. The approach is to characterise the problem as one where the farmer has to choose between two scale-neutral technologies – one is the traditional and the other a modern technology. The latter involves the use of high-yielding seed variety and the associated inputs like fertilizer, pesticides etc. Though such a theoretical format lies at the base of the empirical investigation, only the impact of adoption/non-adoption of improved technology is being assessed; the causative factors in adoption/non-adoption lie outside the scope of the enquiry[4].

The analysis is based on the data obtained from the primary survey of rubber cultivators, who have/have not adopted the high yielding clone RRII 105[5] and the associated inputs. The survey was conducted during April-May 1991. Samples of 30 'adopters' and 30 'non-adopters'[6] having rubber plantations with stabilised yield have been drawn (a stratified random sampling was followed); adopters forming the experimental group and the non-adopters, the control group. The farmers in the Meenachil and Kanjirappally taluks of Kottayam district in Kerala have been chosen for the survey. The rationale for this selection emerges from two considerations. First, the two taluks have recorded the highest acreage of rubber plantations in the country and are acknowledged as the cradle of commercial rubber plantations of different holding sizes. And secondly, as adoption of better technology requires credit support (especially in the case of poor small holders), the selection of the two taluks of Kottayam district seems to be most appropriate. For, in addition to the operation of the replanting subsidy scheme of the Rubber Board[7], the study-area had been chosen for Agriculture Refinance and Development Corporation (ARDC) supported long term credit programme for the development of rubber plantations, viz, The Meenachil-Kanjirappally Rubber Development Scheme[8]. The dynamics of technology changes can be analysed exhaustively with reference to plantations having stabilised yield; the study area provided a very good coverage of different seed/plant varieties (both high yielding variety (HYV) and traditional) with stabilised yield[9].

Sampling Design

Adopters – The experimental Group: A sample of farmers with RRII 105 variety trees have been selected to represent adopters, the experimental group. Thirty such farmers have been selected at random for direct interview from the list (of registered planters) maintained by the regional office of the Rubber Board. Since the plantations as already stated have to be in the stabilised yield phase, holdings with 1975-76 plantings were chosen. The process of selecting 30 adopters necessitated provisional screening of a larger number. There was some variation in the area of plantation, input use, yield per acre etc. among the sample farmers. Therefore the samples have been post-stratified into three holding size groups, viz, group 1 (2 and below 2 acres), group 2 (above 2 and

1. Inputs like pesticides, fungicides, etc. also increase the productivity of the plant and, therefore, their use also constitutes a part of biological technology.
2. There are static individual, dynamic Bayesian type, and empirical adoption models (see for example Heibert, 1974; Mara, 1971). Also see Fedder et al, 1982.
3. The decision to adopt a new seed/plant variety – modern and high yielding – which is popularised by an extension agency is considered an agricultural innovation.
4. There is dearth of research level analysis of the economics of adoption relating to perennials like rubber or coconut. A notable exception is Barlow, Colin & Jayasuriya, 1984.
5. A group of plants produced by vegetative propagation from a single tree is termed a clone. Among the clones developed by the Rubber Research Institute of India, RRII 105 has been the most popular. It is a secondary clone whose mother trees are evolved by cross pollination (hand method) between two primary clones namely Tjir I and GI 1.
6. We may use the term 'adopters' for those who have cultivated RRII 105 and 'non-adopters' for others who have chosen for any of the traditional low yielding varieties.
7. To encourage replanting of old and uneconomic plantations, the replanting subsidy scheme was introduced in 1957.
8. The project was implemented by the Meenachil Primary Cooperative Land Development Bank. For details see National Bank for Agriculture and Rural Development (NABARD), 1990.
9. In yielding plantations there are different phases, viz, yield increasing, stabilised and declining phases until the trees become uneconomic.

inclusive of 5 acres) and group 3 (above 5 acres). In the sample drawn there are 14 farmers forming group 1, 12 belonging to group 2 and 4 planters constituting group 3.

Non-adopters – The Control Group: Rubber cultivators with fully yielding trees of traditional varieties (planted during the same period 1975-76) forming the control group, were identified mainly from local enquiries. The local offices of the Rubber Board could help in this behalf only in a small way as the practice of registering plantations of old variety was not strict during the period and many plantations remained unregistered. The samples in the control group had to be identical in all respects with the experimental group except for the modern variety of plants cultivated. Hence the control group was taken in such a way that their plantations are contiguous to those of the experimental group. The representative character of the sample has been fully established as the above considerations have been scrupulously kept in the process of identifying the control group. Out of the 30 non-adopters selected to be the control group, 18 belong to group 1, 9 form group 2 and 3 constitute group 3.

Impact on Production, Productivity & Yield

An analysis was made of the impact of adoption on the production, productivity and yield of rubber plantations based on the primary survey. Adopters of modern technology as a whole have been getting higher output (506 kgs of rubber inclusive of shells) per acre compared to the non-adopters (334 kgs.) (refer table 1). Among adopters, yield per acre has been the lowest (471 kgs.) for big, and highest (528 kgs.) for small farmers. However, in the case of non-adopters, yield levels across groups exhibit a notable difference, with large farmers getting the highest (377 kgs.) yield. Thus the yield gap has been wide (203 kgs.) among small adopting (528 kgs.) and non-adopting (325 kgs.) farmers and narrow (94 kgs.) among large cultivators (471 kgs. and 377 kgs.). The higher yield obtained by the adopting farmers over the non-adopting group has been mainly due to the impact of better technology. Among the non-adopting class, yield per acre is observed to increase with increase in size of holding, implying economies of scale. The relatively low yield of the small holders of the non-adopting class compared to the large holders of the same class is due to their insufficient input utilisation (because of weaker financial position) and diseconomies of scale.

Labour and capital productivities (defined as output per labour and trees[10] respectively expressed in kgs.)

10. In the literature of perennial crop supply response, capital consists of yielding trees (Wickens & Greenfield, 1973).

Table 1: Yield* in Rubber Plantations (per acre)

Category of Farmers	Size of Holding			All Groups
	Small	Medium	Large	
Adopters	528 (39.76)	493 (110.36)	471 (104.15)	506 (86.68)
Nonadopters	325 (114.52)	339 (203.84)	377 (198.44)	334 (156.57)
Combined**	414 (134.94)	427 (174.86)	430 (158.87)	420 (153.01)

Note: Bracketed values are all standard deviations
't' value of adopters 1.7453189
't' value of nonadopters 0.6617
* Output inclusive of shells in kgs.
** Values refer to combined mean and combined standard deviations.

have been significantly higher for adopters (tables 2 and 3). For adopters the average labour productivity has been high (7.15) compared to that of the non-adopters (4.95). Again labour productivity has been the highest for adopting small farmers (7.30) with a difference of 2.49 compared to that of the small farmers (4.81) of the non-adopting class. Coming to capital productivity (capital being yielding trees), average for adopters is 3.43 as against 2.60 for non-adopters. The productivity of capital is seen to be the highest (3.54) for small farmers of the adopting class with a difference of 1.03 compared to that estimated for the non-adopting small farmers (2.51). Among the medium and large farmers (adopting and non-adopting) also, there are differences in labour and capital productivities; but those differences are lower compared to small farmers' productivity values. Among cultivators following traditional technology, economies of scale appear to operate; large holdings exhibit higher capital and labour productivities than the small. In contrast, higher factor productivities achieved by the adopters as a whole and small holders in particular may be taken as an evidence of adoption-induced input use.

Labour and capital productivities have been significantly higher for adopters.

To sum up, the yield gain of small holders in the adopting class over the large farmers of the same class is found to be significant at 5 per cent level. This yield gain may be attributed to technology disembodied capital productivity (it has been found that the difference in capital productivity of adopting small farmers compared to large is significant at 10 per cent level). It may, therefore, be said that the yield gain of small adopting farmers is

Table 2: Labour Productivity* in Rubber Plantations

Category of Farmers	Size of Holding			All Groups
	Small	Medium	Large	
Adopters	7.30 (0.65)	7.05 (1.43)	6.96 (1.37)	7.15 (1.13)
Nonadopters	4.81 (1.46)	5.13 (2.07)	5.28 (2.51)	4.95 (1.80)
Combined**	5.90 (1.71)	6.23 (1.98)	6.24 (2.05)	6.06 (1.86)

Note: The bracketed values are all standard deviations
't' Value of adopters 0.7192535
't' Value of nonadopters 0.4701
* Output per labour per year in Kgs. including shells
** Values refer to combined mean and combined standard deviation.

Table 3: Capital Productivity* in Rubber Plantations

Category of Farmers	Size of Holding			All Groups
	Small	Medium	Large	
Adopters	3.54 (0.32)	3.36 (0.71)	3.25 (0.61)	3.43 (0.56)
Nonadopters	2.51 (0.94)	2.68 (1.85)	2.92 (1.78)	2.60 (1.38)
Combined**	2.96 (0.90)	3.07 (1.37)	3.04 (1.27)	3.01 (1.13)

Note: Bracketed values are all standard deviations
't' Value of adopters 1.3271
't' Value of nonadopters 0.6202
* Output per tree per year in Kgs. including shells
** Values refer to combined mean and combined standard deviation.

mainly accounted by higher technology disembodied capital productivity in rubber plantations. The significantly higher productivity of capital over that of labour in HYV plantations is supportive of the general criticism (Barlow & Peries, 1977 and Loh, 1985) that research strategies on technology (in rubber plantations) have been biased towards improving the productivity of capital rather than that of labour.

The significantly higher productivity of capital over that of labour in HYV plantations is supportive of the criticism that research strategies have been biased towards improving the productivity of capital rather than that of labour.

Conclusions

The analysis of the dynamics of agricultural technology in plantations has brought out the following conclusions having important policy implications. In a broad sense, differences in technology (traditional and modern) and the size of holdings have been significant factors influencing the productivity and yield in rubber plantations. The adoption of modern technology in plantations has not only eliminated the gap in productivity of small as against the large holders; it has also produced a higher margin for the former.

Though in the case of plantations under traditional varieties of seeds, economies of scale-linked output maximisation has been observed among large holders, in the plantations growing high yielding trees, factor productivity and yield are significantly higher for the small holders compared to the large. Chew and Shahabuddin (1992) have also established that there is no evidence of increasing returns to scale for rubber production in estates, although economies of size exert influences on certain aspects of its operation.

Future policy should have the main focus on the promotion of small-holder cultivation and diffusion of HYV technology.

The most important policy implication of the exercise is that there is a definite case for land reforms to cover rubber plantations. Given the preponderance of small farmers in rubber cultivation and the fastly increasing area under high yielding seeds/plants, it is imperative that future policy for the development of this dynamic crop should have the main focus on the promotion of small-holder cultivation and diffusion of HYV technology.

References

Barlow C. and Peries O.S. (1977), "On Some Biases in the Generation of Technologies by Rubber Research Institutes", Journal of the Rubber Research Institute of Sri Lanka, 54.

Barlow Colin & Jayasuriya S.K. (1984), "Problems of Investment for Technological Advance: The Case of Indonesian Rubber Small Holders", Journal of Agricultural Economics, Vol. XXXV, No. 1.

Bhatty I.Z. (1978), "Technological Change and Employment: A Study of Plantations", McMillan.

Chew T.A. & Shahbuddin Mohd. Yusoff (1992), "Measuring Productivity/Efficiency in Rubber Estates: A Frontier Cost Function Approach", Journal of Natural Rubber Research, Vol. 7, (4).

Commerce (1979), "Annual Number", Vol. 139, No.3577.

Feder Gerhon et al. (1982), "Adoption of Agricultural Innovation in Developing Countries – A Survey", World Bank Staff Working Paper No. 542.

Hiebert Dean (1974), "Risk, Learning and the Adoption of Fertilizer Responsive Seed Varieties", American Journal of Agricultural Economics, 56, November.

Jeffrey James (1993), "New Technologies, Employment and Labour Markets in Developing Countries", Development and Change, Vol.24, No.3, July.

Kannan K.P. & Pushpangadan K. (1990), "Dissecting Agricultural Stagnation in Kerala – An analysis Across Crops, Seasons and Regions", EPW, Vol.XXV, Nos.35 and 36, Sept. 1-8.

Loh, Yee Yuen (1985), "Some Aspects of Technological Developments in the Malaysian Rubber Industry", in Small Holder Rubber Production and Policies – Proceedings of an International Workshop held at the University of Adal Aide, South Australia, 18-20 Feb., Proceedings Series No. 9 of Australian Centre for International Agricultural Research.

Mara Gerald O. (1971), "A Decision-Theoretic View of Technique Diffusion in a Developing Country", Ph.D. thesis, Stanford University.

National Bank for Agriculture and Rural Development (NABARD) (1990), "Development of Rubber Plantation in Kottayam District, Kerala – An Expost Evaluation Study", Evaluation Study Series Tvm- No.3, Trivandrum.

Wickens M.R. & Greenfield J.N. (1973), "The Econometrics of Agricultural Supply: An Application to the World Coffee Market", The Review of Economics and Statistics, Vol. LV, No. 1.

□

Feature

Maximising Water Use Efficiency in Tank & Well Irrigated Areas

S.D. Sundar Singh, Sri Sankari, C. Swaminathan, N. Asokaraja & A. Mohamed Ali

Water is liquid gold and the demand for it is ever increasing. This necessitates the exploitation of water saving technologies without compromising the yield. Some water saving technologies are presented by the authors in this article, and the water use efficiency and the yield achieved are analysed.

S.D. Sundar Singh, Sri Sankari, C. Swaminathan, N. Asokaraja & A. Mohamed Ali are from the Water Technology Centre, Tamil Nadu Agricultural University Coimbatore-641 003.

Water is a finite resource which our country has from prehistoric times widely used, mis-used and abused. Besides, irrigation water is diverted to other uses like industries, domestic etc. at the cost of the share for agricultural purpose. The present scenario at all India level indicates that the supply-demand gap amounts to 8.0 per cent and will further increase to 25 per cent in 2020. In Tamil Nadu, the gap will be about 26 per cent in 2000 AD and 36 per cent in 2020 AD. Therefore, it becomes necessary that every drop of water should be used judiciously and economically to realise maximum agricultural production.

Tamil Nadu Agricultural University has developed many technologies for effective use of water on various crops. Government of India has sponsored a scheme on "Maximising the Use of Available Water in Crop Production" and work was carried out by the Water Technology Centre, Coimbatore. Some of the water saving technologies were demonstrated in the farmers' fields by laying out on-farm trials (OFT) on different crops.

