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EDITORIAL

We are glad to publish Volume 8 Number 2 of Arth Anvesan, a Bi Annual Refereed Journal from Faculty of Management, Shri Mata Vaishno Devi University. As always, our endeavour was to add value to the study of Management and Economics. We hope this volume would lend new insight and provide fresh concepts in the said areas. Our sincere thanks to the Referees, Authors and all others who directly or in many other ways, contributed to the publication of this volume.

Four research papers, one case study and one book review have been chosen for publication in the present Volume of Arth Anvesan. The initial paper by Maniklal Adhikary and Shyamal Saha is an empirical research work to investigate the nature and characteristics of stock market volatility in India. Appropriate GARCH model has been used and the results show that though the higher price movement started in response to strong economic fundamentals, the actual cause of abrupt movements, defying the Economic principals, happening in the bourses is due to the imperfection of the system,. The next paper by Suman Ghalawat and Sunita Mehla on E-Banking is an attempt to examine the various factors affecting the service quality and the effect of these factors on various demographic variables as studied in the Selected Banks within Hisar, The study also revealed that there existed significant relationship between demographic variables (age, gender, occupation, education etc.) and the different factors that respondents consider important while ascertaining service quality through E-banking. The study by Bhavna Anjaly, explores the perception of decision makers regarding the effect of stakeholders on the growth related challenges using structural equation model. In the next paper, Yogesh C Joshi, Ranjan Sabhaya and Falguni H. Pandya has empirically tested various anomalies like day of the week effect, the weekend effect, the turn of the month effect, turn of the year effect, Friday-the 13th effect, Month effect, January Effect and Dow-Jones effect. The results indicate that except monthly effect, turn of the year effect and Friday the 13th effect, no strong evidence is found for other anomalies. The addition of case study by Rahul Gupta on SI IRON in this current edition of Arth Anvesan is a helpful study for understanding particular factors contributing to business growth, with special focus on business expansion. We have also included a book review by Hari Sundar.G.Ram. The book titled "Marketing 3.0- From Products to Customers to the Human Spirit" is authored by Philip Kotler, Hermawan Kartajaya and Iwan Setiawan. Hari Sundar.G.Ram viewed it is a "Must read" book for Marketing practitioners, academicians and students.

We look forward for the original and quality research work for publishing in Arth Anvesan. Specifically we incorporate research articles, case studies, book reviews in the areas of Finance, Human Resource, Marketing, Supply Chain, Economics and any other related subject following the double blind peer reviewed method.

Kakali Majumdar

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MODELING CONDITIONAL VOLATILITY: A STUDY OF INDIAN STOCK MARKET

Maniklal Adhikary* and Shyamal Saha**

Abstract

Well developed securities markets are the backbone of any financial system. Apart from providing the medium for channelizing funds for the investment purposes, securities markets aid in the pricing of asset and serve as a barometer of the financial health of the economy. So it needs modelling and forecasting of stock market volatility. Many financial time series display volatility clustering, implied in autoregressive conditional heteroskedasticity (ARCH). The aim of this paper is to investigate the nature and characteristics of stock market volatility in India. The volatility in the Indian stock market exhibits characteristics similar to those found earlier in many of the major developed and emerging stock markets. The paper is also designed to estimate conditional volatility models in an effort to capture the salient features of stock market volatility in India. The estimation of volatility is made at the macro level on the market index, namely BSE Sensex.

The GARCH (1, 1) model has been fitted to the market index. We observe a strong evidence of time-varying volatility, volatility clustering and a high persistence and predictability of volatility. Conditional volatility of market return series from January 1991 to September 2012 shows a clear evidence of volatility shifting over the period. Though the higher price movement started in response to strong economic fundamentals, the real cause of abrupt movement appears to be associated with the imperfection of the market. It has been observed that the GARCH (1, 1) model provides reasonably a good fit.

Key Words: Stock Market, Volatility, Extreme Value Estimators, Clustering, GARCH model, Forecast.

JEL Classification: G12, C22

INTRODUCTION

A common problem plaguing the low and slow growth of any small developing economy is related to its shallow financial sector. Financial markets play an important role in the process of economic growth and development by facilitating savings and channeling funds from savers to investors. This is needed with a view to ensuring desired growth in the economy. In order to get this end, an economy needs a vibrant stock market which would ensure safety, integrity and liquidity to the investing community that makes investments in a wider range of financial instruments. Studies conducted by Singh (1997), Levine and Zervos (1998) reveal that being a part of the financial system, stock markets play a crucial role to achieve the desired economic growth of a country.

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However, investing activity is vulnerable to various types of risk. Variability or dispersion of returns of an asset from its mean is called volatility. Actually, volatility receives a great deal of concern as it can be used as a surrogate measure to risk. It can be used to assess the market risk of a single instrument or an entire portfolio of instruments. In day-to-day practice, volatility is calculated for all sorts of random financial data such as stock returns, interest rates, the market value of a portfolio, etc. Stock return volatility is the variation of the stock returns in time. More specifically, it is the standard deviation of daily stock returns around the mean value and the stock market volatility is the return volatility of the aggregate market portfolio.

Volatility is an important phenomenon in markets in general and security markets in particular. Modeling stock market volatility has been gaining importance and relevance as the subject of empirical and theoretical investigation by both academicians and practitioners. Since the optimal decision of the investor relies on variance of returns that can change over time, it is important to model and forecast conditional variance. A rise in stock market volatility can be interpreted as a rise in risk of equity investment and thus a shift of funds to less risky assets. This move could lead to a rise in the cost of capital of firms (Arestis *et al.*, 2001). Volatility can also be used as a decision making criterion. In evaluating more than one investment, it could be used as the comparison parameter. One would invest in those assets that yield the highest return per unit of risk (Wessels , 2006).

LITERATURE REVIEW

Following the introduction of models of ARCH by Engle (1982) and their generalization by Bollerslev (1986), there have been numerous refinements of the approach to modeling conditional volatility to better capture the stylized characteristics of the data. Empirically, the family of GARCH (generalized ARCH) models has been very successful in describing the financial data. Of these models, the GARCH (1, 1) is often considered by most investigators to be an excellent model for estimating conditional volatility for a wide range of financial data (Bollerslev et al. 1992).

There is quite a strong body of literature advocating the use of the GARCH family of models to forecast volatility. For example, Akgiray (1989), Pagan and Schwert (1990), Brailsford and Faff (1996), and Brooks (1998) used the US stock data and found that the GARCH models outperformed most competitors. Using data from European stock markets such as France, Germany, Italy, the Netherlands, and the UK, Corhay and Rad (1994) found that with the exception of Italy, the GARCH (1, 1) model generally outperformed the other GARCH models.

Volatility of stock returns has been mainly studied in the developed economies. There is relatively less empirical research on stock return volatility in the emerging markets. In the Indian context, Roy and Karmakar (1995) focused on the measurement of the average level of volatility as the sample standard deviation and examined whether volatility has increased in the early 1990's. Goyal (1995) used the conditional volatility estimates as suggested by Schwert (1989) to study the nature and the trend of stock return volatility and the impact of carry forward system on the level of volatility. Reddy (1997-98)

analyzed the effects of market microstructure, e.g., establishment of the National Stock Exchange (NSE) and the introduction of Bombay Stock Exchange Online Trading (BOLT) system on the stock return volatility measured as the sample standard deviation of the closing prices. Kaur (2002) analyzed the extent and pattern of stock return volatility during 1990- 2000 and examined the effect of company size, day-of-the-week, and FII investments on volatility measured as the sample standard deviation. ARCH/GARCH models have been used by Thomas (1995, 1998), Pattanaik and Chatterjee (2000) and Kaur (2002) to model volatility in the Indian financial markets.

OBJECTIVE OF THE STUDY

This paper attempts to empirically investigate the pattern of volatility in the Indian stock market during 1991-2012 in terms of its time varying nature, presence of certain characteristics such as volatility clustering. The Indian stock market is represented by two most prominent stock indices, viz., Bombay Stock Exchange's (BSE) Sensitive Index (Sensex) and NSE's S&P CNX Nifty (Nifty). The Sensex is generally considered to be the bellwether of the Indian stock market. It is older and the more often quoted index. We have examined the following issues with respect to the Indian stock market basically using the BSE Sensitive Index (Sensex) for the period spanning more than two decades (January 1991- September 2012):

- Is there any evidence of time varying volatility in daily return on Sensex?
- What is the nature of the volatility process?

RESEARCH DESIGN

Data base

The daily stock price data on Sensex has been taken from PROWESS, the online database maintained by the Centre for Monitoring of Indian Economy (CMIE). The database contains all the actively traded stocks at any given time on the BSE. Daily opening, high, low, and closing prices have been taken for the index for the period of study. In addition to PROWESS, web resources such as www.Yahoo.com/Finance, and www.bseindia.com have been used.

Daily stock price have been converted to daily returns. The present study uses the logarithmic difference of prices of two successive periods for calculation of the rate of return. The logarithmic difference is symmetric between up and down movements and is expressed in percentage terms.

If I_t be the closing level of Sensex on date t and I_{t-1} be the same for its previous business day, i.e., omitting intervening weekend or stock exchange holidays, then the one day return on the market portfolio is calculated as:

$$r_t = \ln \left(\frac{I_t}{I_{t-1}} \right) \times 100 \quad (4.1)$$

where, $\ln(z)$ is the natural logarithm of 'z.'

Econometric Methodology

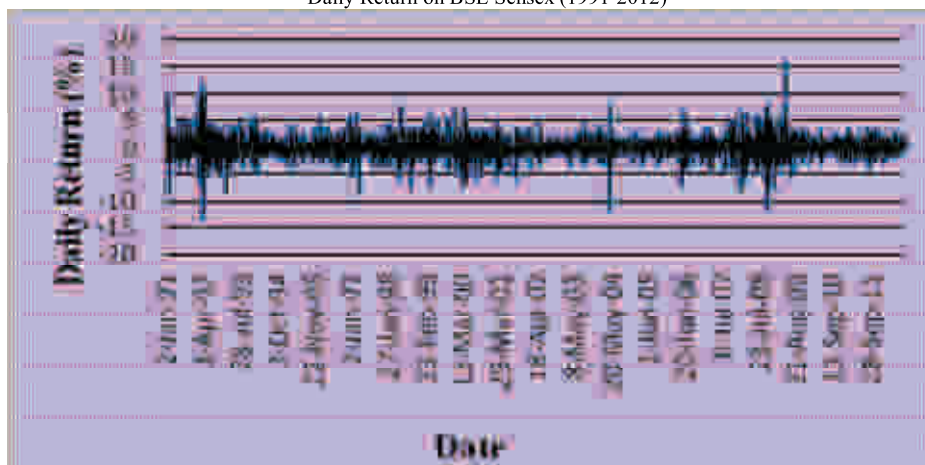
One of the key assumptions of the ordinary regression model is that the errors have the same variance throughout the sample. This is called the homoscedasticity model. If the error variance is not constant, the data are said to be heteroscedastic. We have modelled the mean return as an ARMA (p,q) (Auto Regressive Moving Average) process in our analyses. This requires the testing of stationarity of the series at the onset. Thus, we begin our analysis with testing for stationarity, i.e., unit root testing. We then fit an ARMA model to the data generating process and follow the process suggested by Box and Jenkins (1976). Finally, we model the conditional variance as a symmetrical GARCH process.

DATA ANALYSIS

Diagnostic Test

As part of the diagnostics, we begin with a visual inspection of the plot of daily returns on Sensex as shown in Figure-1. It can be seen that returns continuously fluctuate around a mean

Figure 1
Daily Return on BSE Sensex (1991-2012)



value that is close to zero. The movements are in the positive as well as negative territory and larger fluctuations tend to cluster together separated by periods of relative tranquillity. This is consistent with Fama's (1965) observation that stock returns exhibit volatility clustering where large returns tend to be followed by large returns and small returns by small returns leading to contiguous periods of volatility and stability. Such series are called conditionally heteroskedastic if the unconditional (or long-run) variance is constant, but there are periods in which the variance is relatively high.

Descriptive Statistic

Descriptive statistics of the daily Sensex returns are summarized in Table 1. It could be seen that the returns during the study period varies from -13.6607 to 15.9899. So a wide range of fluctuation in daily returns could be witnessed. The mean return during the study period is 0.0561 which is close to zero. Therefore, a mean reverting process is a certain possibility. For Sensex, the skewness statistic for daily returns is found to be different from zero indicating that the return distribution is not symmetric. Basically it is negatively skewed indicating a relatively long left tail compared to the right one. Furthermore, the relatively large excess kurtosis suggests that the underlying data is leptokurtic or heavily (thick) tailed and sharply peaked about the mean when compared with the normal distribution. These findings are similar to the existing literature. Mandelbort et al. (1963) observed *volatility clustering and leptokurtosis* are common observations in financial time series.

Table 1
Descriptive Statistic of Daily Return

<i>Statistic</i>	<i>Sensex</i>
Observation Period	Jan 91 - Sep 12
Number of observations(n)	5229
Mean	0.0561
Standard Error	0.0244
Median	0.0937
Coefficient of Variation	3.1784
Standard Deviation	1.7645
Sample Variance	3.1136
Skewness	-0.0412
Excess Kurtosis	5.7297
Minimum	-13.6607
Maximum	15.9899
Range	29.6506
Q(1)	40.1
Q(22)	93.314
Q ² (1)	314.99
Q ² (22)	2602
ARCH LM statistic (at lag = 2)	372.0574

Application of Box-Jenkins Methodology

The Box-Jenkins approach is one of the most widely used methodologies for the analysis of time series data.

Auto-Correlation Test

The Q -statistic can be used to test whether a group of autocorrelation is significantly different from zero. Box-Pierce (1970) used the sample autocorrelations to form the statistic,

$$Q = \sum_{k=1}^s \rho_k^2 \quad (5.1)$$

where, n =sample size and s =lag length. Under the null hypothesis that all values of $\rho_k = 0$, Q is asymptotically χ^2 distribution with s degree of freedom.

Since the present study used daily data, a lag length up to 22 has been considered. The reason behind this is that there could be at most 22 trading days in a month. If the computed Q statistic is significant, it indicates the presence of autocorrelation. The Q statistics of return time series data for lag 1 to 22 have been presented in table 5.2. It is clear that Box-Pierce Q statistic is highly significant and it confirms that the return series is serially correlated. This indicate the presence of an autoregressive AR scheme, or, more generally, an autoregressive moving average ARMA scheme in the return series and negates random walk behaviour.

Testing For Stationarity

Stationarity implies that mean and covariance of the return distribution are time independent. In any time series analysis, the test for stationarity is important because, in the presence of non-stationary series, the standard estimation procedures are not applicable. There are two principal methods of detecting nonstationarity as follows.

