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Contents

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The Chairman speaks ...

Global economy is changing fast. It is in the process of a rapid transition from an era of competitive advantage based on information to one based on knowledge creation. As a result, creating, storing, accessing, sharing, collaborating and utilizing knowledge in a most efficient manner to produce maximum value, have become a challenging task of modern management, in an increasingly complex business environment.

Traditional management methods and techniques seem to be inadequate in this situation because knowledge work is fundamentally different in nature from physical labour. Approaches borrowed from product-related management are, therefore, ineffective in solving knowledge-based problems. More and more intensive efforts are required now to build appropriate systems and processes for managing knowledge or intellectual capital as a key asset of an organization.

Something that is difficult to measure is also likely to be difficult to manage well. Therefore, if we are to manage knowledge or intellectual capital better, we need to have reliable methods for measuring these critical assets. However, tangible measurement of such intangible assets is a difficult proposition. This makes knowledge management and measurement an exciting area for researchers and practitioners around the world.

In this context, we bring to you in this edition two study papers on this contemporary topic as lead articles. This edition also carries a unique assortment of well-researched papers on a variety of subjects of topical importance – from e-education to bio-informatics. I am sure you will find all of them informative.

Dr.G.P.C.NAYAR
Chairman, SCMS Group of Educational Institutions

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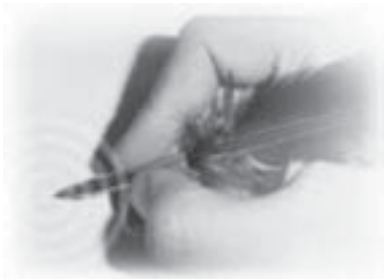
Editorial

Colour and Management

The concept of 'colour' is simple. However, it conjures up different ideas for each of us. The physicist conceives colour as determined by the wavelength of light. The physiologist and the psychologist presume that our perception of colour involves neural responses to the eye and the brain. Colour is not only a thing of beauty, but also a determinant of survival in nature, so says the naturalist. The social historian and the linguist believe that our understanding and interpretation of colour are inextricably linked to our own culture. In the eyes of the painter, colour provides a means of expressing feelings and the intangible, making possible the creation of a work of art.

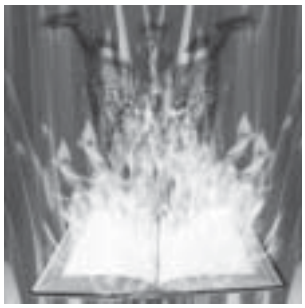
The state of the art in management research conforms itself to research in Finance/Marketing/HR/Operation. It's restrictive owing to its accent on job potential and employment. Research, here, is also limited to the restricted compass. It's high time management research got relieved of the trodden track of this research trajectory. Once an attempt is made to evaluate management research, we will be startled to learn that valid and fruitful research is yet to be made on basic issues in management like its "nature" and its "function." Hitherto only empirical research has been encouraged. It's in this context that we wish if we could take up research with perception through senses, fundamental to comprehension. Introspection on how the eye (visual sense of perception) has been properly used in managerial comprehension is interesting to note. Therefore, it's suggested that three phases of research in this area are worth exploring: 'management' in colour, 'colour' in management and ' colour' and 'management.'

Once we love to learn and understand the manifold aspects of colour, we must swing between the hard sciences and the fine arts. It's interesting to note the continuous shift between ' two cultures,' which give an impression that they are antithetical to each other. In the field of colour, however, the arts and sciences travel in unison, and together they provide rich and comprehensive understanding of the subject. Management is an area of knowledge that defies any reduction of the field into either art or science. It is highly interdisciplinary. It's vivid and spectacular like a painting, with contributory blending in like individual colours to form a unique piece of art.



Dr.D.Radhakrishnan Nair

Strategic Knowledge Measurement



Prabhu N.R.V.and Kameswara Rao

Knowledge and intellectual capital are now recognized as vital resources for organizational survival and competitive advantage. A vast array of knowledge measures has evolved, spanning many disciplines. This paper reviews knowledge measures focusing on groups of individuals (such as teams, business and organizations), as they reflect the stock or flow of knowledge, as well as enabling processes that enhance knowledge stocks and flows. Most Organizations operate in a turbulent business environment in the present globalized economy where uncertainty, complexity and risk are inevitable. Entry of multinationals and their pressures force Indian organizations to modify their environment to global standards. Whatever are their structures or business strategies, companies are realizing that it is the performance of human assets and the values and culture of the company that can make a difference between success and failure. This paper emphasizes the importance of organizational value chains, pivotal talent pools and the link between knowledge and competitive success in understanding the significance of today's knowledge measures, and opportunities for future research and practice to enhance them.

The strategic value of human capital, knowledge and talent is now well established. The other aspects in this paper attest to their essential roles in organizational value creation, uniqueness and competitiveness. This paper focuses on measuring knowledge. Most research in industrial/ organizational psychology and human resource management (HRM) has focused on knowledge measurement at the level of the individual (e.g., competencies, skills, abilities, understanding, etc.), so this paper will focus on knowledge measurement at more aggregate levels, and on the connection between knowledge measures and the competitive value proposition of organizations.

Dr.Prabhu N.R.V., Professor and HOD, SRM-Valliammai Engineering College, Kattankulatur, Chennai-603 203, Email: drnrvprabhu@yahoo.com

Prof.Kameswara Rao P., Department of Management Studies, Kalasalingam University, Anand Nagar, Krishnan Koil-626 190, Srivilliputtur(via), Tamil Nadu, Phone: 04563-289042, Email: kamesh_p2001@yahoo.com

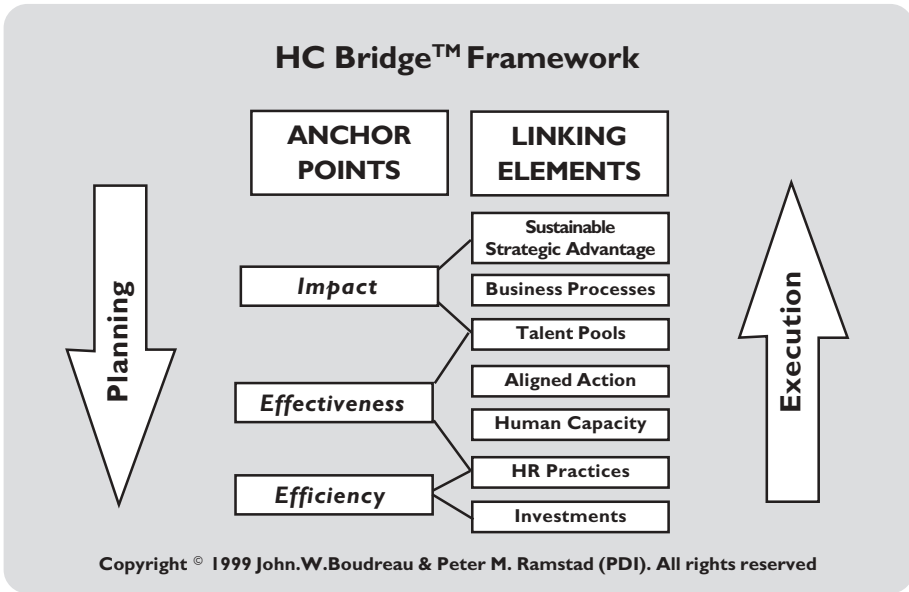
Thus, knowledge measurement should articulate, test and reinforce connections between knowledge and competitive advantage. Similarly, competitive advantage rests not on simply possessing resources, but in the way they are exploited by organizations.

There is no shortage of knowledge measures or consulting products (toolboxes, navigators, scorecards, dashboards, etc.) that propose to measure intellectual capital, knowledge or learning (e.g., Di Francesco and Berman, 2000; Economist, 1998; Barsky and Merchant, 2000). A recent survey of senior executives in 158 companies found that 80 per cent of companies had knowledge management (KM)

efforts, 60 per cent expected to use KM enterprise-wide within five years, 25 per cent had a chief knowledge officer, and 21 per cent had a KM strategy (Hackett, 2000).

Yet the definition of knowledge remains elusive (Crossan, Lane & White, 1999; Fisher & White, 2000), and there remains a "black box" of intervening variables that affect how knowledge can be enhanced, and how they contribute to organizational success (e.g., Argote, Ingram, Levine & Moreland, 2000, p. 4; Collins, 2000, p. 3). Boudreau adopted a new metaphor – a bridge of linking elements – to replace the "black box," as shown in Figure 1. The details of this framework are covered elsewhere (Boudreau, Dunford & Ramstad, 2001). The principles of the framework help to articulate the purposes of this paper, and its conclusions.

Figure 1



Paper Goals

This paper suggests/explains how to design strategically appropriate measures to assess the role of knowledge in the organization's value chain. ***Industry-Organization (I-O****) psychology measures knowledge primarily at the individual and HR-program level.*

In terms of Figure 1, I-O and HR research has generally focused on elements of "Effectiveness," particularly individual differences (human capacity) and HR or I-O initiatives (HR practices), and their associated relationships. Some studies relate knowledge-based HR practices directly to financial outcomes, but measuring knowledge at aggregated levels has not been a primary focus of I-O researchers. The linking elements of the "Impact" portion of the HC B Ridge™ model (pools of talent, business processes and strategic success) have not been central to I-O research. As DeNisi et al. point out, fruitful research and practical opportunities exist in understanding not only the traditionally-studied individual differences related to knowledge ("Human Capacity" in Figure 1), but the tasks and context that enables their contributions to competitive advantage ("Effectiveness" and "Impact" in Figure 1). Measures that vividly reflect these linking elements exist in other disciplines including accounting, economics, psychology, political science, and operations management. So, this paper will attempt to encourage a broadening of measurement in I-O and HR research by illustrating these measures. This becomes particularly necessary to reflect elements including not only knowledge capital, but also social capital and reputation capital. Future researchers, managers and consultants may consider integrating the traditional focus of I-O – the individual and the intervention, and the traditional paradigms – cognitive psychology and organizational behaviour, with emerging knowledge at more aggregate levels, and from a wider array of disciplines.

Aggregated Units of Analysis, Competitive Value-Chain Context, and "Pivotal Roles," Three related themes are helpful to organize and develop research implications about knowledge measurement, from the examples described here. First, these measures focus on *aggregated units of analysis* (that comprise groups of individuals), including profit centers, alliance partners, firms and even regions and economies.

Second, these measures strive to articulate the link between knowledge and the strategic value proposition of the organization, or the *value-chain context.* The term value chain refers to the system of "business processes" (see Figure 1) that support competitive and strategic success. For example, if one sets out to measure knowledge as embodied in organizational "learning curves" reflecting production efficiency, it is incumbent to identify key measures of production efficiency, and how they fit the particular value chain being examined. I-O research may find value in measures that more closely link knowledge outcomes to the value context of organizations.

Third, focusing on the value chain and the role of knowledge in it highlights the importance of talent pools in Figure 1, and particularly the idea of *"pivotal roles,"* Pivotal roles are those where performance or quality differences between individuals have the greatest impact on organizational value and competitiveness. The measures described in this paper are frequently constructed specifically to focus on organizational units, teams or jobs most likely to affect competitive advantage. For example, research on patent and patent citations has often identified areas of research and types of researchers likely to be particularly relevant to certain markets or production processes.

This paper will describe two general roles for the measures discussed here, in I-O research: (1) As higher-level dependent variables which can help validate knowledge effects typically measured at the individual or intervention level of analysis; (2) As moderator or mediator variables, which help to explain why the effects of HR interventions on knowledge may vary with context, or that serve as intervening variables between HR interventions, individual differences and higher-level knowledge outcomes. The paper explicitly exclude literature focusing primarily on general principles of individual learning, cognition, and traditional HR research on knowledge, skills and abilities, because other papers in this paper focus on those issues.

A Framework for Knowledge Measurement

This paper will use a three-category organizing framework for knowledge measures: *Stock, Flow and Enabler.*

Stock – The existing level of knowledge at a point of time. For example, Argote and Ingram (2000) suggest that knowledge is held in three basic "reservoirs" or elements of organizations – Members, Tools and Tasks, as well as their connections and networks.

Flow – Movement of knowledge between entities, including individuals, organizations or organization levels. This includes notions of knowledge transfer, organizational learning, group interaction, and information flows through networks.

Enablers – Investment, processes, structures and activities established by organizations aimed at changing or maintaining knowledge stocks, or influencing knowledge flows.

Argote and Ingram (2000, p. 153) suggest that knowledge *about* the network (e.g., who knows whom, which members can use what tools, etc.) is likely to be important, and that collective knowledge can be measured through task sequences, software, and production processes. Knowledge can be differentially "tacit," or difficult to move. It is embodied in the existence of common meanings or interpretation systems.

Thus, knowledge can be measured through enabling mechanisms, which include organization design, alliances, network design, transitive memory, membership in cooperative initiatives, regional clustering, absorptive capacity, research and development, and HR practices.

Table 1 organizes the knowledge measures discussed here using these three categories. One way to use Table 1 as a research guide, is to consider that *Enablers* facilitate knowledge *Flows* which change knowledge *Stocks*. Perhaps even more interesting is to consider the measures in Table 1 as primarily oriented toward the "Impact" part of Figure 1, while the HR practices and individual differences that are the typical focus of I-O exist within the "Effectiveness" element of Figure 1. Thus, traditional I-O research might add the variables in Table 1, to enhance context and connections to outcomes. The next sections will illustrate the measures in Table 1, and suggest how they can serve as dependent variables, and moderator/mediator variables.

Measuring Knowledge Stocks

"Stock" measures provide a snapshot of the *level* of knowledge at a particular time. They reflect knowledge, but also organizational performance (e.g., survival or cost) and individual attributes

Table 1: Knowledge Measures

Stocks	Flows	Enablers
• Accounting • Augmenting financial statements • Patents or publications and their citation patterns • Organization experience and competitive rivalry • Learning curves • Unit-Level Education, Experience and Job Requirements • "High-Performance' Work Systems	• Performance changes between units or firms • Perceived knowledge flows between units and alliance partners • Movement of routines, tools and ideas, including patents • Perceived information exchanged or awareness of knowledge available in other units • Collaboration and information sharing between colleagues • Analysis of work products for sources of ideas and information	• Geographic and political proximity • International and Domestic Organizational and Alliance Design • R & D Expenditures • Absorptive Capacity • Network attributes (strength, intensity, structure, communication, individual movement) • Tacitness

(education and experience) as proxies for knowledge. Accounting for Intangibles it is fitting to begin with measures that emanate directly from the accounting statements, because such statements are often considered the ultimate measure of strategic success.

Accounting-based knowledge measures strive to reconcile the difference between the *market value* of a firm's shares in the financial markets with the *book value* of the assets recorded in financial statements. This type of measurement has been called "financial statement reconciliation" (Boudreau and Ramstad, in press). The logic is that knowledge investments (e.g., the costs of a new organizational design, training programs, hiring of R&D employees, general R&D) are traditionally subtracted as accounting expenses, yet their benefits may accrue over time, so the accounting system fails to reflect their value as assets.

Financial Statement Augmentation

"Financial Statement Augmentation" (Boudreau & Ramstad, in press) describes measures that add human capital indicators to traditional financial information (e.g., Skandia corporation, 1996). Such reports include measures as diverse as total training expense, the number of employees under 30, and the number of patents (Barsky & Marchant, 2000; including replacement and acquisition costs, development of cross-functional teams, external relationships, information technology investments, and adoption of industry quality standards.

Human resource accounting measures acquisition cost, replacement value, or the discounted value of expected future salaries. Conclusions regarding Accounting and Financial Statement Augmentation Accounting focus on reconciling the gap between traditional reporting the growing importance of knowledge and intangibles. The "residual" approach takes what can be accounted for traditionally and subtracts it from estimated total value to reveal "intangible" value. The "augmentation" approach adds to traditional accounting reports measures presumed to reflect knowledge.

In terms of *aggregated units*, accounting approaches often require the existence of standard financial statements, which presume an entity of sufficient size to have accounting records and transactions. In terms of *competitive and value-chain context*, the measures are rather generic. They usually do not describe the mechanisms through which organizations create value, nor focus on how knowledge interacts with the value-creation processes. Rates of return are often estimated using averages within industries, and competitive processes are assumed to be reflected in the overall financial position. In terms of *pivotal roles*, these measures seldom identify which roles might most affect value through performance or quality differences. Though some financial statement augmentations attempt to report knowledge-based activities for key groups (e.g., training for research scientists, or the number of employees with qualifications in certain technologies), the links between roles and value are not explicitly identified.

For I-O researchers, accounting measures provide high-level dependent variables, such as the level of knowledge assets and returns from those assets. One can imagine studies asking, "Do knowledge-enhancing interventions or changes in individual knowledge levels relate to changes in the accounting levels or returns from knowledge assets?" Current HR strategy research often calculates relationships between HR practices and traditional financial ratios (see Boudreau & Ramstad, in press for a review). Perhaps financial results adjusted to reflect intangibles provide an even more appropriate dependent variable. Do knowledge-based interventions relate more strongly to accounting estimates of intangible assets than to traditional accounting outcomes?

I-O research and theory might contribute to financial statement augmentation by suggesting which human capital numbers should be used. Financial augmentation typically reports training expenditures, numbers of employees, and human resource activities meant to indicate investments in knowledge-based assets. Theories and findings from I-O research on knowledge might well identify the most appropriate expenditures or activities to report. Accounting-based measures may provide fruitful moderating and mediating variables.

Knowledge-enhancing I-O and HR interventions may be differentially effective depending on the rate of return to knowledge in the organization. Organizations with strong financial returns to knowledge may be more receptive to knowledge interventions, thus enhancing their effects. Similarly, the information reported in financial augmentation statements (e.g., number of training programs, number of employees with advanced degrees, etc.) might be used to detect organizational receptivity to knowledge-based initiatives.

Patents, Publications and Citations

Disciplines as diverse as strategic alliances, network analysis, industrial-organizational economics and international relations are used patents to measure knowledge. Patented ideas represent the result of government scrutiny and endorsement of originality and usefulness. Patents are an outcome of knowledge, but it can also be argued that they represent part of the stock of knowledge, because they are protected ideas, which the firm has exclusive rights to use. Closely related to patents is the amount and pattern of research publications generated and used by an organization. Publications are not protected like patents, but they also reflect an external judgment (the scientific field) that ideas are original and useful.

Publications and patents can be objectively traced to an organization. Moreover, patent and publication citations provide valuable insights regarding the sources and patterns of knowledge used, as we shall see. There is surprisingly deep and informative information available about patents. Spencer (2000) examined archival data on articles published by researchers in Japanese and U.S. firms, measuring publication *Paper* (the number of articles), *Quality* (the number of times scientists in outside organizations cited the research), and *Breadth* (the number of different organizations whose scientists cited the work). Sorensen and Stuart (2000) used archival patent data to indicate innovation (citations to newer technology), and knowledge close to the existing core (self-citations). Hall, Jaffe and Trajtenberg (2000) note problems of noise in patent data, and provide several methods for estimating patent quality. They found financial returns more highly correlated with citation-weighted patents than simple patent quantity.

Conclusions Regarding Patents and Publications

Patents, publications and citations reflect *aggregated units of analysis*, with a focus at the level of the firm or business unit. Rich archival data across firms and industries offers significant opportunities. Moreover, because patents, publications and citations are also associated with individuals, these measures offer I-O researchers measures that could potentially span units of analysis from individuals to business units and organizations.

Several studies have found patent and citation-based measures to relate to financial outcomes, enhancing the strategic rationale for these measures. In terms of *value-chain context*, patents and publications can be classified by particular fields and groups of knowledge-worker (e.g., R&D scientists), and thus can be explicitly linked to different areas of the value chain, and to different competitive processes. Patents are also quite useful in identifying and describing *pivotal roles*. They reflect the fields of expertise of individuals, and citation records can trace which knowledge roles have had the most significant impact on the knowledge base, and in which business processes.

Thus I-O research could use of patents and publications as dependent variables, examining whether they are affected by knowledge-enhancing interventions, offering externally verified evidence of the effect of individual or program-level knowledge changes. Because patents, publications and citations can also be

so specifically linked to the value-chain, they offer useful intervening variables that may help to explain the links between knowledge changes at the individuals or program level, and eventual organizational returns. Finally, levels and patterns of patents and publications might provide useful moderator variables to explain contextual differences. For example, firms with a large number of highly cited and value-relevant patents might benefit more from knowledge-enhancing interventions, or from enhancements in individual knowledge, because the "platform" for using such knowledge is already very high.

Organization Experience and Rivalry Patterns

Measures of "organization experience," reflect the time and paper of production or services offered. The idea is that as organizations operate, they gain knowledge. Data reflecting organization experience are often available through archival directories. Industry experience was the number of rooms offered over time. Hotel "experience" was found to matters early in the life cycle, through learning from similar hotels. Organization experience is also measured by exposure to competition. In an international context, Barkema, Shenkar, Vermeulen and Bell (1997) gathered data on the number of domestic joint ventures and international subsidiaries at the time of entry into a new country.

Learning Curves

Learning curves provide a particular interpretation of production experience, reflecting the reduction in unit costs and tangible process improvements that come with experience in specific production processes. Darr, Argote and Epple (1995) provide vivid descriptions of the social processes of learning curves, such as how an innovation in placing pepperoni on pizzas was learned by other pizza stores. Learning curves are estimated using archival production data from business units (e.g., pizza stores, production plants, production shifts). Darr and Kurtzburg (2000) obtained data on pizza's sold and production costs from regional offices of pizza franchise corporations.

Conclusions Regarding Organization Experience, Rivalry and Learning Curve Measures

In terms of *aggregated units of analysis*, organizational experience and rivalry can clearly be measured at the level of the firm, and perhaps even more usefully at the level of the business unit, division, production process or work shift. Detailed directories in many industries provide excellent archival sources that might be used to verify individual perceptions of rivalry or experience. One can even imagine measuring individual differences, such as whether employees have worked in business units or industries with more or less rivalry and competition. This might usefully enhance more typical measures of organizational tenure or number of jobs held. In terms of the *value-chain context*, rivalry and competition measures are less specific, because they reflect the number and age of business units, rather than elements of the value chain. However, learning curve measures address this shortcoming, focusing on specific key manufacturing or other processes, and process quality. Similarly measures of industry experience and rivalry do not reflect *pivotal roles*, because of their focus on business units, and learning curves *per se* provide little information about particular roles. However, learning curve research often gathers qualitative data suggesting how particular employees actually learned or implemented process improvements (e.g., how pizza store employees shared their knowledge about pepperoni placement), potentially allowing researchers to determine which roles are most key in knowledge transfer.

Thus, in I-O research, organizational experience measures, as well as learning curve measures, offer additional dependent variables. For example, one effect of changes or differences in knowledge among individuals or HR programs might be changes in the survival and/or successful entry into more competitive environments. Research questions might include, "Do firms or business units with knowledge-enhancing HR practices tend to have more industry experience? Does enhanced knowledge among individual employees or the existence of knowledge-enhancing HR practices relate to accelerated learning-curve progress?" Industry experience and learning curves also have potentially significant value as moderators and mediators in I-O and HR research. For example, individual knowledge and knowledge sharing regarding successful competitive practices might be more valued and more related to financial performance among firms facing highly competitive environments, because competition makes innovation more valuable. The relationship might even be non-linear (a ceiling effect) if highly competitive environments present such significant day-to-day challenges, particularly for firms with little experience, that HR practices and individual knowledge changes are simply not used or transferred. Businesses or units that are "early" in the learning curve might benefit more from interventions designed to enhance individual ability to receive knowledge, while those further into the

learning curve process might benefit most from interventions that enhance knowledge sharing.

Unit-Level Competencies, Education and Experience

Clearly, this category encompasses a wide variety of attributes such as cognitive ability, training results, performance ratings, and competencies (Lado & Wilson, 1994). The measurement of competencies is a field in itself, with a vast array of products and technologies that generally focus on the individual level. Many of them are covered in other aspects of this paper.

This section focuses on measures of these attributes at the level of jobs, production processes, firms and industries. Much of this research emanates from labour economics, with roots in the concepts of human capital calculated and the knowledge intensity of industries using reported education and training required for jobs. Cappelli (1993) used data from Hay Associates, on job attributes including "Know-How," "Problem-solving" and "Accountability." Cappelli's (1996) survey asked, "Have the skills required to perform production jobs adequately raised over the last three years?" Cappelli (1993, 1996) suggests that the skill-level of industries and organizations can be assessed in several ways, including Dictionary of Occupational Titles job analyses, "production functions" (the level or type of capital spending), and "work organization" indicated by the presence of high-performance HR practices.

Conclusions Regarding Unit-Level Education, Experience and Job Requirements

Aggregated units of analysis are probably the most distinguishing feature of these measures. They emanate from the presumption that certain work demands, job requirements or occupational titles (e.g., engineer) indicate the presence of individual-level knowledge, allowing unit-level experience and education to be measured directly rather than aggregating individual level attributes. I-O researchers might use such measures when individual-level data is unavailable, difficult to obtain, or unreliable.

These measures do not specifically incorporate the *value-chain context* or *pivotal roles*, but they often choose to focus on particular jobs or work areas, suggesting which areas are critical to organizational value creation. As additions to I-O research designs, these variables might offer alternative dependent variables. For example, in addition to tracking the immediate effects of HR interventions on individuals, researchers might also measure whether managers perceive that work requirements have changed, or whether the jobs involved begin to attract more knowledge workers (e.g., engineers or scientists). They also may provide useful moderator or mediator variables, to explain contextual variance. For example, business units that exhibit rising knowledge demands using these measures might be more likely to exhibit strong effects of knowledge-enhancement interventions, because their work environment is becoming more demanding.

Measuring Knowledge Flows

A distinguishing feature of organizational learning (as opposed to individual learning) is that it occurs through transfer of routines, culture, and processes, through this interpretation defines organizational learning as movement of knowledge through and between individual, group and organizational units. The researcher of this paper is noted that continuous organizational learning may be particularly difficult for competitors to duplicate. Knowledge flows can be measured by tracking changes in the measures of knowledge stocks described in the last section. Patent citations, for example, reflect the quality of knowledge, but also indicate who has used prior developed knowledge (Hall, et al., 2000; Spencer, 2000). Or, relative changes in learning curves can indicate knowledge movement (e.g., Baum & Ingram, 1998). They defined knowledge transfer as "the process through which one unit (e.g., group, department, or division) is affected by the experience of another."

I-O and HR research defines knowledge transfer as applying knowledge from one setting (e.g., the classroom) to another (e.g., actual work behaviours). This same principle has been fruitfully applied to knowledge movement between organizations, business units, groups and teams, as this section will illustrate. One group of measures focuses on business units and alliance partners, and another focuses on groups and teams.

Knowledge Flows between Units and Alliance Partners

Business alliances are often formed to obtain knowledge. Deeds noted that "the ability of a firm to develop and manage cross boundary individual and firm relationships and learn from its prior experiences will be important to the firms' competitive position,"

and is likely to increase: for example, in the pharmaceutical/ biotechnology industry, documented over twenty two hundred active alliances. Deeds also noted that alliances are only one form of "hybrid organization" that range "from simple licensing agreements to complex alliances in which multiple parties are cross-licensing technologies and contributing to joint R&D to multiparty joint ventures in which a jointly owned organization is setup to pursue a new market or technology." He noted that evidence suggests a positive effect of alliances on R&D performance and organizational productivity, as well as the tendency for alliances to have difficulty in their "adolescence," similar to marriages. This section will thus illustrate measures of knowledge and knowledge transfer that focus on organizational units, particularly international and alliance partners.

This researcher used the number of expatriates as a proxy for national market- specific knowledge and knowledge about international management. Shenkar and Li (1999) surveyed managing directors of Shanghai enterprises about three types of knowledge sought and offered to the potential partners: Management skills, marketing skills and/or technological know-how. Zahra (2000) measured technological learning in international joint ventures by surveying managers about the *breadth* (e.g., learned many different vs. a few skills), *depth* (e.g., how well your company has learned or mastered new skills) and *speed* (e.g., how fast your company learned). He had expert's rate agreement with attributes describing prior alliances, such as "technology/process know-how easily transferable" (p. 606). Gupta and Govindarajan (2000) surveyed subsidiary presidents regarding whether seven specific knowledge types were received or supplied by the subsidiary, the parent corporation or other subsidiaries: *(1) marketing know-how; (2) distribution know-how; (3) packaging design/technology, (4) product designs, (5) process designs, (6) purchasing know-how; (7) management systems and practices*. A paradox of knowledge flows is that while they can enhance learning *within* organizations, movable knowledge is also more easily appropriated by outsiders. This has been called "spillover." The effects of spillover are quite different from useful internal knowledge transfer, but the measures are quite similar, the difference being that spillover focuses on undesirable movement between *competing* organizations.

Knowledge Flows between Individuals and Groups

Measures of knowledge flows between individuals reflect the concept of knowledge "communities," and that knowledge work "is about social connections and interpretations." Some knowledge flow measures have focused on the degree to which individuals disclose information. Bouty (2000) conducted interviews with 38 researchers working in France, measuring information exchanges with other scientists.

"Shared reality"– convergence in group members' judgments of ambiguous stimuli can also indicate knowledge transfer. Levine, most measures focusing on this concept arose from experimental studies of groups.

Conclusion Regarding Knowledge Flow Measures

The knowledge flow measures illustrated here focus on *aggregated units of analysis* that are either on business units and alliance partners, or groups and teams. Measures focused on business units rely primarily on surveys of unit leaders regarding perceived information flows, with a few attempts to use archival data. Measures focusing on groups and teams also rely on surveys, but more often actually measure how shared knowledge appears in work products and team results. Though such measures are usually applied in experimental settings, their similarity to the patent citation information discussed earlier is quite striking. Both measure the use of knowledge from different sources in work products. Experimental studies provide very deep insights into the precise nature of individuals and situations that lead to knowledge use, while unit-level studies often provide access to objective archival data (e.g., actual citations), as well as identifying work groups according to their likely impact on organizational value. This point brings us to the issues of *value-chain context* and *pivotal roles*. Many of the unit-level flow measures relate very specifically to particular value-enhancing alliances, and even provide specific competitive scenarios which respondents are asked to consider. They generally focus on particular talent pools (e.g., R&D scientists) or frame their questions around particular business processes or goals (e.g., forming an alliance or inventing a new product or service).

Unit-level knowledge flow measures may provide higher-level outcomes to validate and calibrate I-O research results. It is interesting to consider the implications of applying both the experimental methods and the archival or business-unit survey methods in one study. The experimental methods would enhance understanding of group-level interactions, and their results might be compared with perceived unit communication, actual citation of work in publications or patents, etc. For example, information is likely to be differentially known to different groups in the field, suggesting the

possibility of tracking whether that information is used in final products or reports, just as experimental studies have done. These measures also provide potential moderator or mediator variables. For example, I-O and HR interventions to enhance knowledge sharing may be more effective where unit-level measures reveal positive managerial perceptions of the conditions for knowledge flows between alliances, because the environment for sharing is more supportive.

Measuring Knowledge Enablers

Enablers facilitate changes in knowledge stocks or flows. The fact that enablers are present does not necessarily mean that they are actually used, and that knowledge is generated or moved. Still, enablers are included here because virtually every theory or concept of knowledge notes enabling mechanisms as essential.

Thus, enablers illustrate unique measurement opportunities and a fertile set of candidates as moderator or mediator variables for I-O psychology researchers.

Geographical and Political Proximity

Several authors have measured physical, personal or political proximity as knowledge enablers. Capello's (1999) survey measured "location advantages" (e.g., proximity to airports, and cultural or industrial centers). Zahra, et al. (2000), measured "international diversity" using secondary sources and surveys of managers on the number of countries generating products or revenues.

International and Domestic Organizational and Alliance Design Measures focusing on international organizational design include the number of domestic and international joint ventures (Barkema, Shenkar, Vermuelen & Bell, 1997) used archival and survey data to map a particularly comprehensive set of interactions among Toyota's supplier network, including subsidies to the network, meetings and committees, problem-solving teams combining Toyota and supplier employees, employee transfers to suppliers, free information access, open access to supplier plants, and perceived benefits of sharing knowledge. Finally, Hitt, Dacin, Levitas, Arregle and Borza (2000) used a policy-capturing survey of executives in 202 firms, presenting 30 hypothetical case studies that varied 14 potential alliance partner criteria, including "complementary capabilities," "unique competencies," "market knowledge/access" "intangible assets," "managerial capabilities," and "willingness to share expertise." Some measures exploit archival information on financial and reporting structures. Darr and Kurtsberg (2000) measured pizza stores in terms of strategy, customers and geography.

Absorptive Capacity

The capacity to absorb new knowledge can be associated with organizations, units and partners. Absorptive capacity measures overlap with some of the knowledge "stock" measures noted earlier, because having prior knowledge aids assimilation and exploitation of new knowledge. Deeds (this paper) noted that absorptive capacity, and the proximity between the knowledge bases of two alliance partners, may determine which sort of alliance arrangements (e.g., licenses, mergers, etc.) will be most effective.

The Network

Attributes of individual and organizational networks are clearly a key enabler of knowledge flows. Wasserman and Faust (1994), provide an excellent treatment of many of the major approaches, including methods based on graph theory and matrix analysis, etc. For example, "strong" versus "weak" ties (Granovetter, 1973) can be measured through affective reactions about relationships between individuals or groups. "Structural holes" describe network points that fill unique gaps.

The researchers applied these concepts to the interaction patterns among Toyota suppliers. And they measured network size, range and strength of ties by asking top managers to list contacts from nine external categories (e.g., suppliers, customers, financial institutions, etc.) and four internal categories (e.g., sales, R&D, etc.), and then to rate the relationships on dimensions such as frequency, duration and intensity. The researchers surveyed the importance of nine sources of technical information*: (1) Colleagues in your company; (2) technologists at other companies; (3) equipment vendors; (4) materials suppliers; (5) customers; (6) benchmarking studies; (7) presentations at conferences; (8) journals, books, etc.; and (9) patents.* Subramaniam and Venkatraman (2001) surveyed senior managers about the frequency of their telephone, fax and e-mail exchanges to and from overseas managers. Hage and Hollingsworth (2000) noted that there are "numerous sets of data from which one may obtain.

Tacitness

"We know more than we can tell" called Knowledge "tacitness" and it reflects the effort required to move it. Tacitness is an enabler because it affects the ease of knowledge transfer, and the effectiveness of other enablers (e.g., paper; Lam, 2000). Tacitness

can be harmful when it restricts desired knowledge flow between groups, but also valuable in making knowledge difficult for competitors to copy.

Definitions of tacitness abound

Several authors (Gupta & Govindarajan, 2000; Helfat, 1997;) distinguish "know-how" (procedures) as distinct from "know-what" (facts). Spender (1996) defined three types of tacit knowledge: *the conscious* is codified at the individual level (notes), *the automatic* is completely implicit, and *the collective* is held by the community or group. Zander and Kogut (1995) surveyed engineers about specific innovations in their firm, obtaining ratings of codifiability (embedded in manuals, software and documents), teachability (easily learned or taught), complexity (changing physical characteristics, shape, dimensions and assembly), and system dependence (impossible for one person to know everything, requires frequent interpersonal contact). They asked accounting firm partners and their employees to react to a set of scenarios, with tacitness indicated by larger deviations between employees' and partners' ratings. Subramaniam and Venkatraman (2001) had respondents rate information from overseas partners in terms of simple vs. complex, easy vs. difficult to document, communicate and understand from written reports, obvious vs. subtle to competitors, and easy vs. hard to identify without personal experience.

Conclusions Regarding Measures of Knowledge Enablers

In terms of *aggregated units of analysis*, enabler measures span the widest domain, ranging from very specific (the communication of specific items of information by individuals or the use or citation of particular ideas in work products) to more general (geographic proximity or organization design). The *value chain context* is well developed in these enabler measures, as they frequently reflect deep understanding of company strategies, and archival and financial data that illuminates key competitive aspects or results. For example, R&D expenditures and absorptive capacity measures are often constructed to focus on particular competitive innovations or value-chain elements. The relevance of existing knowledge for assimilating new knowledge is certainly recognized in I-O theories of individual knowledge transfer, and the measures describe here illustrate practical ways to apply the concept to organizations and business units, incorporating the value-chain. *Pivotal roles* are also evident in the measurement of network attributes, such as identifying individuals who fill "structural holes." For example, Fischer and White (2000) noted that the turnover of such individuals might have negative implications for networks that go well beyond the individual's job performance. This may offer one mechanism through which the loss of individuals can significantly affect a firm's intangible resources and competitive advantage. The enabler measures noted here present research opportunities for I-O researchers. Perhaps their most obvious role would be as moderators or mediators in traditional I-O research. The nature of organizational design and alliances, the tacitness of knowledge, and the degree to which current knowledge provides a framework for absorbing new competitive knowledge would all seem likely to influence the effects of HR and I-O knowledge interventions.

Moreover, because many of the measures are based on archival information, this provides an opportunity to tap additional constructs relatively unobtrusively. Even the survey measures described here could be incorporated into many I-O studies. The concept of "tacitness" seems particularly relevant to I-O research on knowledge transfer. Some of these enablers may also provide useful high-level dependent variables. For example, R&D expenditures might be expected to rise in areas where firms are targeting investments in employee knowledge. If this is not happening, it might signal missed opportunities to capitalize on such investments. Where HR interventions are aimed at increasing knowledge communication and clarity, we might expect to see increases in measures of absorptive capacity and decreases in measures of tacitness.

Knowledge Management in Indian Scenario

Collecting and Sharing Knowledge

Knowledge Management (KM) is a concept that has been around for a long time. Like any new concept, it has gone through the proof of concept and hype phase. However, as KM is more a concept than a technology, it has not been fully understood by the CIO community. In the absence of evangelical efforts on part of top vendors to hard sell the KM concept, it has failed to gain mind-share.

Defining KM

Arun O. Gupta, Senior Director Business Technology, Pfizer Ltd describes KM as a practice that addresses the need for information that is required for making effective decisions. If this information is structured, the same can be translated into knowledge by applying a set of predefined rules. For example, comments on discussion boards can be converted into useful FAQs.

It is clearly evident that the perception of KM differs from one industry vertical to another. In software service companies,

knowledge management can be a highly effective practice as it helps capture knowledge across different skill sets. For instance, information regarding common queries about specific technologies (if captured on the Intranet) can help solve common problems. This, in turn, boosts productivity. As Indian software service organizations employ software professionals in thousands, employee inputs can be extremely useful for organizational growth.

Does Anybody really care?

KM can be a highly effective tool for organizations that have geographically dispersed teams. They can derive great value from a common knowledge-sharing platform. KM can also prove effective in organizations suffering from high employee turnover. In such cases, a KM practice can help bring new inductees up to speed with the history of ongoing projects. For example, in software companies such as Patni Computer Systems Limited, where development teams are spread across the world, KM is an efficient method for every employee to develop upon existing ideas rather than reinvent the wheel.

A proper flow of information is essential for the growth of every organization. In this situation, KM will be play an essential role, and those organizations that deploy it early on will have an edge. Uma Ganesh of Kalzoom Technologies cites the example of Tata Steel that initiated a pilot implementation of KM. The KM practice proved so useful that the company is now considering incorporating the best practices of the KM implementation in the Tata Business Excellence Model (a model that governs the way every Tata enterprise should function).

As Indian organizations go global, it becomes imperative for Indian CIOs to look at a KM practice to capture knowledge beyond local boundaries. Agrawal agrees, "KM will go beyond the boundaries of individual corporations to provide a global rather than a local picture." For companies like TCS and Infosys that operate in dozens of countries, KM can give them an edge in the competitive software services market.

Knowledge Management

The systematic process of finding, selecting, organizing, distilling and presenting information, improves an employee's comprehension in a specific area of interest. Knowledge management helps an organization to gain insight and understanding from its own experience. Specific knowledge management activities help focus the organization on acquiring, storing and utilizing knowledge for problem solving, dynamic learning, strategic planning and decision making. It also prevents intellectual assets from decay, adds to firm intelligence and provides increased flexibility.

Knowledge creation has two dimensions, one is explicit knowledge and the other one is implicit knowledge. The explicit knowledge comes from published books, written materials, proceedings, presentations etc., whereas the implicit knowledge is derived through the systematic observation and capturing of data from the tacit knowledge available among the individuals in the organization, through their approach to problem solving, bottle-neck removal, goals setting, interactions etc. We need a systematic mechanism to capture this knowledge to make the organization a truly learning organization, which makes use of existing knowledge judiciously and efficiently.