'Kattuthalai' or 'Kaivarappu'

The OFT was laid out at four different locations (districts) for testing irrigation economy in rice. The soil of the experimental field was sandy clay loam in Periyar, Salem and South Arcot and fine textured clay loam in North Arcot-Ambedkar district. The treatment consists of forming a small hand bund at a height of 15-20 cm all around the field bund inside the plot leaving a spacing of 25-30 cm between main bund and hand bund. (Fig.1)

The results (table 1) indicated that there was a water saving of 23.8, 24.8, 24.6 and 19.2 per cent due to the formation of Kattuthalai (hand bund) as against control plots. The grain and straw yield were increased to the tune of 10 per cent and the water use efficiency was also

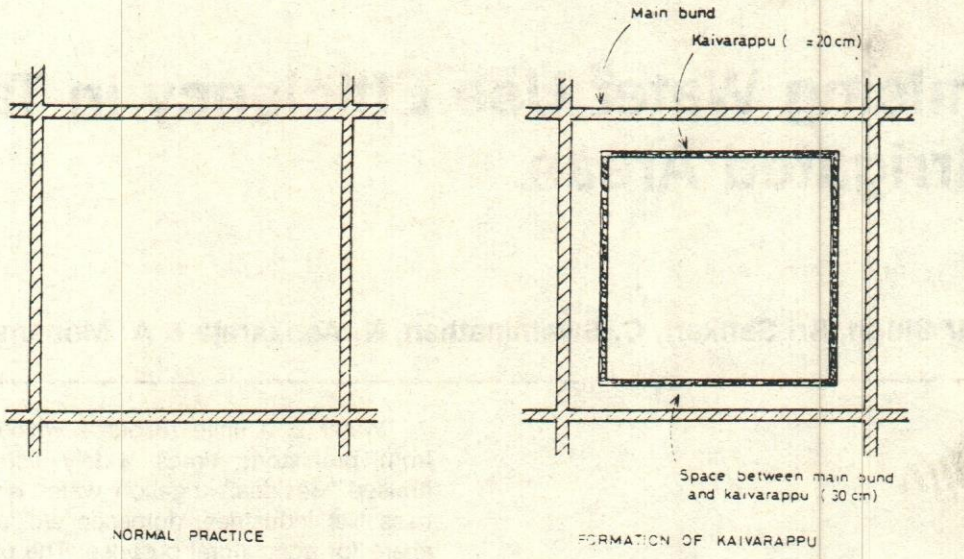


Fig. 1. Kattuthalai or Kaivarappu in Rice Fields

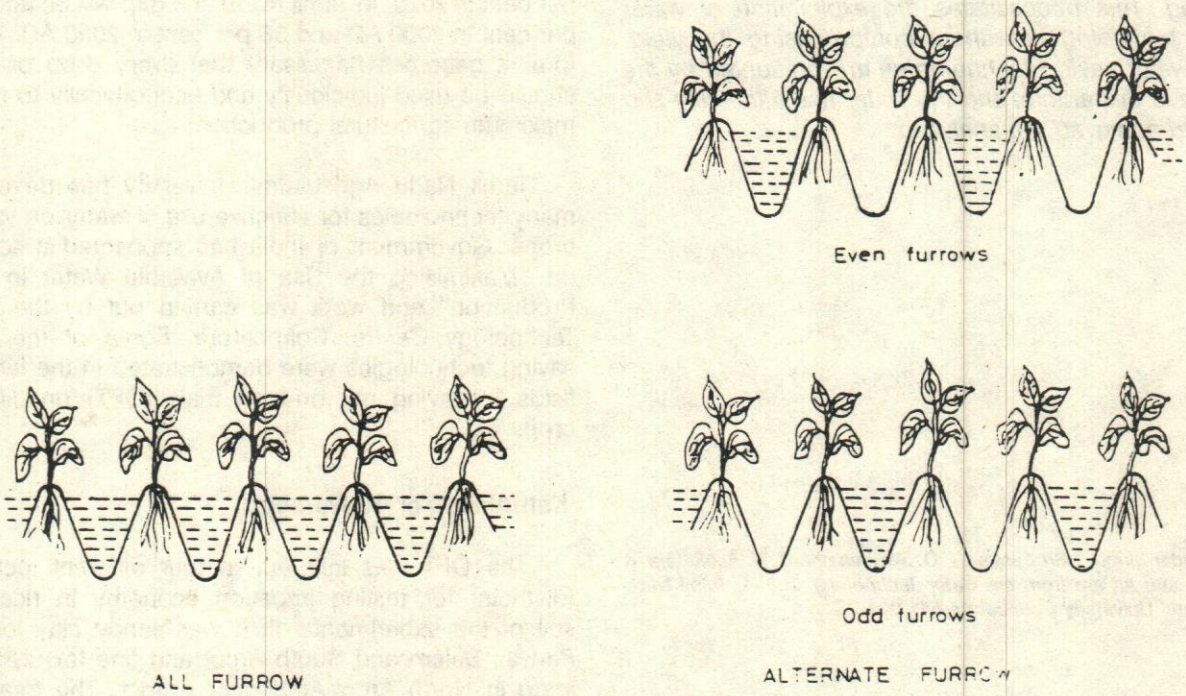


Fig. 2. Alternate Furrow Irrigation

increased to about 32 per cent in treatment plots over control plots.

Paired Row Furrow Irrrigation

Paired row furrow irrigation method was demonstrated through an OFT in cotton. The treatment consisted of normal furrow irrigation method (control) and comparing with the paired row furrow method of irrigation (Fig. 2). The results showed that there was a saving of 28.0 per cent irrigation water. There was no loss in seed cotton yield achieved by the adoption of paired row furrow method as compared to the farmers' practice of every furrow method. The water use

Table 1: 'Kattuthalai' or 'Kaivarappu' for Water Economy Rice Fields

Particulars	Periyar		Salem		North Arcot- Ambedkar		South Arcot	
	Control	Treatment	Control	Treatment	Control	Treatment	Control	Treatment
WATER USE (cm)								
Irrigation	130.5	92.0	143.0	102.0	103.5	66.0	148.0	115.0
Rainfall	31.5	31.5	22.0	22.0	49.0	49.0	20.4	20.4
Total	162.0	123.5	165.0	124.0	152.5	115.0	168.4	135.4
Saving (%)	–	23.8	–	24.8	–	24.6	–	19.2
YIELD								
Grain (kg/ha)	5585	6125	5583	6006	5053	5882	5262	5617
Straw (kg/ha)	5927	6316	6130	6215	5471	6280	5632	5845
Yield increase (%)	–	9.6	–	7.6	–	16.4	–	6.7
Water use efficiency (kg/ha.cm)	34.48	49.60	33.84	48.44	33.13	56.27	31.2	41.3

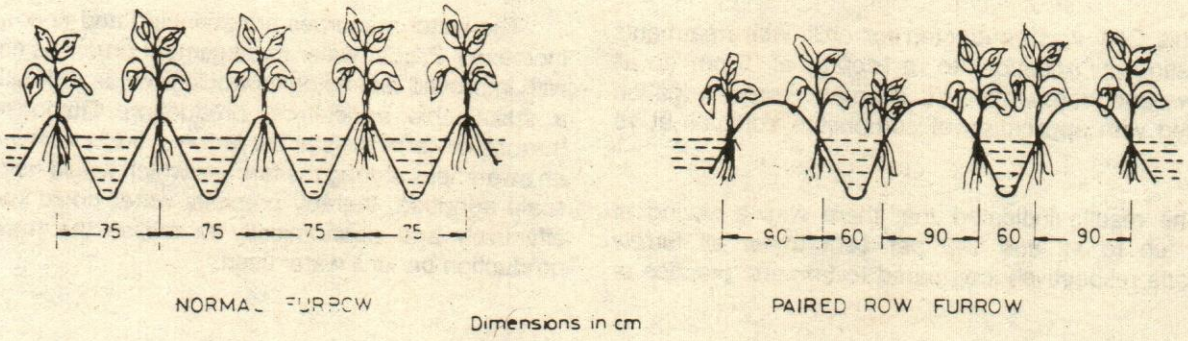


Fig. 3. Paired Row Furrow Irrigation in Cotton

efficiency was also higher in the treatment plots (28 Kg/ha cm) than the control plot (20 Kg/ha cm).

Alternate Furrow Irrigation

The OFT was laid out in sandy clay loam soil for sugarcane. The treatment consisted of irrigating all furrows and alternate furrows with 5.0 cm depth of irrigation water and this was compared with the farmers' method of irrigation (Fig. 3) i.e. using higher depth of irrigation (up to 25-30 cm).

The results indicated that irrigation to 5.0 cm depth under all furrow and alternate furrow saved 53.6 and 142.3 per cent respectively when compared to the farmers' practice, however the water saving was up to 33.6 per cent in alternate furrow as compared to all furrow method, both at 5.0 cm depth of irrigation. Higher cane yield (117 t/ha) was achieved under irrigation to 5.0 cm depth to every furrow than under the other treatments, however there was a marginal yield reduction (up to 9.5 per cent) in adopting alternate furrow methods. Thus, the study revealed that irrigation to 5.0 cm depth to all furrrows was optimum for higher cane yield, water saving and water use efficiency. Under water constraints situations, alternate furrow method of irrigation could be adopted, sacrificing an yield loss up to 10 per cent.

Irrigation to 5.0 cm depth to all furrrows was optimum for higher cane yield, water saving and water use efficiency.

Furrow Irrigation

For groundnut, furrow method of irrigation was introduced and compared with the farmers' practice of check basin method. The soil of the OFT filed was sandy clay loam. The results revealed that there was a

saving of 24 per cent of water with an increase in pod yield amounting to 9.4 per cent compared to check basin method. The water use efficiency was also higher (44.5 Kg/ha.cm) in the furrow method than the check basin method (80.6 Kg/ha.cm)

Use of Coir Pith in Water Economy

Coir pith is a moisture conserving organic material and its effect on water use, yield and water use efficiency in sunflower was studied through an OFT, laid out in a farmer's field. The treatment considered of the use of raw coir pith at 10t/ha as mulch.

The application of raw coir pith at 10 t/ha was found to result in a saving of 15.6 per cent of water and an yield increase amounting to 14.0 per cent . The water use efficiency was more (59.9 Kg/ha.cm) in mulched plots than in unmulched plots (44.4 Kg/ha.cm).

This OFT was conducted for chilli with treatments consisting of irrigation to a depth of 5 cm to all furrows and compared with alternate furrow irrigation coupled with application of composted coir pith at 10 t/ha.

The results indicated that there was a saving of water up to 42 and 149 per cent under all furrow methods respectively compared to farmers' practice of irrigation, however the saving was up to 31 per cent in alternate furrow method as compared to all furrow method. The chilli yield was 2463 Kg/ha.cm under all furrow and 2185 Kg/ha under alternate furrow resulting in a yield loss of about 12.7 per cent , however the water use efficiency was higher (48.6 Kg/ha.cm) under alternate furrrow as compared to all furrow (38 Kg/ha.cm) and farmers' practice (21.3 Kg/ha.cm) of using higher depth and more frequency.

Demonstration through on-farm trials would create an awareness among the farmers which would help large scale adoption.

Summary

The water resources are shrinking and needs to be increased. Proper water management practices coupled with improved technologies would provide a situation for a sustainable agricultural production. Demonstration through on-farm trials at the farmers' fields would create an awareness among the farmers which would help large scale adoption, thereby precious water could be used effectively and economically to realise the maximum production per unit water used.

□

Feature

Economics of Biodiversity: Some Methodological Issues

M. Ravichandran & Cheelam Balasundaram

The worth of the bio and genetic resources, be it in situ or ex situ depends on not only the biological values but also the social and politico-economic values we attach to these resources. In this context, there are a number of methods available for valuing the biological diversity; among these techniques, contingent valuation, hedonic pricing and travel cost methods are widely quoted despite the intrinsic difficulties in interpretation. Essentially these methods aim to assess the non-marketed aspects of environmental services of biodiversity. They differ from the conventional economic estimation methods and depend more on qualitative information which are converted into quantitative valuation, state the authors.

M. Ravichandran and Cheelam Balasundaram are from the Departments of Economics and Futurology respectively Bharathidasan University, Tiruchirapalli-620 024.

In the process of creating a database for environmental resources in general and biodiversity in particular, along with natural scientists, social scientists have also started to propose possible methods of assessing the concerned resources. This has become imperative in the current scenario of local onslaught of biodiversity and the indiscriminate exploitation by developed countries. There are several methods of attaching economic value to biological resources and valuing biodiversity. Notwithstanding the fact that these methods are seldom attempted in developing countries, it is, however, worthwhile to take stock of the available techniques in this context. But the problems of interpretation of these estimates remain unresolved even for those who proposed these methods.

Biodiversity : The Concept

The concept of biodiversity is quite wide in terms of its constituents as it covers all the living components of the extensive ecosystem from the flora and fauna to the recent crops and livestocks. In simple terms, the realm of biodiversity comprises plants, animals and micro organisms. Basically these are resources both biological and genetic in forms found mostly in tropical forests. Many of these resources, (that is in terms of bio and genetic forms, before being manipulated and developed and kept in laboratories for further genetic manipulation) have not received the deserved attention. Realization started only when alternations of these organisms began to affect the environment on which the very existence of life depends (Brown, 1985).

The scenario of biodiversity per se, the heritage of all, has vastly been changing in the recent years due to the intrusion of multinational corporations in this field.

Evidences subscribe to the view that the southern developing countries are endowed with large tropical forests which are known for rich biodiversity (Babbitt

1992). As there is dearth of tropical forests in the Northern developed countries, biodiversity too is limited there. Incidentally India is supposed to be affluent in bio and genetic resources as these tropical forests are located in Andaman and Arunachal Pradesh. Reverse is the case, when it comes to utilizing these resources at a much faster pace than that of developing countries. Developed countries adopt very sophisticated methods of extracting the resources from the bio and genetic sources from the tropical forests and develop the biotechnology.

The Problem at Stake

There is a conflict between the North and the South over the use of these resources. It is a rift over the question of sovereign rights over these resources of the concerned countries. The Northern industrialized countries take the stand to globalize the bio and genetic resources of the world. While the South fights for the sovereign rights to be entrusted to the respective countries where the biodiversity exists in large. The North calls these resources as global heritage, seems very magnanimous as far as bio and genetic resources are concerned. The motivation behind this proposal is certainly a matter of concern for the developing countries. Hitherto the developed countries had gained accessibility almost freely to the biological resources across the world. As mentioned the developing countries endowed with rich biodiversity stand to gain nothing by allowing the high-tech rich North free entry.

There is a conflict between the North and the South over the use of these resources, over the question of sovereign rights of the concerned countries.

Benefits that flow from the research in terms of biotechnology are immense. By biotechnology, we mean the manipulations of genes in plants and animals to prepare new forms of seeds and species through genetic engineering. Technicalities of biotechnology are out of the purview of this paper and only the economic issues are hence analysed. The flow of the fruits of biotechnology research has been one way so far. The North seldom divulges the results or the technical know-how of biotechnology to the South. The South is totally deprived of such facility nor do they get any money paid by the North for the use of bio and genetic resources. The South has so far been too generous in allowing the North to conduct research and also be a market for the technology that they develop. Practically, the South purchases biotechnology from the North, while providing the sources for devising the same.

The flow of the fruits of biotechnology research has been one way so far. The North seldom divulges the technical know-how to the South.

Socio-Political & Economic Issues

Only the economic benefits over the use of these resources cause much concern for both the North and South. The value added to the bio and genetic resources in the form of biotechnoloyg is substantial. Elasticity of loss of biodiversity with respect to per capita use of bio and genetic resources is greater than one. This means that when bio and genetic resources use doubles, the loss of biodiversity is more than doubled. By allowing easy accessibility to the developed countries, biodiversity is drained resulting in extinction of different species from the ecosystems.

Certainly it is an economic loss to the South whose bioresources are subjected to such exploitation. In case the user countries viz., developed countries pay for using the bio and genetic resources, revenue would accrue to the host countries. The revenue thus collected may be used for preserving the biodiversity. Where the question of patents and Intellectual Property Rights comes, developing countries also have every reason to make the user country pay for such uses of bioresources. It is quite logical (Ravichandran, 1993).

Another facet is the sociological dimension which is quite important from the point of forest dwellers who coexist with biodiversity. As far as developing countries, particularly India are concerned, forest based genetic resources are more a community wealth, in the sense that the forests and village dwellers are part and parcel of the set up. They have been adopting so many traditional methods, no matter how unscientific, that has preserved the resources for centuries. In the name of environmental protection, the western mode of conservation has only caused dislocation of local communities, curbing their rights and activities and alienating them.

The services of forest dwellers and villagers require not only appreciation but also deserve more in the form of compensation. If Scientists and research organisations could mange to grab the financial benefits from designing and commercialising biotechnology, why not

the forest and village dwellers? After all, forest dwellers live in harmony with nature, as they adjust their life style in such a way that no harm is done to biodiversity.

Though not explicit, the political motives behind biodiversity conventions are certainly a matter causing concern for the South. Under the pretext of information exchange and conservation programmes, the North would legitimise their stand to gain entry with no burden and exploit the bio and genetic resources of the South. It may so happen that the biodiversity convention is used 'to twist the arms of the developing countries' and enforce many restrictions to aid and trade programmes. Another related issue is the question of Patents and Intellectual Property Rights (IPR). The North tried to play a safe game by bringing in patents and IPR to safeguard the methodology of biotechnology. They use these as their weapons through which they bring in monopolistic restrictions in sharing biotechnology. To the North, commercialisation process starts only after they develop what is called biotechnology, while this does not apply for the inputs that they use. It is here that the biodiversity convention could come to the rescue of the developing countries. Through this convention, the South can insist that the developed countries pay for the use of bio and genetic resources for conducting research, besides sharing the outcome of the research with the host countries.

The South can insist that the developed countries pay for the use of bio and genetic resources for conducting research, besides sharing the outcome of the research with the host countries.

