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From the Desk of the Editor-in-Chief

The winners in life are not those who have never tasted failure but rather those who have failed again and again and never gave up.

Good Governance is nothing but an idealistic and unrealistic phenomenon! The question of good governance is looming large in the minds of all since the time India went for polls. If this critical question is ignored, then it would lead us to another dismal failure, while if strategically successful, it may change the face of the world, and bring India on the map as a powerful nation.

In a panel discussion on **"Priorities before the Nation: Roadmap ahead for the Country and Roadmap ahead for Amity",** I commented on the lack of love and respect for the nation as well as amongst us as citizens and, how it (love and respect) can be generated by fulfilling the basic needs of the people. They do not have massive expectations, but basic expectations like improved living standards, good quality education for their children which may make them wiser, ensuring security, in terms of jobs and protection of their major interests.

Though, the basic concept of 'governance' is as old as human civilization, in simple terms, it refers to the process of decision making and the process by which decisions are implemented. Governance can be used in varied contexts, such as, corporate governance, local governance, national governance and international governance. Since governance is the process of decision making, good governance depends upon the formal as well as the informal players involved in the decision making process.

The United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) highlighted the 8 major parameters of good governance. Good governance is participatory, consensus based, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follows the rule of law. It ensures that corruption is minimized, the views of minorities are taken into account and the voices of the most vulnerable in the society are heard in decision making. Hence, leadership emerges as the kingpin of good governance.

Generation of gainful employment for the youth is another big challenge, keeping in mind that 65% of people are less than 35 years of age. There are approximately 300 million illiterate children, whose future is bleak and enveloped in darkness due to ignorance. This problem of abject poverty is of high priority.

The foreign policy is the tool by which India interacts with other countries of the world. The two major objectives of India's foreign policy are: a) protection of India's national sovereignty and territorial integrity; and b) promotion of the well being of the Indian people. Hence, the next stupendous challenge is to consciously build an appropriate and progressive foreign policy. On a positive note, I would like to state that 'innovation' has become the key term which is playing a strategic role in linking up the government with the market and the civil society for the upliftment of the poor. I am sure that the continuing negotiation between these players will ensure good governance and enable the nation to shine and be recognized as a powerful nation. The government is not answerable to the party but to the nation. Hence, the biggest emerging challenge that the new government faces is to fill the vacuum created by the previous government and address the people's concerns which had been neglected for long.

These five years are going to be crucial for the nation

I have an ardent hope that you will enjoy reading all the articles of the present issue. Looking forward for your valued comments.

Sanjeev Bansal

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Do Buybacks still hold their Signaling Strength? An Empirical Evidence from Indian Capital Market

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Share buyback has been recognized as an important phenomenon in the corporate world that has gained a lot of attention of the researchers worldwide. Share buyback is considered as one of the classic methods to raise a company's stock price. The empirical studies on the impact of share buybacks revealed that signaling hypothesis is the major motivation. Share buybacks were introduced in India since 1998. This study examines whether Indian companies have undertaken buy-backs for the purpose of information signaling through the announcement of share buyback by 58 companies (both from open market and tender offer) in India during 2010-12 by taking the BSE 500 index companies. The study analyzed the share price behavior surrounding initiation announcements of tender offer and open market share repurchase programs and the abnormal stock performance following the announcements, through a standard event study methodology. The study used a detailed dataset on tender offer, open market and total sample population share buyback programs. The results showed that the market had not given any scope for earning abnormal returns. The authors find no evidence that buybacks triggers market reaction in stock prices through generation of abnormal returns to the investors. The results have been found to be in tandem with the studies of Hertzel, 1991; Roosenboom et al., 2001; Cook et al., 2004, which could not find evidence of abnormal returns associated with the announcement of buy-back of shares in the Indian capital market.

Keywords: Share buyback, Abnormal Return, Signaling, Market Reaction, Event Study and Wilcoxon signed rank test.

INTRODUCTION

Corporations distribute large amounts of their cash flow to shareholders through stock repurchases (Fenn and Liang, 1997). Earnings management by corporate executives appeared to be rewarded by investors. According to several studies, investors seem to reward firms that reported steady growth in earnings and consistently met the earnings forecasts of analysts (Nadarajan et al., 2009). Wansley et al. (1989) indicated that repurchase can act as a substitute for dividend payments in order to provide shares for reissue because of a lack of investment opportunities or an excess of available cash and to signal favorable information about the firm's prospects[1]. There are two alternatives for allocation of the surplus fund when companies are over capitalized. First alternative is to retain the fund with itself and invest it for further development of the organization. Second alternative is to return the fund to the shareholders of the company. It can be through dividend or in form of shares buyback[2] (Mohanty

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[1] Vermaelen (2005) pointed four different aspects of share buybacks: investment for the company, payout decision, changes the capital structure and changes the ownership of the company. Grullon and Ikenberry (2000) listed five theories/reasons as to why companies perform share repurchases: to signal that the current share price is too low, reduce agency problems, to reallocate capital in the stock market, to return excess capital to the shareholders and to change the capital structure of the company.

and Panda, 2011). One of the most puzzling business conundrums today is the extreme propensity of public companies to buy back their own shares (Milano, 2011). The stock repurchase is considered as one of the classic methods to raise a company's stock price, but has failed to get the same amount of attention of researchers that other corporate actions viz. dividend announcement, mergers etc. get[3]. By reducing the number of shares outstanding, the interaction of demand and supply is expected to cause the stock price to float upward. As the signaling properties vary with the mode of repurchase[4], the company may buy-back shares from the existing shareholders on a proportionate basis either through tender offer; or from the open market either by inviting tenders or by the book building process (Thirumalvalavan and Sunitha, nd). Bens et al. (2003) investigated whether stock repurchases were affected by a firm's desire to manage earnings and they observed that firms avoid an earnings disappointment. In other words, the notion is that some managers may be announcing open market buybacks with the intention of misleading investors[5].

Share buyback has been recognized as an important phenomenon in the corporate world and has gained a lot of attention in many of the researches that are taking place worldwide. Earlier researches have documented different aspects of buyback; few have focused on magnitude of share buyback, while others have focused on managerial motivation through management surveys (Vermaelen, 1984 and Ofer and Thakor, 1987) and also financial impact of buyback of shares (Elton and Gruber, 1968). Prior studies have mostly covered the reasons to undertake a buyback but not the motivations behind choosing between different methods of doing so. Few studies have identified the main motivations as signaling undervaluation[6] (Dann, 1981 and Vermaelen, 1984), distribution of free cash flow (Grullon and Michaely, 2004), or as a flexible alternative to dividends (Jagannathan et al., 2000). Brav et al. (2005) surveyed 348 financial executives to identify and explore their perspectives on dividends and share repurchase. The study concluded that repurchase decisions are made after investment decisions are undertaken and the firms are concerned with the impact of repurchase on EPS[7]. The study also concluded that managers tend to initiate buybacks when the stock is considered to be undervalued[8].

While companies may announce share repurchase, they are under no obligation to carry them out. The proportion of repurchases actually undertaken varies on the basis of scope as to regions and time. Rau and Vermaelen (2002) argued that the proportion of repurchases actually executed was 37% in U.K. over the 1985-1998 period, but 10% for 1998. Ikenberry et al. (2000) estimated this proportion at 28.6% for the Canadian repurchase programs during 1989-1997[9].

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[2] Buyback and repurchase has been used interchangeably throughout the paper.

[3] Lee (2001) has listed share buyback as first among various areas that have traditionally been regarded as the domain of corporate finance in which accounting researchers have an opportunity to generate some of the most significant research in financial economics over the next few decades.

[4] Refer Comment and Jarrell (1991), Gay et al. (1991), Persons (1994), and Grullon and Ikenberry (2000) for discussions related to the differential signaling strengths.

[5] See, Bens et al. (2003), Hribar et al. (2006) and Chan et al. (2007)

[6] Few main reasons that have been quoted in earlier researches include distribution of excess cash (Brennan and Thakor, 1990 and Stephens and Weisbach, 1998), trying for optimum financial leverage (Dittmar, 2000), reduction of agency costs (Denis and Denis, 1993 and Grullon and Michaely, 2004), earnings management (Grullon and Ikenberry, 2000 and Guay and Harford, 2000), financing of employee stock option plans (Kahle, 2002) and redistribution of voting rights (Harris and Raviv, 1988; Stulz, 1988; Bagwell, 1992 and Hodrick 1999). For further reading, refer Baker et al (2003), Chan et al. (2003) and Brav et al. (2005).

[7] Bens et al. (2003) studied the relation between repurchase and EPS and found that managers tend to increase buybacks in order to maintain a target rate of EPS growth.

[8] For the details on studies supporting the findings, see studies of open market share buyback in Hong-Kong (Brockman and Chung, 2001), Japan (Zhang, 2002), US (Cook et al., 2004), and Canada (McNally et al., 2006).

[9] A study by Stephens and Weisbach (1998) estimated that only between 74% and 82% of the announced repurchase programs were actually carried out in the U.S.

The main research questions addressed in this paper are that whether the buyback announcements have an impact on the stock prices of the respective firms or not and besides this, the researchers have also made an effort to explore the market efficiency of Indian stock market. The remainder of the paper is structured as follows: In the next section, some of the more relevant previous studies on effect of share buyback announcements has been presented, followed by a detailed description on the data that has been used and the methodology that has been applied. Next section presents and discusses the empirical results with the conclusion in the last section.

LITERATURE REVIEW

Share buyback has been a topic of interest not only to the researchers but also to the corporate world. However, a huge number of researches on announcement effects of buyback have been carried out in US as compared to other countries[10]. This section covers a brief on the studies carried out in the said arena. The researchers have followed two paths in addressing the reasons and impact of share buyback: one is to survey the managers to explore their hidden intentions behind share buyback; and second, to empirically test the impact of share buyback. As per the scope of the study, this section throws light on the empirical studies on buyback.

The rich literature house on empirical studies on impact of share buyback revealed that signaling hypothesis[11] is the major motivation[12]. Few studies on signaling hypothesis put forth that buyback announcement represent signals about future operating performances. Dann (1981) compared the signaling hypothesis with other hypotheses using a sample of 143 cash tender offers announced between 1962 and 1976. The study concluded that the announcement returns of these securities are positively related to the size of repurchase and stock price movements. Bartov (1991) analyzed a sample of 185 US companies announcing open market stock repurchases from 1978 to 1986 and found an average increase in the level of earnings. Rees (1996) analyzed the impact of share repurchase announcements on stock prices using UK data of open market repurchase announcements. He found that prior to the repurchase announcement, firms experience a significant decline in their stock prices, and that the market reaction is positively associated to share buyback, further supporting signaling hypothesis. Ginglinger and L´Her (2006) examined open market stock repurchases in France and found a positive average market reaction to the repurchase announcement (+0.57% in window (0, +1)). However, the magnitude of the price reaction is found to depend on a number of corporate governance structure measures. Recently, Aharoni et al. (2011) also observed that repurchases are used as a signaling device. Their results indicated that repurchases signal a lower probability of a large deterioration in the firm's future prospects, rather than a high probability of a good outcome.

In order to test the signaling hypothesis of share buyback, few studies have been carried out in India also. Mohanty (2002) studied 12 buybacks in India and found a 3.86 percent return on the announcement day to indicated the first ever evidence of positive signaling in Indian context. In a study of 25 buybacks between 1999 and 2001, Mishra (2005) investigated the validity of long-term effect of share buyback program on a company´s share price and to assess which companies benefit more from

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[10] See Vermaelen, 1981; Comment and Jarrell, 1991; Ikenberry et al., 1995; Kahle, 2002; Grullon and Michaely, 2004; and Peyer and Vermaelen, 2005.

[11] Signaling hypothesis predicts that managers, having privy information on their firms, would be impelled to correct mispricing of their shares. One of the method is to announce buyback of shares.

[12] See Bhattacharya, 1979; Vermaelen, 1981; Dann, 1981; Lakonishok and Vermaelen, 1990; Bartov, 1991; Comment and Jarrell, 1991; Dann et al., 1991; and Persons, 1997.

these programs. The study concluded that announcement of a buyback did bring about an increase in share prices but this was a short-term phenomenon. Reaffirming the earlier results, Gupta (2006) studied 46 buybacks between 1999 and 2005 and supported positive signaling by having observed a significant abnormal return of 1.66 percent. However, in another study by Hyderabad (2009), a statistically significant average abnormal return of 2.76 percent was found on the announcement day for the 70 corporate buyback announcements made during the period 1999 to 2007. Supporting the findings of Hyderabad (2009), Ishwar (2010) studied 106 BSE listed companies, which announced buybacks during from 1999 to 2006 and found an average abnormal return of 2.23 percent. The results indicated that the market has not found any news in the announcement as revealed and the market anticipated the information and incorporated into prices before the announcements.

It has well been accepted in the earlier researches that share buyback programmes enhances performance indicators of the issuers. Shoven and Simon (1987) have tested the validity of the free cash flow hypothesis[13]. They found a positive correlation between abnormal returns and measures for excess funds at the discretion of management and concluded that buy-backs are an effective means of convincing the market about the sound investment decision making of the firms. Similar results have been witnessed in few other researches also[14]. However, few studies have contradicted the earlier findings[15]. Regarding leverage hypothesis[16], Jensen (1986) indicated that a buyback increases the firm's leverage through a reduction in assets and may create value for the enterprise. Baker and Wurgler (2002) provided empirical evidence that corporate managers issue shares at high prices and repurchase them at low prices. They supported the "market timing theory" of capital structure, indicating that the current mix of debt and equity is influenced by managers' historical market "timing" activities.

Share buyback can be carried out using different modes of buyback[17]. Comment and Jarrell (1991) compared the relative signaling power of three primary buy-back methods. Their research showed that the strongest signal in share price is obtained through a fixed-price tender offer, followed by the Dutch-auction tender offer, and the open market offer[18]. Gay et al. (1996) presented the advantages of

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[13] This hypothesis argues that a firm uses on-market share buyback to distribute its excess cash flow to shareholders. A firm's buyback activities should be positively correlated with its cash in excess of investment (Dittmar 2000).

[14] Stephens and Weisbach (1998), Nohel and Tarhan (1998) and Guay and Harford (2000) showed that the announcement effects of share buyback were strongly positive, and that long-term returns were also positive. Further they also observed that EPS gain came from high book-to-market firms, consistent with the over-investment hypothesis. For further reading, see, Mitchell and Robinson (1999), Weisbenner (2000), Mitchell et al. (2001), Stonham (2002), Baker et al. (2003), Guffey and Schneider (2004) and Hribar et al. (2006).

[15] In a study by Ikenberry et al. (1995) and Jagannathan and Stephens (2003) in which the researchers showed a decline in earnings after the repurchase. The results were further supported in another study carried out by Evans and Gentry (1999), the researchers not only found little improvement but also underperformance by repurchasing firms. They put forth that firms that did not repurchase create more long-run growth in value than firms that incorporate a buyback strategy. For further details, see, Grullon and Michaely (2004), Barth and Kasznik and Lie (2005).

[16] The leverage hypotheses states that management provides information that the firm is moving closer to its optimal capital structure through a buyback that has the effect of reducing the equity of a company and thereby changing its capital structure mix. See, DeAngelo and Masulis (1980) and Hu and Chuan (2006).

[17] One of the type is tender offer that includes: Fixed-price tender offers, where the corporation offers to buy a specified amount of shares at a fixed price during a fixed tender offer period; Dutch-auction tender-offers, which are similar to fixed-price tender offers, except that prices are set in a book-building procedure; targeted buy-backs, where the corporation negotiates with a particular shareholder. For a detailed overview see e.g. Lamba and Ramsay (2000).

[18] Lie and McConnell (1998), and Peterson and Peterson (1993) found no significant differences between fixed-price and Dutch auction tender offer. Nohel and Tarhan (1998) combined these two types of tender offers to examine the operating performance changes surrounding tender offers. Open market share repurchase announcements target on average about 7% of a firm's outstanding shares (Stephens and Weisbach, 1998), whereas Dutch auction and fixed-price tender offers target a larger percentage of total firm shares, about 15.6% and 18.8% respectively (Comment and Jarrell, 1991).

Dutch-auction repurchases over that of fixed-price tender offers. They suggested that if firms use a fixed-price offer, then there will be an excessive wealth transfer from remaining shareholders to exiting shareholders. Further, D'Mello & Shroff (2000) tested whether firms that repurchase their shares using fixed price tender offers are undervalued relative to their economic value (EV), and found that 74% of repurchasing firms are undervalued with regard to their EV at the beginning of the announcement year. Considering undervaluation as one of motives for share buyback, Cook et al. (2004) carried out to study the timings and execution of open market repurchases using data of 64 firms. Their evidence showed that firm's share repurchase is insensitive to market as well as own price movement. The results were further reaffirmed in the study by Dittmar (2000) who concluded that firms repurchase stock to take advantage of potential under-valuation and to distribute excess capital to stockholders.

The major contribution in the field of share buyback is on the stock price reaction, and to detect positive abnormal returns at the announcement date[19]. Ikenberry and Vermaelen (1996) concluded that the buyback announcement is an option that can be exercised whenever market conditions are favorable. The positive reaction of the share prices to the announcement is related to the option value, which is recognized by the market. On the same lines, few other researches have also documented the similar results[20].

NEED AND RESEARCH OBJECTIVE OF THE STUDY

Share buyback and the resulting impact have been long examined in the finance literature. Not only are the empirical findings mixed, but there also exist several distinct hypotheses trying to explain the reasons for varied impacts. Considering the limited research on share buyback in Indian industry, the present research study has been aimed at exploring that whether buyback announcement is always viewed as "good news" and be met with significantly positive stock price reactions. Most repurchases are open market repurchases. However, we have examined tender offers and open market repurchases individually followed by overall impact of share buyback. Open market repurchases usually take several months to several years to complete whereas repurchase tender offers are usually completed within a month (Fried, 2000). Contrary to open market repurchases, tender offers entail substantial costs and involve outside parties. Because repurchase tender offers are completed in a much more timely manner than open market repurchases, they offer a less noisy setting to test questions related to financial reporting as well as performance around repurchases.

HYPOTHESIS OF THE STUDY

Many of the researches that have been conducted till date on the share buyback announcement event holds that stock price returns are significantly

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[19] See Dann, 1981; Dann et al. 1991; Ikenberry et al. 1995 and Erwin and Miller, 1998, showed positive stock price reactions for firms announcing repurchases

[20] Vermaelen and Peyer (2005) found that the average abnormal return is +3.53%, during 48 months after the announcement of share buyback. For further reading, refer Arosio et al. (2000) and Otchere and Ross (2002), who also showed that shareholders earned statistically significant abnormal returns.

positive around the event date and also positive stock returns continue or up to four years post the event date[21].

Dann (1981) concluded that the announcement returns of these securities are positively related to the size of repurchase and stock price movements. Bartov (1991) found an average increase in the level of earnings. Rees (1996) found that prior to the repurchase announcement, firms experience a significant decline in their stock prices, and that the market reaction is positively associated to share buyback. Mohanty (2002) found a 3.86 percent return on the announcement day to indicated the first ever evidence of positive signaling in Indian context. Mishra (2005) found short term gain for the shareholders. Ginglinger and L´Her (2006) found a positive average market reaction to the repurchase announcement (+0.57% in window (0, +1)). Gupta (2006) supported positive signaling by having observed a significant abnormal return of 1.66 percent. Aharoni et al. (2011) also found that repurchases are used as a signaling device. Their results indicated that repurchases signal a lower probability of a large deterioration in the firm's future prospects, rather than a high probability of a good outcome. Rasbrant (2011) showed that initiation announcements of open market share repurchase programs exhibit a two-day abnormal return of approximately 2% which is both statistically and economically significant during the first three repurchase days. Till date, many researches have shown the existence of positive abnormal returns following share buyback announcements[22]. Few earlier researches also indicated that the market has not found any news in the announcement as revealed and the market

anticipated the information and incorporated into prices before the announcements[23]. However, it is still a puzzle that if buyback signals undervaluation or used as a way to mange earnings with an appropriate use of free cash flow, followed by positive reactions around the announcement. Furthermore, if the reason behind buyback is to encash opportunities, one should not see positive long-term abnormal returns. Thus, the following null hypothesis has been developed to explain the announcement effects of share buyback.

H0: There is insignificant (zero) share price response to share buyback announcements.

The researchers have hypothesized that the return for share buyback will be less positive or perhaps non-positive. However, it is quite possible that this may not be immediately recognized in the short run. Also the reason may be that manager of the firm may try to encash some opportunity but it may also holds that such moves are not always aligned with the interests of the shareholders. In other words, if no difference in the stock price reactions is observed at the announcement date, then it may be that buyback in such case may be consistent with either the free cash flow hypothesis or the undervaluation hypothesis, thus, making it a tough decision.

DATA BASE AND METHODOLOGY

The Securities Exchange Board of India (SEBI) permits companies to buy back their shares either by giving a tender offer or by purchasing shares from the open market. In tender offer, the company repurchases its shares from the existing shareholders on a proportionate basis through the tender offer at a specific price, and in an open market

offer, companies purchase their shares by announcing the maximum buyback price; the actual price at which shares are bought back may vary from this announced price. When a company announces a buyback, the stock price of the company moves upwards as investors perceive the buyback as a huge positive for the stock.

To test the semi strong form of market efficiency on the announcement of buyback, both types of share buy-backs announced by companies trading on the Bombay Stock Exchange during January 2010 - December 2012 were taken as sample. Our initial sample of buy-back announcements as collected from the official website of Bombay Stock Exchange i.e. www.bseindia.com and public announcement dates of buy back of shares were collected from the official website of Security and Exchange Board of India (SEBI) i.e. www.sebi.gov.in comprised 68 companies.

To be included in the final sample the researchers required that: (a) there are no other confounding events reported in the five days before and after the announcement date of the buy-back, and (b) daily returns over the estimation and examination periods are available. These criteria resulted in a final sample of 58 share buy-backs. Further, the sample is divided into 2 portfolios taking the modes the companies have used for share re-purchase, which resulted in 6 companies in tender offer portfolio and rest 52 companies in open market portfolio. Table 1 shows the annual distribution of the final sample of buybacks analyzed.

Table 1: Annual Distribution of Share Buy-backs Announced During January 2010 - December 2012		
Year	Buyback through Tender Offer	Buyback through Open Market Offer
2010	3	11
2011	2	27
2012	1	14
Total	6	52

The statistics show that Indian companies prefer open market offer program over tender offer program, primarily because the later can go up to one month only, while share re-purchase through the open market operations can prolong for one year, giving companies ample time to buyback.

Analytical Tools Used

The method chosen to analyze the stock price reaction to buyback announcements is event study methodology. Though event studies have a long history[24], Brown and Warner (1980), and Fama et al. (1969) considered the papers that introduced the event study methodology as is known today. Since then the method has become a widely used standard to examine the impact of firm-specific and economy wide events on the value of a firm. This method measures the stock price reaction to the unanticipated announcement of an event. In our case, the event is the announcement of a share buyback. The event study methodology is based on the hypothesis of efficient markets[25]. A list of companies involved in share buyback during 2010-2012 was compiled from several sources like web sites of the SEBI and BSE. For the purpose of this study, the first date of media announcement of the share buyback has been taken as the event date (day zero). Annexure 1 provides the list of companies' along with the announcement dates that have undertaken buyback program in the period under study.

Event Study Methodology

The data in the present study has also been analyzed using Event Study. The procedure for event studies is to investigate whether there are abnormal returns around the announcement date. The announcement

[21] For details, refer Dann, 1981; Shoven and Simon, 1987; Arosio, et al., 2000; Guay and Harford, 2000; Mohanty, 2002; Otchere and Ross, 2002; Vermaelen and Peyer, 2005; Ginglinger and L´Her, 2006 and Gupta, 2006.
[22] See Stephens and Weisbach, 1998; Guay and Harford, 2000 and Ramsey, 2000.
[23] See Hertzel, 1991; Roosenboom et al. 2001; Cook et al., 2004; Hu and Chuan, 2006 and Hyderabad, 2009.