Digital library is an important component for capturing the explicit knowledge. This has to be supplemented with the implicit knowledge to the digital library system, which will eventually get transformed into a knowledge management system. Let us study how the digital library influences knowledge management in India through research, design and development. This may be relevant to other countries also.

KM is not just a technology

KM is more about best practices and procedures rather than pure technology. Consequently, it requires support from employees and effective use can happen only when all of them are actively involved. Therefore, a big bang approach will not work. An interview published in Darwin Magazine, in September 2004, quotes Jim McGee, currently director of Huron Consulting Group, recalling that his worst mistake was the implementation of a video-based knowledge management system. The concept failed simply because nobody used the system. In October, CIO Magazine published a case study of a successful KM implementation at Children's Hospital in Boston, USA. The hospital succeeded because it took time to involve every user by taking things slow and steady rather than going in for a big bang approach.

India Inc's KM successes

Patni Computer Systems, India's sixth largest software services exporter is one of the few organisations that makes extensive use of KM. The company has created a knowledge centre, which allows its employees to learn about new technologies, have discussions, get technical queries answered and even draft quick sales proposals.

Here are some of the features of the knowledge centre:

- The knowledge centre contains information about the quality management system, information related to different projects, related best practices and lessons learned, technology related white papers and tutorials.
- A searchable repository of reusable software components.
- As it is based upon a Web based model, information is accessible from all Patni offices.
- Classification of content according to industry verticals and technologies.
- A discussion forum for exchange of ideas and solutions.
- A helpdesk for facilitating process consulting to projects.
- A marketing centre, which holds frequently, asked questions by customers (the same is used by employees in sales and marketing). Additionally, case studies and templates for proposals and newsletters are also captured in the knowledge centre.
- A role based access privilege model that ensures that every user has access only to information pertaining to his department.

Summary and Conclusions

This paper distinguished measures according to *stocks*, *flows*, and *enablers*. These distinctions may prove useful to future researchers. Enablers and flows comprise measures that are likely intervening or moderating factors, and may help researchers understand or explain additional cross-context variation in the effects of HR and I-O variables on organizational outcomes. Knowledge stocks may prove useful as high-level dependent variables, as well as important moderators or mediators, particularly when the outcome variables reflect overall organizational financial results.

These distinctions between stock, flow and enabler may also prove useful in identifying which measures in Table 1 are most likely to be affected by the HR practices, I-O interventions and individual differences that are the focus of the other papers in this paper. Some HR practices or individual differences may be linked more closely to some categories than others. For example, training in-group processes should probably manifest itself in an increased flow of knowledge, though it may or may not increase the stock of knowledge. On the other hand, incentives for creativity might be most likely to affect knowledge stocks (e.g., patents and cited papers), rather than flows or enablers.

Earlier sections noted that traditional HR and I-O research focuses at the HR program and individual level (*Effectiveness* in Figure 1) and could be extended to encompass the logic of business processes and competitive context (*Impact* in Figure 1). Also, the research that produced the measures describe here could benefit from understanding the HR and I-O practices and individual differences that affect the phenomena they measure. Most I-O readers have already recognized potential improvements in psychometric properties (e.g., single-item measures, perceptions of only single subjects, etc.) I-O principles of units of analysis might also suggest improvements such as validating the assumption that the existence of certain jobs ("scientist" or "expatriate") indicates associated knowledge ("scientific principles" or "global awareness").

This paper also focuses on how Indian companies understood the Knowledge Management. This probably explains the cautious approach Indian CIOs are taking when it comes to KM. Says Gupta of Pfizer, "We at Pfizer India have embarked on two initiatives that will gradually evolve into a KM framework. The first one involves capturing documents and creating a context sensitive repository. The second initiative focuses on converting unstructured data into structured data and warehousing the same. Together, these initiatives will provide us with key metrics and information that will assist decision making." In conclusion, while there are a few successful cases of KM in India, the average Indian enterprise is not ready for it. For now, it remains a distant dream.

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Measuring Intellectual Capital

Abbas Monavvarian and Fereshte Lotfizadeh

The paper defines the elements of intellectual capital of *ceramic companies in Iran*. To create an appropriate intellectual capital measurement model for this study, a wide literature review has been done. In almost all capital measurement models, elements of intellectual capital are defined in three dimensions; i.e. human capital, structure capital and customer capital. For the research, an intellectual capital measurement model has been created. The results indicate that it is possible to evaluate intellectual capital in ceramic companies. The knowledge and data from the intellectual capital evaluation provide useful information regarding the areas of identifying focal areas, resource allocation, strengths and weaknesses, benchmarking, and managing the future.

The pattern of global economic growth has fundamentally changed since the 1970s with the rapid development of high technology, especially in communication, computer and biology engineering. Knowledge thereupon has taken the place of monetary capital, land, and material capital as the most important capital, especially in the competitive high-tech realm.

Although widely used in literature, the concept of intellectual capital (IC) has not become popular until recently. The burgeoning field of IC is becoming an existing area for both researchers and practitioners, but before the mid-1990s a great deal of work is purely descriptive of what was happening in various organizations without specifically relating the generalized comments to an organizational context. Since then, investigations deal mainly with the process of managing and measuring IC (Petty and Guthrie, 2000).

Dr.Abbas Monavvarian, Faculty, Management School, Tehran University, Chamran Highway and Ale Ahmad St. Intersection, Tehran, Iran, Email: monavvarian@yahoo.com

Ms.Fereshte Lotfizadeh, Mastergraduate of High Institute of Training and Research on Management and Planning Management School, Tehran University, Chamran Highway and Ale Ahmad St. Intersection, Tehran, Iran, Email: fereshte_l2000@yahoo.com

The literature contends that a firm's competitive power and performance are largely influenced by its intellectual capital. Many researchers recognize that intellectual capital, which contains non-financial measures and other related information, is the value driver of an enterprise (Amir and Lev, 1996; Edvinsson and Malone, 1997; Ittner *et al.*, 1997; Stewart, 1997; Bontis, 1999, 2001). They claim that intellectual capital assists enterprises in promoting competitive advantage and value. Therefore, intellectual capital can be viewed as the most

valuable asset and the most powerful competitive weapon in business.

From a strategic perceptive, IC is used to create and enhance the organizational value, and success requires IC and the ability to manage this scarce resource controlled by a company. From another point of view, IC measurement focuses on constructing an effective measurement model (Roos *et al.,* 1997), in which financial and non-financial indices are combined together to reflect thoroughly a company's operations under the influence of knowledge economy and to offer more accurate information for knowledge management.

Intellectual Capital

As many authors point out, a major proportion of growth companies are valued beyond book value. The market value of a firm consists of its financial capital and "something else." The first term is the firm's book value and is formed by organizational financial and physical assets. The "something else" term represents the firm's intellectual capital, defined as resources created from internal learning and development of valuable relationships.

A broad definition of intellectual capital states it is the difference between the company's market value and its book value. Knowledge-based resources contribute to the sustained competitive advantage of the firm from intellectual capital. However these resources are not registered in the financial accounts. In contrast with tangible resources, the payoff and value of investments in firm's current stock of knowledge (intellectual capital) will not appear in the financial accounting until later on. By all these reasons, knowledge-based resources must now be identified, dissected and analyzed.

Stewart (1997) defines intellectual capital as "the intellectual material - knowledge, information, intellectual property, experience - that can be put to use to create wealth."

Intellectual capital provides firms with a huge diversity of organizational value such as profit generation, strategic positioning (market share, leadership, name recognition, etc.), acquisition of innovations from other firms, customer loyalty, cost reductions, improved productivity and more (Harrison and Sullivan, 2000). Successful firms are those, which routinely maximize the value from their intellectual capital.

Prior to continuing the dissertation on the strategic relevance of intellectual capital reports, it may be helpful to conceptualize what the components of intellectual capital are (Edvinsson, 1997; Edvinsson and Malone, 1997; Sveiby, 1997).

A number of classification schemes divide intellectual capital into the categories of external (customer-related) capital, internal (structural) capital, and human capital (Bontis and Fitz-enz, 2002; Edvinsson and Malone, 1997; Roos *et al.,* 1997; Stewart, 1997; Sveiby, 1997). The distinction has been widely accepted in facilitating the preparation of "intellectual capital accounts" which are employed differently in making decisions regarding organizational value that are more encompassing than decisions made previously (Guthrie and Petty, 1999; Sveiby, 1997).

Human Capital

Human capital represents the individual stock of an organization as represented by its employee (Bontis, 1998; Bontis *et al.,* 2002). Roos *et al.* (1997) argue that employees generate intellectual capital through their competence, attitude and intellectual agility. Competence includes skills and education, while attitude covers the behavioural component of the employees' work. Intellectual agility enables one to change practices and to think of innovative solutions to problems. Even though employees are considered the most important corporate asset in a learning organization, they are not owned by the organization. Edvinsson and Malone (1997) define human capital as the combined knowledge, skill, innovativeness, and ability of the company's individual employees to meet the task at hand. It also includes the company's values, culture, and philosophy.

Structural Capital

Structural capital includes all the non-human storehouses of knowledge in organizations. Edvinsson and Malone (1997) define structural capital as the hardware, software, database, organizational structure, patents, trademarks, and all organizational capabilities that support the employees' productivity. Bontis (1997) also argues that structural capital includes process manuals, strategies, routines and anything whose value to the company is higher than its material value. Roos *et al.* (1997) describe structural capital as what remains in the company when employees go home for the night. According to Bontis (1998), if as organization has poor systems and procedures to track its actions the overall intellectual capital will not reach its fullest potential.

Customer Capital

Customer capital is both the current value of an organization's relationship with its customers and potential future value of these relationships. The essence of customer capital therefore lies in the

knowledge embedded in the marketing channels and customer relationships that an organization develops through the course of its existence (Bontis *et al.,* 2000). Customer capital represents the potential an organization has due to ex-firm intangibles (Bontis, 1999).

Intellectual Capital Measuring Tools

IC measurement has become the main research field for both researchers and practitioners since the 1990s. Both sides have been making various efforts to measure and evaluate IC. Therefore it is necessary to review the most popular and influential IC measurement models.

Firms have always used tools to assess their assets. Traditionally the focus of these tools has been the tangible and financial assets. Examples of these tools are economic value added (EVA), market value added (MVA), and cash flow measures.

The coming of the knowledge economy has demanded the design of new managing and measuring tools for a special type of intangible resource: organizational knowledge.

Tobin's Q is one of the first approaches to measure firm's intellectual capital. This tool developed by Nobel Prize winner James Tobin measures the ratio between market value and reposition value of organizational physical assets.

Among these tools for managing company's stock of knowledge is the Skandia Navigator, the intellectual Assets Monitor (Sveiby, 1997), Balanced Scorecard (Kaplan and Norton, 1992, 1993, 1996), technology Broker (Brooking, 1996).

The Skandia Navigator

In 1991, Skandia started to work on the building of intellectual capital tools. The well-known Skandia Value Scheme and the Skandia Navigator (Edvinsson and Malone, 1997) are two models for highlighting and describing the evolution on intellectual capital within Skandia. These models visualize value components that make up intellectual capital as well as the method of managing them and reporting on their development.

Skandia Navigator is designed to provide a balanced picture of the financial and intellectual capital. Its greatest advantage is "the balanced total picture it provides of the operation" (Skandia, 1994, p. 15). The focus on financial results, capital and monetary flows is complemented by a description of intellectual capital and its development. Indicators that specify both the level and change are highlighted. At Skandia, the intellectual capital ratios are grouped into major focus areas: the customer focus, the process focus, the human focus and the renewal and development focus.

Intangible Assets Monitor

Another tool is the intangible Assets Monitor (Sveiby, 1997). It represents a theory of stocks and flows which aim is to guide managers in the utilization of intangible assets, the identification and renewal of these flows and stocks and the avoiding of its loss. This tool is focused on three types of intangible assets: external structure assets, internal structure assets and employee competence assets.

The Swedish firm Celemi uses these intangible assets measuring tool. In its Invisible Balance, Celemi classifies its assets in three main categories: (external structure assets), "our organization" (internal structure assets) and "our people" (employee competence assets). Celemi has also developed different tools that assess and better understand its intangible assets. Tango is one example of this. This simulation tool identifies key intangible assets, measures and manages them in coordination with firm's tangible assets. Intangible assets are studied at three different levels: growth and renewal; efficiency; and stability of firm's parameters.

Balanced Scorecard

It is one of the first tools that aim to create an integral vision of measurement systems for management, including not only financial elements but also those non-financial elements (market, internal processes and learning) that influence organizational performance.

The Balanced Scorecard (BSC) (Kaplan and Norton, 1992, 1993, 1996) complements the information provided by traditional tools with three additional views: clients, internal and business processes, and learning and growth.

The BSC model proposes that an organization must meet the requirements of three groups of people if it wants to achieve success: investors, customers and employees.

Technology Broker Model

Brooking (1996) develops this model in her book *Intellectual Capital.* The model states that the market value of a firm consists of two elements: tangible and intangible assets. Intellectual capital is formed by four asset categories: market assets (brands, customers); human

assets (education, specific task knowledge, skills); intellectual property skills (patents, copyrights, design rights, commercial secrets); and infrastructure assets (organizational culture, information systems, business philosophy).

Why should Companies Measure their Intellectual Capital?

A range of "whys" to measure intellectual capital is presented in the literature. It is easily observed that most of these reasons are the meaning and hypotheses of academics and practitioners. Only a small amount of reliable research has been done on the actual effects of measuring a company's intellectual capital.

A study conducted by the Danish Agency for Trade and Industry (1998) of ten firms working on measuring intellectual capital found that measuring and actively managing intellectual capital were important for a company's long-term success. Companies measuring and managing their intellectual capital clearly outperformed other companies.

Bontis' (1998) exploratory study of the relation between a company's investments in intellectual capital and its business performance shows a significant and substantive causal link between dimensions of intellectual capital and business performance. This relationship support the idea of investing resources in understanding and gaining knowledge about how these important intellectual assets can be further enhanced in organizations. Bontis *et al.* (2000) replicate this study using Malaysian data and find similar results.

Ferrier and McKenzie's (1999) study of Australian companies and the benefits they experienced when focusing on intellectual capital is also important. They concluded with the following main areas of benefits:

- Improvements in information provided to shareholders, supporting investment;
- Increased information to support and guide decision making;
- Support and provide guidance in the management of human resources;
- Support and provide guidance in the management of customer relationship.

These benefits are information-intensive. They can be indirect results of focusing on intellectual capital and therefore difficult to logically explain as measuring a company's intellectual capital.

A New IC Measurement Model

All of the above IC measurement contributes a lot to measuring IC from diverse points of view, but unfortunately, methods of measuring and evaluating IC have been slow to develop. Each of these tools had shortcomings to a certain extent and is inappropriate to Iranian companies.

This dissertation intends to develop a new IC measurement model based on the above studies, especially the Skandia Navigator. It should be pointed out in advance that the main purpose of this new IC measurement is not to calculate the financial value. The former studies have placed a too high emphasis on the highly aggregated financial measure, which makes little sense. Furthermore, owing to the intangibility of IC, it cannot be measured with economic variables. The formula may never exist (Bontis, 1999). The significance of this IC measurement model lies in its capability of providing timely necessary information for the manager of a accompany, which thus enables him/her to modify their strategies of IC management according to the specific situation, to obtain and make full use of knowledge, and to achieve long-term competitive excellence. Consequently, this model will focus on evaluating the indices and the trend of IC instead of calculating its economic value painstakingly.

IC does not exist isolated, so the first step of setting up this new measurement model is to define the structure of IC. In this model, IC is categorized into three elements, human capital (it refers to these factors: Competence, Improvement systems, Intellectual agility, Performance and Attitude and motivation), structural capital (this area is structured into four major section: Efficiency and effectiveness, R&D, Systems and procedures and Atmosphere), customer capital (four basic sections integrate the area of customer capital: Loyalty and satisfaction, Market share, Market orientation and Handling customers).

Methodology

It should be pointed out that the major purpose of IC measuring is not to measure the financial value of the IC because its financial value is not of too much importance. Furthermore, its tacitness makes the IC calculating formula almost unachievable. The importance of an IC measurement model lies in its ability to offer the enterprise management timely information feedback, which enables them to modify their IC strategy accordingly for their long-term competitive advantages through retrieving and utilizing knowledge (Arthur, 1990). The purpose of this study is to assess

the status quo and tendency of the elements of IC rather than to measure painstakingly the economic value of IC.

Development of Hypotheses

The aim of this paper is to investigate the inter-relationships among the variables. These variables are defined and conceptualized based on the literature. Based on the questionnaire developed by Bontis (1997), the following hypotheses are tested:

H1: Human capital (HC) is positively associated with structural capital (SC).

H2: Customer capital (CC) is positively associated with structural capital (SC).

H3: Human capital (HC) is positively associated with customer capital (CC).

Intellectual Capital Questionnaire

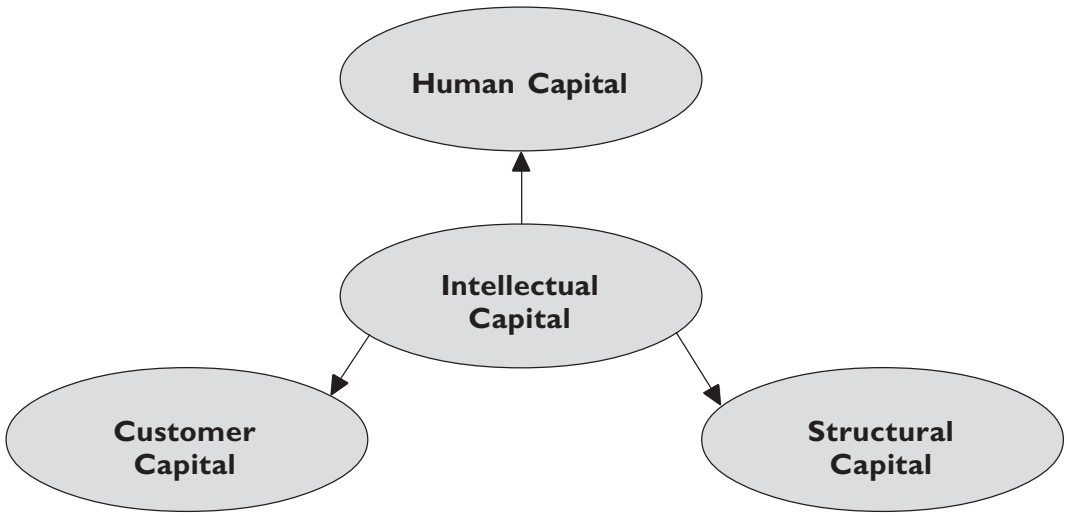
The IC questionnaire contained 53 statements, to which respondents indicated their agreement on a seven-point Likert scale. Each index has a scale, ranging from seven to one, and accordingly presenting strongly agree, agree, fairly agree, so-so, fairly disagree, disagree, and strongly disagree. 19 of these questions are for human capital, 16 questions are for customer capital and 18 questions are for structural capital. The factors related to the intellectual capital survey are given in Table I. The questions in the survey are arranged randomly according to their subjects, without having a designated line.

This study focuses on a sample of 24 companies chosen from the ceramic exporter companies listed in the Iran Trade Yellow Pages (2004-2005) and Iran Export Directory (2004-2005). The complete list consisted of 45 companies. Owing to their knowledge about the company and their ability to give valid answers, only managers and middle managers were asked to answer the questionnaires.

Table I Summary of Measures (Questionnaires)

Level I	Level 2	Level 3
Human capital	Competence Improvement "systems"	Competence ideal level, Succession training programme, Cross-departmental cooperation, Upgrade employee's skills, Recruitment programme comprehensive, Consequences if key employees left
	Intellectual agility	Come up with new ideas, Employees voice opinions, Individuals learn from one another
	Performance	Employees are best in industry, Get the most out of employees
	Attitude and motivation	Employee satisfaction, Employees perform their best, Employees think actions through Employees perform with "energy", Affect one another positively, Employees give it their all
Customer capital	Customer loyalty and satisfaction	Customer satisfaction, Customer loyalty Degree of customer repurchase, Confident of future with customer
	Market share	Market share improving, Market share is highest
	Market orientation	Company is market-oriented, Meet with customer, Customer information disseminated Understand target markets, Care what customer wants, Launch what customers wants
	Handling customer	Reduce time to handle complaints, Value add service, Feedback with customer
Structural capital	Efficiency and effectiveness	Most effective processes, Improving cost per revenue, Increase in revenue per employee, Revenue per employee is best, Transaction time decreasing, Company is efficient
	Renewal and development	Implement new ideas, Supports development of new ideas, Develops most ideas in industry, Procedures support innovation
	Systems and procedures	System allow easy info access, Company is not a bureaucratic nightmare, Not too far removed from one another
	Atmosphere	Atmosphere is supportive

Figure 1: Intellectual Capital Measurement Model



In this study the Cronbach test was used to examine the reliability of the data. Nunnally (1978) has stated that if α is bigger than 0.7 the result is reliable. From the results (see Table II), a conclusion can be drawn that the obtained data are reliable. To the human capital, customer capital and structural capital criteria in our survey result, Cronbach's α test is applied by using the SPSS version 11 separately. As a consequence of Cronbach's a test, the alpha coefficient for human capital is found as 0.73, the a coefficient for structural capital is 0.71 and the α coefficient for the customer capital is found as 0.84. As all these three rates are over the critical point of 0.7, the last status of the survey's reliability is accepted.

Result

To measure amount of the IC elements, the analysis was made in SPSS version 11 program. HUMANMEAN is human capital items mean; CUSTOMERMEAN is customer capital items mean, and STRUCTUREMEAN is structural capital items mean. In final INTELLECTUALMEAN is intellectual capital items mean (Table III).

Correlation between IC elements was analyzed through the SPSS software, and the result is shown as in Table IV. The relationship between the IC elements accords with the expected conclusions.

Table 2: The Result of α Value of Each IC Element from the Investigation

	Human capital	Structural capital	Customer capital
α Value	0.73	0.71	0.84

Table 3: The Result of Mean Value of IC and Its Items from Investigation

	Intellectual Mean	Human Mean	Structural Mean	Customer Mean
Mean value	4.8683	4.7066	4.8588	5.0396

Table 4: Correlation Coefficent of IC Elements

	Human Capital	Structural Capital	Customer Capital
Human capital	1.00	0.796*	0.702*
Structural capital	0.796*	1.00	0.848*
Customer capital	0.702*	0.848*	1.00

Note:* Correlation is significant at the 0.01 level in the two-tailed test

The SPSS version 11 program is used for correlation analysis. *H1* tested the relationship between human capital and structural capital. The results in Table III show a positive, substantive correlation coefficient of 0.796 (significant at <0.01) between human capital and structural capital. *H2* tested the relationship between customer capital and structural capital. The results show a positive and substantive correlation coefficient of 0.848 between them. *H3* tested the relationship between human capital and customer capital. The results show a positive and substantive correlation coefficient of 0.702 between them.

There are tendencies towards a tight relationship between human, structural and customer capital. Survey in 24 companies shows internal consistency between all three aspects of intellectual capital. When calculating an absolute value between the three different components, it is found that the relationship is closer between customer and structural capital than any of the two other combinations of intellectual capital components. This result implies that all companies, which invest heavily in becoming customer-focused and market-driven will ultimately, create efficient organizational routines and processes that service their clientele well. Also results show that the relationship between human capital and customer capital is less than other relationship. This result implies that senior managers must realize the full potential of their organization's human capital in order to establish a strong market orientation for their customers. In other words, the more competent an organization's employees, the better they will understand customers' needs and develop customer capital to retain their loyalty.

Conclusion

The present study is the first to investigate the nature of human, structural, and customer capital in Iranian ceramic companies. The above result revealed that the ceramic companies in Iranian possess many elements of IC and these elements can be, in fact, measured.

The first step for ceramic companies is to develop a knowledge management strategy for each component of IC. A knowledge management strategy contains a series of initiative that support the firm's different kinds of knowledge assets such as an intellectual property policy to protect certain innovation, a secure documentation of potential business interest (customer lists, price lists, business practices and internal processes) and a set of HR policies to support the recruitment, retention and training of developers. Top management should adopt a policy regarding their stocks of knowledge that would include the exploitation of existing knowledge assets to seize market opportunities without reinventing the wheel.

Limitation of the Study

The main limitation of this study is that is due to the confidentiality of some of the required items in each IC component, the data provided were calculated based on CEOs who self-reported on their own firms. Therefore, measures were not based on raw data. A further limitation is that the study focused only on one country, and one sector and one point at a time. Thus, the ability to generalize is limited to that context.

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Incentive Structure for Exports

Pinky Keswani

Export incentives have been a much-debated topic in the international scenario. The prime reason behind this is the effect of these incentives on the export growth of a country. A nation that provides export incentives will certainly have a competitive advantage over other nations in the international market. This paper revolves around the above mentioned concept. It aims to address some of the pertinent issues surrounding the export incentives in India. The three sections attempt to answer these issues. The first section discusses the role played by exports in achieving a global advantage. The next section and its subsections address role played by the export incentives in the export story of India, Benefits and drawbacks of the existing incentive schemes, India's readiness to compete with the world in the absence of incentives and Changes, if any, to be made in the incentive framework. The last section concludes the work with some suggestions for the Indian export sector that will make India ready and competitive to the nations all over the world.

"Export or Perish." The immensely popular slogan given by Nehru stands true today as we gear up fiercely to meet the challenges posed by the parties to world trade. The message has been explicitly stated several times since the slogan was first used. This is clear from every EXIM Policy and the initiatives taken therein. The first five-year plan has been stated as the period of "progressive liberalization" by Bhagawati and Desai (1970). This period was followed by devaluation in 1966 where the value of Indian rupee came down by 57.5 per cent. The export policy resolution was a landmark in promoting the export growth. The pre-reform era focused on import-substitution. Remarkable growth was witnessed in the post 1991 period or the post reforms period.

Dr.Pinky Keswani, Assistant Professor, Pacific Institute of Management, Pacific Hills, Airport Road, Debari, Udaipur, Rajasthan, Email: pinkykeswani@yahoo.com

Table 1
Growth of Exports in Four Decades

Year	Exports (Rs. Crore)
1970-71	1535.25
1980-81	6710.71
1990-91	32557.63
2000-01	203571.01

Source: RBI Handbook of Statistics on Indian Economy, 2005.

The figures state a clear picture of the monstrous growth of Indian exports. There may be a strong desire to know the factors contributing to the growth

of Indian exports. The literature helps to shortlist a few prominent factors:

- Removal of quantitative restrictions
- Change in commodity composition of exports
- Introduction of export incentives
- Price-responsiveness of exports

Getting into an elaborate discussion about the impact of all these factors here would not do justice to any single one. Hence, the main focus here shall be on the contribution of export incentives to Indian export.

Export Incentives - A Vital Component of Export Growth

The Webster Dictionary defines "Incentive" as a stimulus or motive. A stimulus works by providing thrust to any activity thus resulting in greater and better performance. Marjit, Dasgupta and Mitra (2000) have noted that Indian exporters have received several export related incentive schemes quite unprecedented before 1991. Even Pangariya (2004) condemns the fact that many export incentives were introduced or expanded especially after 1985. The exporting community has been provided with the incentives with the intention that they will help us secure a place in the global trading environment.

The history of export incentives dates back to the day when India started its exports. However, the thrust on export incentives was given during the third five-year plan (1961-62 to 1965-66). Schemes like Cash Compensatory Support, Freight Concession and Import Replenishment were initialized. The Export Policy Resolution was framed in 1970.It brought landmark changes to the history of Indian exports. With every policy, some or changes were made to the incentive structure.

Table 2
Export Incentive Schemes Launched in Various Policies

Policy	Schemes*
Import-Export Policy 1985-88	Introduction of Import-Export Passbook Scheme • Extension of additional licenses to export trading houses • Inclusion of 20 additional items foe advance license • More duty free imports allowed against REP licenses • Continuation of duty exemption scheme
Import-Export Policy 1988-91	Introduction of International Price Reimbursement Scheme • Continuation of Cash Compensatory Scheme and Market Development Assistance
Import-Export Policy 1990-93	Continuation of REP License • Introduction of "Star Trading House" • Abolishment of Passbook Scheme • Abolishment of Cash Compensatory Scheme • Replacement of REP Licenses with EXIM Scrips • Continuation of Advance License • Revamping of EPZ and 100% EOU schemes
Export-Import Policy 1992-97	Extension of benefits under EOU and EPZ Scheme • Initialization of Value-based advance License Scheme, Special Import License, Self Certified • Pass Book Scheme, Advance Intermediate License • Liberalization of EPCG Scheme
Export-Import Policy 1997-2002	Abolishment of VABAL (Value Based Advance License) • Simplification of procedures under Advance Licensing Scheme • Modification of DEPB Scheme • Extension of scope of EPCG scheme to include computer software systems • Abolishment of the following schemes under EXIM Policy 2000-2001 • Pre-Export DEPB Scheme• Special Advance Licenses for electronic sector • Transferable Advance Licenses • Special Import Licenses
Export-Import Policy 2002-2007	Abolishment of DEEC Book and annual advance license scheme • Revival of value based advance license scheme • Modification of EPCG scheme
Foreign Trade Policy 2004-2009	Continuation of DEPB • Introduction of new schemes • Free Trade and Warehousing Zones • Biotechnology Park Scheme • Target Plus Scheme • Served From India Scheme • Vishesh Krishi Upaj Yojana • Goldcard Scheme (Mini Exim policy) • Duty free import authorization scheme (2005-06)

**These schemes have been mentioned in the various exim policies introduced by the government from time to time.*

Thus it is seen that the incentives have been renewed and modified very frequently to meet the need of the hour.

After gaining knowledge about the history of export incentives we move further to address the first issue, i.e, *the role of export incentives in the Indian export story.* It must be stated here that the export incentives have always boosted the export trade. They have provided monumental and unprecedented growth to the exports from India. However, this must be understood in the light of the misuses also, which have made the schemes a burden for the government. As noted by Dua & Banerjee (2001), exports increased by two per cent in US $ terms in latter half of 60's and by 19 per cent in nominal terms during first half of 70's.Though this cannot be attributed completely to the use of incentives, yet if we take a look we see that many schemes were initialized during this period which had a positive impact on the export growth. Even after this, the incentive framework kept on strengthening during the post liberalization era. The justification given was the open economy where we had to compete with the developed nations. Thus, to make our products competitive we relied on the incentive schemes. But these incentives have also levied a burden on the government exchequer. This is clear from the figures stated for 2003-04:

Table 3

Burden on Exchequer in 2003-04 through Various Schemes

Scheme	Cost to the Government
DEPB	11,536 cr.
Advance License	10,134 cr
EOUs/ EHTP/ STP	94,224 cr.
EPCG	3,399 cr.
Duty Drawback	1,753 cr.
Remaining Schemes	39,704 cr.

Source: Rafeeq Ahmed, Business Standard, Sep 08, 2004, Should Export Incentives Continue?

The reason of these losses is the serious misuse of many schemes. As a result, the schemes, which are supposed to be an aid to the exporting community, have now turned into a gruesome burden.

Let's move further to the *benefits and drawbacks* of these schemes. Table 4 states clearly the prominent benefits and drawbacks of a few schemes. These benefits and drawbacks have been drawn on the basis of intensive study of the schemes.

Table 4

Analysis of Some Major Export Incentive Schemes

Scheme	Features	Benefits	Drawbacks
Duty Drawback	Duty Neutralization	• Prime Instrument for export promotion • Duty refunded upon filing of a claim • When calculated on basis of rates fixed on value of exports, prevents bogus claims	• Chances of bogus claims high when calculated as a percentage of f.o.b value of exports

Scheme	Features	Benefits	Drawbacks
Duty Entitlement Pass Book Scheme	• Duty Neutralization Scheme • Pre- Export DEPB • Post –Export DEPB	• Customs duty credit against export product • Raw material available at ideal international prices • Free transferability of the license • Simple to operate	• Due to free transferability, it is subject to fraudulent sale through agents • Over-invoicing of exports • High emphasis on exports due to credit element thus reducing availability in domestic markets
Export Promotion Capital Goods	• Allows import of machinery and equipment used to produce export product	• Main force of investment in 1990s. • The concept of export obligation reduces the burden on exporters.	• Intention of exporters is questionable in the context of relaxation provided for fulfillment of export obligation • Import of second hand machinery may not give quality product
Duty Exemption Scheme	• Advance License to import the inputs • Can be issued for three categories – Physical exports, Intermediate exports & Deemed Exports	• Allows Duty-Free Imports thus boosting the exports	• Products imported under this are sold in open market by compacting them.
Duty Free Replenishment Certificate	Post Remission Scheme	• Free Transferability	• Fraudulent export of products against DFRC-cum-drawback shipping bills
Duty Free Credit Entitlement Certificate	Duty free imports upto 10% of average foreign exchange earned by the exporters in preceding three years	• Split licenses for different units. • Permits duty free imports	Too early to find any drawbacks
Income Tax Exemptions/ Deductions	Deductions and tax holidays available to exporters under various section of the income-tax act,1961	• Waiver on export earnings through deductions is the biggest benefit	• The exemptions are not broad based across the exporting community
100% EOU/EPZ/SEZ		• Single window Clearance • No import license required • Duty exemptions on all imports	• Selling the imported raw material to make money in the domestic market • Difficult labor laws, tough bureaucratic controls & stiff customs procedures and regulations
Gem and Jewelry Export Promotion Scheme		• Duty free imports through replenishment licenses	Over-invoicing of exports

Scheme	Features	Benefits	Drawbacks
Target Plus Scheme	Accelerating export growth by rewarding star exporters who have achieved a desired level of performance.	• Provides opportunity to increase production to claim more benefits. • Boosts morale of exporters and adds to export value	• High revenue leakages • Imported goods are used in domestic production • Heavy evasion of tax • Not compatible with WTO
Vishesh Krishi Upaj Yojana	Incentives for the promotion of export of fruits, vegetables, flowers and minor forest products. Duty credit based on FoB value	• Rural areas, village and cotton industries tend to be the beneficiaries	• Not compatible with WTO.
Served from India	Service providers with minimum foreign exchange earnings of a decided amount shall be eligible for a duty credit.	• Imports are transferable within the group. • Provides recognition to Indian brands abroad	• Transferability can be misused to act as cover up for faulty imports.
Focus Product Scheme	Export incentives are provided to products having high employment potential in rural and semi urban areas.	• Helps in minimizing the hassles involved in marketing of such products. • Ensures free transferability of goods imported. • Ensures the manufacture of goods with large employment potential and export generation capacity.	• Too early to detect any drawbacks except the procedural ones
Focus Market Scheme	Offset the high freight cost and other disabilities involved in accessing select international markets.	• Free transferability of good imported under the scheme • Helps to enlarge our market share in markets where the penetration is low.	• Too early to detect any drawbacks except the procedural ones
Duty Free Import Authorization Scheme		• Goods can be imported before going in for exports. • The scrip is freely transferable upon the completion of export obligation. • It is based on actual user conditions thus preventing misuse of the scheme. • It combines the best features of the two schemes. • Imports under this scheme are exempted from payment of basic customs duty, anti-dumping duty, additional customs duty, educational cess and safeguard duty. • More flexible than the existing schemes.	• Too early to detect any drawbacks except the procedural ones.

Agreement on Subsidies and Countervailing Measures
(Important Provisions as applicable to the developing countries)

Article 3
Prohibition

3.1 Except as provided in the Agreement on Agriculture, the following subsidies, within the meaning of Article 1, shall be prohibited:

(a) subsidies contingent, in law or in fact , whether solely or as one of several other conditions, upon export performance, including those illustrated in Annex I ;

(b) subsidies contingent, whether solely or as one of several other conditions, upon the use of domestic over imported goods.

3.2 A Member shall neither grant nor maintain subsidies referred to in paragraph 1.

The editorial in *Economic and Political Weekly* (1999) has some very interesting comments on our export incentives:

"*The variety of schemes with their own rules, procedures, certificates of compliance and resultant benefits make for a veritable maze….. It is more profitable to milk the schemes meant for export promotion than to export….. Thus incentives to promote exports are an integral part of high-cost import substitution. The self-defeating nature of such incentives manifests itself in many ways, including the alienation of state governments from export promotion, as many incentives, like pre-emption of sales tax on goods going into export production, are at the expense of the states.*"

This makes us question the very genesis of the export incentives schemes. Are we making use of the schemes or making fun of the whole system? Rather, we should ask that do we have the right to ask for such benefits from the government. What should the government do when it is aware of the misuses of the subsidies? Should it continue with them or curtail them? Up to Rs.10, 000 crores (100 billion) of export benefits are given out each year. The report number seven for 2006 on indirect taxes states: "The duty foregone under the various export promotion schemes during the year was Rs.41,033 crores which was 71 per cent of the total customs receipts." Once again, ooth these comments have emphasized the fact that the schemes are being used extensively and exploitatively.

With these new set of questions we can now proceed to answer our third issue. *Are we ready to compete with the world without incentives?* The answer comes once again in the form of figures for export trade since the past two years. Exports for 2003-2004 stood at a whooping 293366.75 cr. While the ones estimated for 2004-2005 come up to 356068.88 cr. These figures are subject to debate. It is a fact that India has started reducing the export incentives in the wake of WTO norms for the same. In spite of reducing the incentives the export growth has continued. This suggests that we can compete without incentives. If we study the figures of export growth we will identify that the rise is also due to the increased markets and the increase in the quantity of products demanded. The expanded reach of Indian products has added to the export basket of the country.

A counterview to the same says that to compete with the developed countries we need incentives. The governing body in world trade, i.e., WTO has framed the Agreement on Subsidies and Countervailing Measures, which acts as guidelines in the matters relating to subsidies. The important provisions of the same, as applicable to the developing nations are:

Article 27

Special and Differential Treatment of Developing Country Members

27.2 The prohibition of paragraph 1(a) of Article 3 shall not apply to:

(a) developing country Members referred to in Annex VII.

(b) other developing country Members for a period of eight years from the date of entry into force of the WTO Agreement, subject to compliance with the provisions in paragraph 4.

27.3 The prohibition of paragraph 1(b) of Article 3 shall not apply to developing country Members for a period of five years, and shall not apply to least developed country Members for a period of eight years, from the date of entry into force of the WTO Agreement.

27.6 Export competitiveness in a product exists if a developing country Member's exports of that product have reached a share of atleast 3.25 per cent in world trade of that product for two consecutive calendar years.

Source: www.wto.org

Let us now come to the most important question- *What changes, if any, should be done to the incentive framework?* The answer to this comes in the form of some suggestions.

- Reduction in the number of schemes will help in removal of the confusion in the minds of the exporters. Add to it, many schemes have elements that are not compatible with the WTO framework. A thorough review of the schemes would come out with the non-compatible features.
- Structure of fixation of duty drawback rates should be simplified after an intensive review.
- In case there is an element of free transferability, a severe check must be kept on the same. A condition ensuring the correct use of this feature must be made part of the scheme.
- The commodities imported under the Advance License Scheme must be scrutinized thoroughly. Though tedious, yet it is a mandatory task to ensure the proper usage of the same.

Conclusion

After studying and analyzing the various export incentive schemes, it can be concluded that India must reduce its dependency on the export incentives. But this should be done in a phased manner. It can be seen that some sincere and urgent reforms are needed to keep us competitive. Though some steps have been taken in this direction, yet a lot needs to be done. The efforts of the government are visible in the form of newer and better schemes launched by the ministry of commerce from time to time. However, a million dollar question still remains unanswered. Whether the Indian exporters deserve these incentives or not? Moreover, if they do deserve these incentives, what should be done to bring them in line with the international standards?

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E-Education:
A Global Facilitator

Ashok K.Dua and Sharda P.K.

By 2025, India is likely to emerge as one of the top three nations in the world in economic size, technological leadership, and services and work force. India needs quality engineers with practical knowledge / skills in multi domain areas to ensure not only their employability for the jobs available within the country but also for the global jobs which are likely to be created by virtue of having a large young work force. This calls for an approach in which now, there is a perceived gap between the curriculum taught and desired to meet the industry's requirement. There is an urgent need to bridge this gap. Here, we could take advantages offered by the emerging Information Communication Technologies (ICT) by introducing e-Education to supplement the classroom-based learning and to remove the existing inadequacies. This paper brings out the advantages of e-Education, technologies used, and how it could be dovetailed with the existing teaching / learning methodologies to facilitate achievement of the technical educational goals.