In the light of these discussions, it is necessary to assess the magnitude of the economic values of bio and genetic resources in gene rich countries in the interests of the revenue that these countries deserve by being the donors of the resources. This may enable a host country to charge the user country for the use of resources or to think in terms of granting tradable permits for the users.

Methods of Valuation

Conventional procedures of valuing are of little use in the case of qualitative types of information. Most of the biological resources that we are concerned are qualitative in nature and therefore attaching quantitative values for such cases pose great deal of difficulties. The willingness to pay by individuals becomes the basic premise upon which certain methods were outlined (Campman & Hall, 1992). Broadly, the total economic value of environmental resources can be assessed through use values and non-use values. Use value indicates a direct possible transaction between individuals and biological resources such as food, fuel, shelter and medicine. Non-use values include option and existence values. Option values denote the future use and future flows of information regarding the use of resources which are beneficial to individuals from mere the knowledge that the resources exist.

Contingent valuation method, Hedonic pricing and Travel cost methods are the widely quoted methods which make use of the above stated use and non-use values. The contingent valuation method (CVM) primarily aims at determining the individual's level of desire for environmental quality through his/her willingness to pay for increments in environmental quality. This exercise uses willingness to pay as representative of demand for environmental quality. The precondition here is to artificially create a hypothetical market, then with the help of structured questionnaire, it is reported to be possible to know people's willingness to pay for environmental goods and services directly. As stated earlier as many of the environmental goods are not traded in the market, this method specifically looks for information on items which are usually not marketed. The valuation is contingent because the values derived from CVM depend on the individual perception of a host of background factors that influence the market being surveyed.

In the case of hedonic pricing, the technique is designed in such a way as to take into account the value of non-marketed environmental resources which are implicit in the prices of other marketed goods and services. The price of land and property is a typical example where this technique is useful in valuing soil fertility, scenic beauty and air quality as these are not generally exchanged in markets but influence the price of land a great deal. And the travel cost method is yet another way of assessing values through the information on the expenditure by site visitors.

Concluding Remarks

These methods have been tried in developed countries for assessing diverse ecosystems, wildlife and tropical forest resources. Initiations were made in the direction of attaching economic values for biological resources, lest problems of interpretations of such estimates continue to exist in this area. The reasons could be threefold. Firstly the complexities involved in terms of segregating the non-marketed elements to be assessed. Secondly, the process of correcting the market price

and making it reflect social values involves the understanding of social relations besides the magnitude of the possible influence of the concerned resources on society. Thirdly the whole exercise centres around the premise of willingness to pay by individuals and the estimates are based on the expressions of willingness alone as opinion and not on the basis of actual transaction made in the market. Even in travel cost method, the travel cost incurred in visiting sites may not be realistic as the visits may be multipurpose.

Another related issue is pricing of natural resources through conventional method. Can access to natural resources be determined by marginal products? The reply could be on the negative. The concept of marginal product of factors of production is tautological, with apparent productivity itself being determined by the social relations that govern the distribution of income among labour, capital and ownership. In fact, in all societies, this access is regulated by laws and social convention whose nature and effects are important to understand. Suppose, for instance, that the economist is capable of calculating the marginal product of a particular factor of production, economic agents in this regard must behave in a way that is consistent with the calculation. However, this requires a modification of the social laws governing access to natural resources. The measurement of any environmental resource is associated with the problem of its valuation over time. In the interest of future resource conservation, it is necessary to value the resource not at a single moment but over a period of time. Essentially, this process combines future values with the current values through a discount rate. The net present value calculations, normally, employ a discount rate to arrive at a single value by converting the stream of future benefits. Discounting enables the economist to represent the value of resources in terms of the flow of income derived from the resource over a specific time span. The discount rate reflects the greater importance attached to the current compared with future and the trade-off between them. The practice of discounting the future appears to be an obvious psychological choice for every individual. However, one cannot extend such discounting to the society at large, in any sphere. The observations concerning discounting of the future are to be kept in mind when we consider environment. The negative impacts of a number of today's economic activities will show up only in the long term. Hence the economic method should incorporate absolute values and give up the concept of discounting the future (Amin, 1994).

Notwithstanding the difficulties involved in the interpretations of the estimates, these methods should be modified based on trial and error to make them suitable for assessing the necessary biological resources in the coming years.

Notwithstanding the difficulties involved in the interpretations of the estimates, these methods should be modified to make them suitable for assessing the necessary biological resources in the coming years.

References

Amin Samir (1994), "Environment and Economic Calculations, Mainstream".

Babbitt Bruce (1992), "Earth Summit", World Monitor, January.

Brown Lester R. et al. (1985), "State of the World".

Campman & Hall (1992), "Global Biodiversity Status of the Earth's Living Species", A report compiled by the World Conservation Monitoring Centre.

Chapman Peter M. (1991), "Environmental Quality", Environmental Science and Technology, August.

Fletcher Susan R. & Mary E. Tiemann (1992), "Trade and the Environment", CRS Review.

Kothari Ashish (1992), "Politics and Biodiversity Convention", Economic and Political Weekly, April 11-18.

Ravichandran M. (1993), "Biodiversity Convention: Who Stands to Gain", Southern Economist, June.

□

Feature

Small Farmers' Agri-business Consortium : A Case of Dharwad District in Karnataka

M.J. Bhende & H.G. Hanumappa

In order to make small and marginal farms economically viable and productive entities, the Govt. commenced the Small Farmer's Agri-business Consortium (SFAC) in 1992. Dharwad in Karnataka was selected as one among the 12 districts in the country for implementation of the project on a pilot basis. The authors outlines the projects suggested for implementation in the district along with identifying the costs and benefits.

M.J. Bhende & H.G. Hanumappa are Associate Professor and Professor respectively in Agriculture Development and Rural Transformation Unit, Institute for Social and Economic Change, Nagarbhavi post, Bangalore-560 072.

Development of rural areas has been one of the abiding concerns of the successive Five Years Plans. It began with the community development program in the early 1950s which helped to establish a network of basic extension and development schemes in the villages. These programmes were being implemented during the first three five year plans. Later on, the Small Farmers' Development Agency (SFDA) and Marginal Farmers and Agricultural Labourers Agency (MFAL) were setup during the Fourth Five Year Plan. SFDA and MFAL were supposed to promote rural industries and evolve adequate institutional, financial and administrative arrangements for implementing various programs and to promote the creation of common facilities for production, processing, storage and marketing of the products. However, SFDA, MFAL and the like programmes made very little contribution towards the upliftment of the small and marginal farmers and agricultural labourers. Later on in 1979, these were merged with the larger IRDP. But IRDP could not go too far in alleviating the problems of the rural poor. The findings about the impact of IRDP on the living conditions of rural poor are conflicting. However, IRDP has given rise to a culture of subsidy and changed the perceptions of the rural poor about these programmes. Consequently, the poor do not have active involvement in IRDP.

Over the years, labour force is growing both in absolute and in relative terms and employment opportunities in organized sector are not growing proportionately. In other words, the growth experienced over the past few years is without creating sufficient employment. There is increasing pressure on land as the increasing population and labour force in rural areas do not find other avenues for gainful employment outside the agricultural sector. Hence, the new paradigm of development should be based on a "job for all" strategy which is economically viable, socially equitable and environmentally friendly (Swaminathan & Hoon, 1994). This approach will lead to a "job lead growth" where the

rate of growth in employment will be higher than the rate of growth in GDP.

Now, with the introduction of structural changes through macro-economic policies and increased emphasis on export led growth, it is imperative to improve the viability and efficiency of all the sectors in the economy. So far as agriculture is concerned, the laws of inheritance have led to sub-division and fragmentation of land and rendered the scattered holdings uneconomical and unviable. Moreover, the number of small holdings is swelling year after year.

There is an urgent need to help small and marginal farmers to shift their production strategy from subsistence orientation to commercialization.

These farms which are endowed with poor resource base mostly grow subsistence crops and hence do not generate sufficient income for investment on such farms. Thus there is an urgent need to help small and marginal farmers to shift their production strategy from subsistence orientation to commercialization and also reap the benefits of scale economies.

In order to make small and marginal farms economically viable and productive entities, Government of India has decided to organize Small Farmers' Agri-business Consortium (SFAC). The initiative which could bring drastic changes in the rural scenario was announced by Union Finance Minister, in his budget speech in February 1992. "Special attention needs to be paid to support innovative ideas for generating income and employment in rural areas through support to various types of agri-business. As an experimental measure, Government proposes to set up a Small Farmers' Agri-business Consortium (SFAC) is an autonomous corporate entity funded by the Reserve Bank of India, NABARD and IDBI. The Consortium will include representation from development boards dealing with agriculture and agro-industries, private sector companies, banks, scientific organisations and farmers' associations".

It was decided that SFAC will be implemented on a pilot basis in 12 districts drawn from twelve states. Accordingly, Dharwad district in Karnataka was selected for developing detailed action plans for implementation of SFAC Programme. This Programme is expected to promote a new paradigm of agricultural development based on economic efficiency, social equity and environmental soundness and carry the benefits of modern agri-business to the resource poor small and marginal farmers in the district.

The idea of SFAC is based on the principle of participatory approach unlike in the case of IRDP and other programmes. The participants i.e., producers and agricultural labourers will be actively involved in the formulation and execution of the project and a sense of belongingness will be induced through the SFAC programme. Under the SFAC framework, establishment of producers' organisations is envisaged. These producers' organisations will integrate production, processing and marketing functions and form close linkages among primary producers, private as well as public sector industry. Thus it will help in the value addition of agricultural produce and create employment in rural areas.

The approach adopted in SFAC project is different from other government sponsored projects. The farm families and landless labourers involved in this programme are treated as "participants and producers and not beneficiaries". The approach should be market driven and should be based on a very careful assessment of marketing opportunities both within the country and abroad. The role of government in SFAC is visualized mainly in the development of the necessary techno-infrastructure in rural areas, devising input and output pricing policies and arrangement of credit facilities, and other services through the Consortium.

The farm families and landless labourers involved in this programme are treated as "participants and producers and not beneficiaries".

Finally, majority of the participants are small and marginal farmers and hence, it becomes important to pay attention to the production, processing and marketing chain through appropriate farmers organisation. This calls for a dedicated professional leadership who could develop the institutional and infrastructural base to ensure that benefits accrue to the participating farmers/ producers.

Objectives

The following objectives served as the guidelines in the formulation of SFAC project for Dharwad district.

1. To identify appropriate projects within the existing resource base and development of these resources within the framework of the Consortium.
2. To formulate appropriate projects which are commercially and economically viable and technically feasible.
3. To suggest an organisational structure at village and district levels to facilitate the smooth implementation of the project within the doctrine/ framework of SFAC.

Thus the study basically involved the identification of potentialities and building up of mechanisms for the benefit of farm families in general and small and marginal farms in particular.

Methodology

Before identifying the projects for SFAC, a steering committee meeting was held in Bangalore. The committee members included representatives from different government departments, NABARD, Agricultural University, CFTRI, MSSRF and local NGOs. The committee discussed about the potential projects that can be taken up under SFAC umbrella. There was a long list of projects suggested by the members. However, after considerable discussions and debate on several projects proposed by various agencies and resource persons, the project team decided to concentrate and formulate initially one project for chilli processing, one for cotton ginning and pressing and another one for manufacturing of particle boards using cotton stalks. The projects related to chilli and cotton crops were selected because of the area and production of these two crops in Dharwad district. The decision to select these three projects was also guided by the findings of a sample survey among farmers in the district.

Agricultural sector plays a dominant role in the economic development of Dharwad district. About 40 per cent of the district income is generated by agricultural sector and approximately two thirds of the population depends on agriculture for their livelihood. The cropping pattern is dominated by sorghum, cotton, groundnut and pulses.

Dharwad district has more than one lakh hectares of area under plantation and horticultural crops. Chillis is an important crop among the spices and Dharwad is the largest chilli growing district in the state.

The infrastructural facilities like transport, communication, education, health, water and power supply, irrigation, and marketing determines the development of the region. Dharwad district has good network of roads with an average road length of 0.68 km per sq. km. of the geographical area of the district. There are 52 regulated markets comprising 15 regulated main markets and 37 sub markets with a turn over of Rs. 356 crores. There are 201 commercial bank branches, 122 branches of Regional Rural Banks and 121 branches of co-operative banks.

Dharwad district has abundant scope for the establishment of small and medium scale industries based on raw material supply from agriculture, forestry and animal husbandry. There are more than 10,000 units of small scale industries providing employment to more than one lakh people. Cotton based (textile) industries dominate the industrial sector in Dharwad district.

Field View

The study team undertook extensive field visits and held discussions with the government officials, experts from the Agricultural University, Dharwad as well as with some of the local NGOs. In order to get first hand information about the capabilities, expectations and perceptions about agri-business as well as attitude towards group co-operation, we interviewed about 250 small and marginal farmers spread over 20 villages in Dharwad district.

The data were collected on land holdings, irrigational facilities, cropping pattern, cultural practices, input use and output levels of important crops. We also attempted to elicit information about their perceptions about problems on various aspects like processing of farm produce, marketing facilities and credit availability etc,.

It is generally said that small farms are subsistence oriented and grow foodgrains on sizeable area to safeguard their food requirements. However, the team observed that, in Dharwad district the small and marginal farmers are very responsive to market signals and if opportunity is given they can do better than what is expected of them. During the field visits, it was found that there were more than 15 national as well as multi–national seed companies operating in Rannebennur taluk. Small and marginal farmers of this taluk take up seed production activity for cereals as well as vegetable crops for seed companies and earn handsome profits. This reflects the enterprenurial abilities of small and marginal producers of the district.

Manufacturing of Particle Boards from Agro-Waste

Technology: It has been found that the cotton stalk can be fully exploited to manufacture particle boards as a substitute for panel boards (press wood) which is manufactured out of costly wood by destroying the forest resources. Cotton stalks in Dharwad district are partly used as fuel and partly burnt without being put to any use. Since technology is available to the manufacture of particle boards at lower cost and save the valuable forest wealth, we have proposed a manufacturing unit of particle boards under SFAC in Dharwad district.

Benefits: The setting up of such units will help cotton growers to augment their income through sale of cotton stalk which otherwise is burnt. The production of particle boards from cotton stalks at lower costs will save our valuable forest wealth from destruction. Moreover, it will create direct and indirect employment opportunities in rural areas.

Raw material: Cotton is grown extensively both under irrigated and rainfed conditions in Dharwad district and covers around 2 lakh hectares area. The average yield of cotton stalk (dried) will be around 4 MT per hectare (with the assumption of each cotton stalk weighing about 0.3 to 0.4 kg). Of this about 60 per cent is used for household purposes i.e., 1.6 to 2.4 MT of cotton stalk (per hectare) is burnt to ashes. This cotton stalk can be used as raw material in the preparation of particle boards. The unit suggested requires 15, 000 MT of cotton stalk at 100 per cent capacity. Hence, cotton grown on 7000 to 9000 hectares will be more than sufficient to meet the requirements of cotton stalks. Another raw material used in the manufacture of particle boards is resin, which is a petro product and is easily available in Bombay and other industrial centers.

Project Costs: The total cost of the project including land, buildings and machinery will be Rs. 294 lakhs. The unit is assumed to work for 300 days in 3 shifts per day. The cost of cotton stalk is taken as Rs. 200/ per MT whereas the sales revenue per particle board is assumed to be Rs. 9/ sq. ft. The unit will earn profit of Rs. 10.12 lakh in the second year and it will increase steadily to Rs. 86.12 lakh during the seventh year of the operation. The profitability statement is provided in Table 1. Analysis shows that the unit would break even at 58 per cent of the capacity when it produces 3490 MT of particle boards or the total turn over is about Rs. 283 lakhs. The benefit–cost ratio works out to 1.16 whereas, internal rate of return for investment is more than 50 per cent. Thus based on the financial indicators profitability, break even analysis etc, it is found that the project is financially viable.

Anticipated Benefits: Since the project utilises the agro-waste (cotton stalk) as a major input in the production process, it will help the cotton producers/members of SFAC to augment their income. Moreover, the project would generate more than 30,000 mandays of direct employment per annum, in addition to the indirect employment, which has not been worked out. This would help to improve the living standards of the rural poor as they would get additional income through sale of cotton stalk as well as employment in the project. Moreover, project would help to save valuable forest wealth i.e., forest wood which is used in the preparation of panel boards.

