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vidwat

The Indian Journal of Management

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VIDWAT (विद्वत) in Sanskrit means: know, understand, find out, learn, ascertain, discover, and expound.

"Vidwat – The Indian Journal of Management", published by Dhruva College of Management, Hyderabad, reflects this array of meanings. It is a vehicle for a wide range of researchers from across the globe to bring their insights to B-Schools as well as practising managers.

"Vidwat - The Indian Journal of Management" is a biannual publication. Its objective is to encourage and publish applied research in all the functional areas of Management. It lays emphasis on management issues that are relevant to academicians and practicing managers.

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Focus

Welcome to another issue of 'Vidwat - The Indian Journal of Management'.

This edition is aimed at improving our understanding of the challenges facing India Inc. as it wakes up out of a deep slumber and prepares to stake a claim as the world's largest economy.

The op-ed 'Indo US-Trade: Co-Creating Value' by Dr BVR Mohan Reddy, Chairman, Infotech Enterprises – a leading engineering services company – stands testament to India's role in building the future world economy as co-creators of economic value and not disrupters.

The economic growth of a country is often represented by its per capita income and gross domestic product as a whole. In his research paper 'The Dynamics of Relationship between Money and Income in India', Prof PK Mishra tries to investigate the short-run as well as long-run dynamics of the relation between money and income in a developing country like India for the period 1950-51 to 2008-09. This study provides evidence that the Keynesian type of short-run causality from income to money does not hold well in India over the sample period. However, the author is of the opinion that such causality holds in the long-run.

India Inc. is experiencing a paradigm shift towards sustainability in the business approach across the industries because of globalization and liberalization. In this backdrop, differentiation in delivering high quality service becomes indispensable for organizations in order to ensure survival and growth. Dr Rajesh Kothari, Prof Anamika Sharma and Prof Jitendra Rathore in their research paper 'Service Quality in Cellular Mobile Services: An Empirical Study of Cellular Mobile Users' make an attempt to identify the factors constituting service quality and their relative importance vis-a-vis cellular mobile users.

In the case 'Shantha Biotechnics: Believing in a Dream', the Dhruva Consulting Group and Dr Vipin Gupta, Professor of International Management at California State University - San Bernardino, USA, tell a compelling and uplifting story of Varaprasad Reddy, the man and the travails and tribulations he has undergone in taking Shantha to global heights. Praised as "Gandhian Engineering in action worth emulating" by Dr RA Mashalkar, CSIR Bhatnagar Fellow and President, Global Research Alliance, it chronicles a poignant journey of a man who, against all odds, succeeded to manufacture and bring a recombinant human healthcare product in India to those at the bottom of the pyramid.

The authors of the winning case – 'Bengal Chemicals: Successful Turnaround or Successful Transition?' – Dr Subhadip Roy and Mr Saurabh Bhattacharya at International Case Writing Competition (DICWC-2010) organised by DHRUVA make an attempt to elucidate the turnaround strategy adopted by Bengal Chemicals and Pharmaceuticals Limited (BCPL) to get its day of glory back. They effectively show how BPCL restructured and reinvented its various functions to deal with host of internal constraints recommended by Board for Industrial & Financial Reconstruction (BIFR).

Prof PVL Raju in his review of Nassim Nicholas Taleb's book 'Fooled by Randomness: The Hidden Role of Chance in Life and in the Markets', says that the theory of probability cannot be circumscribed as merely a mathematical phenomenon. It can also be viewed as a qualitative and literary approach of applied skepticism.

Literature reveals that marketing has moved from 'transaction marketing to relationship marketing'. Very often marketers use relationship marketing to make customers loyal in order to ensure that customers will come back to service provider again and again for the similar service requirement. Prof Kunal Gaurav has cited literature in the area of 'Relationship Marketing'. This bibliography is intended to help scholars to locate relevant literature in the area of relationship marketing.

In all humility I submit that I've to focus on increasing the quality of the journal such that it is seen as a refereed journal in management academia around the world.

The real proof of this focus will come when scholars use insights from these articles to build their own research stream and provide critical feed back.

In conclusion let me profusely thank two of the Indian Industry stalwarts – Dr BVR Mohan Reddy of Infotech and Dr K Varaprasad Reddy of Shantha Biotechnics for their contribution in embellishing this issue of Vidwat.

Looking forward to your precious feedback and happy reading.

Dr S Pratap Reddy
Chairman – DHRUVA
Editor-in-Chief, Vidwat

New Year Greetings

There is just something about the start of a new year that gives us the feeling of a fresh start and a new beginning. As we set to start 2011 we want to thank all our stakeholders – students, parents, faculty, staff, vendors and recruiters – for being with and prompting us to travel the extra mile in redefining excellence in management education.

Let us work together to have a prosperous year ahead. The editorial board of Vidwat conveys warm greetings of the New Year.

Indo-US Trade: Co-Creating Value

Dr BVR Mohan Reddy

In the light of US President Obama's visit to India, a lot has been written and said about the US-India business relationship. While the primary purpose of this trip was to enhance trade relationships that help create jobs in the US, the President and Prime Minister Dr Manmohan Singh clearly said that US-India business relationship would only create a 'win-win' situation for both countries.

While endorsing this idea fully, I believe that Indo-US partnership has already co-created value in many areas, especially in R&D and product design (also known as engineering services), and the pace of this co-creating will only increase in years to come.

While some people perceive that the Indian IT industry (including engineering services) is taking away jobs from the US, the fact is that the Indian IT industry has created several thousand jobs back in the US. India IT companies started relationships with US companies in the mid-90s by leveraging cost arbitrage.

However, over the last 15 years the value proposition of Indian IT companies evolved more around capability and capacity. Starting from doing low-end work, Indian companies have quickly moved up the value chain by focusing on process excellence, alternative solutions and innovative ideas.

As Indian companies started moving up the value chain and started executing high-end work, it has become imperative to have a strong local presence, essentially to:

- Build domain expertise
- Manage customer relationships
- Provide program management expertise.

As a result, Indian companies either created jobs by hiring local talent in the US or acquired US companies. No denying some talent was also transferred from India with appropriate visas. On aggregate, for every four jobs created in India, the companies have created at least one job in the US. In most cases these jobs are highly paid jobs.

By quickly moving up the value chain, Indian companies have supported their American partners in product development by providing design, R&D, and after-market engineering support. With this support from Indian companies, American companies have cut down product development cycle time and as a result reduced time-to-market and gained significant advantage over their competitors globally.

In addition, in leading-edge technology industries such as Aerospace, Indian companies have supported their American partners in providing highly competent technical skills and have managed some very critical subsystems development. By working together, India and US businesses have co-created value for stakeholders in both countries.

By adopting frugal engineering, Indian companies have helped American companies bring down the cost of products and increase their marketability globally. This resulted in increased revenues, increased market share and optimized, sustainable cost structure. There are several examples where Indian companies have reengineered existing products with lower component count, lower cost, increased functionality and reliability – these examples range from mission critical safety systems to aerospace products to consumer electronics. A great example of co-creating value through partnerships.

This frugal engineering proposition, by virtue of reducing the total cost and time for product development, has in many cases also resulted in US companies taking up programs and projects that, hitherto, were shelved due to budgetary constraints. These additional programs and projects have created additional revenue streams and additional jobs. Another great example of co-creating value.

Access to new markets is another great example of co-creating value. US companies have recognized that India is not just a supplier of talent but a big consumer of many of the products made by US companies. But these products do require a significant amount of

localization and customization to suit Indian needs – whether it be localizing a car or farm equipment or rail transportation systems. Who can localize these products better than Indian companies that have already worked on product development?

While US companies brought historical knowledge about the product, Indian companies brought capability, capacity, technology and knowledge of local requirements. Together, they created compelling products for Indian markets and helped US companies increase their revenue and market footprint.

By working together, India and the US companies have co-created value and in the process:

- Created more jobs in the US and India
- Reduced cost of product development with resultant savings being invested for newer products
- Created better shareholder value by increasing revenues and profits
- Developed products to address the growing needs of new and emerging markets.

India-US trade relationship is a great example of multifaceted 'co-creation'.

Dr BVR Mohan Reddy is the Founder, Chairman and Managing Director of Infotech Enterprises Limited, Hyderabad. He is a graduate in Mechanical Engineering and has two Masters degrees – one in Management Engineering from the University of Michigan (Ann Arbor, USA) and another in Industrial Engineering from Indian Institute of Technology (IIT), Kanpur.

Dr Mohan Reddy has over 30 years of engineering and management experience, most of it in the IT industry. He is acknowledged to have pioneered the CAD / CAM culture in India.

With this entrepreneurial experience Dr Mohan Reddy promoted Infotech Enterprises in 1991 as a technology services and solutions company. It has now a strength of 7600 engineering and software professionals across 27 global locations. It is a CMMi Level 5, ISO 9001:2000, AS9100, publicly traded company.

Dr Mohan Reddy served as the Chairman of CII Southern Region in 2008-09. He had earlier served as Deputy Chairman of CII, Southern Region and was also the Chairman of the AP State Council. He has held offices as President of Electronics Industries Association of Andhra Pradesh (ELIAP) and Hyderabad Software Exporters' Association (HYSEA).

He now serves as Member on the Executive Council of National Association of Software and Service Companies (NASSCOM) and on the Advisory Councils of many institutions. He has led many initiatives with his forethought and vision for the benefit of the IT Industry, in particular with his involvement with associations like CII, NASSCOM, HYSEA, ELIAP, etc.

Over the years, Dr Mohan Reddy has received many honors and accolades in recognition of his services and entrepreneurial skills, including an Honorary Doctorate from Jawaharlal Nehru Technological University in 2007.

Dr Reddy says, "Unless you can walk your talk, you can never be an outstanding leader."

> **Walk your talk**
>
> I will persist until I succeed. I was not delivered into this world into defeat, nor does failure course in my veins. I am not a sheep waiting to be prodded by my shepherd. I am a lion, and I refuse to talk, walk, and sleep with the sheep. I will persist until I succeed.
>
> **– OG Mandino**

The Dynamics of Relationship Between Money and Income in India

Prof PK Mishra

In any economy money and income are important macro-economic variables which play a significant role in influencing economic activities. This paper is an attempt to investigate the short-run and long-run dynamics of the relation between money and income in a developing country like India for the period 1950-51 to 2008-09. The study uses the annual data on money supply and national income for the sample period and makes the empirical analysis. Applying popular time series econometric techniques of co-integration and vector error correction model, provides the evidence that the Keynesian type of short-run causality from income to money does not hold good in India over the sample period. But such causality holds in the long-run. Moreover, the Monetarist type of causality from money to income does not hold good in the long-run. And, it is very interesting to note that the causal relation runs from money to income in the short-run which supports the Rational Expectation Approach that short-run unanticipated change in money supply may have a role in determining the growth of output.

Key Words: **Money Supply, National Income, India, Co-integration, VECM, Granger Causality.**

Introduction

In the last few decades, the study of the relationship between money and income has attracted the attention of many economists, researchers and policy makers. In any economy money and income are important macro-economic variables which play a significant role in influencing economic activities. In line with classical argument, any increase in money supply will give rise to increase in prices only, but the effect on output will remain unchanged.The Keynesians argue that aggregate demand determines output and thus, money does not play an active role in changing income and prices. In fact income plays the leading role in changing money stocks via demand for money implying that the direction of causality runs from income to money without any feedback. The monetarists, on the other hand, argue that in the short-run money and only money matters. An expansion in the quantity of money may generally expect to result in a rise in general price level and in turn impacts the level of national income. Thus, according to monetarists view, the direction of causality runs from money to income without any feedback. In the case of the rational expectation approach, anticipated changes in money supply are neutral but short-run unanticipated changes in money supply have a role in determining the growth of output.

In view of such contradiction, researchers came forward to investigate the causal relationship between money and income at different times and contributed to the literature several interesting evidences. Sims (1972) examined the causal relationship between money and nominal gross national product in a bi-variate framework. The study provides the evidence of unidirectional causality running from money to income in the post-war era for US. So this evidence supports the monetarists' argument but rejects the claims of Keynesians.

However,the studies of Fiege and Pearce (1976),Williams, Goodhart, and Gowland (1976), and Pierce (1977) did not support the findings of Sims (1972) and argue in favour of little or no causality between money supply and Gross National Product. On the other hand, the studies of Barth and Bennett (1974) for Canada,Dyreyes, Starleaf, and Wang (1980) for six industrialised nations, Lee and Li (1983) for Singapore, and Joshi and Joshi (1985) for India provides the evidence of bi-directional causality running between money and income. But

another study by Patil and Ramanathan (1989) for India provides the evidence that money supply and income are independent of each other.

Similarly, Hsiao (1979) for Canada, Stock and Watson (1989) for U.S, Friedman and Kuttner (1992, 1993) for U.S, Thoma (1994) for U.S, Christiana and Ljungquist (1988) for U.S, Krol and Ohanian (1990) for Canada, Germany,Japan and U.K,Abbas (1991) for India,Pakistan, Malaysia, Korea, and Thailand, Davis and Tanner (1997) for U.S, Jusoh (1986) for Malaysia, Habibullah *et al* (1996) for Malaysia, Biswas and Saunders (1998) for India, and Bengali et al (1999) for Pakistan, Hayo (1999) for 14 European Union (EU) countries plus Canada, Japan, and the United States, Hafer and Kutan (2002) for 20 industrialised and developing countries, Demary *et al* (1984) for West Germany, Yadav (2008) for India addressed to the relationship between money and income and suggested mixed findings.

Thus, it is clear that the empirical evidence regarding the direction of causal relation between money and income remain inconclusive. But for the design of an appropriate monetary policy and its effective implementation in a developing country like India, investigating the causal relationship between money and income is very significant.

If changes in the money stock had no significant causal effect on income, then monetary policy actions could not help to raise economic welfare (as measured by income levels). Conversely, the monetary authorities could be certain that fluctuations in income were not responsible for variations in the money stock. On the other hand, if the money stock was solely determined by economic conditions, then the monetary policy makers would be powerless. However, changes in the money stock had a significant causal effect on changes in income, then monetary policy actions would be very powerful.

Along with the direction of causality, the existence of long-run equilibrium relationship among money and income also has significant implications for monetary policy. The existence of the long-run equilibrium relationship between money and income implies that a monetary policy,using money as a policy instrument can influence fluctuations in income and prices; otherwise it is impossible for the central bank to use money as a policy instrument, and to control prices and income by controlling money.

It is with this backdrop, this paper is an attempt to investigate the short-run and long-run dynamics of the relation between money and income in a developing country like India for the period 1950-51 to 2008-09. The rest of the paper is organised as follows: Section II describes the data and methodology; Section III makes the empirical analysis; and Section IV summarizes and concludes.

Data and Methodology

The objective of this paper is to examine the relationship between money and income in India. Specifically, it attempts to investigate empirically the long-run relationship between money supply and national income using annual data for India over the period 1950-51 to 2008-09. In this study the variables are money supply (MS) and national income (NI). Money supply is measured in terms of broad money (M_3) which consists of currency with the public, other deposits with Reserve Bank of India, demand deposits of banks and time deposits. Similarly, the proxy for national income is the Gross National Product (GNP) at factor cost and at current prices. All the necessary data for the sample period are obtained from the Handbook of Statistics on Indian Economy published by Reserve Bank of India and from Central Statistical Organization, Government of India. All the variables are taken in their natural logarithms to avoid the problems of heteroscedasticity.

The estimation methodology employed in this study is the co-integration and error correction modeling technique. The entire estimation procedure consists of three steps: first, unit root test; second, co-integration test; third, the error correction estimation.