India is moving fast on the path of growth and development and, with the current Gross Domestic Product (GDP) growth rate, is likely to emerge as one of the top three nations in the world by 2025. In addition, India with a median age of 24 years has the second largest population of able-bodied persons in the world. By 2025, the median age is expected to be around 31 years, which would be significantly lower than the majority of the countries and India at that time will possess the largest work force in the world. As a result a large number of global jobs are expected to come to India in the next two decades. Of these, quite a few are expected to be related to technology / engineering. So, there is an urgent need to gear up ourselves to produce greater number of quality engineers in the colleges / institutes of higher learning.

Commander Ashok K.Dua (Retd.), Asst. Professor, Krishna Institute of Engineering and Technology, Ghaziabad–201 206 Uttar Pradesh, Email: Ashokkdua20@kiet.edu

Wing Commander P.K. Sharda (Retd.), Professor and Head, Krishna Institute of Engineering and Technology, Ghaziabad –201 206, Uttar Pradesh.

India has over 2400 professional colleges from which about 600,000 engineers graduate every year. There is a need to equip them with the right kind of industry–centric knowledge / skills in multi domain areas so that they are not only employable but are also able to deliver the goods. The fundamental challenge ahead of us in the educational sector is, therefore, to match the output of academic institutions with the needs of the industry. This calls for adoption of an approach in which the engineering students not only learn the fundamentals guided by a teacher in the class-room but are also able to develop and hone their skills relevant to industry so as to improve their employability. Hence, the emphasis needs to be laid on enlarging the scope, i.e., horizontal expansion so as to cover multiple domain areas with

out compromising the quality, i.e., depth of knowledge of the core areas. Here, we could take advantages offered by the emerging Information Communication Technologies (ICT) by introducing e-Learning / e-Education in our engineering colleges / institutes of higher learning in order to supplement the classroom based learning.

E-Learning / E-Education

As per Rosenberg, *E-Learning* refers to the use of Internet technologies to deliver a broad array of solutions that enhance knowledge and performance. It is based on three

Fundamental Criteria: -

- § E-learning is networked, which makes it capable of instant updating, storage/retrieval, distribution and sharing of instruction or information.
- § It is delivered to end-user via a computer using standard Internet technology.
- § It focuses on the broadest view of learning-learning solutions that go beyond the traditional paradigms of training.

Urdan and Weggen have defined e-Learning more comprehensively as "the delivery of content via all electronic media, including the Internet, intranets, extranets, satellite broadcasts, audio/video tape, interactive TV and CD-ROM." So, *e-Learning* can be any form of learning that utilizes computers network for delivery, interaction, or facilitation. The network could be the Internet, a college LAN or a WAN. The learning could take place individually or as part of a class. On-line classes could be held either synchronously i.e., all students and teachers moving at roughly the same pace and schedule or asynchronously, i.e., students completing course material at their own pace and on their own schedule. This paper uses e–Learning and e-Education interchangeably and synonymously although there is subtle difference between the two. Learning can take place in any environment and does not necessarily require an institution based training whereas education does require systematic training and instructions in a structured fashion in a college / institute.

Benefits of E-Learning

True learning is not memorizing, but understanding of concepts, which requires time, effort, and practice. E-Learning is much more suited to the challenge of not just memorizing but also understanding. It offers a vast array of benefits, as given below: -

- § e-Learning provides access to all students, internal as well as external, 24 * 7 at location of their choice, i.e., ***any one, any time and any where*** can benefit from resources provided by way of e-Learning.
- § e-Learning allows different learning styles of students and fosters cognitive learning leading to better understanding and recall of knowledge.
- § e-Learning facilitates the students to have access to interactive, self-paced and multimedia training.
- § e-Learning enables consistent instructional quality to all students irrespective of their location any where in the world.
- § e-Learning is ideal for remote teaching and distance education.
- § e-Learning enables improved collaboration on a ***one-to-one, one-to-many and many-to-one basis,*** involving students and teachers. In a college / institute, a faculty can handle only a limited number of students in a class. However, in case of e-Learning there is no such restriction and it can provide a multiplicative effect thereby enabling significant acceleration in the spread of new emerging technologies both in qualitative and quantitative terms.
- § E-Learning can facilitate very powerful and effective supplementation of diagrams / models based conceptualization by using visuals of real life systems.
- § e-Learning allows better monitoring of students' progress and aptitude as the students are continually evaluated, with results logged, tabulated and shared.
- § e-Education facilitates students to improve their computer literacy and communicating skills as well as interpersonal and management skills.
- § e-Learning, through Internet offers a much wider scope of resources. Information from books and journals can more readily be found via the World Wide Web using a search engine.
- § e-Learning also facilitates easy repeatability either completely or selectively so that a lecture missed by a student can be repeated.

In addition, a case study involving use of IT based teaching undertaken in an engineering institute brought out the following discernable observations (Patra 2006): -

- § The time taken to complete the same syllabus was less than that with the conventional method of '*chalk and talk.*'

- § The students were more attentive and interactive in the teaching – learning process.
- § The average marks secured were better than those obtained previously.
- § The experience of teaching and learning by the teacher as well as the students was very satisfying.

The above benefits make a strong case for introduction of e- Learning in our colleges / institutes of higher learning.

Technologies Used in E-Learning

E-Learning uses technologies such as 'Delivery Media' and 'Tools for Interactivity.' The former comprises text, graphics, audio, video and data where as the latter includes e-mail for questions and discussions, bulletin boards, news groups, chat, white boards, teleconference, video conference, applications software including word processors, spread sheets, and data base programs, etc.

E-Learning / E-Education Initiatives in India

E-Learning has made inroads into India. Various training institutions are offering e-Learning solutions. NIIT, a Delhi based firm, was one of the first entrants into the e-Learning initiatives in India, which introduced its Project LEDA (Learning through Exploration, Discovery and Adventure) for educational institutes in 1996. This Company also set up an online learning center, www.netvarsity.com. Intel and Microsoft, the two US based companies have also been instrumental in facilitating growth of ICT based learning programmes. Institution of Electronics and Telecommunication Engineers (IETE) has recently launched an e-Learning portal called ELAN. Symbiosis in Pune has successfully implemented e-Learning and offering Post Graduate courses. Delhi University (DU) has embarked on an elaborate e-Learning project that will ensure DU's vast resources being available on-line. E-Classrooms, the other part of the project, would facilitate university faculty taking real-time classes attended by students from far-flung corners of the country. Besides, it is understood that many other Universities / Institutions also have their own projects on similar lines.

National Programme on Technology Enhanced Learning (NPTEL), a joint venture by seven Indian Institutes of Technology (IITs) and Indian Institute of Science (IISc) and funded by Government of India, Ministry of Human Resource Development (MHRD), has been formally launched on the 3rd September 06. The objective of this programme is to enhance quality of engineering education in the country by developing curriculum based video and web courses. It is intended to provide learning materials such as digitally taped classroom lectures, supplementary materials and links to the state-of-the-art research materials in every subject possible. Currently samples from approximately 70 courses are on offer to the students at all levels such as B. Tech., M. Tech., M. S., M. Sc.& Ph.D. It is understood that 140 courses are in various stages of preparation and distribution through Internet. The courses being offered under this programme are as follows: -

- Core Science & Engineering
- Civil Engineering
- Computer Science & Engineering
- Electrical Engineering
- Electronics & Communication Engineering
- Mechanical Engineering

Further, e-resources through INDEST–AICTE consortium are also available for subscription for AICTE approved Institutes. 282 institutes are already subscribing to the above-mentioned e-resources, which include the following: -

- IEL Online
- American Society of Civil Engineers (ASCE)
- American Society of Mechanical Engineers (ASME)
- Springer Verlag's Link
- Digital Engineering Library
- Engineering Science Data Unit (ESDU)

Strategies for Introduction of E-Education

Develop Standards / Guidelines for E-Content

Successful e-Learning implementation requires availability of effective and engaging learning content. Lack of availability of adequate educational content in digitized or electronic form called e-Content or ICT based content is one of the biggest challenges today in implementing e-Learning initiatives in colleges / institute of higher learning in India. A strong need is being felt for developing standards for creation of e-content as well as the guidelines that need to be in place to produce and evaluate content leading to its certification for accuracy and correctness to ensure that it meets the technical educational objectives.

Create E-Learning Systems

E-learning systems available off the shelf such as WebCT, Blackboard, Moodle, ATutor, etc., or those, which are available indigenously,

need to be evaluated for their efficacy. Alternatively, qualitative requirements for a suitable e-Learning system could be generated in our colleges / institutes of higher learning to develop such a system.

Create Co-operative E-Learning Portals

Creation of Co-operative E-Learning portals could be the solution for overcoming lack of e-content. Co-operative e-Learning is about teacher – student centric active learning where students not only learn from their dedicated teacher but get the opportunity to share and learn from a pool of teachers and even students in a portal designed for sharing. This could be done by colleges / institutions offering similar courses to pool in their resources for use of students. These way teachers are not required to prepare every single content themselves but instead can focus on the teaching – learning process and guiding the students.

Create Information Banks of e-Learning Materials

Information banks of tutorials, quizzes, assignments, etc. could be contributed by a number of teachers and uploaded for the benefit of students. This will also facilitate the reserved and shy students, who are afraid of participating in class-room discussions, to get involved in the learning process.

Create e-Learning Solutions Using Existing Infrastructure

Using a simple web camera and a multimedia system, simple and effective presentations can be made and stored in CDs or in a folder for sharing on the institute's intra network / LAN.

Tap the Free Resources Available on the Internet to the Maximum Extent

Internet has a wealth of information and offers a large number of resources that can be accessed 24 * 7. Many Universities upload the resources which are useful for the students and also for the faculty and can be down loaded free of cost. For example, Massachusetts Institute of Technology (MIT) courseware is available freely on the Internet. These resources could be used to supplement those available in a college library. Besides, a faculty could make use of these resources available on the web to complement course material for delivery in the class in a traditional manner. Good quality e-contents are also likely to be available with many other institutes / individuals across the country. However, these do not get shared due to the issues related to intellectual property rights (IPR). It is opined that this problem can be overcome by giving suitable recognition and compensation after evaluation and certification of the content.

Make Maximum Use of Inexpensive Resources

Several cost effective software packages such as Visual Communicator which converts a PowerPoint presentation into a Flash presentation and Presentation Pro used for Webinars (web seminars or online presentations) could be used for making effective e-Learning solutions.

Develop e-Learning Solutions Incrementally

Move gradually to e-Learning solutions, which cost more and also require greater time frames for development. These include Live e-Learning using video conferencing, on-line courses, on-line tutorials, e-Books, e-Literature, etc.

Provide Greater Control to Students by E-Learning

The research has indicated that students perform best when they can take control of their own learning (Oliver 2002). In a typical class room setting where the teacher is the boss, the students have rather limited control but in a properly run online course where the teacher is a facilitator, the students can have more control for discussions, pacing, etc of the topic. This student control can ensure that they learn repeatedly until they have mastered the topic.

Conclusion

India needs a large number of quality engineers to sustain and improve its current growth and also to be highly competitive amongst the nations of the world. This can be achieved by empowering the students with multi-domain industry-centric skills so that they are not only employable but also contribute to the growth of the nation. E- Education / e-Learning could help us in achieving this objective as it is highly flexible, offers a vast array of benefits to the students, teachers as well as the institutes. It is making inroads into the colleges / institutes of higher learning. Proper blending of e-Learning with the existing conventional methodologies using face-to-face communication can help us

improve the teaching-learning process thereby improving the throughput, i.e., quality of the students.

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Service Positioning Decisions: Understanding Strategy

Mohd Nishat Faisal

Positioning has become one of the fundamental components of modern marketing management and thus it should be the backbone of the business plan. Positioning determines firm's unique way of delivering value to customers. Companies, which manufacture products, have long used it to position their brand among the consumers, but services firms are finding it difficult to position their services so as to differentiate it from their competitors. Although some researchers contend that there are no marked differences between positioning in services and that of physical goods, it is now well accepted among the majority of marketing scholars that it is difficult to embark on positioning strategies in services. This paper develops a general understanding of the concept of positioning and then discusses the nuances of service positioning with special references to Indian mobile and entertainment industry.

It is a well-established fact that to be successful over the long term, a firm's products and services must be well "positioned" in the marketplace. (Brooksbank, 1990; Devlin *et al.*, 1995). Most successful companies are those which specialize and concentrate on a well-defined market with a thorough understanding of customer needs-since it is this knowledge which drives all subsequent decisions (Chaganti and Chaganti, 1983). Dovel (1990) contended that positioning shouldn't be just a part of your strategy rather it should be the backbone of your business plan. But in practice it is difficult to identify empirically developed and reliable positioning typologies and models that would allow the development of normative guidelines for positioning (Kalafatis et al., 2000).

Dr.Mohd Nishat Faisal is Senior Lecturer, Department of Business Administration, Aligarh Muslim University, Aligarh, Uttar Pradesh-202002, Tel: 0571-2508007. Formerly he was National Doctoral Fellow, Department of Management Studies, Indian Institute of Technology Delhi, Hauz Khas, New Delhi-110 016, Email: nishat786@yahoo.com

The development of positioning, which is essentially, a statement about what the firm's offering is and stands for, and which the customer can relate to and understand, is an important and vital part of marketing communications plan (Alden et al., 1999; Fill, 1999) and branding tactics (Rossiter and Percy, 1997). This paper offers general contribution to the subject of positioning strategies for services.

Conceptualizing Positioning

According to Aaker and Shansby (1982) "positioning means different

things to different people." According to Rigger (1995), the absence of a rigorous definition is inhibiting both practitioner and academic scholars in developing appropriate means of measuring the operationalization of positioning and thus marketers who are embarking on positioning strategies in services are confronted with unique challenges (Easingwood and Mahajan, 1989).

Product positioning can be defined as the act of designing the image of the firm's offering so that target customers understand and appreciate what the product stands for in relation to its competitors. Each brand within a set of competitive offerings is thought of as occupying a certain position in a customer's "perceptual space" (Kohli and Leuthesser, 1993). While Kotler (2000) defines positioning as the act of designing the company's offering and image to occupy a distinct place in the target market's mind, Arnott (1992) defines it as "the deliberate, proactive, iterative process of defining, modifying and monitoring consumer perceptions of a marketable object."

There are two phases in the positioning process that have been discussed in the literature. The objective during the first phase is association with the leading brand(s) in the category, while the goal during the second phase is differentiation from the auxiliary brands in the product category (Punj and Moon, 2002). During the association phase, the objective of the brand is to enter the consideration set (Urban et al., 1993). Association judgments are frequently based on similarity judgments at the brand level using attributes that are representative of the product category (Sujan and Dekleva, 1987). For new brands with limited resources, a brand's positioning strategy often ends with this step. The familiar "me too" strategy is an example of such an approach (Rossiter, 1997). The differentiation phase becomes important for brands with the resources (and desire) to seek a more distinctive identity. During this phase, the objective of the brand is to establish a unique image in relation to other brands in the consideration set (Dickson and Ginter, 1987). The extent to which a brand is successful in attaining the desired positioning depends on how effective it is in achieving the right "mix" between association and differentiation. This makes the process of positioning iterative and requires deliberate and proactive involvement of the marketer.

Positioning Strategy

Decisions on product positioning and design are affected by several factors, especially product characteristics, the firm's marketing strategy, competition, consumer characteristics, and the state of technology; in addition, the predominance of several aspects of the consumer-decision making process should not be ignored. Kalafatis *et al.* (2000) offered a positioning typology which is structurally robust and which possesses considerable explanatory and predictive powers.

According to Dillon *et al.* (1986) "Positioning (repositioning) strategies can be characterized as attempts to move a brand to a particular location within a perceptual map." Thus we can say that positioning strategy refers to the choice of target market segment, which describes the customers a business will seek to serve, and the choice of differential advantage, which defines how it will compete with rivals in the segment. Following this definition a positioning strategy may be broken down into three interrelated sub-components (Brooksbank, 1994):

- customer targets;
- competitor targets; and
- competitive advantage.

In addition, this process of positioning strategy formulation demands the ability to build-up a picture of the marketplace and thinks creatively about the interrelationships between these three sub-components. The idea is to go for a segment of the market where, by virtue of the company's distinctive strengths, it is able to satisfy customer needs better than (or at least as well as) its competitors. This necessitates a thorough understanding of the strengths, weaknesses, opportunities, and threats profile (SWOTS) facing the firm-something that can only be achieved by a dedicated internal (company), competitor, and customer/ market analysis.

Once a positioning plan has been finalized it is translated into action by assembling an appropriate marketing mix. The popular four P's definition of the marketing mix is: Product, Price, Promotion and Place (distribution), with each "P" comprising a set of decision elements which together defines the firm's offer to its target market. The mix should be tailored so that target customers regard it as being superior to those offered by competitors-by reflecting the firm's choice of competitive advantage. Figure 1 provides a diagrammatic representation of how the three sub-components of the positioning strategy decision interrelate with each other, the SWOT analysis, and the marketing mix (Brooksbank, 1994). Since the determination of congruence in positioning activities is crucial to the credibility of marketing and/or advertising budgets (Rossiter and Percy, 1997), it would be incumbent upon managers and advertising executives to justify whether their positioning strategies appear in marketing communications (Rossiter and Percy, 1997) and, how far their efforts actually affect the consumers' perceptions.

Figure 1: The Key Components of Marketing Positioning Strategy Formulation

Source: Brooksbank, 1994

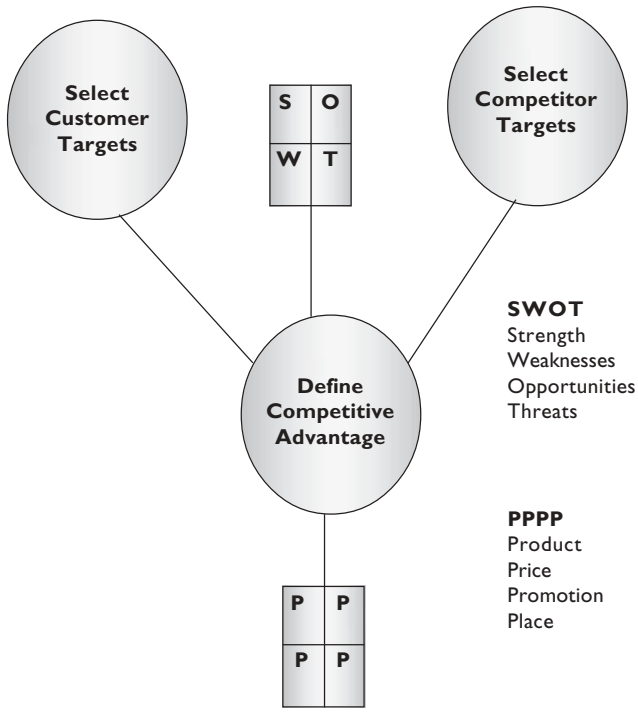
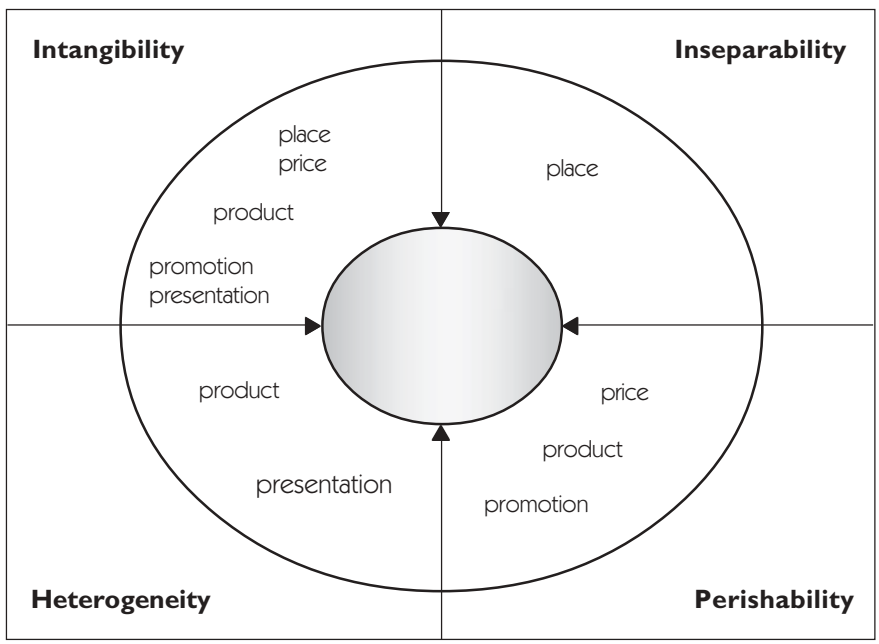


Figure 2: Complete Positioning Strategy for Services

Source: Kalafatis and Blankson, 1999



Positioning Strategy and the Services Sector

The concept of positioning is equally pertinent to both physical goods and services (Cowell, 1989). Positioning a service is more difficult than positioning a product because of the need to communicate vague and intangible benefits (Assael, 1985; Ennew *et al.*, 1993) and thus researchers like Shostack (1987) and Arnott and Easingwood (1994) believe that better strategies can be followed if positioning decisions take into account issues related to the complexity and variability of the service(s) on offer. Berry (1980), who writes that: "Services differ from goods in some very important ways, and these differences present special challenges to positioning."

In the marketing of services, there is a growing trend in the idea of "tangibilizing" the service to facilitate positioning in service (Yost and Tucker, 1995). It is also believed that better strategies can be followed if positioning decisions take into account issues related to the complexity and variability of the service(s) on offer (Gabbott and Hogg, 1994). Zeithaml and Bitner (1996) suggest that services can be positioned on a variety of dimensions including:

- needs they satisfy,
- benefits they deliver,
- specific service features,
- time of use, and
- who uses it.

The challenges encountered in positioning of service brands is endorsed in research undertaken by Darley and Smith (1993) who contend that, in positioning, tangible product attributes provide more favourable consumer perceptions than intangible attributes (with similar importance and value). The authors claim that when equivalent tangible and intangible attributes are available for advertising positioning purposes, the former can often be, expected to be more effective in affecting consumers' perceptions than the latter. This is because, in the case of intangible attributes advertising (i.e. services), consumers have no objective perceptual criterion and therefore in most cases, advertisers rely on consumers' emotions.

The inherent characteristics of services, which have often been seen as largely theoretical, may be conscious signals for recognizing the differences between service brands marketing and the positioning concept (Blankson and Kalafatis, 1999) and thus contextual specifics of services must be, taken into consideration when assessing/evaluating the employment of positioning strategies (de Chernatony and Dall'Olmo Riley, 1999). Ellis and Mosher (1993) recommend the framework, "complete positioning strategy for services" (Figure 2), which may be adapted by marketers involved in the positioning of services. This framework provides the means for manipulating each of the four key characteristics of services through the application of specific marketing tactics.

Cognitive and Affective Positioning

Positioning can be based on a combination of cognition and affect. Cognition depends on logical arguments in favour of the product. It focuses on problems, solutions, or benefits sought by customers and how the product features help to solve the problems or achieve the benefits. In contrast to cognitive approaches, affect goes straight to the heart by focusing on emotions, feelings, or drives associated with a product or service. The emotions that can be drawn on in positioning products range from joy to fear to desire to sadness. While both cognition and affect are important, today the emphasis in positioning strategy is shifting to affect. Although all products and services can and should use affect to some degree, it makes the most sense in the following situations (Mahajan and Wind, 2002):

- Big-ticket items: If customers are motivated to buy products based on emotions, they usually have a reduced need for cognitive information during the pre-purchase stage. It's far easier to purchase a car that gives you the latest technology or makes you look "smart" than to read all the fine print on engines and transmissions.

- Commodity products: Almost by definition, commodity products have very little to say for themselves. Cognitive arguments are pointless if there's little to distinguish one product from another. It's the emotional associations with the commodity product that make it cease to be a commodity. Spring water is the ultimate example of how affect can turn a commodity into a brand. Emotions can lift commodities from sameness and position them as something different.

- Technologically complex products: Among the most complex products or services to sell are those based on high technology. Affective approaches may provide a motivation for purchase without getting lost in the complexity of the cognitive arguments. Apple Computer's more recent "Think different" campaign associates itself with radical thinkers throughout society, without one mention of either the hardware or software (although these are described in more cognitively focused advertising).

- Multiple generations of products: For products such as chips, software, and automobiles, with planned obsolescence of each version of the product, affective approaches can bring continuity to the customer relationship. For example, Intel's use of its "Intel Inside" branding. Affect is used to create an emotional link, so customers will continuously upgrade based on the relationship.

- Service: Service comes from the heart, so it's particularly important to use affect in positioning service. When American Express tried to sum up the impact of its credit card and related services, it used affective relationships with celebrities to make its point. Its "profiles" campaign focused on how the card improved the lives of high-profile individuals. This allows the company to pull together a complex bundle that includes a less tangible service component. Affect fuses together a wide range of features and benefits that are not, or cannot be, clearly articulated. Insurance companies show hurricanes and other disaster to make an emotional appeal.

- Credence goods: Products can be divided into search goods (e.g., clothing and furniture) whose quality can be judged before consumption; experience goods (e.g., travel or restaurant meals) that have to be experienced to be evaluated; and credence goods (e.g., medical diagnosis and auto repair) that customers cannot evaluate even after experience. Because of the trust needed for credence goods, affective positioning may be even more important.

- Discontinuous innovations. Discontinuous innovations require customers to change their current behaviour to adopt the innovation. For example, online grocery shopping and using video telephones require substantial changes in behaviour. Because their attachment to the old product or service may be based on sound reasons, affect can be a way to break through this wall of arguments and encourage more innovative behaviour.

In particular, companies using affective positioning have to be careful of the following potential problems (Mahajan and Wind, 2002):

- Dissonance between affect and cognitive messages.
- Cultural differences: Affect is very susceptible to differences in interpretation across cultures.
- Lack of credibility.
- Confusion: Even though affect can be effective in reaching out to diverse, heterogeneous segments, it's also more open to interpretation than cognitive arguments and thus there is a need to develop and employ better techniques for testing the effectiveness of affect.

- Unwanted overtones: Affective relationships can be very hard to manage because they are highly personal and emotionally charged.

Perceptual Maps

With respect to consumer products, marketers use a variety of advertisements to position brands perceptually in the psyche of the consumer. To understand consumer perceptions of current product positions, it would appear sensible to prefer to get a visual representation, which can identify the few underlying dimensions on which consumers perceive brand positions. A map (commonly two-dimensional) is quite well suited for this purpose since its orthogonal axes represent the cognitive dimensions used by consumers to evaluate brands. This property directly assists the manager in identifying the psychological dimensions and, subsequently, in using advertising to position the firm's brand clearly on those dimensions (Ghose, 1994).

Multi-dimensional Scaling (MDS) is a technique that enables us to map objects (brands) spatially, so that the relative positions in the mapped space reflect the degree of perceived similarity between the objects (the closer in space, the more similar the brands). Using MDS perceptual maps can be generated, which shows the relative positioning of the brands, together with knowledge of the general characteristics of the brands, allow the analyst to infer the underlying dimensions of the map (Kohli and Leuthesser, 1993; Green and Krieger, 1989; Kaul and Rao, 1995). MDS is particularly useful in instances where consumers naturally tend to make overall similarity judgements, or in circumstances where attribute data are sparse.

Indian Service Sector: The Positioning Concerns

There is almost no literature on optimal positioning of services in India. Perhaps work in this area requires development of new concepts and models of consumer choice for services for which

an immediate competitor set is not clearly identified. One may need to consider models for non-comparable alternatives (Johnson, 1986), derivation of "super-perceptual spaces" in which items are compared on higher-level attributes.

In the last five years Indian services sector has shown tremendous growth particularly in the areas like telecommunications, entertainment and air travel. With the removal of governmental shackles the country has seen an immense growth in these sectors with the benefit ultimately reaching to the final consumer. Who would have thought of mobile phones graduating from luxury to commodity items, air tickets to be sold for as less as Rs.500 or the luxury of watching more than 100 channels now available to common man. Though the competition has resulted in a lot of options for the consumers, the service providers are finding it difficult to maintain their competitive position in the marketplace. One of the major reasons is lack of clear understanding about the positioning strategies of services. Some of the major services that are probably lacking in positioning strategies are:

Mobile service operators: Broadly these services can be classified in two categories namely the CDMA operators like Reliance or TATA Indicom and GSM operators like Airtel, MTNL, Hutch, BSNL, and Idea. For an average customer the most important selection criteria for the service are the "cost." This has led these operators to offer a host of schemes and the prices have seen a downward trend. CDMA operators like Reliance or TATA Indicom are late entrants in the telecommunication arena, but it seems they were not able to position their services in the best manner and are now simply competing on the basis of cost. Though Idea at the inception of their service used the caption "An Idea can change your life" but it was not able to distinguish itself from the other operators. One of the harsh facts that these operators have to accept is that mobile services are now commodity services. Gone are the days when the customers used to pay five to ten times of a landline call and even for an incoming call. Now the customers need value added services like entertainment, banking etc to be provided by their mobile service operator in addition to the regular service of communicating. The commoditization of mobile services has taken very fast and thus operators now need specific strategies to differentiate their services form their competitors.

Entertainment channels: In the last decade with the coming of cable television and lately the DTH (Direct-to-Home) television concepts, the consumer has host of choices. The early strategy of these services was to first offer the channel free-to-air and then once the viewers are addicted to it they made it pay channel. Some other channels particularly in the arena of sports this migration from free to pay happened when they exclusively beam some major sport event like Ten sports, which came into limelight when they bought the last soccer world cup exclusive rights or lately the Neo sports a subsidiary of Nimbus, the owner of India-West Indies series telecast rights. But it has been observed that once such exclusivity ends these channels find themselves a part of other channels with little to differentiate. Some big players like Zee and Star adopted the strategy of bouquet, whereby a consumer who wants to watch even if one channel of Star or Zee have to pay for the whole bunch of other channels, which were bundled and marketed together as bouquet. But with conditional access system becoming the norm such channels, which do not have anything to differentiate themselves, would find it difficult to survive.

Thus some of the steps that these services firms need to undertake in immediate future are:

- develop an understanding of consumer preferences about the service being offered,
- plan affective positioning strategies for these services,
- adopt techniques like multidimensional scaling to map competing brands, and
- customize advertising strategies to position in the required segment.

Conclusions

To maintain and enhance its level of profits in the presence of various external forces, a firm must continuously reposition or redesign its existing services-or introduces new service options. Typically, positioning strategy formulation is an extremely time-consuming and difficult task. First, because it demands a good deal of marketing research and analysis in order to understand the marketplace fully, and second because there are no rules; no right ways or wrong ways to interpret it. Formulating a marketing positioning strategy demands a lot from the strategist, such as analytical ability, patience, creativity, imagination and sheer instinct. Thus when planning positioning activities, managers need to develop a set of activities that are congruent in both conceptual and operational terms, i.e. they must reconcile and synchronize a wide range of activities. Further, new models and theories are needed to relate advertising and other variables to service positioning in a perceptual space and how they may change as the brands mature in their life cycles.

Keywords: positioning, services, mobile operators, entertainment

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Working Capital
in Small Scale Industry

Sudarsana Reddy G. and Raghunatha Reddy S.

Working capital management assumes greater significance in Small Scale Industrial (SSI) Units as most of these have weak financial base and limited accessibility to financial markets. In fact, efficient working capital management decides the success or otherwise of a unit. The working capital practices in small-scale industries are more owners centric than professionally managed. The present study attempts to study the working capital management practices in nine small-scale industries located in Bangalore.

Working capital plays a key role in business just as heart in human body. Its effective provision can ensure the success of a firm while its inefficient management can lead not only to loss but also to its ultimate downfall. Working capital management, therefore, is one of the important facets of a firm's overall financial management. Working capital management is concerned with the problems that arise in attempting to manage the current assets, current liabilities and the inter-relationship that exists between them. The basic objective of working capital management is to put current assets to optimum use for overall profitability of a business enterprise.

The management of working capital assumes greater significance in respect of Small Scale Industrial (SSI) Units as most of SSIs have weak financial base and limited accessibility to financial markets. Studies on the causes of industrial sickness have repeatedly emphasized the need for adequate working capital. This being the case, it is found that the perceptions about the working capital management differ among business-persons. This study seeks to place the issues in proper perspective.

Dr.Sudarsana Reddy G.,Professor of Management, Acharya Institute of Management Studies (AIMS), (Affiliated to Bangalore University, Bangalore),1st Cross, 1st Stage, Peenya Industrial Area, Bangalore–560 058 Email: reddyaimsblore@gmail.com

Dr.Raghunatha Reddy S., Associate Professor of Management, Kandula School of Management Studies, (Affiliated to SV University, Tirupati), Kadapa, - 516 003, Andhra Pradesh – 560 058 Cell:09985864008, Email: dr.sreddy820@rediffmail.com

Methodology of the Study

The study covers such discussions of working capital management as working capital managing personnel, basis of determination, period of review, method of assessment and control and managing working capital gap. Obviously, the study excludes the practices of cash management inventory management, and creditors' management. The study covers units across such industries as Automobiles, Batteries, Chemicals,

Source: Peenya Industries Association (PIA) Technical Directory 2005, Bangalore: Bangalore Business Directory Pvt. Ltd.

Electrical, Engineering, Mineral, Plastic, Rubber and Steel. In all we have picked up 94 units out of total population of 160 units. 80 of the 94 owners responded to the study (see Table -1).

Table 1: Industry-wise Classification of Sample of SSI Units

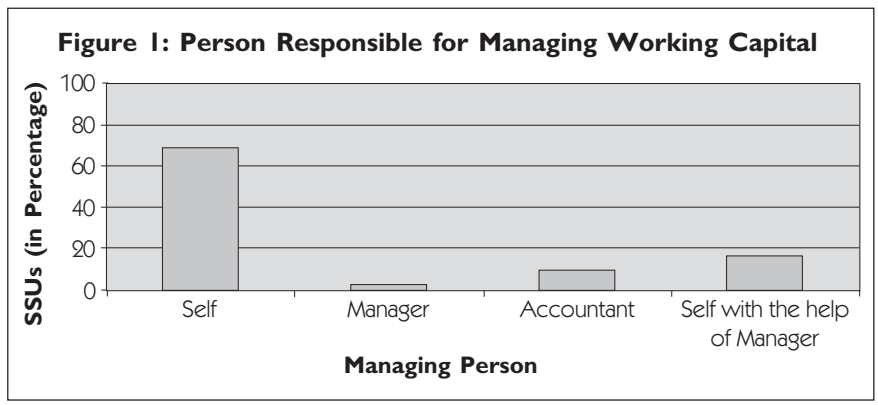
Industry Group	No. of working units in universe	No. of sample units	No. of sample units responded
Automobile (A)	10	7	6
Batteries (B)	11	8	6
Chemical (C)	16	11	9
Electrical (Ele)	27	19	16
Engineering (Eng)	06	5	5
Mineral (M)	04	3	2
Plastic (P)	22	15	13
Rubber (R)	18	13	12
Steel (S)	18	13	11
Total	**132**	**94**	**80**

Source: Peenya Industries Association (PIA) Technical Directory 2005, Bangalore: Bangalore Business Directory Pvt. Ltd.

Table 2: Person Responsible for Managing Working Capital (No. of Units)

Managed by	A	B	C	Ele	Eng	M	P	R	S	SSI
Self	04 (5.0)	04 (5.0)	05 (6.25)	14 (17.5)	03 (3.75)	01 (1.25)	06 (7.5)	09 (11.25)	09 (11.25)	55 (68.75)
Manager	—-	—-	—-	—-	01 (1.25)	—-	—-	01 (1.25)	—-	02 (2.5)
Accountant	—-	—-	02 (2.5)	—-	01 (1.25)	01 (1.25)	03 (3.75)	—-	—-	07 (8.75)
Self with the help of manager or accountant	02 (2.5)	02 (2.5)	02 (2.5)	02 (2.5)	—-	—-	04 (5.00)	02 (2.5)	02 (2.5)	16 (20)
Total	**06 (7.5)**	**06 (7.5)**	**09 (11.25)**	**16 (20.0)**	**05 (6.25)**	**02 (2.5)**	**13 (16.25)**	**12 (15.0)**	**11 (13.75)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units



Data for the study have been obtained from owners of small units first hand and from available published material. The study presents certain interesting phenomena.

Working Capital Managing Personnel

Who manages current assets and current liabilities in small units? The owner himself (69 per cent, see Table-2). The reasons for this are three fold: firstly, the units cannot afford to hire the services of qualified persons. Secondly, the owner feels that he himself has the skills and qualifications to manage working capital. Thirdly, the entrepreneur frustrates no one else.

Working Capital Base

There should not be excess or inadequate working capital. Both have negative impact on profitability performance of the firm. Past experience is the basis (Table-3) for determining the working capital needs in 49 per cent of the sample units. Convenience, availability, experience, and intuition seem to be the other bases.

Estimation of Size of Working Capital Requirement

The size of working capital is usually estimated in relation to fixed capital, turnover or production. Table-4 portrays the basis for estimating the size of working capital required. Majority 38 per cent of the sample units estimate their working capital in relation to sales, while 31 per cent units in relation to production, followed by 30 per cent of units in relation to percentage of fixed capital.

Period of Review of Working Capital

Table-5 catalogues the period of review of the working capital in sample units. Period of review of working capital management is very essential. 51 per cent of the sample units review their working capital position every week and 35 per cent of the units every month. All most all SSIs review their working capital position on either weekly or monthly basis.