[24] See Dolley 1933, Myers and Bakay 1948, Baker 1956, Ashley 1962, Ball and Brown 1968.
[25] Fama, 1970 put forth that if stock prices reflect all the available information of firms, then when the market faces an event that is not anticipated, abnormal returns should happen with a positive or negative impact on stock prices.

effect exists only if abnormal returns are significant. This analytical approach is well accepted and has been used widely. The event study methodology has, in fact, become the standard method of measuring security price reaction to some announcement or event. In practice, event studies have been used for two major reasons: 1) to test the null hypothesis that the market is efficient in terms of information efficiency, and 2) within the ambit of market efficiency hypothesis, to examine the impact of some event on the wealth of the firm's security holders. Cable and Holland (1999) argued that the market model compares favorably to other models proposed in the literature[26]. For that reason, the reference has been made only to the results from the market model.

To investigate the price impact surrounding the initiation announcement of the buyback program we have applied a market model as benchmark for calculating abnormal returns. The market model assumes a linear relationship between the return of the security to the return of the market portfolio. The BSE 500 Sensex had been taken as the benchmark index. The stock returns had been regressed to BSE 500 Sensex returns for a period of 240 trading days viz. 120 trading days before and after the event (announcement) date. The abnormal return for each of the day in the event window was the difference between the actual stock return during that day and the expected normal return according to the BSE 500 Sensex as per the 'α' and 'β' of the concerned stock. In brief, this approach involved the following sequence:

Daily abnormal returns before and after the announcement (including announcement day) of the share buyback has been computed using OLS model as:

$$AR_{i,t} = R_{i,t} - E(R_{i,t})$$

Where t = day measured relative to the share buyback announcement day (t=0)

$AR_{i,t}$ = abnormal return on security 'i' for day 't'

$R_{i,t}$ = raw return on security 'i' for day 't' which was calculated as:

$$R_{i,t} = \frac{MP_{i,t} - MP_{i,(t-1)}}{MP_{i,t}}$$

Where $MP_{i,t}$ = closing price of security 'i' on day 't'

$MP_{i,(t-1)}$ = closing price of security 'i' on day 't-1'

$E(R_{i,t})$ = expected return on security 'i' during day 't' which had been estimated through market model using BSE 500 Sensex as follows:

$$E(R_{i,t}) = \alpha_i + \beta_i R_m + \varepsilon_i$$

Where R_m = return on the BSE 500 Sensex and α_i, β_i are the OLS values from the estimation period and ε_i is assumed to indicate the abnormal returns.

Average abnormal returns for each relative day had been calculated by:

$$AAR_i = \frac{1}{N}\sum_{i=1}^{N} AR_{i,t}$$

Where N = Number of securities (companies) with abnormal returns during day 't'.

Event Definition and Date of Announcement

For the purpose of this study, the first date of media announcement of the buyback has been taken as the event date i.e. day zero (Annexure 1). The first possible date when the news of the buyback was made public has been used. The same has been obtained from the information available on the web sites of SEBI, Bombay stock exchange and the respective firms.

Window Period

Even though there is no consistency between the event windows chosen in existing studies, they can be broadly classified as being either short run or long run. The choice of appropriate performance measure also varies considerably between studies (Barber and Lyon, 1997 and Lyon et al., 1999). This study focuses only on short-run event study methods, restricting analysis to an eleven-day event window. This provides the best comparison of various methods because the shorter the event window, the more precise are the tests (Ahern, 2006). If a test does not perform well for a one-day event window, it will only perform worse for longer-run studies. Thus, if small errors are presented in this study, they will be compounded in long-run studies (Fama, 1998; Kothari and Warner, 2005). It is important to note that if the event window is broadened to include more days then it has the disadvantage in terms that prices, in that period, might be affected by confounding effects, including other significant announcements about the firms (Branca and Borges, nd). Therefore, it is important to use an event window as narrow as possible, balancing the pros and cons of smaller and larger windows[27]. Also, allowing for the possibility of some market rigidities, or a lagged response by investors, we analyze price behaviour until day +5. The event window has been taken at -5 to +5 days; the estimation window has been taken at maximum from -120 days to -6 days and the post event window has been taken at +6 to +120 days.

Test Statistics

t-statistic

The t-statistic is computed as in Brown and Warner (1985). The traditional t test, relies on the assumption that the average abnormal returns as are normally distributed independently and identically. With the assumption that the residuals which are the measurements of the abnormal performance are uncorrelated between the stocks, the abnormal performance standard deviation is based on the standard deviation of each stock performance measure of the sample in the estimation period. Accordingly, while T indicates the length of the estimation period, the test statistics on day 0; complies with T-1 degrees of freedom and Student's t distribution[28].

Wilcoxon signed rank test

The Wilcoxon signed rank test ranks all abnormal values in the t-day or set of t-days under analysis, and then assigns the sign of each abnormal return to the respective rank. If positive abnormal returns tend to be in greater number than negative abnormal returns, and/ or have relatively higher absolute values, the sum of the signed ranks will tend to be a higher positive number. If positive and negative abnormal returns tend to cancel each other, the sum of signed ranks will tend to be close to zero. A sum of signed ranks statistically different from zero will reject the null hypothesis of no abnormal returns in the event window. The sign test uses only the signs of the abnormal returns in the t-day or set of t days under analysis. Under the null hypothesis of no abnormal returns, we expect the proportion of positive (or negative) signs to be close to 50%. p-values can be determined from the binomial distribution. These tests are not affected by outliers, as the absolute values of abnormal returns are dropped, and only ranks or signs are retained (Borges and Branca, 2010).

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[26] Refer Brown and Warner, 1980; Dann, 1981; DeAngelo and Rice, 1983 and McNichols and Manegold, 1983.

[27] See Vermaelen (1981), Comment and Jarrell (1991), Ikenberry et. al (1995), Ikenberry et al. (2000), McNally (2002) and Grullon and Michaely (2004).

[28] Brown and Warner, 1980, indicated that the reason for calculating the standard deviation of the residuals from the estimation period is to solve a probable cross-sectional dependence problem. Dyckman et al. (1984) opined that non-normality of individual security daily return residuals has little effect on the inferences drawn from the use of t-test applied to the portfolios. Berry et al. (1990) also put forth that t-test works well.

RESULTS AND DISCUSSIONS

This section covers the effect of buyback announcements on the share prices for the full sample population as well as on the basis of modes of buyback. When a company buys back its shares, management gives an information signal to shareholders. However, the signal may be ambiguous. On the one hand, it may be that the company has no profitable use for its funds and therefore undertakes a buy-back as a means of returning these funds to shareholders while on the other hand, management may believe that the company is undervalued and a buy-back which is undertaken at a significant premium above the current market price is a means by which management passes this information on to shareholders (Lamba, 2000). However, the signaling theory of buy-backs has received support from a survey of 140 chief financial officers of US companies which undertook share buy-backs. The authors of the study concluded:

"An important finding of this research is that managers do use share repurchases to signal their confidence in the company, which management believes is not being incorporated in share prices." (Lamba, 2000)

Table 2 presents the results for the daily average abnormal returns for the full sample and mode wise sample distribution of 58 share buy-backs announced during 2010-12. Over the period leading up to the announcement day the researchers observed a rush of negative abnormal returns to the highest of -0.7%, for over 50% of the sample companies in most cases. Though the immediate pre announcement period documented negative abnormal returns but the results were not found to be statistically significant, but the returns following the announcement day have been statistically significant. The findings are in tandem with the study of Ishwar (2010) who studied 106 BSE listed companies, which announced buybacks during the period from 1999 to 2006 and found an average abnormal return of 2.23 percent that was not statistically significant on the event day to signal the

under-pricing of securities. The author opined that the market has not found any news in the announcement as revealed by the continuing trend that started before the announcement and the market anticipate the information and incorporated into prices before the announcements. A similar stream of negative abnormal returns was seen since the day companies announced their buybacks (De Ridder, 2005 and Yook, 2010). A little variation was noted in the period exactly after the announcement, with the abnormal returns increasing further from -.09% on day 1 to -.8% on day 2 and then maintaining the level around -.5% till day 5. Also the proportion of companies reporting the negative returns rose from 58% to 74% of the total sample, all being statistically significant at the 0.05 level. Thus, our results are not being driven by only a few negative abnormal returns. This continued for the entire period under consideration till the 120th day after the announcement, indicating a permanent bearish phase for the companies. The findings are consistent with Modigliani & Miller (1961) who stated that in perfect capital markets it doesn't matter whether companies pay out cash to its shareholders as dividends or repurchases shares. All information is already priced in the current share price and therefore no new information is passed on to the markets and the share price should not respond to changes in payout policies from the company. The results are further consistent with the results of Roosenboom et al. (2001) and Mishra (2005). The findings indicate that share buyback does not create a sustained rise in stock price which is in alignment with the results of Hua Zhang (2002) who investigated the stock price performance after actual share repurchases. On average, repurchasing firms do not exhibit strong superior abnormal performance either initially or over long horizons when they make actual share repurchases. The perusal of the above movements/ statistics points out an interesting fact. One of the most prominent motivators for companies to go for buyback of its own shares is to send a positive signal to the shareholders. But it has been noted here that Indian

corporations, in a ray of hope to revive its stock prices and to reverse their process of decline went for share buybacks, which is consistent with the conjecture that firms time their repurchases to coincide with temporary declines in their stock prices (Stewart, 1976; Stephens and Weisbach, 1998; Brav et al., 2005 and Kinsler et al., 2008), yet to their surprise no major change was found in the returns due to the announcement.

A further issue is whether different types of buy-backs convey signals of different strengths. It can be recalled that in the United States, managers may choose among two main types of buybacks: an open-market buy-back, or a tender-offer buy-back. In his 1981 study, Vermaelen studied 131 tender-offer buy-backs and 243 open-market buybacks and argued that open-market buy-backs provide less powerful signals than tender-offer buy-backs (Lamba, 2000). Harris and Ramsay also found that the market's reaction to share buy-backs differs by the type of share buy-back announced. The results for the market's reaction to the disaggregated sample of 6 tender buy-backs and 52 open market buy-backs appear in Table 2.

Table 2 displays the statistics for both the methods of buy-back announcements. The data shown above portrays a clear picture of the movements of stock prices before and after the announcements unfolding itself to the market. In both the cases companies continue to document significant negative cumulative average abnormal returns both before and after the announcement day. Especially between days -8 to +8, the abnormality has a strong drift towards bearish phase for the sample companies. As with the full sample, the results for the tender offer are not driven by outliers since no single company comprising the sample earned positive cumulative average abnormal returns over days {-1, 0}. Though day +1 documented positive returns for 16.66 per cent of companies but again for day +2, no company registered positive returns. Similar results has been witnessed for the open market offer, where negative returns dominate as

over 50 per cent of the sample companies both before and after the announcement. An analysis of it reveals that the market makes no discrimination in its reaction towards the two methods of buyback. Moreover since the results have been similar for the two methods, therefore they also are in tandem to the full sample results.

For event windows {-10, 0} and {-5, 0} preceding the announcement, negative abnormal returns of 0.4% and 0.3% respectively have been recorded, though these are not significant. However, for event window {-1, 0}, statistically significant negative abnormal returns of 0.2% have been recorded with absolutely no company experiencing positive abnormal returns. Even the post announcement period of {+1, +5} and {+1, +10} showed negative cumulative abnormal returns of -2.63% and -2.66%, both significant at 0.05 and 0.01 level. The cumulative returns for the event window of {-1, +1} makes it crystal clear, that market was experiencing negative abnormal returns before and after the announcement, and moreover the entire sample of 58 companies documented negative abnormal returns. The run-down in prices was consistent as observed by the statistically significant cumulative abnormal returns of -2.17% over the period {-10, +10}.

In case of tender offer, the event windows {-10, 0} preceding the announcement, statistically significant negative abnormal returns of 0.2% have been recorded. Also, the post announcement period of {-5, 0} to {-5, +5} have showed negative cumulative abnormal returns of -2.92% and -7.11%, both significant at 0.05 and 0.01 level. The cumulative returns for the event window of {-1, +1} clears the picture, that market was experiencing negative abnormal returns before and after the announcement, and moreover the entire sample of 6 companies documented negative abnormal returns. The run-down in prices was consistent in case of open market offers as observed by the statistically significant cumulative abnormal returns of -1.5% over the period {-10, +10}.

Table 2: Summary of Daily Average Abnormal Returns for the Full Sample and Modes of Share Buy-backs Announced During January 2010 - December 2012

Summary of Abnormal Returns over Days -120 to +120 Relative to the Announcement Day, summated by the its t-statistics computed for each day abnormal return with its two-tailed p-values reported in brackets. The t-statistics which have been found to be statistically significant at 0.05 and 0.10 level have been marked with */**. The last column reports the percentage of companies documenting non-negative (positive) abnormal returns on respective days both preceding and proceeding the event of buyback announcement.

Event Day	Full Sample (N=58)			Tender Offer (N=6)			Open market Offer (N=52)		
	Average Abnormal Returns (%)	t-Statistics	Percentage Non-Negativity	Average Abnormal Returns (%)	t-Statistics	Percentage Non-Negativity	Average Abnormal Returns (%)	t-Statistics	Percentage Non-Negativity
-120	-.7462	-3.528(.001)*	31.03	-0.8728	-2.038(0.097)**	33.33	-.7316	-3.159(.014)*	30.76
-110	-.5678	-1.662(.102)	43.10	-1.8976	-2.619(0.047)*	0	-.4017	-.948(.680)	48.07
-100	-.4439	-1.403(.166)	41.37	-1.6028	-1.421(0.215)	33.33	.4499	1.023(.961)	42.30
-90	-.3010	-.743(.461)	36.20	-0.5523	-0.547(0.608)	16.66	.0382	.093(.532)	38.46
-75	-.5516	-1.245(.218)	37.93	-3.0273	-1.298(0.251)	16.66	.5132	1.434(.063)**	40.38
-50	-.1686	-.369(.008)*	36.20	-0.9898	-2.074(0.093)**	16.66	-2.7238	-1.565(.347)	38.46
-30	-.6134	-1.617(.111)	37.93	-1.4738	-2.871(0.035)*	16.66	-.3078	-.779(.882)	40.38
-15	-.1290	-.332(.741)	51.72	0.1544	0.244(0.817)	50	-.3369	-.642(.816)	51.92
-8	-.5301	-1.454(.152)	39.65	-0.2697	-0.433(0.683)	66.66	-.1739	-.532(.968)	26.53
-5	-.0532	-.128(.898)	38.65	-1.3156	-1.106(.319)	16.67	-.0925	-.210(.834)	32.31
-4	-.4637	-1.264(.211)	40.38	-.8107	-1.544(.183)	16.67	-.4236	-1.045(.301)	38.46
-3	-.4643	1.209(.232)	65.38	.8601	.718(.505)	66.67	-.4186	-1.024(.311)	37.69
-2	-.6139	.962(.340)	51.92	1.8814	.946(.388)	50.00	-.4676	-.690(.493)	36.15
-1	-.0392	-.112(.911)	50.00	-1.9486	-8.060(.000)*	0	-.1811	-.478(.635)	20.00
0	-.2178	-.766(.447)	32.69	-1.5939	-2.838(.036)*	0	-.0590	-.194(.847)	32.69
+1	-.0969	-.334(.040)*	42.30	-1.2267	-2.735(.041)*	16.67	.0334	.106(.916)	40.38
+2	-.8743	-3.297(.002)*	26.92	-1.1171	-2.533(.052)**	0	-.8463	-2.898(.006)*	26.92
+3	-.6355	-2.286(.026)*	32.69	-.4351	-1.718(.146)	16.67	-.6586	-2.132(.038)*	30.77
+4	-.4548	-1.984(.052)*	38.46	-.3901	-1.098(.322)	33.33	-.4623	-1.826(.074)**	34.62
+5	-.5686	-1.712(.092)**	38.46	-1.0229	-2.387(.063)**	0	-.5162	-1.405(.166)	32.41
+8	-.1034	-.396(.693)	43.10	-0.3208	-1.188(0.288)	33.33	-.0783	-.270(.692)	44.23
+15	-.0872	-.222(.825)	46.55	-0.7217	-1.653(0.159)	16.66	-.0140	-.032(.046)*	46.15
+30	.0298	.128(.899)	41.37	-0.8225	-2.44(0.059)**	16.66	-.0510	-.152(.058)**	44.23
+50	-.7884	-2.943(.005)*	32.14	-1.8519	-3.85(0.012)*	0	-.5473	-1.980(.468)	36
+75	-.6123	-2.353(.022)*	33.33	-1.1387	-2.775(0.039)*	16.66	-.2768	-.627(.549)	35.41
+90	-.3655	-1.465(.149)	41.51	-0.005	-0.013(0.99)	50	-.0926	-.297(.047)*	40.42
+100	-.3081	-.762(.450)	45.28	-3.0569	-1.863(0.122)	33.33	-.2808	-1.042(.154)	46.80
+110	.0842	.184(.855)	43.39	-1.8897	-2.925(0.033)*	0	-.1243	-.375(.046)*	48.93
+120	-.5396	-1.909(.062)**	32.07	-0.6393	-2.969(0.031)*	16.66	-.5269	-1.656(.208)	34.04

Source: Author's Own.

Table 3 sums up the cumulative average abnormal returns over different event windows.

Table 3: Summary of Cumulative Average Abnormal Returns over Different Event Windows for the Full Sample of Share Buy-backs Announced During January 2010 - December 2012

Summary of Cumulative Abnormal Returns over nine different event windows. Here three event windows of {-10, 0}, {-5, 0}and {-1, 0}indicate the abnormal movement of stock prices cumulated for 10 days, 5 days and 1 day prior to the event till the date of announcement respectively and on similar lines event windows of {0, +1}, {0, +5}and {0, +10}indicate the abnormal movement of stock prices cumulated from the date of event till 1 day, 5 days and 10 days after the event. The last three windows sum up the abnormal returns for 3 days, 11 days and 21 days around the event. This has been supplemented by the its t-statistics computed for the abnormal return of each event window with its two-tailed p-values reported in brackets. The t-statistics which have been found to be statistically significant at 0.05 level have been marked with *. The last column reports the percentage of companies documenting non-negative (positive) cumulative abnormal returns for respective event windows.

Event Window	Full Sample (N=58)			Tender Offer (N=6)			Open market Offer (N=52)		
	Cumulative Abnormal Returns (%)	t-Statistics	Percentage Non-Negativity	Cumulative Abnormal Returns (%)	t-Statistics	Percentage Non-Negativity	Cumulative Abnormal Returns (%)	t-Statistics	Percentage Non-Negativity
{-10, 0}	-0.4939	-1.109(.293)	36.36	-0.28803546	-3.888(.003)*	54.5454545	-0.517667	-.271(.792)	54.54545
{-5, 0}	-0.3044	-.755(.484)	33.33	-2.92733	-2.893(.034)*	33.33333	-0.677304	-1.764(.138)	66.66667
{-1, 0}	-0.2569	-1.360(.004)*	0	-3.5424602	-3.445(.180)	0	-0.122144	-5.142(.122)	50
{+1, +5}	-2.6301	-3.359(.028)*	0	-4.19193	-5.632(.005)*	0	-2.44987	-3.058(.038)	20
{+1, +10}	-2.6665	-7.246(.000)*	20	-7.71889	-6.606(.000)*	0	-2.08352	-6.979(.000)*	30
{-1, +1}	-0.3539	-2.329(.045)*	0	-4.76917	-4.189(.053)	0	-0.155557	-8.957(.012)*	66.66667
{-5, +5}	-2.3257	-1.589(.143)	18.18	-7.11926	-4.459(.001)*	18.18182	-1.77256	-.511(.620)	45.45455
{-10, +10}	-2.1726	-2.807(.011)*	28.57	-7.43085	-1.603(.125)	28.57143	-1.56585	-3.188(.005)*	42.85714

Source: Author's Own.

Table 4: Pre and Post AR: Results of Paired t-test and Wilcoxon signed-rank test

The table reports an application of Paired t-test and its non-parametric parallel, Wilcoxon Z-test, for comparing the per event abnormal returns with those post event returns for three different windows. They test whether the null hypothesis that the abnormal returns have a mean value equal to zero holds good or not.

Event Window	Full Sample (N=58)		Tender Offer (N=6)		Open market Offer (N=52)	
	T (p-values)	Z (p-values)	T (p-values)	Z (p-values)	T (p-values)	Z (p-values)
-1 to + 1	.135(.893)	.868	-1.316(.245)	.173	.313(.756)	.649
-5 to + 5	1.787 (.148)	.225	1.030(.361)	.345	3.499(.325)	.443
-10 to + 10	2.597(.299)	.437	2.193(.556)	.569	1.668(.130)	.203

Source: Author's Own.

The conclusion holds good as the cumulated returns (of all buyback companies) for windows {-5, +5} and {-10, +10}turn out to be around negative (-.1% and -2% respectively) for more than 30% of the companies, thus indicating no change in the trend from pre announcement to post announcement period and nullifying the signaling hypothesis.

The sample buyback companies were further examined to explore any possible association between pre and post returns as a result of buyback announcement. The table above presents the results of paired t-test and its non-parametric parallel, wilcoxon signed rank test. It can be observed that for the immediate event window {-1 to +1} the market did not witness any significant change in returns for the entire sample. The pattern remained the same for entire sample companies going for buyback either through tender offer or open market in short duration as well {-5 to +5}. Also, the relatively long window of {-10 to +10}days indicated the no significant difference in the returns. The momentum of the share price adjustment to buyback announcements indicated that the markets did not consider buybacks by Indian companies as a significant signal of managerial information. The results are inconsistent with signaling evidences of prior studies that found the average repurchasing firm experiences very positive abnormal returns.

Whatever be the mode of buyback, studies on share buy-backs undertaken in the United States have the strongest empirical support for information signaling (Lamba, 2000). But the scene is a little inconsistent in the Indian context. While Purohit, et al (2012) could not find any association of the abnormal returns with the announcement of buy-back of shares, Gupta (2006) and Mohanty's (2002) found a positive CAR around the announcement. However, the results for this study have been found to be in tandem with the studies of Hertzel, 1991; Roosenboom et al., 2001; Cook et al., 2004, which could not find evidence of abnormal returns associated with the announcement of buy-back of shares in the Indian capital market, resulting in the

acceptance of the hypothesis of insignificant (zero) share price response to share buyback announcements. Thus, buybacks in India have failed to create an impact in the minds of the investors.

CONCLUSION

Buybacks are viewed as an important piece of information to signal undervaluation of shares by effecting a positive change into their stock prices. However, the study failed to find any response to second their results. A negative terrain of statistically significant abnormal returns has been witnessed for the companies both before and after the buyback announcement. The markets reacted in similar fashion for buybacks administered through tender offer as well as open market offer. It has been viewed that the companied announced buyback with a motive of furthering a positive signal to the market of private information revealed by the companies. But, the market reacted in complete contradiction of the signaling hypothesis. The results have been found to be in tandem with another study conducted by Purohit et al. (2012) which could not find evidence of abnormal returns associated with the announcement of buy-back of shares in the Indian capital market. Similar to our study this paper also analyzed the impact of mode of buy-back. No significant impact of mode of buy-back was seen from analysis. The investors did not perceive it as an information signal worth reacting and continued with the previous trend of prices, thus having no significant impact on the minds of the investors.

REFERENCES

Aharoni, G., Brown, C., and Wang, G. J. (2011). The payout policy of Australian Firms: Dividends, repurchases and soft substitution. Conference Paper, FMA Queenstown April, in Warwick, A. and Mc Laughlin, S. Buybacks versus Ordinary Dividends: Marginal Investor reactions to cash-return announcements. Retrieved from http://www.nzfc.ac.nz/archives/2012/papers/updated/26.pdf

Ahern, K.R. (2006). Sample selection and event study estimation. Retrieved from http://ahern.bol.ucla.edu/Ahern.SSESE.pdf

Amitabh G. (2006). Share Price behaviour around buybacks in India. The ICFAI Journal of Applied Finance, 12(12), 26-40.

Arosio A., Bigelli M., Paleari S. (2000). L'acquisto di azioni proprie. Uno studio sul mercato finanziario italiano nel periodo 1988-1998. Banca impresa società 2, in Annalisa, C., Daniele D. and Giancarlo G., Stock repurchases and future operating performance: empirical evidence from Italy, Investment Management and Financial Innovations, 5 (1), 2008. Retrieved from http://businessperspectives.org/journals_free/imfi/2008/imfi_en_2008_01_Croce.pdf

Ashley, J. W. (1962). Stock prices and changes in earnings and dividends. Journal of Political Economy 70(1), 82-85.