Unit Root Test

The econometric methodology, first examines the stationarity properties of each time series under consideration. The present study uses Augmented Dickey-Fuller (ADF) unit root test to examine the stationarity of the data series. It consists of running a regression of the first difference of the series against the series lagged once, lagged difference terms and optionally, a constant and a time trend. This can be expressed as follows:

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_2 Y_{t-1} + \sum_{j=1}^{p} \alpha_j \Delta Y_{t-j} + \varepsilon_t \quad \ldots\ldots\ldots\ldots (1)$$

The additional lagged terms are included to ensure that the errors are uncorrelated. In this ADF procedure, the

test for a unit root is conducted on the coefficient of Y_{t-1} in the regression. If the coefficient is significantly different from zero, then the hypothesis that Y_t contains a unit root is rejected. Rejection of the null hypothesis implies stationarity. Precisely, the null hypothesis is that the variable Y_t is a non-stationary series ($H_0 : \alpha_2 = 0$) and is rejected when α_2 is significantly negative ($H_a : \alpha_2 < 0$). If the calculated value of ADF statistic is higher than McKinnon's critical values, then the null hypothesis (H_0) is not rejected and the series is non-stationary or not integrated of order zero, I(0). Alternatively, rejection of the null hypothesis implies stationarity. Failure to reject the null hypothesis leads to conducting the test on the difference of the series, so further differencing is conducted until stationarity is reached and the null hypothesis is rejected. If the time series (variables) are non-stationary in their levels, they can be integrated with I(1), when their first differences are stationary.

Co-Integration Test

Once a unit root has been confirmed for a data series, the next step is to examine whether there exists a long-run equilibrium relationship among variables. This is called co-integration analysis which is very significant to avoid the risk of spurious regression. Co-integration analysis is important because if two non-stationary variables are co-integrated, a VAR model in the first difference is due to the effects of a common trend. If co-integration relationship is identified, the model should include residuals from the vectors (lagged one period) in the dynamic VECM system. In this stage, Johansen's co-integration test is used to identify co-integrating relationship among the variables. The Johansen method applies the maximum likelihood procedure to determine the presence of co-integrated vectors in non-stationary time series. The testing hypothesis is the null of non-co-integration against the alternative of existence of co-integration using the Johansen maximum likelihood procedure.

In the Johansen framework, the first step is the estimation of an unrestricted, closed p^{th} order VAR in k variables. The VAR model as considered in this study is:

$$Y_t = A_1 Y_{t-1} + A_2 Y_{t-2} + ... + A_p Y_{t-p} + BX_t + \varepsilon_t \quad .....(2)$$

Where Y_t is a k -vector of non-stationary I(1) endogenous variables, X_t is a d -vector of exogenous deterministic variables, $A_1 .....A_p$ *and* B are matrices of coefficients to be estimated, and ε_t is a vector of innovations that may be contemporaneously correlated but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables.

Since most economic time series are non-stationary, the above stated VAR model is generally estimated in its first-difference form as:

$$\Delta Y_t = \Pi Y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta Y_{t-i} + BX_t + \varepsilon_t ..... (3)$$

Where, $\Pi = \sum_{i=1}^{p} A_i - I, \quad and \quad \Gamma_i = -\sum_{j=i+1}^{p} A_j$

Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank $r < k$, then there exist $k \times r$ matrices α *and* β each with rank r such that $\Pi = \alpha\beta'$ *and* $\beta' Y_t$ is I(0). r is the number of co-integrating relations (the *co-integrating rank*) and each column of β is the co-integrating vector. α is the matrix of error correction parameters that measure the speed of adjustments in ΔY_t .

The Johansen approach to co-integration test is based on two test statistics, viz., the trace test statistic, and the maximum eigenvalue test statistic.

Trace Test Statistic

The trace test statistic can be specified as: $\tau_{trace} = -T \sum_{i=r+1}^{k} \log(1-\lambda_i)$, where λ_i is the ith largest eigenvalue of matrix Π and T is the number of observations. In the trace test, the null hypothesis is that the number of distinct co-integrating vector(s) is less than or equal to the number of co-integration relations (r).

Maximum Eigenvalue Test

The maximum eigenvalue test examines the null hypothesis of exactly r co-integrating relations against the alternative of $r+1$ co-integrating relations with the test statistic: $\tau_{\max} = -T \log(1-\lambda_{r+1})$, where λ_{r+1} is the $(r+1)^{th}$ largest squared eigenvalue. In the trace test, the null hypothesis of $r = 0$ is tested against the alternative of $r+1$ co-integrating vectors.

It is well known that Johansen's co-integration test is very sensitive to the choice of lag length. So first a VAR model is fitted to the time series data in order to find an appropriate lag structure. The Akaie Information Criterion (AIC), Schwarz Criterion (SC) and the Likelihood Ratio (LR) test are used to select the number of lags required in the co-integration test.

Vector Error Correction Model (VECM)

Once the co-integration is confirmed to exist between variables, then the third step requires the construction of error correction mechanism to model dynamic relationship. The purpose of the error correction model is to indicate the speed of adjustment from the short-run equilibrium to the long-run equilibrium state.

A Vector Error Correction Model (VECM) is a restricted VAR designed for use with non-stationary series that are known to be co-integrated. Once the equilibrium conditions are imposed, the VECM describes how the examined model is adjusting in each time period towards its long-run equilibrium state. Since the variables are supposed to be co-integrated, then in the short-run, deviations from this long-run equilibrium will feedback on the changes in the dependent variables in order to force their movements towards the long-run equilibrium state. Hence, the co-integrated vectors from which the error correction terms are derived are each indicating an independent direction where a stable meaningful long-run equilibrium state exists.

The VECM has co-integration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationship while allowing for short-run adjustment dynamics. The co-integration term is known as the error correction term since the deviation from long-run equilibrium is corrected gradually through a series of partial short-run adjustments. The dynamic specification of the VECM allows the deletion of the insignificant variables, while the error correction term is retained. The size of the error correction term indicates the speed of adjustment of any disequilibrium towards a long-run equilibrium state.

In this study the error correction model as suggested by Hendry has been used. The general form of the VECM is as follows:

$$\Delta X_t = \alpha_0 + \lambda_1 EC^1_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta X_{t-i} + \sum_{j=1}^{n} \alpha_j \Delta Y_{t-j} + \varepsilon_{1t} \quad \text{.....(4)}$$

$$\Delta Y_t = \beta_0 + \lambda_2 EC^2_{t-1} + \sum_{i=1}^{m} \beta_i \Delta Y_{t-i} + \sum_{j=1}^{n} \beta_j \Delta X_{t-j} + \varepsilon_{2t} \quad \text{.....(5)}$$

Where Δ is the first difference operator; EC_{t-1} is the error correction term lagged one period; λ is the short-run coefficient of the error correction term $(-1 < \lambda < 0)$; and ε is the white noise. The error correction coefficient (λ) is very important in this error correction estimation as greater the co-efficient indicates higher speed of adjustment of the model from the short-run to the long-run.

The error correction term represents the long-run relationship. A negative and significant coefficient of the error correction term indicates the presence of long-run causal relationship. If both the coefficients of error correction terms in both the equations are significant, this will suggest the bi-directional causality. If only λ_1 is negative and significant, this will suggest a unidirectional causality from Y to X, implying that Y drives X towards long-run equilibrium but not the other way around. Similarly, if λ_2 is negative and significant, this will suggest a unidirectional causality from X to Y, implying that X drives Y towards long-run equilibrium but not the other way around.

On the other hand, the lagged terms of ΔX_t and ΔY_t appeared as explanatory variables, indicate short-run cause and effect relationship between the two variables. Thus, if the lagged coefficients of ΔX_t appear to be significant in the regression of ΔY_t, this will mean that X causes Y. Similarly, if the lagged coefficients of ΔY_t appear to be significant in the regression of ΔX_t, this will mean that Y causes X.

Empirical Analysis

At the outset, the Pearson's correlation coefficient between M_3 and Gross National Product has been calculated over the sample period and its significance has been tested by the t-test.

The value of Pearson's correlation coefficient (r) between these two time series over the sample period is 0.98. It shows that broad money and GNP are positively related in India and that to a very high degree of correlation is evident between these two variables. To test whether this value of 'r' shows a significant relationship between two time series, student's t-test has been used. The null hypothesis of the test is $r = 0$ against the alternative of $r \neq 0$. Since the t-statistic at 57 degrees of freedom is 37.19 and the critical value of 't' at 5% level of significance is less than it, the null hypothesis is rejected. So, it can be said that the correlation between M_3 and GNP is statistically significant. Correlation, however, does not say anything about long-run relationship and thus, leaves unsettled the debate concerning the long-run relationship between money and income.

Before proceeding with the empirical analysis, it is required to determine the order of integration for each of the two variables used in the analysis. The Augmented Dickey-Fuller unit root test has been used for this purpose. And, the results of such test are reported in Table -1.

Table 1: Results of Augmented Dickey-Fuller Unit Root Test

Variables in their First Differences with intercept	ADF Statistic	Critical Values	Decision
$LM3_t$	-3.94	At 1% : -3.55 At 5% : -2.91 At 10% : -2.59	Reject Null hypothesis of no unit root
$LGNP_t$	-3.83	At 1% : -3.55 At 5% : -2.91 At 10% : -2.59	Reject Null hypothesis of no unit root

It is clear from Table 1 that the hull hypothesis of no unit roots for both the time series are rejected at their first differences since the ADF test statistic values are less than the critical values at 10%, 5% and 1% levels of significances. Thus, the variables are stationary and integrated of same order, i.e., I(1).

In the next step, the co-integration between the stationary variables has been tested by the Johansen's Trace and Maximum Eigenvalue tests. The results of these tests are shown in Table-2.

Table 2: Results of Johansen's Co-integration Test ($LM3_t$ & $LGNP_t$)

Hypothesized Number of Co-integrating Equations	Eigen Value	Trace Statistics	Critical Value at 5% (p-value)	Maximum Eigen statistics	Critical Value at 5% (p-value)
None*	0.289	25.185	20.261(0.009)	19.123	15.892(0.015)
At Most 1	0.102	6.062	9.164(0.186)	6.062	9.164(0.186)

* Denotes rejection of the hypothesis at the 0.05 level

The Trace test indicates the existence of one co-integrating equation at 5% level of significance. And, the maximum eigenvalue test makes the confirmation of this result. Thus, the two variables of the study have long-run equilibrium relationship between them. But in the short-run there may be deviations from this equilibrium and we have to verify whether such disequilibrium converges to the long-run equilibrium or not. And, Vector Error Correction Model can be used to generate this short-run dynamics. Error correction mechanism provides a means whereby a proportion of the disequilibrium is corrected in the next period. Thus, error correction mechanism is a means to reconcile the short-run and long-run behaviour.

Table 3: Estimates for VECM Regression

$$\Delta LM3_t = 0.063 - 0.083EC^1_{t-1} + 0.336\Delta LM3_{t-1} + 0.263\Delta LM3_{t-2} - 0.134\Delta LGNP_{t-1} + 0.085\Delta LGNP_{t-2}$$
$$\Delta LGNP_t = 0.009 + 0.0875EC^2_{t-1} + 0.604\Delta LM3_{t-1} - 0.029\Delta LM3_{t-2} + 0.139\Delta LGNP_{t-1} + 0.078\Delta LGNP_{t-2}$$

Independent Variable	$\Delta LM3_t$	$\Delta LGNP_t$
Constant [t-statistic] (p-value)	0.063 [4.191] (0.00009)	0.009 [0.431] (0.668)
EC_{t-1} [t-statistic] (p-value)	EC^1_{t-1} = -0.083 [-2.278] (0.026)	EC^2_{t-1} = 0.0875 [1.607] (0.113)
$\Delta LM3_{t-1}$ [t-statistic] (p-value)	0.336 [2.670] (0.0098)	0.604 [3.249] (0.0019)
$\Delta LM3_{t-2}$ [t-statistic] (p-value)	0.263 [2.137] (0.037)	-0.029 [-0.162] (0.871)
$\Delta LGNP_{t-1}$ [t-statistic] (p-value)	-0.134 [-1.349] (0.182)	0.139 [0.951] (0.345)
$\Delta LGNP_{t-2}$ [t-statistic] (p-value)	0.085 [0.985] (0.328)	0.078 [0.607] (0.546)

The estimation of a Vector Error Correction Model (VECM) requires selection of an appropriate lag length. The number of lags in the model has been determined according to Schwarz Information Criterion (SIC). The lag length that minimizes the SIC is 2. Then an error correction model with the computed t-values of the regression coefficients is estimated and the results are reported in Table-3.

The estimated coefficient of error-correction term (EC^1_{t-1}) in the LM_3 equation is statistically significant and has a negative sign, which confirms that there is not only any problem in the long-run equilibrium relation between the independent and dependent variables in 5% level of significance, but its relative value (-0.083) for India shows the rate of convergence to the equilibrium state per year. Precisely, the speed of adjustment of any disequilibrium towards a long-run equilibrium is that about 8.3% of the disequilibrium in M_3 is corrected each year. Furthermore, the negative and statistically significant value of error correction coefficient indicates the existence of a long-run causality between the variables of the study. And, this causality is unidirectional in our model being running from income to money. In other words, the changes in M_3 can be explained by national income.

The existence of co-integration implies the existence of Granger causality at least in one direction (Granger,1988). The long run causality test from the VECM indicates that causality runs from GNP to M_3, since the coefficient of the error term in LM_3 equation is statistically significant and negative based on standard t-test which means that the error term (EC^1_{t-1}) contributes in explaining the changes in M_3. However, the coefficient of the error term in the LGNP equation is positive and statistically insignificant which means that the error term (EC^2_{t-1}) does not contribute in explaining the changes in GNP. Therefore, there is unidirectional causality running from the GNP to M_3.

The coefficient of the first difference of LM_3 lagged one period in GNP equation in Table-3 is statistically significant which indicates the presence of short-run causality from M_3 to GNP based on VECM estimates. In order to confirm the result of the short-run causality between the ΔGNP and the ΔM_3 based on VECM estimates, a standard Granger causality test has been performed based on F-statistics.

Table 4: Results of Granger Causality Test

Null Hypothesis	F-Statistic	Probability	Decision
ΔLM3 does not Granger Cause ΔLGNP	8.328	0.00074	Reject
ΔLGNP does not Granger Cause ΔLM3	2.057	0.1383	Accept

(Number of lags = 2)

The result in Table-4 indicates that M_3 Granger causes the GNP at the 5% level of significance but the reverse in not true.This result supports the previous result obtained from VECM that there is a short-run causality from M_3 to GNP at the 5% level of significance. So, changes in M_3 cause changes in GNP in the short-run, but not in the long-run. And, hypothesis that GNP does not Granger cause M_3 is accepted at 5% level of significance. So, changes in GNP cause changes in M_3 in the long-run but not in the short-run.

Summary and Conclusion

In this paper, the relationship between the money and income for a developing country like India is investigated using popular time series methodologies. In this study money is measured in terms of M_3 and income in terms of GNP at current prices. The data properties are analyzed to determine the stationarity of time series using the Augmented Dickey-Fuller unit root test which indicates that the two series are I(1).The results of the Co-integration test based on Johansen's procedure indicate the existence of the Co-integration between M_3 and GNP.Therefore, the two variables have a long-run equilibrium relationship exists, although they may be in disequilibrium in the short-run. The vector error correction model based on VAR indicates that about 8.3% of disequilibrium is corrected each year. In addition, the negative and significant error correction term in LM_3 equation supports the existence of a long-run equilibrium relationship between GNP and M_3. Furthermore, the estimates of the VECM indicate the existence of a unidirectional causality running from GNP to M_3.The Granger causality test indicates that there is a causal relationship running from GNP to M_3 in the long-run, but not in the short-run. Furthermore, it infers that there exists a causal relationship running from M_3 to GNP in the short-run, but not in the long-run.