Table 3: Basis for Determining Working Capital (No.of Units)

Base	A	B	C	Ele	Eng	M	P	R	S	SSI
Past experience	01 (1.25)	02 (2.5)	06 (7.5)	10 (12.5)	—-	01 (1.25)	06 (7.5)	07 (8.75)	06 (7.5)	39 (48.75)
Some rule of thumb	02 (2.5)	02 (2.5)	—-	02 (2.5)	02 (2.5)	—-	03 (3.75)	03 (3.75)	02 (2.5)	16 (20.0)
Projection based on production / sales	03 (3.75)	02 (2.5)	03 (3.75)	04 (5.0)	03 (3.75)	01 (1.25)	04 (5.0)	02 (2.5)	03 (3.75)	25 (31.25)
Any other	—-	—-	—-	—-	—-	—-	—-	—-	—-	—-
Total	**06 (7.5)**	**06 (7.5)**	**09 (11.25)**	**16 (20.0)**	**05 (6.25)**	**02 (2.5)**	**13 (16.25)**	**12 (15.0)**	**11 (13.75)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units

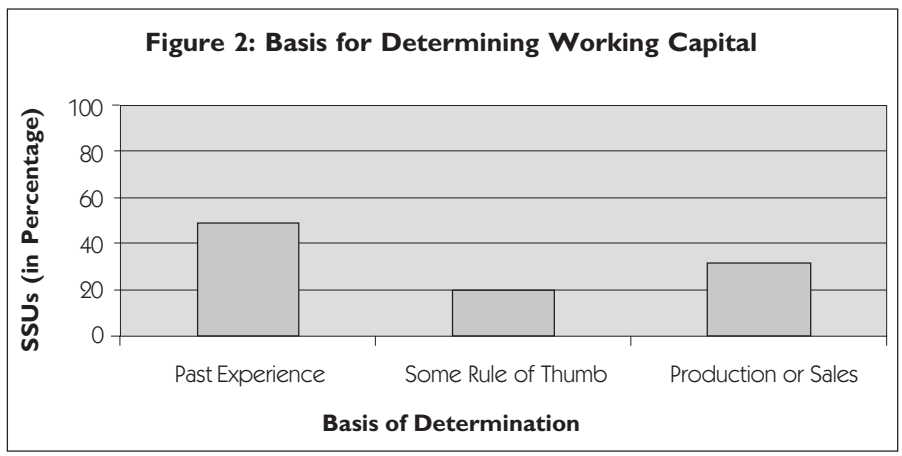


Table 4: Estimation of Size of Working Capital Requirement (No. of Units)

Basis	A	B	C	Ele	Eng	M	P	R	S	SSI
Percentage of fixed capital	—	01 (1.25)	—	04 (5.0)	—	01 (1.25)	07 (8.75)	05 (6.25)	06 (7.5)	24 (30.0)
Percentage of sales	03 (3.75)	03 (3.75)	05 (6.25)	08 (10.0)	04 (5.0)	—	03 (3.75)	02 (2.5)	02 (2.5)	30 (37.5)
Percentage of production	03 (3.75)	02 (2.5)	04 (5.0)	04 (5.0)	01 (1.25)	—	03 (3.75)	05 (6.25)	03 (3.75)	25 (31.25)
Other	—	—	—	—	—	01 (1.25)	—	—	—	01 (1.25)
Total	**06 (7.5)**	**06 (7.5)**	**09 (11.25)**	**16 (20.0)**	**05 (6.25)**	**02 (2.5)**	**13 (16.25)**	**12 (15.0)**	**11 (13.75)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units

Figure 3: Estimation of Working Capital Requirment

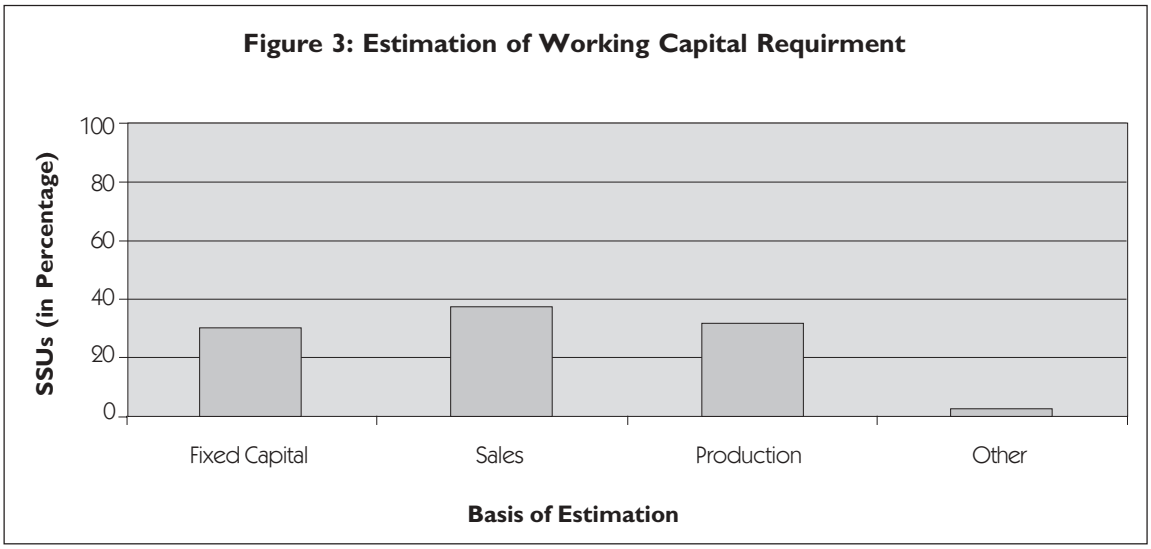


Table 5: Period of Review of Working Capital (No. of Units)

Review Period	A	B	C	Ele	Eng	M	P	R	S	SSI
Daily	—	—	—	03 (3.75)	—	—	01 (1.25)	04 (5.0)	03 (3.75)	11 (13.75)
Weekly	03 (3.75)	04 (5.0)	07 (8.75)	09 (11.25)	03 (3.75)	02 (2.5)	08 (10.0)	04 (5.0)	01 (1.25)	41 (51.25)
Monthly	03 (3.75)	02 (2.5)	02 (2.5)	04 (5.0)	02 (2.5)	—	04 (5.0)	04 (5.0)	07 (8.75)	28 (35.0)
Total	**06 (7.5)**	**06 (7.5)**	**09 (11.25)**	**16 (20.0)**	**05 (6.25)**	**02 (2.5)**	**13 (16.25)**	**12 (15.0)**	**11 (13.75)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units

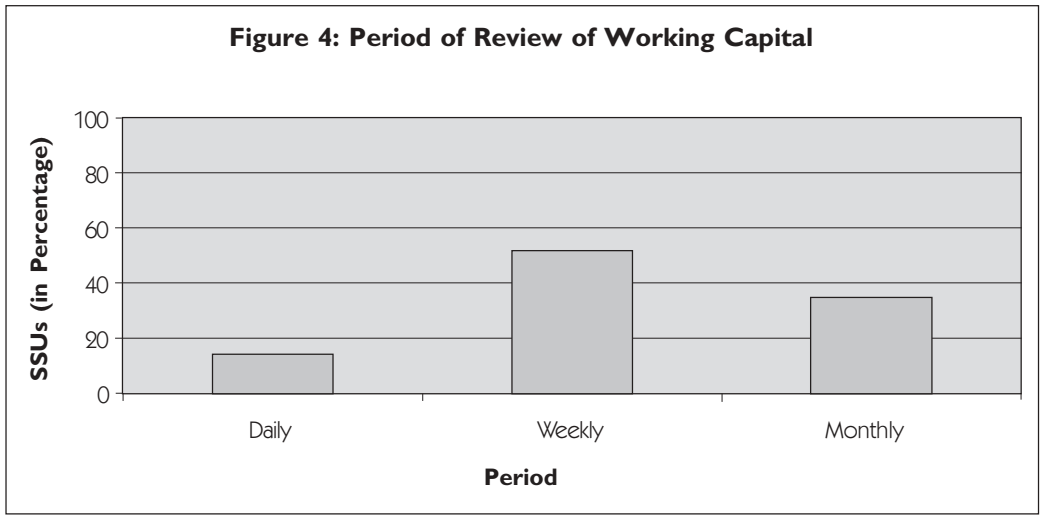


Table 6: Methods of Assessment of Working Capital (No. of Units)

Method	A	B	C	Ele	Eng	M	P	R	S	SSI
Ratio analysis	01 (1.25)	—	—	01 (1.25)	02 (2.5)	01 (1.25)	03 (3.75)	06 (7.5)	05 (6.25)	19 (23.75)
Funds flow analysis	04 (5.0)	04 (5.0)	05 (6.25)	09 (11.25)	02 (2.5)	—	04 (5.0)	01 (1.25)	01 (1.25)	30 (37.5)
No method adopted	01 (1.25)	02 (2.5)	04 (5.0)	06 (7.5)	01 (1.25)	01 (1.25)	06 (7.5)	05 (6.25)	05 (6.25)	31 (38.75)
Total	**06 (7.5)**	**06 (7.5)**	**09 (11.25)**	**16 (20.0)**	**05 (6.25)**	**02 (2.5)**	**13 (16.25)**	**12 (15.0)**	**11 (13.75)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units

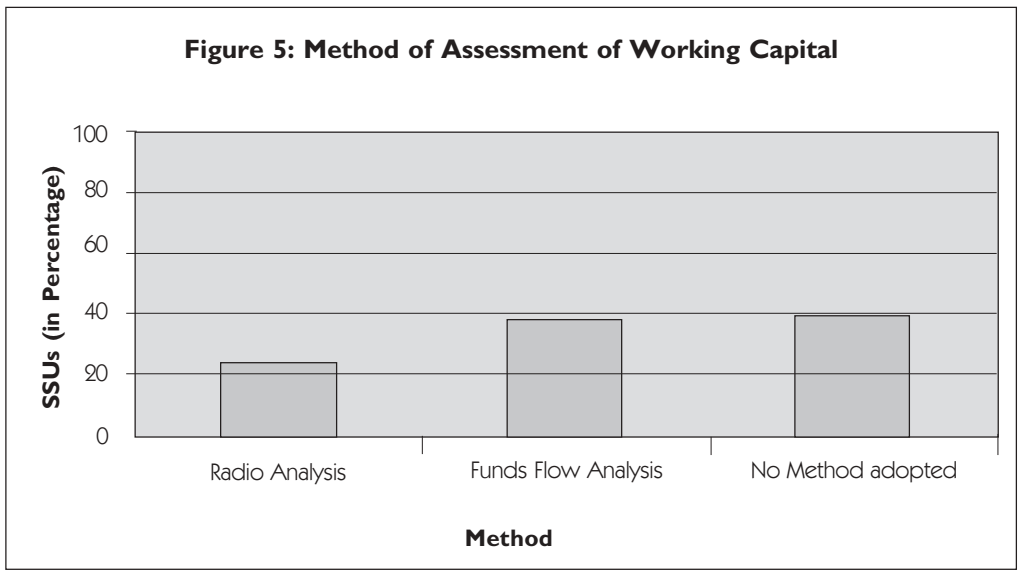


Table 7: Control Methods for Working Capital (No. of Units)

Control Method	A	B	C	Ele	Eng	M	P	R	S	SSI
Cash and bank balance reports	03 (3.75)	03 (3.75)	04 (5.0)	08 (10.0)	05 (6.25)	01 (1.25)	07 (8.75)	06 (7.5)	05 (6.25)	42 (52.5)
Periodical production / sales budget	03 (3.75)	02 (2.5)	03 (3.75)	05 (6.25)	—	01 (1.25)	04 (5.0)	03 (3.75)	04 (5.0)	25 (31.25)
Periodical working capital reports	—	01 (1.25)	02 (2.5)	03 (3.75)	—	—	02 (2.5)	03 (3.75)	02 (2.5)	13 (16.25)
Total	**06 (7.5)**	**06 (7.5)**	**09 (11.25)**	**16 (20.0)**	**05 (6.25)**	**02 (2.5)**	**13 (16.25)**	**12 (15.0)**	**11 (13.75)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units

Figure 6: Control Methods for Working Capital

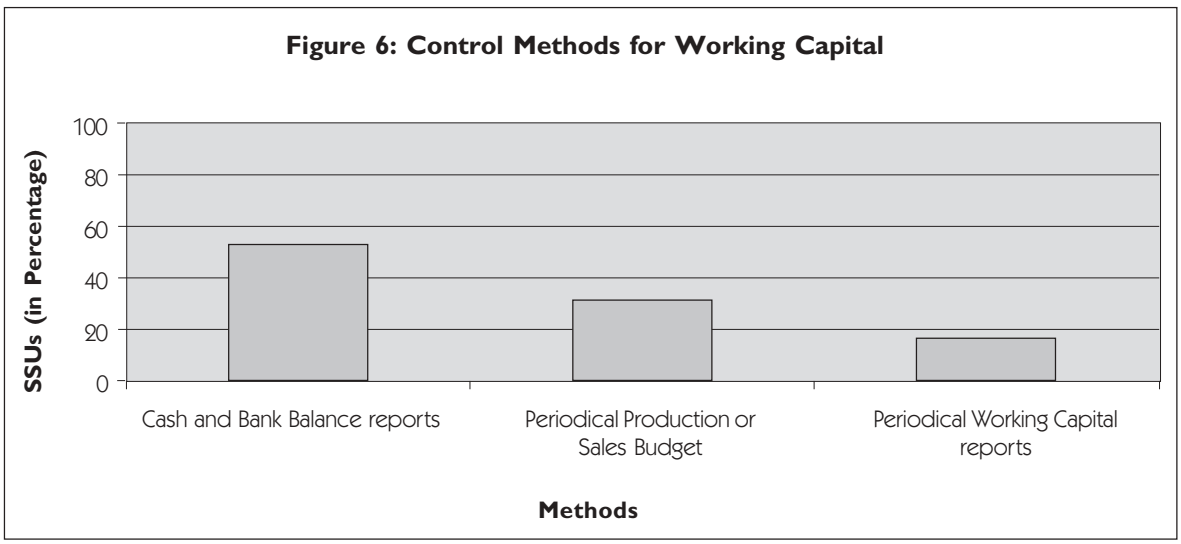


Table 8: Areas of Shortage of Working Capital (No. of Units)

Areas	Always	Seasonal	Never	Total
Cash	41 (51.25)	27 (33.75)	12 (15.0)	80 (100)
Inventories	27 (33.75)	23 (28.75)	30 (37.5)	80 (100)
Other	12 (15.0)	30 (37.5)	38 (47.5)	80 (100)
Total	**80 (100)**	**80 (100)**	**80 (100)**	**80 (100)**

Note: Figures in parentheses indicate percentage to the total units

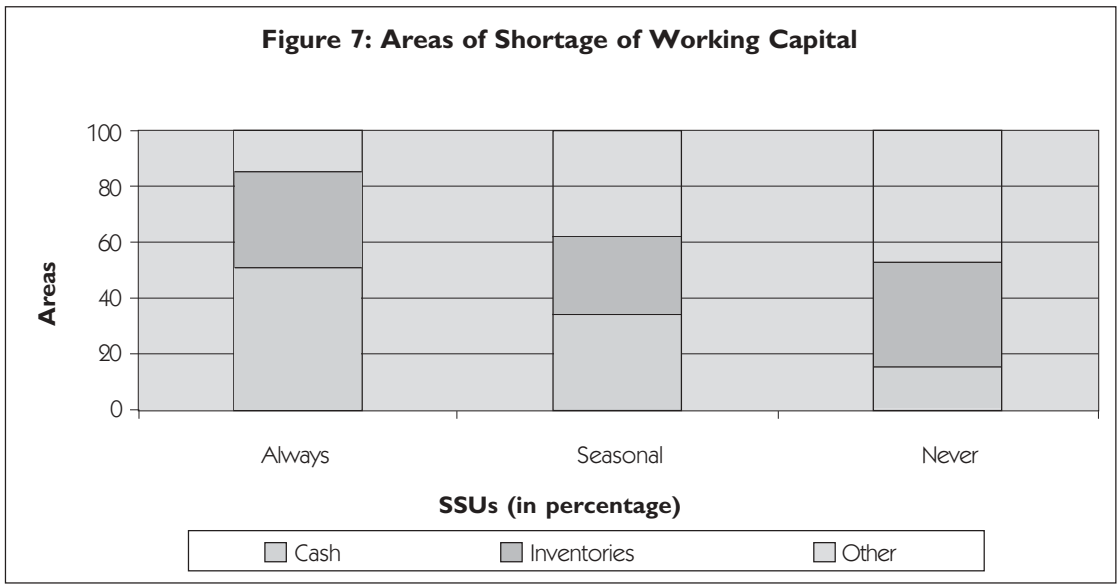
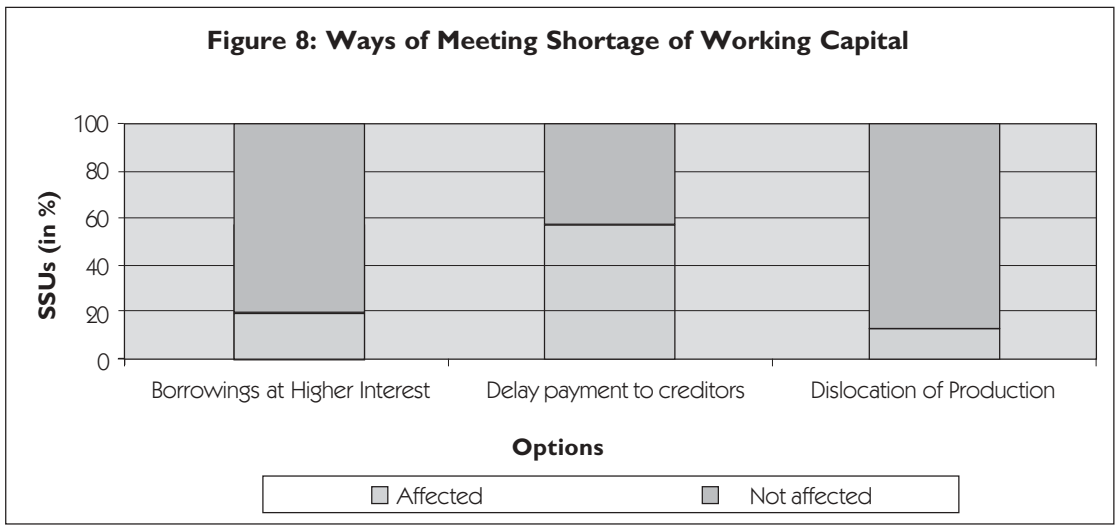


Table 9: Ways of Meeting Shortage of Working Capital (No. of Units)

Ways	Affected	Not Affected	Total
Borrowings at higher Interest	14 (17.5)	66 (82.5)	80 (100)
Delay payment to creditors	46 (57.5)	34 (42.5)	80 (100)
Dislocation of production	10 (12.5)	70 (87.5)	80 (100)

Note: Figures in parentheses indicate percentage to the total units



Method of Assessment of Working Capital

Funds flow analysis seems to be the most popular method used by sample units (38 per cent, see Table-6) to assess the effectiveness of working capital management. Ratio analysis too is used by some of them.

Control Methods for Working Capital

In order to control working capital, majority (Table-7) of the sample units (53 per cent) use common sense approach – keeping on cash and bank balances. Some units are budgets.

Shortage of Working Capital

It is apparent from Table-8 that shortage of working capital is a chronic phenomenon with as many as 51 (cash) per cent of the sample firms affirming this problem. Surprisingly, nearly 15 per cent of them do not face the problem at all. With regard to inventory shortage 38 per cent of the units never faced such problem. Thus, it is evident that cash shortage has been very severe followed by shortage of inventory in the sample units.

Meeting Shortage of Working Capital

When there is shortage of working capital, how will the shortage be managed? Majority 57 per cent (Table-9) of the sample units tried to overcome the shortage by way of delayed payments (spontaneous source) to creditors. 18 per cent of units borrow at higher rates of interest to pay off the pending bills.

Remedy

The findings (problems?) themselves suggest remedies too. That efficient working capital management ensures success of a small unit is an understatement. Whether such units can exist and for how long, depends on the management of inventories, cash and receivables. A few remedies are on the following lines:

- Professional managers to manage working capital may be hired. The problem with owner himself managing that cannot separate business finance from personal finance. Too often the two are mixed up and in most cases, personal finance takes precedence over business finance. Where hiring qualified people is going to be too expensive, the owner needs to pick up rudiments of managing receivables, inventory, and cash. B. Schools are conducting programes to train businessmen in managing finance.
- Estimation of working capital needs to be done on some rational basis- particularly on production or sales budget. Projecting future requirements on past performance served its purpose in the days of protected markets and stable environment. Not any more. This exercise demands the services of a qualified person. In the alternative, let the owner himself train in this area.
- The SSIs units may use financial tools such as ratio analysis, funds flow analysis, budgeted financial statements and cash budgets in assessing their efficiency in managing the working capital. These techniques may also be used in planning, determining and controlling working capital in these units.
- The control over working capital can be exercised through the preparation of periodic reports, which enables SSIs units to properly monitor and control their working capital.
- Shortages-chronic and seasonal-found in cash and inventory components of current assets of SSIs shall be overcome through better planning. To overcome the problem of cash crunch, it is better to estimate cash requirements well in advance through cash budget so that early efforts can be undertaken to fill the shortage. It will also help in avoiding raising loans at higher interest rates, delay in payment to creditors and dislocation in production activity.
- Despite the availability of network of banks, SSIs are forced to look to non-banking sources to raise short-term loans. Such borrowings do not come cheaply. Not that bank loans are not available. They too are expensive. It is time that Government has rethink on making credit available to SSI units with the buzz word – SEZ's doing rounds, the plight of millions of SSI units, which have anchored the destiny of India's economy for too long, has been sidelined. This mindset needs to be changed.

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Snares: Brands to guard against

Senthilvelkumar K.R.

A successful brand is an asset for any company, as it serves as a powerful weapon to ward off the competition in the market. However, the process of building a brand and sustaining its success is arduous. It calls for meticulous understanding of the various dimensions of a brand, which the company itself may not fully comprehend at times, as they are actually possessed by consumers in thought form. This article examines suitable strategies for the several traps that companies stumble upon in the process of managing their brands, which erode the brands and also reduce them to mere commodities.

A brand, in simple terms is a distinctive identity, which a company wants to establish for its products to basically differentiate them from that of its competitors. For target customers, a brand serves as a sign of quality assurance, mostly as a symbol of status and even as a reflection of their own personality. Thus brands stay as images in consumers' thoughts and every company strives for entrenching this image forever. One of the earliest beliefs in branding was that the image got built mostly based on the communication messages and the creative elements incorporated in them. Nevertheless there is an increasing realization now that the image is dependant more on the functional superiority of the product, uniqueness of its benefits, adequacy of the service delivery associated with it and even the societal orientation of the company exhibited by the brand. The marketers consensually opine that building brands and subsequently retaining or enhancing their equity is an onerous task, as it calls for ensuring the right blend of an initial marketing mix, subsequent focus on continuous innovation and effective periodical transformations afterward. Companies often get caught in snares guilelessly, during the process of marketing their brand to the consumers. The fact that these are mostly self-made traps, strengthens the belief that the real enemy for a brand is not outside but from within. The brand-marketers sometimes tumble, in a hurry to match the strategy of competitors, or when they misinterpret the consumers' perceived image of their brand or when they become overconfident of their brand leverage.

Prof.Senthilvelkumar K.R., Assistant Professor, G.R.Damodaran Academy of Management, Civil Aerodrome Post, Avanashi Road, Neelambur-641 014, Coimbatore, Email: krsvk@rediffmail.com

How to keep brands from getting tripped up

A product is only a bundle of features and does not definitely have a life without a brand. Brands give life to products but they may sometimes lose their ability to infuse life into products if they become unaware of many traps that tend to commoditize them. These traps come into being in many ways.

Snare 1: Underestimating the need for rejuvenating the appearance

Appropriate Strategy: "Dressing to the nines"

A brand is not really about the name or its exterior appearance but it is important to focus on this because the first influence of the brand is exerted through its outward looks. Although the beauty of the brand is not skin-deep, it is necessary to decorate externally. When a brand fails to address the need for newness in its exterior looks, it will lose its ability to create excitement among consumers. Brands become stale, when companies ignore this need at the basic dress-up level. The rejuvenation which is in the form of change of packaging, new blend of colours, brand caption revisions, prefixal and suffixal additions and new styling of logo, helps the brand stay alive catering to the consumers' psychological urge for a change, even though there might sometimes be no content-wise change in the brand. The brand conveys a new promise to consumers that it is geared up to deliver in a better way. What is considered as a widely used practice in FMCG category is visible and relevant in other product categories too. Even 'Indian Airlines' needs to change to 'Indian' with a new logo to become more contemporary. Intel's new brand caption, 'Leap Ahead,' Onida's 'Nothing but truth' and Bank of Baroda's new makeover are the recent examples of brands which want to shed their old image and sport a new look to take on the existent and dormant competition in their respective domains. Sometimes major brands underestimate this need for 'dressing to the nines' and strive for permanence in their visual exteriors jeopardizing the fortunes of the brand. Some realize and incorporate the change a little late futilely. This is the basic level trap, which marketers frequently fall into.

Snare 2: Being oblivious of market evolutions Appropriate Strategy: "Turning over a new leaf"

Brands face another pitfall when they become unaware of the evolution of markets. The evolution throws up a lot of opportunities for the brands that are awake but tough challenges for the ones that remain ignorant. The target customer group, which remains as a single segment during the introduction stage, gets disaggregated to include many new segments with many new needs and preferences. In other words, a target segment along the product life cycle and with the evolution of the market in the longer run gets divided into many new segments requiring various new need-satisfiers. The offering of the company, which is a basic product in the beginning, needs to change to become an augmented product later. The company needs to incorporate this change in the brand by repositioning it to cater to the changing consumer preferences and expectations. 'Air India' is a good example of a brand, which has realized the need for a reorientation in the advent of stiff competition from new low-cost carriers. Companies can also take cues from 'Nokia's focus' on 'Indian needs' and from fast-food restaurant brands such as 'McDonalds' and 'Pizza Hut,' which have incorporated newer additions in its menu to suit the Indian consumers' tastes. A complacent brand, which wants to stick to its original offering, would eventually become irrelevant for consumers. Even a market leader can miss out on good opportunities existent in the emerging new segments, if it does not develop early marketing insights through a continuous scan of the market. 'HLL' offered a fairness cream for males only as a reaction to the first successful attempt made by 'Emami.' Brands should sense early signals from the market and change deep inside proactively or else they may become invalid for consumers no matter how strong they are.

Snare 3: Overstretching brands

Appropriate Strategy: "Valuing the power of leverage"

When brands gain higher equity, companies get tempted to extend them to various related and unrelated categories. Many conflicting viewpoints exist about the core values of brands. There are marketing experts like Al Ries, who says that brands will die if the core value is not understood and stretched beyond its relevance. There are counter perspectives held by theorists like Jagadish Sheth, who argue that brands can be extended to any category whatsoever, as long as they have high recognition and reputation. There are examples even in Indian context, of brands that are extended from software to salt and from switches to toothpaste, with no relevance to each other. It becomes evident from these examples that brands can be extended as long as they serve as broader company umbrella brands. However, it may be difficult for the brands that are deeply

associated with specific product categories. The company will not only have a tough time fitting the image of such brands to other unrelated categories but also run the risk of diluting the earlier associations. This poses a major challenge for the marketers attempting at leveraging on their brand equity. Many brands have made faulty moves overvaluing their power and failed miserably in the market. Ponds' foray into 'toothpaste category,' Dettol's extension into 'talcum powder' and Coke's 'Vanilla Coke' are good examples. Brands need to stay clear of this trap by understanding what their brands truly stand for in the minds of their customers.

Snare 4: Inability to deliver value

Appropriate Strategy: "Living upto the promise"

Companies have understood that successful brands need to offer a great value proposition for consumers but find it hard to achieve this in real practice. The more recent snags faced by mega brands are in a new form. Though negligible, it depicts the advent of a new trend, which might pose some unexpected challenges for brands in the marketplace. Calling themselves as anti-brands, they attempt at offering superior products at nominal prices without tall claims in advertisements or celebrity endorsements. Additionally they want to create a movement by making the brand names available for others to use, as in the case of software products. One particular example of an 'open-source brand' is called as 'Black Spot' which is from Adbursters group. It breaks away from the conventional branding methods, as it is an effort to offer a good value in shoes without any tall claims, emotional hypes, celebrity endorsements and copyright restrictions. This is to take on the so-called premium brands and their pricing techniques. This is an attempt at demystifying the premiumness of major brands. The learning from this is that major brands may not be able to continue to enjoy major shares or play on an emotional platform for long, if the value offered is not commensurate with the cost incurred by consumers. It is a wake-up call for brands, which depend on emotional platforms, rather than functional benefits for survival. It is vital that such brands need to introspect to find whether they really deliver what they promise to consumers.

On the other hand, when many leading brands in the market become somewhat comparable or when product supply far exceeds demand or when scope for differentiation becomes minimal, the actual fight among brands, resembles that of brand-less commodities using low-price or other forms of sales promotion techniques as the weapon. This actually diminishes the power of brands and brands tend to get commoditised in order to gain short-term successes. This is the case with many low-involvement product categories, particularly; the recent detergent war is an example. Companies fall into a snare without realizing that there is still a possibility for differentiation and value-addition. Brands need to bring in innovations to add new value for consumers and this is possible even in impulse products. For instance, 'CavinKare's sachet packages,' 'Vegetarian platform' effectively used by Anchor brand and 'natural ingredients' as used by Colgate in the mature toothpaste category and 'fragrance for clothes' as introduced by an Ariel variant are proofs of existing possibilities for innovation in FMCG categories.

The task of managing brands is not so glamourous anymore, as it is conventionally considered to be. It calls for diligent attention to all the facets of the brand, some of which may not be fully understood by the companies themselves, as they are thoughts owned by the consumers. Brands need to be cautious of the lapses in their marketing strategies to be able to steer clear of certain snares, which pose major threats for their continued existence. Even major brands lose sight of these pitfalls sometimes and tend to lose their power of leverage. Brands need to anticipate these glitches and develop early strategies to counter them so as to ensure they are not reduced to mere commodities in the market.

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Shopping Mall:
Driving Force in Organized Retailing

Sanjay Kumar Kar and Alok Kumar Sahoo

India has been rated as one of the most attractive emerging markets for retail for last two years. Organized retailing is growing about 18-20 per cent per annum and new formats are emerging to deliver value to the consumer. Mall is the latest format in the organised retailing; a significant development has occurred in last couple of years due to change in consumer profile and spending behaviour. In 2003 there were 25 operational malls in the country and the number is forecasted to rise to a 220 by 2006 and 600 by 2010. Key challenges are there to operate such a significant number of malls, owing to heavy investment and getting the right operation.

The organized retailing in India has just crossed Rs.200 billion marks and is growing at a rate 18-20 per cent. But the share of organized segment is barely two per cent. India has also been rated as one of the most attractive emerging markets for retail for last two years. This major transformation in outlook is due to improved living standard and continuing economic growth. Therefore the future of organized retail is pretty bright.

Though Mall is the latest format in the organized retailing, a significant development has occurred in last couple of years due to change in consumer profile and spending behaviour. Increasing youth population with more purchasing power and less time is looking for shopping along with entertainment as one stop option. The immediate impact is very much evident from the drastic rise in forecast of 25 operational malls in 2003 to 220 by 2006 and 600 by 2010. Non-metros are also participating equally to make this happen true.

Mr.Sanjay Kumar Kar, Academic Associate-Marketing Area, Indian Institute of Management, Wing-9A, IIMA, Vastrapur, Ahmedabad, Pin-380015, Email: skar@iimahd.ernet.in, kar_sanjay1@sify.com

Mr.Alok Kumar Sahoo, Customer Care Manager, ICICI Bank Ltd., 5th Floor, Landmark Building, Race Course Circle, Alkapuri, Baroda-390007, Ph-09879545069, Email: aloksahoo@rediffmail.com

The major problem in organized retailing is the availability of quality retail space at a reasonable price. Mall is the solution, which has emerged to this growing problem. The paper discusses the role of shopping mall as a driving force in mall retailing in India.

Organized Retail

India popularly referred as "Nation of

shopkeepers" for its more than 11 million retail outlets. Indian retail industry in 2003-04 was about Rs.10,916.2 billion, contributing ten per cent of the country's GDP and employing about ten per cent of the total labour force. But only two per cent of that comes in the organized segment. As compared to this, countries like USA (85 per cent), Malaysia (55 per cent), Thailand (40 per cent) and China (20 per cent) have a much higher proportion of retail in this segment. However, the organized segment is growing at a rate of 18-20 per cent, which is far higher than the overall market. A.T. Kearney has ranked India as the most attractive retail destination among emerging markets globally, ahead of China despite the ban on Foreign Direct Investment (FDI) in the sector and a relatively low market attractiveness of the country. Therefore the future of organized retail is pretty bright in India.

The concept of Organized Retail Outlets started around 20 years back with the launch of stores like "Nallis" and "V.G.Paneerdas" in the South. But these were very much region specific. The foundation store of modern retailing was laid by setting up of "Shoppers Stop" by the Raheja Group at Mumbai in 1991. It is a one-stop destination that provides shopping experience for the entire family by offering the complete range of consumables from apparel to lifestyle accessories. The sector started peaking up by the advent of new millennium, a decade after the first signs of its evolution in the early 1990s. The growth driver of the business has changed dramatically from the large retailers to real estate developers and corporate houses.

According to a study by KSA Techno Park, 88 per cent of the organized retail distribution was concentrated in the top six cities (i.e. NCR, Mumbai, Chennai, Kolkata, Hyderabad and Bangalore) and the remaining 12 per cent is from next four cities i.e. Ahmedabad, Pune, Jaipur and Lucknow in the year 1999. These cities have mature markets, supported by immense competition, good infrastructure and high consumer awareness. However, retailers have started focusing on the secondary cities also. KSA Technopark predicts that by the year 2005, the concentration in the top six cities will fall to 66 per cent and for the other four cities; it will increase to 20 per cent.

Changing Dynamics of Indian Retail

Consumer Profile

With the opening of economy Indian consumer has now a plethora of options coupled with higher purchasing power. He is more aware about how to satiate a need with exposure to media. Though India ranks very high as far as savings rate is concerned the recent developments saw personal consumption in a rising spree. There is an evolution of new breed of customer segments with breaking up of joint families and the increasing number of working couples.

With increasing purchasing power of the middle class and the growing professional working-woman, the buying habit has altogether taken a shift by more income and less time. As the dual income group is taking a better shape in India and the working-women are spending more time in the office than home so the demand for time management is high. The working class women love to go for enjoying their food outside home. Either they go for processed food like ready to each chapatti and ready to cook curry or they prefer to take food in first food chains or hotels. In the changing scenario, consumer demands for more convenience and quality service at affordable price. Apart from that today's highly demanding work culture leaves little time and option for leisure activity. All these led to a strong trend in favour for one-stop destination like malls and hypermarkets. A mall not only offers high quality shopping environment but also provides quality product assortment available at different shopping formats. Even some of the mall developers prefer to allocate a large part of the mall space for leisure and entertainment. Here shopping is no more a mundane activity of yester years but it's a pleasant experience coupled with entertainment called *Shopertainment*.

Focus on Core Competency

In order to run a retail venture successfully, apart from the core activity, maintenance and management of the place is also important. There is also a need to develop the place as a marketing destination. This needs a coordinated and cooperative long run center wide retailing strategy. Shopping centers as contrast to office buildings don't merely lease out space; on the contrary they are complex retail businesses whose sole focus is the sale of merchandise. Therefore, it is critical for the mall developers to find

out right kind of tenant mix to offer wider assortment variety within the mall. Developing malls is not very difficult at this point of time as the government relaxed foreign investment in the real estate development. The bigger and the larger issues are to manage these malls with efficiency and effectiveness. Mall developers face difficulty is managing malls rather than developing malls. The mall developers need to look at customer benefits along with their benefits. Before deciding the anchor store they have to look at the customer profile in those catchments. Right tenant mix is one of the important factors for pulling shoppers into the shopping mall. As there is going to be rapid growth in organized retail in India and national level retailers are looking for strategic location for their store then it complicates issue further while deciding an anchor store. Under such circumstances mall developers need to understand the value proposition they are going to deliver both to shoppers and retailers. They should match the shoppers' requirement with the retailers' product offerings.

Investment Opportunity

With falling interest rates real estate poses to be the big investment destination. Growth of modern retail formats driving the retail space development across the country and malls have managed to remain profitable due to its high occupancies and rents.

Entry of Foreign Players

The big Indian retail players include Shopper's Stop, FoodWorld, Vivek's, Nilgiris, Pantaloon, Subhiksha, Ebony, Crosswords, Planet Health, Lifestyle, Globus, Barista, Qwiky's, Café Coffee Day, Wills Lifestyle, Titan, Raymond, Bata and Westside. Most of the Indian retailers those who started early have access to prime shopping locations. For example retailers like Pantaloon, Westside, Planet Health, Crossword and Star Bazaar have prime locations in the city where the footfall is high and normally these areas remain crowded. But now the trend is changing, as the retailers would like to be a part of shopping mall where they can expect better shopping environment with adequate footfall to make the business viable. As of now the big retailers like Wal-Mart, Tesco and Aldi are not allowed to open their shop in India but in January 2006 Indian government allowed 51 per cent investment in the single brand outlet. That is going to open whole lot of scope for single branded retailers like Body Shop, Nike and Adidas. Next couple of years will be crucial for Indian retail sector as the possibility of opening up the retail sector for the foreign players is gathering momentum and that may bring much needed investment in retail infrastructure development. At this juncture of time infrastructure development is on right track and government and private participation in developing world-class special economic zone (SEZs) in India is on the way. Reliance is planning to use SEZs for its retail and distribution activity in future.

Progress of Retail Highway in India

Last couple of years has witnessed radical changes in the development of shopping centers leaving behind the traditional high street shops. The size and format of the store has also undergone a formidable change. Indian real estate developers picked up models from the West, changed them to suit the Indian context, and skipped a number of stages to arrive at home-grown prototypes. Based on tenant mix, two major formats of development have evolved in India's organized shopping-centre landscape: malls and family entertainment centers. On the basis of variations in space planning and scale, a third segment of "hybrid" centers is also emerging.

Malls

Indigenous factors such as availability of physical space, population densities, city planning and socio-economic parameters have driven the Indian market to evolve its own definition of a "mall." While typically a mall in the United States is 400,000 square feet to one million square feet in size, an Indian version can be anywhere between 35,000 square feet and 10,00,000 square feet (See exhibit 2). Although the primary purpose of a mall is to cater to the retail requirements of its clientele, entertainment-related components are occasionally attached to provide a complete shopping cum entertainment experience. Sahara and In Orbit mall belongs to this segment.

Family Entertainment Centers

These are popularly called as Multiplex, which usually has a large entertainment component consisting of theatre, games, eating outlets, and a small percentage of space devoted to retail. These are primarily entertainment centers with some retail activity to add vibrancy to the environment and cash in on the footfalls. Fun Republic and INOX mall are good example of it.

Hybrid Centers

Here is a combination of large anchor tenants with the remaining retail space sprinkled around a large open plaza. New mall developments including The Forum (350,000-square-feet built-up area) in Bangalore and Nirmal Lifestyle (500,000 square feet) in Mumbai can be classified as hybrid centers. At Forum there is a large entertainment component, a nine-screen Cineplex, and a whole lot of indoor entertainment, amusement park and food joints.

Stages of Mall Revolution

Introduction

The story of Mall first began with the development of Spencer Plaza in Chennai, Crossroads in Mumbai and Ansal Plaza in Delhi together accounting for a total built-up space of approximately 650,000 square feet. This laid the foundation stone for lifestyle retailing in India.

Growth

With the success of the first few malls the market started catching up after a decade of its introduction. Retail development was seen as best investment next to IT. Changing consumer profile and expenditure patterns further fuelled this boom. Real estate developers and corporate houses came into the fray to cash in the opportunity. As of 2003 there were 25 operational malls in the country and the number is forecasted to rise to a 220 by 2006 and 600 by 2010. Non-metros like Pune, Ahmedabad, Lucknow, Ludhiana, Jaipur, Chandigarh and Indore etc are also joining the fray with metros and Grade-A towns resulting, a phenomenal growth in this segment. The total mall space in six A-Grade cities - Delhi (including Gurgaon and Noida), Mumbai, Bangalore, Hyderabad, Chennai and Kolkata-crossed 20 million square feet by 2005 from just five million square feet in 2003. The total mall space in just the seven major cities (NCR and suburbs, Mumbai and suburbs, Pune, Chennai, Kolkata, Bangalore and the twin cities of Hyderabad-Secunderabad) will touch 40.9 million square feet by year 2006. These centers account for more than 61 per cent of the total number of mall projects announced. In the initial acceleration phase, most developers were able to sell 50-70 per cent mall space prior to, and also during, the construction phase and generate the requisite funds. Even the state like Punjab is witnessing significant mall development across ten major cities like Ludhiana, Amritsar, Jalandhar, Mohali, Chandigarh, Ambala, Manimajra, Panchkula, Patiala and Zirakpur. In the end of 2005 there was only 270,000 square feet of gross leasing area, which is expected to increase up to 15 million square feet by the end of 2008? Ludhiana leads the way with 11 malls contributing 5,017,000 square feet of gross leasing area (see Retailing in Punjab, 2006).

Maturity

Though it is still a thing of distant future in India, it has already shown its signs in the developed world due to slower economic growth and maturing population. But the real cause of worry is proliferation of stereotyped one to malls coming up in clusters, each offering more or less similar products and services. For example Gurgaon a population of 1.8 million is expecting some four million square feet of retail space by 2006. At the same time new malls will soon be built in the upper class Delhi neighbourhood of Vasant Kunj, and will likely slash the inflow of wealthy Delhiites into Gurgaon, which is the major catchments so far.

Decline and Consolidation

Most mature markets have gone through this stage of mall development. In the United States, up to one-third of the nation's 1,200-plus malls are already obsolete. Following a decade of consolidation, the 10 largest mall real-estate investments trusts now control 47 per cent of all malls, which includes almost all of the 200 high-performing ones.

Bottlenecks in Mall Development

High property prices and difficulties in accessing real estate Despite the slump in property prices in the last few years, Mumbai and Delhi remain two of the world's most expensive places for property (Refer Exhibit-1).

Investment intensive and high gestation period - A typical mall of one lakh sq feet requires an investment to the tune of 20-30 Crores (excluding the land cost) with a payback of five-six years. Further globally mall operators lease out most of the space (67 per cent) rather than selling it. This allows them to benefit from high rental streams after the malls are well established. But in India this is a risky proposition since most of them are new to the business.

Again reluctance of the banks funding for such projects and ban on FDI reduces possibility of such projects.