1. Subjective judgment applied to time series graph of the series and to its correlogram, and
2. Formal statistical tests for Unit Root

Graphical Inspection

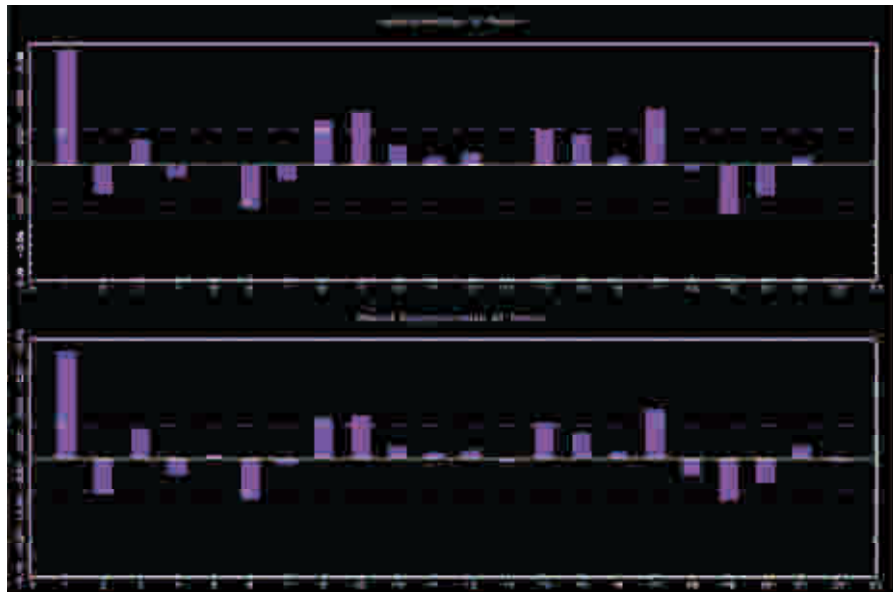
The autocorrelation function (ACF) and partial autocorrelation function (PACF) of return have been computed. The correlogram for return in Table-2 displays the ACF dies out as the lag increases and the single large spike at lag 1 in the sample PACF suggests the classical pattern of a stationary AR(1) model. The dotted line in the ACF and PACF plots represents the confidence intervals for the ACF and PACF values. Thus the diagnostics for ARMA models confirm AR (1) model of the mean equation for Sensex that is we have

$$r_t = \rho_0 + \rho_1 r_{t-1} + \varepsilon_t \quad (5.2)$$

Table 2
Correlogram of Daily Return on BSE Sensex (1991-2012)

Sample Included observations: 5229									
Lag	AC	PAC	Q-Stat	Prob	Lag	AC	PAC	Q-Stat	Prob
1	0.088	0.088	40.1	0	12	0.01	0.007	67.166	0
2	-0.021	-0.029	42.515	0	13	-0.001	-0.003	67.171	0
3	0.02	0.024	44.527	0	14	0.027	0.03	70.988	0
4	-0.009	-0.014	44.942	0	15	0.022	0.02	73.634	0
5	-0.001	0.003	44.943	0	16	0.007	0.006	73.889	0
6	-0.032	-0.033	50.216	0	17	0.043	0.04	83.371	0
7	-0.011	-0.005	50.877	0	18	-0.004	-0.013	83.455	0
8	0.034	0.033	56.8	0	19	-0.036	-0.034	90.395	0
9	0.04	0.035	65.195	0	20	-0.023	-0.019	93.13	0
10	0.015	0.01	66.433	0	21	0.006	0.01	93.314	0
11	0.007	0.005	66.682	0	22	0	-0.002	93.314	0

Figure 2
ACF and PACF Plots of Daily Return on BSE Sensex (1991-2012)



Unit Root Test

If the data is non stationary, the regression result using such data would be spurious, because the usual 't' test would not be applicable to test the significance of coefficients. To test stationarity, the unit root test is applicable on the time series data. The Augmented Dickey-Fuller (ADF) and Phillip-Peron (PP) test statistics are shown for the market return series. The two statistics test for a unit root in the univariate representation of a time series. For a return series r_t , the ADF test consists of a regression of the first difference of the series against the series lagged k times as follows:

$$\Delta r_t = \alpha + \delta r_{t-1} + \sum \beta_s \Delta r_{t-k} + \varepsilon_t \quad (5.3)$$

The null and alternative hypotheses are $H_0: \delta=0$ and $H_0: \delta<0$. The acceptance of the null hypothesis implies nonstationarity. PP statistic is an alternative test of $\delta = 0$. There is no lagged difference term. It is based on the following model:

$$\Delta r_t = \mu + \delta r_{t-1} + \varepsilon_t \quad (5.4)$$

Both the ADF and PP test statistics reported in Table-3 reject the hypothesis of a unit root in the market return series. There is a strong rejection at the 0.01 level; the McKinnon criteria corresponding to constant, no trend and constant, linear trend critical value are -3.4314 and -3.9598 for ADF and PP respectively at 1 per cent level of significant. Therefore, it appears that the Sensex return is stationary at its level.

Table 3
Unit Root Test on Daily Return

Augmented Dickey-Fuller Unit Root Test		Phillip-Peron Unit Root Test	
ADF Test Statistic		PP Test Statistic	
Constant, no trend	-15.434 (-3.4314)*	Constant, no trend	-66.1988 (-3.4314)*
Constant, trend	-15.445 (-3.9598)*	Constant, trend	-66.1969 (-3.9598)*

* McKinnon Critical value at 1% level of Significant

The Sensex appears to have strong autocorrelations in one-day lag returns with significant coefficient. Also, the autocorrelation in the squared daily returns suggests that there is a *clustering of variance*. The daily return and squared return series show strong first order correlation. The results clearly reject the independence assumption for the time series of daily stock returns. The above findings indicate the possible presence of ARCH effect which is confirmed by the computed value of Lagrange Multiplier (LM). This is shown in table-1. From the table it is clear that the LM test statistic is significant. This finding shows the *clustering effects* in daily returns. That is *large shocks to the error process are followed by large ones and small shocks by small ones of either sign* (Fama, 1965). The existence of a leptokurtic distribution, volatility clustering, and a changing conditional variance means that our next logical step in modelling exercise should be to express the conditional volatility as an ARCH or GARCH process with the mean return process as an AR (1) process.

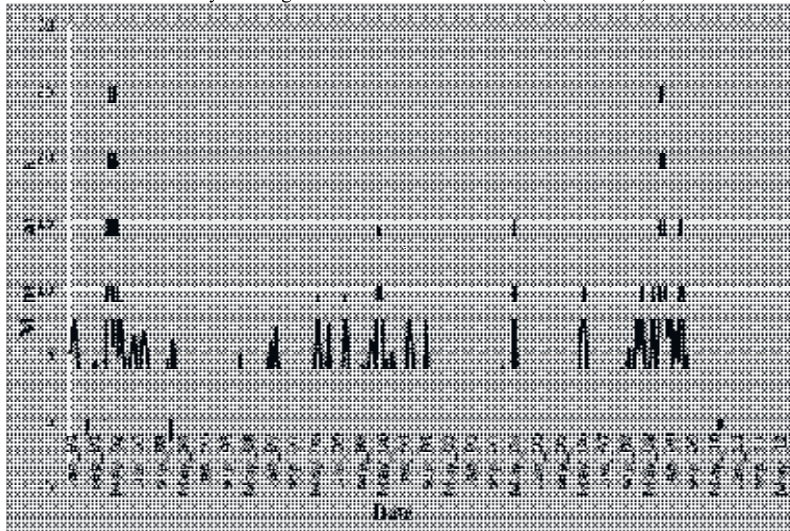
Now before moving on to modelling the conditional volatility as a GARCH process, we compute the variance of the daily returns over a 30-day horizon. Thus, close to close volatility (standard deviation volatility) is measured by the following formula

$$\text{var} \left(r_{22day} \right) = \left(\frac{1}{22} \right) \sum_{t=1}^{22} \left(r_t - \bar{r}_{22day} \right)^2 \quad (5.1)$$

where, r_t is close to close return and \bar{r}_{22day} is the average return for the 30-day period

under consideration. We have deviated from the standard practice of dividing by 30. This is because of the reason that volatility computed divided by higher deflator ($30 > 22$) reduces the true volatility. It is like constructing moving average of a series. This is the way we construct the variance for the remaining period and check whether the variance has changed over time or not.

Figure-3
30-day Moving Variance of Sensex Returns (1991-2012)



The schematic diagram for the 30-day variance of Sensex daily return series is shown in Figure-3. This graphical presentation reveals that, of late the stock market has become more volatile than what it was at the beginning of the period under study. Moreover, some degree of clustering is also evident in the plot. We find that during 1991-92, 1993-94, 1996-97 and 1998 onwards, large variations are generally appearing together whereas periods of small variations appear separately.

Model Specification

Existence of significant ARCH effect in the residuals of the fitted AR (1) process to the return generating process and also the various other volatility estimators indicating graphically the existence of clustering of volatility have led us to the next step of

modelling. Engle (1982) suggests that the conditional variance h_t can be modelled as a function of the lagged ε 's. That is, the predictable volatility is dependent on past news. We model the conditional variance of the residuals as an ARCH (q) process with the mean return being governed by the AR (1) process. Hence, our model becomes:

$$r_t = \rho_0 + \rho_1 r_{t-1} + \varepsilon_t \quad (7.1)$$

$$h_t = \omega_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 \quad (7.2)$$

where, $\alpha_0 > 0$, $\alpha_i \geq 0$ for all $i = 1, 2, \dots, q$. and $\varepsilon_t | \psi_{t-1} \sim N(0, h_t)$. The effect of a return shock i periods ago ($i \leq q$) on current volatility is governed by the parameter α_i . Normally, we would expect that $\alpha_i < \alpha_j$ for $i > j$. That is, the older the news, the less effect it has on current volatility. In an ARCH (q) model, old news which arrived at the market more than q periods ago has no effect at all on current volatility. Alternatively, if a major market movement occurred yesterday, the day before or up to q days ago, the effect will be to increase today's conditional variance. Bollerslev (1986) generalized the ARCH (q) model to the GARCH (p, q) model, such that:

$$h_t = \omega_0 + \sum_{i=1}^q \alpha_i \varepsilon_{t-i}^2 + \sum_{j=1}^p \beta_j h_{t-j} \quad (7.3)$$

where, $\omega_0 > 0$, $\alpha_i \geq 0$, for all $i = 1, 2, \dots, q$. and, for all $j = 1, 2, \dots, p$. The GARCH (p, q) process defined above is stationary when $\sum_i \alpha_i + \sum_j \beta_j < 1$.

The simplest but often very useful GARCH process is the GARCH (1, 1) process which is given by:

$$h_t = \omega_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1} \quad (7.4)$$

where $\omega_0 > 0$, $\alpha_1 \geq 0$, $\beta_1 \geq 0$. The stationary condition for GARCH (1, 1) is $\alpha_1 + \beta_1 < 1$. In the GARCH (1, 1) model, the effect of a return shock on current volatility declines geometrically over time. As referred earlier, the GARCH (1, 1) model is found to be an excellent model for a wide range of financial data (Bollerslev *et al.*, 1992). The sizes of the parameters α_1 and β_1 determine the short-run dynamics of the resulting volatility time series. Large GARCH lag coefficient β_1 indicates that shocks to conditional variance take a long time to die out so that volatility is 'persistent.' Large GARCH error coefficient α_1 means that volatility reacts quite intensely to market movements. Hence if α_1 is relatively high and β_1 is relatively low, the volatilities tend to be more 'spiky.' In financial markets, it is common to estimate lag (or 'persistence')

coefficients based on daily observations in excess of 0.8 and error (or ‘reaction’) coefficients not more than 0.2.

If $\alpha_1 + \beta_1$ is close to unity, a ‘shock’ at time t will persist for many future periods. A high value of $\alpha_1 + \beta_1$, therefore, implies a ‘long memory’. For $\alpha_1 + \beta_1 = 1$, any shock will lead to a permanent change in all future values of h_t ; hence shock to the conditional variance is ‘persistent’. For $\alpha_1 + \beta_1 = 1$, we have what is known as an integrated GARCH process (i.e., IGARCH). For IGARCH, the conditional variance is non-stationary and the unconditional variance is unbounded.

Empirical Evidences

In all the cases, the ARCH parameters are found to be significant. The ARCH parameters are insignificant from ARCH (8) onwards in case of Sensex. The AR (1) parameters are significant in all the models. Hence, our diagnosis of the return process as an AR (1) process under the Box-Jenkins methodology still holds well. What is more important is that the conditional variance of the errors is now being modelled as an ARCH process. These results reinforce our earlier finding that the significant *clustering effect* is present in the data. The sum of all ARCH coefficients in all the models is *less than unity*, which implies that the process is *stationary*. The parameter estimates also satisfy the assumption of non-negativity. The model selection criteria selects the AR (1)-ARCH (7) process for Sensex. These models have the highest log-likelihood values and minimum AIC and SBC values. Hence, at this stage, we select the AR (1)-ARCH (7) for Sensex, as the representative of the conditional volatility process.

Table 4
Estimated Conditional Variance Equation in ARCH (q) Process*

Dependent Variable: \hat{h}_t (conditional volatility); Regressors: lagged ε_t^2 ’s; Method: OLS									
Coefficients of the Regressors in the Regression of h_t on lagged ε_t^2 ’s									
Eq. No.	Intercept	ε_{t-1}^2	ε_{t-2}^2	ε_{t-3}^2	ε_{t-4}^2	ε_{t-5}^2	ε_{t-6}^2	ε_{t-7}^2	ε_{t-8}^2
7.1.1	2.046 (55.976)	0.364 (22.785)							
7.1.2	1.534 (38.469)	0.341 (22.033)	0.215 (13.484)						
7.1.3	1.309 (31.979)	0.294 (21.253)	0.172 (11.330)	0.155 (9.882)					
7.1.4	1.085 (26.302)	0.245 (14.788)	0.144 (9.794)	0.139 (9.347)	0.167 (12.826)				
7.1.5	0.941 (22.713)	0.227 (14.994)	0.111 (7.714)	0.124 (8.656)	0.163 (12.704)	0.122 (8.378)			
7.1.6	0.832 (20.696)	0.215 (13.998)	0.090 (6.256)	0.115 (8.073)	0.141 (11.240)	0.104 (7.421)	0.114 (7.357)		
7.1.7	0.784 (20.321)	0.194 (11.094)	0.084 (6.065)	0.112 (7.984)	0.130 (10.729)	0.096 (6.933)	0.104 (6.730)	0.071 (6.107)	
7.1.8	0.745 (18.732)	0.186 (10.756)	0.080 (5.531)	0.106 (7.647)	0.124 (10.378)	0.090 (6.660)	0.101 (6.540)	0.070 (6.017)	0.046 (4.051)

* t statistic in parentheses

As a diagnostic check on the appropriateness of ARCH processes for daily return series, the autocorrelation function (ACF) and partial autocorrelation function (PACF) of the squared residual series $\{\varepsilon_t^2\}$ are examined.

Table 5
Correlogram of Daily Squared Return on BSE Sensex (1991-2012)

Sample Included observations: 5229									
Lag	AC	PAC	Q-Stat	Prob	Lag	AC	PAC	Q-Stat	Prob
1	0.245	0.245	314.99	0	12	0.13	0.031	1877.1	0
2	0.16	0.106	448.57	0	13	0.173	0.071	2034.8	0
3	0.195	0.144	648.12	0	14	0.131	0.007	2125	0
4	0.21	0.135	878.44	0	15	0.123	0.024	2204	0
5	0.148	0.05	993.18	0	16	0.114	0.001	2272.1	0
6	0.167	0.083	1139.5	0	17	0.088	-0.027	2313	0
7	0.191	0.095	1331.1	0	18	0.084	-0.002	2350.4	0
8	0.102	-0.015	1386.2	0	19	0.117	0.033	2421.9	0
9	0.136	0.053	1483.8	0	20	0.135	0.042	2517.6	0
10	0.184	0.088	1662	0	21	0.112	0.025	2583	0
11	0.155	0.045	1788.6	0	22	0.06	-0.039	2602	0

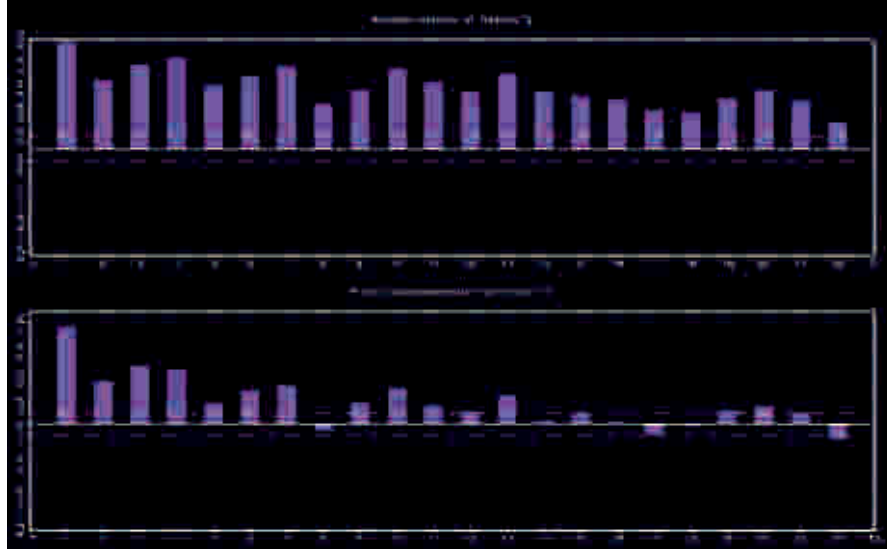
It has been found that although the estimated ACF the squared residual series seems to decay as the lag length increases (the rate of decay may be slower than exponential), the PACF does not become zero after seven lags for Sensex. It becomes zero at much higher lags and oscillates further. Therefore, as far as the ACF and PACF are concerned, the data do not seem to show full agreement with a pure ARCH process.