The result of the study suggests that the Keynesian type of short-run causality from income to money does not hold good in India over the sample period. But such causality holds in the long-run. Moreover, the Monetarist type of causality from money to income does not hold good in the long-run. And, it is very interesting to note that the causal relation runs from money to income in the short-run which supports the Rational Expectation Approach that short-run unanticipated change in money supply may have a role in determining the growth of output.

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Enthusiasm

There is a language in the world that everyone understands – the language of enthusiasm, of things accomplished with love and purpose, and as part of a search for something believed in and desired.

In alchemy, the principle that governs all things is called the soul of the world. When you want something with all your heart, that's when you are closest to the soul of the world. It's always a positive force.

– Paulo Coelho

Service Quality in Cellular Mobile Services: An Empirical Study of Cellular Mobile Users

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Prof Anamika Sharma

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The telecom industry of India is witnessing a surge like never before – since August 2009, about 15 million new subscribers are getting added every month. According to TRAI estimates, the number of subscribers will exceed 500 million by December 2009. The number of telecom players per circle is averaging six (earlier it was 4-5 players). A fierce battle is poised to take place between the already established biggies like Airtel and Vodafone and the new and unheard of ones like S-Tel, Swan Telecom and Unitech Wireless. The companies that will stand firm on their feet will be the ones that will be able to distinguish themselves distinctly on the basis of service quality. The telecom players need to understand well, the perceptions of service quality of customers and their aspirations. The battle will get nasty and rewards will be enormous, but the major chunk will be taken up and retained by the companies that understand the dynamics and implications of quality in services to the best and take to the helm. The study is an attempt to identify the factors constituting service quality and their relative importance.

Key Words: **Service Quality, Telecom Industry, Mobile Services, Cellular Mobile Users.**

Introduction

"Quality is never an accident; it is always the result of high intention, sincere effort, intelligent direction and skillful execution; it represents the wise choice of many alternatives"

– William A Foster

In the last two decades or so, the changing face of India has witnessed revolutions, small and big, because of changing demographics, advent and infusion of technology, arrival of global players in various industries. The cellular services industry is one such industry that has witnessed tremendous growth, more prominently in the last decade. The services have penetrated not only the urban but also the rural areas. The cellular service providers have been pushed to the brim to stay competitive in this arena. The oligopolistic situation in this industry calls for creating differentiation in services to stay competitive. For service providers, the pursuit of service quality is essential for competitiveness and gaining momentum (Seth et al, 2007). The service quality aspect, though, weighed heavily by service providers, is still overlooked when it comes to accentuating the customer base.

Various studies have shown that there is a direct relationship between service quality and customer satisfaction, customer loyalty, retention and profitability. Service quality in cellular service has therefore become an area of principal focus for the Cellular Mobile Service Providers (CMSP). With the rapidly changing technologies, customer needs and increased customer awareness, it becomes imperative to review the Quality of Service (QoS) parameters for cellular mobile communication[1]. There has been a lot of research related to this subject in the Indian context, but the studies have mainly been confined to either functional or technical attributes of service quality. The present paper is an attempt to understand both the dimensions of service quality. The study focuses on understanding the customer's perception of cellular service. In order to understand the service quality attributes in depth,

[1] http://inderscience.metapress.com/app/home/contribution.asp?referrer=parent&backto=issue,5,7;journal,18,35;linkingpublicationresults,1:11088, 1, 28-11-09

the inputs have also been derived from cellular service providers, specifically, the frontline employees in customer care function. Further, the study would help the service providers set standards for service quality which would lead to enhanced performance and efficiency.This paper would help cellular mobile service providers to discover which particular dimensions require attention in order of their relative importance.

Cellular Mobile Services: Indian Scenario

The Indian economy is the twelfth largest economy of the world. The most significant contributors to the booming economy are the development of the services sector and the focus of Foreign Direct Investment (FDI) in the telecommunication sector. In the year 2009, India's GDP grew at the rate of 6.7%. Over the past two decades, the service sector has expanded rapidly and has been playing important role in improving GDP and employment.[2] India's service sector accounts for 54% of the country's GDP, while the industrial and agricultural sectors contribute 29% and 17% respectively. In case of employment generation, the service sector contributes 28% and industrial sector 12%[3]. The flow of FDI worldwide has also shifted towards services. The telecom sector is one of the important sectors of the service sector. During April 2000 to March 2009, the inflow of FDI into India's telecom sector was around Rs 317,198.97 million[4].

In 1990, the Indian government opened up the telecom sector for the private players. In order to regulate and facilitate its growth, the Telecom Regulatory Authority of India (TRAI) was formed in 1997. India has become one of the fastest-growing mobile markets in the world. The mobile services were commercially launched in August 1995 in India.[5] The telecom sector can be divided into two segments:

- Fixed Line Services
- Cellular Services

Fixed Line Services are provided by BSNL and MTNL, which account for almost 90% of revenues.

Cellular services can be further divided into two categories:

- Global System for Mobile Communications (GSM)
- Code Division Multiple Access (CDMA)

The GSM sector is dominated by Airtel, Vodafone, and Idea Cellular, while the CDMA sector is dominated by Reliance and Tata Indicom. International and domestic long distance telephone services were opened for cellular industry. The reduction in tariffs, national long distance, international long distance, and economical handset prices has driven demand. Lack of infrastructure in semi-rural and rural areas and limited spectrum availability are bottlenecks faced by the telecom sector.

India is the third largest telecom market in the world after US and China. The expansion of the telecom industry in India has been triggered by a phenomenal growth in telecom subscribers, which have reached a level of 464.82 million till June 2009[6] thereby registering a growth rate of 8.17% Q-o-Q growth, out of which 427.29 million is wireless subscriber growing at the rate of 9.07%. Tele density in India is 39.86 (out of which 36.64 is for wireless subscribers). Average revenue per user per month for GSM and CDMA are Rs 185 and Rs 92. In India Bharati Airtel has the most wireless subscribers (102.37 million) followed by Reliance (79.62 million). BSNL is in fourth place (54.36 million).[7]

Service Quality Dimension

In Japanese philosophy Quality means zero defect (or defect-free) product and service. It emphasizes on doing the things right for the first time. (Crosby 1979) says that quality means conformance to standards. (Garvin 1983) defines quality by counting the incidence of internal (before product leaves the factory) and external failure (after the product is installed). Research has proved many times that quality helps the firm in contributing to gain market share, return on equity, lowering production cost and improving productivity. In case of tangible goods, measurement of quality is an easy task because uniform quality standards can be met consistently. But the characteristics of service make measurement of quality complicated. Service quality is an elusive and abstract construct that is difficult to measure (Cronin et al. 1992).

[2] The Indian Telecom Services Performance Indicators, April–June 2009, New Delhi, India, 1st October 2009
[3] http://en.wikipedia.org/wiki/Economy_of_India, 8-12-09
[4] http://www.dot.gov.in/osp/Investment%20Policy/FDI%20Inflow%20-Sector-wise.htm, 21-12-09
[5] http://www.trai.gov.in/trai/upload/Reports/1/report31jan06.pdf , 21-12-09
[6] The Indian Telecom Services Performance Indicators, April–June 2009, New Delhi, India, 1st October 2009
[7] Ibid 6

The three basic characteristics of service that pose a challenge for service providers are:

- Intangibility
- Heterogeneity
- Inseparability

Firstly, service is a performance that cannot be counted, measured and inventoried, hence it is intangible. The intangible nature of service makes it difficult for the service provider to analyze how the customer would perceive and evaluate quality. Secondly, heterogeneity of service makes it different from customer to customer and from provider to provider. It cannot be assured that performance of service personnel would be consistent for all customers. Thirdly, the characteristics of inseparability emphasize that production and consumption of service takes place simultaneously. Quality in service cannot be engineered in the factory, but it occurs during interaction between provider and client. Service delivery process and customer's participation in the process are key determinants to quality of service.

All these three characteristics make evaluation of service quality a technical task involving comparison between expectation and actual performance. If service provider knows how the service would be evaluated by the consumer, he would have influenced this evaluation in a desired way. (Parasuraman et al. 1985) emphasizes on three things: evaluating service quality is a difficult task; comparison of consumer expectation with performance built up service quality perception and evaluation of service quality is dependent on the outcome and process of service delivery. In a nutshell, Service quality measures how well the service is delivered.

As per (Gronroos 1983) service quality perceived by customers has two dimensions. One is *technical quality* which emphasizes on 'what' customer actually receives from service and *functional quality* emphasizes on 'how' service is delivered. Behaviour of employees and speed of service delivery are examples of functional quality. If it is difficult for the consumer to evaluate the technical competence of a service provider (technical quality), then he focuses on attributes associated with the process (functional quality). (Lehtinen and lehtinen's 1991) suggests that quality cultivates during two-way interaction between service provider and customer. According to them, there are three dimensions: *physical quality* includes tangible aspect of the service; *corporate quality* which involves the company's image and *interactive quality* which originates from interaction between customer and service provider. (Lehtinen 1991) has observed that service quality has two dimensions – process and output. *Process quality* emphasizes on the way service is catered to consumer and *output quality* is judged once service is provided. Evaluation of service process plays a vital role in building the perception of consumer. Process quality is evaluated while the service is being provided and the outcome is evaluated once the service is provided.

The construct quality used in our research focuses on perceived quality. Perceived quality is a kind of attitude that results from comparison of expected service with perceived service. It is a consumer's verdict developed about the service's superior performance (Gi-Du Kang, 2006). Expected service originates from word of mouth communication, personal needs and past experiences. Expected services are the desires, wants of a consumer i.e. what they feel that service should offer rather than would offer. A perceived service is the outcome of external communication to consumer and service delivery process. (Parasuraman et al. 1985) service quality depends on incongruity between expected services and perceived services. In other words, it can be concluded that perceived quality is the degree and direction of discrepancy between consumer's expectation and perceptions (Parasuraman et al. 1988). When expected service is greater than perceived service, it means inferior service quality. When ES = PS, quality of service is satisfactory. If Expected Service < Perceived Service (ES < PS), then service has been delivered properly to ensure quality. In Figure 1, ten determinants has been shown (developed by Parasuraman et al. 1985) which help in forming the expectation about perception of service. This paper is an attempt to identify both technical and functional quality of mobile (phone) service providers in the city of Jaipur. Functional Quality (as per SERVQUAL Model) and Technical Quality are summarized in Table 1.

Assurance and Empathy dimension developed here contain some variables related to other dimensions like access,communication,competence,courtesy,credibility, security and understanding the customer. Therefore, SERVQUAL model has only five distinct dimensions capturing all the 10 original conceptualized dimensions.

SERVQUAL is a concise multiple-item scale with good reliability and validity that telecom service providers can use to better comprehend the service expectations and perception of mobile users to improve services. SERVQUAL Model helps the service provider in

understanding what needs to be done to improve the quality of service. One potential application of SERVQUAL is to determine the relative importance of five dimensions influencing the customer's overall quality perceptions. For this, overall quality perception has to regress on the dimensions of SERVQUAL Model (see the result in Table 6).

The Role of TRAI

As per TRAI, QoS is defined as the main indicator of the performance of a telephone network, and of the degree to which the network conforms to the stipulated norms. The subscriber's perception of the QoS is determined by a number of performance factors specified by the telecom regulator, particularly, network congestion[8] Quality of Service regulations gained importance in 2005 when TRAI sent notices to major telecom players like Bharti, Reliance Infocomm, Reliance Telecom, BPL Mobile and Spice Communication, asking clarification on high congestion at Points of Interconnection (PoI). The benchmark according to TRAI parameters should be less than 0.5%. The network congestion report released by TRAI found that level of congestion at 404 PoIs was more than 0.5%.

TRAI has come out with a regulation on Quality of Service of Basic and Cellular Mobile Telephone Services, 2000. The main thrust to bring this regulation was to:

- Create condition for customer satisfaction by making quality of service as a benchmark,
- Measure the quality of service provided by the Service Providers and to compare them with the norms so as to assess the level of performance and
- Protect the interests of consumers of telecommunication services[9].

Review of Literature

Various studies in the context have been undertaken from time to time by various researchers and academicians. Marketing literature has substantially acknowledged the use of service quality as a competitive edge (Shostack 1977; Lovelock 1983; Rust & Chung 2006;). The results of these studies have been summarized in the table that follows:

S. No.	Author	Year	Area of Study	Result
1	Pitt, Watson and Kavan	1995	Computer users	SERVQUAL Model was through with content reliability and convergent validity. There was problem with discriminant validity. Responsiveness, Assurance and Empathy loaded in a single factor.
2	Leisen and Vance	2001	Fixed line telephone user	Focused on SERVQUAL model and established that service quality is a key factor for overall customer satisfaction in US and Germany. In US reliability was considered important whereas in Germany responsiveness, reliability and empathy were given importance.
3	William C Johnson; Anuchit Sirikit	2002	Fixed line and cellular service mobile	Tangible aspect of SERVQUAL model is extremely popular and received excellent rating in Thai telecom sector.
4	Van Der wal, Pampallis and Bond	2002	Cellular Mobile Service	Used SERVQUAL model to match perception and expectation of customer service. Tangibility and reliability are loaded into separate factor. No differentiation was found between the remaining three.
5	Ranaweera and Neely	2003	Fixed line telephone services	The study revealed that perception of service quality has direct linear relationship with customer retention in mass telephone service with low customer contact.
6	Kim, Park and Jeong	2004	Cellular Mobile Service	Call quality has significant impact on mobile user's satisfaction.
7	A selvarasu, K Gomathishankar and M G loganathan	2006	Cellular Mobile Service	Used SERVQUAL Model to measure quality of service for CDMA (Code Division Multiple Access) mobile in India. Responsiveness and empathy have been found limiting factor for BSNL and tangibility and responsiveness are relatively important for Aircel. Reliability, assurance and empathy have been the power of Airtel in providing good quality of service.
8	Parvinder Arora, Ajay Garg and Amrit Singh	2007	GSM mobile users	In the study, Problem Solving, Information and Records, Bells and Whistles, Network, Appearance, and Employee Attention were identified as parameters of service quality.
9	Chang Ee Ling and Ernest Cyril de Run	2009	Fixed line and cellular service mobile	Conducted study on customer satisfaction and customer loyalty in Malaysian telecom sector. It is revealed service is important in making customer more loyal
10	Rakshit Negi	2009	Mobile Communication	Overall service quality of mobile communication was below average. The highest quality gap was observed in the case of networking. Therefore, better transmission quality, network coverage will improve the customer perceived quality.

[8] Regulation On Quality Of Service Of Basic And Cellular Mobile Telephone Services, 2000, (2 of 2000), http://www.trai.gov.in/WriteReadData/trai/upload/Regulations/37/QOSREGLN.pdf, 9-12-09

[9] Ibid

Research Methodology

Sample Size

The sample consists of 145 mobile phone users in Jaipur, Rajasthan. Convenience sampling was used to gather the data from the users of the city who have been using the same service for more than three years. The criterion of three years was adopted to increase the credibility of information received from the respondents. The sample consists of 118 male and 27 female respondents.The information was obtained from businessmen,professionals,academicians,homemakers and students who belong to age group of 20-45. Most of the respondents were users of prepaid (73%) services and remaining (27%) were for post paid services. The demographic characteristics of respondents are summarized in Table 3 and Table 4.