Constraints on Demand - A combination of low purchasing power and poor urban infrastructure makes the unwilling to travel more distance reducing the catchments of a store.

Shortage of retailers needing mall space - All malls need few anchor clients such as departmental stores to take up space and attract other retail business. These are currently very few in number. In addition to this the mall needs a base level of smaller specialty stores and fast food outlets to ensure full capacity utilization.

Source: Relating in India. The Emerging Revolution (2000) CII Mc Kinsey Study

Exhibit-I

	Location	Capital value/ sq. ft.	Rental value/sq. ft./ month
Mumbai	Linking Road	15,000-25,000	150-250
	Kemps Corner	10,000-25,000	175-225
	Colaba	18,000 - 23,000	140 – 240
Delhi	Connaught Place	10,000-20,000	100
	South Extension	17,000-20,000	170
	Rajouri Garden	6,000-8,000	60
	NOIDA Sec 18	8,000-10,000	80
Bangalore	MG Road	5,000	80
	Brigade Road	7,000	80
	Commercial St.	6,000	80
	Jayanagar	3,500	65
	Airport Road	4,250	45
	Malleswaram	2,500	40
Chennai	Mount Road	4,000	40
	Nungambakkam	3,500	35
	Anna Nagar	2,200	25
	Adyar	2,200	25
	Spencer Plaza	5,000	50
	Ispahani Centre	5,000	50

Source: India Property Market Overview, Colliers International Asia Pacific Research Report.

Real Estate Scenario in India

Success of any retail venture primarily depends upon the number of footfall it generates, which is directly related to its location. That makes real estate as one of the critical bottlenecks in organized retailing. In India the situation is more complicated by unorganized land market and complicated laws and regulations. The property if available is extremely expensive.

The major issues pertaining to these are:-

- Laws skewed towards the tenants.
- Restrictive zoning legislations.
- Non availability of government owned land.
- Fragmented ownership of private owned land.
- Disorganized transactions due to lack of clear titles and transparency.

As this is a game of demand and supply, supply constraint has sky rocketed the real estate prices in recent times. Coupled with this, due to strong pro-tenancy laws it is very difficult to evict tenants, unwilling to rent. Zoning legislations, which vary across states, restricts the use of land for commercial use. All these factors make access to quality real estate very difficult. The impact of real estate is very much evident from the retail boom in Chennai and Bangalore due to low property cost compared to Delhi and Mumbai.

Supply of Retail Space

As per the latest estimate of the 282 malls expected to come up by 2007 around the country, 39 per cent will be in the national capital region pushing Mumbai to the second slot. The commercial capital of the country, Mumbai has 29 per cent of the total retail space coming up, according to a study done by leading real estate consultants, CB Richard Ellis. The IT hub Bangalore and Hyderabad will have ten per cent each of the distribution of malls, while Kolkata is seven per cent and Chennai is just five per cent. More than 25 million sq ft of organized retail space will be coming up across the country by 2005, the study said.

Mumbai

Mumbai is the epicenter of Indian business and the retailers look for such a lucrative market to start their business. In 1990s Shopper's Stop opened one of the first departmental stores in Mumbai and then this metro is leading the way in retailer revolution in India. Very recently one of the biggest hypermarkets called Hyper City started operation with over 1, 20,000 square feet of trading area. Almost all the large retailers have a presence in the city. Apart from those all leading retailers like Pantaloon Retail, Westside and Lifestyle are actively looking at leasing space in what are perceived to be high traffic shopping destinations. Apparel stores, including Provogue and Weekenders are now targeting malls for expansion after having been present predominantly on the high street. According to IMAGES Retail publication on Mall development in India there is going to be more than 18 million square feet of mall space available in Mumbai by the end of 2007. It is not only such developments are happening in central and southern Mumbai but also across all suburban locations like Powai, Malad and Goregaon.

By March 2007 there is going to be more than 69 malls operational in various parts of Mumbai, majority of which are planned in the suburbs (Refer Exhibit-2). Retail rental and capital values in Mumbai have also remained stable during the last two quarters - both in the traditional retail areas (Linking Road, Colaba etc) and the suburbs. Yields on retail property have been between 10 - 12 per cent.

Delhi

Delhi is one of the leading retailer development centres in India. The cash-rich Delhi population is cosmopolitan in nature and loves to enjoy life. So the market is suitable for all kind of retailers, especially the branded and high-end retailers. National Capital Region (NCR),

Exhibit-2

Mall Developments in Mumbai and Surrounding Area (Existing and Upcoming by Mar-2006)

Mall Name	Location	Built up Area (sq. ft)	Mall Name	Location	Built up Area (sq. ft)
Arkut Mall	Andheri (E)	525000	Karnavat Mall	Thane	70000
Arkut Mall	Kanjumarg		Kemps Shop	Kemps Corner	150000
Atria Mall	Worli	250000	Kohinoor City Mall	Bandra Kurla	300000
Bandra Drive In	Bandra	400000	Lake City Mall	Thane	500000
BN Agarwal Complex	Vile Parle (E)	35000	Landmarc Citi	Lower Parel	200000
Bombay Metal	Thane	400000	Maharaja Property	Juhu Tara	20000
Centre One	Vashi	150000	Mega Mall	Lokhandwala	360000
Cine Vision	Thane	250000	Milan Theatre	Santa Cruz (W)	100000
Cine Wonder	Gorbunder Road	100000	Modella	Mulund/Thane	200000
Citi Mall	Andheri (W)	100000	Nirmala Lifestyle	Mulund	1050000
Crossroad	Tardeo	150000	North Point	Borivali (W)	200000
Crossroad2	Nariman Point	100000	Oberoi mall	Goregaon (E)	400000
Destination	Ghatkopar	150000	Poonam Plaza	Andheri	
Dheeraj	Kandivili	50000	Prime Mall	Vile Parle (W)	130000
Dheeraj Heritage	Santa Cruz	60000	Prime Mall	Vile Parle (W)	100000
Discount Mall	Goregaon (E)	120000	R Mall	Mulund	280000

Mall Name	Location	Built up Area (sq. ft)	Mall Name	Location	Built up Area (sq. ft)
Dream-The Mall	Borivali (W)	300000	R Mall-2	Thane	250000
Dream-The Mall	Vashi	500000	Raghu Leela	Vashi	500000
Dynamix	Juhu	100000	Raghu Leela Mall	Vashi	600000
Evershine Mall	Kandivili (E)	60000	Raghu Leela Mall	Kandivili	450000
Evershine Mall	Malad	380000	Raviraj Mall		195000
Fun Republic	Andheri (W)	125000	RNA Millennium	Kandivili (W)	100000
Fun Republic	Chembur	120000	Runwal Town Centre	Ghatkopar	1000000
Galleria	Powai	200000	Sej Mall	Malad (W)	60000
Gold County	Santa Cruz		Suburbia	Bandra	100000
Grand Hyatt	Kalina	200000	Super Mall	Andheri	200000
Growel's 101-2	Kandivili (W)	650000	Tech Mall	Goregaon	175000
Hatane Shopping Center	Andheri (W)	30000	Thakur Mall	Kandivili (W)	150000
HI ! Life	Santa Cruz (W)	210000	The Dream Mall	Bhandup (W)	600000
High Street Phoenix-3	Lower Parel	500000	The Eastern Mall	Malad (W)	45000
Huma Mall	LBS Marg	120000	The Hub	Goregaon (E)	130000
Inorbit Mall	Vashi	496000	The Mall	Malad (W)	70000
Inorbit Mall-2 Phases	Malad (W)	820000	Tulip Arccade	Juhu	200000
Kalpataru Mall	Thane	300000	Unnamed	LinkRoad	800000
Kanakia Mall	Kanakia	45000			

Source: IMAGES Malls in India, 2005

Exhibit-3

Name	Location	Size (Sq. ft.)
Ansal Plaza	Greater Noida	4,00,000
Gold Souk	Gurgaon	1,00,000
JMD Regent Mall	Gurgaon	1,50,000
East Delhi Mall	Ghaziabad	5,00,000
East End Mall	Ghaziabad	1.00.000
Sinior Plaza	Gurgaon	50,000
Aggarwal Citymall	Ghaziabad	1,25,000
DLF Grand Mall	Pritampura	2,50,000
MGF City Squire	Rajouri Gardens	1,50,000
Expo City	Noida	2,00,000
Destination Point	Faridabad	1,000,00
SB Mall	Gurgaon	2,00,000
Great India Place	Noida	1,00,000

Source: Knight Frank India, ISSC Publication, SCT May 2004

which includes Gurgaon, Noida and Ghaziabad, is increasing getting attention by retailers and real estate developers. A number of malls are being constructed in parts of West and East Delhi. (Refer Exhibit-3). Large format Malls such as Shipra Mall (450,000 sq. ft) in Ghaziabad, Unitech Mall (1.3 million sq. ft) in Noida and Ambi Mall (800,000 sq. ft) in Vasantkunj are gaining acceptance in NCR region.

Bangalore

The next two years will see Bangalore crossing the four-million-square-foot mark in the modern shopping-centre segment. Currently the city has one operational mall in the form of The Forum, besides another semi-shopping centre, the 100,000-square-foot Leela Galleria. But with the scheduled completion of ongoing projects by 2006, Bangalore seems ready to lead the organized retail segment in South India. In the overall A Grade city pie, the share of Bangalore will increase from less than two per cent in 2003 to ten per cent by 2006. Yields on retail property in Bangalore have been between 10 - 12 per cent.

Chennai

The metropolis of Chennai has the distinction of launching India's first shopping mall, Spencer Plaza, in 1999. The development is a housing-cum-commercial complex. Since then, however, the city has remained cool to new projects, with just two new additions in the form of a multiplex-anchored centre, Abhrami Mall, and the Ishpani shopping complex. Chennai has the potential to absorb a large amount of retail developments, though announced projects will only fetch a total of 1.22 million square feet of mall space by 2006.

Pune

Out of the total mall space being developed in the B Grade cities, Pune alone accounts for over 40 per cent. The city has the presence of a large number of organized retailers as well as a high number of SEC-A households. A growing ITES sector and the proximity to Mumbai have also helped in fueling growth. The city already has an estimated mall-space of approximately 475,000 square feet, which is likely to increase to 995,000 square feet by the end of 2004 and another 1.7 million square feet over the next two years.

Kolkata

From about 580,000 square feet of mall space in end-2004, Kolkata is poised to add about 2.5 million-square-foot over the next two-three years. Forum and City Centre are the two operational malls, with other developments like Gariahat Mall, Fort Knox and South City Mall nearing completion. A few expected announcements might give a further boost to the malling scenario in the city. Some of these include: The Homeland (Merlin group), Forum-2 (Saraf Builders), City Centre-2 (Bengal Ambuja), Mani Square, Time Square, Lake Market Mall and one more likely announcement by the Tai Industries group.

Hyderabad-Secunderabad

Though the city is a leading centre for information technology-enabled services (ITES) and business process outsourcing (BPO) in India, but so far the city had just two operational malls, with roughly 3,45,000 square feet of built-up space. The surging demand for quality retail environment has seen several new projects materializing within a short time. From about 9, 10,000 square feet of mall space at the end-2004, the city is likely to add on another 1.5 million square feet over the next two years.

Role of Financial Institutions and Private Sector

Investments in retail real estate, particularly shopping malls, are yielding returns in the region of 12-16 per cent as against six-eight per cent in the residential segment and 11-13 per cent in the office segment. For example, HDFC, the investor in Shoppers' Stop in Pune, has achieved a net return of 15.43 per cent p.a. on its initial investment. The space leased by Adidas in Ansal Plaza, Delhi has yielded a net return of 15.84 per cent p.a. to the investor. Retail companies are now looking at various sources to fund their expansion plans. They are trying to exploit the stock market route as well to get the required finance. Some of the big retailers like Pantaloon Retail, Shoppers' Stop and Pyramid Retail had opted for going public. Investment in real estate has been preferred to any other investment tool and investment of banks in real estate sector in the financial year 2006 stood at a staggering INR 140860 crore. Venture capital funds may play a major role in retail real estate development in India.

Design of Mall

A mall needs to ensure that it has the right mix of low rent paying anchor tenants and high rent paying specialty stores. But in India in

order to realize land sale value quickly the developer sells the space to the first available purchaser. This turns even well planned retail destinations into motley collection of small-unknown shops with unattractive offering and ambience. Thus keeping a tight control on the tenants and positioning of the malls is critical.

A good approach is to start from the macro-level allocation of spaces to down the line planning for specific products in each micro-segment. The idea is attracting not only prospective occupants of space at the shopping centre, but end-customers as well; attracting the right tenant mix, commensurate with the positioning of the centre; using each design element to inspire a psychological situation wherein the casual wanderer becomes a shopper; and well, putting the whole experience together. Shopping centers would be structured so as to ensure uniformity to communicate a feeling of "oneness" - and at the same time, take care that each store retains its personality.

Something new always attracts attention and crowds, but also raises the bar for future developments. It adds to the atmosphere, but people also lose interest in these after a couple of visits, so the problem today is not in designing something new, but in the ability to change and keep it interesting. The culture and behavioural pattern of consumers and the local conditions play a vital role in the design process of any retail format. Each segment, hospitality, entertainment, shopping should help in converting a footfall into a customer and a customer into a brand loyalist.

Tenant Mix and Positioning

Typically, in most Indian malls, around 30 per cent of the space is dedicated to the apparel sector and 12 to 20 per cent goes to F&B. The key anchors in malls are department stores, supermarkets, hypermarkets and multiplexes. Currently, most operational malls are riding on the first-mover advantage and have no clear positioning. Since there are a handful of organized retailers, almost all of the malls have more or less the same set of retailers taking up space. However, there are a few-such as the Sahara Mall in Gurgaon that have tried to position themselves to the mid-market segment by bringing in stores like Big Bazaar and traditional Indian F&B outlets like Haldiram's. There are also few malls who have tried the specialty route like Home mall of Gurgaon that feature all kinds of home products ranging from tiles, fittings, furniture etc. The multiplex segment is making fast headway as the anchor tenant. Delhi is leading the sector, with over 43 multiplexes to be added to the market by 2005.

Future of Mall Business

Future development in this category will be focusing on providing integrated retail-cum entertainment environment. Multiplexes are being developed with amenities such as films, food and video game. Fun Republic, PVR, INOX, Satyam Cineplexes etc are driving the multiplex business while Appu Ghar, the Delhi-based amusement park, has plans of starting operations in at least two new locations.

Mall developers will have to redefine their objectives and reposition themselves due to growing competition for a share of customer's wallet. Malls can differentiate with respect to retail/service mix, ambience, design, target consumer segment etc. A specialized mall will connect to the customer predominantly through the value proposition. ITC has launched its first rural mall-an extension of its e-Choupal called Choupal Sagar. Spread across five acres of land at Sehore in Madhya Pradesh, it is already registering about 700-800 footfalls on weekdays and 1,000 on weekends, with conversion levels of 35 per cent. ITC has plans to set up 50 such malls over the next 12 months, at an investment of Rupees two to four Crores for each.

The Exhibit four provides information on different types of shopping centers, in terms of concept, size and type of anchor tenants, which are constructed in developed countries. Different retailers and developers will try to occupy leadership positions in these different formats rather than crowding in only one segment.

Key Challenges

There are some of the basic challenges that the industry must overcome over the next few years. First and foremost amongst them is that the developers need to invest heavily on market-feasibility studies before jumping on to the mall bandwagon. Next is about getting the operations, designing and positioning right. There should be continuous innovation in all aspects of retail by keeping pace with global evolution. Retailers need to capitalize on economies of

Exhibit 4

Type	Concept	Total Built up (Sq Ft)	Number	Typical Anchor(s) Type
Neighborhood Center	Convenience	30,000 - 150,000	1 or more	Supermarket
Community Center	General Merchandise, Convenience	1,00,000 - 350,000	2 or more	Discount, department store, super market, drug store, home improvement, discount store
Regional Center	General Merchandise, Fashion	4,00,000 - 800,000	2 or more	Full-line department store, mass merchandise, fashion apparel
Super Regional Center	Similar to regional center but more variety	800,000 +	3 or more	Full-line department store, mass merchandise, fashion apparel
Fashion/Specialty Center	High end fashion oriented	80,000 - 250,000	NA	Fashion
Power Center	Category dominant anchors, few small tenants	2,50,000 - 600,000	3 or more	Home improvement, discount store, warehouse club
Theme/Festival Center	Leisure, tourist oriented retail service	80,000 - 250,000	NA	Restaurants entertainments
Outlet Center	Manufactures Out	50,000 - 400,000	NA	Manufactures outlet store

Source: India Property Market Overview, Colliers Study

scale to reap the full benefit of retail. If and when the industry is opened up for FDI, Indian mall developers and retailers will not only have to get their basic act together, but will also have to match the international standards, especially in value-based retailing, operational efficiency, supply chain, category expansion and technology and innovation.

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Whistle-Blowing and Competitive Advantage

Siddharth G.Das and Regina Aldrin

Whistle blowing involves a conflict between two competing duties, to protect the public and to be loyal to the organization. However, given no real mechanism to deal fully with ethical concerns, an employee may be left with a 3-way choice: shut up (and take a hard knock on your conscience); get out (on the grounds of conflicting values); or blow the whistle (and pay for the heavy consequences). The inadequacies of law fail to give support. Although there are ways to tackle it, there might still be limitations. If at all there should be a situation where an employee does not have to blow the whistle then the organization should ensure such procedures that minimize potential whistle blowing situations. There is ethical justification of whistle blowing. The need of the hour is the protection of the whistleblower. At the moment, those who do blow the whistle are ill-supported and ultimately pay a heavy price for being the conscience of us all. The role of whiste-blowing is also important with respect to ethical behaviour as long as there is no mechanism to reduce the need for whistle blowing. If there is no mechanism, then the encouragement of whistle blowing, seen in the right perspective, will bring about a positive image of the organization and will be applauded by the public. This is the beginning of the road to competitive advantage. This is because the issue of ethics is placed in the forefront of the organization. On the other hand, unethical practices in organizations will in all probability lead to its end.

There have always been informers who reveal information to enrich themselves or to get back at others. However, whistle-blowers are a contrast to such informers. Whistle-blowers are the kind of people who expose some wrong-doing, often at great personal risk. A whistle-blower whether a government employee or a corporate employee, usually "goes public" with complaints of corruption or mismanagement in the organization.

The attention for whistle-blowing among the public, media, government institutions and business managers seems to be both growing and turning into a positive attitude. Here the word "seems" is emphasized because around the beginning of the new millennium, whistle-blowing policies have been enacted or have been formulated into law proposals in the UK, Ireland, South-Africa, Belgium, the Netherlands, Japan, India, and Canada.

Dr.Siddharth G. Das, Asst. Professor, MBA Department, S.K.Patel Institute of Management and Computer Studies, S.V.Campus, Sector-23, Gh-6 Road, Gandhinagar-382023, Tel: 079-23245729, Email: home2007all@hotmail.com

Ms.Regina Aldrin, Lecturer, MBA Department, S.K. Patel Institute of Management and Computer Studies, S.V.Campus, Sector-23, Gh-6 Road, Gandhinagar-382023, Tel: 079-23245729 Email: regi_j2000@yahoo.com

The December 2002 issue of *Time magazine* made 'whistle-blowing' part of the Western standard vocabulary. In that issue, Time presented the persons of the year 2002, three women who had 'blown the whistle' on their organization: Cynthia Cooper of WorldCom, Coleen Rowley of the FBI and Sherron Watkins of Enron. They were portrayed as highly intelligent and serious about their societal goals of their organization. They acted with integrity and were family people. Related to this, a telephone poll among adult Americans, taken for Time/

CNN in December 2002, showed 59 per cent of the respondents considered the whistleblowers as heroes and only 18 per cent regarded them as traitors.

The story of late Satyendra Dubey, an IIT qualified engineer, is a pointer towards the perils of blowing the whistle. When he tried to help the central government to wise up about corruption in the working of a contract related to a stretch of road constructed under the Golden Quadrilateral highway project, he paid the price of his life. More than just losing the job is the risk of losing your life is all about the perils of whistle-blowing. But since whistle-blowing is considered by many as an action based on high moral grounds it will prevail in organizations for all time to come.

Whistle-blowers perceive themselves to be loyal employees and, initially, never doubt that their concerns will be fully dealt with by the senior management. However, they are often quite shocked to find the organization taking a 'U-turn against them.' If at all there should be a situation where an employee does not have to blow the whistle then the organization should ensure such procedures that minimize potential whistle blowing situations. At the moment, those who do blow the whistle are ill-supported and ultimately pay a heavy price for being the conscience of all.

What is Whistle-blowing?

Watching a football match and witnessing the blow of a whistle by the match referee for foul made by a player is what should connote the raising of an alarm by an individual of a wrong-doing in the organization. This is "whistle-blowing" and it may find its origin from a game where a match referee halts the match momentarily to expose the player who has fouled. An employee who raises an alarm is actually exposing the wrong-doings in the organization. That is, "going public" by blowing the whistle on the fouling wrong-doer who may be the boss or the employer.

So, what has led the employee to blow the whistle? Obviously, he or she has seen something wrong or he or she has been gravely wronged greatly affecting his conscience that espouses ethics or high moral values.

Most people would have heard of 'whistleblowing' from high-profile cases reported in the media. Some helpful definitions from popular dictionaries are:

- 'Bringing an activity to a sharp conclusion as if by the blast of a whistle' (Oxford English Dictionary)
- 'Giving information (usually to the authorities) about illegal and underhand practices' (Chambers Dictionary).

These definitions give a basic understanding of the meaning of 'whistleblowing.' Various definitions given by personalites and authorities of this concept have meaningful connection with the above dictionary definitions.

In the words of John R. Boatright, *"whistle blowing can be defined as the release of information by a member or former member of an organization that is evidence of illegal and/or immoral conduct in the organization or conduct in the organization that is not in the public interest."*

According to Arun Bhatia, a retired IAS officer, as quoted in the Sunday Express dated December 14, 2003 has expressed a different meaning to the concept of whistle-blowing. He said, *"The whole concept of whistle-blowing has an entirely different connotation in India, here whistle-blowers tend to get branded as 'namak harams.'* 'Namak Haram' would mean "ungrateful" in English. Arun Bhatia has been at the receiving end with countless departmental probes and bureaucratic harassments for exposing irregularities in the public.

Who is a Whistle-blower?

A whistle-blower is any person who has mustered enough courage to speak out the wrongdoings. A whistle-blower has nothing to do with bravado, but has everything to do with bravery. Here, the definition of a whistle-blower appears to be simplistic as there is a wider meaning to it.

The term whistle-blower was first applied to US government employees who "went public" with complaints of corruption in federal agencies. These employees came to know that their employer was acting unethically in a way that could harm someone else or the society at large.

Whistle-blowing characterizes a voluntary release of non-public information by a member (or former member) of an organization outside the normal channels of communication about illegal/immoral conduct or conducts which is opposed to significant way to public interest.

According to Angela Peek, *"An employee or ex-employee of an organization, who discloses information about serious malpractice by that organization, not otherwise known or visible, where the disclosure is made in the reasonable belief that there is malpractice, and the disclosure is made in good faith, without malice, and may be in the public interest."*

The features of this definition in relation to the disclosure are as under:

- Malpractice not known or is visible.

- General belief of the prevalence of wrongdoing.
- Disclosure made in good faith.
- No malice intended.
- Disclosure may be in the interest of the public.

The definition made by R.C.Sekhar reads, *"It may be defined as an attempt by an employee or a former employee of an organization to disclose what he proclaims to be a wrong-doing in or by that organization."*

This definition is comparatively simple to the definition given by Angela Peek. However, it is more direct in the sense that the whistle-blower proclaims, whether internally or externally, the malpractices going on in the organization.

Based on the definitions, a question arises as to who exactly is a whistle-blower?

The truth is that there are no strict criteria to qualify a whistle-blower. A whistle-blower can be a government employee or a PSU employee or could be any ordinary but concerned citizen. A whistle-blower can also be a NGO. We have seen in the recent past of private sector employees (Enron, Xerox, etc.) in the USA blowing their whistle. Whether one looks at what is whistle-blowing or who the whistle-blower is, one thing that is strikingly common is that it is always done in the interest of the public. At this point a question arises. Can the whistle be blown anonymously if it is in the interest of the public?

What is the difference between anonymity and confidentiality?

A worker raises a concern confidentially if he or she gives his or her name only on condition that it is not revealed without their consent. A worker raises a concern anonymously if he or she does not give his or her name. Looking at the drawbacks of anonymously blowing the whistle it is neither advisable nor recommended to carry out such action by the employees.

Generally, it is not recommended that employees raise their concerns anonymously. This is because:

(i) it does not take long to guessing successfully who raised the concern;

(ii) it is harder to investigate the concern if people can not ask follow-up questions;

(iii) it is easier to get legal protection if the concerns are raised openly; and

(iv) The public focus will shift to the whistle-blower as they will suspect malicious intent in raising the concern.

The Difference between Whistle-blowing and Making a Complaint

When someone blows the whistle they are raising a concern about danger or illegality that affects others (e.g. customers, members of the public, or their employer). The whistleblower in most of the cases is not directly affected by the danger or illegality. And what is more is that the whistleblower is not expected to prove the malpractice. He or she is a messenger raising a concern so that others can address it.

A complaint, on the other hand, is very different. When someone complains, they are saying that they have personally been badly affected. Being affected could involve a breach of their individual employment rights and the complainant is seeking redress or justice. The person making the complaint therefore has a vested interest in the outcome of the complaint. For this reason the complainant is expected to be able to prove his/her case.

Most organizations have a grievance or complaints procedure, which will be more appropriate for making a complaint. It is not in anyone's interests if an organization's whistle-blowing policy is used to pursue a personal grievance.

Ethical Justification

Blowing the whistle is only one response that an employee can make to corporate misconduct. However, the act of whistle-blowing itself can take many different forms. So in addition to whether to become a whistle-blower, employees are faced with the further question of how to blow the whistle in a justified manner. The decision is difficult ethically, because whistle-blowing involves a conflict between two competing duties, that is, to protect the public, and on the other hand, to be loyal to the organization. This conflict is actually a stumbling block in justifying whistle-blowing. The ethical justification for whistle blowing is obvious in view of the laudable public service that whistle-blowers provide often at great personal risk.

So, does a potential whistle-blower have a greater obligation to the public or to the organization?

Being obliged to the public is not relatively a problem as it is to prevent serious harm to others. Now, this is within a person's power. However, an obligation of loyalty to an organization is more complicated than it looks. What does an employee owe an

employer? In this relationship, is the employee deprived of a right to reveal information about wrong-doings? What about the psychological contract of loyalty existing between the two.

Employees are considered to be agents of an employer to work for the benefit of the latter. In other words, the main obligation of an agent is to act in the interest of the principal, that is, the employer. To be specific, an employee, as an agent, is obliged to work as directed, to protect confidential information, and most importantly, to practice loyalty. So, ultimately, an employee owes the employer his loyalty. All these appear violated when an employee blows the whistle. However, the justification of whistle-blowing depends not only on the wrongdoing of others, but also on the particular role that the whistle-blower occupies in the organization. Thus, an employee is more justified in blowing the whistle when the wrongdoing concerns matters over which the employee has direct responsibility.

Atul Tirodkar, for example, was not merely an employee of the Bombay Stock Exchange; he was a surveillance director, and so the campaign against graft in the very heart of India's surging economy, in the BSE, involved matters that were part of his job. The welfare of BSE and the public alike depend on such people doing their job conscientiously. Tirodkar blew the whistle against his own president, Anand Rathi. Had he supported intentionally or inadvertently the corrupt practices of his boss then he would have faced the situation of becoming an accomplice in a crime. At this point it is pertinent to as a question. Do all whistle-blowers lose their jobs?

Whistleblowers do not necessarily lose their jobs. Most cases of successful whistle-blowing go unreported - so the popular perception that often the messenger is shot is not challenged. Many people blow the whistle without thinking of themselves as whistleblowers and their concerns are properly addressed. These people feel that they are just doing their job or being good workers when they warn others that something is going wrong. When their employer recognizes the value of the information they are being given and takes action to deal with the concern, often it does not occur to the people involved that this is a case of whistle-blowing.

The Law and Protection for the Whistle-blower

As of now there are not enough protective measures of the law that can be provided to the whistle-blower. This applies to not just India but also other nations. Employment law imposes on the employee duties of confidentiality to the employer during the tenure of the employee. This generally prevents a disclosure, which could put the employer in a tight spot. The disclosure of anything that is 'confidential,' even if it is evident of wrong-doing, puts an employee in a situation where it will be considered as a breach of duty. The consequences are not pretty at all for the whistle-blower. Such situations have led proponents of ethical standards and moral values to press for new policies and laws for the protection of employees who blow the whistle. There is also tremendous pressure from consumer movements to amend the law in order to give such protection. If one observes news in the print and/or the electronic media related to some form of disclosure or revelation of irregularities or corruption by a whistle-blower, the same has come to total grief in the form of getting retrenched, demoted, or even socially ostracized by the perpetrators of the wrong doings itself.

USA is the first country to enact a law in 1989 to protect whistle-blowers. This had a cascading effect in the UK, Australia, and New Zealand, where all of them adopted similar laws.

If the Law Commission Report were to be implemented then India would be the fifth country in the world to enact laws protecting whistle-blowers. The laws protecting the whistleblowers are designed to accept information from anybody. What the law is particular about is the content of the information. The Law Commission while drafting the Bill has put forth that the complaint should be with reference to the conduct of a public servant. Complaint can be made if the public servant:

i) abuses his or her power;

ii) attempts to commit an offence under the Prevention of Corruption Act, the IPC, or any other law, or

iii) any action leading to negligence or delay.

Not without a safety measure, the Law Commission's draft also prescribes penalty, including imprisonment, for false or trifle disclosures. Whatever the risks of having such a law, the prospect of protecting whistle-blowers should be considered as top priority.

Meanwhile, Corporate Governance initiatives in India began with the CII (Confederation of Indian Industry). It came up with the first voluntary code of corporate governance in 1998. The second was by SEBI now enshrined as Clause 49. The codes were based on recommendations of the Kumar Managalam Birla Committee Report. The third was the Naresh Chandra Committee, which submitted its report in 2002. The fourth was again by SEBI-Narayan Murthy Committee, which also submitted report in 2002. Based on the recommendations put forth by this committee SEBI revised Clause 49 on listing agreements in August 2003. After issue of this circular, SEBI received representation/suggestions from corporate and public on various provisions and revisit Clause 49. Based on the revised

recommendations of the committee vide circular dated 29th October 2005, the changes in listing agreement were brought about. This circular is considered to the master circular and it supersedes all other circulars issued by SEBI earlier on this subject.

This has a mention on the whistle-blower policy. Though it has not been made mandatory so far, but if a company has put in a voluntary whistle-blower policy then the Audit Committee will review the mechanism.

Why Not a Mechanism that Reduces the Need for Whistle-Blowing?

If at all there is a situation where an employee does not have to blow the whistle then the organization should ensure such systems that minimize potential whistle blowing situations. Fortunately, there are mechanisms that attempt to reduce the need for whistle-blowing.

There are several institutional mechanisms that try to lessen the need for whistle-blowing. Among them, the most common are the concept of *democratic discourse* and the *safety measures* of the law. Discourse means to set forth one's thoughts and conclusions concerning a subject. Democratic discourse would mean the same, only that there would be more than one person discussing calmly on facts, beliefs, and behaviours related to a subject. If the subject is about whistle-blowing then there should be a democratic discourse on it and eventually setup a mechanism, especially for an organization, that will reduce or even prevent the need for whistle-blowing. The mechanisms could be transparency, surveillance, codes of conduct, non-discrimination by age, race or sex, periodical anti-corruption drives, and the like. The outcome will only benefit the organization. The mechanism can only lead to the espousal of ethical standards and highly motivated happy employees.

The role of law as far as whistle-blowing is concerned has much to be expected. In any case, some progress has been made in India as to the enactment and its adoption as a law protecting the whistle-blower. If such a law comes into force then it is likely that potential corruption and irregularities in organizations will never see "the light of the day." This in turn would either reduce or totally eliminate the need to blow the whistle.

Ethics and Competitive Advantage

Before we know the role of whistle-blowing with competitive advantage, it is important to know what the latter means. Competitive advantage means having the competency to continuously stay ahead. That is, sustaining growth and development to have the leading edge.

Companies are dedicated to being sustainable companies. That is, companies that build long-term shareholder value and competency while being a responsible corporate citizen. And the only way to achieve that is to incorporate economic, environmental, and social codes of conduct into business strategy.

Competency is the central component for sustainable growth and development. A thorough understanding of competence can enable a complete understanding of its inter-relationship with organizational, technological and process factors, which in turn affect organizational performance. According to Losey (1999):

Competency = Intelligence + Education + Experience + Ethics + Interest

To be *competent* in any business or profession, the first three factors of the equation are very relevant and required. However, to be *effective* in the long run, one needs to espouse ethical standards and be passionate for the job.

Continuous efforts with regard to improving the environment, health and safety of employees are an essential elements of being a preferred choice among all stakeholders: customers, employees, shareholders, communities, joint-venture partners, overseas host governments, investors, and national companies. This creates competitive advantage through business ethics.

The merits of ethical behaviour can be seen in this light. First, to do otherwise, can often lead to illegalities and a high price may have to be paid. Second, it is a corporate asset and must be significantly protected as any other hard asset. Thirdly, acting honourably in business encourages best practices, establishes credibility, and provides a sense of pride and satisfaction in how you earn.

The role of whistling-blowing is also important with respect to ethical behaviour as long as there is no mechanism in the organization to reduce the same. If there is no mechanism, then the encouragement of whistle-blowing, seen in the right perspective, will bring about a positive image of the organization and will be applauded by the public. This is the beginning of the road to competitive advantage. This is because the issue of ethics is given its due importance. Unethical practices in organizations will in all probability lead to its end. For example the crumbling of big and established/world renowned business houses like are ENRON, ARTHUR ANDERSON, WORLDCOM, etc. were basically due to their unethical practices.

A positive whistle-blowing culture inculcated into the organization has numerous advantages.

- Detects and deters wrongdoing;
- Gets to managers the information they need to make decisions and control risk;
- Demonstrates to stakeholders and regulators that you are serious about good governance;
- Reduces the chance of anonymous or malicious leaks (including to the media); and
- Reduces the chance of legal claims against your organization.

There is no doubt that with these advantages competency levels would rise in the organizations. Any organization that follows such a culture in letter and spirit will eventually have competitive edge over other organizations that may have espoused it but fall short of real following and practice. Without such a culture, the ENRON Company is a unique example of where prevailed corrupt practices. The questionable decisions it took bordered on unethical, if not illegal, practices. In virtually every instance, the culture of an organization determines the reliability of its financial health. In the words of Lynn Brewer, author of *House of Cards: Confessions of an Enron Executive, "I would argue in fact that the health and sustainability of an organization is dependent upon two things: (1) honesty and integrity of the workforce and management, and (2) reporting of lapses in honesty and integrity by those who witness such behaviour. Both of which can most likely be resolved with the right integrated reporting solution for 'whistleblowers'."*

How to blow the whistle?

The best thing to do is to seek independent advice from an experienced organization before blowing the whistle. It is suggested that one should contact a trade union, a lawyer or, if there is an organization that specializes in advising whistle-blowers. While every situation is different and so it is sensible to seek advice before blowing the whistle, there are some general points to keep in mind when raising a concern.

- Stay calm.
- Remember that you are a witness, and not a complainant.
- Think about the risks and outcomes before you act.
- Let the facts speak for themselves-don't make ill-considered allegations.
- Remember that you may be mistaken or that there may be an innocent or good explanation.
- Do not become a private detective.
- Recognize that you may not be thanked.

Conclusion

Ethical organizations legitimately require and must create improved channels for whistle-blowing. To strike the right balance between confidentiality and business' responsibility to the wider community is now a pressing concern for all organizations. It is time that businesses realized that good business *is* ethical business.

Regulation from within is best achieved by making all employees personally responsible for the maintenance of the highest standards, and requiring them to report when those standards are breached, with no fear of reprisal. A workplace with clearly defined standards and clear procedure for reporting lapses will go a long way towards achieving this. When the internal systems of regulation fail, and even the most closely prescribed ones may do so at one time or another, the legal rights and duties of an employee who blows the whistle externally must be clear, as must the duties owed by the employee to the employer, and the role and effort of professional associations, regulatory bodies, etc in this area.

Alternatively, there should be institutional mechanisms that try to lessen the need for whistle-blowing. What is meant is that whistle-blowing should not be resorted too often if there was healthy, transparent, and constructive practices in an organization. Of course, lesser or no whistle-blowing is an indicator of an almost perfectly run organization. This also indicates an organization adopting high ethical standards, which obviously have led to significant lessening of the need to blow the whistle. This is what leads to competitive advantage. It definitely creates a positive image in the minds of the public (read potential customers).

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Income Inequality in China:
The Kuznets Inverted U Hypothesis

Kit Ying Sharon Chan and Kishore G.Kulkarni

The authors test the Kuznets Inverted U Hypothesis, together with the Lorenz Curve and Gini Co-efficient in the case of China. The Authors explain the meaning of the Lorenz Curve, Gini co-efficient and the Kuznets Inverted U Hypothesis. The income distribution situation in China is discussed. Finally, the authors conclude that they have no evidence whether the Kuznets inverted U Hypothesis can be applied to China or not.

When we think about measuring the economic growth of a country, per capita income is usually the first indictor that comes to our minds. Of course, this indictor is a very important number to evaluate the level of development of a country. However, per capita can only tell us one side of the picture because it does not show how the income is distributed among the population. Therefore, an increase in per capita does not necessarily mean that all (or not even majority of the) people are better off.[1] Therefore, in order to get a clear picture of how well economy is developing, we should take the problem of income inequality into account.

Ms.Kit Ying Sharon Chan, Student, Graduate School of International Studies, 2201 South Gaylord Street, University of Denver, Denver, CO 80208, Email: kchan3@du.edu

Dr.Kishore G. Kulkarni, Professor of Economics and Editor-Indian Journal of Economic and Business Campus, Box 77, P.O. Box 173362, Metropolitan State College of Denver, Denver, CO 80217-3362 Email: kulkarnk@mscd.edu.

Many economists have developed theories to explain the phenomenon of income distribution in an economy, prominent amongst them are the theories discussed in Kalecki's model (1971) and the human capital approach (Mincer, 1958 and Becker, 1962). However, all these theories fail to say anything about the state of development and the equality of income distribution.[2] In 1955, Simon Kuznets made a significant contribution to suggest that when economic growth occurs, the level of capita income and inequality in the distribution of income may initially increase and may decrease only in the long run. According to this hypothesis, when the per capita income rises, inequality of income distribution may also rise initially. Only when the level of aggregate income has reached a certain level, the trend reverses. Thus

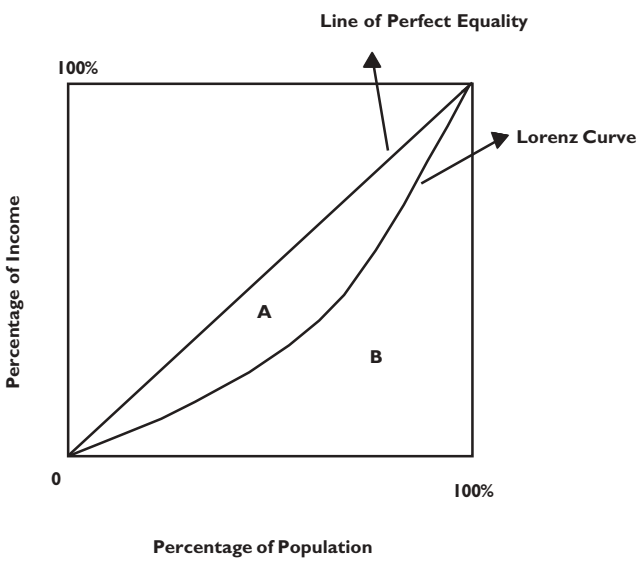
the universally observed phenomenon is that economic growth can never be equally distributed.

China, with a nine per cent annual GDP growth since 1980, is regarded as one of the countries with fastest economic growth. In this essay, we test the Kuznets Inverted U Hypothesis, together with the Lorenz Curve and Gini Coefficient, in the case of China. First we explain the meaning of the Lorenz Curve, Gini Coefficient and the Kuznets Inverted U Hypothesis. Second, the income distribution situation in China in the pre-economic reform period and the post-economic reform period, especially the introduction of Foreign Direct Investment (FDI), is discussed. Finally, we will conclude why we still have no clear-cut evidence whether the Kuznets Inverted U Hypothesis can be applied to China or not.