Bagwell, L. (1992). Dutch auction repurchases: An analysis of shareholder heterogeneity. The Journal of Finance, 47, 71-105.

Baker, C. A. (1956). Effective stock splits. Harvard Business Review, 34(1), 101 106.

Baker, H.K., Powell, G. E. and Veit, E. T. (2003). Why companies use open market repurchases: A managerial perspective. The Quarterly Review of Economics and Finance, 43, 483-504.

Baker, M., and Wurgler, J. (2002). Market timing and capital structure. Journal of Finance, 57(1), 1-32.

Ball, R. and Brown, P. (1968). An empirical analysis of accounting income numbers. Journal of Accounting Research, 6(2), 159-178.

Barber, B.M. and Lyon, J.D. (1997). Detecting long run abnormal stock returns: the empirical power and specification of test statistics. Journal of Financial Economics, 43: 341372.

Bartov, E., (1991). Open-market stock repurchase as signals for earnings and risk change, Journal of Accounting and Economics, 14, 275-294.

Bens, D.A., Nagar, V.,Skinner, D.J., & Wong, M.H.F.(2003). Employee stock options, EPS dilution and stock repurchases. Journal of Accounting and Economics, 36 (1-3), 51-90.

Berry, M.A., George, W.G. and Glenn, V.H. (1990). Using daily stock returns in event studies and the choice of parametric vs non-parametric test statistics. Quarterly Journal of Business Economics, 29, 70-85.

Bhattacharya, S. (1979). Imperfect information, dividend policy, and the 'bird in the hand' fallacy. Bell Journal of Economics, 10, 259-270.

Branca, A.S. and Borges, M.R. (nd). The Impact of Corporate Rebranding on the Firm's Market Value. Retrieved from http://aquila1.iseg.utl.pt/aquila/getFile.do?method=getFile&fileId=136285

Brav, A., John R. G., Campbell R. H., and Roni M. (2005). Payout policy in the 21st century, Journal of Financial Economics, 77, 483-527.

Brennan, M. and Thakor, A. (1990). Shareholder preferences and dividend policy. Journal of Finance, 4, 9931018.

Brockman, P. and Chung, D.Y. (2001). Managerial timing and corporate liquidity: evidence from actual share repurchases. Journal of Financial Economics, 61, 417-448.

Brown, S. J. and Jerold B. W. (1980). Measuring security price performance. Journal of Financial Economics, 8(3), 205258.

Cable, J. and Holland, K. (1999). Modelling normal returns in event studies: A modelselection approach and pilot study. European Journal of Finance, 5, 331- 41.

Chan, K., Ikenberry, D. L. and Lee I. (2003). Economic sources of gain in stock repurchases. Paper delivered in collaboration with various international universities, Seoul in André de Goede, Investigating certain share buyback transactions by companies listed on the Johannesburg stock exchange for the period 2000 to 2005, available at https://scholar.sun.ac.za/...1/818/degoede_investigating_2007.doc?...

Chan, K., Ikenberry, D. L., Lee, I. and and Wang, Y. (2007). Share repurchases as a tool to mislead investors: Evidence from earnings quality and stock performance. Retrieved from http://financelab.nctu.edu.tw/FinMathStatConf/Paper/Share Repurchase.pdf

Comment, R. and Jarrell, G. A. (1991). The relative signaling power of dutch- auction and fixed-price self-tender offers and open-market share repurchases. Journal of Finance, 46(4), 1243-1271.

Cook, D.O., Krigman, L. and Leach, C. (2004).On the timing and execution of open market repurchases. Review of Financial Statistics, 17, 463-498.

Dann, (1981). Common stock repurchase: Analysis of returns to bond-holders and shareholders, Journal of Financial Economics, 9, 113-138.

Dann, L., Masulis, R. and Mayers, D., 1991. Repurchase tender offers and earning information. Journal of Accounting and Economics, 14, 217251.

DeAngelo H. and Masulis R.W. (1980). Optimal Capital Structure under Personal and Corporate Taxation. Journal of Financial Economics, 8, 3-30.

DeAngelo, H. and Rice, E. (1983). Anti-takeover amendments and stockholder wealth. Journal of Financial Economics, 11, 329-359.

Denis, D. and Denis, D. (1993). Leveraged recaps and the curbing of corporate overinvestment. Journal of Applied Corporate Finance, 6, 6071.

deRidder, A. (2008). Share repurchases and firm behaviour, International Journal of Theoretical and Applied Finance, 12(5), 605-631.

Dittmar, A. K. (2000).Why do firms repurchase stock? Journal of Business, 73 (3), 331-355.

D'Mello, R. and Shroff, P. K. (2000). Equity undervaluation and decisions related to repurchase tender offers: An empirical investigation. Journal of Finance, 55(5), 2399.

Dolley, J.C. (1933). Characteristics and procedure of common stock split-ups. Harvard Business Review, 316326.

Dyckman, T., Donna, P. and Jens, S. (1984).A comparison of event study methodologies using daily stock returns: A simulation approach. Journal of Accounting Research. 22, 1-33.

Elton, E. and Gruber, M. (1968). The effect of share repurchase on the value of firm. The Journal of Finance, 23 (1), 135-149.

Erwin, G. R., and James, M. M. (1998, The Intra-Industry Effects of Open Market share repurchases: Contagion or competitive. Journal of Financial Research, 21, 389-406.

Evans, J. P. and Gentry, J. A. (1999). Do strategic share repurchase programs create long-run firm value, Working Paper #99-0119: University of Illinois.

Fama, E. (1970). Efficient capital markets: A review of theory and empirical work. Journal of Finance, 25, 383-417.

Fama, E. F. (1998). Market efficiency, long-term returns, and behavioral finance. Journal of Financial Economics, 49, 283306.

Fama, E. F., Lawrence, F., Michael C. J. and Roll, R. (1969). The adjustment of stock prices to new information. International Economic Review, 10, 1-21.

Fenn, G.W. and Liang, N. (1997). Good news and bad news about share repurchases. Retrieved from citeseerx.ist.psu.edu/ viewdoc/ download?doi=10.1.1.159...pdf

Gay, G. D., Kale, J. R. and Noe, T. H. (1996) Dutch auction share repurchases. Economica, 63, 57-80.

Gay, G., Kale, J. and Noe, T. (1991). Share repurchases mechanisms: A comparative analysis of efficacy, shareholder wealth, and corporate control effects. Financial Management, 20, 4459.

Ginglinger, E. and L'Her, J.F. (2006). Ownership structure and open market stock repurchases in France. European Journal of Finance, 12, 7794.

Grullon G. and Michaely R. (2004). The information content of share repurchase programs. Journal of Finance, 49, 651-680.

Grullon, G. and Ikenberry, D. (2000). What do we know about stock repurchases? Journal of Applied Corporate Finance, 13, 3151.

Guay, W., and Jarrad, H. (2000). The cash flow permanence and information content of dividend increases versus repurchases. Journal of Financial Economics, 57, 3850-415.

Guffey, D.M. and Schneider, D.K.(2004). Financial characteristic of firm's announcing share repurchases. Journal of Business Economic Studies, 10: 1-16.

Gupta, A. (2006). Share price behaviour around buybacks in India. ICFAI Journal of Applied Finance, 12(2), 26-40.

Harris, M and Artur, R. (1988). Corporate control contests and capital structure. Journal of Financial Economics, 20, 55-86.

Hertzel, M. G. (1991). The effects of stock repurchases on rival firms. The Journal of Finance, 46(2), 707-716.

Hodrick, L. S. (1999). Does Stock Price Elasticity Affect Corporate Financial Decisions?, Journal of Financial Economics, 52, 225-256.

Hribar, P., Jenkins, N.T. and Johnson, W.B.(2006). Stock repurchases as an earning management device. Journal of Accounting and Economics, 41, 3-27.

Hu, J. and Chuan, C.H. (2006) The relationships among share repurchases, employee stock ownership plan and real investment expenditure in Taiwan: An empirical study. International Journal of Management, 23, 103112.

Hyderabad, R L (2009). Market Reaction to Buyback Announcement in India. ICFAI Journal of Applied Finance, 15(12), 53-77.

Ikenberry D. and Vermaelen T. (1996). The option to repurchase stock, Financial Management, 25, 9-24.

Ikenberry, D., Josef, L., and Vermaelen, T. (1995). Market underreaction to open market share repurchases. Journal of Financial Economics, 39, 181-208.

Ikenberry, D., Josef, L., and Vermaelen, T. (2000). Stock repurchases in Canada: performance and strategic trading. Journal of Finance, 55, 2373-2397.

Ishwar, P. (2010). Stock price responses to the announcement of buyback of shares in India. Indian Journal of Commerce and Management Studies, 1(1), 14-29.

Jagannathan, M. and Stephens, C. (2003). Motives for multiple open-market repurchase programs, Financial Management, 71-91.

Jagannathan, M., Stephens, C. P. and Weisbach, M. S. (2000). Financial flexibility and the choice between dividends and stock repurchases. Journal of Financial Economics, 57, 355-384.

Jensen M. (1986), Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers, American Economic Review, 76, 323-329.

Kahle, K. (2002). When a buyback isn't a buyback: open-market repurchases and employee options. Journal of Financial Economics, 63, 235261.

Kinsler , A. N. , Bacon,W. F. (2008). Stocks repurchase announcements: A test of market efficiency. Proceedings of ASBBS, 15(1), 364-374.

Kothari, S. and Warner, J. B. (2005). Handbook of Corporate Finance: Empirical Corporate Finance chap. 1 . Handbooks in Finance Series (Elsevier/ North-Holland).

Lakonishok, J. and Vermaelen, T. (1990). Anomalous price behavior around repurchase tender offers. Journal of Finance, 45, 455477.

Lamba A., And Ramsay I., Share Buy-Backs: An Empirical Investigation, (May 2000). Retrieved from SSRN: http:// ssrn.com/ abstract=227930 or http:// dx.doi.org/ 10.2139/ ssrn.227930

Lee, Charles M. C. (2001). Market efficiency and accounting research: A discussion of capital market research in accounting. Journal of Accounting and Economics, 31: 233-253.

Lie, E. and McConnell, J.J. (1998). Earnings signals in fixed-price and Dutch auction tender offers. Journal of Financial Economics, 49, 161-186.

Louis, H., and White H. (2007). Do managers intentionally use repurchase tender offers to signal private information? Evidence from firm financial reporting behaviour. Journal of Financial Economics, 85, 205233.

Lyon, J.D., Barber, B.M. and Tsai, C.L. (1999). Improved methods for tests of long run abnormal stock returns. Journal of Finance, 52, 164201.

McNally, W., Smith, B.F. and Barnes, T. (2006). The price impact of open market repurchase trades. Journal of Business Finance & Accounting, 33, 735-752.

McNichols, M. and Manegold, J. (1983). The effect of the information environment on the relationship between financial disclosure and security price variability. Journal of Accounting and Economics, 5, 49-74.

Milano, G. V. (2011). How to make hay out of buybacks. Retrieved from http:// www3.cfo.com/ Print/ PrintArticle? pageId=dcbf1e7a-2d68-45b8-94de-57948b1abdf3

Mishra, A. (2005). An empirical analysis of share buybacks in India. ICFAI Journal of Applied Finance, 11(5), 5-24.

Mitchell, J.D., Dharmawan, G.V., Clarke, A.W.(2001). Managements' views on share buybacks: An Australian survey. Accounting and Finance, 41, 93-129.

Mitchell, J.D. and Robinson, R. (1999). Motivations of Australian listed companies effecting share buy-backs. ABACUS, 35 (1), 91-119.

Mohanty, M. and Panda, S. (2011). A study on investors' reaction towards share buyback in India. European Journal of Social Sciences, 22 (2), 193-201.

Mohanty, P (2002). Who gains in share buyback? ICFAI Journal of Applied Finance, 8(6), 19-30.

Myers, J. H. and Bakay, A. J. (1948). Influence of stock split-ups on market price. Harvard Business Review, 26(2), 251265.

Nadarajan, S., Ahmad, Z. and Chandren, S. (2009). The effects on earnings from announcement of open market Malaysian corporate share buyback. European Journal of Social Sciences, 11(3), 378-390.

Nohel, T., and Tarhan, V. (1998), Share repurchases and firm performance: New evidence on the agency cost of free cash flow. Journal of Financial Economics, 49, 187-222.

Ofer, A. R. and Thakor, A. V. (1987). A theory of stock price responses to alternative corporate cash disbursement methods: Stock repurchases and dividends. Journal of Finance, 42, 365-394.

Otchere, I. and Ross, M. (2002). Do share buy back announcements convey firm-specific or industry-wide information? A test of the undervaluation hypothesis. International Review of Financial Analysis, 11(4), 511-531.

Persons, J. (1997). Heterogeneous shareholders and signaling with share repurchases. Journal of Corporate Finance, 3, 221249.

Peterson, D.R. and Peterson, P.P. (1993). Dutch auction versus fixed-price tender offers: Do firms overpay in fixed-price offers? Journal of Financial Research, 16, 39-48.

Peyer, U. and Vermaelen, T. (2005). The many facets of privately negotiated share repurchases. Journal of Financial Economics, 75, 361-395.

Purohit, H., Satija, V. and Chhatwal H. (2012). Market reaction around the buyback announcements: an empirical analysis of informational efficiency of Indian stock market. International Journal of Management, IT and Engineering, 2(7), 30-52.

Ramsay, I. and Asjeet, S. (2000). Share Buy-backs: An Empirical Investigation. Retrieved from papers.ssrn.com/ sol3/ papers.cfm?abstract_id=227930SSRN.

Rasbrant, J. (2011). The price impact of open market share repurchases. Retrieved from http:// www.nasdaqomx.com/ digitalAssets/ 76/ 76006_thepriceimpactofopenmarketsharerepu rchases.pdf

Rau, P. R. and Vermaelen, T. (2002). Regulation, taxes, and share repurchases in the U.K. Journal of Business, 75 (2), 245-282.

Rees, W. (1996). The impact of open market equity repurchases on UK equity prices. European Journal of Finance, 2(4): 353-370.

Roosenboom, P. G. J. G., A.P. ;Beemt, A., van den. (2001). Aandeleninkoop nog niet gewaardeerd. ESB Economische Statistische Berichten, 4296, 184.

Shoven, J. and Simon, L. (1987). Share repurchase and acquisitions: an analysis of which firms participate, NBER Working Paper No. 2243.

Stephens, C. P. and Weisbach, M. S. (1998). Actual share reacquisitions in openmarket repurchase programs. Journal of Finance, 53(1): 313.

Stewart, S. S. (1976). Should a corporation repurchase its own stock. Journal of Finance, 31(3), 911 -921.

Stonham PA. (2002). Game plan for share repurchases. European Management Journal, 20, 37-44.

Stulz, R. (1988). Managerial control of voting rights: Financing policies and the market for corporate control. Journal of Financial Economics, 20, 25-54.

Thirumalvalavan, P. and Sunitha, K. (nd). Share Price Behaviour around Buy Back and Dividend Announcements in India, Indian Institute of Capital Markets 9th Capital Markets Conference Paper. Retrieved from SSRN: http:// ssrn.com/ abstract=873986 or http:// dx.doi.org/ 10.2139/ ssrn.873986

Vermaelen, T. (1981). Common stock repurchases and market signalings. Journal of Financial Economics, 9, 139183.

Vermaelen, T. (1984). Repurchase tender offers, signaling, and managerial incentives. Journal of Financial and Quantitative Analysis, 19, 163-181.

Vermaelen, T. (2005). Share Repurchases: Foundations and Trends. Finance, 1(3), 171268.

Vermaelen, T. and Peyer, U. (2005), The Nature and Persistence of Buyback Anomalies, AFA 2006 Boston Meetings Paper, in Annalisa, C., Daniele D. and Giancarlo G., Stock repurchases and future operating performance: empirical evidence from Italy, Investment Management and Financial Innovations, 5(1), 2008. Retrieved from http://businessperspectives.org/journals_free/imfi/2008/imfi_en_2008_01_Croce.pdf

Wansley, J., William, L., and Salil, S. (1989). Managements' view on share repurchase and tender offer premiums. Financial Management, 18(3), 97-110.

Weisbenner, S.J. (2000). Corporate share s in the 1990s: What role do stock options play? Ph.D. dissertation, University of Illinois.

Yook, K. C. (2010). Long-run stock performance following stock repurchases. The Quarterly Review of Economics and Finance, 50(3), 323-331.

Zhang, H. (2002). Share repurchases under the commercial law 212-2 in Japan: Market reaction and actual implementation. Pacific-Basin Finance Journal, 10, 287-305.

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ANNEXURE 1: List of Companies and Announcement Dates for Share Buyback

S. No.	Date of Announcement	Company Name	Mode of Buyback	S. No.	Date of Announcement	Company Name	Mode of Buyback
1	January 13, 2010	FDC Limited	Open Offer	30	November 02, 2011	Bhagyanagar India Limited	Open Offer
2	February 18, 2010	Poddar Pigments Limited	Open Offer	31	November 02, 2011	Rain Commodities Limited	Open Offer
3	February 22, 2010	Gee Cee Ventures Limited	Tender Offer	32	November 08, 2011	De Nora India Limited	Open Offer
4	February 22, 2010	Kilburn Engineering Limited	Open Offer	33	November 08, 2011	Jindal Poly Films Limited	Open Offer
5	March 04, 2010	TIPS Industries Limited	Open Offer	34	November 11, 2011	Gemini Communication Limited	Open Offer
6	May 10, 2010	Manaksia Limited	Open Offer				
7	July 07, 2010	Panacea Biotec Limited	Open Offer	35	November 16, 2011	SoftSol India Limited	Open Offer
8	August 16, 2010	Hindustan Unilever Limited	Open Offer	36	November 18, 2011	Borosil Glass Works Limited	Open Offer
9	August 18, 2010	Consolidated Securities Limited	Open Offer	37	November 24, 2011	Amtek Auto Limited	Open Offer
				38	November 24, 2011	Avantel Limited	Open Offer
10	October 22, 2010	Crisil Limited	Open Offer	39	December 13, 2011	Praj Industries Limited	Open Offer
11	November 16, 2010	Navin Fluorine	Tender Offer	40	December 15, 2011	CRISIL Limited	Open Offer
12	November 24, 2010	Sasken Communication Technologies Limited	Open Offer	41	December 19, 2011	Infinite Computer Solutions (India) Limited	Open Offer
13	December 10, 2010	Piramal Healthcare Limited	Tender Offer	42	December 28, 2011	Ansal Housing and Construction Limited	Open Offer
14	December 28, 2010	Buyback offer of India Infoline Limited	Open Offer	43	December 29, 2011	India Bulls Real Estate Limited	Open Offer
15	January 03, 2011	ABG Infralogistics Limited	Tender Offer	44	January 10, 2012	Valiant Communications Limited	Open Offer
16	January 03, 2011	Lakshmi Machine Works Limited	Open Offer				
				45	January 25, 2012	Reliance Industries Limited	Open Offer
17	January 28, 2011	Hindustan Composites Limited	Open Offer	46	January 30, 2012	Geecee Ventures Limited	Open Offer
18	February 14, 2011	FDC Limited	Open Offer	47	February 28, 2012	Monnet Ispat and Energy Limited	Open Offer
19	March 01, 2011	Balrampur Chini Mills Limited	Open Offer	48	April 03, 2012	Rain Commodities Limited	Open Offer
20	March 22, 2011	SRF Limited	Open Offer	49	April 13, 2012	Zee Entertainment Enterprises Limited	Open Offer
21	March 25, 2011	HEG Limited	Open Offer	50	April 27, 2012	Sasken Communication Technologies Limited	Open Offer
22	April 06, 2011	Reliance Infrastructure	Open Offer				
23	April 11, 2011	Allied Digital Services Limited	Open Offer	51	May 25, 2012	Akzo Nobel India Limited	Tender Offer
				52	June 05, 2012	LKP Finance Limited	Open Offer
24	May 11, 2011	Deccan Chronicle Holdings Limited	Open Offer	53	July 31, 2012	TIPS Industries Limited	Open Offer
25	May 26, 2011	Amrutanjan Health Care Limited	Tender Offer	54	August 22, 2012	Kanoria Chemicals and Industries Limited	Open Offer
				55	August 24, 2012	FDC Limited	Open Offer
26	June 15, 2011	PVR Limited	Open Offer	56	September 25, 2012	Selan Exploration Technology Limited	Open Offer
27	July 20, 2011	ECE Industries Limited	Open Offer				
28	August 30, 2011	Amtek Auto Limited	Open Offer	57	October 05, 2012	Rain Commodities Limited	Open Offer
29	October 05, 2011	Eon Electric Limited	Open Offer	58	November 12, 2012	Mastek Limited	Open Offer

Metrics for Human Assets: An Empirical Analysis of the Current Practice in Service Sector Organizations in India

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Human Asset Measurement can be defined as quantifying the contributions of all employees of an organization to produce value from their knowledge, skills, abilities, and other characteristics as well as the organizational processes, like recruitment, selection, training, etc., which are used to build and support these human aspects. It involves number of parameters to evaluate the employees in the organization. The study was conducted to find the metrics on the basis of which the service sector organizations in India evaluate their employees and to find whether there is any significant difference that exists between the employees from different backgrounds. It was found that experience, Client satisfaction surveys, Competencies, Cost of people, Cost per hire, Educational level, Seniority, and Tenure were identified as being used mostly as a human asset evaluation measure by the organizations. Also, there is a significant difference between employees having different years of experience in the choice of parameters used for measurement of human asset in their organization.

Key Words: *Human Asset, Evaluation of Human Asset, Parameters to evaluate employees, Metrics for human asset.*

INTRODUCTION

In knowledge economy/ society, human asset constitutes to be the focal point around which all economic activities rotate. A knowledge economy is one in which the generation and exploitation of knowledge play the predominant part in the creation of wealth (United Kingdom Department of Trade and Industry, 1998). In these types of economies, the service-oriented companies dominate the majority of economic activities. The major asset to these companies is thus the knowledge, experience, and skill of the workers who are responsible for everything that happens in the organization rather than machines. The fast growth of service organizations in various developed and developing countries shifts the focus of management towards skill empowerment of their employees.

Despite the fact that service sector organizations are fast growing in the 21st century universally where intellectual capital is the most important asset, the system of measurement of human asset accounting has few evidences of its application.

Singh & Gupta (2008) by using the human resource valuation model (Singh, 2002) found that there was huge difference between the cost incurred on an employee by an organization and the value of their employees. Also, Singh & Gupta (2010) in their research study showed the importance of valuation

of human asset by proving that the cost incurred on employees could not be used as a surrogate measure of their value. Also, the various Organizational and Environmental factors relating to human resource had an impact on Organization's human resource value. Values calculated by using the human resource valuation model (Singh, 2002) provided the information for strategic decision making particularly relating to the human resource decision problems. Hence, HCIS (Human Capital Information System) can be used by the decision makers as Decision Support System (Singh, 1999).

Human Asset Accounting is all about developing a way of measuring and valuing that captures the very essence of a business - its people and reports their worth in such a way that not only shows the added worth that they make to the organization but allows for the continued development of this worth as well (Singh & Rastogi, 2001(a) & 2001(b)).

Human Asset Measurement by Organizations in India

Many studies have aimed at constructing a human resource or an intellectual capital statement or report along with traditional financial statements to provide them to managers and external stakeholders (Edvinsson and Malone, 1997; Lev, 2001, Brooking, 1996; Roos et al., 1997, Singh & Gupta, 2010). It has been suggested by Hermanson (1964), Likert (1967), Likert and Pyle (1971), Lev & Schwartz (1971) that the inclusion of Human Resource Accounting Information might benefit the investors and it would be of immense use if information relating to human resource is presented so that the investors can evaluate properly assets and income.

In India, Human Resource Valuation until now has not been introduced as a system in most of the companies. So far as the statutory requirement is concerned, the Companies Act, 1956, requires the furnishing of little information about human resources in the annual reports of the companies. Sec. 217 (2A) of the Companies Act 1956 requires the

companies to give the particulars of some employees drawing salaries above a specified limit in the annual reports of the companies.

The statement to be included in Board's report under subsection (2-A) of section 217 of the Companies Act, 1956 (1 of 1956), shall also contain the following particulars, namely:-

(a) Designation of the employee.

(b) Remuneration received.

(c) Nature of employment, whether contractual or otherwise.