A questionnaire of 29 variables was framed to test the application of SERVQUAL model. The steps involved in the development of the questionnaire depend on the reliability of constructs. SERVQUAL model emphasizes on functional quality, therefore 18 variables of SERVQUAL model have been used. For the assessment of convenience and network quality, additional six and four variables have been included in the measurement scale (questionnaire). Each of these variables were evaluated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree). One question related to overall perception of service quality was included and measured on the five-point Likert scale ranging from 1 (very bad) to 5 (excellent).

Assessment of Reliability

The validity and reliability of variable was assessed by computing coefficient of alpha (cornbach alpha) that measures internal consistency.Coefficient of alpha above 0.6 is acceptable which indicates good consistency among variables within each dimension of service quality. A value below 0.6 is generally unsatisfactory. All extracted factors have reliability,g with a value of equal to or more than 0.6. Omission of any variable from extracted factor would have resulted into decrease in reliability.The total scale reliability is 0.908.

Factor Analysis

The appropriateness of factor needs to be analyzed by examining sample adequacy through Kaise-Meyer-Olkin (KMO) statistics. KMO measures whether partial correlation among variables is small[10]. In other words, large values for the KMO measure indicate that a factor analysis of the variables is a good idea. Bartlett's test of Sphericity tests whether correlation matrix is an identity matrix. Identity matrix indicates the factor analysis is inappropriate. Bartlett's test of Sphericity is used to test the null hypothesis that the variables in the population correlation matrix are uncorrelated. The observed significance level is .0000. It is sufficient to reject the hypothesis. It is concluded that the strength of the relationship among variables is strong. It is an excellent idea to carry on a factor analysis for the data. [11]

From Table 5, it can be concluded that both KMO and Bartlett's results are significant and acceptable.SPSS 13.0 was used for applying principal component analysis with varimax rotation. Variable with low factor loading has not been taken into account. Ultimately seven factors consisting of 28 variables were extracted and the result was shown in Table 6.The individual variable explained total variance exceeding 65% signifying the suitability of process. To validate the result, content validity and criterion related validity are used.

Content Validity[12]

Content validity is related to face validity which refers to the extent to which a measure represents all facets of a given construct. In order to evaluate the content validity, the questionnaire constructed in the present study was shown to the front line employees in customer care function. They were required to express their opinion. Any disagreement with the questionnaire would require another revision of the measurement scale in consultation with them. However, the response from these executives indicated no such disagreement with the constructed questionnaire. Hence, this agreement helped in validating the scale, which established the content validity. However, content validity alone is not a sufficient measure of the validity of a scale.

Criterion Related Validity[13]

This is used to establish the accuracy of a one measure or procedure by comparing it with another measure or procedure which has been shown to be valid. In this present study, criterion related validity, is established by comparing overall service quality with customer

[10] KMO value greater than 0.5 is satisfactory
[11] http://evolutionarymedia.com/cgi-bin/wiki.cgi?StatisticalMethods,template.html, 18-11-09
[12] http://en.wikipedia.org/wiki/Content_validity, 4-12-09
[13] http://writing.colostate.edu/guides/research/relval/com2b3.cfm, 4-12-09

perceived factors.Table 7 shows the correlation between overall service quality and seven factors. The entire customer perceived service factors have statistically significant positive correlation with overall service quality. Factors like responsiveness and convenience have very high correlation with overall service quality and there by signifies that these factors are excellent determinant of overall service quality. For measuring the relative importance of seven factors, regression analysis is used. In multiple regression model, overall service quality is taken as dependent variable and seven extracted factors have been taken as independent. Average score of each factor is regressed on overall service quality for each respondent.

Standardized coefficient (â) helps in deciding the relative importance of independent variables. Beta with highest coefficient represents most important factor thereby predicting overall service quality. The second largest coefficient represents second dominant factor. In present study, convenience (â=0.243) and network quality (â=0.218) are the most important factors influencing overall service quality. Higher the beta, the more will be the contribution of factor in explaining the overall service quality. It depicts that technical quality is given more preference than functional quality.The result shows that customer consider tangibles (â = 0.131) as least important factor influencing overall service quality. Least importance does not mean unimportant.

The regression model is significant at F = 1725.826 and p<0.00. R square is 0.989 which signifies that 98.9% variance in overall service quality is explained by independent variable.The result of regression equation can be written as follows.

Overall Service Quality = 0.182 + 0.183 (convenience) + 0.133(Reliability) + 0.123(Responsiveness) + 0.151 (Assurance) + 0.100 (Empathy) + 0.117 (Tangibles) + 0.137 (network quality)

Discussion and Inference

The present study verifies application of SERVQUAL model by emphasizing on two dimension of service quality (technical and functional) among mobile phone users in Jaipur city.This study helps in concluding the mobile users' perception regarding quality in cellular mobile services on the basis of both functional and technical quality. For measuring the mobile user's perception, questionnaire comprising of seven dimensions inclusive of Reliability, Responsiveness, Assurance, Empathy, Tangibles, Network quality, and Convenience were used.The result of study emphasizing that Reliability, Responsiveness, Assurance, Empathy, Tangibles, Network quality, and Convenience are the factors that a consumer always looks for before availing the mobile service. Overall service quality is much influenced by all these factors. But all the dimensions are not equally contributing in framing the customer's perception regarding service quality. Convenience and network quality are relatively important (with highest beta value) than the other dimensions of SERVQUAL Model. These two dimensions are followed by assurance, responsiveness, reliability, empathy and tangible. In the past, most of the service quality research revolves around SERVQUAL Model which emphasizes only on functional dimensions. This model has also been criticized because it ignores technical quality of service. Therefore, in the present both functional and technical quality is measured. And it can be concluded that by improving the network quality and convenience of mobile users, cellular mobile service providers could enhance quality of services.Tangible dimension is not at all influencing mobile user's perceived service quality.

'*Convenience*' dimension with highest beta emphasizes that mobile users look for easy lodging of complaints, convenient business hours, flexibility in payment of bills, and simple formalities at the time of taking connection. Customer also wanted that retail outlets should be approachable and frontline officers keep informing them about different offers / plans. Mobile users are more conscious about technical quality. Hence, the company should provide sufficient '*network quality*' like geographical network coverage, clear and undisturbed voice, connectivity to other network and less congestion during peak hours. '*Assurance*' occupies third place involving employees friendly and polite behavior, employee's adequate knowledge to handle queries, assurance to customers of the accuracy and confidentiality of their transactions and employee's Behavior.

'*Responsiveness*' with 0.186 beta is at fourth place in order of relative importance. It suggest that front line officers dealing with end user should be given proper training and resources so that they should be prompt in their services and responding to customer's query.They should know how to take queries of employees seriously. They should be quick in resolving the complaints of employees.'*Reliability*' is the fifth important dimension focusing on timely receipt of bill, information about progress of complaint,accuracy of bills and performance

of service as per the promise. '*Empathy*' has emerged out at sixth place requiring that the employees should give individual attention to customers. They have to understand specific needs of their. The customers also want easy accessibility to customer care. Tangible is at the seventh position in order of relative importance. It means that professional appearance, pamphlets and physical facilities are not at all influencing customer's perception regarding quality. It can be inferred that technical quality has been emphasized over functional quality.

The telecom sector is one of the competitive sectors which need regular attention on quality while offering services to its customers. By administrating these above-mentioned seven dimensions in order of their relative importance, service providers can enhance the quality of service thereby building customer's positive perception. SERVQUAL quality model can be used to appraise the performance of employees dealing with consumers and the whole service providers.

Conclusion and Implication

India offers an unprecedented opportunity for telecom service operators. A growing Indian economy with increased focus on the services sector, population mix moving favorably towards a younger age profile, urbanization with rising income level and upcoming rural telecom market are the factors contributing for growth and investment in telecom sector. Present research proves that in the order of relative importance, responsiveness and empathy is at fourth and sixth place. Service providers must pay attention to those factors which receive lower ratings. The telecom sector employees play a very dominant role. Telecom companies should make all the employees aware of their role and responsibilities towards customer and end-users. They should impart training in order to consistently deliver high standards of service. They should be taught to help and to provide the requested services promptly. In the service sector, there should be sufficient level of employees to cope up peak and slack seasons. On account of perception and expectation, the employee must instill confidence and trust in customer. Delivery of high quality service helps the companies to gain competitive advantage and building customer loyalty. The result of the study also establishes the reliability of questionnaire developed to measure functional and technical quality with total scale reliability of 0.908. Cellular service providers should strive for long-term customer loyalty and repeat business. Service quality has to be assessed regularly. It will help the organization in assessing the current as well as future expectation of customers. Delivery of quality in service is an integral part of business not only for success but for survival. For customer satisfaction and retention, achieving and maintaining customer perceived service quality is an essential strategy.

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Table 1: Dimensions of Functional Quality and Technical Quality for Mobile Phone Users

Category	Dimensions	Description	Relevance from literature
Functional Quality	Reliability	Ability of the firm to consistently perform the service right for the first time	Parasuraman, Zeithaml and Berry, 1985
	Respon-siveness	Willingness of personnel for prompt service and help to the customer	Parasuraman, Zeithaml and Berry, 1985
	Assurance	Knowledge and courtesy of employee and their ability to inspire confidence and trust	Parasuraman, Zeithaml and Berry, 1988
	Empathy	Caring, individualized attention that firm provides to its customer	Parasuraman, Zeithaml and Berry, 1988
	Tangibles	Physical facilities, appearance of personnel, tools, equipments and communication equipments	Parasuraman, Zeithaml and Berry, 1985
	Convenience	Comfortable amenities to suit the customer needs	Galiano and hathcote 1994
Technical Quality	Network Quality	Network performance, call drop, undisturbed voice, connectivity to other network	Telecommunication regulatory Authority of India

Figure 1 (Parasuraman et al. 1985)

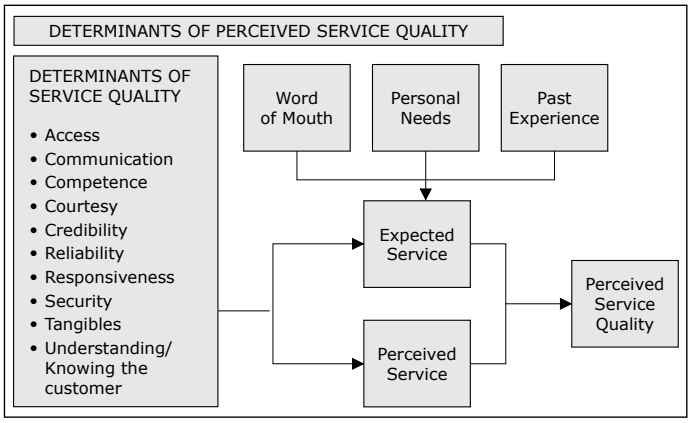

Table 3: Service Providers and Occupation of Respondents

Count		Occupation						Total
		Businessmen	professionals	Academicians	Home-makers	Students	Others	
Service Provider	Airtel	9	28	10	1	7	1	56
	BSNL	2	11	5	4	5	2	29
	Idea	2	7	2	0	3	1	15
	Reliance	1	2	2	0	2	1	8
	Tata Indicom	1	5	1	0	7	1	15
	Vodafone	5	13	3	0	1	0	22
Total		20	66	23	5	25	6	145

Table 4: Gender and Monthly Expense

Count		Monthly Expense					Total
		Less than Rs 500	Rs 501- 1000	Rs 1001- 2000	Rs 2001- 3000	Rs > 3000	
Gender	Male	27	50	32	5	4	118
	Female	6	17	2	1	1	27
Total		33	67	34	6	5	145

Table 5: KMO and Bartlett's Test Results for Service Quality

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	1778.826
	df	435
	Sig.	.000

Table 6: Factor Extraction Result of Service Quality KMO and Bartlett's Test

Sr. No	Factor Name	Variable	Factor loading	Cronbach Alpha	KMO
1	Reliability	Provide the services as promised	0.543	60	0.602
2		Bills are received on time	0.718		
3		Bills contain accurate details	0.794		
4		Well informed about progress of complaint	0.615		
5	Responsiveness	Queries are taken seriously	0.804	73	0.749
6		Promptness of the service	0.762		
7		Quick complaint resolution	0.712		
8		Employee's Readiness to respond to customers' query	0.690		
9	Assurance	Employees are friendly and polite	0.794	70.2	0.694
10		Employees have adequate knowledge to handle your queries	0.760		
11		Assure customers of the accuracy and confidentiality of their transactions	0.525		
12		Employee's Behavior make you feel confident	0.806		
13	Empathy	Easy accessibility to Customer Care	0.751	70	0.662
14		Gives you individual attention	0.825		
15		Understand your specific Needs	0.799		
16	Tangibles	Employees have a neat & professional appearance	0.610	60	0.565
17		Pamphlets are visually appealing	0.742		
18		Physical Facilities are visually appealing (ambience etc.)	0.668		
19	Convenience	Easy Lodging of Complaints	0.723	70.3	0.748
20		Convenient Business Hours	0.721		
21		Retailer outlets are approachable	0.718		
22		Flexibility in Payments of Bills	0.683		
23		Provides sufficient information about different offers/plans	0.611		
24		Formalities are simple at the time of taking Connection	0.466*		
25	Network Quality	Provides sufficient geographical network coverage	0.715	75	0.766
26		Clear and undisturbed Voice	0.793		
27		Connectivity to other network	0.799		
28		Less congestion during peak Hour	0.719		
* variable deleted on account of low factor loading					

Table 7: Correlation Among Factors and Overall Service Quality

Correlations	
Factor	Overall Service Quality
Reliability	0.760
Responsiveness	0.853
Assurance	0.802
Empathy	0.762
Tangibles	0.652
Network quality	0.556
Convenience	0.834
Correlation is significant at the 0.01 level (2-tailed).	

Table 8: Regression Analysis and Relative Importance of Service Quality Factor

Order of importance		Un standardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
	(Constant)	0.182	0.036		5.071	0.000
1	Convenience	0.183	0.011	0.243	17.373	0.000
5	Reliability	0.133	0.010	0.172	12.973	0.000
4	Responsiveness	0.123	0.010	0.186	11.877	0.000
3	Assurance	0.151	0.011	0.202	13.693	0.000
6	Empathy	0.100	0.008	0.168	12.557	0.000
7	Tangibles	0.117	0.010	0.131	11.261	0.000
2	Network quality	0.137	0.006	0.218	21.710	0.000
	Dependent Variable: overall Service Quality					

Table 9: Result of Regression Analysis Model Summary

Model	R	R Square	Adjusted	Std. Error of
1	.994[a]	.989	.988	.05959

a. Predictors: (Constant), networkquality, Assurance, reliability, tangibles, Empathy, convenience, responsiveness

ANOVA[b]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	42.901	7	6.129	1725.826	.000[a]
	Residual	.487	137	.004		
	Total	43.388	144			

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> **Achievement**
>
> The sight of an achievement is the greatest gift a human being could offer others.
>
> **– Ayn Rand**

Shantha Biotechnics: Believing in a Dream

Dr Vipin Gupta

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It was May 27, 2010. Varaprasad Reddy Koduru (Varaprasad) was reflecting on an invitation from India's Ministry of Health. Varaprasad had started Shantha Biotechnics (Shantha Bio) 17 years. back, and was revered as the harbinger of Indian high-end biotechnology industry. He was credited with getting Hyderabad the label of the Genome Valley or the biotech hub of India. He had inspired a new generation of biotech enthusiasts with revolutionary indigenous development of a Hepatitis-B vaccination – Shanvac-B. That vaccine had been distributed by the UNICEF to millions of children around the world for 1/40th of the price charged by the Western multinational corporations (MNCs). **"In the US, Hepatitis-B vaccine costs $100 a dose. Shantha Biotech has brought it down to Rs.34 per dose. This is Gandhian Engineering in action and Dr. Reddy is indeed worth emulating," says Dr. RA Mashelkar,** CSIR Bhatnagar Fellow & President, Global Research Alliance. Reacting to this magnificent accolade, he says, "I just wanted to do something for my country". Varaprasad had received more than 150+ awards for the vaccine, which showed the possibility of making affordable preventive care vaccines, with limited investments, using an innovative recombinant technology. Though Shantha Bio's portfolio had expanded to include the development of generic biologicals, novel therapeutic antibodies, proteins and vaccines, Shanvac-B constituted nearly 90% of its revenues until last year. Because of Varaprasad's pioneering efforts, India was now being counted as the most promising emerging market for the biotech industry.