Fitting GARCH (1, 1) model

We now fit the GARCH models to the daily return series. We find that all the estimated parameters in the GARCH (1, 1) model are statistically significant. Higher order GARCH models either did not converge or the parameters were insignificant at the conventional levels of significance. Thus, at this stage, we find that GARCH (1, 1) can be the possible representative of the conditional volatility process for the daily return series. Further diagnostic checking for model selection reveals that GARCH (1, 1) is a better fit than the highest order ARCH models available. For the Sensex, the log-likelihood function has a higher value and both AIC and SBC are smaller as compared to the ARCH models. Hence, we come to the conclusion that for the Sensex, the conditional volatility of the daily return distribution follows GARCH (1, 1) process. It has also been seen that the

standardized residuals from the GARCH (1,1) model have ACF coefficients that are not significant – almost all of them lie between the asymptotic bounds of $\pm 2/\sqrt{T}$ (equal to ± 0.0276 for Sensex), meaning that the GARCH model is specified correctly.

Figure 4
ACF and PACF Plots



While running GARCH (1, 1) process, we get the following estimated conditional variance equation (with standard error in parentheses):

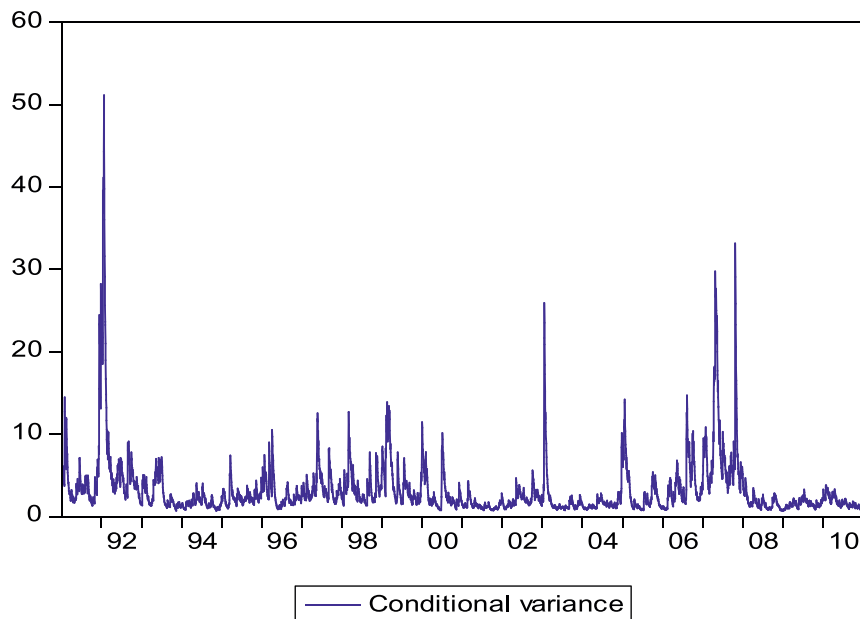
$$\hat{h}_t = 0.0549 + 0.1097\varepsilon_{t-1}^2 + 0.8757\hat{h}_{t-1} \quad (7.2.1)$$

(0.0065) (0.0062) (0.0063) $DW\ d\ stat = 1.823$

This is plotted in Figure-4. It is clear that the volatility behavior in Figures-4 is qualitatively like the apparent volatility variation in the return series. We can notice that the estimated volatility is high for some periods and low for other periods.

The estimates of β_1 are always markedly greater than those of α_1 and the sum $\beta_1 + \alpha_1$ is very close to but smaller than unity. The fact that $\beta_1 + \alpha_1$ is close to unity, however, is useful for purposes of forecasting conditional variances. As for the stationarity of the variance process, it can be observed that $\beta_1 + \alpha_1$ is equal to 0.9854 for Sensex. This is less than unity indicating no violation of the stability condition. The sum, however, is rather close to one, which indicates a long persistence of shocks in volatility

Figure-5
Conditional Variance of the Return Series of Sensex (1991-2012)



Volatility Shifting

As mentioned earlier, the conditional volatility for the series has been plotted in Figure-5 over the period from January 1991 to September 2012. In the above figure, we find strong evidence of time-varying volatility. We also find those periods of high and low volatility tends to cluster. From the figure it appears that the year 1992 has the highest volatility in the period under study. In fact, this period experienced the highest volatility in the history of the Indian stock market (Roy and Karmakar, 1995) and this coincided with the initial years of liberalization of the Indian economy after a long era of control. Roy and Karmakar (1994) examined whether change in volatility was due to the fundamental economic factors. The study reveals that much of the movement in stock market return volatility is not explained by the fundamental economic factors. It is possible that the presence of 'fads' introduced by noise traders in stock price is associated with these immeasurable elements of stock price volatility.

The initial boost up of share prices and the resultant fluctuation was due to the fundamental economic factors of the period which was supplemented by a number of liberalizing policies and procedures of the government. However, the real cause of the excessive movement was the irrational behaviour of the market where the speculators along with the frenzy investors drove the price away to the fundamental level. Following the rule of the market, an eclipse followed the illumination and, in April 1992, the 'bubble' burst and the price started its downward journey after the unearthing of the ever

largest security scam in the history of the Indian stock market. Thus, the formation and eventual burst of the bubble was a period of extreme volatility of the Indian stock market. The violent fluctuation of 1992 was followed by a tranquil period of around four years after which volatility again continued to increase till the end of the decade when a series of security scams got revealed once again in the Indian stock market.

CONCLUSION

In this paper, volatility of return series calculated from daily time series data of BSE Sensex have been analyzed. The study reveals that the volatility in the Indian stock market exhibits characteristics similar to those found earlier in many of the major developed and emerging stock markets, viz., mean reverting, autocorrelation and negative asymmetry in daily returns. The special feature of the models is that the series is modelled as a function of the previous values of the variable. Once the volatility clustering is confirmed, the GARCH (1, 1) model has been fitted to the market index, BSE Sensex. The conditional volatility for the series has been plotted over the period from January 1991 to September 2012. We find strong evidence of time-varying volatility. We also find that periods of high and low volatility tend to cluster. Also, volatility shows high persistence.

The related study reveals that much of the movement in stock market return volatility is not explained by the fundamental economic factors. It is possible that the presence of 'fads' due to the actions of noise traders in the market may be associated with these immeasurable elements of stock price volatility. In fact, the initial boost up of share prices and the resultant fluctuation were due to fundamental economic factors of the period which were supplemented by a number of liberalizing policies and procedures of the government. However, the real cause of the excessive movement might be attributed to the irrational behaviour of the market where the speculators along with the frenzy investors drove the price away from fundamental level resulting in fads or bubbles as the natural outcome of the price formation process.

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E-BANKING AND ITS EFFECT ON DEMOGRAPHIC VARIABLES OF CUSTOMERS: A STUDY OF SELECTED BANKS IN HISAR

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Abstract

The present paper endeavours to study the various factors affecting the service quality and the effect of these factors on various demographic variables. The data was collected from 200 customers from five selected banks namely: State Bank Of India, Punjab National Bank, HDFC Bank, AXIS Bank & ICICI Banks. The data has been analyzed with the help of the SPSS 13 software using data reduction technique i.e. factor analysis and further ANOVA has been used in the study. The results of the study indicate that the twenty variables used in the study has been reduced to seven factors i.e. authentication and authorization, acceptability, security, accessibility, promotional services, competitive advantage, data integrity and ease of use. For banks, it is worth noting that customers had laid more emphasis on the factors i.e. authentication and authorization, acceptability and data integrity while selecting variables that influence their decision for E-banking. The study also revealed that there is significant relationship between demographic variables (age, gender, occupation, education) and the different factors that respondents consider important while ascertaining service quality through E-banking.

Key Words: E-Banking, Service Quality, Internet, Factor Analysis, ANOVA.

JEL Classification: E58, G21

INTRODUCTION

Electronic banking (E-banking), also known as internet banking is defined as the automated delivery of new and traditional banking products and services directly to customers through electronic, interactive communication channels (Daniel, 1999; Sathye, 1999). E-banking includes the system that enables financial institutions, individuals and businesses, to access accounts, transact business or obtain information on financial products and services. Quality of service has become the ultimate factor which differentiates banks and determines their survival. The bank also recognizes the need to adapt itself to the changing environment with a vision for service quality so as to bring the banks closer to the customers. In developing economies, information technology in the form of E-banking plays a significant role in providing better services in the form of automated teller machines(ATM), internet banking, smart cards, credit cards, mobile banking, phone banking, and anywhere-anytime banking for the convenience of customers. The banks are aims to provide these services extensively to their customers.

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E-banking has an edge over traditional banking system because it has reduced the cost of transaction processing, improved the payment efficiency and also the bank-customer relationship. The relationship between E-banking and service quality can be measured with the extent of satisfaction in the customers. As the customer satisfaction is the function of customer expectation, therefore, the service quality provided by the banks plays a pivotal role in filling up the gap between the expected and the perceived service quality. So in order to fill this gap, banks should find ways of making electronic services more accessible and by allowing the customers to verify the accuracy of the E-banking.

REVIEW OF LITERATURE

There are a number of studies conducted nationally as well as internationally to gauge the satisfaction amongst customers from E-banking services. The Barczak et al., 1997; Danniell and Strong, 1997; Lia et al., 1999; Polatoglu and Ekin, 2001; and Devlin report factors such as convenience, flexibility, security concern, complexity, and responsiveness being associated with a higher propensity to use internet banking. However Polatoglu and Ekin, (2001) emphasized on the perceived risk as one of the major factors affecting consumer adoption and satisfaction of online banking services.

Black, et al. (2001) performed a study on the adoption of internet services and found that the highest income has direct relation with the use of information technology. According to Howcroft, et al., (2002) the principal characteristics that inhibit online banking adoption are security and privacy. In Malaysia it was found that security was main barrier to e-commerce expansion. Security is perhaps the most feared problem on the internet. Banks and customers take a very high risk by dealing electronically.

Rao, et al. (2003) provide a theoretical analysis of internet banking in India and found that as compared to banks abroad, Indian banks offering online services still have a long way to go. The researcher further adds that for online banking to reach a critical mass, there has to be sufficient number of users and the sufficient infrastructure in place. Information technology has introduced new business paradigms and is increasingly playing a significant role in improving the services in the banking industry. Therefore, enhancing the level of service performance acceptance is the major issue to get competitive advantages. Wilson and Sasse, (2004) concluded that end user experience has become an important factor in internet-based businesses because the end user often pays for the majority of new products and services. Therefore, new product characteristics such as perceived risk, ease of use, quality aesthetics, appeal and value for money must be matched or exceeded with customer expectations toward the product. Therefore, assessing customer satisfaction has become very important, especially for high tech products and services. Al-Hawari, et al., (2005) studied on consumer attitude and adoption of internet banking have shown that there are several factors influencing the consumer's attitude towards online banking such as person's demography, motivation and behavior towards different banking technologies and individual acceptance of new technology. Service quality has received much attention because of its obvious relationship with financial performance, customer satisfaction and retentions.

Demography may also affect the usage pattern of internet banking. It is interpreted that the female respondents are yet to get fully involved in internet purchase (Anonymous,

2006). Benamati and Serva, (2007) found that consumer's attitudes toward online banking are influenced by the prior experience of computer and new technology. As far as online banking adoption is concerned, security, trust and privacy concerns have been outlined as extremely important ones from the consumer's standpoint. Further Servon and Kaestner, (2008) emphasized that online banking requires perhaps the maximum consumer involvement, as it requires the consumer to maintain and regularly interact with additional technology. Consumers who use E-banking use it on an ongoing basis and need to acquire a certain comfort level with the technology to keep using it. Khan, et al. (2009) conducted a research study to evaluate the service quality of internet banking services in India from customer's perspective. They developed a battery of 26 items which were condensed to seven quality dimensions: reliability, accessibility, user friendliness, privacy/security, efficiency, responsiveness and fulfillment. The impact of these seven dimensions on the overall internet banking service quality was empirically tested and all the dimensions except user friendliness and fulfillment were found statistically significant.

The above review indicates that measuring the impact of E-banking has attracted much attention from researchers, at the international level but there has not been much analysis on the effect of E-banking on the service quality in the Indian banking industry. So the present paper attempts to fill this research gap and evaluate the factors affecting service quality and determines their effect on demographic variables in Indian banking sector.

OBJECTIVES OF THE STUDY

- To find the factors affecting the service quality of E-banking.
- To determine the relationship between demographic variables and factors affecting the service quality of E-banking

HYPOTHESIS

Overall satisfaction of a customer depends on the psychological, social, emotional and economic characteristics. The demographic variables affect various factors differently. Hence, following null hypothesis have been formulated:

H0 (1): There is no significant relationship between gender and factors affecting the service quality of E-banking.

H0 (2): There is no significant relationship between age and factors affecting the service quality of E-banking.

H0 (3): There is no significant relationship between education and factors affecting the service quality of E-banking.

H0 (4): There is no significant relationship between occupation and factors affecting the service quality of E-banking.

RESEARCH METHODOLOGY

The present study is based on primary as well as secondary data. Secondary data is collected through research papers, journals, websites, books etc. The primary data is collected through structured questionnaire from 200 young respondents during the period

of February 2012 to April 2012. The customers of five banks i.e. State Bank Of India, Punjab National Bank, HDFC Bank, AXIS Bank and ICICI Banks were selected and the rationale for selection of these banks for the study was on the basis of their asset base structure. The respondents were interviewed through a pre-tested questionnaire which was administered personally. Questionnaire had two sections. First section contained questions regarding demographic profile of customers while second section contained a list of 20 statements pertaining to various attributes of E-banking. Convenient and judgmental sampling method has been used keeping in view the socio-economic characteristics. Five-point scale has been used for the said purpose ranging from strongly agree to strongly disagree. Data collected has been analyzed with the help of SPSS-13 version. To find the effect of factors on E-banking services, factor analysis technique was used. Factor analysis is a set of techniques which, by analyzing correlations between variables, reduces their number into fewer factors that explains much of the original data, more economically (Nargundkar 2010).