Spice Oleoresins

Spices are aromatic vegetable substances used for seasoning of foods. Apart from food preparations, the spices are used in culinary, cosmetics and pharmaceutical preparations, flavours and medicinal extracts etc. Spice in its raw form has certain disadvantages. Whole or ground spice does not impart its total flavour readily and when finely ground, it losses its aroma partially on account of its volatile nature. Other disadvantages include variability of flavour, strength and quality. It is unstable, bulky for storage and often unhygienic due to contamination. Moreover, some of the spices, though are abundantly available, their transportation, storage and handling are found to be inconvenient and expensive due to bulkiness. In this context, the extraction of spice oils and resine assumes importance. The quality of extracts and oils vary from 4 per cent to 20 per cent of the bulk used and hence the transportation and storage costs are considerably saved. Also for the end use it is very convenient when extracts are taken.

Market potentialities: The demand for spice oils and oleoresins have been increasing form USA and other European countries. The export of spice oils and oleoresins from India has recorded an increase of 29 per cent in terms of quantity and 75 per cent in terms of value in 1991-92, with export of 1,150 tonnes valued at Rs. 56 crores as compared to 890 tonnes valued at Rs. 32 crores in 1990-91. There are about a dozen plants manufacturing spice oils and resins in the country and most of them are located in South India mainly in Kerala.

In food and beverage industries, chilli has acquired a great importance in the form of oleoresin which permits better distribution of colour and flavour in food as compared to chilli powder. Oleoresin is used in the preparation of processed products and

Table 1: Profitability Statement of Particle Board Plant (3 Shifts) (Operation Years) (300 Days)

Particulars		1	2	3	4	5	6	7
1.	Installed Capacity (MI)	6000	6000	6000	6000	6000	6000	6000
2.	Capacity Utilisation	70%	70%	80%	80%	90%	90%	90%
3.	Production in MI	4200	4200	4800	4800	5400	5400	5400
A.	Sales	378.00	378.00	432.00	432.00	486.00	486.00	486.00
	Less: Excise Duty 10% advoluram	37.80	37.80	43.20	43.20	48.60	48.60	48.60
		340.20	340.20	388.80	388.80	437.40	437.40	437.40
B.	Cost of Production							
a.	Raw Material Cotton Stack	21.00	21.00	24.00	24.00	27.00	27.00	27.00
	Resin	105.00	105.00	120.00	120.00	135.00	135.00	135.00
		126.00	126.00	144.00	144.00	162.00	162.00	162.00
b.	Power	17.78	17.78	20.32	20.32	22.86	22.86	22.86
c.	Labour	15.00	15.00	16.50	16.50	18.15	18.15	19.96
d.	Production Overhead	22.50	22.50	22.50	22.50	22.50	22.50	22.50
e.	Cost of Steam	14.70	14.70	16.80	16.80	18.90	18.90	18.90
f.	Administration expenses	7.50	7.50	7.75	7.75	8.00	8.00	8.25
g.	Selling and Dist. expenses	33.80	33.80	37.18	37.18	40.89	40.89	40.89
	Total (B)	237.28	237.28	265.05	265.05	293,30	293.30	295.36
C.	Gross Profit (A-B)	102.92	102.92	123.75	123.75	144.10	144.10	142.04
D.	Interest							
	Term Loan	37.00	36.00	31.75	26.49	20.25	13.10	5.50
	Working Capital Loan	7.20	7.20	7.20	7.20	7.20	7.20	7.20
	Total (D)	44.20	43.20	38.95	33.69	27.45	20.30	12.70
E.	Profit before Depreciation (C-D)	58.72	59.72	84.80	90.06	116.65	123.80	129.34
F.	Depreciation	61.62	46.84	35.70	27.27	20.91	16.09	12.45
G.	Profit before (E-F) (-)	(–) 2.90	12.88	49.10	62.79	95.74	107.71	116.89
H.	Net Profit after Tax (-)	(–) 2.90	10.12	36.22	26.31	70.61	79.44	86.21

also incorporated into a number of pharmaceutical formulations. The growing awareness of the consumers for quality, ready made and easy to use commodities are any indicators, the potential market for spice oils and resins can hardly be exaggerated. Setting up of a modern unit for extraction of spice oils and oleoresin under SFAC project will help in the economic development of the region. Moreover, once the unit is established, there is good scope for the development of down-stream industries like chilli powder unit and/or poultry feed plant using the by-product of chilli oleoresin.

The global trade in spices is about 4 lakh tones valued at U.S. $ 1.3 billion. The biggest market for the spices in the world is the US estimated at around 1.5 lakh tonnes. North America and Western Europe are the most important regions in terms of demand. The erstwhile socialist countries of East Europe are also significant outlets. The Middle East countries are also major importers of spices especially from India.

India has a distinction of being a traditional exporter of spices for centuries now. The Indian king of spices, "pepper" has held the reign in the world export market for quite long. So also Indian ginger were sought after in the international market. Indian chilli has carved a place in the export markets of USA, European countries and East Asian countries. The world demand for spice oils and oleoresins are estimated at 2,300 tonnes in 1990, 3,100 tonnes in 1995 and 3,900 tonnes in 2000 AD. The projected average annual growth is 10 per cent. India's present export of 1,150 tonnes of oleoresins and oils amounts 35 per cent of the world demand in 1995 and 28 per cent of the world demand in 2000.

Considering the world demand projections for oleoresins and India's potential for expanding its share,

the proposed capacity is very small. Besides export demand, there is also an indigenous market namely, hotels and food processing industries.

Project costs & benefits: Chilli is extensively grown in Dharwad district and covers about 1 lakh hectares area with an annual production of more than 70,000 tonnes of ripe-dry chilli. The variety and quality of chilli in this area are considered suitable for the project. The proposed spice oil and oleoresin plant of the SFAC is basically envisaged to manufacture capsicin/chilli oleoresin with the intention of helping chilli-growers in Dharwad district. However, spices are seasonal, crop yields are subjected to vagaries of weather, export market and prices fluctuate and to have flexibility of production and supply of range of products to the buyers, installation of a multi product or a multi purpose unit has been suggested so that either chilli or ginger or pepper can be charged to the plant.

The proposed unit is a multipurpose plant with a charge capacity of 2 tonnes per day. The yield in terms of oleoresin is 7 per cent of weight, a production of 140 kgs of oleoresins per day approximately. The plant working is assumed to be in 3 shifts/day for 300 days in a year. The total cost of the project is estimated at Rs. 210 lakh. The project will be financed through equity share capital and partly through loans from financial institutions.

The projected turn over for the first year of operation is Rs. 297 lakhs and will rise to Rs. 436 lakh in the third year of the operation. The net profit during the first year will be Rs. 56 lakh and this would increase to Rs. 123 lakhs in the seventh year. (Table 2). Analysis indicates that the unit would break even at 35 per cent (Rs. 153 lakh) of the turn over estimated from third year onwards. The return on investment will be 69 per cent. The benefit cost ratio for the project is 1.36 whereas the

Table 2: Estimated cost of Production and Profitability of Oleoresins Plant Years

Rs. Lakhs

Description	1	2	3	4	5	6	7
Installed Capacity Charge/tonnes	666	666	666	666	666	666	666
Utilisation % Production/Sales (tonnes)	60	75	90	90	90	90	90
Oleoresins	30	30	30	30	30	30	30
Oils	5	6	7	7	7	7	7
A. Export Sales	297	367	436	436	436	436	436
B. Costs							
1. Raw materials	116	147	181	181	181	181	181
2. Solvents	13	16	19	19	19	19	19
3. Power, fuel and water	2	2	2	2	2	2	2
4. Salaries and Wage	11	12	13	14	15	17	19
5. Consumables, spares and stores	2	2	3	3	3	3	3
6. Repairs and maintenance	2	2	3	3	3	3	3
7. Other mfg. expenses including carriage inward etc.	5	2	3	3	3	3	3
C. Cost of production	151	188	231	232	233	235	237
D. Gross Profit (A-C)	146	179	205	204	203	201	199
E. Administration expenses	12	12	12	12	12	12	12
F. Selling and distribution	15	19	23	23	23	23	23
G. Profit before interest and depreciation (D–E+F)	119	148	170	169	168	166	164
H. Interest	37	40	38	32	27	21	15
I. Depreciation	26	26	26	26	26	26	26
J. Profit before tax (G–H+I)	56	82	106	111	115	119	123
K. Profit after tax	56	82	106	111	115	119	123
L. Depreciation	26	26	26	26	26	26	26
M. Cash Accruals (K+L)	82	108	132	137	141	145	159

Note: Being export earnings, Income is tax free.

internal rate of return works out to be more than 50 per cent per annum. The unit will employ more than 50 persons per day on a regular basis in addition to casual or contract labour for unskilled jobs.

The project will help small and marginal farmers to reap the benefit of value addition to their produce (individual perspective) and earn valuable foreign exchange (national perspective).

Cotton Ginning and Pressing

Background: Dharwad district ranks first in terms of area and production of cotton in the state. Area under cotton was 1.96 lakh hectares accounting for roughly one third of the total area under cotton in Karnataka and contributed 2.39 lakh bales i.e., one fourth of the total state production in 1991-92. Cotton shared more than 14 per cent of the gross cropped area of Dharwad district in 1991-92. Different varieties of cotton are grown in the district depending on the local agro-climatic conditions and resource endowment of the farm. However, long staple cotton varieties like Varalaxmi and DCH-32 are dominant in irrigated tracts and Jayadhar and other local critics with short staple length are grown under rainfed conditions.

At present, most of the farmers sell cotton either at Agricultural Produce Marketing committee (APMC) yard or through Cooperative Cotton Marketing Society (CCMS) and a few to commission agents and creditors. During the course of our field visit to Dharwad district, we discussed about the existing/current marketing practices followed by the cotton growers especially small and marginal farmers. The majority of these farmers were unhappy about the delay in payment and prices offered to their produce by the traders. The farmers get only 25 to 40 per cent of the total value of the produce at the time of sale and have to wait for 2 to 3 months to get remaining amount. If the farmer desires for full payment, he has to bear 5 to 10 per cent discount for spot payment.

The Cooperative Cotton Marketing Societies in the district play the role of intermediary between the farmers and the cotton traders like the commission agents in APMCs. Most of the CCMS have cotton ginning and pressing facilities in their premises. However, they do not undertake ginning of cotton on behalf of farmers, and on the contrary, CCMS are engaged in providing custom services to the traders. The ginning and pressing work is carried out on a job work basis for the traders. Thus the CCMS neither facilitate prompt payment for cotton nor extend any benefit of value addition to the cotton growers.

With the marketing scenario of cotton described in the foregoing and considering the potential benefit of value addition to cotton growers along with employment generation in rural areas we proposed to install one or two cotton ginning and pressing units on a pilot basis for the cluster of cotton growing villages in Dharwad district. The unit will be engaged in Raw cotton (kapas) ginning and pressing activities. The final products are bales of ginned cotton and cotton seeds. The products are consumed by various textile mills and oil mills respectively. There are 199 textile factories in Dharwad district. Moreover, Government of Karnataka has plans to establish a "textile city" near Hubli, which is a commercial centre in Dharwad district. As of today, there are a few spinning and weaving mills in Dharwad district and marketing of cotton bales will not be a problem. The CCMS' which has the ginning and pressing facilities also can amend their bye laws and undertake ginning and pressing of cotton on behalf of farmers.

The project costs and benefits: The proposed unit will have 10 double roller gins and a bailing press. It is assumed that the unit will work for a minimum period of 160 days in a year in 2 shifts of 8 hours each. The unit will need 170 quintals of kapas every day and will produce 33 cotton bales of 170 kgs each. The unit also can provide custom hire services to traders as well as other agencies such as Cotton Corporation of India (CCI) for processing cotton and earn additional revenue and augment the income.

The total cost of the project is estimated at Rs. 204 lakhs. The unit will get investment subsidy on land, building and machinery from the state government up to Rs. 25 lakhs (maximum). The project will be financed through contribution of equity capital and borrowing from financing institutions.

The turnover projected for the first year of operation is Rs. 606.43 lakhs. There will not be any operating profit during the first year of operation, however, the unit will make a profit of Rs. 2.75 lakh in second year which will steadily rise to Rs. 33.81 lakhs in the ninth year (Table 3). The unit will break even at 77 per cent of the turn over. The benefit cost ratio works out to 1.02, whereas the internal rate of return for the investment works out to 29.75 per cent.

Anticipated Benefits: The ginning and pressing unit as envisaged under SFAC project will be owned by the cotton growers themselves and this will help them not only to get remunerative price for their produce (cotton) but also to reap the benefits of value addition. Moreover, the cotton ginning operation is highly labour incentive and will provide employment for at least 100 unskilled labourers of which more than half will be female

Table 3: Profitability Statement of Cotton Ginning & Pressing Unit (2 Shifts and 160 Days Operation)

Particulars/Years	1	2	3	4	5	6	7	8	9
No. of Gins worked/shift	10	10	10	10	10	10	10	10	10
Total No. of Gins/Shifts per year	3200	3200	3200	3200	3200	3200	3200	3200	3200
Lint production in quintals	8960	8960	8960	8960	8960	8960	8960	8960	8960
Seed production in quintals	17662	17662	17662	17662	17662	17662	17662	17662	17662
A. Sales	606.43	606.43	606.43	606.43	606.43	606.43	606.43	606.43	606.43
B. Cost of Production									
a. Raw material	517.02	517.02	517.02	517.02	517.02	517.02	517.02	517.02	517.02
b. Stores	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82	1.82
C. Packing Materials	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87	4.87
Total (B)	523.71	523.71	523.71	523.71	523.71	523.71	523.71	523.71	523.71
C. Utilities									
Power and water	3.66	3.66	3.66	3.66	3.66	3.66	3.66	3.66	3.66
D. Factory Wages	9.12	9.12	9.12	9.12	9.12	9.12	9.12	9.12	9.12
E. Factory Overheads	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30	7.30
F. Contingency	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
G. Selling & ADMN	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63	6.63
H. Cost of Sales (B+C+D+E+F+G)	551.42	551.42	551.42	551.42	551.42	551.42	551.42	551.42	551.42
I. Gross Profit (A-H)	55.01	55.01	55.01	55.01	55.01	55.01	55.01	55.01	55.01
J. Interest									
Term Loan	22.19	22.19	19.30	16.50	13.78	11.02	8.27	5.51	2.76
Working Capital	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50
Total (J)	36.69	36.69	33.80	31.00	28.28	25.52	22.77	20.01	17.26
K. Profit Before Depreciation (I-J)	18.32	18.32	21.21	24.01	26.73	29.49	32.24	35.00	37.75
L. Depreciation	19.59	15.57	12.49	10.10	8.21	6.73	5.59	4.67	3.94
M. Net Profit (K-L)	1.27	2.75	8.72	13.91	18.52	22.76	26.65	30.33	33.81

labourers. In addition to this about 15 to 20 educated unemployed will also get job in the unit. Further more, there is vast scope for vertical integration i.e., by way of establishing spinning and weaving mills by the farmers cooperative society.

Organisational Structure

The success of any developmental intervention depends to a great extent on the nature and structure of the implementing organisation. SFAC attaches importance to shareholders participation and the shareholders are by and large farmers—a majority of whom are poor. It is highly relevant that their future economic prosperity and the nature of participation are ensured in the organisational form which SFAC takes. It is with this promise that we have attempted to outline an organisational form and structure of SFAC in Dharwad district.

The farmers were reluctant to join private entrepreneurs as partners as they fear that profits would be siphoned off by the unscrupulous among them. Thus giving weightage to farmers' perceptions and feasibility of the organisation, an organisational set up under cooperative fold is suggested here.