A tall, handsome man with a graciousness that belies the single-minded focus and conviction, Varaprasad's mission was to provide quality affordable healthcare to the world's impoverished population – a thought that he had imbibed from his mother. He had faced serious challenges associated with single-handedly founding a new industry, deemed as high-tech and cutting edge even in the industrialized markets. Funding had been tough and venture capitalists were not willing to take the risk. The market had been under-developed, and required creating mass awareness amongst largely illiterate and poor people about preventive healthcare. Securing collaborations with the United Nations, non-profit organizations, government organizations, and private companies with marketing resources and networks required time. There were also questions about the bioethics of using illiterate subjects for vaccine trials, and about the public policy prudence of the emerging market governments investing their limited resources in further expansion of universal preventive immunization programs. Marketing opportunities in the industrialized markets had significant barriers to entry from tough regulations and costly distribution networks.

Just a year earlier, France's largest and world's 4th pharma major, Sanofi-Aventis, had acquired an 80% stake that another French family business Merieux Alliance held in Shantha Bio. The acquisition valued Shantha Bio at unexpectedly large amount, after a private bidding war with GlaxoSmithKline. Sanofi finally won the deal by reaffirming its commitment to Varaprasad's public health mission of providing affordable drugs. It planned to develop Shantha Bio into a global R&D hub, and to expand in India and in other emerging markets.

During 2008-10, with seven major and several minor acquisitions of Indian firms, the foreign pharma MNCs had increased their share of India's $9.5 billion retail drug market to 25%. Many MNCs had set up outsourcing contracts in India. India's advantage included trained English-speaking physicians, diversity of diseases, large patient base, and development and manufacturing

costs that were 60% less than in the US. With US$2.58 billion of revenues in fiscal 2008, India held a 2% share of the global biotech industry. Still, the growth of the nascent Indian biotechnology industry, with about 400 firms, was down to 20% annually, compared to 30% in the past due to lack of funds.

The media in India was worried that the sell-out of Indian biotechnology firms to foreign MNCs could prove disastrous for India. Drug prices in India were among the lowest in the world. The analysts worried that the MNCs will soon dominate the Indian biotech market, and raise the prices, making drugs out of reach of the hundreds of millions at the bottom of pyramid. Alarmed, on May 27, 2010, the Ministry of Health invited the heads of domestic biotech and pharma companies for an emergency meeting to discuss why there were an increasing number of Indian producers selling out to foreign interests.

Varaprasad wondered if he should he not be concerned about Sanofi asking for increased prices for its drugs. How could Sanofi's stake be leveraged to bring about the greatest benefits to Shantha Bio and to India? What should the government of India do to help Indian biotech firms maintain their independence?

Homespun Scientist: 1948

Varaprasad, born in 1948, hailed from an agriculture family in Papireddypalem Village, Nellore District, Andhra Pradesh. He was the only child and was brought up by his maternal uncle. He considers his mother - Shantha - his first guru. His father had just a primary school education, and his mother had gone only to a secondary school. He was the first to graduate in his extended family.

After completing his Bachelors in Science from Sri Venkateswara University in 1967, Varaprasad – an avid reader – wished to pursue literature. But Varaprasad's maternal uncle felt that the nation required engineers, and persuaded Varaprasad to join the engineering program in electronics and communication from Andhra University. A decade later, he studied at Biblingen University, West Germany for eight months in Automatic Quality Testing Systems.

In 1972, Varaprasad joined the Defense Electronics Research Lab (DLRL) as a Research Scientist in Electronic Counter Counter Measures. His specialization was in radar jammer controls. During his 5-year tenure there, Varaprasad has demonstrated his confidence in indigenous technology. He could achieve integration between radars of different makes. The process would have cost $8.5 millions to the exchequer but Varaprasad did it at a fraction of the cost.. In recognition of his talent he was awarded Tamra patra (Bronze Medal) but his innovation was published in some other's name. Frustrated, Varaprasad left the job.

Uncomfortable Bureaucrat: 1977

It took only a few weeks for Varaprasad to be appointed as a Deputy Manager in the technical department of the Andhra Pradesh Industrial Development Corporation (APIDC). His job was to assist small and medium scale enterprises in product development and quality assurance. Most entrepreneurs he met were not interested in product design, and were not even interested in quality. So, Varaprasad asked the CEO Ram K Vepa to transfer him to the Headquarters to look after the promotion of electronics industry.

Varaprasad then joined the part-time MBA program at Osmania University with a desire to learn more about balance sheets, and finished the program in 1980. With management skills on hand, he saw through the (mal) practice of maintaining different balance sheets by entrepreneurs. He became frustrated with the system and started looking out for an opportunity to get out of it and become entrepreneur himself.

It was at this time that Varaprasad came in contact with a professor at the Administrative Staff College of India at Hyderabad, and a visiting faculty at New York University. He had an MBA from MIT and a doctorate in international business from Columbia University. Varaprasad felt stimulated by him and noted "As a visionary, he could see what was going to happen 20 years down – in terms of technological changes and acceptability of the society. He wrote three books visualizing the future trends."

Enthusiastic Entrepreneur: 1985

The professor had founded a small scale enterprise producing industrial batteries. Over its history, the maximum revenues had been Rs.1.7 million, and that was in 1978-80. Since then, the equity had been wiped out. He had limited interest and time for business, and was looking for a managing partner. Varaprasad was a perfect implementer and adept at developing harmony with people without creating turbulence in the environment. They complemented each other.

Using financial support from his father and some loans, Varaprasad began developing the firm by implementing the ideas of the professor. They focused on quality and built excellent facilities. In 1986, the duo promoted Indo-Swedish venture, for the development and production of high tech batteries for Defense applications like submarines and MIG aircrafts. In the first year itself, the revenues touched Rs.50 million in 1985, and by 1990 had grown to Rs.500 million, and employee base to 780. In those six years, the company got several awards for its performance and exports.

Though the business was growing, the bonhomie between the partners was waning. One momentous day in 1991, the professor wrote up a memo to the Board, stating that Varaprasad wrote to him that admitting that he had wasted a lot of money and be pardoned for all his misdeeds; and as repentance he would surrender all his shares and property to the professor and walk out of company to do spiritual cleansing. Varaprasad was not even allowed to sell his stock, on the plea that it would destabilize the management of the company. The market value of Varaprasad's stock was about Rs.15 million. Each stock was valued at Rs.74, but the professor demanded its transfer in his name at par at Rs.10. Varaprasad offered to give his stock for as low as Rs.50, but he refused and filed a lawsuit. The legal fight lingered on for several years, when the court eventually decided in Varaprasad's favor.

The Insult and the Initiative: 1991

Varaprasad felt totally devastated. He would cry like a child into the night, as his mother and wife consoled him and strived to rebuild his self-confidence. Unable to come to terms with this sense of betrayal, Varaprasad started to look for peace. Varaprasad described his condition in terms of the Sanskrit word "Mahabinishkramanam" (to walk away barefoot without anything on hand). To recover and to start his life afresh, Varaprasad went to the US looking for opportunities. During his stay with his cousin at Cincinnati, on his suggestion, he accompanied his cousin to Geneva, where his cousin had been invited to present a paper at a conference conducted by the World Health Organization on Global Impact of Immunization.

At Geneva, attendees from western countries expressed a feeling that India and other developing nations did not have the commitment to provide vaccination to their children and accused that they came with a begging bowl to them for subsidized vaccinations. Varaprasad found it insulting and derogatory. He heard for the first time about the mandate of the World Health Organization to incorporate Hepatitis-B into the immunization schedule, and that India and other developing nations were not able to do so because of a serious foreign exchange shortage and high cost of vaccine.

Varaprasad called his family doctor in Hyderabad, who informed him that the Hepatitis-B vaccination was very expensive, and was only for rich and for those with connections. For immunization three doses were needed, and a family of four members needed Rs.10,000 for vaccination. Even if one member of the family was already affected with the disease, the cost of the treatment would be whopping, very few families in the nation could afford.

Varaprasad made up his mind to start the Hepatitis-B vaccination project, because one of the delegates at WHO program was repeatedly telling that "Indians were beggars begging for vaccines." He asked his cousin to find out about the technology, and found that only three companies in the world were making the vaccine first introduced to the world by SmithKline Beecham in 1987.

They then went to a pioneering genetic engineering company in California. There, after a tedious wait for 90 minutes, he was advised by an executive, "In India,

you do not need this expensive vaccination. India has enough people and death of a few hardly makes a difference." When Varaprasad persisted, the executive said the Hepatitis-B vaccination technology became commercial only in 1988, and India will not be able to afford it. Even before Varaprasad could say anything, he added that the technology would cost $100 million, and challenged that Indian scientists will not be able to even absorb its complex technology for at least two decades. With that the meeting ended. Varaprasad was very angry – he vowed that they would come out with a better vaccine within two years, leave aside two decades.

Varaprasad decided to go to New Jersey to meet another cousin and sought his help to prove that Indians were capable of producing high quality vaccines and offering them at affordable prices to the masses. The cousin called all his friends, and got 35-40 families into a meeting hall. After two days, when they realized Varaprasad was not giving up, they decided to do something to help. But they did not know the technology and said so. Varaprasad passionately and emotionally appealed that since some of them were scientists and knew the techniques; they could meet experts in different spheres, hire and train graduates, evolve the techniques, and finally put them together to develop the technology. The idea was highly risky – the time frame was unknown, fund requirement unknown, and even the outcome was unknown. Varaprasad said all he required was their support with the techniques. He knew the other ingredient – technology management – i.e. how to manage people and how to properly sequence them to get the product based on his previous R&D experience. He challenged them to give something back to their country. His friends agreed to pool together Rs.12 million to support his noble mission.

Search for Funding: 1992

In 1992, Varaprasad promoted Shantha Bio as a privately held company – named after his mother Shantha. The goal was to develop recombinant based vaccines and therapeutic proteins for human health care. The mission was to produce cost-effective drugs to reach the common man at an affordable price while meeting international quality standards. He asked his father to sell off some of his property, wary that he might not agree. But to his surprise his father readily agreed and so the initial seed investment was raised and then he impressed Dr. Malla Reddy, Vice Chancellor of the Hyderabad-based Osmania University to allow him to use the University microlab for research under the industry-university interactive program. Years later Malla Reddy would say "I agreed only because of Varaprasad's enthusiasm and sincere efforts." Varaprasad recruited Dr. Gita, a senior scientist in the department, to work as the lead on the project at this microlab. Dr. Guntaka Rami Reddy, a brilliant microbiologist in the US, offered his lab to work on developing the technology. In two years, Dr. Gita perfected the technology at the US lab, but their lab facility usage at Osmania University was withdrawn though Varaprasad spent quite a money on to upgrade it. Dr. Guntaka referred Varaprasad to Hyderabad-based Center for Cellular and Molecular Biology (CCMB) to start animal tests. CCMB had been founded in 1977 as a constituent national laboratory of the Council of Scientific and Industrial Research (CSIR), the premier multidisciplinary Research & Development organization of the Government of India.

In the interim, no bank or venture capitalist was willing to fund the fledgling project. First, the venture capital industry was under-developed in India, and biotechnology was in nascent stage. Second, even though 45 million Indians were affected by Hepatitis-B, mortality data showed only 80,000 deaths and there was limited use of vaccines because of a lack of awareness. The investors thought that it was too small a number to make the venture viable. Third, the investors wondered how Varaprasad with his electronics background could succeed in a life-sciences project. Even in the West, Hepatitis-B vaccination project was a frontier technology, and required fifteen years to develop. The financiers were concerned about how many years Varaprasad would take, how could he develop, and how could he assure returns on the investment.

One Government of India financial institution, Industrial Development Bank of India (IDBI), did agree to provide the funding, but expected a return of 80%. Varaprasad asked for a rationale, and was told that out of every

100 projects supported, only 1 project would be the jackpot, and the remaining would fail. So, each project was expected to compensate for the other 99 projects. Varaprasad felt this rationale was not fair, and decided not to go for those funds.

Varaprasad continued to look for every possible source of funding. Finally, in 1994, he met Khalil Ahmed, the healthcare investment representative for H.E. Yusuf Alawi Abdullah, the foreign minister of the Sultanate of Oman. Abdullah and his associates offered to invest but demanded a matching equity share of 50%. Abdullah said they would not interfere or participate in the management, will not guide him in any manner; will not expect any guidance from him, but wanted to maintain their status and have an equal equity share. They showed full faith in Varaprasad's philosophy of offering the vaccination at an affordable cost. Abdullah also arranged long term loans from Oman International Bank at low rates of interest. Abdullah sensed that "Varaprasad was a man in a hurry. He would go ahead with nothing in hand."

Varaprasad obtained Rs.6.5 million of loans from his cousins and friends, and sold some of his property for Rs.2.3 million, for his own share of the equity, as he was unable to secure any external funds. After that, another Government of India institution – ICICI – agreed to offer a loan for technology development. When the R&D results were viable for commercialization of the product, the newly established Technology Development Board (TDB), under the Ministry of Science & Technology offered a loan of Rs.50 million.

Actualizing the Dream: 1997

Varaprasad now was able to invest in a state-of-the-art R&D facility, largest in India, devoted exclusively to biotechnology-base healthcare products. He formed collaborations for research with reputed academic institutes like CCMB (Hyderabad) IISc (Bangalore), JNU (New Delhi), Anna University (Chennai), Bhabha Atomic Research Centre (Mumbai) and NII (Delhi). His goal was to make Hepatitis-B available at 10% of the cost – Rs.70 per dose, as against Rs.780 charged by SKB.The figure was kept low as most of the Indians were getting free vaccination from the government. Paying for vaccine was unknown phenomenon for Indian poor. Varaprasad did not use any rational approach of estimating the project cost or evaluating the process.

In 1997, Shantha Bio successfully developed India's first genetically engineered product "SHANVAC-B", vaccine against Hepatitis-B virus after five years of intense research. India joined the select club of four countries in the world to have the know-how to make a genetically engineered Hep-B vaccine. When Varaprasad approached the founder of a leading pharmaceutical company in India, to market his Hepatitis-B vaccination, he suggested that the drug be priced at the market price of Rs.780, as he was uncomfortable with low-cost product since it does not leave scope for margins and incentives to doctors. Varaprasad was committed to price at Rs.70, and decided to go on his own. Varaprasad felt that in order to truly make a difference and realize his dream of serving the greatest good to the underprivileged and poor of this country, profit maximization cannot be an objective at a time of severe Hepatitis-B vaccine shortage in India.