RESULTS AND DISCUSSIONS

Table 1(a) presents the demographic profile of the respondents. Majority of the respondents were male (79.5%) and the females constituted only 20.5% share of total sample. In terms of age groups, bulk of the respondents fall in the age category of 21-30 (98%) and a meager share of 2% belongs to 31-40 age group. This shows that our sample is inclined towards the opinion of youngsters on E-banking. With regard to the respondents' education, highest number of respondents were post-graduate (69%), followed by graduates (20%) and the remaining were under-graduate (11%). The data reveals the relatively high educational background of the respondents. In case of the occupation, 69% of the respondents were from students' category while 31% of the respondents were working.

Table 1(a)
Demographic Profile of Respondents

Demographic Variables	Demographic Characteristics	Frequency	Percentage
Gender	Male	159	79.5
	Female	41	20.5
Age	21-30	196	98.0
	31-40	4	2.0
Education	Undergraduate	22	11.0
	Graduate	40	20.0
	Post Graduate	138	69.0
Occupation	Student	138	69.0
	Working	62	31.0

Objective 1: To find the factors affecting the service quality of E-banking

In order to achieve the objective of the study, first and foremost, the reliability of the data is tested by using Kaiser-Meyer-Olkin measure of sampling adequacy and Bartlett test of sphericity. The value of KMO statistics in Table 1(b) is >0.5 , therefore, null hypothesis is rejected. null hypothesis is rejected as all the factors are not considered equally important for measuring the service quality of E-banking. Bartlett test of sphericity shows

the value of Chi-square which is significant at 1 percent level of significance. These two tests show that the data is fit for conducting the factor analysis. The sampling adequacy measure was also tested for questionnaire in Table 1(b) and the value found to be 0.569, which is greater than 0.5 and falls between permissible limit of 0.5 to 1 and is considered as highly significant.

Table 1(b)
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.569
Bartlett's Test of Sphericity	Approx. Chi-Square	1020.824
	Df	190
	Sig.	.000

Table 1(c)
Naming Of Factors and Their Factor Loadings

Name of Dimension	Name of Statements	Factor Loading	Reliability	Eigen Values	% of Variance
Authentication and Authorization	1) E-banking provides more punctuality, transparency and accountability.	0.223	.616	2.225	11.123
	2) It provides accuracy in billing.	0.368			
	3) E-banking ensures physical security of the transaction	0.372			
Acceptability	1) It reduces the waiting time to receive service	0.493	.865	1.929	9.643
	2) It is trusted by young generation most	0.505			
Security and Accessibility	1) E-banking service is accessible via internet banking, mobile banking and ATM.	0.267	.430	1.822	9.108
	2) It provides the up to date information	0.299			
	3) E-banking is necessary for the development of new economy of India	0.241			
	4) Password facility provides confidentiality to transaction	0.415			
Promotional Services	1) E-banking provides effective medium of promotion of various schemes.	0.269	.468	1.752	8.761
	2) It provides service at the designated time.	0.347			
	3) Response of service through E-banking is very quick and prompt.	0.525			
Competitive Advantage	1) Online purchase of goods and services including online payment is easier.	0.257	.315	1.743	8.714
	2) Transfer of funds is faster as compared to manual banking system	0.489			
	3) E-banking increases the reputation of the banks	0.429			
Data Integrity	1) It provides convenient location of service facility.	0.353	.567	1.686	8.430
	2) E-banking explains the service itself.	0.424			
	3) It assures customers that the problem will be handled.	0.504			
Ease of Use	1) Transfer of funds is easier through E-banking.	0.330	.432	1.604	8.019
	2) E-banking provides 24*7*365 days service to customers.	0.458			

The results of factor analysis with the variables, their names, factor loadings, reliability, eigen value and percentage of variance is presented in Table 1(c). The Principal Component Analysis Varimax Rotation was employed for extracting the factors. The process of extraction was stopped where the size of Eigen value has gone less than 1.0 and at that level it explained 63.798% of the total variance. Large communalities indicate that a large amount of variance has been extracted by the factor solution. A factor loading represents the correlation between an original variable and its factor. The criteria given by Hair (1995), where factor loading based on sample size taken as the basis for decision about significant factor loading, was adopted. The sample shows a factor loading of 0.4 and above which has been considered significant.

Factor loading is nothing but coefficient of correlation. The factor analysis yielded seven factors which throw light on the most important variables included in each factor. The derived seven factors are: authentication and authorization, acceptability, security and accessibility, promotional services, competitive advantage, data integrity and ease of use.

Factor 1 Authentication and Authorization:

This is an important factor which accounts for the maximum variations (11.123%). Three out of twenty variables have been loaded on this factor. The eigen values of more than 2 (highest among the rest of factors) also highlights that it is the most important factor in respect of identifying the effect of E-banking on the service quality. The components included in this factor are punctuality, transparency, accountability, and accuracy in billing and physical security of the transaction. Thus, E-banking is considered more transparent by the respondents as every transaction is which can be checked and verified anytime.

Factor 2 Acceptability:

The second factor which accounts for 9.643% of the variations has been named as Acceptability. Two out of twenty variables have been loaded on this factor. The eigen value more than 1.9 also highlights that it is also an important factor with respect to the effect of E-banking on service quality, as per the factor analysis. The statements included in this factor are reduction in waiting and trust-worthiness among the young generation. This indicates customers need not to visit the branches which reduce the waiting time. Further, the youth of today has trust on the e-operation of the bank.

Factor 3: Security & Accessibility:

This factor also accounts for maximum percentage of variations that equals to 9.108. Four out of twenty variables have been loaded on this factor. The eigen value more than 1.8 also highlights that it is reasonably important factor with respect to our main objective. The variables included in this factor are ease of access, latest information, confidentiality and development of economy. The results disclose that the most respondents agree that the E-banking provides more confidentiality to the transaction and also lack of E-banking habits in Indians are an important constraint in the development of economy of India.

Factor 4: Promotional Services:

The fourth factor that emerges from the factor model has been designated as promotional services. This factor accounts for 8.76% of the variations. Three out of twenty variables have been loaded on this factor. The eigen value of more than 1.7 also highlights that it is moderately important factor. The statements included in this factor are timely and prompt response and an effective medium of promotion of various schemes. Keeping in view the above analysis, most of the respondents agree to the statement that E-banking can be an effective medium for the promotion of various schemes.

Factor 5 Competitive Advantage:

This factor, which accounts for more than 8.5% of variations, is named as competitive advantage. Three variables out of twenty have been loaded on this factor. The eigen value of 1.743 also highlights that it is slightly important factor with respect to the effect of E-banking on service quality. The statements included in this factor are quick and easy online purchase, convenient location and increase in reputation of banks. It can be concluded that most of the respondents agreed that E-banking provides a competitive edge to the banks and also enhances the reputation of the banks.

Factor 6 Data Integrity:

This factor, which accounts for over 8.43% of variations, has been named as data integrity. Three out of twenty variables load on this factor. The eigen value of 1.686 highlights that, it is comparatively an important factor with respect to the study of E-banking on service quality. The variables included in this factor are convenient location, self explanation of service and assurance of problem handling. It can be concluded that E-banking service can be availed at anytime from any place.

Factor 7 Ease of Use:

This factor, which accounts for over 8.019% of variation, has been named ease of use. Two out of twenty variables have been loaded on this factor. The Eigen value of 1.604 also highlights that it is slightly important factor with respect to impact of E-banking on service quality. The variables included in this factor are easy transfer of funds and round the clock service. It can be concluded that E-banking service is available round the clock throughout the year.

Objective 2: To determine the relationship between demographic variables and factors affecting the e-service quality of banks.

Here, to study the relationship between demographic variables and factors affecting the e-service quality of banks one way analysis of variance (ANOVA) was used. Mean score was calculated for factors where significant relationship between independent variable (demographic) and dependent variables (authentication and authorization, acceptability, security and accessibility, promotional services, competitive advantage, data integrity, ease of use) was observed.

Effect of Gender on Factors:

Table 2.1 displays that the null hypothesis H_0 (1) is partially rejected as it discloses that there is a significant difference between the views of males and females on three factors: security and accessibility, competitive advantage and data integrity. From the descriptive analysis, it is evident that the females have assigned more significance to the above said factors. This may be because the females consider security mechanism as the most important factor than males. Moreover females are also very protective about money in Indian society. Thus, the perception of males and females vary up to a huge extent in terms of the various services of E-banking. Thus, it can be concluded that banks should consider these aspects more seriously while convincing their female customers.

Table 2.1
ANOVA between Gender and Various Factors

Statements	Male	Female	F-value	Significance
Security & Accessibility	-.0983921	.3815693	7.764	.006
Competitive Advantage	-.1416064	.5491567	16.787	.000
Data Integrity	-.0744260	.2886278	4.369	.038

Effect of Age on Factors:

Table 2.2 clearly states that the null hypothesis H_0 (2) is rejected as age is found to be significantly related to the factor competitive advantage. Respondents in the age group of 31-40 were found to be inline with the statement that E-banking plays a significant role in providing a competitive edge to one bank over the other. The difference in the preference can be understood by the stage of their life cycle. Due to higher exposure of electronic media, the respondents were shifting towards E-banking. As they consider it convenient to make online purchases and then making online payments. Moreover the respondents in this age group also believes that E-banking increases the reputation of the banks.

Table 2.2
ANOVA between Age and Various Factors

Statements	21-30	31-40	F-value	Significance
Competitive Advantage	-.0202709	.9932747	4.089	.044

Effect of Qualification on Factors:

Null hypothesis H_0 (3) is also partially rejected as it is observed that three factors authentication and authorization, acceptability and data integrity have significant relationship with the qualification background. As evident from the Table 2.3, one way ANOVA reveals that education has a considerable impact on the perception of the respondents regarding the various services provided by the banks through E-banking. The descriptive analysis shows that the respondents with the intermediate qualification (graduates) strongly agrees with the factors that enhances the transparency, accuracy and security to the transactions and also makes the services and information available at any

place and at any point of time. The reason for this can be the fact that the E-banking is mostly availed & accepted by the younger generation.

Table 2.3
ANOVA between Level of Qualification and Various Factors

Statements	Under-graduate	Graduate	Post - Graduate	F-value	Significance
Authentication & Authorization	-0.7266386	0.4881970	-.0256654	11.770	.000
Acceptability	.5179506	-.0646950	-.0638197	3.396	.035
Data Integrity	-.7076401	.2600614	.0374321	7.406	.001

Effect of Occupation on factors

Null hypothesis H_0 (4) is also partially rejected as occupation is found to be significantly related to all except competitive advantage and ease of use. Table 2.4 shows the results of ANOVA analysis on the various factors evolved with respect to the occupation of the respondents. The results reveal that the non-working respondents (i.e. students) are more inclined towards the facilities and services provided by the banks than the working ones. The descriptive analysis, further justifying the results of one way ANOVA, shows that the students strongly agree with the statements that E-banking provides the competitive advantage to the banks over the banks which don't offer the same. Moreover, they do agree with the fact that the e-banking service is quite easy to understand, use and access. The fact behind this can be that during the study period, the students travel throughout different place across the globe and in those circumstances e-banking can make the money available at any place at any point of time. Moreover during student life, the people are highly exposed and aware about the different innovations and up-gradation.

Table 2.4
ANOVA between Occupation and Various factors

Statements	Student	Working	F-value	Significance
Competitive Advantage	.1016532	-.2262602	4.685	.032
Ease of Use.	.0978818	-.2178660	4.337	.039

Hence, it can be concluded from summary Table 2.5 that gender has significant relationship with security and accessibility, competitive advantage, and data integrity. Where as age is significant with only one factor i.e. competitive advantage. On the other hand qualification has significant impact on authentication and authorization, acceptability and data integrity. While, occupation has significant relationship with competitive advantage and ease of use.

Table 2.5
Summary results of ANOVA

Factors	Gender	Age	Qualification	Occupation
Authentication & Authorization	X	X	√	X
Acceptability	X	X	√	X
Security & Accessibility	√	X	X	X
Promotional Services	X	X	X	X
Competitive Advantage	√	√	X	√
Data Integrity	√	X	√	X
Ease of Use	X	X	X	√

(√) represents significant relation at 1% and 5% level of significance

CONCLUSION

Electronic banking has contributed a lot to improve the service quality of banks internationally as well as nationally. The present paper is an attempt to find the various factors important for the customer satisfaction with respect to E-banking and also how these factors affect the demographic variables of the respondents. The factors taken into consideration provide a wide platform to the banking industry and further scope of improvement. To achieve the objective of the study, the paper developed seven factors having the various sub-factors. In light of the research and analysis done it can be concluded that, internet banking is marked by the factors such as authentication and authorization, acceptability, security and accessibility, promotional services, competitive advantage, data integrity and ease of use. Authentication and authorization, acceptability and data integrity are being considered as the major factors as their factor loading is also very high and hence strongly affect the overall satisfaction of E-banking customers. Alternatively, 'security and accessibility', 'promotional services', 'competitive advantage' and 'ease of use' are considered to be reasonably affecting the overall contentment of customers using internet banking services. Undoubtedly, E-banking is an improvement over traditional banking. To promote customers' satisfaction, it is unavoidable for banks to give due weightage to all the above-mentioned factors. It can also be considered that all the factors are not equally important for measuring the effect of these factors on demographic variables. The results show that the perception of males and females vary up to a huge extent in terms of the various services of E-banking and also about their effect on the service quality. E-banking is mostly availed and accepted by the younger generation.

Thus, technology has also made the banks to put forward new products more competently, and contend globally. Banks have come to recognize that survival in the new e-economy is primarily based on conveying some or all of their banking services on the internet while abiding to maintain their customary methodology. In view of the fact that most of the customers do not use internet banking, the bank has to enhance its services by additional payment tie up so that customers have more options.

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THE ANALYSIS OF THE EFFECT OF STAKEHOLDERS ON THE GROWTH CHALLENGES OF SOCIAL ENTERPRISES USING STRUCTURAL EQUATION MODELING

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Abstract

This study explores the perception of decision makers regarding the effect of stakeholders on the growth related challenges. These stakeholders i.e. funders, channel partners and society are part of the value-chain of social enterprise operations. The aim of the paper is to identify the intensity of the relationship between growth challenges and these stakeholders with the help of structural equation modeling. The approach used is variance based partial least square method. The results show that in the perception of the decision makers, funders can influence the growth prospects of a social enterprise the most. This goes against the traditional view that social entrepreneurs does not bother about the source of the fund and prefers conventional modes like grants and donations. This emphasize that the social enterprises realize the importance of the source and quality of funding. Thus, the major contribution of this study is in establishing the change exhibited by the social enterprises & its decision makers with respect to funding & growth related aspects.

Keywords: Funders, Social enterprises, Partial Least Square.

JEL Classification: L32, C36

INTRODUCTION

Social Entrepreneurs are people who are trying to solve social problems by using entrepreneurial skills. They work in most challenging circumstances to make the world a better place. Their contributions have started getting recognition and the support for them has started pouring in. But the support at the right place and in appropriate way is yet to be realized. Growth is still an issue for start-ups. This calls for an in-depth research on the challenges of social enterprises, which can provide the suitable way forward.

This study explores the perception of decision makers regarding the effect of stakeholders on the growth related challenges. These stakeholders are part of the value-chain of social enterprise operations. The aim of the paper is to identify the relationship between growth challenges and stakeholders effect, with the help of structural equation modeling. The approach used is variance based.

The results show that the effect of funders influence is most significant. The beneficiary and even channel partners do not affect growth according to the perception of the decision makers.

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The paper has been divided in five parts. The next part discusses about the literature pertinent to this research. Then the methodology has been explained. The part after that carries the analysis and results. Following the result discussion, the paper ends with conclusion and future research.