(d) Other terms and conditions.

(e) Nature of duties of the employee.

(f) Qualifications and experience of the employee.

(g) Date of commencement of employment.

(h) The age of the employee. 3

(I) The last employment held by such employee before joining the company.

(J) The percentage of equity shares held by the employee in the company within the meaning of sub-clause (iii) of clause (a) of sub-section (2A) of section 217 of the Act.

But this section is still silent about Measurement of Human Asset and the main focus is on emoluments received by employees which is basically cost to the company and is generally much lower than their value. No significant information about human asset is mandatory to be shown in the financial statements of the company.

Although, Institute of Chartered Accountants of India (ICAI) has issued accounting standards on most of the important areas in accounting and has ensured their implementation by making accounting standard mandatory, the most regrettable fact is that it has not issued any accounting standard for the measurement and reporting of the cost and value of human resources of an organization and the contribution made by them. Due to this fact, a very large number of organizations

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are following even to-day, the principles and practices of conventional accounting.

Under the 1956 Act, , there is no mandate requiring companies to ensure compliance with accounting standards or generally accepted accounting principles while proposing the accounting treatment in a scheme. However, listed companies are required to ensure such compliance as the Equity Listing Agreement mandates such companies to obtain an auditor's certificate regarding appropriateness of the accounting treatment proposed in the scheme of arrangement. The Companies Act 2013 Act requires all companies undertaking any compromise or arrangement to obtain an auditor's certificate (section 230 and 232 of the 2013 Act). This requirement will help in streamlining the varied practices as well as ensuring appropriate accounting treatment.

So, an accounting standard should be there to evaluate human asset on different metrics.

There are few of the companies in India who do the valuation of human resources and disclose in their Annual report.

Public Sector Enterprises

• Cement Corporation of India Limited (CCIL)

• Hindustan Petroleum Corporation limited (HPCL)

Private Sector Enterprises

• Infosys Technologies Limited

• Rolta India Limited

Considering the fact that very few companies are valuing human resources in their annual report, the need was felt to conduct a study based on primary data with the following objectives and hypotheses.

Objective of the study

The study was conducted to find the parameters on the basis of which the service sector organizations in India evaluate their employees. The main objectives of the study are:

1. To find out the parameters those are currently used for measuring the value of human asset in the organization.

2. To find whether there is any significant difference between employees from different background viz., age, experience, qualifications, and service industry in the number of parameters used for measurement of human asset in their organization.

Research Hypotheses of the study

To achieve the objectives, following hypotheses have been formulated.

Null Hypothesis H01: There is no significant difference between employees of different age groups in the number of parameters used for measurement of human asset in their organization.

Alternative Hypothesis Ha1: There is a significant difference between employees of different age groups in the number of parameters used for measurement of human asset in their organization.

Null Hypothesis H02: There is no significant difference between employees having different years of experience in the number of parameters used for measurement of human asset in their organization.

Alternative Hypothesis Ha2: There is a significant difference between employees having different years of experience in the number of parameters used for measurement of human asset in their organization.

Null Hypothesis H03: There is no significant difference between employees having different educational qualifications in the number of parameters used for measurement of human asset in their organization.

Alternative Hypothesis Ha3: There is a significant difference between employees having different educational qualifications in the number of parameters used for measurement of human asset in their organization.

Null Hypothesis H04: There is no significant difference between employees from different service industry in the number of parameters used for measurement of human asset in their organization.

Alternative Hypothesis Ha4: There is no significant difference between employees from different service industry in the number of parameters used for measurement of human asset in their organization.

Research Methodology

For the purpose of the study, both primary and secondary data sources of information have been used. Published books, journals and periodicals, etc., along with manuals and reports of different companies in India constituted the secondary sources of data. Primary data is obtained using a structured questionnaire.

From a list of 33 potential human asset related measures as shown in Table 1 (Verma and Dewe, 2006), respondents were asked to identify those measures that they are currently being used in their organizations on a three point scale ranging as mostly, moderately and least.

To meet out these objectives, the statistical treatment of the data obtained was carried out from a sample of 150 employees working in the service sector organizations namely Banking and Insurance, Finance, Information Technology, and Telecommunication.

The data have been analyzed with by using Microsoft Excel and Predictive Analytic Software (PASW). Statistical tools like Mean and Standard Deviation, and ANOVA have been used to analyze the data.

Reliability of the Questionnaire

In order to obtain a good estimate of the reliability of a questionnaire, Cronbach's alpha is computed. Cronbach's alpha computed as 0.896 shows high consistency.

Analysis of the data

Respondents were asked about the human resource measures that were utilized by their organizations. From a list of 33 measures, respondents were asked to identify which ones were used by their organizations. The measures included both

Table 1: List of Possible Human Asset Evaluation Measures		
• Absenteeism rate	• Healthcare cost per employee	• Revenue per employee
• Accident frequency rate	• HR costs/investment	• Seniority
• Average age	• HR ratio	• Tenure
• Client satisfaction surveys	• Innovation	• Time to fill jobs
• Competencies	• Job satisfaction	• Total shareholder return (TSR)
• Cost of people	• Leadership	• Training and educational costs
• Cost per hire	• Learning	• Training lost
• Cost-benefit analysis	• Organizational commitment	• Turnover cost
• Economic value added (EVA)	• Return on investment (ROI)	• Turnover rate
• Educational level	• Return on investment in human capital	• Value added per employee
• Experience	• Return on training	• Intellectual capital

measures, which might predominantly be used by the human resource function in an organization such as job satisfaction and organizational commitment and measures of wider interest such as economic value added and intellectual capital.

As shown in the Table 2, 63.1% respondents have agreed that experience as a human asset evaluation measure was used mostly by their organizations. Of the other measures, Client satisfaction surveys (58.7%), Competencies (51%), Cost of people (46.7%), Cost per hire (40.9%), Educational level (51%), Seniority (49.7%), and Tenure (47%) are identified as being used mostly as a human asset evaluation measure by the organizations.

Accident frequency rate (45.3%), Average age (50%), Cost-benefit analysis (41%), Economic value added (EVA) (52.7%), HR costs/ investment (46%), HR ratio (51%), Leadership (46%), Return on investment (ROI) (51%), Return on training (51%), and Total shareholder return (TSR) (54.4%) were identified as being used moderately by the organizations.

More than 30% of the respondents have identified HR costs/ investment (34%), HR ratio (34.7), Innovation and Creativity Quotient (35.4%), Learning Quotient (29.7%), Return on investment in human capital (33.1%), Time to fill jobs (32%), Training lost (46.7), and Intellectual capital (30.9) as being least used in their organizations.

Thus, there is a range of measures that are least or not used by many organizations or used moderately. This supports the view that although Human Asset Metrics/ Measurement is an area of interest and importance in organizations, there are relatively few measures actually calculated by organizations in relation to the measurement of human assets.

To test the null hypothesis H01 that there is no significant difference between employees of different age groups in the number of parameters used for measurement of human asset in their organization, descriptive statistics, and ANOVA have been performed as given in Tables 3 and 4.

S. No.	Human Asset Evaluation Measures	Mostly (%)	Moderately (%)	Least (%)
16	Job satisfaction	39.3	35.3	25.4
17	Leadership	34	46	20
18	Learning Quotient	27	43.3	29.7
19	Organizational commitment	36.1	42.9	21
20	Return on investment (ROI)	30.6	51	18.4
21	Return on investment in human capital	20.9	46	33.1
22	Return on training	26	51	23
23	Revenue per employee	40.7	41.3	18
24	Seniority	49.7	33.6	16.7
25	Tenure	47	34.9	18.1
26	Time to fill jobs	26	42	32
27	Total shareholder return (TSR)	21.8	54.4	23.8
28	Training and educational costs	30.2	42.3	27.5
29	Training lost	15.3	38	46.7
30	Turnover cost	24.7	46.7	28.6
31	Turnover rate	28.9	51	20.1
32	Value added per employee	22	52	26
33	Intellectual capital	22.1	47	30.9

Table 2:Percentage of Employees Who Identified the Measures used for Evaluating Human Asset by the Organizations				
S. No.	Human Asset Evaluation Measures	Mostly (%)	Moderately (%)	Least (%)
1	Absenteeism rate	38.7	41.3	20
2	Accident frequency rate	9.3	45.3	45.4
3	Average age	16	50	34
4	Client satisfaction surveys	58.7	25.3	16
5	Competencies	51	32.9	16.1
6	Cost of people	46.7	35.6	17.7
7	Cost per hire	40.9	37	22.1
8	Cost-benefit analysis	39	41	20
9	Economic value added (EVA)	27	52.7	20.3
10	Educational level	51	41.6	7.4
11	Experience	63.1	30.2	6.7
12	Healthcare cost per employee	22	41.3	36.7
13	HR costs/investment	20	46	34
14	HR ratio	14.3	51	34.7
15	Innovation and Creativity Quotient	23.3	41.3	35.4

Table 3: Comparisons of Mean Scores of Employees having different Age Groups in the number of Parameters used for Measurement of Human Asset in their Organization		
Age	Mean	Standard deviation
Less than 25 years	2.0350	0.38478
25-35 years	1.8941	0.32889
36-45 years	1.9257	0.34109
More than 45 years	2.0350	0.39627

Table 4: Summary of Significant F-test of Employees having different Age Groups in the number of Parameters used for Measurement of Human Asset in their Organization				
	Sum of Squares	Mean Squares	F	Sig.
Between Groups	0.519	0.173	1.439	0.234
Within Groups	17.564	0.120		
Total	18.084			

As shown in the Table 3, since '1' is for mostly used and '3' is for least used parameters, employees of age less between 25 to 35 years perceives parameters used more for measurement of human asset in their organization (M= 1.89, SD= 0.329) followed by employees of age 36-45 years (M= 1.9257 , SD= 0.341).

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The next step is to conduct test of significant differences to evaluate the null hypotheses.

It shows that there is no significant difference among the employees under different groups of age (F= 1.439, p> 0.05).

Thus we accept the null hypothesis H0 1 that there is no significant difference between employees of different age groups in the number of parameters used for measurement of human asset in their organization.

To test the null hypothesis H02 that there is no significant difference between employees having different years of experience in the number of parameters used for measurement of human asset in their organization, descriptive statistics, and ANOVA have been performed as given in Tables 5 and 6.

Table 5 shows that employees having experience of 2-5 years perceive parameters used more for measurement of human asset in their organization (M= 1.811, SD= 0.0.335).

Table 6 shows whether there is any significant difference between the employees having different years of experience. As shown in the Table 6, there is a significant differences (F= 3.241, P< 0.05) among employees having different years of experience.

Table 7 shows the results of Tukey's HSD Test.

Results of Tukey's HSD test (Table 7) shows that there is a significant difference in the means of employees having experience '2-5 years' and 'more than 10 years' (Mean Difference=-0.199).

Thus, we reject the null hypothesis H02 and accept the alternative that there is a significant difference between employees having different years of experience in the number of parameters used for measurement of human asset in their organization.

To test the null hypothesis H03 that there is no significant difference between employees having different educational qualifications in the number of parameters used for measurement of human asset in their organization, descriptive statistics, and ANOVA have been performed as given in Tables 8 and 9.

Table 5: Comparisons of Mean Scores of Employees having different Years of Work Experience in the number of Parameters used for Measurement of Human Asset in their Organization		
Age	Mean	Standard deviation
Less than 2years	2.028	0.397
2-5 years	1.811	0.335
6-10 years	1.942	0.315
More than 10 years	2.010	0.337

Table 6: Summary of Significant F-test of Employees having different Years of Work Experience in the number of Parameters used for Measurement of Human Asset in their Organization				
	Sum of Squares	Mean Squares	F	Sig.
Between Groups	1.129	0.376	3.241*	0.024
Within Groups	16.955	0.116		
Total	18.084			

Significant at 0.05 level

Table 7 Summary of Tukey's HSD (Honestly Significant Difference) Test of Employees having different Years of Work Experience in the number of Parameters used for Measurement of Human Asset in their Organization				
Experience (I)	Experience (J)	Mean Difference (I-J)	Standard Error	Sig.
Less than 2 years	2-5 years	0.217	0.08648	0.062
	6-10 years	0.086	0.08799	0.760
	More than 10 years	0.018	0.08720	0.997
2-5 years	Less than 2 years	-0.217	0.08648	0.062
	6-10 years	-0.131	0.07445	0.297
	More than 10 years	-0.199*	0.07351	0.037
6-10 years	Less than 2 years	-0.086	0.08799	0.760
	2-5 years	0.131	0.07445	0.297
	More than 10 years	-0.069	0.07529	0.798
More than 10 years	Less than 2 years	-0.018	0.08720	0.997
	2-5 years	0.199*	0.07351	0.037
	6-10 years	0.069	0.07529	0.798

The mean difference is significant at the 0.05 level.

Table 8:Comparisons of Mean Scores of Employees having different Educational Qualifications in the number of Parameters used for Measurement of Human Asset in their Organization		
Educational Qualification	Mean	Standard deviation
Graduate	1.955	0.323
Post Graduate	1.965	0.393
Professional	1.871	0.304
Any Other	1.885	0.313

Table 9:Summary of significant F-test of Employees having different Educational Qualifications in the number of Parameters used for Measurement of Human Asset in their Organization				
	Sum of Squares	Mean Squares	F	Sig.
Between Groups	.237	0.079	0.646	0.587
Within Groups	17.847	0.122		
Total 18.084				

Table 8 shows that employees having Professional Qualifications perceive parameters used more for measurement of human asset in their organization (M= 1.871, SD= 0.304).

Table 9 shows whether there is any significant difference between the employees having different Educational Qualifications. As shown in the Table 9, there is no significant differences (F= 0.646, P >0.05) among employees having different Educational Qualifications.

Thus, we accept the null hypothesis H03 that there is no significant difference between employees having different educational qualifications in the number of parameters used for measurement of human asset in their organization.

To test the null hypothesis H04 that there is no significant difference between employees from different industries in service sector in the number of parameters used for measurement of human asset in their organization, descriptive statistics, and ANOVA have been performed as given in Tables 10 and 11.

Table 10 shows that employees from finance sector perceive parameters used more for measurement of human asset in their organization (M= 1.807, SD= 0.322) followed by IT sector (M= 1.924, SD= 0.281).

Table 11 shows whether there is any significant difference between the employees from different industries in service sector. As shown in the Table above, there is no significant difference (F= 2.281, P>0.05) among employees from different industries in service sector.

Thus, we accept the null hypothesis H04 that there is no significant difference between employees from different industries in service sector in the number of parameters used for measurement of human asset in their organization.

CONCLUSION AND RECOMMENDATIONS

The research study set out to explore current practices in the area of measurement of human asset focusing on identifying current measures being used to measure human asset. On the basis of the results, it was found that experience, Client satisfaction surveys, Competencies, Cost of people, Cost per hire, Educational level, Seniority, and Tenure were identified as being used mostly as a human asset evaluation measure by the organizations. More than 30% of the respondents identified HR costs/ investment, HR ratio, Innovation and Creativity Quotient, Learning Quotient, Return on investment in human capital, Time to fill jobs, Training lost, and Intellectual capital as being least used by the organizations. Verma & Dewe (2006) also found that a range of measures relating to human resources were calculated but only seven were used by more than 50% of respondents. These were absenteeism, accident rates, training and educational costs, turnover rate, cost of people, client satisfaction surveys, and competencies.

Table 10: Comparisons of employees from different Industries in Service Sector in the number of Parameters used for Measurement of Human Asset in their Organization

Service Sector	Mean	Standard deviation
Banking and Insurance	2.003	0.342
Finance	1.807	0.322
Information Technology	1.924	0.281
Telecommunication	1.991	0.450

Table 11: Summary of Significant F-test of Employees from different Industries in Service Sector in the number of Parameters used for Measurement of Human Asset in their Organization

	Sum of Squares	Mean Squares	F	Sig.
Between Groups	0.810	0.270	2.281	0.082
Within Groups	17.274	0.118		
Total	18.084			

Significant at 0.05 level

It was also found that there is no significant difference between employees having different age groups, different educational qualification, and from different industries in service sector in the parameters used for measurement of human asset in their organization. Significant difference has been found between the employees having different experience. Since employees having experience of 10 years and more perceived that less number of parameters were used for measurement, it is recommended that management should design roles for them so that they will have more involvement in the measurement process.

It is apparent that the measurement of human asset will never be as straight forward as calculating the value of a tangible asset; there are simply too many variables involved to make this practical. But, major reason for using less number of measures to evaluate human asset is that there is no universally accepted model for measurement of human asset. Experts developed a number of models during last few decades but none got credit of convenience and objectivity. Therefore, there is a need to develop a model that is acceptable to all the companies. The Value of Human Asset for the Organisation should be perceived in terms of the contributions made by him/ her to the Organisation which is useful for decision making (Singh & Gupta, 2008 & 2010). Human Resource Valuation model based on the Human Asset Accounting Information System (HAAIS) should be used to give the information about human asset in the organisation (Singh, 2000).

REFERENCES

Brooking, A. (1996). Intellectual capital. London: International Thomson Business Press.

Edvinsson, L., & Malone, M. S. (1997). Realizing your company's true value by finding its hidden brainpower. Intellectual Capital. New York: Harper Collins.

Hermanson, R. (1964). Accounting for human asset. Occasional Paper No. 14, Graduate School of Business Administration, Michigan State University. http:// digital commons.ilr.cornell.edu/ cahrswp/ 179.

Lev, B. (2001). Intangibles: Management, measurement, and reporting. Brookings Institution Press, Washington, D.C.

Lev, B., & Schwartz, A. (1971). On the use of the economic concept of human capital in financial statements. The Accounting Review, January, Vol. 46, 103-112.

Likert, R. (1967). The human Organization: Its management and value. New York: Mcgraw Hill, 153.

Likert, R., & Pyle, W.C. (1971). A human Organizational measurement approach. Financial Analysts Journal, January-Febuary, 45-84.

Roos, J., Roos, G., Dragonetti, N., & Edvinsson, L. (1997). Intellectual capital: navigating the new business landscape. London: Macmillan Press ltd.

Singh, A. K. (1999). Human Capital Information System. The Indian Journal of Accounting, vol. 30(1), 40-50.

Singh, A. K. (2000). Human Asset Information System: A Model Based Approach. Delhi Business Review: An International Journal of SHTR, vol. 1(2), 1-11.

Singh, A. K. & Rastogi, L. (2001a). Human Value Added. Delhi Business Review: An International Journal of SHTR, vol. 2(1), 21-34.

Singh, A. K. & Rastogi, L. (2001b). Human Value Added. ed. Jauhari Lal, "HRD". New Delhi: Excel Books.

Singh, A. K. (2002). Accounting for Human Resources: Acquisition, Development and Retention. Society for Human Transformation and Research, New Delhi.

Singh, A. K. and Gupta, N. (2008). Measurement of Human Asset: An Empirical Analysis. Indian Journal of Accounting, Vol. 38(2), 13-22.

Singh, A. K. and Gupta, N. (2010). Contribution Based Measurement of Human Asset for Strategic Decision Making Using HCIS. International Journal of Business and Management Studies, Vol.2(1), 97-105. Available from 2010 ISSN: 1309-8047.

Verma, S. and Dewe, P. (2006). Valuing human resources: perceptions and practices in UK organizations. Department of Management Studies, University of York, Working Paper 17.

United Kingdom Department of Trade and Industry (1998), Corporate Reporting Under a Knowledge Economy. London: Jossey-Bass.

BIOGRAPHIES

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He is the Member North Apex Body of Art of Living (Delhi NCR), member of American Accounting Association, life

member of ICA and Managing Trustee of ICA since Feb. 2010, IAA, NHRD, CSI, DET, DI, & GMDA. He has been awarded two gold medals in 2008 and has been conferred PRO FAKULTATE INTERNATIONAL Award by Szent Istvan University, Godollo, on June 24, 2009 at Hungary. Memorable Medal has been awarded by Dean - Faculty of Economics and Management, Slovak University of Agriculture in Nitra, Slovak Republic on Sept. 10, 2009 and Gold Medal was awarded by Rector of Slovak University of Agriculture in Nitra, Slovak Republic for cooperation and contribution in the fields of science and education on May 26, 2010 at Nitra, Slovak Republic. On June 2, 2011, Silver Medal of Faculty of Applied Economics and Rural Development, University of Debrecen, Hungary, was conferred on him which is the highest award of that Faculty.

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Capital Adequacy Growth in Banks: An Indian Scenario

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Basel norms are synonymous with the best practices and standards in banking regulation and supervision. In order to strengthen the soundness and stability of banks, Basel Committee on Banking Supervision (BCBS) came out with a series of comprehensive and flexible documents in the form of Basel I, Basel II and Basel III. The present paper analyses the changes in Capital Adequacy Ratio of public and private sector banks from 2001-2013 in the light of Basel Capital adequacy requirements. Using Compound Annual Growth rate it was found that most of public and private sector banks have shown sign of growth of Capital Adequacy ratio and all of them have crossed the minimum CAR requirement of 9% stipulated by RBI. This paper also attempts to study the role of Reserve Bank of India, in implementation of Basel framework in Indian banking Scenario.

Key Words: *Basel Norms, Banks, Capital Adequacy*

INTRODUCTION

With change in the financial landscape of world economies due to rapidly evolving diverse markets and introduction of sophisticated banking products, regulators around the world have aroused concern for protecting the stability and soundness of banks. Basel Committee on Banking Supervision (BCBS) took initiative to protect banks from failure with co-operation of central banks of various countries and released the First Capital Accord i.e. Basel I in 1988. Basel I guidelines stipulated a minimum regulatory capital requirements of 8 % for banks. The main purpose of the Capital Accord was to make regulatory capital requirements more responsive to credit risk associated with bank portfolio of assets and off-balance sheet activities and to ensure that the regulators utilize particular standards while assessing capital adequacy (Hai et al., 2007 and Mohanty, 2008). The first and incontestable achievement of the initiative was that it created a worldwide benchmark for banking regulation and had become basis of inspiration for banking regulators in more than 100 nations (Shin, 2003). But, Basel I suffered from certain rigidities in the wake of more volatile and risk sensitive financial environment. So, BCBS came out with a superior, comprehensive and more risk sensitive framework on 26 June 2004 "International Convergence of Capital Measurement and Capital Standards", commonly known as the New Basel Capital Accord or "Basel II (Bagchi, 2005). The main objective of Basel II accord is to improve the effectiveness of banking supervision and regulation through

adoption of more risk-responsive and innovation-supportive regulatory framework. The structure of Basel II has its foundation on three mutually reinforcing pillars namely Minimum Capital Requirements (Pillar I), Supervisory review (Pillar II) and Market Discipline (Pillar III). These three pillars allow banks and bank supervisors to evaluate properly the various risks that banks face and realign regulatory capital more closely with underlying risks (Prakash, 2008). Even though Basel II was primarily intended to strengthen the soundness and stability of banking system yet global financial crisis revealed the inadequacy of Basel II which provides strong incentives to banks to underestimate credit risk thus engage in risky lending practices (Cannata and Quagliariello, 2009). To plug the loopholes in capital rules on 16 December 2010, the Basel Committee on Banking Supervision (Basel Committee) had published the Basel III rules with an objective to reduce the probability and severity of future crisis. Mr Nout Wellink, Chairman of the Basel Committee on Banking Supervision and President of the Netherlands Bank, described the Basel III Framework as "a landmark achievement that will help to protect financial stability and promote sustainable economic growth. The higher levels of capital, combined with a global liquidity framework, will significantly reduce the probability and severity of banking crises in the future" (Bank for International Settlements, 2010).