Section 1: Theory: The Lorenz Curve and the Gini Coefficient

Before we explain what the Kuznets Inverted U Hypothesis is, we should introduce the concept of a Lorenz Curve. A Lorenz Curve is commonly used to analyze personal income statistics: essentially it is the curve that shows the relationship between the proportion (or percentage) of population receiving percentage of income in an economy. Consider Figure 1.

Figure 1: The Lorenz Curve



The horizontal axis shows the percentage of income recipients. The vertical axis shows the share of total income received by each percentage of population, which is also cumulative up to 100 per cent.[3] In order to draw a Lorenz Curve, both the income recipients on the horizontal axis and percentage of income on the vertical axis must be ranked from the lowest to the highest. The line of perfect equality, which is the diagonal (45 degree line), represents a perfectly equal income distribution in an economy where every household has the same income. On the contrary, the line of perfect inequality, which coincides with the horizontal and vertical axes, represents a perfectly unequal income distribution in an economy where one household has all the income and everyone else has none.[4] In other words, the inequality of the distribution of income is more serious if the actual line bends further away from the 45-degree line.

The Gini Coefficient is also developed from Figure 1, which is named after the Italian statistician Corrado Gini who first formulated it in 1912 and known as a measure of inequality of a distribution.[5] If "A" represents the area bounded by the 45 degree line and the curve, while "B" is the area that is not covered by "A" then the Gini Coefficient can be calculated by using the formula A/A+B. Gini Coefficient can vary anywhere from zero (perfect income equality) to one (perfect income inequality). The bigger the area covered by "A" the higher the Gini Coefficient and thus higher income inequality.[6] We will see in a minute that both the ideas of the Lorenz Curve and the Gini Coefficient are closely related to the Kuznets Inverted U Hypothesis.

The Kuznets Inverted U Hypothesis

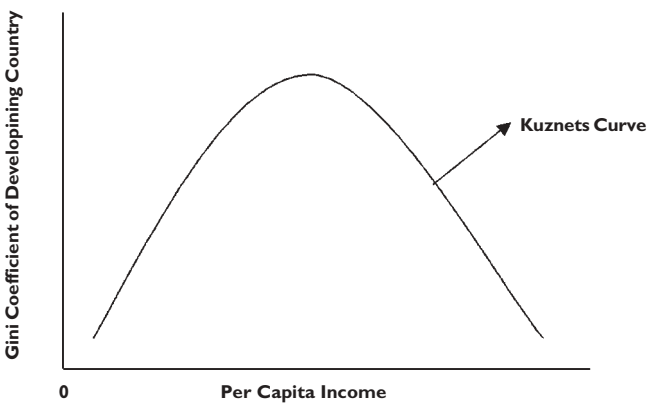
In 1955, Kuznets published an article "Economic Growth and Income Inequality" on *The American Economic Review.* He was the first person to introduce the idea of a link between inequality and development. Kuznets argued that in the early stages of development, the rich accumulate more wealth than the poor. As a consequence, the income distribution becomes more unequal.[7] Kuznets pointed out that development involves the shift of population from traditional to modern activities. This process of population shift from participating in agricultural productions to industrial productions allowed Kuznets to predict the behavioural of inequality during the course of development:

An invariable accompaniment of growth in the developed countries is the shift away from agriculture, a process usually referred to as an industrialization and urbanization. The income distribution of the

total population, in the simplest model, may therefore be viewed as a combination of income distributions or the rural and of the urban populations. What little we know of the structures of two component income distribution reveals that: (a) the average per capita income of the rural population is usually lower than that of the urban; (b) inequality in the percentage shares within the distribution for the rural population is somewhat narrower than in that for the urban population… Operating with this simple model, what conclusion do we meet? First, all other conditions being equal, the increasing weight of urban populations does not necessarily drift downward in the process of economic growth: indeed, there is some evidence to suggest that it is stable at best, and tends to widen because per capita productivity in urban pursuits increases more rapidly than in agriculture. If this is so, inequality of the total income distribution should increase" (Kuznets, 1995, pp.7 – 8).

However, Kuznets claimed that when the level of aggregate income has reached a certain level, income inequality levels off and diminishes finally during the latter stages.[8] This relationship between the distribution of income and the degree of development forms an inverted U-shaped function as shown in Figure 2.

Figure 2: The Kuznets Inverted U Hypothesis



General Economic Development Picture in China

Pre-Economic Reform Period (1949 – 1978) – A Period with low Income Inequality

Geographically speaking, the central part of China was with a comparative advantage in producing energy, materials and machineries; while the western part was with comparative advantage in producing primary products, such as grain, forestry and livestock etc. As the eastern part of China is close to the sea, they had a comparative advantage in producing consumers and industrial goods, and industries there could export their products to the rest of the world easily. However, during a Maoist era (1949 – 1976), Mao deliberately got rid of these kinds of comparative advantages and accepted an approach named "Maoist development strategy" by Dali Yang.[9] In other words, Mao tried to develop Chinese economy in a way that was contrary to the economic rule.

Mao refused to develop China according to efficiency was because he thought that China should be a truly socialist country. Mao believed that if the economic development of China is based on the regional comparative advantage, regional income disparity would appear. Therefore, in Mao's April 1956 speech, he openly expressed that he was in favour of building most of heavy industry, "90 per cent or perhaps still more," in the interior.[10] Obviously, he wanted to avoid income inequality in China. During the First Five Year Plan (1953-1957), almost two-thirds of the major projects were located in these areas.[11] However, "Maoist development strategy" was not as idealistic as Mao thought. Since the interior parts were with poor infrastructures and facilities, it was really hard for them to develop industries. At the same time, as Mao did not allow any foreign direct investment (FDI) and the state investment in the coastal region was highly limited, this area could not make use of the comparative advantage and as a result, the Chinese economy did not develop at all during this period.

Mao also tried hard to root people to their place of birth through the household registration system (*hukou* system).[12] It is a system that when a person was born in a province, his or her name was recorded in that provincial government and he or she was qualified to receive subsidies from the government. However, if the person moved to another province, he or she was not qualified to receive any subsidies from that provincial government. Clearly, the household registration system tried to prevent the migration of the rural population into cities,[13] and thus from the agricultural sector to the industrial sector. The income inequality problem was not serious in China at that time.

During the ten-year Cultural Revolution (1966-1976), Chinese suffered from class struggles and most people did not go to work. The Chinese economy was seriously destroyed, not to say

development. Therefore, before the death of Mao in 1976, the level of income inequality remains low since Mao believed in egalitarianism and the economy had not developed at all during the Maoist era. Before Deng Xiaoping came to power in 1978, the Gini Coefficient of China remains relatively low and it was 0.23.[14]

Post-Economic Reform Period (1978 – 2005) A Period with high Income Inequality

Deng Xiaoping came to power in 1978 and the main and primary objective of him was to develop the economy of China since it is the only way to retrieve the mistakes and problems caused by the Cultural Revolution. There were many economic reforms, such as Special Economic Zones (SEZs), township and village enterprises and foreign direct investment (FDI) etc. However, in this essay, I will concentrate on discussing FDI since it was the most important economic reform in China and has the greatest influence on Chinese economic development.

Economic development can never be started without capital. Therefore, Deng cleverly adopted the approach of "reform and openness" in order to attract the capital from foreign investors. Here comes to the question: how can China attract the foreign investment? The answer was that the government of the People's Republic of China (PRC) must issue new economic policies in order to show their determination in opening up China.

Introduction of Foreign Direct Investment

Unsurprisingly, the east costal area in China was chosen as the region that should be firstly developed. The central government tended to use the coastal area to attract the foreign investment because it was with better infrastructures. Since the eastern part of China is close to the sea, the port facility there has been developed and it was extremely easy for the foreign investors to access these areas. Moreover, closer to the sea meant that the finished goods could be easily exported to other countries. Furthermore, the transportation facilities in these areas were much better than the interior parts of China. Therefore, the PRC government has chosen to develop the coastal area first and they believed that the better infrastructure condition could definitely help to attract the foreign investment.

Other than the above, the central government also issued many favourable policies to enhance the development in the costal areas. For example, it established four Special Economic Zones (SEZs) in 1980, including Shenzhen, Zhuhai, Shantou and Xiamen[15] and the further opening of 14 coastal cities in 1984.[16] Moreover, the PRC government also granted many privileges to the foreign investors of the coastal areas, such as lower tax rates or even tax exemption.[17] Therefore, it seemed that developing the coastal area was the only way to attract the foreign capital. Obviously, what the Chinese government did was trying to use the coastal area as an "engine of growth," so that the economic development of and capital gained from the eastern part of China could also help the interior parts.

The "reform and openness" policy of China successfully attracted many foreign enterprises to start their business in China. Before the economic reform, there was no FDI in China, but at the end of 2003, according to the Organization for Economic Co-operation and Development (OECD), China was the biggest recipient of FDI, receiving $53 billion out of $192 billion that the OECD countries invested to all emerging economies.[18]

Income Inequality Appeared and How It Showed Kuznets's Predictions

Due to the economic reform and the dramatic increase of FDI in the urban areas, the central government also released the restrictions on the household registration system (*hukou* system) that means rural population can move to urban areas to find jobs. In fact, FDI created a lot of employment opportunities for the urban as well as rural population. From the 1980s to 1990s, employment in the state-owned enterprises (SOEs) had increased only by 3.1 per cent, while the employment in the non-public sector (most were joint-venture and foreign-capital enterprises) increased by 730.7 per cent.[19] From this, we can see that the economic development of China fits Kuznets's prediction on population shift started to appear during the economic reform period. The share of the Chinese population living in the rural areas has fallen from 81 per cent in the early 1980s to 71 per cent in 1996.[20] Obviously, it was the result of many people moved from the countryside to cities and shifted from agricultural production to industrial production. Moreover, since foreign enterprises usually paid high wages than the state-owned enterprises (SOEs), together with other non-cash benefits like pensions, housing and medical care,[21] the income of the urban population was higher than those living in the rural area. In 1978, the per capita income of the urban population was about USD$33, while the per capita income of the rural population was about USD$24. However, in 1995, the per capita income of the urban population increased to USD$245, which was with a 700 per cent increase, while the per capita income of the urban population just increased to USD$94, which was only with 300 per cent increase,

Figure 3: Per Capita Income of Urban and Rural Household (In USD)

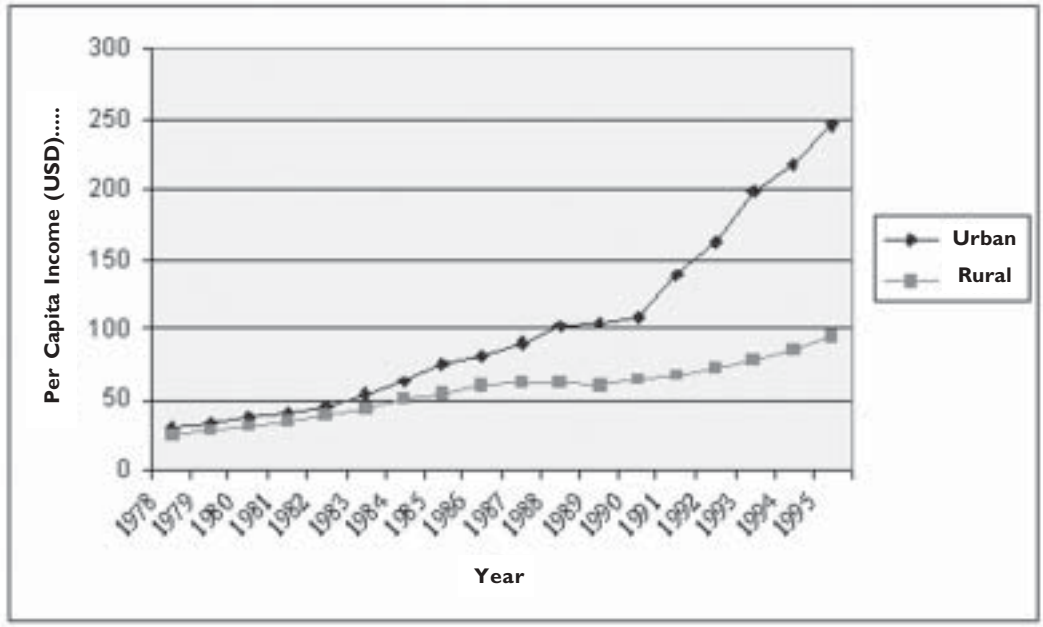


Table 1: Regional Disparities of per capita GDP and Per Capita Income (in US Dollar)

	Per capita income (Urban)	Gini Coefficient (Urban)	Per capita income (Rural)	Gini Coefficient (Rural)
1978	31	0.2438	23	0.1261
1979	34	0.2394	28	0.1174
1980	38	0.2394	31	0.1119
1981	40	0.2391	35	0.0998
1982	45	0.2335	39	0.1003
1983	54	0.2404	44	0.1057
1984	63	0.2323	51	0.1123
1985	75	0.2324	54	0.1106
1986	81	0.2355	59	0.1198
1987	90	0.2467	61	0.1271
1988	102	0.2463	61	0.1326
1989	105	0.2419	59	0.1394
1990	108	0.2414	64	0.1452
1991	137	0.2435	67	0.1407
1992	163	0.2538	73	0.1484
1993	198	0.2613	78	0.1685
1994	217	0.2747	86	0.1658
1995	245	0.2747	94	0.1670

Sources: Justin Yifu Lin, Fang Cai, and Zhou Li. "Social Consequence of Economic Reform in China: an Analysis of Regional disparity in the Transition Period" in Mary-Francoise Renard. *China and Its Regions: Economic Growth and Reform in Chinese Provinces.* Cheltenham, Massachusetts: Edward Elgar Publishing Limited, 2002. p.36.

and the per capita income of the former is 2.5 times of the latter. (Please see Figure 3 and Table 1).

From the figures form Table 1; we can see that the rural income in China was just about 40 per cent of the urban income. Compared with most of the other countries, where the percentage was about 66 per cent in 1995,[22] we can see that the income inequality problem in China was more serious than in the rest of the world and the income gap between urban. Moreover, the economic development situation in China also reflects the Kuznets's prediction that "the average per capita income of the rural population is usually lower than that of the urban."[23]

Other than the difference of average per capita income between the urban and rural areas, Table 1 also shows the second prediction of Kuznets, that is "inequality in the percentage shares within the distribution for the rural population is somewhat narrower than in that for the urban population."[24] This prediction can be shown by looking at the Gini Coefficients of the urban and rural areas. We can see that since the economic reform in China, the income inequality in the rural area, with Gini Coefficients ranging from 0.1261 to 0.1670 is smaller than the urban areas, with Gini Coefficients ranging from 0.2438 to 0.2747.

If we take the larger picture of the entire economy by looking at the national Gini Coefficients, we can also see that the income inequality problem has also been getting more and more serious in the past thirty years. Table 2 shows the national Gini Coefficients from 1978 to 2005.

Table 2: Gini Coefficients During the Economic Reform Period (1978-2005)

Year	Gini Coefficient	Year	Gini Coefficient
1978	0.230	1992	0.314
1979	0.233	1993	0.320
1980	0.238	1994	0.330
1981	0.239	1995	0.340
1982	0.232	1996	0.394
1983	0.246	1997	0.408
1984	0.258	1998	0.414
1985	0.264	1999	0.418
1986	0.288	2000	0.421
1987	0.292	2001	0.447
1988	0.301	2002	0.450
1989	0.300	2003	0.456
1990	0.310	2004	0.465
1991	0.307	2005	0.470

Sources: 1. Qunjian Tian. "Agrarian Crisis, WTO Entry, and Institutional Change in Rural China". *Issues & Studies*, Vol.40 No.2 (June 2004) p. 24
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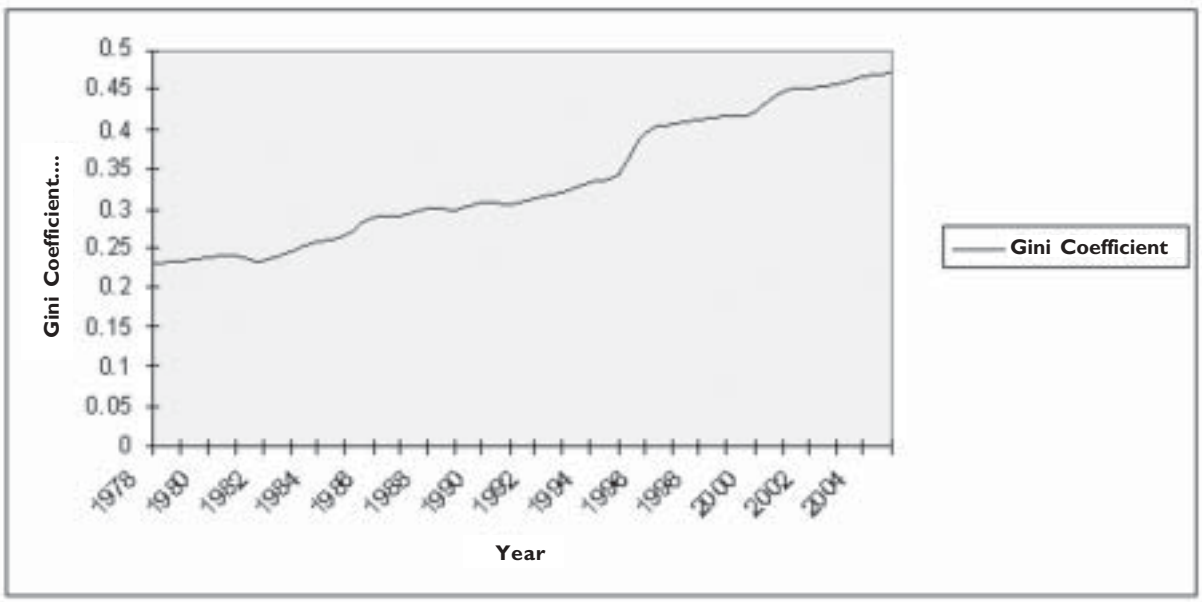
According to the international standard, the "Gini Coefficient" below 0.3 means the "optimal state" the figure between 0.3 and 0.4 refers to the "normal state" the one above 0.4 refers to the "warning state" and the one reaching 0.6 means the "dangerous state" and a social turmoil is about to happen at any moment.[25] In 2005, the Gini Coefficient of China has reached 0.470 and it is regarded as in the "warning state" and in the words of *Asia Times*, China is headed with a social "red alert."[26] In fact, 66 per cent of all total bank deposits belong to 10 per cent of the population, with 20 per cent of all population holding 80 per cent of total deposits. China's urban areas, home to some 0.23 per cent of the total population produces about 70 percent of China's GDP.[27] We can see that the income distribution in China is highly unequal.

Income Inequality in China and the Kuznets Inverted U Hypothesis

By studying the Gini Coefficients before and after the economic reforms launched by Deng Xiaoping, we can see that in the past fifty-five years, the income inequality problem in China has been getting more and more serious. After the introduction of economic reforms in 1978, the Gini Coefficient increased from 0.230 to a historical high at 0.470 in 2005. If the Kuznets Inverted U Hypothesis really holds in China, it seems that China is still in the first half of the "U curve" since in the past twenty-seven the Gini Coefficients increased in a consistent way, except in 1982 and 1989 (Please see Figure 4).

Figure 4: Gini Coefficients of China during 1978 to 2005



Undoubtedly, income inequality is a side-effect that a country cannot avoid during the economic development and China is not an exception. However, what makes the income inequality problem more serious is that China has adopted a relatively *gradual* approach to economic reform, which led to the coexistence of two economic systems (planned system and market system; and planned system is more commonly found in the rural areas), and a dual price system (planned prices and market prices; and planned prices are also more commonly found in the rural areas)[28]. These kinds of economic policies hinder the Chinese economy goes toward a truly mature market economy and thus the income inequality problem is still very difficult to solve.

Suggestions for Decreasing Income Inequality

Although it is not uncommon for a developing country like China to have the income inequality problem, the level of income inequality in China is so serious that many scholars warn that if the current gap exceeds certain limits, it is very likely that people may become severely psychologically distressed and question the sense of fairness leading to a challenge on domestic stability.[29] Therefore, in order to tackle the problem effectively, here are three suggestions:

Speed up the economic reform towards a mature market economy

Since China is a country with a huge population, i.e. 1.3 billion, it is hard for them to change the economy overnight. Therefore, it is reasonable for them to adopt a dual economic system approach and a dual price system. However, these policies can only be used during a transitional period. In other words, the Chinese government should not use the huge size of population as an excuse to slow down the further progress of reform toward a mature market

economy. Since under a mature market economy, it can usually adjust itself. As a result, the problem of income inequality can be improved.

More efforts should be put in the rural areas

After the introduction of the economic reform in 1978, the development of the urban areas has been quite satisfactory. However, the rural areas have just been very limitedly developed. Since about 70 per cent of Chinese population are living in these interior parts, if the central government can put more resources to develop these areas, such as building more infrastructure and schools, income inequality will certainly be greatly alleviated.

Improve the income redistribution system

Taxes and welfares are two important tools to redistribute income in most countries. However, the taxation and welfare systems in China are still under-developed. It makes the income redistribution system difficult to function. For example, if the Chinese government charges high-income groups by a progressive income tax, with the intent of narrowing income inequality, while at the same time high benefits and welfares are provided to low-income groups,[30] it can improve the problem of income inequality.

Conclusion

In past decades, some scholars tried to test for the Kuznets Inverted U Hypothesis with real-world data and resulted in different conclusions (Anand and Kanbur 1993; Ogwang 1995), but the hypothesis has still been commonly used in evaluating a country's economic development and income distribution. In the case of China, with over twenty-seven years of economic reforms, the Gini Coefficient still keeps on increasing every year in general. It seems that China does fit the Kuznets's Hypothesis so far because when the Chinese economy develops, income inequality is increasing.

Since Chinese situation is quiet different from many other countries, for example, they are with huge population, gradual economic system approach and a dual price system, the economic development path may be quite different from others. Up to this moment, we still cannot sure whether the "Kuznets Curve" will go down or continue to go up in the near future. However, one thing that we can sure about the income inequality situation in China is that if it keeps on getting more and more serious, it is bad to the social stability as well as the psychological development of the population. Therefore, after a twenty-seven years of economic reform, I believe that it is the time for the Chinese government to do something to tackle the problem by shortening the transitional period of changing the dual economy to a mature market economy, paying more attention to the rural areas and reforming the income redistribution system.

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Economic Value Added,
an Indicator of Market Price

Karam Pal and Ashok Kumar

To understand the market price behaviour of a security is one of the most debated issues of research in the field of finance. The market price of a security is affected by a number of economic activities in the given financial environment. The price of a security is the present value of the future streams of earnings. To observe the earnings or performance of company, investors can go through different parameters like Return on Capital Employed (ROCE), Net Operating Profit after Tax (NOPAT), Earnings per Share (EPS), Labour Productivity (Lp), Capital Productivity (Kp), Market Value Added (MVA) and Economic Value Added (EVA). Which parameter is closely related with the market price of security is the matter of investigation. In the present paper an attempt is made to answer the question under reference with the help of Granger Causality Model. The paper concludes that EVA, ROCE and MVA outperform other financial performance measures in predicting Market Price with special reference to the companies of BSE-Sensex.

Profit has traditionally been viewed as an important performance indicator of a Corporate. Many financial experts/scholars believe that huge decrease in the profit of a company is the reflective of the future collapse in the market price of the company where as constant increase in profit suggest future economic growth in the shareholders' value. But other financial indicators of performance like Return on Capital Employed (ROCE), Net Operating Profit after Tax (NOPAT), Earnings per Share (EPS), Labour Productivity (Lp), Capital Productivity (Kp), Market Value Added (MVA) and Economic Value Added (EVA) also influence the market price of the company.

Dr.Karam Pal, Associate Professor, Haryana School of Business, Guru Jambheswar University of Science and Technology, Hissar-125001, Haryana, Email: karampalsingh@yahoo.com

Mr.Ashok Kumar, Research Scholar, Haryana School of Business, Guru Jambheswar University of Science and Technology, Hissar-125001, Haryana, Email: ak118in@yahoo.co.in.

This paper is to examine and intimate the leading financial variables truly explaining the market price. The statistical analysis based on the notion of Granger Causality model is applied to judge the relationship between the market price and other indicators of corporate financial performance. Moreover, an attempt is made to explore the questions like: First, does the Market Price is affected by different indicators of performance? Second, does the cause and effect relationship exist between market price and other indicators of performance? For the purpose, paper has been divided into four sections in which first section reviews the bygone researches in the field and the second section brings out the objective and methodology, section third presents the results and

discussion and last section summarizes the conclusion drawn from the analysis.

Section I: Review of Bygone Researches

Mohanty Pitabas (2006) argued that contrary to popular perception, EVA is actually the excess free cash flow the company generates to meet the expectations of the investors. In this sense, it is both a cash flow based measure and it is also positively associated with the return the investors get on their investment in the company. The study recommends an alternative performance measurement that addresses some of the limitations of both the traditional EVA-based and ESOP-based performance measurement system.

Ghanbari and Sarlak (2006) make it clear that Maximizing shareholders' value is fast becoming the new corporate standard in India. EVA is an appropriate performance measure, which evaluates the manner in which managerial actions affect shareholders' value. EVA is a tool for identifying whether the management of the company has created wealth or destroyed it. In his study he reviews the trends of EVA of Indian automobile companies. The result indicates that there is a significant increasing trend in EVA during the period of the study and the firm of the automobile industry is moving towards the improvement of their firm's value.

Stern, Joel (2003) explained in an ASCI's workshop on Value Based Management in collaboration with SCOPE and Stern Stewart and Co. The program was inaugurated by the Principal, ASCI Dr. E.A.S. Sharma, who emphasized the failure of the traditional accounting metrics in measuring the value of an organization and hence leading to problems like Enron. He hoped that the current endeavour of ASCI in bringing about the awareness of the VBM concept would gather momentum in future. Mr. U.K. Dikshit, Director of SCOPE was happy that the PSUs are showing active interest in the subject and he hoped that the PSUs may also adopt such a framework to improve their performance.

Sangameshwaran, Prasad (2002) finds that EVA taking care of the performance- related aspects of compensation; many organizations like Godrej have decided to do without stock options (ESOPs). Not TCS though. "You have to get into ESOPs. This EVA is certainly not in lieu of that," he says. EVA focuses on value creation and ESOPs provide the commitment as well as reward over the long term. EVA in TCS is being administered for a large number of employees whereas ESOPs will be restricted to a few.

Evans and John (1999) found that regardless of a growing literature, the relationship between the structure of executive remuneration and firm performance is not fully understood. Furthermore, little work has been done on the relationship between Economic Value Added (EVA) as a measure of firm performance and the form of executive remuneration. An examination of the remuneration structure and economic value added of 209 companies in 1995-1998 provides evidence supporting incentive compensation. Economic Value Added is found to be positively and significantly related to incentive based compensation. Cash based remuneration, was found to be unrelated to EVA performance.

Tully (1997) disclosed that EVA is a method for understanding that what is happening to the financial performance of an organization. The paper presents the method for calculating EVA and also shows some graphic presentations of EVA's of several companies like Bajaj Auto, Asian Paints, Procter and Gamble (India) Ltd., Siemens India. It has been concluded in the paper that EVA can be a better financial performance evaluation measure than other traditional measures.

Todd Milbourn (1997) exposed that EVA is a better compensation measure than NPV because EVA is a flow measure whereas NPV is stock measure. The author stressed on the use of measures that can be computed periodically as they are realized (i.e. a flow measure). EVA also takes into account the cost of capital and the amount of capital invested in the company. Thus EVA is more useful than another flow measure (i.e. cash flow).

Section-II: The Objective and Research Methodology

The first objective of the paper is whether different indicators of performance affect the Market Price? Second, does the cause and effect relationship exist between market price and other indicators of financial performance? To answer these questions the sample data contain a total of 30 top companies of India that constitutes the BSE-Sensex has been taken which covers the period from 1996-97 to 2005-06 (10 years). The reason for choosing the BSE-Sensex rather than other stock market is because it is fairly representative measure of stock market. The data relating to these companies has been collected from BSE Stock Exchange Official Directory, CIME Publications, Prowess Data Base, Business Newspapers and through Internet, etc. The study required variety of data; therefore websites like www.rbi.org, www.indiainfoline.com, and www.indiastat.com have been comprehensively searched.

Regression analysis deals with the dependence of one variable on the other variables but it does not necessarily imply causation. In fact, the question that arise is weather one can statistically detect the direction of causality (cause and effect relationship), when temporally there is a lead-lag relationship between two variables. The Granger (1969) approach to the question of whether X causes Y is to see how much of the current Y can be explained by past values of Y and then to see whether adding lagged values of X can improve the explanation. Y is said to be Granger-caused by X if X helps in the prediction of Y, or equivalently if the coefficients on the lagged X's statistically significant. Note that two-way causation is frequently the case; X Granger causes Y and Y Granger causes X. It is important to note that the statement "X Granger causes Y" does not imply that Y is the effect or the result of X. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term. Consider the following model in which X and Y are expressed as deviation of respective means:

$$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-1} + \sum_{j=1}^{n} \beta_i Y_{t-1} + \mu_{1t} \qquad \text{(i)}$$

$$X_t = \sum_{i=1}^{n} \lambda_i Y_{t-1} + \sum_{j=1}^{n} \delta_i X_{t-1} + \mu_{2t} \qquad \text{(ii)}$$

Where, it is assumed that the disturbance μ_{1t} and μ_{2t} are uncorrelated. The null hypothesis is H_0: $\Sigma\alpha = 0$, that is lagged X term do not belong in the regression. To test the hypothesis, we apply the F test with n degree of freedom. We reject the null hypothesis when the lagged X term belong in the regression. In other word that X cause Y. Similarly we can test model (ii), that is weather Y cause X. However before proceeding to application of Granger test, one must keep in mind that the number of lags to be included in regression. We have considered both lags i.e. lags 1 and lags 2 in analysis as per econometric criterion. All table have been put together at Appendix-"A."

Section III: Results and Discussions

'Time does not run backward. That is if event X happens before event Y, then it is possible that X is Causing Y. However, it is not possible that Y is causing X. In other words, events in the past can cause events to happen today. Future events can not.' (Gary Koop, 2000).

The Granger (1969) approach to the question of whether x causes y is to see how much of the current y can be explained by past values of y and then to see whether adding lagged values of x can improve the explanation. y is said to be Granger-caused by x if x helps in the prediction of y, or equivalently if the coefficients on the lagged x's are statistically significant. Note that two-way causation is frequently the case; x Granger causes y and y Granger causes x. It is important to note that the statement "x Granger causes y" does not imply that y is the effect or the result of x. Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term.

When you select the Granger Causality view, you will first see a dialog box asking for the number of lags to use in the test regressions. In general it is better to use more rather than fewer lags, since the theory is couched in terms of the relevance of all past information. You should pick a lag length that corresponds to reasonable beliefs about the longest time over which one of the variables could help predict the other.

From Table 1, it may be observed that the Return on Capital Employed (ROCE) does not cause Market Price (MP) is accepted in case of 25 companies and Market Price (MP) does not cause Return on capital Employed (ROCE) is accepted of 21 companies at .05 level of significance using Lags 1. These companies are Bajaj Auto Ltd, Glaxosmithkline Pharmaceuticals Ltd., Reliance Energy Ltd., Ranbaxy Laboratories Ltd. and Tata Motors Ltd. rejected the hypothesis means ROCE of these companies will affect the MP of these companies. Hypothesis that MP does not cause ROCE is rejected in the companies like Grasim Industries Ltd., Gujarat Ambuja Cements Ltd., H C L Technologies Ltd., Infosys Technologies Ltd., Mahanagar Telephone Nigam Ltd., Nestle India Ltd., Satyam Computer Services Ltd., State Bank of India and Colgate-Palmolive (India) Ltd. means MP cause ROCE of these companies. At lags two hypotheses is accepted by 24 companies and rejected in case of 6 companies.

Table 2 indicates that the null hypothesis is accepted in twenty-three cases and rejected in case of only seven companies out of total thirty companies when tested at .05 level of significance. The companies in which null hypothesis stands rejected include Associated Cement Cos. Ltd., Glaxosmithkline Pharmaceuticals Ltd., Bharat Heavy Electricals Ltd, Colgate-Pamolive (India) Ltd., Reliance Energy Ltd., Reliance Industries Ltd., Tata Motors Ltd., Tata Steel Ltd. and Zee Telefilms Ltd. and accepted in case of remaining companies. In case the causality test is applied by taking lags 2, we find almost similar trend as the null hypothesis get rejected only in

Annexure - I

Table 1: Granger Causality Test: Between Market Price and Return on Capital Employed

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
ACCROCE does not Granger Cause ACCMP	9	1.24957	0.30638	8	0.75184	0.54366
ACCMP does not Granger Cause ACCROCE		0.35066	0.57536		0.21066	0.82109
BAJAROCE does not Granger Cause BAJAJMP	9	9.67534*	0.02084	8	2.72610	0.21146
BAJAJMP does not Granger Cause BAJAROCE		1.26622	0.30347		0.89961	0.49423
BHELROCE does not Granger Cause BHELMP	9	0.49966	0.50616	8	2.18593	0.25961
BHELMP does not Granger Cause BHELROCE		0.39336	0.55364		0.75836	0.54131
CASTROLMP does not Granger Cause CASTRLROCE	9	0.04338	0.84191	8	2.15733	0.26266
CASTRLROCE does not Granger Cause CASTROLMP		0.41644	0.54259		0.11893	0.89186
CIPLAROCE does not Granger Cause CIPLAMP	9	0.24956	0.63517	8	2.38818	0.23962
CIPLAMP does not Granger Cause CIPLAROCE		0.11856	0.74235		1.20646	0.41260
COLGATEROCE does not Granger Cause COLGATEMP	9	3.79840	0.09920	8	1.67868	0.32417
COLGATEMP does not Granger Cause COLGATEROCE		23.0936*	0.00298		8.96898*	0.05424
DRREDDYROCE does not Granger Cause DRREDDYMP	9	0.17737	0.68831	8	0.10770	0.90122
DRREDDYMP does not Granger Cause DRREDDYROCE		0.18762	0.68005		0.20094	0.82814
GLAXOSMTMP does not Granger Cause GLAXOROCE	9	0.63978	0.45428	8	2.13280	0.26532
GLAXOROCE does not Granger Cause GLAXOSMTMP		27.3475*	0.00196		7.13707	0.07237
GRASIMROCE does not Granger Cause GRASIMMP	9	14.5825*	0.00877	8	3.75993	0.15229
GRASIMMP does not Granger Cause GRASIMROCE		1.58849	0.25434		0.50706	0.64609
GUJRATROCE does not Granger Cause GUJARATMP	9	0.16365	0.69984	8	0.84028	0.51314
GUJARATMP does not Granger Cause GUJRATROCE		8.67148*	0.02579		2.84893	0.20256
HCLROCE does not Granger Cause HCLMP	9	1.01077	0.35353	8	0.34092	0.73550
HCLMP does not Granger Cause HCLROCE		107.972*	4.7E-05		216.863*	0.00057
HDFCROCE does not Granger Cause HDFCMP	9	5.70145	0.05419	8	5.37868	0.10183
HDFCMP does not Granger Cause HDFCROCE		0.14432	0.71710		3.17678	0.18164
HEROHONDAROC does not Granger Cause HEROHONDAMP	9	3.10507	0.12852	8	0.64737	0.58382
HEROHONDAMP does not Granger Cause HEROHONDAROC		1.30480	0.29686		11.0032*	0.04155
HINDALCOROCE does not Granger Cause HINDALCOMP	9	3.12099	0.12772	8	4.50206	0.12494
HINDALCOMP does not Granger Cause HINDALCOROCE		0.29410	0.60714		0.15745	0.86095
HINDUSTANLROC does not Granger Cause HINDUSTANLMP	9	0.00667	0.93757	8	0.06499	0.93836
HINDUSTANLMP does not Granger Cause HINDUSTANLROC		3.09077	0.12924		3.36601	0.17115
HINDUSTANPROC does not Granger Cause HINDUSTANPMP	9	2.52874	0.16289	8	0.32219	0.74687
HINDUSTANPMP does not Granger Cause HINDUSTANPROC		0.25958	0.62860		0.79670	0.52781
ICICIROCE does not Granger Cause ICICIMP	8	0.00052	0.98265	7	0.22756	0.81462
ICICIMP does not Granger Cause ICICIROCE		0.90313	0.38558		0.85842	0.53809
INFOSYSROCE does not Granger Cause INFOSYSMP	9	4.26174	0.08454	8	0.89899	0.49442
INFOSYSMP does not Granger Cause INFOSYSROCE		69.2406*	0.00016		39.8976*	0.00690
ITCROCE does not Granger Cause ITCMP	9	1.60459	0.25220	8	0.44057	0.67958
ITCMP does not Granger Cause ITCROCE		0.15144	0.71060		0.68835	0.56749
LARSENTROCE does not Granger Cause LARSENMP	9	5.27907	0.06130	8	15.0138*	0.02738
LARSENMP does not Granger Cause LARSENTROCE		0.35576	0.57267		3.89267	0.14670
MTNLROCE does not Granger Cause MTNLMP	9	2.55802	0.16085	8	1.52741	0.34876

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
MTNLMP does not Granger Cause MTNLROCE		7.17732*	0.03658		0.87996	0.50036
NESTLEROCE does not Granger Cause NESTLEMP	9	1.24858	0.30656	8	3.53047	0.16283
NESTLEMP does not Granger Cause NESTLEROCE		1.48783	0.26832		1.74736	0.31394
RANBAXYROCE does not Granger Cause RANBAXYMP	9	7.07559*	0.03752	8	2.35424	0.24279
RANBAXYMP does not Granger Cause RANBAXYROCE		3.29398	0.11946		0.25947	0.78716
RELIANCEEROCE does not Granger Cause RELIANCEENGMP	9	16.9045*	0.00628	8	4.62372	0.12123
RELIANCEENGMP does not Granger Cause RELIANCEEROCE		0.00131	0.97231		0.17336	0.84869
RELIANCEINDROC does not Granger Cause RELIANCEINDMP	9	0.00517	0.94501	8	0.06316	0.94001
RELIANCEINDMP does not Granger Cause RELIANCEINDROC		0.37864	0.56093		0.37839	0.71361
RELIANCEINDROC does not Granger Cause RELIANCEINDMP	9	0.00517	0.94501	8	0.06316	0.94001
RELIANCEINDMP does not Granger Cause RELIANCEINDROC		0.37864	0.56093		0.37839	0.71361
SATYAMROCE does not Granger Cause SATYAMMP	9	0.20206	0.66884	8	1.50348	0.35294
SATYAMMP does not Granger Cause SATYAMROCE		18.1066*	0.00535		11.7908*	0.03791
SBIROCE does not Granger Cause SBIMP	9	1.71493	0.23825	8	13.3775	0.03201
SBIMP does not Granger Cause SBIROCE		24.4580*	0.00259		2.64585	0.21763
TATAMROCE does not Granger Cause TATAMOTERSMP	9	12.7218*	0.01183	8	3.68220	0.15573
TATAMOTERSMP does not Granger Cause TATAMROCE		12.4605*	0.01237		2.51601	0.22827
TATASTEELMP does not Granger Cause TATASROCE	9	0.00766	0.93312	8	5.96548	0.09006
TATASROCE does not Granger Cause TATASTEELMP		3.75638	0.10070		1.66817	0.32578
ZEETROCE does not Granger Cause ZEETMP	9	4.48875	0.07843	8	2.84210	0.20304
ZEETMP does not Granger Cause ZEETROCE		0.47215	0.51766		0.32288	0.74645