LITERATURE REVIEW

India of today is thriving with the spirit of entrepreneurship. The 'National Knowledge Commission of India' in its 2008 report presents the increasing significance and visible impact of entrepreneurship in wealth creation and employment generation in India's growth and development. The entrepreneurs are being celebrated. The social attitude towards choosing this as a career option is improving. The emerging 'entrepreneurial culture' provides the confidence for the future of entrepreneurship (Leadbeater, 1997; Nicholls, 2006; Bull, 2008).

In its journey, entrepreneurship has evolved into various sub-forms. These forms are developed on the basis of the business model and the operations performed by the enterprises. These new type of entrepreneurship are making their presence felt. They are now in the process of establishing themselves as standalone legitimate areas of research. One such notable area is Social Entrepreneurship. In Indian context, the work for social welfare has been an integral part of the culture. Still the social problems persist. The social workers and activists are also working to solve these problems for ages. But the magnitude of the problem had not reduced. This emphasized the need for an innovative solution. The social enterprises present a way out by combining the entrepreneurial business efficiency along with a deep commitment towards social change.

The origin of the term social entrepreneurship is debatable. In literature Dennis R. Young (1986) first recognized social entrepreneurship when he distinguished the nonprofit entrepreneur from the ordinary manager as the one who "is engaged in breaking new ground rather than engaging simply in customary managerial practices or ordinary decision-making".

Amongst practitioners, Bill Drayton is credited for making this term significantly recognizable (Bornstein, 2010). In 1981, he elected first Ashoka fellow in India.

Since then the field of social entrepreneurship has flourished into identifiable area of research. Today the researchers define social entrepreneur as someone who recognizes a social problem and uses entrepreneurial principles to organize, create, and manage a venture to make social change (Finkle and Mallin, 2007; Bosma & Levie, 2010). This definition is more lucid but the research in this area has been primarily focused on describing and explaining the phenomenon (Short, 2009).

The area is practice oriented, thus the research also needs to be of relevance to them. The practitioners of social entrepreneurship have recognized the importance of identifying challenges and its mitigating factors. The proofs have been the four reports published in 2012 by the organization working in this sector (two by Intellectap, one by GIZ and last one by Asian Development Bank). All these studies report the challenges for the social enterprises.

The research gap left out by these studies comes from the fact that they have considered only 'for profit' social enterprises and ignored the other formats of social enterprises i.e. not for profit self sustaining enterprises and social business (Yunus, Mohammad, 2008). The reports also lack the academic rigor and in-depth analysis.

Funders' perspective

Traditionally, the funds for social ventures mostly come from individual donors, personal relationships, and large foundations. Now the scenario is changing and Impact investor firms are coming into the picture. Impact investing is a term coined by a group of investors convened by the Rockefeller Foundation in 2007 to refer to a broad array of profit-seeking investment strategies that generate social and environmental good as well as a strong financial return. They have come up with innovating funding instruments and partnerships. This has given boost to the availability of funds in this sector. This availability has its own consequences. The accountability of the social enterprises has increased along with this.

Beneficiary perspective

Beneficiaries are one of the primary stakeholders. Their acceptability and engagement is prime objective of the social enterprises. According to Rangan et al (1999) the beneficiary behaviour change is the most difficult challenge for the social enterprise. The most crucial factor in this regard is the social attitude towards social enterprises. This can have an influence on the challenges related to the growth of the social enterprise.

Network & Partners perspective

Creating network and identifying right partner(s) can be one of the essential decisions of a social enterprise value chain. They support in business progression and can help in scaling up the enterprise to the next level.

This study has identified the above mentioned three stakeholders for studying their impact on the growth of the social enterprises.

RESEARCH OBJECTIVE

The objective of this research is to

- 1) Identify the effect on the growth challenges faced by social enterprises caused by three stakeholder i.e. Funders, Societal Attitude and Network & Partner
- 2) Developing a composite causal model of growth challenges and the intensity above mentioned affecting factors

METHODOLOGY

The methodology used in this study is mixed method with dominant quantitative phase. The study explores the phenomenon with in-depth interview with ten social entrepreneurs. The content analysis of the transcripts of these interviews provided the measuring indicator for the constructs. Then the data is gathered from the decision makers of social enterprises through a structured questionnaire based on these indicators.

Then the data is gathered from the *decision makers of social enterprise* through a structure questionnaire based on these indicators. The **sample size** for the study was 53. The sample size is not a constraint in PLS. Barclay et al. (1995) suggest using a minimum sample size of ten times the maximum number of paths aiming at any construct in the outer model (i.e., the number of formative indicators per construct) and inner model (i.e., the number of path relationships directed at a particular construct). In this study that amounts to be $10 \times 5 = 50$. The data has been analyzed to bring out the causal relationship between multiple independent and one dependent variable.

The causal relationships between factors identified were analyzed through structural equation modeling (SEM). It allows the simultaneous modelling of relationships among multiple independent and dependent constructs (Gefen, Straub, & Boudreau, 2000). It is an extension of the factor analysis and regression.

It is applied when the variables of interest cannot be measured perfectly and some observable indicators are used for measuring these variables. They also provide a way to test the specified set of relationships among observed and latent variables as a whole, and allow theory testing even when experiments are not possible.

These observed indicators can be split into two groups: (a) reflective indicators which are construct dependent and (b) formative ones which cause the formation of or changes in an unobservable variable (Bollen & Lennox, 1991). The formative indicators are highly correlated with each other and a change in one may create change in others and the construct, whereas the reflective indicators may have positive, zero or negative correlation with each other (Hulland, 1999).

There are two types of approaches to apply SEM

- Covariance-based techniques (CB-SEM; Jöreskog 1978, 1993)
- Variance-based partial least squares (PLS-SEM; Lohmöller 1989; Wold 1982, 1985).

This study has chosen the variance based PLS-SEM approach for the analysis of the data. According to Chin (1998), in the exploratory settings where new measures are used and less substantial knowledge is available in the area of study, use of PLS SEM is more appropriate. The area of social entrepreneurship is nascent and the scales are not fully developed so this argument in support of usage of PLS SEM is important.

STRUCTURAL EQUATION MODELING

Hair et al (2009) defines structural equation modelling (SEM) as the extension of various multivariate techniques like Factor Analysis and Multiple Regression. It can handle multiple constructs and test multiple relationships between those constructs.

There have been **six** steps identified by Hair et al (2009) for applying SEM for data analysis. The steps are stated below

- 1) Defining each construct
- 2) Developing the overall measurement model
- 3) Designing a study to produce empirical result

- 4) Assessing the validity of the measurement model
- 5) Specifying the structural model
- 6) Assessing structural validity

The steps mentioned earlier have been described in detail in context with this study.

For defining the construct, the views of 10 social entrepreneurs have been taken through personal interviews. The transcripts of the interviews were analyzed using content analysis. This yielded the definition and the indicators of the constructs as below:

Exogenous Variable – These are constructs which have an affect on the other construct but they do not get affected by any other construct. The following three constructs are exogenous which affect the growth.

1) **Funders' Influence (QoF)** – This represents the perception of 'decision makers' about the influence created by fund provider on the growth challenges of the social enterprise. This has been measured by following indicators:

- i) Well planed association
- ii) Newly developed funding options
- iii) Funder's network

2) **Societal Attitude (SA)** – This construct measures the perception of 'decision makers' regarding the attitude of the beneficiary groups. The manifest variables for this are:

- i) Working for social enterprise
- ii) Attitude towards people working for social enterprise
- iii) Beneficiary acceptability

3) **Network and Partners (PN)** – This latent variable depicts the attitude of 'decision makers' regarding network creation and the partners who may help in spreading the work. The measuring indicators for this are:

- i) Network creation
- ii) Selection of partners
- iii) Platform for networking

Endogenous Variable – These constructs experience the influence of exogenous or other endogenous constructs. The Growth challenges of the model is an endogenous construct.

4) **Growth (Gro)** – This endogenous variable represents the challenges faced by decision makers in business progression.

- i) Diversification into new geographical region
- ii) Diversification in offering
- iii) Collaboration with local development organization

The number of measuring indicators per construct has been restricted to three.

Based on the above definitions the measurement model has been developed for the constructs. The mathematical connotation of this measurement model is as below

$$\begin{aligned}
 (\text{QoF}) &= \lambda_{\text{qof1}} \text{M9} + \lambda_{\text{qof2}} \text{M11} + \lambda_{\text{qof3}} \text{M25} + \varepsilon_{\text{qof}} \\
 (\text{SA}) &= \lambda_{\text{sa1}} \text{M23} + \lambda_{\text{sa2}} \text{ME7} + \lambda_{\text{sa3}} \text{M65} + \varepsilon_{\text{sa}} \\
 (\text{P\&N}) &= \lambda_{\text{p\&n1}} \text{M18b} + \lambda_{\text{p\&n2}} \text{M14} + \lambda_{\text{p\&n3}} \text{M16} + \varepsilon_{\text{p\&n}} \\
 (\text{Gro}) &= \lambda_{\text{gro1}} \text{M48} + \lambda_{\text{gro2}} \text{M50} + \lambda_{\text{gro3}} \text{M51} + \delta_{\text{gro}}
 \end{aligned}$$

That has been the basis of further analysis and model development.

Modelling

The process of modelling involves four general stages: specification, estimation, evaluation and modification (Sanchez, 2013).

In the specification stage, the model identified by researchers is put to test and this information is converted into a format of computer program. In the estimation stage, a fitting function is chosen and parameter estimates are obtained for the model. In the evaluation stage, interpretation of the test of model fit and other indices of fit is done. In the modification stage, the original model is modified in accordance with the information obtained in the previous stage as well as theory.

Specification – For specification, following three criteria have to be met.

- 1) First, an identified model must have non-negative degrees of freedom; i.e. the number of estimated parameters should be less than or equal to the number of data points.
- 2) Second, every latent variable in the model needs to be assigned a scale; this is usually accomplished by fixing one of its loadings to one.
- 3) Third, the latent variables need to relate to a few other things or literature to allow their identification. A latent construct with three indicators will be identified; two indicators can work if there is also a non-zero correlation with another construct in the model, or if additional constraints are imposed on the loadings of the indicators

For identification the ‘Three Indicator rule’ (Hair et.al., 2007) has been applied. This provides enough degrees of freedom for the model to be over identified. This can be calculated using the formula $df = p*(p+1)/2 - q$

Here p is the no. of measured variables and q depicts the no. unknown

$$12*(12+1)/2 - 21 = 57$$

This takes care of the identification problem by depicting the model as over identified.

The modelling gives two types of models i.e. Measurement Model or Outer Model and Structural Model or Inner Model. The assessment of PLS path modelling requires analysis and interpretation of both the structural and measurement model. Thus, the study follows a two step process: 1) assessment of measurement model and 2) assessment of structural model. The order is important because it is necessary to understand the measuring instrument before proceeding to the measured value.

ANALYSIS

Outer Model

It depicts the relationship between the measuring indicators and the constructs. As it is important to gauge appropriateness of the measuring instrument, thus the reliability and validity of the instrument have to be established first.

Reliability

It indicates that the internal consistency exists. For establishing this, the unidimensionality of the measurement model is checked.

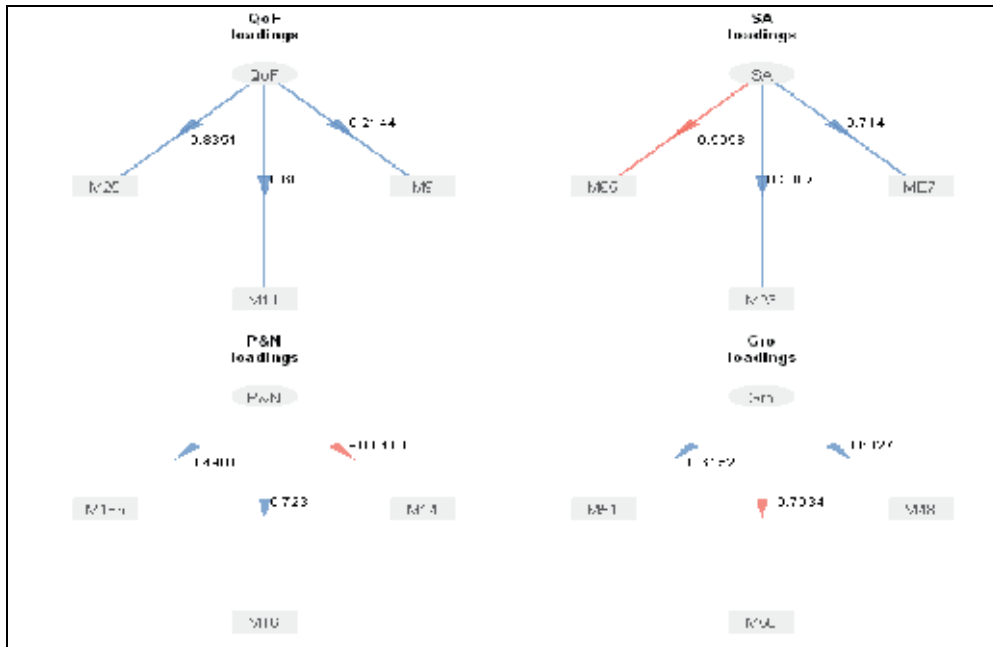
Unidimensionality – The indicators reflect, to some extent, the latent variable that they are associated with. The means that change in construct will change in the indicators. Unidimensionality tests that. In PLS-PM there are three main indices to test unidimensionality:

- Cronbach's alpha – It is an average inter-variable correlation between indicators of a reflective construct. The indicators are supposed to have high correlation. The computation of the Cronbach's alpha requires the observed variables to be standardized and positively correlated. As a rule of thumb, a cronbach's alpha greater than 0.7 is considered acceptable. In exploratory research **0.60 is considered acceptable** (Bagozzi and Yi, 1988)
-
- Dillon-Goldstein's rho – This is another test of unidimensionality. As a rule of thumb, a block is considered as unidimensional when Dillon-Goldstein's rho is larger than 0.7. This index is considered to be a **better indicator than the Cronbach's alpha** because it takes into account to which extent the latent variable explains the block of indicators.
- First eigenvalue of the indicators' correlation
- n matrix – For the block to be unidimensional, the first eigenvalue should be larger than 1 whereas the second eigenvalue should be smaller than 1.

In the case of mixed signs: half of the indicators are positive weights while the other half have negative weights, the Cronbach's alpha and the Dillon-Goldstein's rho are inadequate. Cronbach's alpha requires all indicators in reflective block to be positively correlated. In such cases the construct should be analyzed from heuristic perspective and coding should also be looked at.

Type.	measure	MVs	C.alpha	DG.rho	eig.1st	eig.2nd
QoF	Reflective	3	0.2929	0.678	1.25	0.929
SA	Reflective	3	0.0765	0.411	1.18	0.983
P&N	Reflective	3	0	0.163	1.59	0.86
Gro	Reflective	3	0.1577	0.486	1.35	0.978

As we can see that the C.alpha along with DG.rho is not good except in the case of Qof. Thus, there is a need to check the loading. The path diagrams for the loadings with their respective constructs are as below



The red marked loadings show negative loading. It is present in the three models. So in these three cases the eigen values have to be considered which makes these measuring indicators acceptable.

Validity

It tests the indicators for a construct whether it belongs to the same group. It also establishes the constructs to be significantly distinct from each other. There are various types of validity. The major two are as below:

- Convergent validity – The manifest variables of a construct display a high amount of variance with each other.
 - Average Variance Extracted (AVE) should be higher than 0.5 (Fornell & Larcker, 1981), the emerging field where the scales are not established, may consider AVE more than 0.4
- Discriminant validity – It establishes the distinction between construct
 - The AVE of a latent variable should be higher than the squared inter-construct correlations (Fornell & Larcker, 1981).
 - The loading of an indicator on its assigned latent variable should be higher than its loadings on all other latent variables.