Varaprasad began directly marketing Hepatitis-B vaccination through his own field force. SmithKline Beecham, who held the monopoly in the Indian market, responded by crashing its own price, increasing the incentives to doctors and spreading the rumor that Shanvac-B vaccine was unsafe. Varaprasad took the matter up with the Drug control Authority to conduct a comparison test, which showed that Shanvac was at par and in some parameters better than the SmithKline Beecham product. The results were published in an internationally respected journal "Vaccine" and 200 doctors rallied to support Shanvac-B. Taking distribution expenses and doctors' margin into consideration, Shanvac-B was marketed at Rs.180. Varaprasad reached out to the Indian Medical Association to give lectures and organize camps and committed to offer Shanvac-B for Rs.100 (adult) Rs.50 (child) for mass public vaccination through the Government of India. He even gave away 10% of the production free for orphan children through the Ramakrishna Mission. NGOs and Rotary Clubs also joined in the campaign to help create mass awareness

and conducted mass vaccination camps on never-before scale using Shanvac-B. Pharma associations protested for bypassing market chain system but there was no looking back for Varaprasad. Thanks to these camps, where children were vaccinated at Rs.50 including cost of syringe and inoculation, the consumption has gone up many folds.

Varaprasad mainly harped on 'Swadeshi' (indigenous) theme and it paid rich dividends. Shanvac-B became one of the fastest growing brands in the Indian pharma industry, securing a 46% of market share in Hepatitis-B vaccinations by 2001. Until 1997, India was totally dependent on an expensive imported vaccine, and Shanvac-B offered an affordable home-grown solution. Within three years, Shantha Bio's success attracted four new Indian companies to launch their competing Hepatitis-B vaccine.SmithKline Beecham's share in India for r-DNA Hepatitis-B vaccine fell from 100% in 1997 to just 10% in 2000.As a first mover,Shantha Bio garnered sales of Rs.240 million in 18 months, and of Rs.320 million in fiscal 1999-2000. Over 1998-2000,Varaprasad received 47 awards.This included the first-ever National Technology award received from the Prime Minister in May 1999 for commercialization of home-grown technologies. In 2000, Ernst & Young bestowed 'Entrepreneur of the Year' Award on him for his contributions to the field of life sciences. Every product coming from Shantha stable won some or the other award.

Varaprasad was reinvesting 25% of revenues back into R&D – the highest of any company in the country. In India, R&D average was only 0.1 to 0.2%, and in the US, most major companies put only 4-5% into R&D. Still, Varaprasad needed more funds to tap new opportunities and be ahead of the competition.

In 2000, Varaprasad decided to list 30% of Shantha Bio with the NASDAQ stock exchange in the US – but had to abandon that plan due to unfavorable market conditions. In September 2000, Varaprasad divested 6.9% of the company's equity from his stake to a mutual fund owned by Morgan Stanley Dean Witter (3.9%) and to State Bank of India (3%), in a private equity placement worth Rs.500 million.The divestment valued the company at Rs.7.5 billion – 50 times its historical earnings and 22 times its historic sales. The proceeds provided working capital cash, and also financed the Rs.600 million manufacturing facility. Varaprasad also retained ABN Amro Asia Corporate Finance to divest another 26% stake to a strategic investor. Though more than 20 companies showed their interest, a deal could not be finalized.

To increase Shantha Bio's profile in the US for a future listing, Varaprasad was connected with the US-based East-West laboratories. East West Labs held an exclusive global license for TB94, a complete human monoclonal antibody for the treatment of small-cell lung cancer.The market value for the product was estimated at $1 billion. Shantha Bio agreed to make a phased investment of $9 million in a 51% joint venture named Shantha West. Ghassal Shekhar, an NRI investor took 40%, while another nine% was taken by two other investors.

In September 2000, Pfizer paid Rs.60 million for exclusive rights to co-market Shanvac-B under the brand name Hepashield in India and overseas. Pfizer had been courting Shantha Bio since 1997. Varaprasad was not keen because of his bitter experiences with some of the multinationals, but eventually gave in to Pfizer persistence and commitment to India after Pfizer also agreed to subcontract some of its R&D to Shantha Bio. Within six months of the agreement, Hepashield emerged as the No. 2 selling brand among over 700 brands launched by various pharma companies worldwide. In April 2001, Pfizer paid an additional amount to obtain the first refusal rights for exclusively marketing the future stream of Shantha Bio's products.

In 2002,Varaprasad received Rs.180 million in loans from Export Import Bank of India and Rs.90 million in loans from Technology Development Board for setting up a manufacturing facility for four-in-one combo vaccination -Shantetra – for hepatitis B and DPT (Diphtheria,Pertussis and Tetanus). Internal accruals financed the rest of the Rs.400 million investments. The facility, compliant with the international Good Manufacturing Practices, was slated to open in September 2004.Varaprasad expected to lead a shift of the Indian bio tech towards combo drugs, as they allowed for an easier immunization for the government and for the children, and supported

greater margins through R&D. A dose of DPT vaccine was priced at 10 cents (Rs.4.40), and a dose of Hepatitis B at 27 cents (Rs.11.88). Varaprasad intended to price Shantetra – the first indigenously developed combo vaccine in India – at $1.75 (Rs.80) initially, and bring that to 87 cents (Rs.38.28) within two years. Only GlaxoSmithKline and Chiron offered this four-in-one combo, priced at Rs.225 per dose. Varaprasad intended to capture a 20% share of the 390 million combo doses required annually globally.

In April 2002, Shantha Bio launched the first indigenous Interferon Alpha (brand: Shanferon) for the treatment of cancer and viral hepatitis. Interferon was priced at Rs.300 / dose, against the import price of Rs.1800. The annual cost of Interferon for the patient fell from Rs.750,000 to Rs.150,000.

Keeping pace with the growing competition, Shanvac-B prices were reduced to Rs.25 by 2003. Profit margins fell gradually from 20-25% at the time of launch. However, turnover stagnated over 2000-2003, and was only Rs.340 million in 2003. Shantha Bio was denied a major opportunity to deliver Shanvac-B to UNICEF for worldwide distribution, under the Global Alliance for Vaccine and Immunization program of the Bill & Melinda Gates Foundation. Andhra Pradesh State government refused to recommend Shanvac-B for the program, launched in 2000, because of a controversy surrounding another local rival Hepatitis-B drug maker. The issue was resolved only in 2003, paving way for the World Health Organization to pre-qualify both Shanvac-B and Shanferon for a long-term UNICEF contract for low cost drugs. Shanvac-B happens to be the first vaccine to obtain WHO pre-qualification. The results immediately impacted the top line: in fiscal 2004, sales almost doubled to Rs.650 million, of which exports were Rs.550 million. In 2004, Morgan Stanley Dean Witter offloaded its 3.9% stake taking the revived growth as an exit opportunity to the US-based non-resident Indians, and Varaprasad was also forced to offload an additional 6.1% of his stake to them to generate resources. However, Varaprasad was able to tie up with the US-based Spectrum Pharmaceuticals who agreed to take care of all regulatory, marketing and distribution issues for marketing Shanvac-B and Shanferon in the US.

Shantha Bio at a Crossroads: 2005

In 2005, Varaprasad was conferred the third highest civilian honor – Padma Bhushan – by the Government of India. Three drugs were launched within a span of 12 months. First, in October 2004, Shankinase brand of life-saving drug for acute heart attacks, and to help dissolve blood clots was launched. Varaprasad targeted a 10% share in the first year of the Rs.400 million domestic market, pricing the drug at less than half the Rs.2400 cost of the imported drug. Shankinase launch was delayed by a year, because of bio-ethic controversy surrounding the death of 3 of the 96 patients on which had been tested. Second, in January 2005, "Shanpoietin" brand of pre-filled syringes – developed over a five year period with a R&D of Rs.200 million – were launched for treating anemia and renal failure. At the time, India was importing 70% of the Rs.750 million demand. Third, in October 2005, the 4-in-1 combo drug Shantetra was launched, delayed by a year because of resource issues. In the interim, the new factory opened in September 2004 was used for making the DPT vaccine. Critics questioned the benefits of government paying for a combo drug, when the DPT and Hepatitis-B vaccinations separately cost much lower. Therefore, Shantetra remained excluded from the national immunization program.

The global demand for Shanvac-B through UNICEF remained strong, and with other new vaccines, Shantha Bio generated sales of Rs.1 billion in fiscal 2005. In fiscal 2005, the Indian bio tech market was worth $1 billion, growing @ 30% annually – double the global rate. As of March 2005, Shantha Bio's cumulative investment was Rs.1.50 billion – Rs.650 million in equity and premium, Rs.300 million in loans, and Rs.550 million in internal accruals. Of this, Rs.650 million was invested in the manufacturing facility and Rs.850 million in R&D. Its cumulative sales were Rs.1840 million. It had 650 employees, of which 125 in R&D. Shantha Bio had brought down the global prices of Hepatitis-B vaccine by 40 times and raised the global consumption by 500 times since Shanvac-B launch. Shantha Bio now supplied 40% of the UNICEF's worldwide distribution of this vaccine, impacting the health and lives of millions of children.

From a business standpoint, Shantha Bio had only five drugs on market till date since its founding in 1993, with only one truly winning product Shanvac-B that accounted for 91% of its revenues (see Table 1). Further, Shantha Bio had a direct presence in only 14 nations, with no presence in Western Europe. Shantha Bio feared falling behind its local rivals, who had roped in big global firms as strategic partners and investors. Shantha Bio had a potential to launch 2-3 products every year, subject to funding and global marketing access - the number of companies globally producing vaccines had fallen from 26 in 1967 to 4 in 2005, so opportunities were immense. Due to limited marketing resources, Shantha Bio was able to utilize only 38.31%of its installed capacity of 200 million doses in fiscal 2005.

Table 1: Shantha Bio's Idle Capacity and Hepatitis-B dependence

	Total Capacity Utilization	% of Revenue Contributed by Hepatitis-B Vaccine
Fiscal 2002	21.77%	92.57%
Fiscal 2003	46.78%	91.46%
Fiscal 2004	23.64%	91.36%
Fiscal 2005	38.31%	91.81%

Shantha Bio – just like the other Indian biotech companies – was at a crossroads. While it had demonstrated competence, the political and financial commitment required from the government and the market had not been forthcoming. As of January 1, 2006, India adopted the product patent regime, in conformity with World Trade Organization's intellectual property rights agreement. The new regime ended the ability of the Indian firms to reverse-engineer patented drugs till their patent was in existence. Therefore, to stay alive, there was a growing pressure on the Indian generic drug makers to refocus towards the developed country diseases, using the contract research work for the Western MNCs. Varaprasad had been able to avoid this pressure in the past through partnerships with public and private organizations in India and abroad, and by securing project-specific financing from government agencies. But now his partner investors wanted to cash in on their investment.

French Strategic Investor on-board: 2006

In November 2006, the Oman-based investors and the US-based NRIs then sold off their joint 60% stake to a 113-yeaRs.old Lyon-based French family business - Merieux Alliance, for $110 million. Varaprasad was pressured to sell an additional 20% of his stake in exchange for Merieux infusing cash into Shantha Bio. That left 17.1% still with Varaprasad, and 3% with the State Bank of India.

Merieux appointed one of its directors, Georges Hibon, as the chairman of Shantha Bio. Merieux – with $1.8 billion of revenues – was known for using biology in therapeutic (curative) drugs, and straddled the entire chain from diagnostics to immunotherapy. It was facing stiff global competition, in the maturing global therapeutics market, and was searching for a low-cost research and manufacturing hub in Asia to cut those costs by 20-30%. Shantha Bio would become its global hub for the preventive vaccine business, as the global vaccine development industry was projected to more than double to $24 billion by 2010. The surging demand for new generation vaccines, such as Anthrax and flu, would allow Merieux to expand vaccine business in the Western markets, and to further penetrate the emerging markets.

Benefit potential for Shantha Bio was immense. First, Varaprasad hoped to generate "Rs.1 billion by doing R&D for group companies of Merieux over the next three years." Merieux invested Rs.1300 million in a new R&D center at Shantha Bio to strengthen research activities and accelerate the development of product portfolio. Second, to tap the contract manufacturing opportunity, Merieux committed to invest $250 million in expanding the manufacturing capacity. Third, Merieux committed to enable access to the global markets. Varaprasad noted, "We will work as partners to increase our growth rate, reduce time to market, while maintaining high quality standards. We share a vision of the need for affordable healthcare for all." Fourth, Varaprasad was keen to use the alliance as an opportunity for Shantha Bio to make a foray into the therapeutics market by developing clinical diagnostic equipment. The global diagnostics market was estimated at $80 billion, and

the Indian market at $250 million. Though, Merieux was non-committal initially, it agreed to invest $250 million into a new diagnostic equipment facility at a biotech park set up by the State government at Medak district.

Within five months, in May 2007, the new high-speed vaccine fill and finish facility was commissioned. The facility had 3 filling lines - a High speed vial filling line, Uniject filling line and Glass pre-fill syringe line. The facility would formulate and blend Shanvac-B and Shantetra, and other to-be-launched vaccines. The facility expanded the vaccine filling capacity from 100,000 vials per day to 350,000 vials per day. Pre-qualification was secured from WHO for Shentetra, opening new opportunities for its exports through UNICEF. Shantha Bio had increased its direct marketing presence to 35 nations, and was now looking to expand that to 50 nations.

In 2007, Shantha Bio formed an alliance with the global nonprofit health organization, PATH, to develop an affordable vaccine for rotavirus - which causes infant diarrhea. Bill & Melinda Gates Foundation offered the funding. Clinical trials began in 2008, and launch was slated for 2012. Increased R&D funding also allowed clinical trials for the Shantha West anti-bodies for treating lung cancer to begin in 2008.

In fiscal 2006, Shantha Bio enjoyed a turnover of Rs.1.48 billion, and grew to Rs.2.05 billion in fiscal 2007, and then to Rs.4 billion in fiscal 2008, with 700 employees, and 95% revenues from exports. The Indian biotech industry revenues were $1.5 billion, $2.1 billion, and $2.5 billion respectively, of which 56% were exports. The industry was still young, and was referred to as "baby elephant" with considerable space to grow. Though the top three firms – Serum Institute, Biocon, and Panacea Biotech – held a 27% share of the industry revenues, the rest of the industry was highly fragmented. A significant transformation of the industry was expected, as the international pharma MNCs were beginning to shift their strategies.

Historically, the international pharma MNCs focused their marketing strategies on the industrialized markets, and charged very high prices. However, with global financial meltdown in 2008 and 2009, the industrialized economies were slowing down. There was a growing pressure to cut healthcare costs, by reducing the drug prices. Additional pressures existed to offer discounted drugs for the public health systems in the emerging markets, as the attitudes globally had shifted to recognizing the value of healthcare in these markets also. To top it all, the pipeline of innovative drugs was drying up, and within next decade, 90% of the pharma revenues were expected to be from off-patent drugs. In contrast, the healthcare markets in the emerging markets were growing by double-digit, and the rural markets were seeing even faster growth. The emerging market biosimilar (generic) drug makers had excellent R&D teams and state-of-art manufacturing facilities that could be platform for growth in both industrialized as well as emerging markets, and had marketing networks extending into the fast growing rural markets. Therefore, the race to acquire emerging market generic drug makers had intensified among the international pharma MNCs. The race was heating up particularly in India, where the low prices of drugs made it nearly impossible for the MNCs to penetrate Indian urban and rural market with their high cost international technologies and assets.