Cooperative movement in Karnataka took its roots in Dharwad district in the first quarter of this century. The first cooperative society was registered in 1918.. Most of the cooperative organisations and institutions established later are doing well in Dharwad district. The

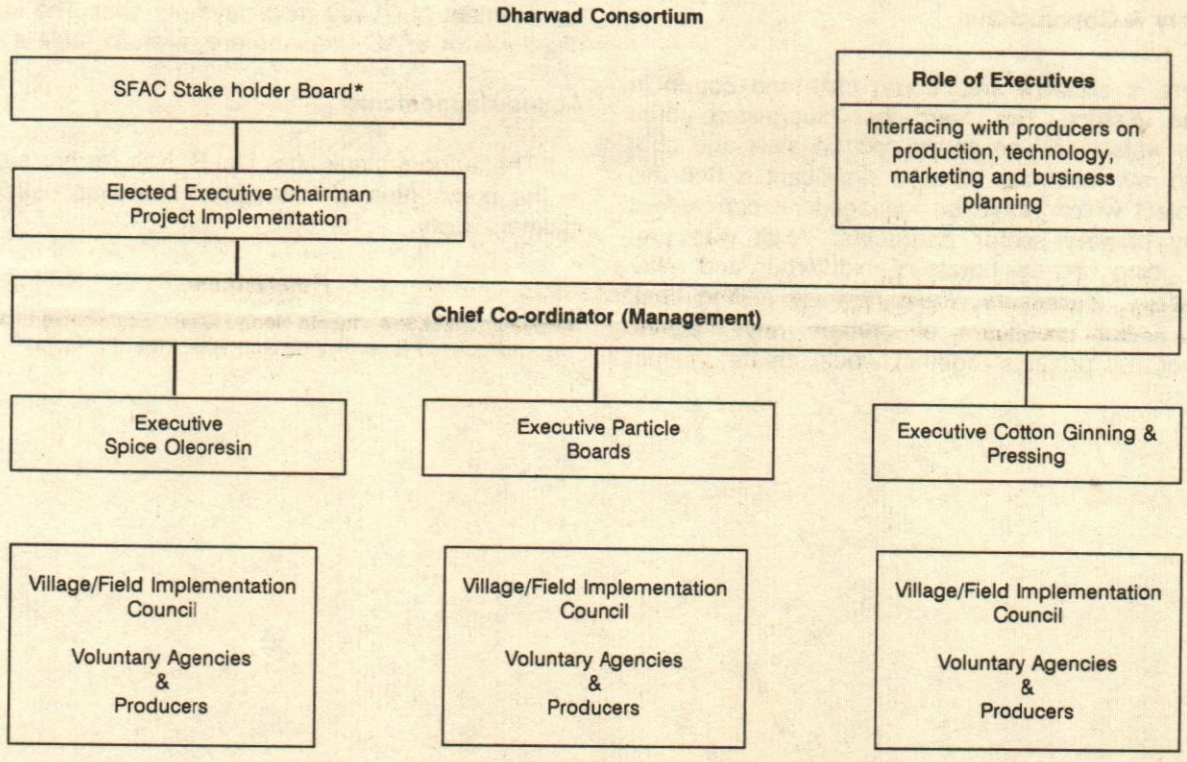


Chart 1

organisation registered under Cooperative Societies Act is eligible to get financial assistance from government and other financial institutions to make up the margin money or equity capital. Moreover, societies can distribute profits as patronage dividends to members in proportion to the inputs (raw material).

It is proposed to register SFAC in Dharwad as a registered society under Cooperative Societies Act. Dharwad SFAC will have a district level Executive Board for all the three enterprises identified for implementation. The executive Board will comprise elected representatives from marketing bodies financing institutions like DCC Bank, IDBI, NABARD and the like. Chairman of this board will normally be elected form among the members of the executive board and more specifically from farmers' representatives and not from ex-officio members. The board will formulate policy guidelines to all the enterprises coming under its jurisdiction. Executive board will appoint a professional manager to coordinate various activities of different enterprises in the district and provide day to day professional guidance whenever necessary. Also there will be one specialised person or manager dealing with each product irrespective of the number of units involved in the production of a given product (Chart 1).

Table 4: SFAC Key Indicators

Project	Total Investment (Lakh Rs.)	Loan (Lakh Rs.)	Subsidy	Working Capital (Loan Lakh Rs.)	Equity (Lakh Rs.)	Employment Mandays*	Output Quantity	Output Value (Rs. in Lakhs)	Farmers
Spice Oleoresin	210.00	140.00	15.00	54.00	55.00	15,000	53.00 Tonnes	436.00	2,000
Particle Boards	294.00	194.00	25.00	40.00	75.00	30,000	54.00 M.Tonnes	486.00	10,000
Cotton Ginning and Pressing	204.00	153.00	–	100.00	51.00	19,200	8960 Qtls.	606.43	8,000
Total	708.00	487.00	40.00	194.00	181.00	64,200	–	1,528.43	20,000

* Direct employment per year.

Summary & Conclusions

There is sizeable area under chilli and cotton in Dharwad district. The team has suggested three projects which will use cotton, cotton stalk and chilli as basic raw materials. What is significant is that this is a project which would be managed on commercial lines by primary sector producers. What was previously going into the hands of middlemen and other intermediary processors would now be getting back to the actual producers of primary raw material. Moreover, the projects together would create a direct employment of 64,200 man days per year. The key indications for SFAC Dharwad are given in Table 4.

Acknowledgements

The authors thank Miss Lini R. Nair for her support in the preparation of this paper. However, usual disclaimers apply.

References

Swaminathan M.S. & Vineeta Hoon (1994), "Sustainable Strategies for Job-led Growth" Working Paper, MSSRF, Madras.

□

Labour & Capital Productivity Estimates for Indian Economy (1951 to 1994)

NPC Research Division

In our earlier studies, attempts were made to arrive at labour productivity for various sectors of the Indian economy (Productivity, 29(4), 1989;30(1), 1989;30(2), 1989) and capital productivity, (Productivity 30(3), 1989) for the period 1980-81 to 1987-88. Attempts were also made to arrive at labour and capital productivity estimates for years 1950-51 to 1988-89 for Indian economy (Productivity 31(1), 1990), and labour productivity growth in the Indian Economy for the period 1982-1992 (Productivity 35(3), 1994). International comparisons in labour productivity were also attempted (Productivity 30(4), 1990). In the present, study, the effort has been to arrive at the capital as well as labour productivity for various sectors of the Indian Economy for all the years during the period 1950-51 to 1994-95. (Tables 1-2). The corresponding indices (base 1980-81) are given in Tables 3-4.

For the present analysis output data (Gross Domestic Product at 1980-81 factor cost) for the various sectors of the economy are taken from the National Accounts Statistics of the Central Statistical Organisation (Appendix 1). For arriving at the estimates of gross capital stock (Appendix 2) we have added depreciation during the year to the Net Fixed Capital Stock of that year (at 1980-81 prices). These data are obtained from the National Accounts Statistics sources. The depreciation figures in turn were arrived at through subtracting the Net Domestic Product from the Gross Domestic Product for the respective years.

There is no labour input data (employment) for various sectors of the economy on an year to year basis. Therefore, the sectoral employment has been estimated by simple intrapolation of the employment between any two census years. For years beyond 1991, the rate of growth in sectoral employment have been assumed as the same as they were between 1981 and 1991 (Appendix 3).

Limitations

1. Since the data on output and labour input, are taken from two sources there may arise problems of sectoral coverage.

2. The definition of workers has not been uniform between any two censuses, e.g. in the 1981 Census, concepts of 'main workers' and 'marginal workers' were brought in. Only the 'Main Workers' are taken into account from 1981 onwards because 'main workers' of 1981 census corresponds to the 'workers' of 1971 census (Census of India, 1981 Reports). Similarly in 1971 census 'total workers' were shown as less than that in 1961 census. This is because of the changes in the concept of 'workers' between the two censuses. Despite the corrections introduced afterwards by the Registrar General, there was decline in employment in 'Other services' which included Banking and Insurance. Real Estate and Business Services, Public Administration and Defence etc. (Code Nos. 8-9). Due to this reason, and also due to the limitations of the methodology of computing gross domestic product in services sector, productivity computations, were not carried out in the case of 'other services'. The 'total economy' however, includes these sectors also. It was found that there has been no increase in employment in the construction sector between 1961 and 1971 censuses due to variations in concepts. Therefore, no estimates of labour productivity for this sector were arrived at for years between 1961 and 1971. The figures given under 'total economy' are not the sums of the sectors that constitute the economy for the non-census years which are arrived at by intrapolation of the series itself.

Compiled by
V. Anil Kumar

Table 1: Sectoral Labour Productivity Ratios (Rs. per Person at 1980-81 prices)

Year	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construction	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total@
1951	2351.99	5511.90	3870.63	*	9311.69	5017.86	5071.43	3062.21
1952	2349.36	6190.48	3903.03	*	9515.53	5105.19	5092.17	3084.15
1953	2385.55	6333.33	3946.93	*	8408.28	5248.30	5035.56	3120.99
1954	2528.72	6428.57	4157.89	*	8276.84	5418.35	5056.03	3258.65
1955	2561.92	6702.38	4349.28	*	8897.30	5757.37	5133.33	3342.60
1956	2499.82	6809.52	4583.57	*	10092.78	6149.33	5318.55	3373.52
1957	2594.16	7154.76	4818.56	*	10753.69	6540.40	5552.53	3508.43
1958	2438.74	7529.41	4892.35	*	9037.74	6644.27	5724.53	3410.92
1959	2642.09	7764.71	5019.19	*	9644.14	6876.96	5948.91	3610.77
1960	2574.37	8164.71	5238.68	*	9819.74	7272.14	6091.55	3630.27
1961	2686.40	9388.24	5558.30	14920.00	10844.26	7865.81	6332.19	3799.93
1962	2664.72	9813.95	5991.19	15777.78	*	8241.42	6500.00	3884.99
1963	2588.45	10976.74	6383.13	16482.76	*	8553.88	6719.24	3933.71
1964	2625.39	11172.41	6939.17	18225.81	*	9044.44	6866.67	4098.06
1965	2841.80	11204.55	7364.14	18147.06	*	9555.29	6918.60	4371.78
1966	2505.46	12522.73	7382.50	18405.41	*	9477.84	6980.50	4176.39
1967	2447.80	12674.16	7390.88	18974.36	*	9571.43	6911.76	4183.52
1968	2786.77	12911.11	7365.72	19093.02	*	9769.77	7053.98	4485.85
1969	2757.56	13131.87	7717.80	20152.17	*	10040.09	7105.91	4563.94
1970	2908.68	13780.22	8489.88	20200.00	*	10420.99	7203.31	4820.52
1971	3096.00	12728.26	8632.76	19870.37	18522.45	10774.09	7170.45	5013.36
1972	2978.26	12652.63	8541.08	20350.88	17804.69	10474.13	7140.35	4940.45
1973	2773.14	12858.59	8500.27	19901.64	17406.72	10016.10	7384.78	4804.64
1974	2914.83	12524.27	8504.16	19092.31	15578.57	9958.73	7407.33	4900.74
1975	2814.08	12764.15	8382.28	18811.59	14412.97	9927.72	7842.83	4836.86
1976	3114.57	13790.91	8199.81	20094.59	15716.61	10345.25	8189.39	5143.73
1977	2877.02	13798.25	8540.18	20987.34	16501.56	10198.67	8469.84	5081.03
1978	3103.82	13613.45	8690.73	20678.57	17360.12	10533.28	8379.19	5327.38
1979	3112.89	13528.46	9354.99	21741.57	16247.86	10915.41	8634.35	5483.44
1980	2662.05	13140.63	8672.02	20621.05	14719.35	10068.39	8793.44	5071.30
1981	2941.30	14295.45	8299.08	20294.12	15839.38	10077.40	9014.17	5265.68
1982	3048.62	15859.26	8777.03	21769.23	16360.41	10503.35	9265.02	5467.63
1983	2962.43	17172.66	9280.18	22570.09	15068.63	10702.46	9472.10	5608.54
1984	3228.66	17260.56	10128.38	23527.27	15582.94	10872.03	9884.79	6019.24
1985	3174.27	17027.40	10706.21	25336.28	15660.55	10947.59	10552.02	6184.80
1986	3130.91	17486.67	11053.59	26715.52	15891.59	11423.84	11262.04	6352.08
1987	3026.13	19337.66	11738.42	28516.67	16139.19	11694.90	11765.60	6519.63
1988	2987.32	19493.67	12506.47	30016.26	16101.45	11803.47	12519.67	6674.06
1989	3417.79	21864.20	13499.11	32380.95	16758.00	12217.87	13019.92	7223.77
1990	3418.14	22897.59	14968.14	34653.85	17034.82	12717.24	13866.06	7524.76
1991	3488.84	24602.34	15763.53	35798.51	18379.44	12927.53	14221.66	7693.11
1992	3333.71	25120.00	15051.61	38050.72	18059.03	12505.14	14608.91	7442.43
1993	3423.98	24800.00	15297.03	39767.61	17368.15	12790.39	14985.56	7584.71
1994	3445.79	25281.08	15624.71	40972.60	16827.87	12836.14	15459.02	7727.11

* Data not available
@ See text.

Table 2: Sectoral Capital Productivity Ratios

Year	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construc-tion	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total
1951	0.81	2.71	1.17	1.01	7.79	5.14	0.23	0.44
1952	0.79	2.12	1.00	0.52	8.11	4.90	0.23	0.43
1953	0.80	1.99	0.92	0.37	7.48	4.87	0.22	0.43
1954	0.83	1.79	0.88	0.32	6.60	4.85	0.22	0.45
1955	0.84	1.56	0.86	0.21	4.78	5.02	0.22	0.45
1956	0.81	1.45	0.82	0.16	3.82	5.12	0.21	0.45
1957	0.83	1.51	0.74	0.13	3.23	5.09	0.20	0.45
1958	0.77	1.56	0.65	0.12	2.84	4.77	0.19	0.42
1959	0.83	1.52	0.62	0.12	3.03	4.65	0.18	0.44
1960	0.81	1.49	0.60	0.12	3.04	4.57	0.17	0.43
1961	0.85	1.34	0.58	0.11	2.72	4.84	0.17	0.44
1962	0.83	1.14	0.59	0.11	2.77	4.85	0.16	0.44
1963	0.80	1.02	0.59	0.10	2.69	4.61	0.16	0.43
1964	0.80	0.84	0.59	0.10	2.50	4.44	0.15	0.43
1965	0.85	0.68	0.59	0.09	2.49	4.41	0.14	0.44
1966	0.73	0.72	0.54	0.09	2.37	3.93	0.14	0.41
1967	0.70	0.66	0.50	0.09	2.51	3.83	0.14	0.39
1968	0.78	0.62	0.46	0.09	2.54	3.63	0.14	0.41
1969	0.76	0.61	0.46	0.09	2.51	3.55	0.14	0.41
1970	0.78	0.58	0.49	0.09	2.48	3.46	0.15	0.42
1971	0.82	0.52	0.48	0.09	2.48	2.97	0.15	0.42
1972	0.78	0.50	0.48	0.09	2.44	2.53	0.15	0.42
1973	0.72	0.51	0.48	0.08	2.46	2.27	0.15	0.40
1974	0.75	0.48	0.48	0.08	2.28	2.08	0.15	0.40
1975	0.72	0.47	0.47	0.08	2.22	1.93	0.16	0.40
1976	0.80	0.47	0.44	0.09	2.54	1.98	0.17	0.42
1977	0.73	0.39	0.46	0.09	2.65	1.93	0.17	0.41
1978	0.77	0.34	0.47	0.09	2.75	1.97	0.17	0.42
1979	0.76	0.32	0.49	0.09	2.56	2.03	0.18	0.42
1980	0.64	0.30	0.45	0.08	2.33	1.86	0.19	0.39
1981	0.70	0.31	0.43	0.08	2.44	1.87	0.19	0.40
1982	0.72	0.30	0.44	0.08	2.26	1.88	0.20	0.40
1983	0.69	0.26	0.45	0.08	1.88	1.86	0.20	0.40
1984	0.75	0.23	0.46	0.08	1.87	1.85	0.20	0.41
1985	0.73	0.21	0.46	0.08	1.82	1.83	0.21	0.41
1986	0.72	0.19	0.45	0.08	1.89	1.88	0.22	0.41
1987	0.70	0.20	0.46	0.08	1.93	1.89	0.22	0.41
1988	0.69	0.19	0.46	0.08	1.91	1.88	0.23	0.40
1989	0.78	0.20	0.47	0.08	1.97	1.90	0.23	0.43
1990	0.78	0.20	0.49	0.09	1.88	1.92	0.24	0.44
1991	0.80	0.21	0.49	0.09	1.82	1.90	0.24	0.44
1992	0.76	0.21	0.44	0.09	1.91	1.80	0.24	0.42
1993	0.79	0.21	0.43	0.09	1.87	1.79	0.24	0.42
1994	0.80	0.21	0.42	0.09	1.97	1.84	0.24	0.42