LV.	Type	Measure	MVs	R.square	Av.Commu	Av.Redun	AVE
QoF	Exogen	Reflective	3	0	0.402	0	0.402
SA	Exogen	Reflective	3	0	0.32	0	0.32
P&N	Exogen	Reflective	3	0	0.49	0	0.49
Gro	Endogen	Reflective	3	0.459	0.425	0.195	0.425

The results of the above chart show that the convergent validity is at just acceptable level. The AVE of the construct related to SA is lower than the acceptable level so the measuring indicator loading have to be checked. The chart below presents the loadings of the measuring indicators on the construct.

	weights	std.loads	communal	redundan
QoF				
M9	0.0918	0.214	0.046	0
M11	0.5447	0.68	0.4623	0
M25	0.7304	0.835	0.6974	0
SA				
ME7	-0.6902	0.714	0.5097	0
M23	-0.4313	0.309	0.0953	0
M65	0.6278	-0.596	0.355	0
P&N				
M14	0.6607	-0.841	0.7079	0
M16	-0.5419	0.723	0.5227	0
M18b	-0.1068	0.49	0.2402	0
Gro				
M48	-0.4208	0.633	0.4003	0.184
M50	0.6427	-0.703	0.4948	0.227
M51	-0.4578	0.615	0.3785	0.174

The loadings of the measuring indicators shows that almost all the indicators are fulfilling the criteria of more than 0.4. There are two indicators which are less than the prescribed level. The effect of removing them turned out to be positive. The results are as below:

Unidimensionality

Type.	measure	MVs	C.alpha	DG.rho	eig.1 st	eig.2nd
QoF	Reflective	2	0.297	0.74	1.17	0.825
SA	Reflective	2	0	0	1.06	0.943
P&N	Reflective	3	0	0.163	1.59	0.86
Gro	Reflective	3	0.158	0.486	1.35	0.978

The indicators have improved. This means the reliability of the model has also improved. The indicators for validity also have to be checked.

	LV.Type	Measure	MVs	R.square	Av.Commu	Av.Redun	AVE
QoF	Exogen	Rflct	2	0	0.583	0	0.583
SA	Exogen	Rflct	2	0	0.528	0	0.528
P&N	Exogen	Rflct	3	0	0.482	0	0.482
Gro	Endogen	Rflct	3	0.469	0.414	0.194	0.414

The chart above shows an improvement in the AVE. Thus, it is having a positive impact on the Convergent validity of the model.

For checking the Discriminant validity, the loadings have to be looked at

	weights	std.loads	communality	redundancy
QoF				
M11	0.5156	0.65	0.423	0
M25	0.7716	0.862	0.742	0
SA				
ME7	-0.6945	0.733	0.537	0
M65	0.6812	-0.721	0.519	0
P&N				
M14	0.6328	-0.812	0.659	0
M16	-0.5937	0.762	0.581	0
M18b	-0.0741	0.454	0.206	0
Gro				
M48	-0.3829	0.586	0.343	0.161
M50	0.7158	-0.771	0.594	0.279
M51	-0.4052	0.553	0.306	0.144

This also shows an improvement, so the estimation of the Inner model can be done.

Inner Model

The structural model is evaluated through two indices

- the R^2 determination coefficients
- Goodness of Fit

R^2 determinant coefficients

It is the determinant coefficient for the endogenous latent variables. It is interpreted like multiple regression analysis. It depicts the amount of variance in the endogenous construct which is explained by its independent exogenous constructs. Under the PLS-PM standards more than .70 can be considered as an outstanding R^2 . The values for the R-squared can be classified in three categories (Sanchez, 2013):

1. Low: $R^2 < 0.30$ (although some authors consider $R^2 < 0.20$)
2. Moderate: $0.30 < R^2 < 0.60$ (you can also consider: $0.20 < R^2 < 0.50$)

3. High: $R^2 > 0.60$ (alternatively there's also $R^2 > 0.50$)

\$Gro		
	concept	value
1	R2	0.4694
2	Intercept	0
3	path_QoF	-0.5281
4	path_SA	-0.2075
5	path_P&N	-0.2828

The R^2 of the model suggest a moderate fit of the model. The Goodness-of-Fit of the model is given which also depicts a moderate fit.

GOODNESS-OF-FIT - 0.4801

This model can explain 48% effect of the affecting variables or exogenous variables on the growth challenges. The emerging fields do not have a very established or standardized scale, so this fit is to be acceptable.

To measure the fit of complete model together does not have any specified indicator in PLS (Tenenhaus et al., 2004). Thus, the indicators of the Inner Model are usually taken as the indicator of the overall model.

DISCUSSION

The conclusions can be drawn from the fact that the path loading of the path between growth challenges and funders' influence is highest i.e. 0.5281. Thus, it can be concluded that the growth challenge can be tackled through funders' influence. The source and time of the funding can be crucial for the growth of the social enterprise. The results show that the decision makers of the social enterprise not only consider funding as per their need but they also like to plan the association before committing. On the other hand, they do consider the domain knowledge of the funders but this is not a significant constraint for them. The innovative financial solution can also play a major role in boosting the association between social entrepreneurs and decision makers.

The beneficiaries' acceptability does not have a very significant impact on the growth and related challenges. Similarly the decision makers do not consider networking or identifying partners to be that significant. The mindset of working in silos can be a possible explanation for this research.

CONCLUSION

The study employs structural equation modeling to explore the perception of decision makers of social enterprises about the effect of three stakeholders on the growth related challenges. The findings of the study can be used by the funders while designing the funding options. This can also be referred by social entrepreneurs who are in the orbit going out of the start-up phase towards the growth phase.

The study can be taken further by exploring other stake holders and their perceptions about the growth challenges faced by social enterprises. This will present the holistic picture of the growth issues related to other value chain partners.

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STUDY OF MARKET ANOMALIES AND CHALLENGES TO EMH

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Abstract

Researches across the world have empirically proved that developed country's stock market has shown deviations from strong form of efficiency at some particular time period of year. Such deviations from efficient market are known as anomalies. Empirical evidence indicates that Indian stock market has shown characteristics of semi strong form to strong form of efficiency. This paper has empirically tested various anomalies like day of the week effect, the weekend effect, the turn of the month effect, turn of the year effect, Friday-the 13th effect, Monthly effect, January Effect and Dow-Jones effect. The result indicates that except monthly effect, turn of the year effect and Friday the 13th effect, no strong evidence is found for other anomalies.

Key words: Market, risk-return, anomalies

JEL Classification G14, E44

INTRODUCTION

The Efficient Market Hypothesis (EMH) posits that stocks are priced efficiently to reflect all available information about its intrinsic value. In other words, an efficient market is one in which all unexploited profit opportunities are eliminated by arbitrage. As per EMH prices respond only to information available in the market and as all participants are privy to same information; no one has the ability to out-profit anyone else. In other words, in efficient markets, prices are not predictable but random; so no investment pattern can be determined. Thus, the planned approach to investment is not successful. The 'random walk' theory born out of EMH theory results in the failure of any investment strategy. In an order for a market to be efficient; it is perceived that market is inefficient and possible to beat and so investment strategies to take the advantage of inefficiencies are actually the fuel that keeps the market efficient. Expecting EMH in its purest form is difficult, but there are three identified classification of EMH.

1. Strong form of efficiency: This is the strongest version of EMH which states that all information in a market whether public or private is accounted for in a stock price and no insider information can give any advantage to any investor.
2. Semi strong form of efficiency: Semi strong form of EMH says that all public information is calculated in to a stock's current share price.
3. Weak form of efficiency: This type of EMH implies that all past prices of stocks are reflected in today's stock prices.

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EMH propagandists state that in practice profit seekers try to exploit whatever available opportunities and/or abnormalities exist until it disappears. In the real world, market cannot be absolutely efficient or wholly inefficient. So, it is reasonable to see the market as a mixture of both; wherein daily decisions and events cannot always be reflected immediately in to a market. If all the participants believe that market is efficient, no one would seek extraordinary profit; this in fact is the force that keeps the wheels of the market moving.

In the real world, there are number of examples and arguments against EMH. There are portfolio managers and investors who have beaten the market and their investment strategies have reaped them profit. So, one question can arise here is that how stock prices can be considered as a random when people are able to tap such investment opportunities. Counter argument to EMH implies that consistent patterns are present. There are some of the certain and systematic deviations have been found and recorded even in developed stock markets of the world. Many researches in the area of behavioral finance have revealed the effects of investor psychology on stock prices and some predictable patterns in stock markets.

Some puzzling empirical evidence about the relationship between the stock market and calendar has been uncovered. In financial markets, anomalies refer to situations when a security or group of securities or market itself performs contrary to the notion of efficient markets. Because of constant release and rapid dissemination of new information; efficient markets are hard to maintain. The inefficiencies in the market are reflected by market anomalies. Some of such deviations observed in the market are: the average monthly return in the New York Stock Exchange is significantly higher in January than during the rest of the year (Cadsby Bram Charles 1992). Average daily returns for S&P 500 index are negative on Monday, positive on other days and highest on Wednesdays and Fridays over a number of different time periods (Russell 1991). Similar effects have been found in other countries. There are many market anomalies; some occur and disappear and some are continuously observed. Anomalies that are linked to a particular time are called calendar effects. Some of the most popular calendar anomalies are weekend effect, the turn of the month effect, the turn of the year effect, January effect etc. Not all anomalies are related to time of the week, month or year. Some are linked to the announcement of information regarding stock-splits, earnings and mergers and acquisitions etc. For a condition of an efficient market of any economy, such anomalies should not occur and if they occur they should not persist. Still it has been not clear why anomalies occur. Researchers and market experts have offered several different opinions, but many of the anomalies have no conclusive explanations. It is like a chicken and egg scenario with them and which came first is highly debatable. There is no clear cut evidence that anyone can consistently earn the profit by exploiting such anomalies. The first problem lies in the need for history to repeat itself.

REVIEW OF LITERATURE

Research by Cadsby Bram Charles (1992), titled “The CAPM and the Calendar: Empirical Anomalies and the Risk-return Relationship”, is based on the earlier research conducted by Tinic and West (1984). The research conducted by Tinic and West (1984) argue that a trade-off between return and risk exists only in January. However the first

observation of this research concludes that contrary to Tinic and West's findings, the CAPM risk premium is significant both in January and during rest of the year from January 1963 to December 1985. The second observation is that January effect is really a turn of the year effect where the turn of the year runs from about December 24 to January 28. Also the CAPM risk premium is significant at the turn of the year but not during the rest of the year. Thirdly, for each calendar effect on stock returns, there is a corresponding calendar effect on the risk-return relationship. Thus, estimates of CAPM risk premium are significant and positive during periods such as turn of the year, the turn of the month and the latter part of the week where stock returns do particularly well.

A research article by Avramov Doron and Chordia Tarun (2006), titled "Asset Pricing Models And Financial Market Anomalies" has developed a framework that applies to single securities to test whether assets pricing models can explain the size, value and time of market anomalies. When stock level betas were allowed to vary with firm level size and other macroeconomic variables, size and value of the stock also varied. However when betas were kept constant, very poor result of market anomalies was found. In summary, time varying beta versions of multi-factor models can capture the size and book to market effects.

Study by Lundholm J Russell (1991), in the research paper titled "What Affects the Efficiency of a Market? Some Answers from the Laboratory" has considered how a different feature of a market which affects its price and allocation efficiency. This study was conducted in a laboratory setting; it was possible to measure efficiency of the market and to manipulate different features of the market. The study concluded that the nature of the information asymmetry is very important.

Research paper by Sarkar Nityanand and Mukhopadhyay Debabrata(2005), titled, "Testing Predictability and non-linear dependence in the Indian Stock Market" suggests a systematic approach to studying predictability and non-linear dependence in the context of the Indian stock market. The study has found that Indian stock market is predictable and the observed lack of efficiency is due to serial correlation, non-linear dependence, day-of-the week effects, parameter instability, conditional heteroskedasticity, daily level seasonality in volatility, short-term interest rates and some dynamics in the higher order moments. In their approach, inefficiency has been defined to include non-linear dependence in returns as well. Authors have found some predictability in Indian stock market, represented by four indices such as BSE Sensex, BSE 100, Nifty and Dollex.

As per the authors Ajayi A Richard, Mehdian Seyed and Perry J Mark (2004) a notable anomaly is the Monday effect in the daily stock returns which suggests that stock returns are significantly lower or negative on Mondays relative to other days of the week. The paper discusses that the day of the week effects has been investigated extensively in United States and other advanced economies; it has not been observed commonly in Eastern European Emerging Markets (EEEM). For this purpose the paper has used daily closing values of major stock indices in each of the EEEM countries. The outcome of the study indicates negative Monday returns in six of the eleven stock markets and positive Monday returns in the remaining five. The paper indicates that two of the six negative Monday returns and only one of the positive Monday returns are statistically significant. The paper has also tested mean return of the Monday versus the mean return during the

rest of the week and variance of the Monday returns versus the variance of the return during the rest of the week. The results show that the difference in means is statistically significant in only one country and the difference in variance is statistically significant in four of the eleven markets.

A research paper by Malkiel G Burton(2003), titled, "The efficient Market Hypothesis and its critics" discusses that as long as stock market exists, the collective judgment and behaviour of investors may make sometimes some mistakes and also some participants' behaviour is irrational. Because of such collective effects, pricing irregularities and predictable patterns in stock returns can appear over time and can persist over short periods. Due to this market deviates from efficiency.

A paper by Ferson E. Wayne, Heuson Andrea and Su Tie(2005), titled, "Weak Form and Semi Strong Form Stock Return Predictability Revisited", makes indirect inference about the time variation in expected stock returns. For that authors have compared unconditional sample variances to estimate expected conditional variances. Research concludes that weak form tests find no reliable evidence of predictability; while semi-strong test find small but economically significant predictability.

Ziembra W. T and Hensel C.R. (1994) have tested anomalies and presented in their research paper titled, "World-wide security Market Anomalies". The finding of their research says that the turn of the month effect seems to be a worldwide phenomenon. The returns on individual days during turn of the month (TOM) were very high.

RESEARCH METHODOLOGY

As it has been very well argued by many researchers (Nitayand, Mohanty and Pandian) that Indian market shows characteristics of semi strong form of efficiency. However at the same time it has been also argued that due to revolution in Information Technology and demographic dividend effect, Indian capital market is moving towards efficiency. Many such calendar and information anomalies are found in developed and developing countries of the world. Here an attempt has been made to empirically test whether such calendar anomalies exists or not. As no conclusion can be derived from short term trend of the market, it was decided to take last ten years daily closing values of Sensex for study. Data for this study are taken from www.bseindia.com for a period of April 1, 2002 to May 31, 2012.

Objective:

1. To find out whether different types of calendar anomalies really exist or not.
2. To find out the effects on return to the investors.

DATA ANALYSIS

1. The day of the week effect

The day of the week is calculated by taking average return of each day of the week separately. To investigate the Day of the week effect, the average return for various days of the week for 10 years (2002 to 2012) were taken for study. The day of the week effect

says that returns on Mondays are consistently lower even in most of the developed markets of the world.

From the table 1 and 2 it can be revealed that for majority of the years and also for the sub-periods average return on Monday is lower but the trend is not consistent throughout the period. i.e. from table 1 it can be observed that for year 2003-04, 2004-05 and 2008-09 average return on Mondays is higher than many other days of the week.