A Replacement Strategic Investor in 2009

By early 2009, Merieux Alliance concluded that under its own corporate umbrella, Shantha Bio was valued at Rs.10-12 billion. That value was estimated to be much higher for a pharma MNC looking to integrate its own preventive medicine assets. As Merieux Alliance searched for prospective investors, GlaxoSmithKline Pharmaceuticals, the most affected by the development of Indian biotech industry, emerged as frontrunner. Varaprasad was alarmed enough to inform Merieux "that whoever comes, if the name of the company or its philosophy is changed, I'd exit."

In an interview, Varaprasad gave deeper insights into his philosophy that he expected any potential partner to share. Varaprasad had set up Shantha Bio to offer affordable healthcare to each and every Indian. Varaprasad credited his career path and realizations to his mother's aspirations, who wanted him to do something good for the people. He always took care of the needs of the poor when fixing the profit margins

on his products. He observed "I acted up on the great provocation, not on the great vision. I did several strategic mistakes in my life. But since I cared for the society, society, in turn, took care of me. I expect good intentioned people to carry on this torch of Societal Entrepreneurism."

In July 2009, France's biggest and world's fourth largest pharma firm, Sanofi-Aventis, agreed to buy out the 80% stake, valuing Shantha Biotech at an enormous Rs.38 billion/ $780 million.Sanofi already had 2870 employees in its existing operations in India, and had recently acquired three vaccine firms in Mexico (Laboratorios Kendrick), Brazil (Medley), and California (Bio Par Sciences). Shantha Biotech offered it an opportunity to aggressively expand its vaccine business in the emerging markets. Most importantly, Sanofi endorsed Varaprasad's public health mission and Shantha Bio's ongoing development as a platform to address the need for high quality affordable vaccines in international markets. They asked him to continue as Managing Director.

Varaprasad noted with pride, "It is very unusual that such a high valuation has come to an Indian company. Before my eyes Shantha has grown beyond my comprehension. This deal means that now Shantha can grow bigger. Being a manufacturer of affordable drugs and vaccines, the company operates on thin margins, hampering its ability to invest in R&D. Now we can do all that and more without compromising on our philosophy of providing affordable drugs to society." In addition to using Shantha Bio brand in other emerging markets, Sanofi-Aventis wanted to develop Shantha Bio into a global hub for R&D. Varaprasad added, "For new molecules, we need lots of money. Even if our research costs are about 20% of what they would be in the U.S., no bank in India will give money for R&D."

By early 2010, several more MNCs had acquired Indian bio tech firms, raising the MNC share of India's bio tech market to 25%. Both media as well as Ministry of Health were alarmed about the possibility of the MNCs raising the drug prices in India, after eliminating local competitors. Varaprasad felt that the lack of funds and lack of supportive government policy made it essential for him to seek foreign investment. He also believed that Sanofi-Aventis complemented his mission through its global vision. Varaprasad considered his major weakness to be his inability to convince the successive governments the need to support indigenous endeavors and to promote R&D. He did have a strong urge to do something for the people, and knew that it will transform into concrete action. Unlike the Western pharma companies that maintained 100% margins to cover the high costs of drug discovery, he had kept the margins to no more than 10%. Varaprasad longed for India to walk back into glorious past, when India was renowned for its innovative technologies, by creating several generations of technologies. His aim was India should not get technologies from the West, and instead should create own technologies, and offer those technologies to the West. Varaprasad believed that India had a vast pool of talented people who can develop the latest technology available in the world. He wanted Shantha Research Foundation to grow. He wanted to provide contract research and contract manufacturing services, and develop collaborative arrangements for the co-development of new drugs or molecules.

At his heart, Varaprasad was a family man. His office desk had photographs of his mother, his wife Vasantha, two daughters Sangeeta and Sravanthi, and four grandchildren. One thing Varaprasad never misses an opportunity to enjoy his first love – music. He has great sense of humor too. And he published magazine and currently runs "Haasam Publications" and "Haasam Clubs" to promote music and humor. Varaprasad's managerial skills lay in identifying the right kind of person with good attitude, with a passion to do something for the society. He was not looking for the graduates of Indian Institute of Managements – the elite business schools of India. He did not look around for great scientists; instead he sought great human beings, with noble thinking. He created a congenial atmosphere for the people to perform with their mind as well as heart, and a passion to do something new. The employees would not say that they were working for Varaprasad or for Shantha Bio – instead they would say they are working for themselves, as members of Shantha Bio family. Varaprasad never acted like a boss to his employees – he felt "My presence is insignificant

there; whether or not I am there, they will do their work." He believed management was more of an art, than science. Management had to be adapted to the context depending upon the intention (bhava), the expression (raga), situation (sandharbham) and its importance, the poet's heart (kavi hridayam) behind it and his/her chamatkara (communication skill).

He is a firm believer in the "Gayatri Mantra" – a Hindu spiritual chanting, which, he says, gives him inspiration and moral strength. He followed the principle that "Let noble thoughts pass through, and everything will fall in your way." The secret of shantha, Varaprasad felt, was in a noble intention which helped his enterprise more than his managerial skills or capabilities. Name, fame, and money followed as by-products. But talk about success and he retorts "I have not been successful. I will not feel like I have succeeded until the Government of India launches a mass immunization program for children using low-cost vaccines. That has always been my goal."

A true reflection of the man who emerged, because of his straightforwardness, transparency, humility and amiability, as a role model and an inspiration for the budding bio-techs, who he advises, "Believe in your vision; do not lose sight of society and never give up on your dream fearing hurdles."

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Dhruva Consulting Group (DCG) is an eclectic mix of Industry and Academia which undertakes consulting projects far and wide. Global Leadership and Organizational Behavior Effectiveness (GLOBE) is a multi-phase, multi-method research project in which investigators spanning over 72 countries in the world are examining the inter-relationship between societal culture, organizational culture and organizational leadership. This project is envisaged by Robert J House of Wharton School along with Dr. Vipin Gupta. DCG has been retained as the sole Principal co-investigator for the state of Andhra Pradesh, India. DCG has managed the daunting task of profiling the case studies of about top 50 CEOs of Andhra Pradesh. DHRUVA retains the right over these case studies including that of Shantha Biotechnics. DHRUVA eventually will publish these GLOBE case studies under the title - "Models of Organizational Excellence in AP".

> **Dreaming the seemingly impossible**
>
> We must not be afraid of dreaming the seemingly impossible if we want the seemingly impossible to become a reality.
>
> **– Vaclav Havel**

Bengal Chemicals: Successful Turnaround or Successful Transition?

Dr Subhadip Roy

Saurabh Bhattacharya

The problem of sick companies in India is an old one and the Government has tried to revive sick companies through various measures, but most of the sick companies remained sick, some even closed down. The following case is a typical scenario of turnaround strategy, to find out how a sick company can revive itself with planned restructuring and reinventing its various functions. The case is about Bengal Chemicals and Pharmaceuticals Limited (BCPL), one of the oldest companies in India, which in 1993 was declared as a 'sick unit' after being in a state of decline for over 40 years. In this case BCPL tried to use turnaround strategy to get its days of glory back. BCPL was suffering from a host of internal constraints, which in the post-BIFR recommendations period were removed by downsizing, quality control, joint ventures and technology up-gradation. In 2002 BCPL's working was reviewed and the tag of 'sickness' was removed. However, the financial results of BCPL mostly indicate a negative outcome until 2007.

Key Words: **Business Strategy, Sick Company, Turnaround, BCPL.**

BCPL Celebrates 150th Birth Anniversary of its Founder

The management of Bengal Chemicals and Pharmaceuticals Limited (BCPL) is happy to announce a revival of the golden era of the company. In the last fiscal of 2009-10 the company achieved a turnover of Rs 83 crores and set a target of Rs 150 crores in the current fiscal, which apparently coincides with the 150th birth anniversary of BCPL's founder Acharya PC Ray. BCPL, one of the oldest pharmaceutical companies in India, was declared a 'sick' unit in 1993 by Board for Industrial & Financial Reconstruction (BIFR). BIFR offered a 10-year Rs 440 crores package for BCPL's revival in 1995. By 2002 it was felt by both the company and BIFR that BCPL had made significant turnaround and could be declared to be free of industrial sickness. However, five years down the line, things were not looking rosy. The company's performance of late has made analysts skeptical of the turnaround strategies that have been used by BCPL at large.

Background

Bengal Chemicals and Pharmaceutical Works was the brainchild of Acharya Prafulla Chandra Ray, one of the most prolific scientists India has ever produced. During his education in the University of Edinburgh in the 1880s, he was impressed by the collaboration of science and industry in creating prosperity in Europe. Hence, soon after joining Presidency College as a professor in 1889, he conceived the idea of starting a chemical manufacturing concern. He contacted some of the medical stores in Calcutta and ascertained the drugs prescribed in the British Pharmacopoeia available in such stores. M/s BK Paul & Co. were the biggest in this line and its main Director, Mr Bhutnath Paul, assured Acharya Ray that he would patronize the drugs to be manufactured by Acharya Ray. After inspecting a few small factories, Acharya Ray realized the wretched condition in India in comparison with conditions in Europe. So he himself started experimenting in industrial chemistry. Success was achieved in obtaining pharmaceutical products

[1] BCPL's logo is given in Exhibit 1
[2] Definition of a sick unit is given in Exhibit 2
[3] BIFR's function is given in Exhibit 3

mentioned in British Pharmacopoeia.Shortly afterwards, in 1901, the Bengal Chemical started functioning in Maniktola Street in Calcutta, which became Bengal Chemicals and Pharmaceutical Works Limited in 1903.

The Progress

As the people of Bengal had great confidence in the integrity of Acharya PC Ray, when Bengal Chemical and Pharmaceutical Works Limited was created, there was no dearth of capital. The company soon became the first one of its kind in India to manufacture quality chemicals, drugs, pharmaceuticals and home utility products, employing indigenous technology, skills and raw materials. Notable Indians like Mahatma Gandhi, Pandit Jawaharlal Nehru, Netaji Subhas Chandra Bose, Dr Bidhan Chandra Ray to name a few, were associated with the company in some way or other. Bengal Chemical and Pharmaceutical Works Limited paved the way for industrial resurgence in the Chemicals and Pharmaceuticals sector during the 1920s and 1930s. Mr Probir Roy (Managing Director in 2007), a descendent of Acharya Ray, reminisces that in the early 1950s, the shares of Bengal Chemicals were traded for as high as Rs 700.

With the passage of time, the company expanded and diversified into a multi-product conglomerate. Some of its products became household names like Lamp Brand Phenol (a disinfectant), Aqua Ptychotis (an extract of ajwain, used a digestive medicine) and Cantharidine Hair Oil, which still enjoy the same position among the consumers till date. Today, BCPL has four factories in India; two in West Bengal (Kolkata and Panihati), one in Mumbai and one in Kanpur. It has sales outlets in 11 cities and a wide distribution network spanning outside India involving over 1500 distributors. The product range of the company can be divided into three broad divisions as[4]:

- Basic Industrial Chemicals
- Pharmaceuticals
- Consumer and Home Products

Within these divisions there are a lot of products like Bulk Drugs, Perfumeries, Toiletries, Hospital and Surgical Equipment, Sera, Vaccines and Fire Extinguishers among others.

The Decline of BCPL

However, in the 1960s the ownership of the company fell into the hands of another Bengali family whose mismanagement led to its downfall. Poor technology up-gradation was another factor behind its decline. The third factor which led to problems was a larger labor force than what was required. Thus the Central government took over the management of the company from 15 January 1977 and the company was nationalized in 1980. The new company was named Bengal Chemicals and Pharmaceuticals Limited and was incorporated as a PSU on 17 March 1981. However, nationalization could not save the company. The other four PSUs, viz., SSPL, HAL, BIL and IDPL, also encountered similar faith and were declared sick[5].

Beginning of Corrective Actions

In 1993, the BIFR formally declared BCPL sick and Industrial Reconstruction Bank of India (IRBI)[6] was appointed as the Operating Agency. On the basis of the IRBI report on the company, a revival package was approved by the BIFR on 4 April 1995 with the term of the package being 10 years.

While everyone had written BCPL off, the management of the company was not willing to give up so soon. Company executives at the core of the company formed a 'working group' to formulate policy decisions on downsizing of the workforce, venturing into new areas, and control of trade union (which is a very common feature in West Bengal). The company could achieve a consistent growth rate and net losses came down significantly. During 1995-96 the company sold its surplus land of 8 acres to the Coast Guard (Ministry of Defence) and raised Rs 15.68 crores. The sale proceeds were used to pay the outstanding debts of IRBI and the United Bank of India. A number of factors acting together were responsible for the turnaround of BCPL. Some of the chief factors are given below:

- **Downsizing:** Downsizing the workforce is not seen with a positive eye in West Bengal. However, that was necessary to bring BCPL back on track. The company reduced its workforce from around 2200 in 1986-87 to about 900 in the early 2000s and to 869 recently.

[4] A description about the product range of BCPL is given in Exhibit 4
[5] For a description of the Indian Drugs and Pharmaceuticals Industry refer to Exhibit V
[6] Now known as Industrial Investment Bank of India (IIBI)

- **Quality Control:** The Company increased its focus on quality of products and tuned up its manufacturing process to keep up with change. BCPL was the first company in Eastern India to receive the WHO-GMP (World Health Organization – Good Manufacturing Practices) certificate for manufacturing tablets and capsules. It also received ISO 9002 license for the same.
- **Newer Avenues:** With zeal to achieve a nearly impossible turnaround, BCPL was in search of newer avenues. This resulted in an international joint venture between BCPL and Evans Vanodine International PLC, Preston, UK. Evans, set up in 1919, is a vaccine and hygiene products manufacturer. BCPL and Evans entered into an MOU on 3 January 2003, where the former would manufacture and market the products of Evans Vanodine in the country and its neighbors for a period of five years. The latter would supply BCPL with its formulations and technical knowhow. BCPL would manufacture janitorial products and vaccines for cattle and poultry.
- **Up-gradation of Technology:** Realizing the need of IT enabled services in management BCPL decided to upgrade its technology status. The company evaluated various technology platforms and then selected Matrix Infosystems to implement an ERP (Enterprise Resource Planning) solution built on the MS Windows Server System. The eight-month-long first phase of the implementation process was done at the Maniktala Factory and Kolkata Head Office. The Mumbai and Kanpur offices were connected afterwards. The implementation had multiple benefits, such as availability of real time information, better decision making, planning and forecasting and quick and meaningful data analysis.

The Transition

On 4 October 2002, after being the aegis of BIFR for nearly eight years, there was a review meeting held by the Operating Agency in Kolkata to consider the Rehabilitation Scheme submitted by BCPL. The Central Government has conveyed its approval to BIFR in January 2002, to the relief and concessions sought by BCPL in the modified revised rehabilitation scheme. In the last hearing held on 14 January 2004, the BIFR approved certain modifications to the sanctioned scheme of 19 April 1995. The BIFR had concluded that future operations would generate surplus and BCPL would not depend on funds from any outside agency in near future.

The Company in the Beginning of 2007

Armed with a dedicated management, a focused vision, devoted workforce and a diversified product line BCPL was all set to revive its golden days once more. Since January 1996, after BIFR announced the relief package for BCPL, sales of the company steadily increased from Rs 26.12 crores in January 1996, to Rs 43.02 crores in January 2002. However, sales plummeted in January 2007 to Rs 50.99 crores in comparison to January 2006 when sales were 56.93 crores. Also, the profit after tax apart from two years (January 1997 and January 2003) has never in the positive zone signifying heavy losses to BCPL[7].