Table 3: Indices of Labour Productivity (Base 1980-81)

Year	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construc-tion	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total@
1951	79.96	38.56	46.64	*	58.79	49.79	56.26	58.15
1952	79.87	43.30	47.03	*	60.08	50.66	56.49	58.57
1953	81.11	44.30	47.56	*	53.08	52.08	55.86	59.27
1954	85.97	44.97	50.10	*	52.25	53.77	56.09	61.88
1955	87.10	46.88	52.41	*	56.17	57.13	56.95	63.48
1956	84.99	47.63	55.23	*	63.72	61.02	59.00	64.07
1957	88.20	50.05	58.06	*	67.89	64.90	61.60	66.63
1958	82.91	52.67	58.95	*	57.06	65.93	63.51	64.78
1959	89.83	54.32	60.48	*	60.89	68.24	66.00	68.57
1960	87.53	57.11	63.12	*	62.00	72.16	67.58	68.94
1961	91.33	65.67	66.97	73.52	68.46	78.05	70.25	72.16
1962	90.60	68.65	72.19	77.75	*	81.78	72.11	73.78
1963	88.00	76.78	76.91	81.22	*	84.88	74.54	74.70
1964	89.26	78.15	83.61	89.81	*	89.75	76.18	77.83
1965	96.62	78.38	88.73	89.42	*	94.82	76.75	83.02
1966	85.18	87.60	88.96	90.69	*	94.05	77.44	79.31
1967	83.22	88.66	89.06	93.50	*	94.98	76.68	79.45
1968	94.75	90.32	88.75	94.08	*	96.95	78.25	85.19
1969	93.75	91.86	93.00	99.30	*	99.63	78.83	86.67
1970	98.89	96.40	102.30	99.54	*	103.41	79.91	91.55
1971	105.26	89.04	104.02	97.91	116.94	106.91	79.55	95.21
1972	101.26	88.51	102.92	100.28	112.41	103.94	79.21	93.82
1973	94.28	89.95	102.42	98.07	109.90	99.39	81.92	91.24
1974	99.10	87.61	102.47	94.08	98.35	98.82	82.17	93.07
1975	95.67	89.29	101.00	92.69	90.99	98.51	87.01	91.86
1976	105.89	96.47	98.80	99.02	99.22	102.66	90.85	97.68
1977	97.81	96.52	102.91	103.42	104.18	101.20	93.96	96.49
1978	105.53	95.23	104.72	101.89	109.60	104.52	92.96	101.17
1979	105.83	94.63	112.72	107.13	102.58	108.32	95.79	104.14
1980	90.51	91.92	104.49	101.61	92.93	99.91	97.55	96.31
1981	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1982	103.65	110.94	105.76	107.27	103.29	104.23	102.78	103.84
1983	100.72	120.13	111.82	111.21	95.13	106.20	105.08	106.51
1984	109.77	120.74	122.04	115.93	98.38	107.89	109.66	114.31
1985	107.92	119.11	129.00	124.85	98.87	108.64	117.06	117.46
1986	106.45	122.32	133.19	131.64	100.33	113.36	124.94	120.63
1987	102.88	135.27	141.44	140.52	101.89	116.05	130.52	123.81
1988	101.56	136.36	150.70	147.91	101.65	117.13	138.89	126.75
1989	116.20	152.95	162.66	159.56	105.80	121.24	144.44	137.19
1990	116.21	160.17	180.36	170.76	107.55	126.20	153.83	142.90
1991	118.62	172.10	189.94	176.40	116.04	128.28	157.77	146.10
1992	113.34	175.72	181.36	187.50	114.01	124.09	162.07	141.34
1993	116.41	173.48	184.32	195.96	109.65	126.92	166.24	144.04
1994	117.15	176.85	188.27	201.89	106.24	127.38	171.50	146.74

* Data not available
@ See text.

Table 4: Indices of Capital Productivity (Base 1980-81)

Year	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construc-tion	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total
1951	115.82	886.61	269.52	1253.66	318.80	275.38	119.36	109.60
1952	113.67	695.00	231.42	638.33	331.58	262.51	116.79	108.68
1953	114.32	652.45	211.45	460.93	305.93	260.78	114.85	108.98
1954	119.53	587.45	203.57	394.01	269.94	260.22	113.91	112.40
1955	119.82	512.10	198.18	254.61	195.73	269.25	111.73	113.45
1956	115.57	474.18	188.91	197.27	156.13	274.66	108.00	111.83
1957	118.74	495.71	171.24	158.41	132.29	272.86	103.80	113.03
1958	110.81	511.14	148.87	146.35	116.29	255.72	97.60	106.75
1959	119.58	496.82	142.36	143.14	123.88	249.43	92.83	110.65
1960	116.67	487.66	138.00	147.21	124.46	245.17	89.22	109.02
1961	121.86	439.91	133.51	141.22	111.36	259.52	85.96	111.67
1962	119.34	373.98	136.82	134.09	113.17	260.21	83.49	110.72
1963	114.31	335.63	135.19	125.49	110.05	247.21	80.69	108.04
1964	114.09	276.05	137.06	123.62	102.28	237.83	78.02	108.25
1965	121.05	221.60	135.23	116.62	101.72	236.14	74.65	111.05
1966	104.45	234.17	124.01	111.27	96.77	210.83	72.39	101.92
1967	100.20	215.00	114.22	107.98	102.48	205.55	70.62	98.72
1968	111.69	203.26	106.67	107.72	103.84	194.78	72.51	102.73
1969	108.37	200.36	107.08	111.14	102.64	190.51	73.84	102.00
1970	111.88	190.10	112.60	110.97	101.66	185.28	75.76	105.00
1971	116.74	171.49	110.22	108.73	101.27	159.13	75.80	106.75
1972	111.39	163.93	110.26	109.66	99.76	135.83	75.74	104.34
1973	102.80	166.07	109.77	103.07	100.49	121.83	77.96	100.06
1974	107.43	156.33	110.54	100.31	93.13	111.51	78.27	101.18
1975	103.17	154.96	108.58	100.35	91.02	103.32	82.86	99.36
1976	114.43	152.75	102.12	106.65	103.77	106.18	86.55	104.30
1977	104.22	128.71	106.19	109.73	108.34	103.25	89.84	101.73
1978	110.98	111.89	107.35	105.58	112.34	105.40	89.83	105.24
1979	109.29	105.28	112.44	108.25	104.90	108.69	93.30	106.38
1980	91.81	98.42	104.32	101.93	95.41	99.78	96.42	97.16
1981	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1982	102.79	98.44	101.83	99.90	92.58	100.75	101.52	101.37
1983	98.64	85.87	103.02	97.41	76.91	99.93	102.00	99.62
1984	107.07	75.54	105.86	96.75	76.49	99.42	104.36	103.15
1985	104.60	68.42	105.80	100.14	74.58	97.86	107.94	102.45
1986	102.95	63.35	103.43	100.76	77.30	100.52	112.88	102.10
1987	99.69	64.29	105.06	101.25	78.89	101.43	113.43	101.74
1988	98.15	61.53	105.69	100.37	78.01	100.84	118.57	101.47
1989	112.03	66.00	108.31	102.72	80.55	101.88	119.58	107.28
1990	112.03	65.20	113.47	106.20	76.77	103.00	123.02	109.62
1991	114.10	67.54	111.97	105.53	74.57	101.60	122.66	109.66
1992	109.49	67.92	101.96	107.21	78.03	96.59	124.02	105.90
1993	113.14	67.59	99.00	108.74	76.55	95.74	124.53	105.92
1994	114.83	68.75	97.37	108.96	80.58	98.82	124.35	106.25

Sectoral Gross Value Added Estimates (Rs. crores at 1980-81 prices)

Year (ending March)	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construc-tion	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total
1951	23741	463	4877	140	1434	3653	1065	42871
1952	24095	520	5031	156	1532	3737	1105	43872
1953	24855	532	5206	163	1421	3868	1133	45117
1954	26769	540	5609	176	1465	4015	1173	47863
1955	27556	563	6002	191	1646	4295	1232	49895
1956	27318	572	6472	212	1958	4612	1319	51173
1957	28803	601	6958	231	2183	4938	1427	54086
1958	27509	640	7226	266	1916	5043	1517	53432
1959	30281	660	7584	300	2141	5254	1630	57487
1960	29976	694	8099	345	2288	5585	1730	58745
1961	31995	798	8771	373	2646	6096	1849	62904
1962	32022	844	9520	426	2739	6486	1976	64856
1963	31385	944	10213	478	2841	6826	2130	66228
1964	32119	972	11179	565	3188	7326	2266	69581
1965	35082	986	11952	617	3444	7864	2380	74858
1966	31208	1102	12063	681	3674	7914	2506	72122
1967	30764	1128	12158	740	3976	8107	2585	72856
1968	35339	1162	12205	821	4262	8402	2744	78785
1969	35283	1195	12881	927	4411	8765	2885	80841
1970	37551	1254	14263	1010	4548	9233	3047	86109
1971	40214	1171	14598	1073	4538	9729	3155	90426
1972	39459	1202	15075	1160	4558	9919	3256	91339
1973	37479	1273	15666	1214	4665	9956	3493	91048
1974	40178	1290	16362	1241	4362	10377	3637	95192
1975	39566	1353	16840	1298	4223	10851	3992	96297
1976	44666	1517	17195	1487	4825	11866	4324	104968
1977	42085	1573	18703	1658	5297	12269	4633	106280
1978	46309	1620	19867	1737	5833	13293	4751	114219
1979	47375	1664	22321	1935	5703	14452	5077	120504
1980	41323	1682	21602	1959	5402	13985	5364	114236
1981	46649	1887	21644	2070	6114	14713	5724	122427
1982	49406	2141	23382	2264	6446	15671	6013	129889
1983	48803	2387	24908	2415	6148	16546	6280	133915
1984	54080	2451	27377	2588	6576	17417	6692	144865
1985	54061	2486	29153	2863	6828	18173	7302	150433
1986	54218	2623	30320	3099	7183	19649	7951	156566
1987	53281	2978	32445	3422	7537	20852	8483	163271
1988	53479	3080	34818	3692	7777	21801	9227	170322
1989	62214	3542	37865	4080	8379	23385	9804	188461
1990	63263	3801	42285	4505	8807	25231	10663	201453
1991	65653	4207	44863	4797	9833	26579	11164	212276
1992	64174	4396	43454	5251	10095	26761	11804	214156
1993	67425	4464	44805	5647	10143	28497	12453	223438
1994	69412	4677	46421	5982	10265	29767	13202	233042

Appendix 2

Sectoral Gross Capital Stock Estimates (Rs. crores at 1980-81 prices)

Year (ending March)	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construc-tion	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total[@]
1951	29356	171	4171	138	184	711	4601	98251
1952	30359	245	5011	302	189	763	4879	101393
1953	31138	267	5675	437	190	795	5087	103989
1954	32073	301	6351	552	222	827	5310	106961
1955	32938	360	6981	927	344	855	5686	110466
1956	33853	395	7897	1328	513	900	6298	114938
1957	34740	397	9366	1802	675	970	7089	120189
1958	35554	410	11188	2246	674	1057	8015	125726
1959	36266	435	12280	2590	707	1129	9055	130502
1960	36798	466	13528	2896	752	1221	9999	135352
1961	37602	594	15143	3264	972	1259	11092	141486
1962	38429	739	16038	3926	990	1336	12204	147128
1963	39323	921	17413	4707	1056	1480	13612	153974
1964	40319	1153	18800	5648	1275	1651	14977	161445
1965	41505	1457	20372	6538	1385	1785	16441	169315
1966	42791	1541	22422	7563	1553	2012	17851	177735
1967	43969	1718	24535	8469	1587	2114	18876	185370
1968	45315	1872	26373	9418	1679	2312	19514	192639
1969	46627	1953	27727	10307	1758	2466	20149	199069
1970	48068	2160	29197	11247	1830	2671	20741	205987
1971	49333	2236	30528	12195	1833	3277	21465	212777
1972	50732	2401	31515	13072	1869	3914	22168	219876
1973	52213	2510	32896	14555	1899	4380	23105	228545
1974	53564	2702	34118	15289	1916	4988	23963	236306
1975	54643	2859	35750	15984	1898	5629	24843	243436
1976	55901	3252	38814	17229	1902	5990	25763	252784
1977	57834	4002	40599	18672	2000	6369	26593	262416
1978	59758	4741	42659	20331	2124	6760	27273	272600
1979	62079	5149	45759	22089	2224	7127	28062	284517
1980	64459	5596	47732	23751	2316	7512	28687	295334
1981	66809	6179	49890	25580	2501	7886	29517	307509
1982	68838	7122	52927	28005	2848	8337	30544	321830
1983	70855	9102	55728	30637	3270	8875	31748	337649
1984	72335	10625	59613	33055	3517	9390	33066	352762
1985	74019	11897	63517	35331	3745	9954	34886	368817
1986	75422	13559	67571	38008	3801	10477	36323	385152
1987	76541	15168	71183	41764	3908	11019	38566	403077
1988	78038	16391	75936	45455	4078	11588	40130	421632
1989	79530	17574	80585	49083	4255	12303	42279	441251
1990	80874	19091	85898	52419	4693	13130	44697	461603
1991	82408	20398	92356	56173	5394	14022	46935	486200
1992	83941	21193	98239	60524	5292	14850	49080	507938
1993	85352	21626	104315	64175	5420	15954	51569	529840
1994	86572	22275	109888	67841	5211	16145	54749	550928

Sectoral Employment Estimates (Million numbers)

Year	Agriculture Forestry & Fishing	Mining & Quarrying	Manufac-turing	Electricity Gas & Water Supply	Construc-tion	Trade Hotels & Res-taurants	Transport Storage & Communi-cation	Total@
1951	100.94	0.84	12.60	*	1.54	7.28	2.10	140.00
1952	102.56	0.84	12.89	*	1.61	7.32	2.17	142.25
1953	104.19	0.84	13.19	*	1.69	7.37	2.25	144.56
1954	105.86	0.84	13.49	*	1.77	7.41	2.32	146.88
1955	107.56	0.84	13.80	*	1.85	7.46	2.40	149.27
1956	109.28	0.84	14.12	*	1.94	7.50	2.48	151.69
1957	111.03	0.84	14.44	*	2.03	7.55	2.57	154.16
1958	112.80	0.85	14.77	*	2.12	7.59	2.65	156.65
1959	114.61	0.85	15.11	*	2.22	7.64	2.74	159.21
1960	116.44	0.85	15.46	*	2.33	7.68	2.84	161.82
1961	119.10	0.85	15.78	0.25	2.44	7.75	2.92	165.54
1962	120.17	0.86	15.89	0.27	*	7.87	3.04	166.94
1963	121.25	0.86	16.00	0.29	*	7.98	3.17	168.36
1964	122.34	0.87	16.11	0.31	*	8.10	3.30	169.79
1965	123.45	0.88	16.23	0.34	*	8.23	3.44	171.23
1966	124.56	0.88	16.34	0.37	*	8.35	3.59	172.69
1967	125.68	0.89	16.45	0.39	*	8.47	3.74	174.15
1968	126.81	0.90	16.57	0.43	*	8.60	3.89	175.63
1969	127.95	0.91	16.69	0.46	*	8.73	4.06	177.13
1970	129.10	0.91	16.80	0.50	*	8.86	4.23	178.63
1971	129.89	0.92	16.91	0.54	2.45	9.03	4.40	180.37
1972	132.49	0.95	17.65	0.57	2.56	9.47	4.56	184.88
1973	135.15	0.99	18.43	0.61	2.68	9.94	4.73	189.50
1974	137.84	1.03	19.24	0.65	2.80	10.42	4.91	194.24
1975	140.60	1.06	20.09	0.69	2.93	10.93	5.09	199.09
1976	143.41	1.10	20.97	0.74	3.07	11.47	5.28	204.07
1977	146.28	1.14	21.90	0.79	3.21	12.03	5.47	209.17
1978	149.20	1.19	22.86	0.84	3.36	12.62	5.67	214.40
1979	152.19	1.23	23.86	0.89	3.51	13.24	5.88	219.76
1980	155.23	1.28	24.91	0.95	3.67	13.89	6.10	225.26
1981	158.60	1.32	26.08	1.02	3.86	14.60	6.35	232.50
1982	162.06	1.35	26.64	1.04	3.94	14.92	6.49	237.56
1983	164.74	1.39	26.84	1.07	4.08	15.46	6.63	238.77
1984	167.50	1.42	27.03	1.10	4.22	16.02	6.77	240.67
1985	170.31	1.46	27.23	1.13	4.36	16.60	6.92	243.23
1986	173.17	1.50	27.43	1.16	4.52	17.20	7.06	246.48
1987	176.07	1.54	27.64	1.20	4.67	17.83	7.21	250.43
1988	179.02	1.58	27.84	1.23	4.83	18.47	7.37	255.20
1989	182.03	1.62	28.05	1.26	5.00	19.14	7.53	260.89
1990	185.08	1.66	28.25	1.30	5.17	19.84	7.69	267.72
1991	188.18	1.71	28.46	1.34	5.35	20.56	7.85	275.93
1992	192.50	1.75	28.87	1.38	5.59	21.40	8.08	287.75
1993	196.92	1.80	29.29	1.42	5.84	22.28	8.31	294.59
1994	201.44	1.85	29.71	1.46	6.10	23.19	8.54	301.59

* Data not available.
@ See text.