Table 1.
Means, standard deviations, t-statistic of the returns on the BSE sensx by day-of-the week

	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY
2002-03					
Mean	2.01088	2.13001	2.08251	2.28376	2.30938
S.D.	1.09891	1.09020	0.77440	0.98503	1.17457
T-statistics	13.195	13.536	18.631	16.394	14.041
2003-04					
Mean	2.45368	2.15508	2.24412	1.89305	2.68596
S.D.	1.50882	1.28978	1.21687	1.46958	1.28267
T-statistics	10.687	12.049	13.679	9.017	14.658
2004-05					
Mean	1.93550	2.19550	1.94348	2.28179	1.95735
S.D.	1.94341	1.69271	1.00868	1.07158	1.53758
T-statistics	7.042	9.353	13.487	15.355	8.727
2005-06					
Mean	1.85656	1.70027	1.76990	1.54239	1.63778
S.D.	1.09104	0.87949	0.93296	1.08466	1.08662
T-statistics	12.152	13.806	13.143	9.852	10.658
2006-07					
Mean	1.06181	1.22941	1.37810	1.71662	1.54150
S.D.	1.82345	1.45866	1.63430	2.00544	1.80901
T-statistics	4.034	5.839	5.963	6.054	5.904
2007-08					
Mean	0.89919	1.32240	1.26084	0.87982	1.32436
S.D.	2.39460	1.79033	1.84014	1.61502	1.88547
T-statistics	2.734	5.065	4.845	3.852	4.917
2008-09					
Mean	1.50575	1.24222	1.54774	1.38197	1.078669
S.D.	2.92821	2.50855	2.74831	2.62384	3.259630
T-statistics	3.563	3.536	3.982	3.572	2.293
2009-10					
Mean	1.71999	1.38838	1.51891	1.32692	1.53505
S.D.	3.20751	1.46412	1.66404	1.49051	1.43499
T-statistics	3.637	6.570	6.646	6.233	7.176
2010-11					
Mean	1.55221	0.89255	1.15704	1.17548	0.95504
S.D.	1.10935	1.02870	1.03129	1.11682	1.14207
T-statistics	10.090	6.377	8.097	7.590	5.734
2011-12					
Mean	1.08885	1.61836	1.59694	1.21007	1.37291
S.D.	1.36969	1.31716	1.14014	1.31420	1.30324
T-statistics	5.565	8.688	10.003	6.312	7.224

The t-statistics shown in the table 1 indicates the daily returns at the beginning of the week are positive for all the days of the week, and for the whole period at 5% level of

significance. The results of sub periods and for BSE Sensex indicate that the distributions of daily returns vary by day-of-the week while return on Friday is significantly positive; the average returns on Monday Tuesday and Wednesday are also not negative.

Table 2
Means, standard deviations of the returns of sub periods on the BSE Sensex by day-of-the week

	Monday	Tuesday	Wednesday	Thursday	Friday
2002-04					
Mean	2.23227	2.14255	2.1633	2.0884	2.4977
S.D.	1.31538	1.19222	1.03070	1.25757	1.23704
2004-06					
Mean	1.89603	1.9479	1.8567	1.9121	1.79755
S.D.	1.56442	1.36884	0.97081	1.13486	1.32713
2006-08					
Mean	0.98049	1.2759	1.31945	1.2982	1.43295
S.D.	2.13334	1.62648	1.73246	1.85991	1.84163
2008-2010					
Mean	1.61287	1.3153	1.5333	1.35445	1.3069
S.D.	3.05336	2.06012	2.25512	2.09425	2.54273
2010-12					
Mean	1.32053	1.2555	1.37695	1.1928	1.16395
S.D.	1.25790	1.22588	1.10092	1.20834	1.23622

2. The weekend effect

It describes the tendency of stock prices to decrease on Mondays, meaning that closing prices on Monday are lower than closing prices on the previous Friday. For some unknown reason, returns on Mondays have been consistently lower than every other day of the week¹.

Table 3
Means of the weekend effect

	Monday	Tuesday	Wednesday	Thursday	Friday
2002-03	2.01087	2.13	2.0825	2.2838	2.3094
2003-04	2.45367	2.1551	2.2441	1.893	2.686
2004-05	1.9355	2.1955	1.9435	2.2818	1.9573
2005-06	1.85656	1.7003	1.7699	1.5424	1.6378
2006-07	1.0618	1.2294	1.3781	1.7166	1.5415
2007-08	0.89918	1.3224	1.2608	0.8798	1.3244
2008-09	1.50575	1.2422	1.5477	1.382	1.0787
2009-10	1.71999	1.3884	1.5189	1.3269	1.5351
2010-11	1.5522	0.8926	1.157	1.1755	0.955
2011-12	1.08885	1.6184	1.5969	1.2101	1.3729

The reason behind the weekend effect is similar to that of day of the week effect. From the table 3 we can see that average return on the Friday of year 2002-03 is 2.3094 percent (which is a previous year for this analysis) while average return for Monday 2003-04 (which is a next year in this analysis) is 2.45367 percent. This does not fulfil the condition for weekend effect anomalies. However, the weekend effect anomalies is found for the year 2003-04 to 2007-08; while for the years 2008-09, 2009-10 and 2010-

¹<http://www.investopedia.com/articles/stocks/08/market-anomaly-efficient-market.asp#ixzz1gPFVpxCS>

11, the previous year average return of Friday is lower than average return of Monday for the next year. So, it can be concluded that weekend effect is not found in recent years which shows that market is moving towards semi-strong form of the efficiency in the recent years.

3. The turn of the month effect

This describes the tendency of stock prices to rise on the last trading day of the month than the first three trading days of the next month. Here, this effect has been analyzed.

Table 4
Return for turn of the month effect

		2002-04	2004-06	2006-08	2008-10	2010-12
JAN	Last Day	2.40091	2.62991	1.00345	1.45949	1.33301
	First 3 Days	2.39370	1.68888	1.16461	2.72056	1.60063
FEB	Last Day	1.57595	3.02569	0.34465	2.68416	2.10380
	First 3 Days	2.13304	1.47094	2.48780	1.30001	1.81659
MAR	Last Day	3.01805	3.04566	-1.56528	1.74124	1.71180
	First 3 Days	2.14183	2.04404	-0.48927	1.28605	1.80063
APR	Last Day	1.64966	2.24326	-0.70380	1.99610	2.68981
	First 3 Days	2.90236	1.64588	2.15673	3.29646	1.74650
MAY	Last Day	2.92820	0.65490	1.84404	2.87746	0.85333
	First 3 Days	2.60301	2.24598	1.59035	2.17658	0.08598
JUN	Last Day	2.31373	1.45839	-0.05190	2.62584	2.11066
	First 3 Days	3.05642	2.17810	1.00946	0.52975	1.09818
JUL	Last Day	2.93906	1.92022	3.99786	-0.92603	2.17725
	First 3 Days	2.64170	2.08352	2.02799	1.36102	0.97045
AUG	Last Day	2.34673	2.46177	2.48338	2.41230	0.93738
	First 3 Days	2.30075	2.02489	1.09161	2.17702	1.39938
SEP	Last Day	3.69692	2.27440	1.80485	2.27923	1.96406
	First 3 Days	2.23557	2.15946	1.67710	1.34592	1.74687
OCT	Last Day	1.95582	2.24631	1.90728	3.13338	0.85102
	First 3 Days	2.44741	2.49055	1.58105	-0.24581	0.91377
NOV	Last Day	4.51271	2.88036	0.99829	5.17324	1.20369
	First 3 Days	2.82951	3.03351	1.10702	2.29689	1.39921
DEC	Last Day	2.84931	1.56940	2.28424	2.79505	1.98384
	First 3 Days	2.61184	2.02694	1.64423	1.18980	2.36582

The data of Bombay Stock Exchange for last 10 years shows the return of the last day of previous month is even more than the average return of the first three days of the next month. The bold figures indicate year and month where market anomaly exists.

4. Turn-of-the-year effect

The turn-of-the-year effect describes a pattern of increased trading volume and higher stock prices in the last week of December and the first two weeks of January. Here for analysis purpose, average return is calculated by taking daily stock prices data rather than trading volume.

Table 5
Return and risk for Turn of the year effect

	Last week of the December	First two weeks of the January	Days Except Last Week of December and 1 st Two Weeks of January
2002-03			
Mean	2.428252	2.032081	2.163512532
S.D.	0.622808	0.648833	1.055689228
2003-04			
Mean	2.78607	2.290987	2.2804814
S.D.	0.702649	1.222101	1.36961279
2004-05			
Mean	<u>2.114102</u>	1.190276	2.099581276
S.D.	0.722286	1.521247	1.490643651
2005-06			
Mean	<u>1.779702</u>	1.409046	1.71310647
S.D.	1.47907	0.922432	1.008042672
2006-07			
Mean	1.81478	1.466237	1.363919667
S.D.	0.88946	1.512661	1.751503446
2007-08			
Mean	<u>1.990182</u>	1.028982	1.132875043
S.D.	1.542496	0.903082	1.944904545
2008-09			
Mean	1.793156	1.572779	1.350945125
S.D.	2.02737	3.397519	2.789970382
2009-10			
Mean	2.014593	1.13614	1.499265591
S.D.	1.364939	0.475337	1.987978344
2010-11			
Mean	<u>1.463335</u>	0.234197	1.189831487
S.D.	0.547453	1.295694	1.089311777
2011-12			
Mean	1.247176	1.999686	1.349944836
S.D.	1.03884	1.094791	1.30107092

The bold figures indicate years where complete turn of the year effect exists, while the underlined figure indicates partial turn of the year effect exists. For the year 2011-12, no such anomalies are found.

5. Friday – the 13th effect

One of the deep-rooted superstitions found in Indian society is Friday the 13th effect. It is considered as black Friday even in many developed countries. In this context, it has been attempted to analyse the stock market behaviour of all Fridays from year 2002-12 on which 13th calendar day is found. Total 17 such Fridays were observed in this last 10 years.

Table 6
Friday-the 13th effect

FRIDAY – The 13 th	2002-2012
Mean	2.90975
S.D.	2.29705
Observation	17
OTHER FRIDAYS:	
Mean	1.55593
S.D.	1.76271
Observation	479
t-Statistic	20.473

From the table it can be observed that average return and risk for total 496 Friday were calculated between year 2002 to 2012. Out of these, 13th date was found on total 17 Fridays and remaining 479 other Fridays were taken where other than 13th date was falling. From this table it can be observed that mean return on Friday –the 13th is higher than that on other Fridays although the difference is not statistically significant. The result indicates that there is certainly no evidence of mean returns being lower on Friday the- thirteenth than on other Fridays for the whole period. Thus, it may be concluded that there is no “Friday- the thirteenth effect” in Indian capital Market.

6. Monthly effect

One of the anomalies observed in the market is that Mean daily returns in the first half of the month is equal to the mean daily return in the second half of the month. In testing the monthly effect, the first half of the each month is defined as the period which includes 30th & 31st calendar days of previous month and 1st to 14th calendar days of the month, while the second half comprises the rest of the calendar days that are from 15th to 29th. The returns across the first half of the month as well as the second half of all the months for the Sensex are shown below.

Table 7
Return and risk of the monthly effect

	Average Return across Calendar Days (30, 31...&1 to 14)	Average Return across Calendar Days (15 to 29)
Mean	1.646188	1.5868
S.D.	0.789293	0.916944
No. of Observation	1264	1234
t-statistic	28.798	25.297

The return values across the first half as well as the second half of all months along with the t statistic is shown in table for Sensex indicates that the first half of the month is significant higher than that of second half of the month.

1. January effect

The January Effect is another persistent and well found anomaly in the financial market. Numerous researchers have found that the average return on January has been unusually high than other months and this phenomenon is referred to as “January effect”.

Table 8
Return and risk of the January effect

Month		2002-12	2002-03	2003-04	2004-05	2005-06	2006-07
Jan.	Mean	1.40	2.0069	1.6327	1.8385	1.7170	1.3100
	S.D.	0.64	0.6993	2.0266	1.5246	1.0135	1.1615
	t- statistic	11.216					
Feb.	Mean	1.47	2.2592	1.7778	1.8696	1.6283	0.7409
	S.D.	0.47	0.7853	1.4880	0.7901	0.8971	1.5072
	t- statistic	14.093					
Mar.	Mean	1.55	1.9150	1.7561	1.5420	1.6785	1.3467
	S.D.	0.49	1.1070	1.4393	1.0116	0.8772	1.9368
	t- statistic	13.363					
Apr.	Mean	1.63	1.7068	2.1693	1.6632	1.4040	1.4489
	S.D.	0.48	0.9744	1.1992	1.1619	1.2264	1.5929
	t- statistic	16.410					
May	Mean	1.53	1.7202	2.7326	1.1816	2.0949	0.6403
	S.D.	0.79	1.5251	0.7074	3.7641	0.6436	2.4779
	t- statistic	9.776					
Jun	Mean	1.62	2.2389	2.8158	2.4130	1.7196	1.6465
	S.D.	0.74	1.1757	1.0165	1.3101	0.7537	3.2430
	t- statistic	13.934					
Jul	Mean	1.73	1.8403	2.3878	2.6762	1.6498	1.5442
	S.D.	0.47	1.0346	1.0247	1.0382	0.9073	1.9501
	t- statistic	15.577					
Aug.	Mean	1.69	2.8214	2.6611	2.2831	1.4340	1.7791
	S.D.	0.66	0.9065	1.3430	0.9074	0.9592	0.6655
	t- statistic	17.127					
Sept.	Mean	1.74	2.0114	2.2136	2.4944	1.8747	1.6480
	S.D.	0.47	0.8305	1.6675	0.7283	1.0933	1.0442
	t- statistic	18.372					
Oct.	Mean	1.55	2.3595	2.3139	2.1436	1.2323	1.5401
	S.D.	0.65	0.9623	1.4275	0.8879	1.4141	0.9345
	t- statistic	10.569					
Nov.	Mean	1.71	2.8404	2.1978	2.4723	2.1535	1.5052
	S.D.	0.68	0.6520	1.3003	0.6853	0.9969	0.5855
	t- statistic	14.089					
Dec.	Mean	1.74	2.3986	2.6138	2.0936	1.8057	1.2713
	S.D.	0.55	0.8378	0.8913	0.7547	1.0867	1.4617
	t- statistic	18.177					

From table 8 it can be observed that no consistent pattern exists to show January effect. The average return of the month of the January for whole period 2002-12 and for sub-periods has sometimes outperformed average return of February but not of other months. In fact the average returns from August to December are found higher due to monsoon, Diwali festival and English New Year reasons. Thus there is no clear cut evidence about January effect in Indian stock market.

2. Dow Jones effect

It is generally believed that the Indian stock market follows the trend of previous day of developed foreign stock market. It means if the foreign stock market shows upward movement on Monday, the Indian Stock market reacts in the same direction on the Tuesday. So, here it was tried to identify that this belief is right or wrong. For the return of Dow Jones & Sensex, correlation is 0.2100, positive correlation means that if Dow Jones Index shows upward trend, then Sensex will also move up which implies that the Dow Jones Index affects the Sensex but the relationship is not so strong.

CONCLUSION

There were total eight calendar anomalies empirically tested for a period of 2002 to 2012. From this study, it is clearly found that there is no such black Friday or Friday the 13th effect is observed in Indian stock market. Contrary return on Friday the 13th is found substantially higher than other Fridays of this ten year time period. Similar result is found for monthly effect where average return on first half of the month is higher than that of second half. For January effect it can be said no such anomaly exists in Indian market. However Indian stock market shows very well supportive evidence for turn of the year effect where return of the last week of December is found higher than return of the first two weeks of January. Similar result is found for turn of the month effect and weekend effect. For day of the week effect it can said that no such anomalies exists. From this study it can be concluded that no such any type of strong anomaly is found in the recent year of study which is 2011-12. Anomalies or some identified patterns are found during 2006-07 to 2009-10. Thus, it can be concluded that Indian market is moving towards semi-strong to strong form of efficiency.