REVIEW OF LITERATURE

Raghavan (2004) discussed the framework of Basel II capital accord with special focus on international banking scenario. The study emphasized the radical change in approaches for calculating various categories of risks under Basel II. It further investigated CAR (Capital Adequacy Ratio) of public sector banks under Basel I for the period of five years from 1998-2003 and found improvement in CAR of many banks while decline in case of some banks. Nikolov (2004) attempted to analyze the results of the survey conducted by New York State Banking Department in 2004 on Basel II

implementation. The survey aimed at describing the capital adequacy policies to be implemented by parent institutions of foreign agencies and branches in accordance with guidelines set forth by BIS. Sarma and Nikaido (2007) presented an analytical review of capital adequacy regime in India in context of Basel I. It focused on state of capital adequacy of Indian banks during 1996-2006 and found satisfactory position of banks in India in terms of CAR. Hai et al. (2007) investigated the issues, challenges and implications of Basel II implementation for the developing economies with prime focus on Pakistan. The study indicated that, especially for developing economies striking a right balance between regulation, supervision and market discipline is a difficult task. Sharma (2009) analyzed CAR of 10 banks as per Basel I and Basel II for the financial year ending 2009. The study used Simple average and the change in CAR during FY 2008-09 for a comparative Study. It was found that average CAR of the analyzed banks as per Basel II norms improved from 12.35 per cent for the year ended March 2008 to 13.48 per cent in FY '09. The results suggested that with remarkable performance during the crisis period, Indian banking sector has proved to be based on prudent lending practices and sound fundamentals. Singh and Vyas (2009) studied the status of capital requirements in India. The results suggested significant difference in mean CAR of SBI and its associates, private banks and foreign banks with nationalized banks i.e. benchmark group during the period of study. Davis (2010) outlined flaws in capital requirements and difficulty in its implementation with special reference to global financial crisis. The study also highlighted merits of various proposals which have been made for changes to bank capital regulation. Pasha et al (2012) studied the conceptual framework of Basel II accord and its impact on CAR. The study examined the trends in CAR values for selected public, private and foreign banks operating in India for the period of 2007-2011. The analysis revealed that capital remains a useful regulatory tool in the hands of policy makers for influencing bank's behavior.

The above studies highlighted the importance of capital adequacy in maintaining soundness of a banking industry and proper implementation of Basel norms. These studies have examined the capital adequacy position for selected categories of banks and that too for a shorter time frame. The prime focus of the present study is to provide the comprehensive overview of the state of banks' capital adequacy position considering not only their average CAR but analyzing their actual growth by using Compound annual growth rate for the period of 2001-2013.

OBJECTIVES OF THE STUDY

1. To analyze the changes in Capital Adequacy Ratio of public and private sector banks in India in context of Basel Capital adequacy requirements.

2. To throw light on role of RBI in implementation of Basel norms in Indian banks.

DATA BASE AND RESEARCH METHODOLOGY

The universe of study consists of all public sector and private sector banks operating in India. For the data collection secondary sources have been used namely, Annual Reports of sampled banks, publications of Reserve Bank of India like, Annual Report(s) of Reserve Bank, and Basel committee publications. The study covers period from 2001 to 2013. Compound Annual Growth Rate (CAGR) has been calculated to analyze the data.

ROLE OF RESERVE BANK OF INDIA IN BASEL NORMS IMPLEMENTATION

International capital adequacy norms known as Basel norms were introduced in India in response to RBI (Reserve Bank of India) approach of gradual convergence with international standards and best

practices. The Narsimahan committee on financial system endorsed the internationally accepted norms for capital adequacy standards, developed by BCBS and thereby India adopted Basel I norms for scheduled commercial banks in April 1992, and market risk amendment of Basel I in 1996. (Sarma and Nikaido, 2007).

Considering the 'One-size fits all' approach of Basel I, Basel Committee on Banking Supervision came out with more risk sensitive and comprehensive framework Basel II to replace the existing Accord. Thus, Basel II was adopted by India keeping into view size, complexity of operations and relevance to financial sector. The Reserve bank directed that Indian banks having foreign branches and foreign banks operating in India should migrate to Basel II norms from March 31, 2008 and all other commercial banks, excluding local area banks and regional rural banks, were required by RBI to adopt Basel II norms not later than March 31, 2009.

As of April 2009, all commercial banks in India had migrated to simpler approaches available under Basel II framework in two stages. After development of adequate skills, both in banks and at supervisory levels, RBI allowed the banks to migrate to the Internal Ratings Based (IRB) Approach (Annual Report, Reserve Bank of India, 2009-10). The Reserve Bank of India (RBI) has already proposed timelines as shown in Table 1 for banks to migrate to advanced risk norms under Basel II, which entails improved standards for banks worldwide for assessing risks. RBI has directed the banks to apply to the central bank (RBI) for migrating to these norms earliest by April 1, 2012, for which banks may receive approvals by March 31, 2014 (The Statesman, 2011).

As a move towards upgrading and enhancing risk management practice in banks, RBI has issued several guidance notes and set up various advisory groups keeping in view banks' own requirements dictated by the size and complexity of business, risk philosophy, market risk perception and expected level of capital. (Annual Report, RBI, 2002-03).

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Table 1: Time frame for Implementation of Advanced Approaches in India		
Approach	Earliest Date of submitting Applications to Reserve Bank	Likely Date of Approval by Reserve Bank
Internal Model Approach (IMA) for Market Risk	April 1,2010	March 31,2011
The Standardized Approach(TSA) for Operational Risk	April 1,2010	September 30,2010
Advanced Measurement Approach(AMA) for Operational Risk	April 1,2012	March 31,2014
Internal Rating Based (IRB) Approach for Credit Risk (foundation as well as advanced IRB).	April 1,2012	March 31,2014

Source: Annual Report RBI, 2009

In the wake of financial turmoil facing the world economy, BCBS introduced more sophisticated version of Basel norms known as Basel III. The proposed changes have begun to be implemented in India in phases starting from January 2013 till January 2015. The creation of conservation buffer can be taken up by banks during the January 2016 2019 period (ICRA, 2010). RBI had proposed that Indian banks should maintain the Tier I capital at a minimum 7% of risk-weighted assets under the new Basel III norms on bank regulation, higher than the 6% suggested by Bank of International Settlement's Committee on Banking Supervision (BCBS). There are no apprehensions that implementation of Basel norms in proper sense will make the Indian banking system more resilient and improve the risk management of banking industry as a whole.

GROWTH OF CAPITAL ADEQUACY AND BANKS IN INDIA

"Capital adequacy has traditionally been regarded as a sign of strength of the financial system in India. In terms of section 17 of Banking Regulation Act, 1949, every banking company incorporated in India is required to create a reserve fund as has been advised to transfer a sum equivalent to not less than 25 percent of its disclosed profits to the reserve fund every year" (Das and Ghosh, 2004).

Under Basel norms Capital Adequacy has assumed the prime importance and it has become sign of soundness of banking system. As per Basel Accord every bank is required to maintain 8% of Capital Adequacy ratio (Ratio of capital (Tier I and Tier II) to Risk Weighted Assets) breach of which attracts regulatory action against bank. In India, RBI had stated that minimum Capital Adequacy Ratio requirement should be 9% which is 1% higher than Basel requirement and Tier I capital of banks should be at least 6 per cent. Banks below this level were required to achieve this ratio on or before March 31, 2010 at both solo and consolidated level. Further, the Government of India has stated that public sector banks must have a capital cushion with a CAR of at least 12%, higher than the threshold of 9% by RBI (Annual Report, RBI, 2005-06, and 2006-07).

Table 2 depicts the Compound Annual Growth Rate of Capital Adequacy Ratio of public and private sector banks in India during a period of 13 years i.e. from 2001 to 2013.

Private Sector Banks

As depicted from Table 2, in most of the private sector banks, Capital Adequacy Ratio (CAR) has been constantly increasing during these thirteen years. Among private sector banks, Ratnakar bank is having highest and significant CAGR i.e. 10%. Second to it comes ICICI Bank (5.9%) followed by Federal Bank (5.12%), Axis Bank (3.9%) and HDFC Bank (3.7%). Since the implementation of Basel II all the private sector banks are well above the regulatory minimum of 9%, in 2011, 2012 as well as in 2013 and all of them have reached double digit CAR, a commendable achievement.

Table 2: Growth of Capital Adequacy Ratio of Public and Private Sector Banks in India from 2001-2013														
Banks CAR →	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	CAGR	T-Test
PRIVATE SECTOR BANKS														
AXIS BANK LIMITED	9	10.65	10.9	11.21	12.66	11.08	11.57	13.99	13.69	15.8	12.65	13.66	17	3.977048	5.870*
CATHOLIC SYRIAN BANK LTD	6.08	9.57	10.58	11.23	11.35	11.26	9.58	11.21	12.29	10.82	11.22	11.08	12.29	2.942459	2.612*
CITY UNION BANK LIMITED	13.59	13.97	13.95	13.36	12.18	12.33	12.58	12.48	12.69	13.46	12.75	12.57	13.98	-0.29955	-0.868
DEVELOPMENT CREDIT BANK LTD.	11.28	11.49	10.08	14.26	9.88	9.66	11.34	13.38	13.3	14.85	13.25	15.41	13.61	2.634095	2.749*
DHANALAKSHMI BANK LTD.	9.69	11.23	10.45	13.56	10.16	9.75	9.77	9.21	15.38	12.99	11.8	9.49	11.06	0.601804	.494*
FEDERAL BANK LTD	10.29	10.63	11.23	11.48	11.27	13.75	13.43	22.46	20.22	18.36	16.79	16.64	14.73	5.12711	3.775*
HDFC BANK LTD.	11.09	13.93	11.12	11.66	12.16	11.41	13.08	13.6	15.69	17.44	16.22	16.52	16.80	3.769302	5.355*
ICICI BANK LIMITED	11.57	11.44	11.1	10.36	11.78	13.35	11.69	13.96	15.53	19.41	19.54	19.6	19.69	5.9715	7.443*
ING Vysya Bank	12.05	11.57	9.81	11.05	9.09	10.67	10.56	10.2	11.65	14.91	12.94	14	13.24	2.224378	2.410*
INDUSIND BANK LTD	15	12.51	12.13	12.75	11.62	10.54	12.54	11.91	12.55	15.33	15.89	13.85	15.36	1.409846	1.594
JAMMU & KASHMIR BANK LTD.	17.44	15.46	16.48	16.88	15.15	13.52	13.24	12.8	14.48	15.89	13.72	13.36	12.83	-1.98013	-3.426
KARNATAKA BANK LTD	11.37	12.96	13.44	13.03	14.16	11.78	11.03	12.17	13.48	12.37	13.33	12.84	13.22	0.30045	0.596
KARUR VYSYA BANK LTD	15.56	16.9	17.01	17.11	16.07	14.79	14.51	12.58	14.92	14.49	14.41	14.33	14.41	-1.48881	3.039*
KOTAK MAHINDRA BANK LTD.		30.47	25.97	15.25	12.8	11.27	13.46	18.65	20.01	19.28	19.92	17.92	17.02	-1.29159	-0.538
LAKSHMI VILAS BANK LTD	10.21	11.54	11.35	13.79	11.32	10.79	12.43	12.73	10.29	14.82	13.19	13.1	12.31	1.409846	1.817
NAINITAL BANK LTD	15.81	14.88	20.93	18.54	14.85	13.88	12.89	12.32	13.1	15.68	16.35	15.09	14.43	-1.29159	-1.213
RATNAKAR BANK LTD.	10	13.6	14.05	16.65	12.03	10.77	34.34	49.15	42.3	34.07	56.41	23.2	17.11	10.18604	2.634*
SOUTH INDIAN BANK LTD.	11.17	11.26	10.75	11.32	9.89	13.02	11.08	13.8	14.76	15.39	14.01	14	13.91	2.942459	4.207*
TAMILNAD MERCANTILE BANK LTD	17.59	18.02	18.54	21.07	19.74	18.33	16.77	15.35	16.1	15.54	15.13	14.69	15.01	-2.37143	-4.402*
YES BANK LIMITED					18.91	16.4	13.6	13.6	16.6	20.06	16.5	17.94	18.3	1.511306	0.854
PUBLIC SECTOR BANKS ALLAHABAD BANK	10.5	10.62	11.15	12.54	12.53	13.37	12.52	11.99	13.11	13.62	12.96	12.83	11.03	1.106072	1.916
ANDHRA BANK	13.4	12.59	13.62	13.71	12.11	14	11.33	11.61	13.22	13.93	14.38	13.18	11.76	-0.1998	-0.272
BANK OF BARODA	12.8	11.32	12.65	13.91	12.61	13.65	11.8	12.94	14.05	14.36	14.52	14.67	13.30	1.308487	2.663*
BANK OF INDIA	12.37	10.68	12.02	13.01	11.52	10.75	11.75	12.04	13.01	12.94	12.17	12.03	11.02	0.2002	0.309
BANK OF MAHARASHTRA	10.64	11.16	12.05	11.88	12.68	11.27	12.06	10.85	12.05	12.78	13.35	12.43	12.59	1.106072	2.761*
CANARA BANK	9.84	11.88	12.5	12.66	12.78	11.22	13.5	13.25	14.1	13.43	15.38	13.76	12.40	1.918165	3.011*
CENTRAL BANK OF INDIA	10.02	9.58	10.51	12.43	12.15	11.3	10.4	9.39	13.12	12.23	11.64	12.4	11.49	1.308487	1.829
CORPORATION BANK	13.3	17.9	18.5	20.12	16.23	13.92	12.76	12.09	13.61	15.37	14.11	13	12.33	-2.37143	-2.334*
DENA BANK	7.73	7.64	6.02	9.48	11.91	10.62	11.52	11.09	12.07	12.77	13.41	11.51	11.03	4.707441	3.866*
IDBI BANK LIMITED	11.72	9.59	9.56	10.38	15.51	14.8	13.73	11.95	11.48	11.31	13.64	14.7	13.23	2.020134	1.867
INDIAN BANK	-0.09	1.7	10.85	12.82	14.14	13.19	14.14	13.03	13.27	12.71	13.56	13.47	13.08	8.871707	1.896*
INDIAN OVERSEAS BANK	10.24	10.82	11.3	12.49	14.2	13.04	13.27	11.93	13.2	14.78	14.55	13.32	11.85	1.816298	2.507*
ORIENTAL BANK OF COMMERCE	12.17	10.99	14.04	14.47	9.21	11.04	12.51	12.12	12.98	12.54	14.23	12.69	12.04	0.601804	0.627
PUNJAB AND SIND BANK	11.42	10.7	10.43	11.06	9.46	12.83	12.88	11.57	14.35	13.1	12.94	13.26	12.91	2.122205	3.276*
PUNJAB NATIONAL BANK	10.24	10.7	12.02	13.1	14.78	11.95	12.29	13.46	14.03	14.16	12.42	13.12	13.16	1.612869	2.393*
SYNDICATE BANK	11.72	12.12	11.03	11.49	10.7	11.73	11.74	11.82	12.68	12.7	13.04	12.24	12.59	1.005017	2.981*

Table 2: Growth of Capital Adequacy Ratio of Public and Private Sector Banks in India from 2001-2013

Banks ↓ CAR →	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	CAGR	T-Test
PRIVATE SECTOR BANKS															
UCO BANK	9.05	9.64	10.04	11.88	11.26	11.12	11.56	11.02	11.93	13.21	13.71	12.35	14.15	3.14855	6.945*
UNION BANK OF INDIA	10.86	11.07	12.41	12.32	12.09	11.41	12.8	11.7	13.27	12.51	12.95	11.85	11.45	0.601804	1.349
UNITED BANK OF INDIA	10.4	12.02	15.17	17.04	18.16	13.12	12.02	11.24	13.28	12.8	13.05	12.69	11.66	-0.69756	-0.581
VIJAYA BANK	11.5	12.25	12.66	14.11	12.92	11.94	11.21	11.22	13.15	12.5	13.88	13.06	11.32	0.10005	0.185
STATE BANK OF INDIA	12.79	13.35	13.5	13.53	12.45	11.8	12.34	12.64	14.25	13.39	11.98	13.68	12.92	0	0.987
STATE BANK OF BIKANER AND JAIPUR	12.39	12.26	13.08	12.93	12.6	12.08	12.89	12.51	14.42	13.3	11.68	13.76	12.16	0.2002	0.503
STATE BANK OF HYDERABAD	12.28	13.67	14.91	14.29	11.74	12.08	12.51	11.53	11.53	14.9	14.25	13.56	12.36	0	-0.103
STATE BANK OF MYSORE	11.16	11.81	11.62	11.53	12.08	11.37	11.47	11.73	13.38	12.42	13.76	12.55	11.79	1.005017	2.489*
STATE BANK OF PATIALA	12.37	12.55	13.57	13.56	14.21	13.67	12.38	13.56	12.6	13.26	13.41	12.3	11.12	-0.5982	-1.281*
STATE BANK OF TRAVANCORE	11.79	12.54	11.3	11.36	11.05	11.15	11.68	13.53	14.03	13.74	12.54	13.55	11.70	1.106072	1.881

Source: CAR: from RBI website and Annual reports of Banks, CAGR : Own Calculations
*Note: * indicate Significant at 5% level*

However, growth of CAR of other private sector banks like, IndusInd Bank, Karnataka Bank and Yes Bank and Lakshmi Vilas Bank has been found to increase insignificantly since last thirteen years.

In case of some other private sector banks like City Union Bank, Jammu Kashmir Bank, Kotak Mahindra Bank and Nainital Bank, CAGR of CAR has been declining insignificantly while significant decrease was found in case of Karur Vysya Bank and Tamilnad Mercantile Bank.

Public Sector Banks

As far as Public sector Banks are concerned, the CAGR of CAR has been low in case of most of the banks. Only a few banks have been found to be with positive and significant growth. Indian Bank is having the highest growth during 2001-13 i.e.8% followed by Dena bank (4.7%), UCO Bank (3.14%), Punjab and Sind Bank (2.12%), Bank of Maharashtra (1.10%), Canara Bank (1.9%) and Indian Overseas bank (1.8%).

However positive though insignificant growth has been found in some of the banks i.e., Allahabad Bank, Bank of India, Central Bank of India, Vijaya

Bank and Oriental Bank of Commerce and State Bank and its Associates except State Bank of Mysore which is found to have significant growth in CAR. Andhra Bank, Corporation Bank, State Bank of Patiala and United Bank of India are found to have negative growth.

Hence, in comparison to Public sector banks, Private sector Banks are having overall highest growth rate of CAR. Moreover, the number of banks with positive and significant overall growth rate in CAR is higher in case of private sector banks as compared to the public sector banks.

As far as Public sector Banks are concerned, all of them have crossed the threshold level of 9% CAR. Banks like Allahabad bank, Andhra Bank, Bank of India, State Bank of Travancore of India were above minimum CAR of 12% in 2012 but decline in CRAR of these banks below 12% was witnessed in 2013 and many of public sector banks are just above minimum CAR of 12%. To meet the regulatory requirement, recapitalization packages have been announced by Government of India from time to time. Government infused about Rs 20117 cr in public sector banks in the fiscal 2010-11 and Rs 12000 cr in the year 2011-12.

In the year 2012-13 public sector commercial banks were provided recapitalization funds to the tune of Rs 12500 cr to meet the Basel requirements (www.financialexpress.com). In the Union budget 2013-14 Finance Minister has set aside Rs 14000 cr towards recapitalization of state-run banks to improve their capital adequacy positions (budget.business-standard.com). Hence, overall position of Indian commercial banks as regards capital adequacy is satisfactory as per Basel II framework as all public and private sector banks are well above the minimum capital adequacy ratio as required by RBI. Banks in India are also preparing to implement and meet the capital requirements under Basel III.

CONCLUSION

Implementation of Basel Norms provides an opportunity to make global financial system more secure and stable. Basel Committee has taken several initiatives to upgrade the capital adequacy and risk management framework by issuing series of documents from Basel I to Basel III in the wake of changing global scenario. In India, RBI has also endorsed the Basel framework and its superior versions to achieve harmonization and make Indian banking system more stable. It has issued several guidelines to banks for achieving proper implementation and has given several recapitalization packages from time to time to help the banks to meet higher level of capital adequacy. Many banks running short of minimum capital requirement have also been issued capital by government to meet the required Capital Adequacy ratio. Over the period of time, most of the public and private sector banks have shown sign of growth of Capital Adequacy ratio and all of them have crossed the minimum CAR requirement of 9% stipulated by RBI under Basel II. Banks are also preparing themselves to implement Basel III in proper sense to make them more resilient towards economic shocks.

REFERENCES

Bagchi, S.K. (2005). Avoid credit concentrations, else serve credit losses: Basel II mantra. IBA Bulletin, March, 15-17.

Bank for International Settlements. (2010). Basel III: International framework for liquidity risk measurement, standards and monitoring. Retrieved from: http://www.bis.org/publ/bcbs188.pdf

Cannata, F. & Quagliariello, M. (2009). The role of Basel II in the subprime financial crisis: guilty or not guilty? CAREFIN Working Paper, 3/09. Retrieved from: http://www3.unisi.it/ricerca/dip/dir_eco/basilea%202%20guilty%20or%20not%20guilty.PDF

Das, A. & Ghosh, S. (2004). The relationship between risk and capital: Evidence from Indian public sector banks. Industrial Organization. EconWPA, 0410006. Retrieved from: http://129.3.20.41/eps/io/papers/0410/0410006.pdf

Davis, K. (2010). Bank capital adequacy: Where to now? Retrieved from: http://www.google.co.in/url?sa=t&rct=j&q=&esrc=s &source=web&cd=1&cad=rja&uact=8&ved=0CBsQFjAA&url=htt p%3A%2F%2Fwww.researchgate.net%2Fpublication%2F228584 398_Bank_Capital_Adequacy_Where_to_Now%2Ffile%2Fe0b49 51f3640e1f99c.pdf&ei=U_meU6WJDoSzuAT06IGoAQ&usg=AF QjCNHQAcq3rIB5LJpo1cSnzVvKzACC_Q&sig2=IYFnTVXn44 YiTzWr6gC-KQ&bvm=bv.68911936,d.c2E

Hai, S.S., Minihaj, S.Q. & Ahmed, R. (2007). Implementation of Basel II: Issues, challenges and implications for developing countries. Paper presented at International Conference on Modelling of Growth, Development and Poverty, Nepal. Retrieved from: www.hull.ac.uk/php/ecskrb/GDP2007/SESARO-58110.pdf

ICRA (2010). Proposed Basel III guidelines: A credit positive for Indian banks. Retrieved from: http://www.icra.in/Files/Articles/2010-September-Basel-III.pdf

Mohanty, S. K. (2008). Basel II: Challenges and risks. Academy of Banking Studies Journal 7(2), 109-130.

Nikolov, P. (2004), "Implementation of Basel II capital requirements by foreign banking institutions' branches and agencies in New York State", retrieved from: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=924431

Pasha, M.A., Srivenkataramana, T. & Swamy, K. (2012). Basel II norms with special emphasis on capital adequacy ratio of Indian banks. Dharana, 6(1), 23-40.

Prakash, A. (2008). Evolution of the Basel framework on bank capital regulation. Reserve Bank of India, Occasional Papers 29(2), 81-122.

Raghavan, R.S. (2004). Bank's capital structure and Basel II. Chartered Accountant. Retrieved from: http://icai.org/resource_file/10938p1107-14.pdf

Sarma, M. & Nikaido, Y. (2007). Capital adequacy regime in India: An overview. Indian Council for Research on International

Economic Relations, Working Paper 196. Retrieved from: http://www.icrier.org/pdf/working_paper_196.pdf

Sharma, G. (2009). Indian banking sector: Capital adequacy under Basel II. Assocham Financial Pulse Study. Retrieved from: http://www.assocham.org/arb/afp/2009/AFP-Indian_Banking_Sector_BaseIII_june2009.pdf

Singh, M. & Vyas, R.K. (2009). Capital adequacy and scheduled commercial banks in India. Bauddhik.1 (1), 1-13.

Shin, H.S. (2003). Basel II and bank competition in emerging market economies: Background and recent developments. Paper presented at KFMA, KIA Conference on the Consequences of the New Basel Accord for the Korean Banking Sector, and Policy Implications. Retrieved from: http://www.princeton.edu/~hsshin/www/BaseIII.pdf

The Statesman (2011). RBI moots timelines for Basel II norms. Retrieved from: http://www.thestatesman.net/index.php?option=com_content&view=article&id=354790&catid=40

Annual Reports of Reserve Bank of India for the period 2000-01 to 2012-2013

Annual Reports of sampled banks from 2000-2001 to 2012-2013

www.financialexpress.com

budget.business-standard.com

Www.rbi.org.in

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The Examination of Contemporaneous Relationship between Intraday Return, Volume and Volatility Measures in Indian Equity Market

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This paper examines the contemporaneous relationship between intraday returns, volume and volatility dynamics, by using 1 minute intraday data of 35 composite stocks of S&P CNX Nifty index, during the period from April 2010 to March 2011. The empirical analysis for majority of the stocks under study depicts no contemporaneous relationship between the intraday return-volume and intraday volume-volatility associations. The present paper thus concludes that for majority of stocks listed on the index, neither the intraday return-volume measures, nor the intraday volume-volatility parameters, can be used in predicting each other.