Data Bank

Water Pollution from Leather Processing Industry

NPC Environment Division

Background

The leather processing industry in India processes about 225 million pieces a year. About 75% of the production comprises goat and sheep skins, the rest being hides of cow and buffalo. About 60% of the tanning activity is carried out in Tamil Nadu alone. The other major tanning centres are Calcutta, Kanpur, Hyderabad, Bangalore and Jallandhar. More than 90% of the units (80% of production) are in the SSI sector.

Leather processing is one of the most polluting processes, having adverse environmental impacts and health hazards. The process generates wastewater having high organics and dissolved solids which are detrimental to the receiving environment.

Process

The leather processing can be broadly classified into three stages:

1. *Beam House Operations* : During beam house operations the skin/hide is prepared for tanning by cleaning and conditioning to ensure the correct moisture content. The skin/hides are soaked to rehydrate them to remove dirt, blood, dung and the salt used during the curing process. Soaked hide/skins are unhaired with the help of lime and sodium sulphide. Limed skins/hides (pelts) are fleshed mechanically to remove the adipose tissue from the flesh side of the pelt to avoid interference with the subsequent tanning stage. Thorough washing and application of neutralising chemicals are followed. An enzymatic process called bating is used to have pronounced effect on the grain of the pelt. Subsequently in pickling pH of the pelt is adjusted thereby sterilising the skin/hide, ending the bating action, and improving penetration of the subsequent tanning material. This is followed by degreasing.

2. *Tanning* : Tanning is the stabilization of the collagen structure of the hide, using natural or synthetic chemicals. In addition tanning imparts a particular "feel" to the resulting leather.

3. *Post Tanning Operations* : After tanning, the skin/hide is squeezed (sammying) to remove excess moisture, splitted and shaved to have an even surface. Post tanning wet operations involve further processing of the stabilised collagen network and may comprise a further tannage when special characteristics are required. Conditioning, softening, dyeing or bleaching may also be carried out depending upon the desired product. The leather is sammyed to remove moisture and dried. the final finishing process includes mechanical treatment of grain and flesh, followed by application of surface finish.

Environmental Scenario

In leather processing industry, all types of pollutants are generated. However, it is a water polluting industry. Wastewater is generated virtually from all operations. Air emissions occur during spray painting, drying, steam generation etc. However, the quantity of pollutants discharged is very low. Solid waste is also generated from different sources like beam house operations trimming, buffing etc.

Sources of all type of waste generated in a tannery are summarised in table 1. Wastewater characteristics from a typical hide processing unit (12 Tons/day), and a typical skin processing unit (2 Tons/day) are given in tables 2 and 3 respectively. The data has been generated through a survey by National Productivity Council.

Compiled by
Somesh Rastogi

Table 1: Sources of Waste Generation

Sl. No.	Unit Operation	Waste Generated	Nature
	Beam House Operations		
1.	Soaking	– Wastewater having high TDS & organic load from washings	W
2.	Liming & unhairing	– Spills from the liming pit	W
		– Residual paste containing lime and sulphides	W
		– Hair & organic matter	S
3.	Fleshing	– Wastewater having high organic load	W
		– Fleshings (semi solid)	S
4.	Delming & Bating	– Wastewater having high alkalinity	W
		– Spent bating liquor	W
5.	Degreasing	– Wastewater with high organics	W
	Tanning Operations		
1.	Pickling	– Spent pickling liquor with high acidity and TDS	W
2.	Tanning	– Spent tanning liquor	W
		– Suspended organic matter	W
		– Wastewater from washing with high chromium content	W
		– Spills and leaks from drums	W
	Post Tanning Operation		
1.	Sammying	– Squeezed wastewater containing unfixed chrome	W
2.	Splitting	– Splittings	S
3.	Shaving	– Shavings	S
4.	Wet Operations	– Wastewater containing spent syntans, fat liquors, dyes, retanning and fixing agents	W
5.	Drying & Finishing	– Moisture loss	A
		– Trimmings	S
		– Air borne spray paint and lacquer mist	A
	Utilities		
1.	Boiler	Flue gas having particulate, CO_2, SO_2, NO_x, CO etc.	A
2.	Diesel Generator Set		

W – Wastewater
A – Air Emissions
S – Solid Waste

Table 2: Waste water flow, characteristics and pollution load from various sectional discharges of a hide processing tannery

No.	Source	Flow m^3/d	Flow lit/kg	pH	Pollution Parameters							
					BOD		COD		TDS		TSS	
					mg/l	kg/T	mg/l	kg/T	mg/l	kg/T	mg/l	kg/T
1.	Soaking	90.00	7.5	7.0	896	6.72	3200	240.0	16282	122	2200	16.5
2.	Liming	77.0	6.4	11.0	3800	24.4	1300	83.4	17415	111.8	8000	51.3
3.	Fleshing	25.0	2.08	–	–	–	12000	25	3300	6.9	–	–
4.	Deliming and bating	170	14.2	11.0	516	7.3	2579	36.5	5384	76.3	2000	28.3
5.	Pickling and Tanning	26.0	2.2	3.5	803	1.7	4015	8.7	26461	57.3	10154	22.0
6.	Dyeing fat liquoring (Buff & cow dye house)	178	7.5	–	1153	17.1	4521	67.1	7051	104.6	3500	51.9
7.	Spray Wash	20.0	1.7	–	–	–	4000	6.7	1792	3.0	–	–
8.	Miscellaneous	56.0	4.7	–	–	–	–	–	–	–	–	–
9.	Combined Effluent	642	53.5	–	1717	91.8	5000	267.5	9312	498.2	3000	160.5

Specific figures (kg/T) are based on weight of raw hides.

Table 3: Waste water flow, characteristics and pollution load from various sectional discharges of a skin processing tannery

No.	Source	Flow m^3/d	Flow lit/kg	pH	Pollution Parameters							
					BOD		COD		TDS		TSS	
					mg/l	kg/T	mg/l	kg/T	mg/l	kg/T	mg/l	kg/T
1.	Soaking	38.00	19.00	7.1	2891	55.0	9635	183.0	15500	294.5	1090	20.7
2.	Liming	3.3	1.65	12.5	4200	6.95	15069	24.85	36060	59.5	6980	11.5
3.	Reliming	3.0	1.5	12.1	509	0.765	1424	2.15	1073	1.6	1270	1.9
4.	Fleshing wash water	9.0	4.5	–	2925	13.2	5217	23.5	1621	7.3	760	3.4
5.	Deliming, bating and degreasing	3.9	1.95	7.9	1596	3.11	4200	8.2	5662	11.0	660	1.3
6.	Pickling and tanning	2.0	1.0	2.8	1693	1.7	5602	5.6	88493	88.5	2246	2.25
7.	Retanning and fat liquoring	4.1	2.05	3.0	2955	6.06	8924	18.3	14528	29.8	2540	5.2
8.	Wet back	4.1	2.05	4.0	821	1.7	2347	4.8	2790	5.7	384	0.8
9.	Dyeing & fat liquoring	1.8	0.7	–	4620	4.16	17013	15.3	7104	6.4	1328	1.2
10.	Miscellaneous	2.0	1.0	–	–	–	–	–	–	–	–	–
11.	Combined effluent (excluding soaking)	33.2	16.6	9.0	2268	37.65	6187	102.7	12639	209.8	1660	27.55
12.	Combined effluent (including soaking)	71.2	35.6	8.1	2602	92.5	8025	285.7	14165	504.3	1355	28.25

Specific figures (kg/T) are based on weight of raw skins.

Book Review

Tax without Tears: For Economic Independence and National Integration by *Vasant Sathe.* Wiley Eastern Ltd., New Delhi, 1994, 101 p, Rs. 95.

Taxation necessarily involves a compulsory levy and one of the principles of direct tax is that it should be based on the ability or faculty of the assessee. In India the benefits of economic growth have largely been shared by a few at the cost of the many, leading to the emergence of a rich class with phenomenal growth in wealth, the same is not reflected in the tax return as only less than one per cent of the population (around 70 lakh) pay income tax (while in developing countries, the average is more than 50 per cent). It emphasises that direct taxes need be broad based and the area of coverage enlarged.

The book 'Tax without Tears' proposes a new and revolutionary method of levying tax—The Expenditure Based Income Tax (EBIT). It is not an expenditure tax per se, rather it uses expenditure on certain standard items of consumption as an indicator and basis for presuming the income of assessee—both individual and institution—with moderate rates of tax between 5 and 25 percentage. The persumptive income is to be determined on the basis of the identifiable items such as electricity bill, cooking gas, water bill, house tax and rent, ownership and use of two and four wheelers and telephone. For shops and establishments, presumed or actual market rent, whichever is higher is taken as the base to estimate the annual income. Consumption is the basis for estimating income and no distinction is made between urban and rural citizens.

The book recognises the poor response to the presumptive voluntary income tax scheme of the Government leving a lump sum tax of Rs. 1400 on small business man having turnover below Rs. 5 lakh per annum, 'as the income earners don't want to get identified in the eyes of the tax authorities for fear of further harrassment'; hence the author proposes a comprehensive scheme of tax on presumptive and estimated income which should be easily acceptable to the income earners of the country and yet bring substantial revenue for the state.

The proposed tax has the feature of being broad based to reach the maximum section of income earning middle class, approximately 30 per cent of population, with an estimated revenue of Rs. 2,00,000 crore per annum, which is ten times the present collection. The increase in the direct tax revenue could be used to wipe out the debt as well as deficit and to finance infrastructure development. To quote, "the entire tax is without tears, and can be collected by mobilising the patriotic spirit of all middle class income earning citizens, who owe it to the nation and also to themselves to contribute their little bit to make this country economically self-reliant."

The tax assessment and collection as per the proposal would be simplified as the tax could be collected alongwith the bills of expenditure on electricity, telephone and there would be no need for the assessees to file income tax returns. The states would be the biggest beneficiary of the proposal as they share 80 per cent of the revenue from direct tax and 50 per cent of the revenue from corporate tax, so as to enable them to reduce indirect taxes and control prices. Broad basing of the income tax is also expected to check unaccounted money.

The proposal recommends a guaranteed protection of the assessee, and "no question whatsoever should be asked from any citizen about the source of his income and once he pays the annual tax, he should be protected from any enquiry or question about his income or holdings by the taxation or any other authorities."

The proposal is laudable and stimulating, would require the development of an information network of the consumption pattern of assessees and more than that, it would require political will and structural change as it would bring in the citizens having agriculture income. Would it check unaccounted money, is a subject open to a number of uncertainties.

The book is a valuable contribution in the area of direct taxation and should be of interest of researchers and policy makers. Caricatures used to highlight the salient features of the proposal have added to its appeal.

Nand Dhameja
Indian Institute of Public Administration,
Indraprastha Estate, Ring Road,
New Delhi - 110 002

Effective Organisations and Social Values Ed by *Henry S.R. Kalo, Durganand Sinha and N.G. Sek Hog.* Sage Publications, New Delhi, 1994, 352 p, Rs. 325.

This book is a collection of 20 articles presented during the International Symposium on Social Values and Effective Organisations held in Taiwan in November, 1988.

The book aims at providing the reader with a spectrum of the latest academic perspectives on the role of social values for effective work organisations in a cross cultural context. While the focus is on the Asian context, the authors have endeavoured to incorporate essays illuminating the experiences and insights developed in other societies outside the Asian league. The essays exemplify a diversity of diagnostic viewpoints on how work activities and managerial assumptions are underpinned by social values which help determine the degree of success in organisational performance.

The first section has seven articles and focuses exclusively on China. The second section, once again, has seven articles—four of them on India, one each on Thailand, Venezuela and Australia. The third section has five articles—one each on China, Japan, Yugoslavia, Indonesia and Israel.

The success of South East Asian countries has led to a surge of interest in researching the factors contributing to the same, and this volume amply reflects the interest. What comes out clearly is that effective work organizations in the Asian context could be the result of indigenous practices that crystallize slowly in the specific cultural contexts and histories of those societies. The Eastern cultures are based on the philosophy of management by trust as against the rational impersonal approach of the West. The Eastern cultures are based on the Philosophy of Management by Trust as against the rational impersonal approach of the West. While a wholesale transfer of imported systems seems to be totally unwarranted, the correct approach, it appears, could be one that avoids the rigidities of ethnocentrism and also a non-discriminate and also a non-discriminate emulation of the west.

The tradition bound practices of the East have certain inherent strengths, as also drawbacks. At the same time the results of modernity are always double edged.

The authors, point out the negative, impact of the increasing adherence to the instrument of contract in the eastern societies, leading to an emasculation of 'trust'. The decay of traditional values in these eastern cultures and their impact on youth are viewed with alarm and concern. The essays reveal that Asian societies are in a state of flux, with mixed features of the East and West, tradition and modernism. It may take some time for these societies to settle down to a new and reformed set of business values and work ethics. Hope is expressed for the emergence of an Asian model of industrial relations due to the absence of a tradition of recalcitrant labour unions. Also, it appears that some of the primordial values and loyalties could be channelled towards creating a synergic work culture among Indian Organisations.

It is almost about seven years since these essays were presented. The Asian Tigers are progressing with high industrial growth rates and India is expected to catch up with countries like Indonesia. China is surging ahead and with the reforms picking up in India these two Asian giants are expected to emerge as the leading nations in about a decade. With increasing inter-action, trade, and co-operation among Asian countries, there is need for the member countries to know about each other's cultures and practices. This book would eminently serve the need and is a useful contribution in this direction. One gets a good idea about Confucianism, Thai, Indonesian, Japanese, Indian and Israeli cultures.

The volume would be of good use for academics, practitioners and those involved in international business. It would be a good addition for libraries and for scholars in organisational behaviour, comparative culture etc.

U. Surya Rao
Deptt. of Management Studies
Madurai Kamaraj University
Palkali Nagar, Madurai-625 021

Organizational Ethnography: An Illustrative Application in the Study of Indian R & D Settings by *V. Suchitra Mouly and Jayaram K. Sankaran.* Sage Publications, New Delhi, 1995. 170 p, Rs. 235.

In recent years social scientists involved in the study of organisations have become increasingly sceptical

about the ability of conventional quantitative techniques to fully comprehend organisational realities. To many of them the fruits of quantitative and survey-based research have not been commensurate with their research efforts, more particularly, in organisational studies. At the same time there are serious lacunae in existing research on Indian R & D as there is a distinct lack of in-depth qualitative studies. Acknowledging these twin problems, Mouly and Sankaran have made an attempt to address these related issues in this book. In their effort to suggest an alternative viable mode of inquiry into organisations, they have introduced a relatively new qualitative paradigm, known as organisational ethnography. And in order to carry forward their arguments they have illustrated the application of organisational ethnography in the study of Indian R & D settings by undertaking field investigations in two R & D organisations. Furthermore, they have attempted to demonstrate the evidence of its potential through its empirical applications. Thus, the major thrust of this book has been to introduce the ethnographic method of investigation to social scientists as a viable mode of enquiry into organisations.