In terms of efficiency the 'Return on Capital Employed' (ROCE) of the company is also showing a marked decline since January 2001, when it was at its peak. Another measure of efficiency – 'Total Expenses to Sales' ratio – has shown a continuously low trend since January 1996. Similarly, 'Marketing Expenses to Sales' ratio also showed a somewhat constantly low trend over the period of January 1996 to January 2006. This again implies that the company was not able to extract benefits from the expenditure they incurred in marketing. Besides 'Return on Sales' (ROS) – another indicator of efficiency – has shown a declining trend since January 2003 onwards and was not any better before this period.

However, the 'Return on Net Worth' (RONW) has shown a marked improvement since December 2005. As regards exports, BCPL also showed an improvement since January 1996, but declining since January 2004[8].

The growth of BCPL over the years has not been stable as reflected in most of the financial indicators. Does this mean that until 2007 BCPL was still in its transition stage or does it mean that the turnaround strategies adopted by BCPL, though in the right direction, were not able to fully solve the operating problems of BCPL? Another issue which BCPL needs to address is whether simply focusing on internal constraints would be sufficient for its long-term success, or whether both internal and

[7] For data regarding Financial Performances refer to Exhibits VI-Figure a, b, c and d and Table 1
[8] Data Source is CMIE- PROWESS

external factors should have been considered. Being one of the oldest organizations and pioneers in the drugs and pharmaceutical industry in India, BCPL should be able to address the issues related to the turnaround strategies, for stable and successful growth over time.

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- Official Website of Evans Vanodine International PLC, (www.evansvanodine.co.uk)
- Official Website of Hindustan Antibiotics Limited, (www.hindantibiotics.com)
- Official Website of the Indian Chemical Manufacturers Association, (www.icmaindia.com).

Exhibit 1: Logo of BCPL

Source: http://www.netwingsinfotech.com/client.html

Exhibit 2: Meaning of a 'Sick Company'

According to the 'The Sick Industrial Companies (Special Provisions) Act, 1985 (SICA)' (which was amended in 1993), a 'sick industrial company' has been defined as "an industrial company (being a company registered for not less than five years) and having an accumulated loss equal to or exceeding its entire net worth at the end of any financial year."

We can sum up the chief reasons under two broad categories - Internal and External.

- The Internal Reasons are those, which can be controlled by the company itself, which may be due to factors such as Mismanagement, Underestimation of costs, Underutilization of Resources, etc.
- The External Reasons are outside the control of the company itself. Some of them are Adverse Government Rules & Regulations, Delay in getting financial assistance, Competition, Change in consumer behavior or technology, etc.

(Source: Compiled from different sources).

Exhibit 3: The Operation of BIFR

The Board of experts known as the 'Board for Industrial and Financial Reconstruction' (BIFR) was set up in January 1987 and started functioning from 15 May 1987. If an industrial company becomes sick as per the criteria given by SICA, it becomes the obligation of the company to make reference to BIFR within 60 days from the date of finalization of the duly audited accounts of the company for the financial year at the end of which the company has become sick. If the Board has enough reasons to form an opinion that the company has become sick it will make an enquiry, and may

appoint any **Operating Agency** (any Public Financial Institution or State Level institution, Scheduled Bank or any other person as may be specified by BIFR) to enquire into and make a report.

The Order by BIFR: If the Board is satisfied after the enquiry that the company has become sick, it has to make a written order whether it is possible for the sick industrial company to make its net worth exceed the accumulated losses within a reasonable time. However, if the Board thinks that it is not practically possible for the company to make its net worth exceed the accumulated losses within a reasonable time, it may direct the operating agency to prepare a scheme for the company which may include measures such as Change in Management, Financial Reconstruction, Sale or lease of a part or whole of any industrial undertaking of such company, etc.

(Source: www.bifr.nic.in)

Exhibit 4: The Broad Product Range of BCPL

Division - I (Heavy Chemicals)

- Sulphuric Acid
- Alumina Ferric

Division-II (Pharmaceuticals)

- Snake Venom Anti-Serum (AVS)

Pharmaceutical Formulations

- Injectables
- Tablets
- Capsules
- Liquid Orals
- Ointments
- Herbal Preparations
- Antiseptic Solutions

Division-III (Cosmetics & Home Products)

- Cantharidine Hair Oil
- Pheneol (Disinfectant)
- Perfumes
- Napthalene Balls

Source: Website of The Ministry of Chemicals and Fertilizers (www.chemicals.nic.in)

Exhibit 5: The Drugs and Pharmaceuticals Industry in India

The drugs and pharmaceuticals industry in India is one of the most advanced and largest among the other developing countries. India manufactures quality bulk drugs and formulations, which belong to several major therapeutic groups. About 250 large units are in operation, which includes five Central PSUs, viz., Indian Drugs and Pharmaceuticals Ltd (IDPL), Hindustan Antibiotics Ltd (HAL), Bengal Chemicals and Pharmaceuticals Ltd (BCPL), Smith Stanistreet Pharmaceuticals Ltd (SSPL) and Bengal Immunity Ltd (BIL).

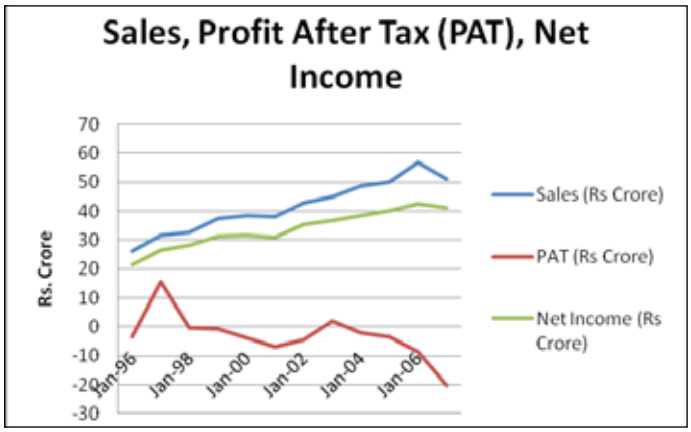
Besides this there are about 8000 small-scale units in operation. Together these units produce on an average 350 bulk drugs and a wide range of formulations. India is in a position to meet 70% of the total requirement of bulk drugs in the country and almost the entire demand for formulations. In 1997-98, net production of bulk drugs and formulations (in rupee terms) amounted to Rs 2,623 crores and Rs 12,068 crores respectively, clearly showing a growth of 20% and 15% over the previous year's production. The performance of the industry in contribution to the exports has also been above satisfactory level. During 1998-99, exports growth rate of the industry was a little over 30% over 1997-98[9].

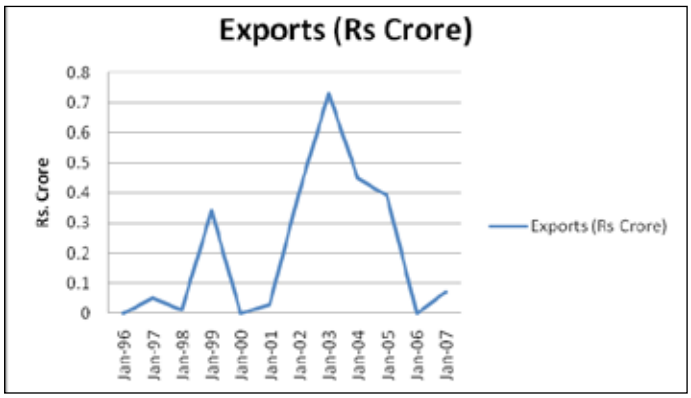
The wave of liberalization has been infused in the drugs and pharmaceutical industry. The manufacturers are now free to produce any drug duly approved by the Drug Control Authority. Almost all drugs are now allowed to be imported under Open General License. All these factors signify that the drugs and pharmaceutical industry, therefore, is highly competitive. However, it is found that all the five central PSUs are sick. In case of BCPL, SSPL, HAL, and BIL, revival packages have been sanctioned by BIFR and are under implementation. But in the case of IDPL, it was not possible to put together any viable revival package. Before having a look into the companies mentioned above, one look at the sickness of Indian companies and the government measures taken to cure the problem is necessary.

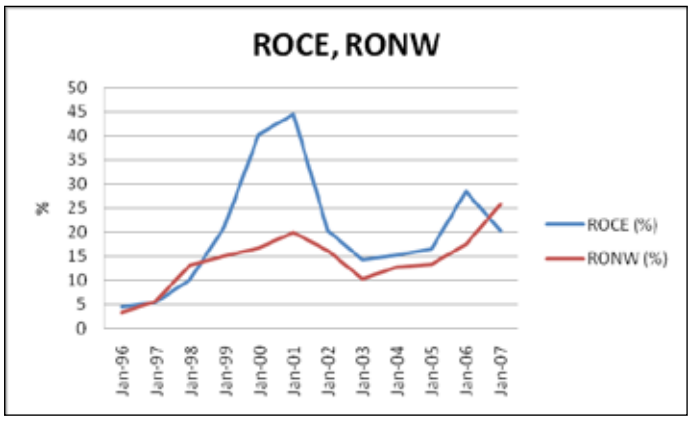
Source: Compiled from different sources.

[9] Source: The Planning Commission, Annual Plan, 1999-2000.

Exhibit 6: Financial Performance of BCPL







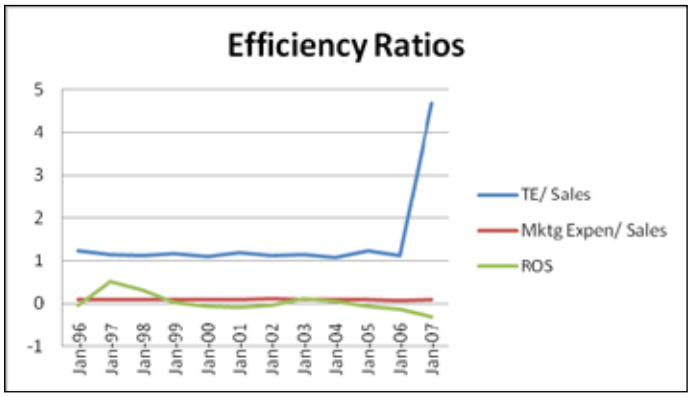


Table 1: Overview of Financial Performance of BCPL

Indicators	Jan-96	Jan-97	Jan-98	Jan-99	Jan-00	Jan-01	Jan-02	Jan-03	Jan-04	Jan-05	Jan-06	Jan-07
Sales (Rs Crore)	26.12	31.74	32.75	37.52	38.54	38.09	43.02	45	48.67	49.97	56.93	50.99
PAT (Rs Crore)	-3.59	15.75	-0.27	-0.65	-3.87	-7.02	-4.51	2.12	-2.12	-3.53	-8.45	-20.07
ROCE (%)	4.46	5.48	10.12	21.13	40.3	44.44	20.33	14.36	15.256	16.57	28.45	20.23
RONW (%)	3.34	5.59	13.16	14.98	16.69	19.94	16.11	10.37	12.785	13.29	17.4	25.7
Exports (Rs Crore)	0	0.05	0.01	0.34	0	0.03	0.41	0.73	0.45	0.39	0	0.07
Net Income (Rs Crore)	21.38	26.61	28.21	31.44	31.8	31.12	35.45	36.79	38.45	40.26	42.54	41.16
TE/ Sales	1.2301	1.1515	1.1236	1.1636	1.1155	1.2006	1.122	1.1469	1.078	1.2409	1.1231	4.6831
Mktg Expen/ Sales	0.09	0.0838	0.0912	0.0914	0.0957	0.0985	0.1034	0.0989	0.0977	0.0877	0.0792	0.0939
ROS	-0.047	0.5214	0.3125	0.0216	-0.058	-0.074	-0.032	0.1136	0.0456	-0.061	-0.121	-0.308

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> **Credit**
>
> No man will make a great leader who wants to do it all himself or to get all the credit for doing it.
>
> **– Andrew Carnegie**

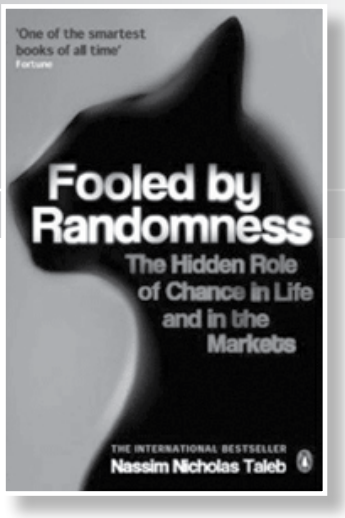
Book Review

Fooled by Randomness

The Hidden Role of Chance in Life and in the Markets

Nassim Nicholas Taleb

Reviewer: Prof PVL Raju



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Publisher: Random House
Pages: 316

To become successful is a natural human instinct but it is a chosen few who become ultimately successful. The essence of the book is to present 'Probability' not as a quantitative or scientific approach or a branch of engineering, but as a qualitative and literary approach and a branch of applied skepticism.

Skills, ability to reduce the odds are necessary factors to succeed, but not necessarily the only factors in an environment that is highly random in nature. The author says that he is not questioning the skills of Warren Buffet but avers that "a large population of random investors will *almost necessarily* produce someone with his track record *just by luck*." Is success really attributable to skill and strategy or some thing else that is beyond human ken and control? Call it chance, luck or randomness – it plays a critical role in shaping our success.

The concept of 'probability' has a variety of meanings to different people. The author is of the opinion that probability is a not a mere computation of odds on the dice or gambling in a casino. It is a much more complex phenomenon. While it is understood with little degree of certainty in science, we hardly comprehend its implications in social sciences like economics.

Hard work, planning and thinking are important but not necessarily the only success factors. With tongue in cheek, the author says, "*the fact that every intelligent, hardworking, persevering person becomes successful does not imply that every successful person is necessarily an intelligent, hardworking, persevering person….. Luck is democratic and hits everyone regardless of original skills.*" Calculated risk-taking is extolled a special virtue to be endowed with for success but how do we account for failures that stem from risk taking abilities?

The book is thought-provoking and challenges the conventional wisdom about the way we perceive success factors in business and the world we populate. It is all about luck and how we perceive it through the prism of our personal experiences. The element of randomness is demonstrated in a pronounced fashion in the stock markets. The entrepreneur with 'vision', the stock trader with 'talent' – all are subject to randomness and the performance is down to mere chance rather than skill. We rationalize success to certain attributes like logic and analytical ability. We convince ourselves that events and occurrences tend to be non-random and key success factors are linear and predictable. We try to find reasons that do not exist and to paraphrase the oft-quoted Shakespearean phrase "there's a method in randomness" (for the original -"there's a method in the madness").

The theory of probability cannot be circumscribed to merely a mathematical phenomenon.

Author's Profile

Nassim Nicholas Taleb, a Distinguished Professor at New York University's Polytechnic Institute is widely recognized as the foremost thinker on probability and uncertainty. He has devoted his life to immersing himself in problems of luck, randomness, human error, probability, and the philosophy of knowledge. He managed to transform his interests into three successful careers, as a man of letters, businessman-trader-risk manager, and university professor.

Reviewer's Profile

Prof PVL Raju *(raju@dhruvacollege.net)* has about a decade of training and teaching experience in corporate training programs especially in the area of inter personal skills. He is a certified trainer of CAMI and is certified to administer and debrief internationally acclaimed profiling tools and psychometric assessments like FIRO-B, MBTI. He has more than two decade of experience in banking sector as a senior executive. Earlier, He worked as an Associate Professor in the area of Human Resource Management at Dhruva College of Management, Hyderabad.

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