Keywords: High Frequency Data, Stock Return, Trading Volume, Return Volatility, S&P CNX Nifty index

INTRODUCTION

The efficiency of equity market is principal prerequisite for the development of any economy. Understanding the efficiency has been on the target of investors and speculators for a long time. It has also been accredited time and again, that return and volume are two major pillars around which the stock market revolves. While returns are interpreted as the evaluation of the new information, volume is an indicator to which the investors disagree about this information (Mahajan and Singh, 2009). Reviewing the combined dynamics of stock prices and trading volume is essential to improve the understanding of the microstructure of stock markets (Mestal et al., 2003). Return-volume associations are of mutual interest as they may excavate reliance that can form the basis of lucrative trading strategies, and this has implications for market efficiency (Chen, Firth and Yu, 2004).

Hussain (2011) supports the mixture of distribution hypothesis (MDH) and sequential information arrival hypothesis (SIAH) to be the two academic elucidations for the perceived return, volume and volatility associations of stocks. The SIAH assumes that traders receive new information in a chronological, random fashion. From an opening position of steadiness where all traders possess the same set of information, new evidence reaches in the

market and traders revise their expectations as a result. But, traders do not obtain the information indicators simultaneously. Responses of different traders to information are parts of a series of half-finished equilibrium. Once all traders have reacted to the information signal only then a final equilibrium is reached.

On the other hand, MDH implies a substitute volume and volatility connection, in which the relation is critically dependent upon the rate of information flow into the market. MDH assumes that the combined dissemination of volume and volatility is bivariate normal, conditional upon the arrival of information. It implies that all the traders concurrently receive the new price signals. As such, the shift to a new evenness is instantaneous and there will be no midway partial evenness. This is contrary to the SIAH, which assumes that there is intermediate equilibrium on the road to the final equilibrium. Thus, under the MDH, there should be no information content in past volatility data that can be used to forecast volume (or vice versa) since these variables contemporaneously change in response to the arrival of new information.

The contemporaneous relationship between return and volume holds significance, as it discloses information about symmetry/ asymmetry of trading volume in market. To observe this aspect of trading volume in Indian market, the present study examines the contemporaneous correlation between intraday return and volume based minute by minute data for the 35 composite stocks of S&P CNX Nifty index.

Thereafter this paper delves into the contemporary relationship between trading volume and its impact on volatility of financial assets. Karpoff (1987) seminal paper summarizes the importance of this research area by presenting the following arguments. First, the theory of the stock returns volatilityvolume relationship provides insight into

the structure of financial markets. It predicts that this relationship depends upon the rate of information flow to the market, information dissemination, market size, and the existence of short sale constraints. Second, the stock returns volatilityvolume relationship has important implications for event studies that use a combination of price and volume data. Third, this relationship has important implications for the empirical distribution of speculative assets (Alsubaie, 2008).

In addition, the intraday return, volume and volatility relationship sheds light on the efficiency of stock markets. Despite the obvious importance of return-volatilityvolume relationship, there is a paucity of research on this topic with studies based on intraday analysis (see table 2 and 4). This paper attempts to fill this gap by investigating intraday return-volatilityvolume relationship, based minute by minute data of S&P CNX Nifty index, The findings of this paper can aid investors to understand the dynamics of the Indian equity market, which are extremely imperative for investors in determining the allure of market restrictions.

REVIEW OF LITERATURE

Voluminous literature is available (see Table 1 and Table 3) with respect to studies which have reported the evidence (or the lack thereof) of contemporaneous relationship between return, volume and volatility with low frequency data (daily, weekly, monthly). The intraday based analysis (minute, hourly) is a relatively new phenomenon in the stock market. There is a dearth of literature (see Table 2 and Table 4) with respect to high frequency based studies, particularly in the Indian context, to the best of our knowledge. This study thus aims to plug this literature gap by empirically examining the contemporaneous relationship between intraday return, volume and volatility measures of the Indian equity market.

APPENDIX

Table 1 Contemporaneous Relationship between Return and Volume						
Sr No	Author	Year of Study	Time Interval	Sample Size / Database	Sample Period	Findings
1.	Granger and Morgenstern	1963	Weekly	Sec Composite Index And Total NYSE Volume	1939-1961	Negative Correlation
2.	Godfrey et al.,	1964	Weekly And Daily	Stock Market Aggregate And 3 Common Stocks	1959-1962 1951-1953	Negative Correlation
3.	Epps and Epps	1976	Transactions	20 Common Stocks	Jan 1971	Positive Correlation
4.	Epps	1977	Daily	20 Common Stocks	Jan 1971	Positive Correlation
5.	Rogalski	1978	Monthly	10 Common Stocks And 10 Associated Warrants	1968-1973	Positive Correlation
6.	Hanna	1978	Transactions	20 NYSE Bonds	1971	Positive Correlation
7.	Tauchen and Pitts	1983	Daily	T-Bill Futures Contracts	1976-1979	Positive Correlation
8.	Cornisky et al.,	1984	Yearly	211 Common Stocks	1976-1979	Positive Correlation
9.	Richardson	1987	Weekly	106 Common Stocks	1973-1982	Positive Correlation
10.	Chordia et al.,	2001	Daily	S&P500 (ISSM) and the NYSE (TAQ)	1993–1998	Negative Correlation
11.	Ciner	2002	Daily	NASDAQ	1990-2002	Negative Correlation
12.	Mestel et al.,	2003	Daily And Weekly	25 Individual Stocks (Turkish Stock Market)	2000-2003	Negative Correlation
13.	Gurgul et al.,	2005	Daily	WIG20	1995-2005	Negative Correlation
14.	Mahajan and Singh	2007	Daily	NIFTY INDEX	2001-2006	Positive Correlation
15.	Sabri	2008	Daily	Nifty 50 Companies	1994-2006	Positive Correlation
16.	Balios	2008	Daily	NYSE Stocks	2002-2005	Negative Correlation
17.	Mahajan and Singh	2008	Monthly	Arab Monetary Fund Database	2001-2006	Positive Correlation
18.	Al-Jafari and Tliti	2013	Daily	Nifty Index	2006-2011	Positive Correlation

Where: NYSE = New York Stock Exchange, ISSM = Integrated Surgical Systems, TAQ = Trade and Quote Database, NASDAQ = National Association of Securities Dealers Automated Quotations, WIG 20 = The 20 most liquid companies quoted on the primary market of the Warsaw Stock Exchange.

Source: Compiled from Various Studies

Table 2 Contemporaneous Relationship between Intraday Return and Volume

Sr No	Author	Year of Study	Time Interval	Sample Size / Database	Sample Period	Findings
1	Crouch	1970	Hourly and Daily	Stock Market Aggregates, 3 Common Stocks	1966-1968	Positive Correlation
2	Wood et al.,	1985	Minutes	946 Common Stocks 1138 Common Stocks	1971-72 and 1982	Negative Correlation
3	Jain And Joh	1988	Hourly	NYSE	1979-1983	Positive Correlation
4	Chung And Joo	2005	2 minute interval	KRW/USD Spot Foreign Exchange Market	2001-2002	Positive Correlation
5	Gwilym et al.,	2010	5 minute interval	FTSE-100, Short Sterling and Long Gilt LIFFE futures		Positive Correlation
6	Hussain	2011	5 minute interval	DAX 30	2004-2005.	Positive Correlation

Where: NYSE= New York Stock Exchange, KRW/USD Korean Won/Us Dollart, DAX 30-= Deutscher Aktien Index, FTSE-100- Co Owned By London Stock Exchange And The Financial Times.
Source: Compiled from Various Studies

Table 3 Contemporaneous Relationship between Volume and Volatility

Sr No	Author	Year of Study	Time Interval	Sample Size / Database	Sample Period	Findings
1	Ying	1966	Daily	Stock Market Aggregates	1957-1962	Positive Correlation
2	Epps	1976	Transactions	20 Common Stocks	Jan, 1971	Positive Correlation
3	Bessembinder and Seguin	1993	Daily	8 Futures Contracts	1982-1990	Positive Correlation
4	Jones et al.,	1994	Daily	NASDAQ	1986-1991	Positive Correlation
5	Kocagil and Shachmurove	1998	Daily	16 Major U.S. Futures Contracts	1995-1998	Negative Correlation
6	Daigler and Wiley	1999	Daily	LDB	1986-1988	Positive Correlation
7	Lee and Rui	2000	Daily	SHSE, SZSE	1990-1997	Positive Correlation
8	Chan And Fong	2000	Daily	New York Stock Exchange, NASDAQ	1993	Positive Correlation
9	Chen et al.,	2001	Daily	New York, Tokyo, London, Paris, Toronto, Milan, Zurich, Amsterdam and Hong Kong	N.A	Positive Correlation
10	Mestal et al.,	2003	Daily	31 Common Stocks in ASM	2000-2003	Negative Correlation
11	Gurgul et al.,	2005	Daily	20 most liquid companies of WSE	1995-2005	Positive Correlation
12	Otavio and Bernardus	2006	Daily	BOVESPA	2000-2005	Negative Correlation
13	Long	2007	Daily	CBOE	1983-1985	Positive Correlation
14	Mahajan and Singh	2008a	Daily	Sensex	1996-2007	Positive Correlation

Where: KLSE= Kuala Lumpur Stock Exchange, LDB= Liquidity Data Bank NYSE= New York Stock Exchange CBOE= Chicago Board of Option Exchange, WSE= The Warsaw Stock Exchange, CBOE = Chicago Board Of Option Exchange, BOVESPA = Brazilian Stock Index, SENSEX = Sensitive Index, SHSE = Shanghai Stock Exchange , SZSE = The Shenzhen Stock Exchange, ASM = Austrian Stock Market, NASDAQ = National Association of Securities Dealers Automated Quotations,
Source: Compiled from Various Studies.

Table 4 Contemporaneous Relationship between Intraday Volume and Volatility

Sr No	Author	Year	Country	SAMPLE PERIOD	Sample Size/ Database	Time Interval	Findings
1	Jain and Joh	1986	India	1979-83	Stock Market Aggregates	Hourly	Positive Correlation
2	Darrat Et Al.,	2003	USA	1998	30 Stocks of DJIA	5 minute interval	Negative Correlation
3	Celik	2013	Istanbul	2005-2010	30 index data/ISE	5 minute interval	Positive Correlation
4	Darrat et al.,	2002	USA	2002	NYSE	1 minute interval	Positive Correlation
5	Worthington and Higgs	2003	Australia	2002- 2003	S&P/ASX 50 index	5 minute interval	Positive Correlation
6.	Fuertes	2009	UK	1997-2003	14 largely trades stocks of S&P 500 on NYSE and NASDAQ	5 minute interval	Positive Correlation

Empirical endeavors with low frequency data into the contemporaneous relationship between return and volume measures can be traced back to Osborne (1959). He made an early attempt to study the price volume relationship, in which he demonstrated that variance of change in stock price is governed by the volume of transactions. Granger and Morgenstern (1963) analyzed SEC composite index and NYSE volume, and concluded no association between volume and its subsequent prices. Thereafter, Ying (1966) studied S&P 500 index return and total volume of NYSE for the period 1957-1962 and established the stock price and volume to be positively correlated with each other.

In the year 1975, Epps established a concept that in bull market, the proportion of volume to price change on individual transactions should be more than in the bear market. Further in 1977 he examined the rationality for stock returns, under the influence of transaction costs and concluded that the relationship between stock returns and volume remained positive over a period of days. Further on Rogalski (1978) tested the connection between volume and returns and became responsible for maintaining to the assumption that a variation in stock price change and its subsequent volume, are positively interrelated for the individual stocks under examination. Tauchen and Pitts (1983) claimed the improbability that changes in stock price are likely to increase with growing volume of transactions. In fact they were of the opinion that an increase in number of market participants would act as a smoothening agent to market price fluctuations and hazards.

Additionally, Comiskey et al., (1984) using yearly data on 211 Common Stock for a period 1976-1979 found the stock prices to be positively correlated to its volume measures. As per Grammatikos and Saunders (1986), the resulting positive correlation between its stock returns and volume could be attributed to the combined reliance on a conjoint guiding event or occurrence. Thereafter, Hasbrouch (1991 and 1996) and O'Hara (1995) in their respective studies found that prices (returns) are affected by the four variables, namely, volume, trade, characteristics of the market and the bid ask spread atmosphere of the stock market.

More recently, the endeavors of Chen et al., (2001) explored the price-volume relationship in nine major stock markets, namely, U.S., Japan, U.K., France, Canada, Italy, Switzerland, Netherlands and Hong Kong. Their outcomes showed momentous positive association between trading volume and returns. Pathirawasam (2008) directed a study using stock volume and returns from Colombo Stock Exchange (CSE) and revealed that stock returns are positively related to the contemporary change in trading volume. Further, he established that past trading volume alteration is deleteriously connected

to stock returns. Depositor misspecification regarding the upcoming remunerations or illiquidity of low volume stocks can be the reason for the negative relationship between trading volume and stock returns. Khan and Rizwan (2008) had conducted the same study before using the data of KSE 100 index for the period 2001-2007 and deduced a positive contemporaneous relationship between the trading volume and returns.

Mahajan and Singh (2009) explicate that the price volume relationship depends on the rates of information flow, the diffusion of information into the market, the extent to which markets convey information, the size of the market and level of market efficiency. Trading volume alone is thought to reflect information about the changes in investors' expectations. Similar results were found by Alsubie and Najand (2009) who tested the effect of trading volume on the persistence of the conditional volatility of returns in the Saudi stock market. All in all, their consequences maintained the conformance to mixture of distribution hypothesis at the company level.

Tripathy (2011) had investigated the dynamic contemporaneous relationship between stock return and trading volume of Indian stock Market and found positive correlation between them. Thereafter, a research of 98 companies listed in Karachi Stock Exchange (KSE) of Pakistan by Rehman et al., (2012) revealed a strong positive relation between returns and trading volume. In the case of emerging markets, numerous literatures can be found that had discussed this return-volume relationship and how volatility can be understood in this context.

These studies based on low frequency data, support a positive contemporaneous relationship between return and volume measures, thus providing identification to the succeeding explanation. The existence of positive contemporaneous correlation is based on a famous Wall Street adage by Karpoff (1987) which says "it takes prices to make volume move". This implies that investors commonly use trading volume to predict price movements and have a peek of an opportunity to earn supernormal profits.

The empirical studies which found the return and volume series to be negatively correlated, thus lending support to the sequential information arrival hypothesis are those of Granger and Morgenstern (1963), who studied the weekly data for the sample period of 1939-1961 and found significant negative correlation among return and volume. Further, Godfrey et al., (1964) studied the weekly and daily data and found the measures of return-volume to be negatively correlated. More recently, Chordia et al., (2001) studied the S&P 500 index of ISSM and NYSE on a daily regularity, and reported negative correlation between stock return and trading volume. Ciner (2002) studied the NASDAQ index at daily interval and reported the return and volume measures to be negatively correlated. Following these conclusions, Mestal et al., (2003) examined the 25 individual stocks on the Turkish stock market on a daily and weekly basis and supported the same. Further Gurgul et al., (2005) reported the WIG20 index to be insignificantly correlated with each other with respect to the stock price volume measures.

This paper provides a comprehensive review of studies, which have reported positive correlation on intraday basis. These studies are in conformance with the mixture of distribution hypothesis. An early instance of such findings can be traced back to Jain and Joh (1988) who studied the NYSE on an hourly basis and established noteworthy positive connexion among the intraday variables of stock price and volume. Further, Chung and Joo (2005) considered the KRW/ USD Spot Foreign Exchange Market and testified outcomes authorizing the sustenance of MDH belief of positive and simultaneous correlation between intraday return and volume measures. Kaniel et al., (2006) studies ASX stock exchange at a 6 hourly interval and found positive contemporaneous correlation among the intraday measures of return and volume. Gwilyn et al., (2010) examined the FTSE-100, Short Sterling and Long Gilt LIFFE futures and Hussain (2011) studied the DAX 30 (Deutscher Aktien Inde), at 5 minute interval each. Both these authors confirmed presence of positive correlation among the intraday return and volume measures under scrutiny

Further on, the studies on intraday analysis to have reported negative correlation those of Wood et al., (1985) who with the help of high frequency data studied the 946 Common Stocks 1138 Common Stocks on a minute by minute basis and found the intraday return and volume to be negatively correlated with each other. And lastly, Mcmillen and Speight (2002) examined the intraday data of Toronto Stock Exchange-100 Short Sterling Contracts Long Gilt Series and found contemporaneous negative correlation coefficients for the intraday return and volume measures. More recently, Jong and Donders (2014) studied the AEX index, options and futures at 10 minute interval and found the intraday return and volume to be negatively correlated and thereby supporting the sequential information arrival hypothesis.

A perusal of table 3 depicts all the imperative studies piloted with low frequency data which shows the endeavours of various academicians and researchers with respect to the relationship between trading volume and volatility measures. There is extensive and voluminous literature in finance supporting the positive relationship between trading volume and volatility (Karpoff (1987)). O'Hara (1995) elucidate that the positive correlation between the measures trading volume and return volatility is constant with maximum hypothetical market microstructure models. Lamoureux and Lastrapes (1990) concluded that trading volume has a positive impact on volatility measure. Further, Board and Sutcliffe (1990) also find results in sustenance to the hypothesis of a positive relationship between volatility and volume for the Toronto Stock Exchange-100 index. Thereafter, Bessembinder and Seguin (1993) deduce the results by adopting the methodology of dividing the volume into expected and unexpected components. This was done in order to examine the relation between price volatility and trading volume for markets under study. Their results advocate the influence of unexpected volume shocks on volatility to be irregular. This leads them to conclude, that the hypothesis that volatility is affected by existing market depth holds true for their study.

By means of variant statistical methods, Gallant et al. (1993) studied the S&P 500 Index for a period from 1928-1987 and reported positive correlation among volume and volatility measures. Subsequently, Tauchen et al. (1993) and Hiemstra and Jones (1994) conclude similar evidences of positive correlation between volatility and trading volume measures in their respective studies. Further Brailsford (1994) examination into this relationship supports the supposition that the disproportionate relationship between volume and price changes. Additionally, Brailsford (1996) volatility models are found to be inconsequential when the volume is taken into view. Ragunathan and Pecker (1997) arrange for robust confirmation that unanticipated volume has a greater impact on volatility than anticipated volume. Following this, Hogan et al. (1997) show that there is a strong positive relationship between the parameters of trading volume and volatility. Further contributions into this relationship was made by Kocagil and Shachmurove (1998) who studied the daily parameters of 16 Major U.S. Futures Contracts for a period of 1995-1998 and found that there existed negative correlation between the volume and volatility under study.

Further on, Wang and Yau (2000) examined the relationship between trading volume and price volatility and supported a positive relationship between trading volume and price volatility. Gallo and Pacini (2000), using data on 10 actively traded U.S. stocks from 1985 to 1995, found that persistence decreased when trading volume was used in the conditional variance equation. Sabri (2004) discovered that trading volume is one of the main

factors which had an effect on predicting the volatility for the emerging markets under examination. Watanabe (2001) suggests that there is negative relation between price volatility and volume. Mestal et al., (2003) studied daily data of 31 Common Stocks in Austrian Stock Market and found negative correlation persistence between volume and volatility estimators. Otavio and Bernardus (2006) estimated the existence of significant negative correlation using daily data of the Bovespa Index for a period of study from 2000-2005, thus supporting Copeland's SIAH.

Thereafter a review of table 4 lists the studies which have examined the relationship between volume and volatility with the help of intraday data. Jain and Joh (1986) examined hourly data and found positive correlation thus supporting the MDH. Celik (2013) studied the ISE-30 index, Worthington and Higgs (2006) studied the ASX-30 Index and Fuertes (2009) studied the S&P 500 stocks all with 5 minute interval respectively and found the variables to be positively correlated. All these studies confirmed to the MDH implying a positive contemporaneous correlation between intraday volume and volatility measures. Darrat et al., (2002) studied the NYSE at 1 minute interval and reported intraday volume and volatility to be positively correlated. On the contrary, the sequential information arrival hypothesis has been supported by Darrat et al., (2003) who studied NYSE at 1 minute interval and established the intraday volume and volatility to be negatively correlated.

As can be seen from table 2 and table 4, there is a literature gap with respect to intraday based studies into the contemporaneous relationship between return-volume-volatility measures in context of the Indian equity market. Thus this paper will contribute to understanding the market efficiency and information processing of the Indian equity market by analyzing the S&P CNX Nifty index (a flag ship index of NSE, which is one of the leading stock exchange in India) on an intraday basis.

DATA AND METHODOLOGY

This study is based on 1 minute interval data of stocks listed at S&P CNX Nifty index, during the period from 1stApril 2010 to 31stMarch 2011. The S&P CNX Nifty index is a well-differentiated 50 stock index precisely imitating general market environments, characterized by very dynamically dealt stocks. This study applies the filters of bonus issue and stock split announcement and derives a concise and well balanced sample of 35 stocks. The intraday stock return measure is comprised of continuous rates of return, computed as log of ratio of present minute's price to previous minute's price (i.e. Rt = ln (Pt / Pt-1)). Volume is taken as per the trading volume data. Volatility is calculated as the squared value of minute by minute stock returns (in confirmation with Andersen et al., 2001, 2003).

EMPIRICAL FINDINGS AND ANALYSIS

The examination of relationship between return, volume and volatility provides significant information regarding the price discovery efficiency of an asset. The summary statistics of the sample stocks suggests that dispersion of mean returns represent trivial values, thereby indicating a steady index. This authorizes to the belief that the index under examination is a very safe index. Substantial Jarque-Bera (JB) statistics undoubtedly discards the hypothesis, which suggests that all variables do not conform to the normal distribution, which is the precondition for any market to be efficient in the weak form (Fama (1965), Stevenson and Bear (1970), Reddy (1997) and Kamath (1998)).

Further, the statistics of skewness and kurtosis preserve the substantiation of withdrawal from normality hypothesis. The realistic distribution of the return, volume and volatility series in this paper is positively skewed, indicating a right tail of distribution. These positively skewed series accentuate the asymmetric nature of the series. Additionally, the excess kurtosis projected for trading volume series is a strong indication of

leptokurtic peaked series. The extreme kurtosis values of Indian markets demonstrate extraordinary erratic behavior in the returns measure. The results of this paper thus suggest the high probability of extreme values (profit/ loss) occurring. These results further stress, that only the chief and dominant players attained the core of trading activity while the small time traders could not participate actively in the trading activity.

For the 35 composite stocks of S&P CNX Nifty index, this paper verifies the existence (inexistence) of contemporaneous relationship between intraday return, volume and volatility variables. This study applies the correlation test for determining whether one intraday measure can be used to forecast the other measure. For this the pre-condition is that the series under study should be stationary in nature. Therefore, the ADF unit root test results are estimated on the basis of the technique. The unit root test results shows that intraday return, volume and volatility are stationary at 1% and 5% levels of significance for all the stocks comprising the sample.

Table 5 depicts that only 8 stocks (constituting 22.85% of the sample) depict positive contemporaneous relationship between intraday stock return and trading volume measure of the index. These stocks are namely, ACC, ASIANPAINT, CIPLA, COALINDIA, DRREDDY, NTPC, TATAMOTORS and WIPRO. If the joint distribution of volume and price change is non-normal, this relationship will conform to the mixture of distribution hypothesis, which predicts positive relationship between return and volume. Majority of these positively significant stocks in the sample, depict low significance levels at 5% and 10%, thus indicating weak correlation persistence. Trading restrictions, such as higher costs for short sales, may cause the positive price-volume relationship in the equity market (Long, 2007).