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CASE STUDY:

“SI IRON – AN ENTREPRENEUR’S PREDICAMENT”

Rahul Gupta*

Abstract

As new orders through sales associates were received by Mr. Sushil Kumar, Managing Director Si Iron Products, as a result of hard work put-in by his organization in last many years. They were receiving raw material for making Wire mesh, and other related products, having ample raw material, required machinery and facilities with them, the issue Suhil kumar faces is labour absenteeism and lack of trained manpower, for manufacturing of these products. He is vexed about requirement for technical staff, processing staff, knitting and pressing staff for fulfilling Total Quality Commitment in his organization. Customers are satisfied and pouring orders and he need to supply them on a regular basis, he knew that if this issue can be taken care with his efforts, the sky is the limit for him in the future.

Key Words: Fitters, Wire Mesh, Growth

INTRODUCTION

July 10, 2013, was a rather good day for Mr. Sushil Kumar, Managing Director, Si Iron Products Limited ²(Si Iron). Most of telephone calls he received during the day from Si Business Associates (SBAs)³ carried good news about the new orders booked by them from various parts of the state. Most of the SBAs were naturally upbeat as they were encouraged by increasing flow of new orders. Hard work done in last many years for developing the market for Wire Products was beginning to pay off and the business prospects seemed bright. Sushil was also delighted, but sitting in his office in mid-town Bareilly, experiencing the onset of monsoons, he was preoccupied with the thought of an issue, in executing the orders, which were beginning to crop up as Si Iron’s scaled up its business.

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² Si Iron was a Nail, Wire mesh, Wire bed Wire and Chicken mesh manufacturer at Bareilly (State of U. P.), in India.

³ Si Iron preferred calling its franchisees as Si Business Associates (SBAs), as it treated them as key partner in company’s endeavor of achieving rapid growth. Relationships with SBAs were carefully nurtured.

Within the next 10-15 days, from receipt of orders, raw material from NCR region would reach factory and had to be installed on machines. Sushil knew his factory is in short of Fitters⁴. This often caused problems such as; Failure in supply schedule, supply beyond the committed date; below the prescribed standards of specifications not being as neat as Si Iron's quality standards prescribed; local Fitters called up in factory for machine work are failed on minor issues, because, fitters were not properly trained. In addition he felt in some cases he will have to hire Fitters from the consultants, the fitters were not trained enough to handle premium range of products, requiring higher degree of skills and care.

Sushil strongly felt that some solution for shortage of trained fitters had to be found; else these could become an impediment in Si Iron's rapid growth plan. Sushil also thought of increasing its market base from Uttar Pradesh to adjacent states so that full utilization of the machines can be done and if required capacity extension can be done by purchasing new machines available in NCR Delhi region.

COMPANY BACKGROUND

Si Irons Mission Statement says....

"We will provide engineering and customer service while maintaining cost leadership in order to exceed our customers' expectations, add value to their interests and ensure continuous opportunities for our people."

Sushil a young entrepreneur after graduating from college and seeing the growth impending of business in the country, after economic reforms in 1991, and industrial development in the region, thought of having a manufacturing unit, after exploring many available options, Sushil purchased and installed wire mesh making machines, nail making machines, bar bid wire making machines and thin wire mesh making machines for Coolers and mesh used under plaster for giving strength, and started manufacturing these items, market was on the increase and regular orders were impending, Si Iron was able to get a good market share, earn confidence of dealers and customers in terms of quality and availability of product on time and of required quantity, Now production was at good speed and suhil was able to supply the required quantity at right time place and quantity. The company's position in to the eyes of customers and SBAs' was escalating as their business was growing (Exhibit 1).

Wire Mesh manufacturing process

The manufacturing of wire mesh is not a complicated process; it requires few simple steps for converting raw wire into a useful wire mesh. The manufacturing of wire mesh is done through five phases:

Phase I: Technical Sales and Engineering

Tooling and required equipments are designed in built in-house, by eliminating lead times and outsourcing costs traditionally associated with wire mesh making process.

⁴ Fitters - Industry name for workers', who works on Machines for making the products.

Phase II: Raw Material Processing

Si Iron used to purchase basic raw material from few raw material suppliers from NCR Delhi, raw material usually comes in Gittle (Spools), these spools are being fitted on a machine and being spiralled around big rollers and from these rollers these wires are being transferred to small Charkhis. These Charkhis are used on wire mesh making machine which uses these wires for making wire mesh.

Phase III: Knitting and Pressing

The knitted wire mesh manufacturing process forms wire into a series of interlocking loops to create a flexible cylinder of material. The “sleeve” of knitted wire mesh is then formed into a roll and further processed by flattening, shaping, crimping, and over-knitting to satisfy the performance requirements.

Phase IV: Distribution

Si Iron has positioned itself to satisfy customer needs in every region quickly and cost effectively. Additionally Si Iron is equipped to handle Just-in-time shipping for supply.

Phase V: Total Quality Commitment

In every phase of operation, Si Iron is committed to total quality management. As an organization, streamlined daily business functions from manufacturing to back-office management allow us to maximize the value Si Iron offer to its customers.

Wire mesh is usually five feet height and ten meters long. After making wire mesh, these are being coloured with different colours in order to distinguish it from competitors. SBA's usually place orders to Si Iron by using the colour codes of the wire mesh as per the requirements from their customers.

Uses of wire mesh

Different quality of wire mesh is being made as per the requirement of the customers on different types of machines with different type of raw materials. The reinforcing wire mesh is mostly used in cement concrete work for construction of buildings, National Highway pavements, runways, dams, airports etc. the bar bid wire is used for doing fencing work on boundaries of premises. This wire mesh is used in plastering for giving strength. Nails have various uses in Industry as well as it many house hold usages.

Woven wire mesh with very small openings is often called wire cloth. It is the most popular variety of wire mesh because it is widely used in screens for windows and doors. Wire cloth comes in a number of different opening sizes. If you're looking to create airflow, but keep small bugs out, wire mesh is for you; it is the perfect material to use for enclosing a porch.

INDIA GROWTH STORY

Indian economy went through far reaching reforms in early 1990s, encompassing removal of licensing for setting up of new manufacturing units or for expansion of existing capacities, de-reserving of industries which were earlier exclusive domain of

Government or were reserved for small scale sector. This was coupled with easing of norms for imports, entry of foreign companies & relaxation of FDI norms.

Rapid strides were also made in development of support services and infrastructure, though still a lot remained to be achieved. Indian economy was moving on a higher growth trajectory and the sentiment is well captured in the following extract from the Annual Economic Survey 2007-08, published by Ministry of Finance, Government of India:

“The economy has moved decisively to a higher growth phase. Till a few years ago, there was still a debate among informed observers about whether the economy had moved above the 5 to 6 per cent average growth seen since the 1980s. There is now no doubt that the economy has moved to a higher growth plane, with growth in GDP at market prices exceeding 8 per cent in every year since 2003-04. The projected economic growth of 8.7 per cent for 2007-08 is fully in line with this trend. Country has seen a different group of customers from pre liberalization period's deprived group of 77 percent consumers which remains today only 3 percent, and growth of middle class consumers from 8 percent to 60 percent by 2025 giving a multinational stormed into country. There was acceleration in domestic investment and saving rates to drive growth and provide the resources for meeting the 9 per cent (average) growth target of the Eleventh Five-Year Plan⁵. Macroeconomic fundamentals continue to inspire confidence and the investment climate is full of optimism.”

(Source: Union Budget & Economic Survey 2007-2008, Ministry of Finance, Government of India)

Economic growth also led to higher per capita income and per capita expenditure and India was witnessing a consumer boom. India with population of about 1,150 million being the second largest populated country in the world, next to China, emerged as an attractive emerging market investment destination. Sheer size of the market with rapidly increasing affluence was too large to be ignored. Many global companies had either entered or were evaluating a possible entry. Local Indian entrepreneurs too were sprucing up their products and services to face international competition. See Exhibit 2 for key economic indicators of Indian Economy.

Fitters

An engineering fitter fits and assembles parts and sub-assemblies made from metal, repair machinery and equipment in a range of industries. Their work generally can be divided into three areas: marking out work to be done, assembling and installing machine components, and maintaining and repairing them. They may be known as bench fitters, fitter machinists, fitter welders, fluid power fitters. Fitters may shrink-fit parts during assembly, using oxy-acetylene torches and presses, manufacture, repair and fault-find hydraulic and pneumatic equipment; computerised systems to guard against production delays, inspect machinery and make repairs, making scheduled checks on machinery and parts, finding and fixing faults, and recalibrating instruments or shut-down of systems.

⁵India followed a planning model of 5 Year Plans comprising of a block of five financial years each. Eleventh Five Year plan covers period from 2007-2012. Each financial year begins on 1st April and ends on 31st march of subsequent calendar year

When spool of wires are ready these fitters are required so that these spools can be loaded on machines, they are expected to be knowing their job of taking measurement, making rough sketch, with pointing peculiarities, and able to make fitment drawing. A fitter's job is to interact with supervisor with certain degree of cordiality, fineness and skills in interface.

Si anticipated that it will be able to induct abundantly available fitter for this role. As large part of market was being catered to by the unorganized sector (individual fitters or small furniture manufacturing units) and as there was hardly any "Do It Yourself" (DIY) culture in India, there was a large pool of fitters doing a variety of work and related jobs. Training in this sector was largely unorganized with skills getting transferred within families over generations or through learning on the job under more experienced fitters.

A fitter produces a good piece of work as being craftsmen of excellent quality, due to their improper educational back ground they often lacked ability to read basic drawings, unaware of new kinds of hardware and machines tools, and finesse to deal with customers.

Failing to induct Fitters from traditional pool, another source for Fitters, Si tried to explore, was Industrial Training Institutes (ITIs) and Industrial Training Centre (ITCs). While Industrial Training Institutes (ITIs) are government-run training organizations, Industrial Training Centres' (ITCs) are privately-run equivalents. They provide post-school technical training. In 2002 there were 1800 ITIs, providing 373000 training places, and 2850 ITCs providing 305 000 places⁶ ITIs and ITCs were open to students, with 10 years of school education and trained them in various job oriented vocational courses, including carpentry. Here again, Si found that the candidates lacked ability to read and make basic drawings, were unfamiliar with new kinds of hardware used in machines and did not know how to use latest tool.

DISCUSSION

Suhil is thinking about how to get trained workers and fitters, what action should Sushil take so that current works do not leave, and new workers can be hired for meeting requirements.

We discuss this case as a quest for understanding what factors contributed to business growth, with special interest in business expansion, our case suggest that the importance of technical staff in intensification of the business, simply stated, it is much more important for a industry to be in a growth industry. An entrepreneur having all the resources for running its organization, making a product liked by his customers, its resources like raw material and machinery is available on time, and if the technical staff is unavailable, it becomes difficult for the entrepreneur to sustain and grow in the market place, case gives us a valuable inside that how one factor of production may create hindrance in the success on an organization. An entrepreneur should manage all the resources in order to make their products available for his customers, we understand that if trained fitters are lacking, this one factor of production may become a bottle neck in the growth of a successful entrepreneur.

⁶Source :wikipedia.org/wiki/Industrial_training_institute

Exhibit 1
Orders for Si Iron from Various Regions

	North Region	East Region	Southern Region	Western Region
Year 2013	₹ 01.25 Cr.	₹ 1.01Cr.	₹ 1.23 Cr.	₹ 1.45 Cr.
Year 2012	₹ 08.00 Lacks	₹ 07.00 Lacks	₹ 09.50 Lacks	₹ 09.40 Lacks
Year 2011	₹ 0.88 Lacks	₹ 06.00 Lacks	₹ 06.05 Lacks	₹ 05.00 Lacks
Year 2010	₹ 0.68 Lacks	₹ 03.60 Lacks	₹ 03.50 Lacks	₹ 04.30 Lacks

Source: Company Records

Exhibit 2
Growth in GDP, Per Capita Income and Consumption

	GDP at Factor Cost*	Income*		Consumption*	
	Growth (%)	₹	Growth (%)	₹	Growth (%)
2002-03	3.8	20996	2.2	13352	1.1
2003-04	8.5	22413	6.8	13918	4.2
2004-05	7.5	23890	6.6	14413	3.6
2005-06	9.4	25696	7.6	15422	7.0
2006-07	9.6	27784	8.1	16279	5.6
2007-08	8.7	29786	7.2	17145	5.3

*In 1999-2000 prices

Income is taken as GDP at market prices. Consumption is Private final consumption expenditure (PFCE). Per Capita is obtained by dividing these by population
Source: website: <http://indiabudget.nic.in> (Economic Survey 2007-2008).

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BOOK REVIEW

“MARKETING 3.0-FROM PRODUCTS TO CUSTOMERS TO THE HUMAN SPIRIT”

[Authored By Philip Kotler, Hermawan Kartajaya and Iwan Setiawan John Wiley & Sons Inc. | Price Rs.495]

Hari Sundar.G.Ram*

REVIEW

About the Book in a nutshell

Marketing 3.0 is more than just a book title. It is a phenomenon, a new school of thought which has been beautifully crafted to suit the kaleidoscopic world of Marketing. A book by Philip Kotler, a man who needs no introduction, needless to say holds the rapt attention of the reader from front to back or rather cover to cover.

The book aptly quotes a Chinese proverb: “Tell me and I will forget, Show me and I may remember, Involve me and I will understand”. One of the most favourite quotations of the former President of India, Dr. A. P. J. Abdul Kalam, who frequently uses this quote while addressing students, this proverb is the essence throughout this work, where the authors explain the slow transition of Marketing from an orientation towards Products to Consumers and its culmination in the Human Spirit. The authors have chosen to divide the areas such as Product Marketing as Marketing 1.0, Consumers as 2.0 and the end at the Human Spirit as 3.0 after which the book is titled as Marketing 3.0.

There is an extensive narration about the role of a consumer, from a faceless, passive respondent in the past, to a more active participant today. In a way the process tries to invert the Abraham Maslow’s Need Hierarchy Pyramid by satisfying the self-actualization need of its customers as well as its employees (internal customers). The key question that the book tries to answer is “Whether profitability can be balanced with corporate responsibility whilst making its customers, strategic partners/”.

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Cauterisation of the book

The book is organized into three parts. The first part discusses aspects like “Trends”, such as Globalization, Culture, Participative and Collaborative Marketing and the new wave technology, namely Social media marketing.

The paradigm shift to a Value-driven Marketing style has redefined brands by giving them a 3-dimensional outlook of Identity, Image and Integrity.

Part 2 is a discussion on Strategy. With the aid of a host of examples, authors try to educate the reader on the importance of weaving a story around a Product, Service or an Idea in such a way that it ensures complete consumer involvement and guarantees a promise of transformation.

This section also propagates the idea of a Values-driven Channel partnership. Finally, the third part is Application-oriented and highlights on the significance of Sustainable practices as the solution to Market Polarization.

The challenge, as rightly put forth in the book is “to transform the wealth in the community from a pyramid to a diamond”. The book ends with an innovative “Ten credos of marketing 3.0” that effectually puts it all together.

Summing up

This is a book, whose theories if practiced are sure to bring a revolution in the arena of Marketing. It is a “Must read” book for Marketing practitioners, academicians, students and enthusiasts, which at many pages puzzles you, takes you by surprise, makes you smile, drives you to think and is sure to inspire you.

To put the whole text of this work in simple lucid words, the book is an attempt to define or rather redefine the “Meaning of Marketing and the Marketing of meaning”.

So what are you waiting for? Read the book and feel the pulse of the revolution termed as Marketing 3.0 by Philip Kotler.

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