* Significant at 5% level of significance

Table 2: Granger Causality Test Between Market Price and Earning Per Share

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
MTNLMP does not Granger Cause MTNLROCE		7.17732*	0.03658		0.87996	0.50036
ACCMP does not Granger Cause ACCEPS	9	1.76326	0.23250	8	5.35955	0.10226
ACCEPS does not Granger Cause ACCMP		0.03346	0.86089		7.59934*	0.06693
BAJAJMP does not Granger Cause BAJAJEPS	9	0.00939	0.92595	8	0.82023	0.51980
BAJAJEPS does not Granger Cause BAJAJMP		3.16396	0.12559		1.24511	0.40392
BHELMP does not Granger Cause BHELEPS	9	12.3698*	0.01256	8	2.84995	0.20249
BHELEPS does not Granger Cause BHELMP		0.51233	0.50102		0.15518	0.86272
CASTROLMP does not Granger Cause CASTROLEPS	9	3.06350	0.13064	8	2.32522	0.24556
CASTROLEPS does not Granger Cause CASTROLMP		1.57242	0.25650		1.00282	0.46397
CIPLAMP does not Granger Cause CIPLAEPS	9	0.30875	0.59854	8	0.98763	0.46823
CIPLAEPS does not Granger Cause CIPLAMP		1.84545	0.22317		0.59999	0.60369
COLGATEPS does not Granger Cause COLGATEMP	9	1.71983	0.23766	8	3.87132	0.14758
COLGATEMP does not Granger Cause COLGATEPS		11.4579*	0.01477		15.0838*	0.02720
DRREDDYMP does not Granger Cause DRREDDYEPS	9	1.21683	0.31225	8	14.7173	0.02813
DRREDDYEPS does not Granger Cause DRREDDYMP		0.12018	0.74067		0.06171	0.94131
GLAXOSMTMP does not Granger Cause GLAXOSMTEPS	9	0.61276	0.46352	8	5.62881	0.09652

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
GLAXOSMTEPS does not Granger Cause GLAXOSMTMP		11.2760*	0.01527		4.58724	0.12232
GRASIMMP does not Granger Cause GRASIMEPS	9	1.95090	0.21197	8	4.23561	0.13374
GRASIMEPS does not Granger Cause GRASIMMP		5.44386	0.05838		4.95601	0.11199
GUJRATEPS does not Granger Cause GUJARATMP	9	0.28591	0.61208	8	0.20900	0.82229
GUJARATMP does not Granger Cause GUJRATEPS		0.01598	0.90354		0.29407	0.76450
HCLMP does not Granger Cause HCLEPS	9	0.04901	0.83213	8	0.61721	0.59634
HCLEPS does not Granger Cause HCLMP		0.78862	0.40870		0.38723	0.70860
HDFCMP does not Granger Cause HDFCEPS	9	0.08923	0.77523	8	0.11977	0.89116
HDFCEPS does not Granger Cause HDFCMP		1.48155	0.26923		0.42583	0.68740
HEROHONDAMP does not Granger Cause HEROHONDAEPS	9	3.64092	0.10498	8	2.91879	0.19778
HEROHONDAEPS does not Granger Cause HEROHONDAMP		2.62417	0.15637		0.23995	0.80045
HINDALCOMP does not Granger Cause HINDALCOEPS	9	0.00616	0.93999	8	2.21554	0.25651
HINDALCOEPS does not Granger Cause HINDALCOMP		0.39350	0.55357		0.26780	0.78161
HINDUSTANLMP does not Granger Cause HINDUSTANLEPS	9	0.21087	0.66225	8	0.57182	0.61604
HINDUSTANLEPS does not Granger Cause HINDUSTANLMP		1.51282	0.26474		0.65084	0.58240
HINDUSTANPMP does not Granger Cause HINDUSTANPEPS	9	0.01830	0.89681	8	1.37252	0.37735
HINDUSTANPEPS does not Granger Cause HINDUSTANPMP		0.04474	0.83949		0.42527	0.68770
ICICIMP does not Granger Cause ICICIEPS	8	0.09405	0.77145	7	5.14910	0.16263
ICICIEPS does not Granger Cause ICICIMP		1.80501	0.23686		3.42079	0.22620
INFOSYSMP does not Granger Cause INFOSYSEPS	9	1.02539	0.35032	8	0.56853	0.61751
INFOSYSEPS does not Granger Cause INFOSYSMP		1.14912	0.32495		0.42438	0.68818
ITCMP does not Granger Cause ITCEPS	9	0.35857	0.57120	8	0.27735	0.77531
ITCEPS does not Granger Cause ITCMP		0.29524	0.60647		25.1463*	0.01336
LARSENTEPS does not Granger Cause LARSENMP	9	1.07016	0.34079	8	0.37740	0.71417
LARSENMP does not Granger Cause LARSENTEPS		1.23693	0.30863		0.54092	0.63008
MTNLMP does not Granger Cause MTNLEPS	9	1.97527	0.20950	8	0.59777	0.60465
MTNLEPS does not Granger Cause MTNLMP		0.81857	0.40047		7.42733*	0.06887
NESTLEMP does not Granger Cause NESTLEEPS	9	0.00139	0.97142	8	1.43860	0.36469
NESTLEEPS does not Granger Cause NESTLEMP		2.99518	0.13423		3.14434	0.18355
RANBAXYMP does not Granger Cause RANBAXYEPS	9	2.40943	0.17159	8	0.45481	0.67217
RANBAXYEPS does not Granger Cause RANBAXYMP		0.71203	0.43112		0.38807	0.70812
RELIANCEENGMP does not Granger Cause RELIANCEENGEPS	9	3.04506	0.13160	8	0.30225	0.75930
RELIANCEENGEPS does not Granger Cause RELIANCEENGMP		7.63957*	0.03268		5.29714	0.10367
RELIANCEINDMP does not Granger Cause RELIANCEINDEPS	9	1.87662	0.21977	8	0.12675	0.88544
RELIANCEINDEPS does not Granger Cause RELIANCEINDMP		10.2436	0.01859		14.2123*	0.02950
SATYAMMP does not Granger Cause SATYAMEPS	9	1.20069	0.31521	8	0.66884	0.57517
SATYAMEPS does not Granger Cause SATYAMMP		4.54894	0.07691		5.79842	0.09317
SBIMP does not Granger Cause SBIEPS	9	0.11113	0.75020	8	1.00180	0.46426
SBIEPS does not Granger Cause SBIMP		3.51281	0.11003		3.58919	0.16002
TATAMOTERSMP does not Granger Cause TATAMOTERSEPS	9	0.83842	0.39516	8	0.50148	0.64880
TATAMOTERSEPS does not Granger Cause TATAMOTERSMP		9.88366*	0.01997		2.91703	0.19790
TATASTEELMP does not Granger Cause TATASEPS	9	2.13188	0.19456	8	0.96993	0.47327
TATASEPS does not Granger Cause TATASTEELMP		13.2632*	0.01081		4.40839	0.12792
ZEETMP does not Granger Cause ZEETEPS	9	0.60446	0.46642	8	4.56707	0.12293
ZEETEPS does not Granger Cause ZEETMP		16.5487*	0.00659		22.3288*	0.01579

* Significant at 5% level of significance

Table 3: Granger Causality Test Between Market Price and Net Operating Profit after Tax

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
ACCNOPAT does not Granger Cause ACCMP	9	7.78922*	0.03154	8	2.31538	0.24651
ACCMP does not Granger Cause ACCNOPAT		1.01976	0.35155		0.69557	0.5647
BAJANOPAT does not Granger Cause BAJAJMP	9	1.97143	0.20988	8	0.66896	0.57512
BAJAJMP does not Granger Cause BAJANOPAT		0.40800	0.54658		2.41693	0.23698
BHELNOPAT does not Granger Cause BHELMP	9	0.32944	0.58684	8	1.40266	0.37149
BHELMP does not Granger Cause BHELNOPAT		6.75946*	0.04067		5.35915	0.10227
CASTROLMP does not Granger Cause CASTRLNOPAT	9	13.7142*	0.01005	8	5.10245	0.10829
CASTRLNOPAT does not Granger Cause CASTROLMP		4.83331	0.07025		0.31475	0.75147
CIPLANOPAT does not Granger Cause CIPLAMP	9	3.10629	0.12846	8	4.39841	0.12824
CIPLAMP does not Granger Cause CIPLANOPAT		0.48086	0.51397		0.31547	0.75102
COLGATENOPAT does not Granger Cause COLGATEMP	9	5.62340	0.05542	8	4.02745	0.14137
COLGATEMP does not Granger Cause COLGATENOPAT		2.42116	0.17071		9.80147*	0.04835
DRREDDYNOPAT does not Granger Cause DRREDDYMP	9	1.05966	0.34299	8	0.34199	0.73486
DRREDDYMP does not Granger Cause DRREDDYNOPAT		2.99236	0.13438		13.7343*	0.03090
GLAXOSMTMP does not Granger Cause GLAXONOPAT	9	2.09941	0.19753	8	7.91936	0.06355
GLAXONOPAT does not Granger Cause GLAXOSMTMP		9.95319*	0.01969		5.44134	0.10046
GRASIMNOPAT does not Granger Cause GRASIMMP	9	9.82151*	0.02022	8	1.15746	0.42407
GRASIMMP does not Granger Cause GRASIMNOPAT		2.89199	0.13993		1.36946	0.37795
GUJRATNOPAT does not Granger Cause GUJARATMP	9	3.07650	0.12997	8	0.92907	0.48526
GUJARATMP does not Granger Cause GUJRATNOPAT		11.2603*	0.01531		9.65353*	0.04932
HCLNOPAT does not Granger Cause HCLMP	9	0.79616	0.40660	8	0.39510	0.70419
HCLMP does not Granger Cause HCLNOPAT		3.85797	0.09713		3.17183	0.18193
HDFCNOPAT does not Granger Cause HDFCMP	9	3.02032	0.13289	8	13.2501*	0.03243
HDFCMP does not Granger Cause HDFCNOPAT		2.2E-06	0.99887		0.84812	0.51057
HEROHONDANOP does not Granger Cause HEROHONDAMP	9	0.43462	0.53420	8	0.09075	0.91566
HEROHONDAMP does not Granger Cause HEROHONDANOP		0.57365	0.47749		14.0548*	0.02995
HINDALCONOPAT does not Granger Cause HINDALCOMP	9	3.44724	0.11274	8	11.5513*	0.03896
HINDALCOMP does not Granger Cause HINDALCONOPAT		1.02043	0.35141		0.72069	0.55514
HINDUSTANLNOP does not Granger Cause HINDUSTANLMP	9	5.45664	0.05817	8	2.62743	0.21909
HINDUSTANLMP does not Granger Cause HINDUSTANLNOP		0.43195	0.53542		0.31902	0.74883
HINDUSTANPMP does not Granger Cause HINDUSTANPNOP	9	1.23262	0.30940	8	1.88848	0.29453
HINDUSTANPNOP does not Granger Cause HINDUSTANPMP		0.14158	0.71966		0.46307	0.66793
ICICINOPAT does not Granger Cause ICICIMP	8	1.91867	0.22462	7	0.95851	0.51059
ICICIMP does not Granger Cause ICICINOPAT		0.69828	0.44145		32.2397*	0.03008
INFOSYSNOPAT does not Granger Cause INFOSYSMP	9	1.35821	0.28808	8	0.34664	0.73209
INFOSYSMP does not Granger Cause INFOSYSNOPAT		0.87525	0.38561		3.61883	0.15863
ITCNOPAT does not Granger Cause ITCMP	9	0.37965	0.56042	8	2.46915	0.23232
ITCMP does not Granger Cause ITCNOPAT		0.18166	0.68482		0.58287	0.61115
LARSENTNOPAT does not Granger Cause LARSENMP	9	0.74954	0.41989	8	0.56014	0.62129
LARSENMP does not Granger Cause LARSENTNOPAT		3.56244	0.10803		3.03271	0.19037
MTNLNOPAT does not Granger Cause MTNLMP	9	0.04657	0.83628	8	0.10943	0.89976
MTNLMP does not Granger Cause MTNLNOPAT		3.43674	0.11319		0.39837	0.70237

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
NESTLENOPAT does not Granger Cause NESTLEMP	9	2.26004	0.18344	8	9.95778*	0.04737
NESTLEMP does not Granger Cause NESTLENOPAT		0.04009	0.84792		1.18282	0.41807
RANBAXYNOPAT does not Granger Cause RANBAXYMP	9	13.5622*	0.01030	8	4.41952	0.12756
RANBAXYMP does not Granger Cause RANBAXYNOPAT		3.35385	0.11677		0.36477	0.72144
RELIANCEENOPAT does not Granger Cause RELIANCEENGMP	9	12.9573*	0.01137	8	7.88370	0.06391
RELIANCEENGMP does not Granger Cause RELIANCEENOPAT		18.7078*	0.00495		2.99464	0.19279
RELIANCEINDNOP does not Granger Cause RELIANCEINDMP	9	11.1890*	0.01552	8	15.0533*	0.02728
RELIANCEINDMP does not Granger Cause RELIANCEINDNOP		0.25783	0.62974		0.01383	0.98633
SATYAMNOPAT does not Granger Cause SATYAMMP	9	0.81762	0.40072	8	0.66413	0.57705
SATYAMMP does not Granger Cause SATYAMNOPAT		0.49095	0.50975		2.26511	0.25146
SBINOPAT does not Granger Cause SBIMP	9	5.30219	0.06088	8	8.81663*	0.05544
SBIMP does not Granger Cause SBINOPAT		0.45208	0.52638		0.32556	0.74480
TATAMOTERSMP does not Granger Cause TATAMNOPAT	9	5.83687*	0.05215	8	0.08775	0.91825
TATAMNOPAT does not Granger Cause TATAMOTERSMP		28.5955*	0.00175		4.87908	0.11402
TATASTEELMP does not Granger Cause TATASNOPAT	9	1.95339	0.21171	8	8.10225	0.06174
TATASNOPAT does not Granger Cause TATASTEELMP		0.78864	0.40870		0.56402	0.61954
ZEETNOPAT does not Granger Cause ZEETMP	9	1.54498	0.26025	8	1.07143	0.44553
ZEETMP does not Granger Cause ZEETNOPAT		0.36084	0.57002		0.60886	0.59988

* Significant at 5% level of significance

Table 4: Granger Causality Test Between Market Price and Labour Productivity

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
NESTLENOPAT does not Granger Cause NESTLEMP	9	2.26004	0.18344	8	9.95778*	0.04737
ACCMP does not Granger Cause ACCLP	9	0.09809	0.76473	8	1.36330	0.37917
ACCLP does not Granger Cause ACCMP		3.98534	0.09290		0.40120	0.70080
BAJALP does not Granger Cause BAJAJMP	9	43.0535*	0.00060	8	11.3059*	0.04009
BAJAJMP does not Granger Cause BAJALP		3.64132	0.10497		2.13700	0.26486
BHELMP does not Granger Cause BHELLP	9	6.34687*	0.04533	8	6.21592*	0.08571
BHELLP does not Granger Cause BHELMP		0.47625	0.51592		1.91015	0.29173
CASTROLMP does not Granger Cause CASTRLLP	9	0.00082	0.97808	8	1.58575	0.33892
CASTRLLP does not Granger Cause CASTROLMP		13.1531*	0.01101		3.19501	0.18059
CIPLAMP does not Granger Cause CIPLALP	9	1.19636	0.31601	8	0.38027	0.71253
CIPLALP does not Granger Cause CIPLAMP		0.05925	0.81579		2.38728	0.23970
COLGATEMP does not Granger Cause COLGATELP	9	1.3E-06	0.99912	8	0.99419	0.46638
COLGATELP does not Granger Cause COLGATEMP		0.03300	0.86184		6.77616*	0.07716
DRREDDYMP does not Granger Cause DRREDDYLP	9	0.08856	0.77605	8	0.00064	0.99936
DRREDDYLP does not Granger Cause DRREDDYMP		0.49223	0.50922		0.05247	0.94974
GLAXOSMTMP does not Granger Cause GLAXOLP	9	0.12151	0.73931	8	2.56337	0.22429
GLAXOLP does not Granger Cause GLAXOSMTMP		0.31235	0.59647		2.97035	0.19437
GRASIMMP does not Granger Cause GRASIMLP	9	21.4967*	0.00355	8	7.10441*	0.07279
GRASIMLP does not Granger Cause GRASIMMP		4.27289	0.08422		1.24590	0.40375

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
GUJRATLP does not Granger Cause GUJARATMP	9	5.98447	0.05004	8	6.06737*	0.08825
GUJARATMP does not Granger Cause GUJRATLP		0.38839	0.55608		1.26954	0.39859
HCLMP does not Granger Cause HCLLP	9	0.60384	0.46664	8	0.24792	0.79498
HCLLP does not Granger Cause HCLMP		0.94663	0.36815		0.39157	0.70616
HDFCMP does not Granger Cause HDFCLP	9	0.52833	0.49468	8	1.85377	0.29911
HDFCLP does not Granger Cause HDFCMP		4.91877	0.06840		6.65366*	0.07891
HEROHONDAMP does not Granger Cause HEROHONDALP	9	0.15507	0.70735	8	2.94586	0.19598
HEROHONDALP does not Granger Cause HEROHONDAMP		2.07535	0.19977		0.30919	0.75494
HINDALCOMP does not Granger Cause HINDALCOLP	9	0.41126	0.54503	8	0.06664	0.93688
HINDALCOLP does not Granger Cause HINDALCOMP		11.7707*	0.01396		18.8436*	0.02002
HINDUSTANLMP does not Granger Cause HINDUSTANLLP	9	0.13333	0.72753	8	0.14207	0.87307
HINDUSTANLLP does not Granger Cause HINDUSTANLMP		0.14305	0.71829		0.37626	0.71482
HINDUSTANPMP does not Granger Cause HINDUSTANPLP	9	0.54571	0.48796	8	1.75804	0.31239
HINDUSTANPLP does not Granger Cause HINDUSTANPMP		0.01674	0.90127		1.49503	0.35443
ICICIMP does not Granger Cause ICICILP	8	13.7248*	0.01393	7	2.90716	0.25594
ICICILP does not Granger Cause ICICIMP		0.03159	0.86591		0.00296	0.99705
INFOSYSMP does not Granger Cause INFOSYSLP	9	0.00924	0.92655	8	0.70319	0.56177
INFOSYSLP does not Granger Cause INFOSYSMP		2.59459	0.15836		1.41490	0.36915
ITCMP does not Granger Cause ITCLP	9	0.04107	0.84611	8	1.69879	0.32111
ITCLP does not Granger Cause ITCMP		0.00318	0.95686		0.24291	0.79841
LARSENTLP does not Granger Cause LARSENMP	9	0.50902	0.50236	8	4.46477	0.12611
LARSENMP does not Granger Cause LARSENTLP		6.10336*	0.04843		1.69763	0.32129
MTNLMP does not Granger Cause MTNLLP	9	0.67292	0.44340	8	4.21347	0.13452
MTNLLP does not Granger Cause MTNLMP		9.12603*	0.02337		2.07351	0.27195
NESTLEMP does not Granger Cause NESTLELP	9	2.30998	0.17936	8	0.08514	0.92053
NESTLELP does not Granger Cause NESTLEMP		0.61446	0.46293		1.23118	0.40702
RANBAXYMP does not Granger Cause RANBAXYLP	9	11.2624*	0.01531	8	4.48112	0.12559
RANBAXYLP does not Granger Cause RANBAXYMP		1.50091	0.26644		1.09380	0.43978
RELIANCEENGMP does not Granger Cause RELIANCEELP	9	0.58847	0.47211	8	1.13668	0.42909
RELIANCEELP does not Granger Cause RELIANCEENGMP		1.04149	0.34685		0.38355	0.71068
RELIANCEINDMP does not Granger Cause RELIANCEINDLP	9	0.00090	0.97706	8	0.08048	0.92460
RELIANCEINDLP does not Granger Cause RELIANCEINDMP		0.23342	0.64613		3.37209	0.17083
SATYAMMP does not Granger Cause SATYAMLP	9	0.01960	0.89323	8	0.44989	0.67472
SATYAMLP does not Granger Cause SATYAMMP		0.46983	0.51866		7.89483*	0.06380
SBIMP does not Granger Cause SBILP	9	36.2446*	0.00095	8	1.53980	0.34663
SBILP does not Granger Cause SBIMP		1.93974	0.21312		9.17401*	0.05268
TATAMOTERSMP does not Granger Cause TATAMLP	9	2.45747	0.16801	8	0.34040	0.73581
TATAMLP does not Granger Cause TATAMOTERSMP		6.83401*	0.03990		0.88263	0.49952
TATASTEELMP does not Granger Cause TATASLP	9	1.12882	0.32891	8	6.36647*	0.08327
TATASLP does not Granger Cause TATASTEELMP		1.26002	0.30455		0.46907	0.66488
ZEETMP does not Granger Cause ZEETLP	9	2.67016	0.15336	8	6.36307*	0.08332
ZEETLP does not Granger Cause ZEETMP		0.10780	0.75382		0.11427	0.89572

* Significant at 5% level of significance

less than 25 per cent of the companies. From the above we can conclude that the Earning Per Share (EPS) does not cause Market Price (MP) and vice-versa is also true.

Table 3 states that the null hypothesis that Net Operating after Tax (NOPAT) does not cause Market Price (MP) and vice-versa is accepted in eighteen cases and rejected in twelve cases out of total thirty cases when tested at .05 level of significance. The companies in which null hypothesis stands rejected include Associated Cement Cos. Ltd., Bharat Heavy Electricals Ltd., Castrol India Ltd., Glaxosmithkline Pharmaceuticals Ltd., Grasim Industries Ltd., Gujarat Ambuja Cements Ltd., Ranbaxy Laboratories Ltd., Reliance Energy Ltd., Reliance Industries Ltd. and Tata Motors Ltd. and accepted in case of remaining companies. In case the casuality test is applied by taking lags 2, we find almost similar observable fact as the null hypothesis gets rejected only in ten cases.

Table 4 presents that the null hypothesis is accepted in twenty-one cases and rejected in case of eleven companies out of total thirty companies when tested at .05 level of significance. The companies in which null hypothesis stands rejected include Bajaj Auto Ltd., Bharat Heavy Electricals Ltd., Castrol India Ltd., Grasim Industries Ltd., Hindalco Industries Ltd., ICICI Bank Ltd., Larsen & Toubro Ltd., Ranbaxy Laboratories Ltd., State Bank of India and Tata Motors Ltd. and accepted in case of remaining companies. In case the casuality test is applied by taking lags 2, we find almost similar phenomenon as the null hypothesis gets rejected only in less than 30 per cent of the companies. From the above we can conclude that the Labour Productivity (Lp) does not cause Market Price (MP) and vice-versa is also true.

Table 5 reveals that when tested at .05 level of significance the null hypothesis that Capital Productivity (Kp) does not cause Market Price (MP) and vice-versa is accepted in twenty cases and rejected in only ten cases out of total thirty. The companies in which null hypothesis stands rejected by taking Lags 1, include Bajaj Auto Ltd., Bharat Heavy Electricals Ltd., Housing Development Finance Corpn. Ltd., Hindalco Industries Ltd., Larsen & Toubro Ltd., Ranbaxy Laboratories Ltd., Reliance Industries Ltd. and Tata Motors Ltd. and accepted in case of remaining companies. In case the casuality test is applied by taking lags 2, we find almost similar occurrence as the null hypothesis get rejected only in 11 cases. These companies are Bharat Heavy Electricals Ltd., Colgate-Palmolive (India) Ltd., Hero Honda Motors Ltd., Hindalco Industries Ltd., ICICI Bank Ltd., Infosys Technologies Ltd., Larsen & Toubro Ltd., Mahanagar Telephone Nigam Ltd., Reliance Energy Ltd., Tata Steel Ltd. and Zee Telefilms Ltd.

Table 6 indicates that the null hypothesis is accepted in seventeen cases and rejected in case of only twelve cases out of total thirty companies when tested at .05 level of significance. The companies in which null hypothesis stands rejected include Bajaj Auto Ltd., Castrol India Ltd., Colgate-Palmolive (India) Ltd., Glaxosmithkline Pharmaceuticals Ltd., Grasim Industries Ltd., HCL Technologies Ltd., Infosys Technologies Ltd., Ranbaxy Laboratories Ltd., Reliance Energy Ltd., Tata Motors Ltd. and Tata Steel Ltd. and accepted in case of remaining companies. In case the causality test is applied by taking lags 2, we find that null hypothesis gets rejected only in less than 25 per cent of the companies. From the above we can conclude that the Average Return on Net Worth does not cause Market Price and vice-versa is also true.

Table 7 shows the hypothesis that Market Value Added (MVA) does not cause Market Price (MP) and vice-versa when tested at five per cent level of significance, the null is accepted in fifteen and also rejected in the same number of companies out of total thirty at lags one. In case the causality test is applied by taking lags two, we find almost similar occurrence as the null hypothesis get rejected only in 14 cases.

Table 8 indicates that the null hypothesis is accepted in thirteen cases only and rejected in case of seventeen companies out of total thirty companies when tested at .05 level of significance by taking Lag 1. The number of companies in which hypothesis is rejected at Lags two is Eight. The companies in which hypothesis stands rejected include Associated Cement Cos. Ltd., Castrol India Ltd., Pharmaceuticals Ltd., Grasim Industries Ltd., Gujarat Ambuja Cements Ltd., Hindalco Industries Ltd., I T C Ltd., Larsen & Toubro Ltd., Ranbaxy Laboratories Ltd., Reliance Energy Ltd., Reliance Industries Ltd., State Bank of India, Tata Motors Ltd. and Zee Telefilms Ltd. and accepted in case of remaining companies. In case the causality test is applied by taking lags two, we find almost similar phenomenon as the null hypothesis get rejected only in less than 27 per cent of the companies. From the above we can conclude that the Economic Value Added Cause Market Price.

Section-IV: Summing up

The prime objective of this paper was to investigate the relationship between Market Price and other variables of performance like Return

Table 5: Granger Causality Test between Market Prince and Capital Productivity

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
ACCMP does not Granger Cause ACCKP	9	0.00076	0.97895	8	0.00036	0.99964
ACCKP does not Granger Cause ACCMP		0.00173	0.96815		1.63088	0.33162
BAJAKP does not Granger Cause BAJAJMP	9	8.92090*	0.02442	8	2.62263	0.21947
BAJAJMP does not Granger Cause BAJAKP		0.95382	0.36647		1.09809	0.43869
BHELMP does not Granger Cause BHELKP	9	0.61588	0.46243	8	0.37482	0.71565
BHELKP does not Granger Cause BHELMP		13.6888*	0.01009		8.61871*	0.05708
CASTROLMP does not Granger Cause CASTRLKP	9	0.25110	0.63415	8	0.23912	0.80102
CASTRLKP does not Granger Cause CASTROLMP		0.05604	0.82075		2.93793	0.19650
CIPLAMP does not Granger Cause CIPLAKP	9	0.57582	0.47670	8	2.64555	0.21765
CIPLAKP does not Granger Cause CIPLAMP		2.31386	0.17904		1.14313	0.42752
COLGATEMP does not Granger Cause COLGATEKP	9	0.99935	0.35606	8	0.32719	0.74381
COLGATEKP does not Granger Cause COLGATEMP		0.05950	0.81541		8.32539*	0.05965
DRREDDYMP does not Granger Cause DRREDDYKP	9	4.84399	0.07001	8	76.1077*	0.00269
DRREDDYKP does not Granger Cause DRREDDYMP		0.88423	0.38334		0.37662	0.71462
GLAXOSMTMP does not Granger Cause GLAXOKP	9	0.06400	0.80873	8	2.20300	0.25781
GLAXOKP does not Granger Cause GLAXOSMTMP		3.50907	0.11018		2.66882	0.21583
GRASIMMP does not Granger Cause GRASIMKP	9	0.91075	0.37677	8	4.59613	0.12205
GRASIMKP does not Granger Cause GRASIMMP		0.27960	0.61594		0.47276	0.66302
GUJRATKP does not Granger Cause GUJARATMP	9	0.94473	0.36860	8	0.61740	0.59625
GUJARATMP does not Granger Cause GUJRATKP		0.54226	0.48928		0.63739	0.58791
HCLMP does not Granger Cause HCLKP	9	0.29806	0.60479	8	0.19127	0.83525
HCLKP does not Granger Cause HCLMP		0.87306	0.38617		0.39033	0.70686
HDFCMP does not Granger Cause HDFCKP	9	0.69342	0.43689	8	0.43877	0.68053
HDFCKP does not Granger Cause HDFCMP		9.24491*	0.02279		4.25677	0.13301
HEROHONDAMP does not Granger Cause HEROHONDAKP	9	0.15315	0.70906	8	7.35693*	0.06970
HEROHONDAKP does not Granger Cause HEROHONDAMP		1.39052	0.28295		1.40867	0.37034
HINDALCOMP does not Granger Cause HINDALCOKP	9	0.64258	0.45335	8	0.76915	0.53745
HINDALCOKP does not Granger Cause HINDALCOMP		16.9864*	0.00621		12.5853*	0.03475
HINDUSTANLMP does not Granger Cause HINDUSTANLKP	9	0.02716	0.87452	8	0.75323	0.54316
HINDUSTANLKP does not Granger Cause HINDUSTANLMP		0.82643	0.39835		0.69417	0.56524
HINDUSTANPMP does not Granger Cause HINDUSTANPKP	9	0.23935	0.64204	8	0.43024	0.68504
HINDUSTANPKP does not Granger Cause HINDUSTANPMP		2.52303	0.16329		1.09730	0.43889
ICICIMP does not Granger Cause ICICIKP	8	0.60896	0.47049	7	1.48962	0.40167
ICICIKP does not Granger Cause ICICIMP		0.20884	0.66685		15.0645*	0.06225
INFOSYSMP does not Granger Cause INFOSYSKP	9	0.97704	0.36110	8	6.38701	0.08294
INFOSYSKP does not Granger Cause INFOSYSMP		0.36440	0.56818		0.22423	0.81142
ITCMP does not Granger Cause ITCKP	9	0.00153	0.97007	8	2.62509	0.21927
ITCKP does not Granger Cause ITCMP		0.18079	0.68552		1.46674	0.35952
LARSENTKP does not Granger Cause LARSENMP	9	17.0624*	0.00614	8	16.4949*	0.02407
LARSENMP does not Granger Cause LARSENTKP		0.23509	0.64497		0.94886	0.47939
MTNLMP does not Granger Cause MTNLKP	9	8.43027*	0.02721	8	6.67903*	0.07854
MTNLKP does not Granger Cause MTNLMP		0.42876	0.53687		0.05835	0.94436

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
NESTLEMP does not Granger Cause NESTLEKP	9	0.00296	0.95835	8	1.49608	0.35425
NESTLEKP does not Granger Cause NESTLEMP		2.03334	0.20377		2.13320	0.26528
RANBAXYMP does not Granger Cause RANBAXYKP	9	7.14336*	0.03689	8	2.19858	0.25828
RANBAXYKP does not Granger Cause RANBAXYMP		9.55831*	0.02134		3.99638	0.14257
RELIANCEENGMP does not Granger Cause RELIANCEEKP	9	2.93520	0.13750	8	0.95019	0.47900
RELIANCEEKP does not Granger Cause RELIANCEENGMP		0.01030	0.92246		0.35141	0.72926
RELIANCEINDMP does not Granger Cause RELIANCEINDKP	9	8.93171*	0.02436	8	10.5840*	0.04373
RELIANCEINDKP does not Granger Cause RELIANCEINDMP		0.59600	0.46941		0.18080	0.84307
SATYAMMP does not Granger Cause SATYAMKP	9	1.42390	0.27780	8	0.95659	0.47713
SATYAMKP does not Granger Cause SATYAMMP		0.45912	0.52329		0.95118	0.47871
SBIMP does not Granger Cause SBIKP	9	1.14981	0.32481	8	4.09006	0.13900
SBIKP does not Granger Cause SBIMP		3.50419	0.11038		2.24128	0.25387
TATAMOTERSMP does not Granger Cause TATAMKP	9	4.80797	0.07081	8	0.95269	0.47827
TATAMKP does not Granger Cause TATAMOTERSMP		14.3819*	0.00905		1.95218	0.28642
TATASTEELMP does not Granger Cause TATASKP	9	0.15241	0.70973	8	10.9222*	0.04196
TATASKP does not Granger Cause TATASTEELMP		5.78983	0.05285		3.44133	0.16725
ZEETMP does not Granger Cause ZEETKP	9	1.68609	0.24179	8	0.33694	0.73790
ZEETKP does not Granger Cause ZEETMP		0.45790	0.52382		19.2524*	0.01943

* Significant at 5% level of significance

Table 6: Granger Causality Test between Market Price and Average return on Net Worth

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
NESTLENOPAT does not Granger Cause NESTLEMP	9	2.26004	0.18344	8	9.95778*	0.04737
ACCARNW does not Granger Cause ACCMP	9	2.84794	0.14246	8	0.95417	0.47784
ACCMP does not Granger Cause ACCARNW		0.07886	0.78828		0.16067	0.85845
BAJAARNW does not Granger Cause BAJAJMP	9	9.19413*	0.02303	8	3.49591	0.16452
BAJAJMP does not Granger Cause BAJAARNW		1.61163	0.25128		2.16283	0.26207
BHELARNW does not Granger Cause BHELMP	9	0.49943	0.50625	8	1.98300	0.28262
BHELMP does not Granger Cause BHELARNW		0.41009	0.54559		0.90705	0.49194
CASTROLMP does not Granger Cause CASTRLARNW	9	6.28504*	0.04609	8	4.30956	0.13120
CASTRLARNW does not Granger Cause CASTROLMP		0.41480	0.54336		0.31872	0.74901
CIPLAARNW does not Granger Cause CIPLAMP	9	0.34542	0.57815	8	18.5728*	0.02043
CIPLAMP does not Granger Cause CIPLAARNW		0.51229	0.50104		1.22182	0.40912
COLGATEARNW does not Granger Cause COLGATEMP	9	3.86326	0.09695	8	2.47648	0.23168
COLGATEMP does not Granger Cause COLGATEARNW		17.3109*	0.00594		3.78985	0.15100
DRREDDYARNW does not Granger Cause DRREDDYMP	9	0.43344	0.53474	8	0.23464	0.80413
DRREDDYMP does not Granger Cause DRREDDYARNW		0.42106	0.54044		0.24544	0.79667
GLAXOSMTMP does not Granger Cause GLAXOARNW	9	0.85258	0.39144	8	18.6490*	0.02031
GLAXOARNW does not Granger Cause GLAXOSMTMP		22.9841*	0.00302		4.82391	0.11552
GRASIMARNW does not Granger Cause GRASIMMP	9	11.3178*	0.01515	8	2.05392	0.27421
GRASIMMP does not Granger Cause GRASIMARNW		0.00024	0.98815		0.04352	0.95801

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
GUJRATARNW does not Granger Cause GUJARATMP	9	0.08114	0.78534	8	11.2811*	0.04021
GUJARATMP does not Granger Cause GUJRATARNW		0.21853	0.65666		6.11736*	0.08738
HCLARNW does not Granger Cause HCLMP	6	36.0689*	0.00925	8	0.33952	0.73635
HCLMP does not Granger Cause HCLARNW		28.8352*	0.01264		166.092*	0.00085
HDFCARNW does not Granger Cause HDFCMP	9	2.90144	0.13939	8	202.882*	0.00063
HDFCMP does not Granger Cause HDFCARNW		0.43785	0.53274		3.38337	0.17024
HEROHONDAARNW does not Granger Cause HEROHONDAMP	9	1.34035	0.29097	8	0.39335	0.70516
HEROHONDAMP does not Granger Cause HEROHONDAARNW		0.03702	0.85376		3.79141	0.15093
HINDALCOARNW does not Granger Cause HINDALCOMP	9	3.70035	0.10275	8	1.52239	0.34963
HINDALCOMP does not Granger Cause HINDALCOARNW		4.59190	0.07585		0.29444	0.76427
HINDUSTANLARNW does not Granger Cause HINDUSTANLMP	9	1.47443	0.27027	8	0.74277	0.54697
HINDUSTANLMP does not Granger Cause HINDUSTANLARNW		1.20471	0.31447		0.70037	0.56285
HINDUSTANPARNW does not Granger Cause HINDUSTANPMP	9	0.65602	0.44889	8	0.04788	0.95396
HINDUSTANPMP does not Granger Cause HINDUSTANPARNW		0.21908	0.65626		0.96982	0.47330
ICICIARNW does not Granger Cause ICICIMP	8	0.04504	0.84030	7	0.08392	0.92258
ICICIMP does not Granger Cause ICICIARNW		0.00120	0.97374		0.32072	0.75716
INFOSYSARNW does not Granger Cause INFOSYSMP	9	2.66312	0.15382	8	3.51336	0.16366
INFOSYSMP does not Granger Cause INFOSYSARNW		13.1842*	0.01095		15.2517*	0.02679
ITCARNW does not Granger Cause ITCMP	9	1.42196	0.27810	8	3.87168	0.14756
ITCMP does not Granger Cause ITCARNW		0.27020	0.62181		0.87081	0.50326
LARSENTARNW does not Granger Cause LARSENMP	9	3.12639	0.12745	8	3.75038	0.15270
LARSENMP does not Granger Cause LARSENTARNW		0.02879	0.87085		0.11811	0.89253
MTNLARNW does not Granger Cause MTNLMP	9	0.86365	0.38858	8	0.54557	0.62794
MTNLMP does not Granger Cause MTNLARNW		3.14336	0.12661		0.97484	0.47186
NESTLEARNW does not Granger Cause NESTLEMP	9	0.99698	0.35659	8	2.86164	0.20168
NESTLEMP does not Granger Cause NESTLEARNW		0.64838	0.45141		1.74224	0.31468
RANBAXYARNW does not Granger Cause RANBAXYMP	9	7.61187*	0.03290	8	2.63415	0.21855
RANBAXYMP does not Granger Cause RANBAXYARNW		2.80404	0.14505		0.20007	0.82877
RELIANCEEARNW does not Granger Cause RELIANCEENGMP	9	183.048*	1.0E-05	8	64.1700*	0.00345
RELIANCEENGMP does not Granger Cause RELIANCEEARNW		0.01458	0.90784		2.87978	0.20043
RELIANCEINDARNW does not Granger Cause RELIANCEINDMP	9	0.00269	0.96031	8	0.90916	0.49129
RELIANCEINDMP does not Granger Cause RELIANCEINDARNW		0.12335	0.73743		0.35734	0.72577
SATYAMARNW does not Granger Cause SATYAMMP	9	1.16968	0.32101	8	32.9022*	0.00910
SATYAMMP does not Granger Cause SATYAMARNW		0.53004	0.49401		1.42032	0.36812
SBIARNW does not Granger Cause SBIMP	9	3.66036	0.10424	8	5.31148	0.10334
SBIMP does not Granger Cause SBIARNW		0.20207	0.66884		1.91057	0.29167
TATAMARNW does not Granger Cause TATAMOTERSMP	9	19.9312*	0.00426	8	3.84905	0.14850
TATAMOTERSMP does not Granger Cause TATAMARNW		14.5278*	0.00885		0.62425	0.59337
TATASTEELMP does not Granger Cause TATASARNW	9	0.56375	0.48115	8	4.49700	0.12509
TATASARNW does not Granger Cause TATASTEELMP		9.10267*	0.02349		1.97389	0.28374
ZEETARNW does not Granger Cause ZEETMP	9	4.35167	0.08204	8	3.36903	0.17099
ZEETMP does not Granger Cause ZEETARNW		0.39983	0.55050		0.42531	0.68768