Further the contemporaneous relationship results for the S&P CNX Nifty index (see Table 5), shows that 27 stocks, constituting a 77.14% of the sample (namely, AMBUJACEM, AXISBANK,

BANKBARODA, BHEL, BPCL, CAIRN, DLF, GRASIM, HCLTECH, HDFCBANK, HEROHONDA, HINDALCO, HINDUNILVR, ICICIBANK, IDFC, INDUSINDBK, INFOSYSTCH, LT, MARUTI, PNB, POWERGRID, RANBAXY, SBIN, SESAGOA, TATAPOWER, TATASTEEL and ULTRACEMCO) depict no positive contemporaneous relationship between intraday volume-return. This implies that trading volume does not show any predictive power for future returns in the presence of current and past returns. It further implies that these stocks of the S&P CNX Nifty index supports the mixture of distribution hypothesis of Clark (1973), which elucidates the new information is simultaneously absorbed by the market participants at the same time. This implies that no investor can propose to hold a profitable position as everyone receives and reacts to new information concurrently. The results of this paper propose that this index is a successful index, which relate the Indian equity market being efficient. The findings of this paper are consistent with those of Grammatikos and Saunders (1986), Karpoff (1987), Gunduz and Hatemi-J (2005), Alsubie and Najand (2009) and Tripathy (2011). Studies which have reported similar results on an intraday analysis are those of Wood et al., (1985) and Jong and Donders (1998).

The results of this study are consistent with prior intraday based analysis of return and volume measures (see Wood et al., (1985) and Jong and Donders (1998)), which concluded no evidence for contemporaneous correlation suggesting that the measures scrutinized in this study, cannot be used in forecasting each other. Further, the insignificant contemporaneous relationship of intraday return and volume measures of S&P CNX Nifty index could be attributed to the impact of introduction of rolling settlement in Indian capital market. As explained by Mahajan and Singh (2013), who administered that no contemporaneous relation was detected between volume and returns in post rolling settlement period for the Nifty index. Positive relationship between volume and return has been seen only in pre-rolling

settlement period for the index. This indicates that markets became more efficient after introduction of rolling settlement. This further implies that neither are the rising markets accompanied by rising volume and nor are the declining markets accompanied by the falling volume. Further this explanation is consistent with the theory that implies that information content of volume does not affect future stock return by any method. In short, the knowledge of one of these variables cannot improve the short-run forecasts of the other (Mestel et al., (2003))

Further, the results of this study for the contemporaneous relationship between intraday volume and volatility measures. Table 6 depicts that only 8 stocks (constituting 22.85% of the sample) exhibit a positive contemporaneous correlation relationship between intraday trading volume and intraday stock volatility. These stocks conforming to the MDH criteria are those of, CAIRN, COALINDIA, HINDALCO, IDFC, PNB, SBIN, TATASTEEL and ULTRACEMCO.

A careful appraisal of Table 6 depicts that 27 stocks constituting 77.14% of the sample (namely, ACC, AMBUJACEM, ASIANPAINT, AXISBANK, BANKBARODA, BHEL, BPCL, CIPLA, DLF, DRREDDY, GRASIM, HCLTECH, HDFCBANK, HEROHONDA, HINDUNILVR, ICICIBANK, INDUSINDBK, INFOSYSTCH, LT, MARUTI, NTPC, POWERGRID, RANBAXY, SESAGOA, TATAMOTOR, TATAPOWER and WIPRO) show no positive correlation between the intraday volume and volatility measures. This leads the study to refute a profound Wall Street adage by Karpoff

(1987) that states "volume is relatively heavy in bull markets and light in bear markets" for these stocks. The rationale behind insignificant intraday volume-volatility association is that trading volume is negatively related to the magnitude to which traders differ when they review their price anticipations. This is accredited to the uniformity of information amongst the investors. Accordingly, as information equilibrium increases, these investors are unable to protect themselves against the jeopardy of trading against remote information. Hence, this leads the trading volume to be insignificantly correlated with volatility. This further leads to the decrease in correlation, characterized by increasing information symmetry between intraday volume and volatility measures. These findings of the paper are in conformance with the intraday based volume-volatility analysis of Darrat et al., (2003).

CONCLUSION

It is a pre-conceived notion that the activity of the stock market cannot be decided, only on the basis of prices. This implies that stock prices deprived of their related volume measures, delivers ambiguous information about market movement. This paper examines the empirical relationship between intraday return, volume and volatility dynamics of stock market by using 1 minute interval data for the 35 composite stocks listed on the S&P CNX Nifty index of the National Stock Exchange (India's primary stock exchange).

The findings of this study, support the viewpoint that, for majority of the 35 sample stocks listed on S&P CNX Nifty index, the businesses are implemented as soon as they finds a similar auction

Table 5 Contemporaneous Relationship between Intraday Return and Volume						
Symbol	Return-Volume	P Value	Symbol	Return-Volume	P Value	
ACC	0.003646**	0.0268	ICICIBANK	0.003575	0.2848	
AMBUJACEM	-0.00226	0.1882	IDFC	0.001394	0.3959	
ASIANPAINT	0.00324***	0.0544	INDUSINDBK	0.00213	0.1963	
AXISBANK	-0.00277	0.1088	INFOSYSTCH	-0.00062	0.7074	
BANKBARODA	-0.00084	0.6116	LT	-0.0014	0.3928	
BHEL	-0.00193	0.2394	MARUTI	-0.00082	0.6173	
BPCL	-5.66E-05	0.9726	NTPC	0.002844***	0.0833	
CAIRN	-0.0021	0.2009	PNB	0.00106	0.5197	
CIPLA	0.003634**	0.0271	POWERGRID	0.002549	0.1471	
COALINDIA	0.009462***	0.0555	RANBAXY	-3.77E-06	0.9982	
DLF	-0.00353	0.0374	SBIN	-0.02769	00000	
DRREDDY	0.007722*	0	SESAGOA	-0.00025	0.878	
GRASIM	0.00112	0.4983	TATAMOTORS	0.010491*	00000	
HCLTECH	0.000617	0.7079	TATAPOWER	0.002318	0.1599	
HDFCBANK	-0.00292	0.076	TATASTEEL	-0.18143	00000	
HEROHONDA	7.51E-05	0.9637	ULTRACEMCO	-0.0027	0.1052	
HINDALCO	-0.02755	0	WIPRO	0.003845**	0.0194	
HINDUNILVR	4.36E-05	0.9797	* Significant at 1% level of significance, ** Significant at 5% level of significance, *** Significant at 10% level of significance.			

Table 6 Contemporaneous Relationship between Intraday Volume and Volatility						
Symbol	Volume-Volatility	P Value	Symbol	Volume-Volatility	P Value	
ACC	0.001963	0.2333	ICICIBANK	0.001389	0.6778	
AMBUJACEM	-2.85E-05	0.9868	IDFC	0.005527*	0.0008	
ASIANPAINT	0.001015	0.5468	INDUSINDBK	0.000159	0.9232	
AXISBANK	-0.00277	0.4501	INFOSYSTCH	1.74E-05	0.9915	
BANKBARODA	-0.00047	0.7743	LT	-0.00025	0.8777	
BHEL	0.000225	0.8911	MARUTI	0.000783	0.634	
BPCL	6.40E-06	0.9969	NTPC	0.000489	0.7661	
CAIRN	0.003056***	0.063	PNB	0.002812***	0.0878	
CIPLA	0.00045	0.7845	POWERGRID	0.000688	0.6957	
COALINDIA	0.012976*	0.0086	RANBAXY	0.00101	0.5388	
DLF	0.001111	0.5119	SBIN	0.032706*	0	
DRREDDY	0.000119	0.9424	SESAGOA	-0.00023	0.8899	
GRASIM	0.000298	0.8569	TATAMOTORS	0.001216	0.4591	
HCLTECH	0.000311	0.8501	TATAPOWER	-3.00E-05	0.9855	
HDFCBANK	0.002139	0.1938	TATASTEEL	0.183001*	0	
HEROHONDA	9.29E-05	0.9551	ULTRACEMCO	0.005248*	0.0016	
HINDALCO	0.025858*	0	WIPRO	0.00033	0.8408	
HINDUNILVR	-0.00016	0.9253	* Significant at 1% level of significance, ** Significant at 5% level of significance, *** Significant at 10% level of significance.			

Sample Stocks in the Study

Company Name	Industry	Symbol
ACC Ltd.	CEMENT & CEMENT PRODUCTS	ACC
Ambuja Cements Ltd.	CEMENT & CEMENT PRODUCTS	AMBUJACEM
Asian Paints Ltd.	CONSUMER GOODS	ASIANPAINT
Axis Bank Ltd.	FINANCIAL SERVICES	AXISBANK
Bank of Baroda	FINANCIAL SERVICES	BANKBARODA
Bharat Heavy Electricals Ltd.	INDUSTRIAL MANUFACTURING	BHEL
Bharat Petroleum Corporation Ltd.	ENERGY	BPCL
Cairn India Ltd.	ENERGY	CAIRN
Cipla Ltd.	PHARMA	CIPLA
Coal India Ltd.	METALS	COALINDIA
DLF Ltd.	CONSTRUCTION	DLF
Dr. Reddy's Laboratories Ltd.	PHARMA	DRREDDY
Grasim Industries Ltd.	CEMENT & CEMENT PRODUCTS	GRASIM
HCL Technologies Ltd.	IT	HCLTECH
HDFC Bank Ltd.	FINANCIAL SERVICES	HDFCBANK
Hero MotoCorp Ltd.	AUTOMOBILE	HEROMOTOCO
Hindalco Industries Ltd.	METALS	HINDALCO
Hindustan Unilever Ltd.	CONSUMER GOODS	HINDUNILVR
ICICI Bank Ltd.	FINANCIAL SERVICES	ICICIBANK
IDFC Ltd.	FINANCIAL SERVICES	IDFC
IndusInd Bank Ltd.	FINANCIAL SERVICES	INDUSINDBK
Infosys Ltd.	IT	INFOSYSTCH
Larsen & Toubro Ltd.	CONSTRUCTION	LT
Maruti Suzuki India Ltd.	AUTOMOBILE	MARUTI
NTPC Ltd.	ENERGY	NTPC
Power Grid Corporation of India Ltd.	ENERGY	POWERGRID
Punjab National Bank	FINANCIAL SERVICES	PNB
Ranbaxy Laboratories Limited	PHARMA	RANBAXY
State Bank of India	FINANCIAL SERVICES	SBIN
Sesa Sterlite Ltd METALS	SSLT	
Tata Motors Ltd.	AUTOMOBILE	TATAMOTORS
Tata Power Co. Ltd.	ENERGY	TATAPOWER
Tata Steel Ltd.	METALS	TATASTEEL
UltraTech Cement Ltd.	CEMENT & CEMENT PRODUCTS	ULTRACEMCO
Wipro Ltd.	IT	WIPRO

or attainment order from a counter party. All the orders in this index are automatically harmonized on a value/ period precedence basis. This has thus resulted in a substantial decrease in the time spent, cost and risk of scams, thereby, ensuing enhanced functioning competence of the index. The resultant characteristics permits for quicker assimilation of price sensitive information into prevalent prices, as the market participants then are able to see the entire market in the actual scenario. Hence, this enhances better informational adeptness for the index, which accordingly makes the market conditions more obvious. The insignificant contemporaneous relationship between the variables under examination in this study enables the S&P CNX Nifty index to refute the Wall Street adage, "Volume is relatively heavy in bull markets and light in bear markets". The results of the paper therefore, solidify belief that the S&P CNX Nifty index comprises of the most abundantly and actively traded securities. These inherent features thus impart sustenance to the efficiency results of Indian stock market in this study.

In nutshell, the faintness in correlation can be attributed to the fact that the index is rendered to be weak form efficient with respect to a joint contemporaneous study of these measures. With the exploration into these intraday contemporaneous relationships of 35 composite stocks of S&P CNX Nifty index, market investors and regulators can obtain a healthier understanding of the risk evolution of their financial exposure in trading sessions within a day. The results of this study are supportive of NSE's transparent transactions combined with lower operational prices and efficiency, which has greatly increased the attractiveness of the Indian stock market to the domestic and international investors.

REFERENCES

Bessembinder, H. and Seguin, P.J., (1993), "Price Volatility, Trading Volume and Market Depth: Evidence from Futures Markets". The Journal of Financial and Quantitative Analysis, Vol.28, No.1, 21-39.

Board and Sutcliffe, (1995), 'The Effects of Trade Transparency in the London Stock Exchange: A Summary". Discussion Paper at London School of Economics, Financial Markets Group (1995).

Brailsford, T. J. (1996), "The Empirical Relationship between Trading Volume, Returns and Volatility", Journal of Accounting and Finance, 35(1), 89-111.

Celik, S. (2013), "New Evidence on the Relation between Trading Volume and Volatility". Journal of Business and Economic Research, Vol 3, No 1

Cetin Ciner, (2002), "The Stock Price-Volume Linkage on the Toronto Stock Exchange: Before and After Automation," Review of Quantitative Finance and Accounting, Vol.19, No.4, 335349.

Cetin Ciner, (2003), "The Dynamic Relationship between Stock Prices and Trading Volume: An Examination of Call Markets," Downloaded from http://207.36.165.114/Denver/Papers/callmarkets.pdf.

Chan and Fong, (2000), "Trade Size, Order Imbalance and the Volatility-Volume Relation," Journal of Financial Economics, Vol. 57, No.2, 247-273.

Chen, Firth and Yu (2004), "The Price-Volume Relationship in China's Commodity Futures Markets", The Chinese Economy, 37(3), 87-122.

Chen, Firth, G. M. and Rui, O. (2001), "The Dynamic Relation between Stock Returns, Trading Volume and Volatility", The Financial Review, 36(3), 153-174.

Chung, C.S. and Joo, S. (2005), "Information flow and trading volumes in foreign exchange markets: The cases of Japan and Korea". Retrieved from http://www.jsie.jp/Annual_Conferences/64th_Ritsumeikan/paper/ProfChung-paper-1.pdf

Comiskey, E. E., Walking, R. A. and Weeks, M. A., (1984), "Dispersion of Expectations and Trading Volume," Journal of Business Finance and Accounting, Vol.14, No.2, 229-239.

Crouch, R.L., (1970), "The Volume of Transaction and Price Changes on the New York Stock Exchange," Financial Analysts Journal, Vol.26, 104-109.

Daigler and Wiley, (1999), "The Impact of Trader Type on the Futures Volatility-Volume Relation," The Journal of Finance, Vol.54, No.6, 2297-2316.

Darrat, A. F., Rahman, S. and Zhong, M. (2003), "Intraday Trading Volume and Return Volatility of the DJIA Stocks: A Note", Journal of Banking and Finance, 27(10), 2035-2043.

De Long, J. et al., (1990), "Positive Feedback, Investment Strategies and Destabilizing Rational Speculation," The Journal of Finance, Vol.45, No.2, 379-395.

Epps, T. W. (1975), "Security Price Changes and Transaction Volumes: Theory and Evidence", American Economic Review, 65(4), 586-597.

Epps, T. W. (1977), "Security Price Changes and Transaction Volumes: Some Additional Evidence". The Journal of Financial and Quantitative Analysis, 12, 141-146.

Epps, T.W. and Epps, M.L., (1976), "The Stochastic Dependence of Security Price Changes and Transaction Volumes: Implications for the Mixture of Distributions Hypothesis," Econometrica, Vol.44, No.2, 305-321.

Fuertes A, M., Kalotychou E, and Todorovic, N. (2011), "Volume, Intraday and Overnight Returns for Volatility Prediction: Profitability or Accuracy". EMG Working Paper Series. WP-EMG-04-2012.

Gallant, Rossi and Tauchen, (1992), "Stock Prices and Volume," The Review of Financial Studies, Vol.5, No.2, 199-242.

Gallo, G. M. and Pacini, B. (2000), "The Effects of Trading Activity on Market Activity", European Journal of Finance, 6(2), 163-175.

Godfrey, Granger, C. W. J. and Morgenstern, O. (1964), "The Random Walk Hypothesis of Stock Market Behavior", Kyklos, 17(1), 1-30.

Granger, C.W.J. et al. (1998). "A Bivariate Causality between Stock Prices and Exchange Rates: Evidence from Recent Asia Flu", Discussion Paper, Department of Economics, University of California, San Diego, pp. 1-24.

Gwilyn, C and Verousis, P. (2010), "Price clustering and underpricing in the IPO aftermarket", International Review of Financial Analysis, Volume 19, Issue 2, March 2010, Pages 89-97.

Hanna, (1978), "Security Price Changes and Transaction Volumes: Additional Evidence," American Economic Review, Vol.68, No.4, 692-695.

Hiemstra, C. and Jones, (1994), "Testing for Linear and Nonlinear Granger Causality in the Stock Price-Volume Relation," The Journal of Finance, Vol.49, No.5, 639-1664.

Hussain, S M. (2011), "The Intraday Behaviour of Bid-Ask Spreads, Trading Volume and Return Volatility: Evidence from DAX30".International Journal of Economics and Finance Vol. 3, No. 1

Jain, P.C. and Joh, G., (1986), "The Dependence between Hourly Prices and Trading Volume". The Journal of Financial and Quantitative Analysis, Vol.23, No.3, 269-283.

Jones, C.M., Kaul, G. and Lipson, M.L., (1994), "Transactions, Volume and volatility," The Review of Financial Studies, Vol.7, No.4, 631-651.

Jong, F and Donders, MW. (2014), "Intraday Lead-Lag Relationships between the Futures, Options and Stock Market". Review of Finance, Volume 1, Issue 3, Page 337-359.

Karpoff, J., (1987), "The relation between price changes and trading volume: A survey", Journal of Financial and Quantitative Analysis, 22, 109-126.

Khan, S.U., Rizwan, F. (2008). Trading volume and stock returns: evidence from Pakistan's stock market. International Review of Business Research Papers, vol. 4, 151-162.

Kocagil, A. E. and Shachmurove, Y., (1998), "Return-Volume Dynamics in Futures Markets," The Journal of Futures Market, Vol.18, No.4, 399-426.

Lamourex, C. G. and Lastrapes, W. D. (1990), "Heteroskedasticity in Stock Return Data: Volume versus GARCH Effects". The Journal of Finance, 45(1), 221-229.

Lee, B. S. and Rui, O. M., (2000), "Does Trading Volume Contain Information to Predict Stock Returns? Evidence from China's Stock Markets," Review of Quantitative Finance and Accounting, Vol.14, No, 4, 341-360.

Lee, B.S. and Rui, O.M., (2002), "The Dynamic Relationship between Stock Returns and Trading Volume: Domestic and Cross-Country Evidence," Journal of Banking and Finance, Vol.26, No.1, 51-78.

Mahajan and Singh (2009), "The Empirical Investigation of Relationship between Return, Volume and Volatility Dynamics in Indian Stock Market", Eurasian Journal of Business and Economics 2009, 2 (4), 113-137.

Mahajan, S. and Singh, B., (2008), "An Empirical Analysis of Stock Price-Volume Relationship in Indian Stock Market," Vision, Vol.12, No.3, 1-13.

Mahajan, S. and Singh, B., (2008), "Trading Volume and Return Volatility Dynamics in Indian Stock Market," ICFAI Journal of Applied Finance, Vol.14, No.2, 53-73.

Mcmillan, D. and Speight, A. (2002), "Return-Volume Dynamics in UK Futures", Applied Financial Economics, 12, 707-713.

Mestal, R. et al., (2003), "The Empirical Relationship between Stock Returns, Return Volatility and Trading volume on the Austrian Stock Market," Downloaded from www.charttricks.com/ Resources/ Articles/ volume_volatility_Mestel.pdf.

Najand, M. and Yung, K. (1991), "A GARCH Examination of the Relationship between Volume and Price Variability in Futures Markets", The Journal of Futures Markets, 11(5), 613-621.

O'Hara, M. (1995), "Market Microstructure Theory", Blackwell Publishers: Oxford, England.

O'Hara, M. (2003), "Presidential Address: Liquidity and Price Discovery", The Journal of Finance, 58(4), 1335-1354.O'Hara, M. (2003), "Presidential Address: Liquidity and Price Discovery", The Journal of Finance, 58(4), 1335-1354.

Osborne, M. F. M. (1959), "Brownian Motion in the Stock Market", Operation Research, 7(2), 145-173.

Otavio, R. and Bernardus, F.N., (2006), "The Empirical Relationship between Stock Returns, Return Volatility and Trading Volume in the Brazilian Stock Market," SSRN Working Paper, Downloaded from www.ssrn.com.

Pathirawasam, C. (2011) "The relationship between trading volume and stock returns" Journal of Competitiveness, Vol. 3, pp. 41-49.

Ragunathan and Peker (1997), "Price Variability, Trading Volume and Market Depth: Returns, Return Volatility and Trading Volume in the Brazilian Stock Market", SSRN Working Paper, Downloaded from www.ssrn.com.

Rehman, A., Burhan, M., Shah, S. Z. A., and Rizwan, M. (2012)

"The empirical relationship between risk-return and trading volume in Karachi stock exchange" Journal of Risk and Diversification Vol. 4, pp. 36-43.

Richardson, Sefcik and Thompson, (1987), "A Test of Dividend Irrelevance Using Volume Reaction to a Change in Dividend Policy," Journal of Financial Economics, Vol. 17, No.2, 313-333.

Rogalski, R.J., (1978), "The Dependence of Prices and Volume," The Review of Economics and Statistics, Vol.60, No.2, 268-274.

Schwert, W.G. (1989), "Why Does Stock Market Volatility Change Over Time?", The Journal of Finance, 44(5), 11151153. Studies, 3, 77-102.

Tauchen, G. and Pitts, M. (1983), "The Price Variability-Volume Relationship on Speculative Markets", Econometrica, 51(2), 485-505.

Tripathy, N., (2011), "The relation between price changes and trading volume: A study in Indian stock market". Interdisciplinary Journal of Research in Business, 1(7), 81-95.

Wang and Yau (2000), "Trading Volume, Bid-Ask Spread and Price Volatility in Futures Markets", The Journal of Futures Market, 20(10), 943-970.

Watanbe, T. (2001), "Price Variability, Trading Volume and Market Depth: Evidence from the Japanese Stock Index Futures Market", Applied Financial Economics, 11, 651-658.

Wood, McInish and Ord (1985), "An Investigation of Transaction Data for NYSE Stocks", The Journal of Finance, 40(3), 739-741.

Worthington, A and Higgs, H (2004) Transmission of equity returns and volatility in Asian developed and emerging markets: A multivariate GARCH analysis. International Journal of Finance and Economics, 9(1), pp. 71-80.

Worthington, A and Higgs, H (2005) Systematic Features Of High Frequency Volatility In Australian Electricity Markets: Intraday Patterns, Information Arrival And Calendar Effects. The Energy Journal, 26(4), pp. 23-41.

Worthington, AC, and Higgs, H. (2005), Weak-Form Market Efficiency in Asian Emerging and Developed Equity Markets: Comparative Tests of Random Walk Behaviour". Accounting & Finance Working Paper 05/ 03, School of Accounting & Finance, University of Wollongong, 2005.

Ying, C.C., (1966), "Stock Market Prices and Volume of Sales," Econometrica, Vol.34, No.3, 676-686.

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Impact of Technology in Banking Sector: A Study in NCR Delhi

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The application of technologies in the developing countries represents an important tool that can determine economic development and prosperity of the country. One of the main areas in which technology can have a powerful impact on the economic activity is the banking sector. Indian banks are investing heavily in the technologies such as automated teller machine (ATMs), net banking, mobile banking, tele -banking, credit cards, debit cards, smart cards, call centers, CRM, data warehousing etc. It is essential to evaluate the impact of technology on the performance of Indian banks in terms of extended value added services and customer satisfaction thereby. The present article investigates and analyzes the present situation of banking in NCR Delhi in terms of impact of ATM, Internet banking, Mobile banking and Tele- banking services on customer satisfaction and retention by leading Indian banks. The study examines the views of 400 banking customers on the implementation of technological delivery channels in banks.

The study has found that technology has a positive impact on the customers of the bank. Response to query, availability of cheque drop box, queues at ATM, time to process request, account balance enquiry, security of transaction, SMS reminder /confirmation of transaction, are the significant factors across the banks.

Key words: *ATM, Tele-banking, Internet banking, Public & private sector banks , Technology in banking , Customer attraction and retention.*

INTRODUCTION

The Indian banking system has come a long way since independence from nationalization to liberalization. It has witnessed from a slow business institution to a highly proactive and dynamic entity. The banks have been able to generate revenue by exploring new opportunities. This has been possible due to liberalization and economic reforms undertaken by the Indian Government. The need to become highly customer focused has forced the banks to adopt an appropriate and suitable approach. Technology has marked a turning point in the history of global banking and services. With ever increasing availability of international bandwidth and powerful workflow management, it is now possible to disaggregate any banking process, execute the sub-processes in multiple locations around the world, and reassemble it, at another location.