After providing a comprehensive introduction of the concept, origin, scope and methodology of ethnographic research the authors critically evaluate the advantages and disadvantages of the quantitative tool of survey approach and the ethnographic research methodology. They define ethnography as nothing but the process of describing a culture from members' point of view. It is a cultural description that reveals a social group or a knowledge system and purports to bear a close resemblance to life in the group or to knowledge in the social system. Ethnography being a cultural description needs qualitative mode enquiry by a researcher. After examining the strengths and weaknesses of both survey and ethnographic research, the authors discuss the complementarity between both the methods, which is often labelled as *triangulation.* They present the ethnography, issues, and process model of a public sector R&D organisation from Bangalore, where the first author had carried out her field work for 18 months. In the last Chapter they have undertaken a comparative study of a private sector R&D team. With the help of their ethnographic analysis the authors draw a central thesis that centralised administration, excessive bureaucracy, authoritarianism at various levels in the hierarchy coupled with professional mediocrity, and an apathetic superior can seriously vitiate the quality of life and work of an R&D team. Such an environment results in severely strained interpersonal relationships, distinct lack of identity as a group, poor self-images of team members, apathetic attitude toward work and low quality of research output. On the other hand, the private sector R&D organisations have exhibited contrary behaviours and findings.

But if one critically examines the suggested methodology and its findings, he will come across a number of loopholes and weaknesses. One serious drawback of the book is that the field studies selected to test the efficacy of ethnographic research are non-comparable ones. There is lack of homogeneity among the units chosen for analysis. The authors have chosen a public sector R&D undertaking (named GOVARI in the text), which is a pure research institution without any profit motive. On the other hand, the private sector R&D organisation (named ELERT) is engaged in manufacturing and research, but its sole aim is to maximise profit. Besides they have covered a very small sample size, e.g. only five technical persons out of few hundreds of staff in GOVARI and only three staff in ELERT. They have only studied a microscopic sub-set of both the organisations. They have not validated their findings with any supporting evidence. In view of these serious problems, it is obvious that the general findings of the study may not hold good for other R&D organisations. In addition to these weaknesses, there are some serious limitations associated with the suggested methodology of ethnographic research. They are:

It is too time consuming. For example, the first author had spent 18 months in studying the behaviour of 5 persons. As reported in the book she had devoted only 126 hours within 18 months in conducting her interview. Is it not a serious waste of time on the part of the ethnographer?.

There are too many elements of subjectivity. As it lacks specific goals, it is likely to be biased either towards the subjective interpretation of the researcher or of the participants. The normative value judgement of the researcher plays a dominant role in the analysis of data.

There are wide variations in the socio-cultural backgrounds of the participants. When the organisation consists of people who are drawn from various regions of the country with varied socio-cultural backgrounds, they carry with them their own convictions/biases that will influence the inside culture of the organisation. In such a circumstance it is difficult to generalise the subjective perceptions of the participants.

The entire exercise of ethnography is subjected to too many value judgements. Though the authors have argued in Chapter V that ethnographic research is more suitable than the survey method for the study of conflicting organisational settings, they have simultaneously admitted that there is no yardstick for evaluation in ethnography (p 74). They also admit that there are several pitfalls in doing

ethnography successfully in such settings (p 107). As those limitations arise mainly due to interpersonal nature, they advocate that the researcher must use considerable amount of tact in conducting his/her field studies. Since there are no amenable means to adhere to such tact, the entire exercise involves the value judgement of the researcher. And in the absence of any suitable tool to measure value judgements, the whole method of ethnography will lead to erroneous results/conclusions.

Possibility of loss of information. The authors have admitted that an ethnographer faces a number of constraints in the early stages of the field work. On many occasions she was not permitted to take systematic notes from the participants and has to recount from her memory. But reconstructing the interactions from memory, which is a dominant tool in ethnography, implies a lot of loss of information or leakages. The same is further evident from the first author's observation that most of the answers to her questions by the technical staff covered in GOVARI were evasive and non-committal (which she calls as "play it safe" strategy).

Furthermore, the data analysis contained in page 67, talks of high sounding terms like "Folk Domain". On the other hand, the analysis of data conveys hardly any significant results that can be used for improving the communication and work culture of an organisation. The variables identified by the authors can be very well designed/comprehended without going through the rigours of ethnographic research that had taken 18 months of valuable time of the researcher.

In Chapter IV, the authors have searched the themes on the basis of cultural domains and have developed/identified some themes. But the themes drawn are lacking any cohesive analysis; they are nothing but the casual observations of any researcher. Since they have not identified the causes, how can the organisation remove those problems to improve their R&D activities? If the authors think that domain analysis worksheets are important for policy analysis, then why have they provided the same in the appendix? Indeed, the same should have been incorporated as a part of the text. Therefore both appendix B & C are misplaced. The presentation of the case study suffers too much of repetition. For example, the discussions on the factors in the process model in chapter VI (p 112-122) are nothing but repetitions of the same in chapter V (p 75-90).

A more serious deficiency of the ethnographic research lies in its lack of generalization. As quoted by the authors, many qualitative researchers adopt an apologetic stance, implying that generalization in qualitative research may not be possible. If this is true then what is the point in undertaking ethnography, specially to study the behaviour of public and private sector organisations? In spite of these weaknesses and limitations of ethnographic research, we would like to conclude that the proposed approach contains certain advantages over the conventional approaches in studying complex situational and emotional problems. It may prove to be more appropriate in studying human behaviour, clinical diagnosis, and ethnic issues.

Binayak Rath
Deptt. of Humanities and Social Sciences
Indian Institute of Technology
IIT Post Office, Kanpur-208016

"In Search of Participation" by *J.S. Sodhi and others*. Shri Ram Centre for Industrial Relations and Human Resources, New Delhi, 1995, Rs. 325.

The book contains an excellent study of the patterns of workers' participation through their unions in management processes in work related, interest related and welfare related sectors. It covers a survey of eight industrial undertakings in India nominated representatives of Unions participate in the management decisions of these companies through fora, like Joint Management/Works Standing/Department Committees, Shop-floor Committees, Township Committees, Negotiating Committees, Quality Circles, Suggestion Box Schemes, Employees Awareness Programmes, Safety Committees, Canteen Committees, Welfare Committees etc.

The Introductory chapter written by Prof. J.S. Sodhi gives a good overview of the legal and practical framework of workers' participation in management in several countries including India, Germany, Japan, Sweden, USA and the UK. This chapter also provides a conceptual perspective. It lists four major objectives of workers' participation in management – increased productivity and efficiency, increased worker satisfaction, reduced industrial conflict and increased industrial harmony.

The last chapter also written by Prof. Sodhi attempts to analyse the success of the various schemes in the companies covered. One of his findings is that participation schemes have been comparatively more successful at the shopfloor or operational level where issues affect the workers most in their day-today work and where they are in the best position to contribute to joint decision making. In many countries, the schemes are limited to this sphere. Quality circles and information

schemes are areas of major strength of participative systems in India where there has been limited evidence of direct participation of workers as against the participation of Union representatives. Schemes involving workers nominated or chosen by Unions, as distinguished from elected representatives of workers, empower the established strong-hold of Unions, and are liked by them. In some cases, like the HAL, Unions have used this power negatively in collective bargaining. It is perhaps for this reason that laws in some countries, like Germany, have a "no strike clause" rendering industrial action between the employer and the works council unlawful.

Consultation and information-sharing continue to be the universal focus of Workers Participation in Management rather than vesting of total decision making powers with participatory mechanisms.

Surendra Nath
Chief Labour Commissioner (C)
Ministry of Labour
Shram Shakti Bhawan
New Delhi-110001

Planning Research and Development (Eds.) by *U. Colombo and R. Gali.* New Age International Publishers, New Delhi, 1995, 312 p, Rs. 500.

This volume is a compilation of papers presented at a seminar on "Research and Development Planning" organized by the Arab School of Science and Technology, Damascus, Syria, from July 14th to 20th, 1990. The focal theme of the seminar was the management of technological innovation and planning in R&D organisations with special reference to the issues of technology transfer, and the role of innovation in development. The participants in the seminar included scholars from Argentina, Egypt, Iran, Italy, Jordan, and Sweden. The volume consists of nine full length and four relatively short papers contributed by the participating scholars.

The first paper, "International Trends in the Management of Technology" by Colombo is the lengthiest. It elucidates the issues and topics pertaining to the management of R&D, technological revolution, and technology transfer to the developing countries. The paper is well illustrated, and highlights the deficiencies of government R&D centres in developing countries. The major areas of deficiencies include technological innovation; technology marketing, transfer, forecasting, and assessment; project planning and control; leadership style in R&D activities; and multifaceted dependence on industrialized nations. The paper also outlines new developments in technology, and the patterns of technological development in Japan and Italy. The author holds that the Italian experience is particularly useful for the developing countries.

The papers by Galli and Bonfiglioli respectively deal with the management of R&D. Galli traces the changes in the nature and organisation of R&D activity in USA and Europe both at the level of governments and companies since the sixties. He then deals with 'Basic Concepts in R&D and Technological Innovation', and 'Diffusion of Technological Innovation'. The remaining two parts elucidate 'Key Concepts in Technology Transfer' and the 'Management of the Innovation Process'. All the five parts are largely expository in nature, and complement one another toward a comprehensive presentation of the author's framework for R&D management. Bonfiglioli's paper entitled 'R&D Planning and Organisation' focuses R&D and Innovation within the industrial firm, and the organisational and operating aspects of R&D. The paper also discusses the issues involved in the selection, evaluation, implementation, control, and termination of R&D projects.

The fourth paper by Abeledo deals at some length with the role of innovation in the economic, social, and technological development of nations. The author also explores the linkage between R&D and industry with special reference to the experience of the Latin American countries e.g., Argentina, Brazil, and Chile. According to the author teaching and research institutions in these countries have played a major role in developing indigenous research capacities and interacting with industrial firms. Supportive government policies are needed to foster cooperation between the industry and the academia.

Two papers deal with the theme of technological cooperation. Nilsson highlights the possibilities and limitations of the role of international and regional organisations in fostering R&D cooperation between firms in different countries. The example of regional initiatives toward cooperation in science and technology within the European Community countries is elaborated in this context. The paper goes on to identify new challenges and new strategies for the promotion of international cooperation in science and technology. The concluding part of the paper discusses briefly the role of S&T networks in facilitating R&D and innovation.

The seventh paper, also by Nilsson is entitled 'Practicing R&D'. It focuses on the role of information Technology in R&D planning in and by firms. It provides

brief case studies of R&D management in electronics and telecommunications industries.

The next two papers are again by Galli. The eighth paper entitled 'R&D in the Chemical Industry under Environmental Constraints' Highlights the problems of environmental pollution engendered by chemical industries, and shows how such problems may be tackled through an appropriately designed R&D effort. The ninth paper is entitled 'New Responsibilities of R&D Management in Industrial and Governmental Organisations'. It is a brief paper which summarizes the key changes in the management of technology, and outlines the relevant areas in which education and training need to be provided to research managers.

The remaining four 'Short' papers are by Arab and Iranian Scholars. They delineate the nature and problems of R&D work, units, and technology management on the one hand, and the nature and requirements of national R&D policies on the other. The problem of brain drain owing to weaknesses and deficiencies of R&D policies and infrastructure in the countries concerned, is brought out in this context.

The volume under review is a useful addition to the existing literature on R&D and technology management. It apprises the reader of the status and problems of R&D management and organisation in Arab countries and Iran. These problems are seen to be basically of the same type as those in other developing countries. A major shortcoming of the book however, is that the editors have not provided any introduction or comments toward linking the various parts of the book and bringing out their thrust and complementarity. The coverage of the specific contextual problems faced by middle eastern countries in their efforts to develop indigenous technology base and R&D capabilities, is also rather sketchy. It should have been elaborated more adequately. Despite these shortcomings, the book is quite informative and useful.

P.N. Rastogi
Indian Institute of Management
Prabandh Nagar, Off. Sitapur Road
Lucknow-226013

Theory and Problems in Production and Operations Management by *S.N. Chary.* Tata McGraw Hill, New Delhi, 1995, 681 p, Rs. 165.

This is a book primarily written for helping post-graduate students pursuing business management courses. A large percentage of management students experience difficulty in understanding and working out numerical problems related to the subject – Production and Operations Management. This is indeed a very genuine need which the reviewer has also come across in course of his teaching assignments. It is, therefore, a very timely and appropriate intervention by an experienced faculty member of Indian Institute of Management, Bangalore to come to the rescue of future management students.

The subject of Production and Operations Management is commonly taught in the framework of techniques which are to be applied by a practitioner or a specialist. These techniques are normally related to areas which are common concern to a functional manager, which include inventory control, facility location and lay out, production planning and control, quality control etc. The book under review has dealt with almost all of the above areas to a reasonable degree of depth. It has solved several problems which are normally set in examinations held in different management courses. It addition, every chapter which is mostly devoted to a group of techniques has also included several objective questions which are of great use to a student. Considering all the above facts, this book is going to be highly beneficial to students.

It may be mentioned here that there is hardly any good text book covering both principles and techniques of production and operations management which can be referred to by Indian students. It may be, therefore, very pertinent that the author may go one step further and attempt full fledged text book on Production and Operations Management.

S.N. Nandi
Director (IFC)
National Productivity Council
Interfirm Comparison Project
705 Bhikaji Cama Bhawan,
New Delhi-110066

□

MANPOWER JOURNAL

Manpower Journal provides an interdisciplinary forum to debate ideas and share perceptions with researchers, academicians and practitioners interested in planning for human resources.

With a focus on manpower, employment and human resource development, the journal covers such dimensions as:

- Economic and social policies and their implications on human resources.
- Economic growth, employment growth, incomes, unemployment and poverty.
- Population, migration and other relevant demographic parameters.
- Employment policies, strategies and programmes.
- Human resource development and utilisation.
- Specific manpower groups classified by region, sex, education, occupation or sector of economic activity.
- Manpower data and information systems.

The Journal features Articles, Notes and Comments, Policy Pronouncements, Manpower News, Book Reviews, etc. Periodically, the Journal brings out special issues on specific themes.

The Journal is the principal periodic publication of the **Institute of Applied Manpower Research.** The Institute is the only one of its kind devoted exclusively to human resource planning, development and utilisation.

The activities of the Institute are structured to emphasize specific theme areas namely, (i) employment and unemployment (ii) science, technology and industry, (iii) human resource development, (iv) social concerns, and (v) information systems. Through research, consultancy and training activities, the Institute has developed strong national and international linkages which are reflected in the contents and contributions of the journal.

READERSHIP

Research Workers. Academicians. Personnel Managers. Management Professionals dealing in Human Resource Management.

ANNUAL SUBSCRIPTION

Vol. 32	1996	quarterly
II ISSN 0542-5808	Rs. 400 (INDIA)	US $ 60 FOREIGN

Please mail your orders to .....

NEW AGE INTERNATIONAL PUBLISHERS (P) LIMITED

4835/24 Ansari Road, Daryaganj, New Delhi-110 002.
Phones : 3288149/3276802 FAX : 91-11-3267437

NATIONAL PRODUCTIVITY COUNCIL

Announces

A NEW PUBLICATION

Waste Minimisation In Pesticides Formulation Industries

Waste minimisation, a potentially attractive environmental management approach, not only reduces environmental problems and health hazards but offers attractive economic benefits also. The manual **Waste Minimisation In Pesticide Formulation Industry** lists 46 practical, successfully implemented waste minimisation measures along with anticipated benefits, technical requirements, economic viability and impact on environment. The manual illustrates a step by step approach for a waste minimisation programme and develops a series of worksheets to facilitate data collection and analysis. The manual also includes two case studies. The four colour publication with tables, charts and illustrations is addressed to pesticides formulation industries, technical professionals, academia and other environmental specialists.

Price : **Rs. 200.00 (In India)**
US $ 50.00 (Abroad)

For Orders, Contact

Director
Public Information and Publication Division
National Productivity Council
Lodi Road, New Delhi - 110 003

Registered with Registrar of Newspapers REGD. NO. 4757/59