* Significant at 5% level of significance

Table 7: Granger Causality Test between Market Price and Market Value Added

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
ACCMP does not Granger Cause ACCKP	9	0.00076	0.97895	8	0.00036	0.99964
ACCMVA does not Granger Cause ACCMP	9	0.41325	0.54409	8	8.78208	0.05572
ACCMP does not Granger Cause ACCMVA		0.89327	0.38108		4.66662	0.11997
BAJAMVA does not Granger Cause BAJAJMP	9	5.81457	0.05248	8	3.62576	0.15831
BAJAJMP does not Granger Cause BAJAMVA		17.3426	0.00592		8.68394	0.05653
BHELMVA does not Granger Cause BHELMP	9	5.14115	0.06389	8	14.1995*	0.02953
BHELMP does not Granger Cause BHELMVA		9.26190*	0.02271		16.5102*	0.02404
CASTROLMP does not Granger Cause CASTRLMVA	9	55.4558*	0.00030	8	157.900*	0.00091
CASTRLMVA does not Granger Cause CASTROLMP		2.45223	0.16840		1.90474	0.29242
CIPLAMVA does not Granger Cause CIPLAMP	9	3.11161	0.12819	8	3.25521	0.17717
CIPLAMP does not Granger Cause CIPLAMVA		0.29902	0.60422		0.33578	0.73859
COLGATEMVA does not Granger Cause COLGATEMP	9	1.61867	0.25036	8	0.18406	0.84062
COLGATEMP does not Granger Cause COLGATEMVA		1.40838	0.28018		0.17088	0.85059
DRREDDYMVA does not Granger Cause DRREDDYMP	9	2.80449	0.14502	8	1.45513	0.36164
DRREDDYMP does not Granger Cause DRREDDYMVA		3.51121	0.11009		14.8346*	0.02783
GLAXOSMTMP does not Granger Cause GLAXOMVA	9	0.15221	0.70991	8	1.11900	0.43345
GLAXOMVA does not Granger Cause GLAXOSMTMP		8.54094*	0.02655		3.35356	0.17181
GRASIMMVA does not Granger Cause GRASIMMP	9	2.33562	0.17731	8	4.45565	0.12640
GRASIMMP does not Granger Cause GRASIMMVA		5.89153	0.05135		6.52032	0.08088
GUJRATMVA does not Granger Cause GUJARATMP	9	7.55308*	0.03337	8	2.19401	0.25876
GUJARATMP does not Granger Cause GUJRATMVA		0.38699	0.55677		0.77689	0.53472
HCLMVA does not Granger Cause HCLMP	9	0.69986	0.43488	8	0.25871	0.78767
HCLMP does not Granger Cause HCLMVA		6.96319*	0.03860		1.66407	0.32641
HDFCMVA does not Granger Cause HDFCMP	9	8.52752*	0.02662	8	15.3026*	0.02667
HDFCMP does not Granger Cause HDFCMVA		0.07723	0.79042		1.71265	0.31904
HEROHONDAMVA does not Granger Cause HEROHONDAMP	9	7.47062*	0.03404	8	1.03576	0.45496
HEROHONDAMP does not Granger Cause HEROHONDAMVA		1.12524	0.32961		2.91031	0.19835
HINDALCOMVA does not Granger Cause HINDALCOMP	9	5.91127	0.05107	8	4.13638	0.13729
HINDALCOMP does not Granger Cause HINDALCOMVA		0.42690	0.53773		0.11307	0.89672
HINDUSTANLMVA does not Granger Cause HINDUSTANLMP	9	1.47961	0.26951	8	6.73098	0.07780
HINDUSTANLMP does not Granger Cause HINDUSTANLMVA		8.85500*	0.02477		9.27300	0.05196
HINDUSTANPMVA does not Granger Cause HINDUSTANPMP	9	1.07676	0.33942	8	0.13869	0.87577
HINDUSTANPMP does not Granger Cause HINDUSTANPMVA		0.12724	0.73352		0.14894	0.86762
ICICIMVA does not Granger Cause ICICIMP	9	0.08480	0.78070	8	0.72431	0.55379
ICICIMP does not Granger Cause ICICIMVA		0.85155	0.39171		0.45707	0.67101
INFOSYSMVA does not Granger Cause INFOSYSMP	9	0.57470	0.47711	8	3.60622	0.15922
INFOSYSMP does not Granger Cause INFOSYSMVA		0.00692	0.93642		0.04883	0.95309
ITCMVA does not Granger Cause ITCMP	9	0.93398	0.37115	8	1.72811	0.31675
ITCMP does not Granger Cause ITCMVA		0.00527	0.94451		0.89245	0.49645
LARSENTMVA does not Granger Cause LARSENMP	9	2.87949	0.14064	8	19.6752*	0.01885
LARSENMP does not Granger Cause LARSENTMVA		14.7400*	0.00857		48.7240*	0.00516
MTNLMVA does not Granger Cause MTNLMP	9	0.04327	0.84210	8	0.95690	0.47704

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
MTNLMP does not Granger Cause MTNLMVA		0.38986	0.55536		0.60808	0.60022
NESTLEMVA does not Granger Cause NESTLEMP	9	0.06276	0.81055	8	0.32113	0.74753
NESTLEMP does not Granger Cause NESTLEMVA		0.11599	0.74503		0.33800	0.73726
RANBAXYMVA does not Granger Cause RANBAXYMP	9	8.28469*	0.02812	8	6.97451	0.07447
RANBAXYMP does not Granger Cause RANBAXYMVA		3.88131	0.09634		0.91502	0.48950
RELIANCEENGMP does not Granger Cause RELIANCEEMVA	9	4.77124	0.07163	8	1.49183	0.35500
RELIANCEEMVA does not Granger Cause RELIANCEENGMP		1.42351	0.27786		0.37558	0.71521
RELIANCEINDMVA does not Granger Cause RELIANCEINDMP	9	0.40087	0.55000	8	0.21592	0.81732
RELIANCEINDMP does not Granger Cause RELIANCEINDMVA		1.54256	0.26058		0.75297	0.54326
SATYAMMVA does not Granger Cause SATYAMMP	9	3.28953	0.11966	8	0.77751	0.53450
SATYAMMP does not Granger Cause SATYAMMVA		18.8040*	0.00489		78.8420*	0.00255
SBIMVA does not Granger Cause SBIMP	9	4.74820	0.07216	8	11.3307*	0.03997
SBIMP does not Granger Cause SBIMVA		1.61252	0.25116		48.3766*	0.00522
TATAMOTERSMP does not Granger Cause TATAMMVA	9	17.1887*	0.00604	8	17.1936*	0.02273
TATAMMVA does not Granger Cause TATAMOTERSMP		17.9313*	0.00547		7.32742	0.07005
TATASTEELMP does not Granger Cause TATASMVA	9	0.12791	0.73285	8	1.63599	0.33081
TATASMVA does not Granger Cause TATASTEELMP		1.06288	0.34231		10.8538*	0.04231
ZEETMVA does not Granger Cause ZEETMP	9	180.737*	1.0E-05	8	65.7132*	0.00333
ZEETMP does not Granger Cause ZEETMVA		195.906*	8.3E-06		104.191*	0.00169

* Significant at 5% level of significance

Table: 8 Granger Causality Test between Market Price and Economic Value Added

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
NESTLENOPAT does not Granger Cause NESTLEMP	9	2.26004	0.18344	8	9.95778*	0.04737
ACCMP does not Granger Cause ACCEVA	9	0.83432	0.39625	8	0.45824	0.67041
ACCEVA does not Granger Cause ACCMP		6.59574*	0.04244		2.15950	0.26242
BAJAJMP does not Granger Cause BAJAEVA	9	0.12481	0.73595	8	1.19001	0.41640
BAJAEVA does not Granger Cause BAJAJMP		0.05866	0.81670		1.17762	0.41929
BHELMP does not Granger Cause BHELEVA	9	3.62388	0.10563	8	2.50464	0.22924
BHELEVA does not Granger Cause BHELMP		0.98733	0.35876		2.32649	0.24543
CASTROLMP does not Granger Cause CASTRLEVA	9	9.13764*	0.02331	8	3.47738	0.16544
CASTRLEVA does not Granger Cause CASTROLMP		4.14985	0.08779		0.29268	0.76539
CIPLAMP does not Granger Cause CIPLAEVA	9	2.86331	0.14157	8	2.00094	0.28045
CIPLAEVA does not Granger Cause CIPLAMP		2.90820	0.13901		4.32204	0.13077
COLGATEMP does not Granger Cause COLGATEEVA	9	2.08867	0.19852	8	11.8745*	0.03756
COLGATEEVA does not Granger Cause COLGATEMP		5.73796	0.05363		3.87492	0.14743
DRREDDYMP does not Granger Cause DRREDDYEVA	9	2.21563	0.18719	8	7.39475	0.06925
DRREDDYEVA does not Granger Cause DRREDDYMP		0.47492	0.51648		0.09583	0.91129
GLAXOSMTMP does not Granger Cause GLAXOEVA	9	1.47212	0.27060	8	6.57786	0.08002
GLAXOEVA does not Granger Cause GLAXOSMTMP		10.6301*	0.01724		4.60205	0.12188
GRASIMMP does not Granger Cause GRASIMEVA	9	5.21766	0.06244	8	2.18601	0.25960
GRASIMEVA does not Granger Cause GRASIMMP		9.55243*	0.02137		1.17490	0.41993

Sample: 1997-2006	Lag:1			Lags:2		
Null Hypothesis	Obs	F-Statistics	Probability	Obs	F-Statistics	Probability
GUJRATEVA does not Granger Cause GUJARATMP	9	2.96374	0.13593	8	0.73187	0.55098
GUJARATMP does not Granger Cause GUJRATEVA		6.36018*	0.04517		6.32686	0.08390
HCLMP does not Granger Cause HCLEVA	9	0.67710	0.44206	8	21.4835*	0.01667
HCLEVA does not Granger Cause HCLMP		0.57955	0.47533		0.38995	0.70707
HDFCMP does not Granger Cause HDFCEVA	9	0.07260	0.79661	8	0.63311	0.58968
HDFCEVA does not Granger Cause HDFCMP		0.40729	0.54692		4.76610	0.11712
HEROHONDAMP does not Granger Cause HEROHONDAEVA	9	0.68438	0.43974	8	6.15077	0.08681
HEROHONDAEVA does not Granger Cause HEROHONDAMP		0.43255	0.53514		0.08210	0.92318
HINDALCOMP does not Granger Cause HINDALCOEVA	9	8.79735*	0.02509	8	1.57268	0.34108
HINDALCOEVA does not Granger Cause HINDALCOMP		0.01643	0.90218		0.01647	0.98375
HINDUSTANLMP does not Granger Cause HINDUSTANLEVA	9	1.23524	0.30893	8	0.64734	0.58383
HINDUSTANLEVA does not Granger Cause HINDUSTANLMP		4.99478	0.06681		2.43136	0.23568
HINDUSTANPMP does not Granger Cause HINDUSTANPEVA	9	1.52251	0.26338	8	2.50482	0.22922
HINDUSTANPEVA does not Granger Cause HINDUSTANPMP		0.40262	0.54915		0.60399	0.60197
ICICIMP does not Granger Cause ICICIEVA	8	0.78282	0.41679	7	9.91225	0.09164
ICICIEVA does not Granger Cause ICICIMP		1.13754	0.33494		0.97091	0.50738
INFOSYSMP does not Granger Cause INFOSYSEVA	9	0.45253	0.52618	8	1.23628	0.40588
INFOSYSEVA does not Granger Cause INFOSYSMP		0.79679	0.40643		0.97387	0.47214
ITCMP does not Granger Cause ITCEVA	9	6.47733*	0.04378	8	9.34100	0.05147
ITCEVA does not Granger Cause ITCMP		0.40181	0.54954		3.25949	0.17693
LARSENTEVA does not Granger Cause LARSENMP	9	8.44442*	0.02712	8	3.54143	0.16230
LARSENMP does not Granger Cause LARSENTEVA		8.57745*	0.02633		3.52498	0.16309
MTNLMP does not Granger Cause MTNLEVA	9	5.23581	0.06210	8	0.97293	0.47241
MTNLEVA does not Granger Cause MTNLMP		0.12841	0.73236		0.60958	0.59957
NESTLEMP does not Granger Cause NESTLEEVA	9	0.04696	0.83562	8	1.25590	0.40155
NESTLEEVA does not Granger Cause NESTLEMP		2.20040	0.18850		9.14757	0.05288
RANBAXYMP does not Granger Cause RANBAXYEVA	9	2.87152	0.14110	8	0.20562	0.82473
RANBAXYEVA does not Granger Cause RANBAXYMP		12.1475*	0.01306		3.77057	0.15183
RELIANCEENGMP does not Granger Cause RELIANCEEEVA	9	2.51031	0.16420	8	0.01792	0.98234
RELIANCEEEVA does not Granger Cause RELIANCEENGMP		12.4166*	0.01246		9.67113*	0.04920
RELIANCEINDMP does not Granger Cause RELIANCEINDEVA	9	0.65460	0.44936	8	1.22954	0.40738
RELIANCEINDEVA does not Granger Cause RELIANCEINDMP		14.4980*	0.00889		13.0302*	0.03317
SATYAMMP does not Granger Cause SATYAMEVA	9	1.60933	0.25158	8	1.04179	0.45334
SATYAMEVA does not Granger Cause SATYAMMP		0.75305	0.41886		0.70047	0.56281
SBIMP does not Granger Cause SBIEVA	9	7.07422*	0.03754	8	4.15719	0.13653
SBIEVA does not Granger Cause SBIMP		8.45220*	0.02708		28.6767*	0.01108
TATAMOTERSMP does not Granger Cause TATAMEVA	9	5.70161	0.05419	8	0.02304	0.97740
TATAMEVA does not Granger Cause TATAMOTERSMP		30.3558*	0.00150		5.42991	0.10070
TATASTEELMP does not Granger Cause TATASEVA	9	1.71323	0.23846	8	10.0925*	0.04654
TATASEVA does not Granger Cause TATASTEELMP		1.14246	0.32624		0.74623	0.54570
ZEETMP does not Granger Cause ZEETEVA	9	11.7235*	0.01408	8	31.5908*	0.00965
ZEETEVA does not Granger Cause ZEETMP		14.1276*	0.00941		25.8654*	0.01283

* Significant at 5% level of significance

on Capital Employed (ROCE), Net Operating Profit after Tax (NOPAT), Earnings per Share (EPS), Labour Productivity (Lp), Capital Productivity (Kp), Market Value Added (MVA) and Economic Value Added (EVA) and explore causal relationships between Market Prices and Performance Indicator. The analysis in this paper used formal tests of causality developed by C. J. Granger and yearly data for the period 1996-97 to 2005-06 to investigate the relationship between these variables.

The results indicated a "causal" relationship between the Market Price and the Performance Indicators. We found Return on Capital Employed (ROCE) cause Market Price (MP) in only five cases, EPS cause MP in six cases, NOPAT cause MP in four cases, Lp cause MP in five cases, Kp cause MP in five cases ARNW cause MP in seven cases furthermore there is a case of reverse causality also which is almost same except EPS and in remaining cases null hypothesis is accepted while, Economic Value Added Granger-caused Market Price in eleven cases and reverse causality in only six cases is there, and in thirteen cases null hypothesis is accepted. On the above bases it can be concluded that EVA is the indicator, which is affecting market price in maximum cases. In conclusion, the results of this paper reveal that the Economic Value Added does help to predict the Market Price of a security. Although there are many other factors which also influence the market price of a security.

Key-words: *Market Price (MP), Economic Value added (EVA), Return on Capital Employed (ROCE), Net Operating Profit After Tax (NOPAT), Earnings per Share (EPS), Labour Productivity (Lp), Capital Productivity (Kp), Market Value Added (MVA), Granger Causality Model and Performance.*

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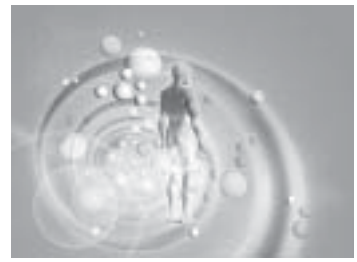
India's Emerging Role in Bio-informatics



Pankaj M. Madhani

This paper focuses on India's emerging role in global bio-informatics market. Bio-informatics is growing as an independent discipline and is fundamental to the growth of biotechnology. India has achieved remarkable success in the software industry. It would add seven per cent to India's GDP by 2010 from present level of 4.1 per cent. With India's strong presence in world software market, India is expected to play a leading role in the bio-informatics revolution. This paper highlights Indian and global bio-informatics scenario. It also discusses bio-informatics challenges and opportunities and examines India's competitive position in bio-informatics by using S.W.O.T. analysis framework.

The term bio-informatics was coined in 1987 in a journal article by Dr. Hwa Lim, a renowned expert and pioneer in the fields of bio-informatics - also known as father of bio-informatics and currently president and CEO of California based biotech consultancy D'Trends. Since then, the term has taken on a life of its own. Bio-informatics uses computers to store, organize, generate, retrieve, analyze and share sequences, structures, functions, pathways and genetic interactions. Growth of biotechnology has accelerated particularly during the last decade due to accumulation of vast information as a result of sequencing of genomes and solving of crystal structures. This, coupled with advances in Information Technology (IT) has made biotechnology increasingly dependent on computationally intensive approaches. This has led to the emergence of a super-specialty discipline, called Bio-informatics.

Mr.Pankaj M.Madhani, Faculty-ICFAI Business School, ICFAI House, Near GNFC Tower, SG Road, Bodakdev, Ahmedabad-380 054, Tel: 079-26858632, Email: pmmadhani@yahoo.com

Bio-informatics is a highly interdisciplinary, using techniques and concepts from applied mathematics, informatics, statistics, chemistry, bio-chemistry, physics, linguistics and computer science to solve biological problems and is the interface between the biological and computational sciences. Its ultimate goal is to uncover the wealth of biological information hidden in the mass of data and to obtain a clearer insight into the fundamental biology of organisms. Simply put it is the marriage between biology and IT.

The definition of bio-informatics is not universally agreed upon. Generally speaking, it is defined as the creation and development of advanced information and computational technologies for problems in biology. A simpler definition of bio-informatics is that it is the application of computer technology to the management and analysis of biological data such as the sequences of DNA (Deoxyribonucleic acid) and RNA (Ribonucleic acid) in genes and amino acids in proteins.

The terms bio-informatics and computational biology are often used interchangeably, although the latter typically focuses on algorithm development and specific computational methods. As per NIH (National Institute of Health, USA) working definition, Bio-informatics is "Research, development, or application of computational tools and approaches for expanding the use of biological, medical, behavioural or health data, including those to acquire, store, organize, archive, analyze, or visualize such data" while Computational Biology is "The development and application of data-analytical and theoretical methods, mathematical modeling and computational simulation techniques to the study of biological, behavioural, and social systems." A common thread in projects in bio-informatics and computational biology is the use of mathematical tools to extract useful information from noisy data produced by high-throughput biological techniques.

Importance and Applications of Bio-informatics

Historically, the 20th century belonged to physics, chemistry and fundamental science. The 21st century belongs to biology. Fusion of biology, statistics and computer science has created exciting field of bio-informatics in recent years. This interdisciplinary field drives an exciting process of understanding the secret of life. Bio-informatics is a set of enabling technologies responsible for the annotation, storage, analysis and retrieval of nucleic acid sequence, protein sequence and structural information. Bio-informatics plays a central role in the development of bio-industries in general, including biotechnology, pharmaceutical, agri-food, environment management, medical diagnostics, bioprocessing, bio prospecting and others. Indeed, it is impossible to imagine a modern bio-industry sector in the world without a competitive bio-informatics sector. Bio-informatics is used in many areas of life sciences such as drug discovery, molecular medicine, microbial genome applications, and agriculture.

With the high cost of drug discovery, rising costs to the consumers, the product recalls being done and adverse side effects, the pharmaceutical sector image has been tattered with the focus shifting towards developing the right drug for the right patient in the shortest time at least cost. Thus it is imperative that the sector finds ways of reducing the costs of drug discovery as well as the time it takes to get the medicine from the laboratory to the patient and at the same time producing drugs, which are target specific, and with minimal side effects.

Bio-informatics is being applied to speed up the drug discovery process by moving towards data-driven drug discovery, to improve efficiency, trim down costs and the time-lines and provide wider access to the entire life sciences sector. In order to gain a competitive advantage in the drug discovery process, pharmaceutical and life sciences companies are placing increasing emphasis on bio-informatics as it reduces the time and costs of developing medicine because of its facilitation with filtering data and with choosing the best way to proceed. With the ever-rising costs of discovering new drugs and taking them to the market, the average cost of discovering a new drug is about one billion dollars. Bio-informatics has the potential to hugely decrease the risk, cost, and expertise required for the early stages of drug development, target selection and validation.

Bio-informatics is the buzzword for this new era of biological data analysis. The biotechnology sector depends on bio-informatics to deal with analyzing, interpreting, organizing and storing biological information related to DNA and proteins. With the mapping of the human genome completed, bio-informatics is undergoing a sea change. Now that researchers and scientists possess maps of the human genome and those of several other animal species, they can look for divergence and similarities between all the genes of multiple species, with the ultimate goal of gaining a holistic view of biological systems as a whole. Genome mappings have generated a vast amount of biological data and the pace at which new biological data is being generated is creating a deluge and the use of bio-informatics methods is the only way to cope with this flood of information.

World Bio-informatics Market and Indian Scenario

The global bio-informatics market is expected to grow at an average annual growth rate of 27 per cent to reach nearly $6.9 billion by 2010 from $1.25 billion now. The largest markets for bio-informatics include USA, Europe and Japan while emerging large markets

include Australia, China and India. A number of US based companies, like IBM, SGI; Sun Microsystems etc. are actively working towards developing IT based bio-informatics tools.

Bio-informatics content, software, services and hardware add up to more than $1 billion in global revenue annually, according to market research firm Business Communications Co. Inc. Content, mostly in the form of specialized databases on micro arrays, ESTs (expressed sequence tag), SNPs (single nucleotide polymorphism) and so on, represents most of the bio-informatics industry. Currently estimated at $717 million, the content market is expected to almost double to $1.4 billion by 2010.

Analysis software and services are anticipated to be the fastest growing market in bio-informatics, primarily driven by the need for improved and sophisticated tools for analyzing and using biological data for developing therapeutic drugs. The segment is estimated to grow at an average annual rate of 21 per cent from $445 million in 2005 to $1.2 billion in 2010. The application of bio-informatics in drug discovery and development is expected to reduce the annual cost of developing a new drug by 33 per cent, and the time taken for drug discovery by 30 per cent. Pharmaceutical companies are expected to increase their R&D expenditure in the future, mainly focused towards bio-informatics.

Bio-informatics tools were used to analyze the huge amount of data obtained from Human Genome Project (Oct.1990-April 2003) attracting many companies round the globe to venture into this field. The U.S. emerged as the market leader in the Bio-informatics in 2005 contributing 45 per cent ($551.8 million) to the world bio-informatics market. Research from Frost & Sullivan predicts that the sales of desktop bio-informatics programs in the USA will rise from $390 million this year to $2.2 billion in 2007 and global bio-informatics market will grow to US $6.9 billion by the year 2010.

Indian Bio-informatics recorded a growth of 25 per cent in the last year and of the total turnover of Rs.4,700 crore in biotechnology industry, bio-informatics contributed nearly Rs.100 crore, 60 per cent of this from the export market. There are about 45 companies in this space. Indian Bio-informatics companies can look forward to garnering a large chunk of the US$ 2 billion world market for bio-informatics services such as data mining, mapping and DNA sequencing, functional genomics, proteomics and molecule design simulation. Growing volumes of genomics data and an expanding number of participants contracting work to Indian companies have encouraged many pharmaceutical, IT, and Biotechnology (BT) companies to enter the bio-informatics sector. Indian IT companies such as Tata Consultancy Services (TCS), Cognizant Technologies, Infosys, and Wipro have already set up their bio-informatics divisions. Indian pharmaceutical companies such as GVK Biosciences, Dr. Reddy's Laboratories, Biocon, Astra Zeneca, Ranbaxy, Biological E, and Nicholas Piramal too, are making moves into the bio-informatics arena. Companies such as SciNova Technologies, Mascon Lifesciences and Helix Genomics have about five to eight products in their kitty. Further, multinationals such as Accelrys (a subsidiary of Pharmacopoeia) and Tripos have a direct presence in India. India is also witnessing the emergence of pure-play bio-informatics companies such as Strand Genomics. Prominent software companies such as Infosys and TCS offer bio-informatics services while IBM, Sun Microsystems and Intel, provide hardware.

Complementary competencies in BT and IT make India well positioned to exploit the bio-informatics wave. India, with its enormous strengths in the IT software and services industry and its wide experience in the Biotechnology sphere, has also begun gearing up for this emerging market. India has the potential to become a leading hub of Bio-informatics projects.

Indian Bio-informatics Market: Critical Issues and Challenges

Despite India's IT capabilities, it may be difficult to replicate this success in bio-informatics as bio-informatics differs from IT in many ways. While the market potential for bio-informatics is huge few Indian companies have the skill sets or the ability to capture a significant share of the market. While the market is still big enough for Indian software service players to tap, the important thing for IT companies is to realize that bio-informatics is a highly specialized field where domain knowledge is more important than pricing. Additionally, there are issues of domain expertise, which is not easy to find and build. This is where IT companies could lose out as they focus more on the volume front than the value front. There is potential but we must not forget that the market space is much smaller than the regular IT services or BPO (Business Process Outsourcing) operations. Till Indian companies realize this, they too would join the mounting number of companies worldwide who have burnt their fingers awaiting the bio-informatics boom.

Most global bio-informatics players have close ties to major pharmaceutical companies. Unless an Indian company achieves the same, it will be difficult for them to become globally competitive. Since the pharmaceutical industry is highly sensitive about IPR

Annexure - I

S.W.O.T. Analysis of Indian Bioinformatics

Strengths	Weaknesses
• World's first state-of the-art CDFD – SUN 'Center of Excellence' (CoE) for medical bioinformatics set up in 2005 at Hyderabad at cost of $5 million – gives major research thrust. • Launch of BIOGRID INDIA, a high-speed, high bandwidth network in the form of Virtual Public Network (VPN) for resource sharing. It has mirror sites of globally recognized databanks and public domain bioinformatics software tools • The Supercomputing Facility for Bioinformatics & Computational Biology (SCFBio) set up at IIT Delhi in July 2002, connects 12 academic institutes on VPN • Early technology adopters • International recognition of scientific strengths and inventions • Good pool of IT professionals and life science researchers • A robust IT industry with 86 SEI CMM (Capability Maturity Model) level '5' companies - Three fourth of the world total • Established Technology Clusters • R&D Strengths - A vast network of public national research laboratories provides world class support • High Quality Educational Infrastructure i.e. IIT's, IISC, IBB (Institute of Bioinformatics and Biotechnology), IOB (Institute of Bioinformatics), BII (Bioinformatics Institute of India) etc. • Rich biodiversity and large datasets of commercial value • A good reputation for project management skills and systems integration know-how. • Strong clinical research base • Well-developed user/base industry – 4th largest pharmaceutical industry in the world and 3rd largest Biotech industry in Asia-Pacific • First country in the world to establish a Biotechnology Information System Network (BTISNet) in 1987 • Vast network of 65 Bioinformatics centers with more than 12,000 users - avoids duplication, builds a network of critical mass, and allows each of the various regional centers to offer customized services for local bioinformatics needs. • A strong multinational presence (i.e. Sun Micro, IBM, Oracle etc.) enables Indian talent to work on the most state-of-the-art research projects and experience cutting edge technologies • The USP of India -Skilled knowledge & intellectual base • Abundance of qualified research talent at low costs • Five academic Center of Excellence (CoE) established by GOI i.e. JNU New Delhi, IISC Bangalore, University of Pune, Madurai Kamraj Uni. Madurai and Bose Institute, Kolkata	• The results of the recent National Eligibility Test on Bioinformatics (NETBI) showed the need to improve and reform the quality of bioinformatics education • Few R&D centers having high performance computing infrastructure facilities • Non-availability of adequate risk capital venture fund • Lack of nationally streamlined and fully integrated bioinformatics database • Lack of nodal agency for better coordination as Bioinformatics comes under the jurisdiction of various government agencies and departments • Absence of national lobbyist organization for Bioinformatics such as NASSCOM (National Association of Software & Service Companies) for IT • Reduced basic life science research due to lack of local bioinformatics support industry

Opportunities	Threats
• New product patent regime in line with TRIPS (Trade Related Aspects of Intellectual Property Rights) agreement of WTO to enhance export prospects • Establishment of biotech (Bio-IT) parks and new biotech policy acts as growth catalyst for bioinformatics sector • Global IT leadership leverage • Fusion of biotechnology and ICT (Information and Communication Technology) industry growth to create an even stronger bioinformatics industry • Strong education infrastructure to tap foreign student markets • Huge existing data sets resources that could be commercialized as bio-information products • Growth of domestic bioindustries will result in increasing demand for bioinformatics products and services • Movement of medical research into using genomic will see a convergence of medical informatics and bioinformatics, increasing the need for bioinformatics industry players • Large expatriate community ready to come home to fuel the industry if local conditions change • Tax incentives from Government - at par with IT • Momentum for collaborative R&D • Large growth potential with exports and increased KPO trend • Rapidly improving infrastructure • Growing acceptance as a global player in knowledge-based industry • Growing government support as Bioinformatics is identified as an area of high priority in 10th planning period (2002-2007) • Promising investment growth opportunities in India • Growing collaborative partnerships to pursue domestic and global commercial bioinformatics ventures • Increasing trend of partnerships between the private sector and the institutions such as New Millennium India Technology Leadership Initiative • Development of Bio-Suite, an indigenous end-to-end world class CMM level '5'Bioinformatics software tool by TCS • Growing leadership due to large resource pool of molecular biologists, statisticians and software programmers • Extensive clinical trials opportunities and growth of CROs (Clinical Research Organizations) to fuel Bioinformatics.	• Competition form IT savvy emerging biotech countries i.e. Singapore, Taiwan, Japan, and Korea • Reliance on IT sector business model i.e. focus on low cost high volume and not on high value niche products and services • Continued 'brain drain' of Indian expertise • Insufficient trained talent pool to meet demand • Significant lead time in training the available talent • Complexity of IP related ownership and access issues of Bioinformatics database • Increased competition form emerging bioinformatics market i.e. Australia and China.

(Intellectual Property Rights) issues, the usual differentiators such as price will not work in bio-informatics. India should move away from its image of a low-cost supplier to a value-added service player. S.W.O.T. analysis indicates current weaknesses and future threats for Indian Bio-informatics sector (See Annexure-I).

India's Bio-informatics Capabilities and Emerging Opportunities

In India, major government organizations, such as Biotechnology Information System (BTIS) and Department of Biotechnology (DBT) are promoting bio-informatics. DBT has identified bio-informatics as an area of high priority during the tenth plan period (2002-2007). The government is also making efforts to support the bio-informatics by setting up Bio-IT Park. These parks would be a conglomerate of academic-industry-research initiatives thereby opening up new vistas for the Indian Bio-informatics market and making it a sunrise industry for the future. The Department of Biotechnology, Government of India has been working with other departments to set up this park, which is expected to position India in the global hub of bio-informatics. The Indian bio-informatics industry is highly progressive in many areas such as contract research and development services, clinical trials, contract manufacturing and drug development. Many IT services companies are joining the race for a share of the bio-informatics pie. Accelrys, Makro Technologies, IBM, Mascon Global, Systat Software, Cherrysoft Technologies and Oracle have their units in India working in the bio-informatics space. But the unveiling of the initiatives by TCS and Sun Micro indicates the growing strength of India in this space. S.W.O.T.analysis reveals many in built strengths and potential opportunities for Indian Bio-informatics sector (See Annexure-I).

India has started developing world-class products for bio-informatics. TCS has developed Bio-Suite - versatile, portable and comprehensive software for bio-informatics. Bio-Suite is a major opening for India in the global bio-informatics field. Bio-Suite is developed in collaboration with Council of Scientific and Industrial Research (CSIR) and several leading Indian academic institutes under the Government of India funded New Millennium Indian Technology Leadership Initiative (NMITLI) program. It was a Team India effort with 18 Research Institutions and 3 Industrial Partners. Bio-Suite was launched by His Excellency Dr. A.P.J. Abdul Kalam, the President of India on July 18, 2004.

Bio-Suite will run on variety of platforms, and it is highly modular in structure and comprises eight major components, 58 sub-modules, 165 individual algorithms and 0.7 million lines of C++ code. Bio-Suite can be used to analyze, formulate, predict and provide solutions to specific areas in computational biology. Bio-Suite will also help in drug discovery and bring down the cost of research. On August 2005, TCS made agreement with Congenia of Italy's Genextra Spa group to provide advanced fragment-based lead optimization solutions for drug discovery. TCS will be using Bio-Suite to work on the target protein. The agreement is the first of its kind for an IT company and proves India's Bio-informatics strengths in global market. TCS became first IT services company to deliver molecules and not code.

Sun Microsystems Inc. has established the world's first state-of the-art Center of Excellence (CoE) for medical bio-informatics at Hyderabad, in collaboration with the Center for DNA Fingerprinting and Diagnostics (CDFD) at a cost of $5 million. CoE was dedicated to the nation by His Excellency Dr. A.P.J. Abdul Kalam, the President of India on August 05, 2005.

CDFD - SUN 'Center of Excellence' (CoE) provides major thrust to bio-informatics research.

With its large resource pool of molecular biologists, statisticians, and software programmers, good network infrastructure and an emerging venture capital industry, India is well positioned to obtain a fairly large share of the global bio-informatics market. Indian companies can play a significant role in areas such as data handling, data mining, genotyping and fingerprinting, DNA sequencing etc. The cost of setting up and running a bio-informatics company in India is a fraction of the cost in the US. Indian players will have to leverage upon the lower costs of infrastructure and human resources, while focusing on value added products and services. The Indian bio-informatics sector is gradually trying to garner a good share of the global revenues, which is expected to grow to US $6.9 billion by the year 2010. India has great potential for a vibrant bio-informatics industry as the S.W.O.T. analysis indicates (See Annexure-I).

India has several unique capabilities that may allow it to become a forerunner and important international player. India took early steps in 1986 and established a nationwide bio-informatics system. The Bio-informatics program, as a distributed database and network organization, was launched during 1986-1987. The program has become a successful vehicle for transfer and exchange of information, scientific knowledge, technology packages, and references in the country. The government took a major step forward

in establishing a national grid of bio-informatics centers as the Biotechnology Information System Network (BTISNet). The network has presently grown to 65 bio-informatics centers covering all parts of the country with more than 10,000 users and 100 databases. Bio-informatics centers coordinate bio-informatics activities, facilitate collaboration and improve awareness of bio-informatics.

With the improvements in the IPR regime, increasing support from the government and continuing efforts of the private sector companies, it is very much likely that India could repeat its IT success story in bio-informatics too. Considering the growth potential as highlighted in S.W.O.T. analysis, Indian Bio-informatics market is expected to grow to $120 million by 2006 and likely to take a major pie in the global bio-informatics sector in next few years.

Conclusion

India's position as a global software powerhouse and as a leading IT nation with growing biotechnology expertise gives Indian companies many advantages with the bio-informatics challenges. As IT is an indelible part of the bio-informatics industry the future outlook for Indian Bio-informatics looks bright. India has great potential to develop competitive research and innovative technologies. According to a report prepared by the CII-DIT, the Indian Bio-informatics market has the potential to increase its current share of two and half-per cent to five per cent of the global market. It is envisaged that by 2011, India will emerge as a significant contributor to the world bio-informatics market and position itself as a global hub for bio-informatics. As per S.W.O.T. analysis, Indian bio-informatics sector has numerous strengths compared to weaknesses and also opportunities are outnumbering threats, making bio-informatics sector sunrise industry of India.

Bio-informatics would help to generate significant economic benefits for India such as high skill and high value jobs, growth of firms (e.g. in contract research, clinical trials and investigation, product and software development), additional private and public sector R & D spending, higher export revenues and increased share of global KPO (Knowledge Process Outsourcing) market.

Keywords: Bio-informatics, Biotechnology, Computational biology, Drug discovery, Genome mapping, S.W.O.T analysis

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Skimming and Scanning

Book Title	:	***Services Marketing : Text and Cases***
Author	:	**Mr.Rajendra Nargundkar**
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Services Marketing has evolved to become a major stream of study across b-schools in India thanks to the boom in the sector. With analysts expecting further growth in the Banking, financial and Insurance sectors in the coming decades, the importance of this stream of study has become more visible.

In that perspective, Mr. Nargundkar's book on Services Marketing is indeed a valuable addition to the existing literature. Although there are many books dealing with Services Marketing, Mr. Nargundkar's book is more refreshing and stimulating.

Services Marketing: Concepts and Cases follow the traditional 7 P as its foundation. The chapters 2-8 focus on explaining the 7 P's: Product, Place, Promotion, Price, Physical Evidence, Process and People. Nargundkar follows a lucid style in presenting the concepts, which makes reading this book easy for management students. Here, Mr. Nargundkar has followed the same style of his earlier book on Marketing Research, which is a preferred book of management students on that subject.

Services Marketing also touches upon the concepts like Strategy, CRM and its application and also some insights into retailing in the service angle. Besides the chapters on concepts, the book also offers mini cases and perspectives, which give insights into the application of these concepts in the practical world. The book is full of such boxed items and illustrations that too Indian examples which make this book more attractive to the Indian audience. The chapter on Promotion has several print ads of Indian service firms and that speaks volumes about the importance of advertising campaigns in service industry. The book also has 30 cases, which offer a valuable pedagogical tool for faculty and students. The cases are a mix of conceptual and quantitative data and the author has been able to strike a balance between both types.

Although the book is refreshingly Indian, it is only an adaptation of existing services marketing concept in the Indian context. The book is purely conceived and developed as a textbook for management students and it fulfills that promise. For a scholar on services marketing, this book may pass on as another basic textbook since the author has not tried to develop or propose any original model or concept. The book also does not provide links to any additional reading in terms of references.

Services Marketing: Text and Cases is a good basic academic textbook that is easy to read for students and pedagogically useful for academicians.

Harish B.
Assistant Professor-Marketing
SCMS-COCHIN
Email: harishb@scmsgroup.org

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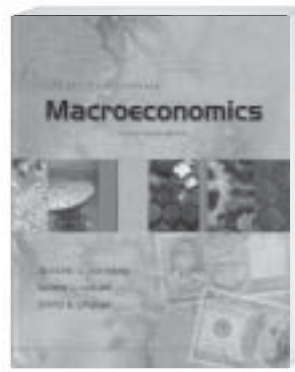

Title	:	***Understanding MacroEconomics***
Author	:	**Kishore G.Kulkarni, Edwin G.Dolan & David E.Lindsey**
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The book fufills the expectations of readers: It is coherently sound, and affluent with facts and illustrative macroeconomic theory and its application to the globalised economy. The prose reads clear of professional jargon while remaining true to the authors' training in economics. The result is an entertaining and informative book. It will appeal to lay readers interested in the common origins and different growth paths of macroeconomic policies, as well as professionally trained economists interested in macroeconomics and its different application in liberal economy.

Understanding MacroEconomics is exceptional for discussing the macroeconomics with help of case studies. The authors could devote cases for each part. *Understanding MacroEconomics* begins out with a chapter discoursing the subject matter and perspective of economic way of thinking. This is accompanied by five main topical sections, each separated into chapters and resolving with Economic growth, Productivity and Saving. It has been considerably elaborated to incorporate to greater extent international and historical cases informed by basic economic insights. This book could establish a link between macroeconomics theory and market economy. It is well appreciated that the authors could give right picture about the impact of monetary economics in macroeconomics.

Without ever exhibiting even so much on economic theory, Kulkarni, Dolan and Lindsey bring the reader on a stimulating tour of the basic principle of macroeconomics that will promote the reader to think severally about other consequences that may be conforming to similar analysis. The tone is conversational, and the authors conscientiously avoid technical terms and economic jargon.

Starting out with the Three Basic Questions: What? How? and for Whom?, readers will encounter the choice of what to produce, whom to produce for and what mechanism is used to coordinate economics choice. The section on introduction to macroeconomics digs into the role of price stability, economic growth and phases of business cycle. The authors present a concise discussion of the model of aggregate income and product and their linkages with business cycle. The section on monetary economics offers perspectives on financial markets, role of bank crucial to rational individual and business decisions. The trio authors have drawn on their impressive comprehensiveness and deep cognition on economics, financial market from various cultures to find out compelling cases from the real world.

The concluding discussion of price stability employment and economic growth touches to the more specifically economics related questions of inflationary expectation and strategies for lasting price stability. The authors conclude the book with some parting thoughts about managing the growth of demand and savings.

The book carries the merit it deserves as it is co-authored by Prof. Kishore G. Kulkarni, one of the best economists known all over. *Understanding MacroEconomics* is a highly recommendable book because it does what it promises. It clarifies concepts of the trend toward globalisation of the macro economy expressing it in simple and clear style. It is full of information about the macroeconomic scenario and therefore could be used in any introductory course.

Dr.Abey P.Philip
Assistant Professor-Economics
SCMS-COCHIN
Email: abeypp@yahoo.co.uk

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"It is one of these March days when the sun shines hot and the wind blows cold: when it is summer in the light, and winter in the shade"

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