The development of new services and efficient delivery channels for the banking industry has been made possible with the application of technology. Some of the examples of technology adoption are electronic banking, mobile banking and internet banking.

It is well recognized that, technology holds the key to the future success of Indian Banks since it is information technology which has brought in a sea change in the way banking is being conducted today, which is but an indication of the future. It would be beyond anybody's imagination to even think about conducting banking business anywhere in the country or using a powerful yet simple medium such as the Internet even from roadside kiosks. But today this is the reality which owes its credit to the rampant exploit of IT by banks. And concepts such as 'Anywhere Banking' or 'Automated Teller Machines' 'Internet Banking' and 'Mobile Banking' have become realty due to technology implementation by banks. Such innovations have had a positive impact on customer service efficiently and accurately over the counters of branches.

The objective of the study is to examine the impact of technology in banking services related to e-channels such as ATM, Tele-banking Mobile banking and Internet banking in National Capital Region Delhi. It also seeks to find the significant characteristics/ factors related to technology in banking services

LITERATURE REVIEW

The adoption of technology in Indian Banking sector commenced from the mid eighties when the Reserve Bank of India (RBI) started promoting automation in banking to improve customer service, book keeping, MIS and productivity. The banking sector has undergone a major revolution due to the adoption of information technology. It was the introduction of computer system which created right atmosphere for online banking in India. The Indian banking sector , after economic liberalization of 1991, has been the hallmark of innovation and use of technology. This has been facilitated by the development of world-class software and hardware system by some of the leading Indian IT companies such as Infosys, Wipro and TCS.

The massive dose of computerization and use of technology was the result of recommendation of a "Committee on Mechanization in the Banking Industry" formed by Reserve Bank of India in 1984. The committee was headed by Dr C Rangarajan, then Deputy Governor, Reserve Bank of India. The banks introduced 'MICR Technology" and standardized cheque forms and encoders after the recommendation of this committee.

On the recommendation of "Committee on Computerization in Banks" headed by Dr. C.R. Rangarajan, all the settlement operation were computerized in the clearing houses of RBI at Bhubaneshwar, Guwahati, Jaipur, Patna and Thiruvananthapuram. Further the 'National Clearing of inter-city cheques' at Kolkata, Mumbai, Delhi, Chennai and MICR were set up on the basis of recommendation of this committee.

Another committee on "Technology issues relating to payments system, cheque clearing and securities settlement in the banking industry" was set up in 1994. Mr. WS Saraf, Executive Director, Reserve Bank of India was chairman of the committee. Funds Transfer (EFT) system, a BANKNET communications, MICR clearing of cheque in all branches of all banks were introduces on the recommendation of this committee. 'Electronic Fund Transfer (EFT) was made on the recommendation of "Committee for proposing Legislation on Electronic Funds Transfer and other Electronic Payments (1995)".

The global business environment witnessed many changes in the last decade of the 20th century, among which is "electronic commerce or exchange of products and services through Internet and telecommunication networks" (Kalakota & Whinston, 1997). Most of the industries have been influenced by this emerging technology-based approach to business (Gunasekaran & Love, 1999). Previous literature on IT in developing countries has focused on development of national policies (Bhatnager & Odreda, 1992; Madon, 1992), development of manpower (Aladwadni, 2001; Bhatnager, 1992; Kanungo, Sadavarti, & Srinivas, 2001; Montealegre, 1998; Pawar, 1992), using tested technologies, managing IT investments (Avgerou, 1998; Heeks, 2002;), and role of consultants in deploying technologies (Palvia, Palvia, & Zigli, 1992). However, the impact of electronic commerce has been apparent in the banking and financial services industry when compared with other industry segments (Bughin, 2004; eMarketer, 2000).

It is clearly evident that use of internet banking will remain and continue to grow in Asian countries with the further penetration of internet services. Internet usage and Internet banking has grown to 45.4 million by 2006 in the Asia Pacific region (Jaffe, 2003). The percentage of banks that have launched on-line banking products and services has grown from 6% in 1998 to 75% in 2003 and the present scenario is that almost all banks offers on line banking products and services.

According to IDC, markets like Korea and Singapore have nearly 10% of their population banking over the Internet during the same period. Although these markets are way ahead of India both in terms of Internet penetration and on-line banking penetration, there is immense potential in India for the internet penetration and banking service through electronic channels. It is evident from the literature that banks across the world are motivated to implement e-banking to achieve either top-line or bottom-line benefits. This is achieved through increased market share due to product delivery convenience and product innovation (Jaleshgari, 1999; Orr, 1999). Further, it is found from the literature that banks in the developed markets with established telecommunications, commercial, and legal infrastructures and possessing the necessary resources and levels of operational efficiency in terms of costs and revenue have a greater chance of successfully implementing e-banking (Goodman, 1999; Messmer, 1999). According to Kalakota & Whinston, (1997) there are new opportunities for the banks in the form of re intermediation in the e-commerce market by identifying themselves as "trust authorities to validate and stand as security between business and consumers".

Although the Internet is revolutionizing the way in which companies offer their products and services, studies relating to customer acceptance of this technology are limited (Meuter, Ostrum, Roundtree, & Bitner, 2000). An understanding of different dimensions of creating value to the customer through the use of new technology and its impact on

their performance in terms of return on investment is always a matter of concern for the banking and financial services industries (Lucas, & Spilter, 1999). Liao &Cheung, (2002) observed that individual expectations regarding "accuracy, security, transactions speed, user-friendliness, user involvement, and convenience" were the most important quality attributes in the perceived usefulness of Internet-based e-banking. Trust is also one of the important determinants of successful e-banking (Suh & Han, 2002). Many researchers have argued that trust is essential for understanding interpersonal behavior and is relevant to e-banking. There is generally agreement among the researchers that trust is most significant long-term barrier for realizing the potentials of B to C e-commerce and not just a short-term issue, (Gefen, 2002; Jarvenpaa, Tractinsky, & Vitale, 2000). Different models have been proposed by researchers to measure the impact of e-banking. A model was proposed for evaluating the business value of e-banking channels involving an internal view, (Stamoulis, Panagiotis, & Drakoulis, 2002) where the channel is considered as a resource whose utilization must be maximized, and an external view, where the channel as an interface to the bank's customer base should enable and support customer relationship management. Previous research also reveals that the effectiveness of Internet banking is related to the size of a bank and is projected to have significant impacts on various elements of the banking system, which is faced with many challenges. (Courchane, Nickerson, & Sullivan, 2002)

There is an intense debate in the economic literature regarding the effect of developing the information and the communication technology (ICT) infrastructure on the pace of economic development of a country (Baliamoune, 2004). A report of the World Bank (McNamara, 2003) outlines that ICT development is not an end in itself, but rather a tool that can be used to increase the capacity of poor and underdeveloped countries to accelerate economic development, to connect to the world, and to increase the opportunities offered to their citizens

(Hadidi, 2003). On the other hand, the development of ICT has to be directed towards areas where it can create the maximum economic and social effect; therefore, the ICT policy has to use a strategic approach, identifying the main priorities at national and regional levels. ICT strategies are only effective and sustainable if they are integrally linked to broader, more comprehensive development and poverty-reduction strategies (Steinberg, 2003).

There are mainly two role played by information technology in the banking sector. One is related to supportive functions as enables of different services, and second, the strategic role in providing strategic leadership in the field. The development of new products which may give the competitive edge using information technology platforms is the strategic role where as preparing the platform for business process reengineering and IT based financial products is the supportive or enables role . Both the roles have vital importance in banking sector as it leads to higher customer satisfaction and retaining the existing customer whereby reducing the need and cost of attracting new customers . In the emergence of e-banking and payment system, both play a vital role as infrastructure for ecommerce (Raihan A. 2001).

Online banking is becoming the indispensable part of modern day banking services. It is expected that 60 % of retail banking dealings will be online in ten years' time. Most of the Indian banking customers are likely to prefer the online banking activity but with ensured security.

A big concern about information technology on service delivery channels is security of transaction. According to Buchanan and Gilles (1990), "security is the condition of being protected against danger, loss, and criminals". In common language, we understand that, security is similar to safety, and banks must ensure full proof security of banking activities. The ultimate satisfaction of any value added banking facility offered to the customer is arrived only with the security level attached with that facility in India.

Internet banking is the newest delivery channel to be offered by retail banks in many developed countries. It allows customers to conduct financial transactions on a secure website operated by their retail or virtual bank. In this case, the internet is used as a message carrier where the customer uses a PC and a modem or local area network to connect to the bank using its online website or software provided by the bank. In India, Internet banking is offered to customers on the basis of their requirements.

Boon and Yu ,(2000) has defined 'E-channels' as the methods of delivering service products using electronic media such as the telephone, internet and automated teller machines (ATMs) . These delivery methods have become an increasingly important technique to retain customers in today's dynamic banking environment since customers can make withdrawals, deposits and access balances at their own convenience. E-Channels are preferred by the Indian customers nevertheless of their socio economic back ground. To enhance speed and efficiency of delivery of services banks have equipped themselves with the latest of technology application such as "Core Banking". Technological innovation and exposure creates a smooth competitiveness among the nationalized and private sector and foreign sector banks.

Major Contribution of Technology in Indian Banking Sector

Banking is an industry that provides vital service and support to the economic and financial sectors. It is information technology which enables banks in meeting such high expectations of the customers who are more demanding and are also more techno-savvy compared to their counterparts of the yester years. Present day customers are tech savvy and cannot wait for their banking needs. For them the banks have to use technology to provide instant banking facility without the constrains of branch or time. Technology has been providing solutions to banks to take care of their accounting and back office requirements.

Core Banking Solutions (CBS): CBS enables banks to consolidate their technology platforms across functions and geographies leveraging cost and at the same time acquiring flexibility and scalability to adapt to a fast changing and competitive environment. In core banking, banks are getting their data aggregation layers in place to facilitate projection of data in the form of static and dynamic reporting capability. The percentages of such branches has increased by 79.4 % at end March 2009 to 90% at the end of March-2010.

Magnetic Ink Character Reader (MICR) MICR was introduced in 1987 in the four metros cities. Initially the MICR clearing was available only in 14 clearing centers, which included the upcoming cities such as Pune, Trivandrum, Kanpur, Hyderabad, Japura, Nagpur, Baroda, Bangalore, Ahmadabad Gauhati. This facility was further extended to another eight centers. These 22 centers are the one where volume of clearing transactions is very large and they virtually cover the majority of transactions.

Automated Teller Machine (ATM) : An ATM is an Electronic Fund Transfer terminal facilitating cash deposits, inter and intra transfer between accounts, balance enquiries along with mini statement of accounts, cash withdrawals and pay bills. ATM itself can provide information about accounts of customers and also receive information's and instructions from customers like stop instruction, auto pay, cheque drop, etc.,

Internet Banking (I-Banking / E-Banking): Internet banking (or E-banking) means any user with a personal computer and a browser can get connected to his bank's website to perform any of the virtual banking functions. In internet banking system every bank has a centralized database that is connected with other banking system through web-based environment. All the services that the bank has permitted on the internet are displayed in menu. Through that any service can be selected by the customer and further the demo or working manual is provided by the nature of service. It would be a borderless entity permitting anytime, anywhere and anyhow banking. The intranet network connects the various locations of the same organisation and gives connectivity to these locations with the central office. However, intranet can be used only in the organisation which has created them. SWIFT is a live example of intranet application.

Mobile Banking / Phone Banking: In October, 2008, the first measure to regulate mobile banking in India was start up. Since then, it has progressively liberalized the manner and extent to which banks and their customer can conduct mobile banking. Mobile banking can prove to be an important extension of banking to the far flung areas of the country where there is neither a bank branch nor there is internet connectivity. Today, mobile phones have enhanced the functioning of the banks in India to facilitate intra and interbank funds transfer between bank accounts. In telephone banking, the telephone is used as a message carrier to enable person to person or voice activated automated communication between the bank and the customer. Mostly telephone banking uses an automated phone answering system with phone keypad response or voice recognition capability in India.

Credit Cards/Debit Cards: The Credit Card holder can spend wherever and whenever he wants with his Credit Card. However this spending cannot be beyond the credit card limit. In Credit Card you spend first and then you pay on the due date or before it. In case of a Debit Card, the user has to deposit in his bank account in advance and this deposited amount become the upper limit. This limit reduces when you make purchase using debit card and increases when you deposit the money in your account. When the debit card is used, money is transferred from buyer's account in the bank to the account of the seller. The bank never faces a default because the amount spent is debited immediately from the customer's account.

Smart Card: Banks are continuously adding new services to their existing one to enhance security and provide new service, this services are provided through Smart Cards. Smart Cards are the new generation card where lot of information can be stored, with enhanced security features and can be used for different purposes. These card can also be used to store personal information like medical and health history, personal banking and personal preferences. Smart card technology is now familiarized in India.

Automated clearing House (ACH): Automated clearing house (ACH) is an electronic network for financial transaction. ACH processes large number of debit and credit transaction in batches. Computers are deployed in clearing house to speed up the process and clearing the operations quickly and efficiently which is voluminous work.

Electronic Fund Transfer: The customer has adopted to electronic payments in India in big way. From less than half a percent of transactions in the electronic mode in 2001, today the process is close to about 30 crores transactions per year in the electronic mode. RBI's initiative is moving "High Value Clearing" to electronic modes. It is a step aimed at creating a safer, secure funds transfer route.

National Electronic fund Transfer (NEFT): National Electronic Fund Transfer (NEFT) is an online system for transferring funds of Indian Financial Institution. This facility is used mainly to transfer funds below Rs. 2,00,000/ - The NEFT system in India has been   in operation from 21 November 2005. NEFT covers all banks which were participating in the special electronic funds transfer (NEFT) clearing. Public key infrastructure (PKI) technique is used in NEFT for maintaining security.

Real Time Gross Settlement (RTGS) System: It is an electronic fund transfer system where the fund transfer take place from one bank to another on real time and gross basis . Gross settlement means the transaction is settled on one to one basis without bunching or netting with any other transaction. Once the transaction is processed, payment is final and irrevocable. It also provides the means for risk-free and credit push-based fund transfers settled on a real-time basis with the central bank money. There are 55000 branches of different banks using RTGS for inter-bank funds. This is the widest coverage of banking using RTGS in the whole world.

Indian Financial Network (INFINET): Institute for Development and Research in Banking Technology (IDRBT) implemented the Indian Financial Network, the INFINET a 'one-of-a-kind' initiative for the banking sector aimed at sharing expensive IT resources so as to achieve economies of scale. One of the notable achievements of IDRBT's has been the implementation of Public Key Infrastructure (PKI) based on electronic data transfer with very high security levels. The Institute has also developed a messaging standard known as Structured Financial Messaging System (SFMS) with security features superior even to SWIFT.

Security in Banking: Security in an Information Technology based transaction processing environment is also very much essential and critical. Adequate security controls must be exercised in place to protect the consumer interest. This includes the validation of transactions with the maker-checker concept, transmission of encrypted form of electronic messages over a network, due authentication by means of providing for digital signatures and warehousing of electronic records in conformity with the provisions of the "Information Technology Act, 2000 and amendment Act 2008".

Society for Word wide Interbank Financial Telecommunication (S.W.I.F.T): The S.W.I.F.T provides reliable and expeditious telecommunication facilities for exchange of financial message all over the world. Presently Mumbai acts as the gateway for S.W.I.F.T. Soon other cities will be joined in this network either through leased lines or public data network. The majority of international interbank messages use the S.W.I.F.T network.

BANKNET: It is an internet based communication network. It provides speed of financial transaction. BANKNET had been set up in 1991 by the RBI, and is meant to facilitate transfer of inter-bank (and inter-

branch) messages within India by Public Sector banks who are members of this network.

Institute for Development and Research in Banking Technology (IDRBT): The main purpose of IDRBT is to adopt research and development as well as consultancy in the application of technology to the banking and financial sector in the country. Reserve Bank of India (RBI) established IDRBT in 1996.

OBJECTIVES AND HYPOTHESES

This study seeks to examine the impact of technology on customer satisfaction in banking services related with e-channels such as ATM, Tele-banking Mobile banking and Internet banking in National Capital Region Delhi.

In pursuance of the above objectives, the following hypotheses were formulated for testing:

➢ H01 There is no impact of technology on customer satisfaction on banking services in NCR Delhi.

➢ H02 There are no significant characteristics/ factor related to technology in banking services.

RESEARCH METHODOLOGY

Sampling Unit, Sample Selection and Sample Size

The population studied here is Indian retail bank customers in Delhi and NCR region. The sampling unit was the customers of four selected banks, two banks from public sectors and two banks from private sector. (i.e. State Bank of India, Punjab National Bank, ICICI bank & HDFC Bank) who has an account in any branch located in NCR Delhi. Random sampling method was adopted to select the customers. There was no discrimination on the bases of occupation, age, or educational level. The sample is broadly representative of the population for purposes of cross sectional survey. Sample selection was to ensure generalization and validity of findings. Total 400 respondents were selected which comprises of 100 respondents from each bank.

Sampling procedure: To obtain a representative sample, a probability sample of population was drawn. 400 respondents were divided equally among the four selected banks. In each bank simple random sampling method was adopted. In simple random sampling every member of the population has an equal chance of being selected in sample.

Data Collection Method

The main instrument used for data collection in this research was the questionnaire; the responses have been collected by means of face-to-face interviews by the author.

Measurement Scales Employed

The overall satisfaction of the respondents towards the provision of different services was gauged using a questionnaire containing close-ended question, which were designed to ascertain the satisfaction level of the respondents using a five point Likert scale with following options: Excellent, Good, Satisfactory, Poor, Worst. Excellent being the highest satisfaction level followed by good, satisfactory and poor. Worst was considered as the no satisfaction level. The respondents were asked to read the questions and then choose the option for their response. Questions were explained to the respondent if he/ she could not understand a particular question. Prior to the final survey, the questionnaire was pre-tested using a sample of respondents similar in nature to the final sample.

Research and Statistical Tools Employed

The research and statistical tools employed in this study are frequency analysis, factor analysis, and ANOVA (Analysis of variance). SPSS 16 was used to perform the statistical analysis. The reliability of the data was carried out by using Cronbach's Alpha Value. Frequency analysis on the main factor under study, indicated overall satisfaction levels of the respondents with retail banking in general. ANOVA was employed to find the significant factor which will determine the overall customer satisfaction.

DATA ANALYSIS AND INTERPRETATION

The analysis of this data was divided into following section:

(i) Demographic Factor Analysis of Respondents : Table 1

(ii) Reliability and Validity : Table 2

(iii) Mean score of Customer satisfaction level : Table 3

(iv) Computation of ANOVA : Table 4

(V) KMO and Bartlett's Test : Tables 5

(Vi) Total Variance Explained : Tables 6

(Vii) Rotated Component Matrix : Tables 7

The respondent profile as displayed in table 1 indicates the current scenario of banking sector and their user's profile. Most of the respondents (35.8%) were employed in private sector, were either graduate (54.8%) or post graduate (35.5%)in the age group of 20-40 years. The profile of respondents indicates they are young, urban educated and decently employed, which is the new generation who are tech savvy and wants the services at the click of the button or mouse.

Reliability & Validity: Table 2 reflects the result of reliability analysis- Cronbach's Alpha Value. This test measured the consistency between survey scales. A Cronbach's Alpha score of 1.0 indicate 100 percent reliability. Cronbach's Alpha score were all greater than the Nunnally's (1976) generally accepted score of 0.7. The score was 0.936 for different characteristic in the findings that indicates reliability of the survey.

Table -1 : Demographic Factor Analysis of Respondents					
Factor		Frequency	Percent	Valid Percent	Cumulative Percent
Occupation	Govt. service	90	22.5	22.5	22.5
	Private service	143	35.8	35.8	58.2
	Business	99	24.8	24.8	83.0
	Student	68	17.0	17.0	100.0
	Total	400	100.0	100.0	
Age Group	20-30yrs	143	35.0	35.8	35.8
	30-40yrs	126	31.5	31.5	67.2
	41-50yrs	100	25.0	25.0	92.2
	51yrs&above	31	7.8	7.8	100.0
	Total	400	100.0	100.0	
Educational Qualification	Post Graduation	142	35.5	35.5	35.5
	Graduation	219	54.8	54.8	90.2
	10+2	34	8.5	8.5	98.8
	Matriculation	5	1.2	1.2	100.0
	Total	400	100.0	100.0	
Respondent's Bank	SBI	100	25.0	25.0	25.0
	PNB	100	25.0	25.0	50.0
	ICICI	100	25.0	25.0	75.0
	HDHC	100	25.0	25.0	100.0
	Total	400	100.0	100.0	

Table -2: Reliability & Validity Statistics			
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items	No of cases
.936	.932	29	400

Table 3 : Mean score of Customer satisfaction level				
Characteristics	ICICI	HDFC	SBI	PNB	Mean score of four Banks
Location/proximity of ATM	3.97	3.79	3.77	3.58	3.77
Availability of cash	4.09	3.70	3.96	3.63	3.84
Time to process request	3.74	3.52	3.57	3.48	3.57
No of ATMs in locality	3.58	3.31	3.38	3.14	3.35
Response to query	3.68	3.39	3.42	3.14	3.40
Availability of desired forms	3.63	3.38	3.5	3.27	3..45
Availability of Cheque drop box	3.72	3.38	3.44	3.16	3.42
Printed statement of Transaction	3.63	3.37	3.64	3.63	3.57
Cash deposit facility	3.52	3.41	3.39	3.48	3.45
Availability of Networked (shared) ATM	3.55	3.15	3.14	3.14	3.24
Fee charged for using other banks ATMs	3.26	3..15	2.82	2.89	3.03
Time required to get a response	3.22	3.43	2.72	2.76	3.03
Account balance enquiry	3.34	3.38	2.78	2.86	3.10
Statement of specific Accounts dates	3.24	3.13	2.85	2.76	3.0
Cheque stop payment instruction	3.05	2.89	3.25	2.96	3.04
Demand draft facility	3.21	3.02	2.7	2.53	3.89
Requisition of new cheque book	3.18	3.12	3.02	2.86	3.04
Money transfer between Accounts	2.81	2.88	2.33	2.45	2.61
Payment of utility bills	2.88	2.89	2.28	2.48	2.75
Credit card information	3.01	2.41	2.48	2.51	2.60
Availability of desired information on website	2.62	2.91	2.34	2.04	2.48
Security of transaction	2.52	2.79	2.2	1.93	2.36
Time to get password & user id	2.38	2.72	2.19	1.90	2.30
User friendly website	2.44	2.59	2.21	1.91	2.29
Utility bill payment facility	2.45	2.40	2.13	1.83	2.20
Prompt response to email query	2.44	2.35	1.92	1.75	2.12
SMS reminder	2.44	2.27	1.92	1.82	2.11
Request for a new Cheque book	2.43	2.37	1.95	1.79	2.14

Scale used : **Excellent -5, Good-4,satisfactory-3, poor-2, Worse -1**

In order to find the impact of the technological factors on the customer satisfaction, customers were asked to give their responses from excellent to worse. Excellent was given the score of 5, followed by good-4, satisfactory -3 poor-2 and worse as 1. These responses have been shown in the table-3. The mean score of two or less than two has been taken as poor satisfaction level. The mean score between   two to three has been considered as satisfactory level. The mean score between three to four has been considered as positive or good satisfaction and any mean score above 4 is considered as excellent satisfaction level. Higher the mean score, higher is the satisfaction level similarly lower the mean score (less than two) will indicate lower satisfaction level or no satisfaction level .

Based on the mean score level as indicated in the table-3, it was found that all the characteristics of the e-banking channels have mean score above 2. This indicates that generally the customers have given satisfactory score to the e-banking channels facilitated by the technology implementation. Also there are 17 characteristics which have mean score above 3 indicating that the customer satisfaction is positive. This support the assumption that the technology has a positive impact on banking services and leads to the rejection of H01   and conclude that technology has a positive impact on customer satisfaction on the banking services in NCR Delhi

ANOVA Analysis : One way   ANOVA was performed on the basis of   occupation , age group education of the respondents and the bank used by these respondents. The objective of the analysis was to find if there are any significant characteristics related to different aspects of technology in the banking on the basis of these demographics. The researchers have taken occupation as a factor for ANOVA. We find that there are three characteristics, where there is significant difference that exists among the different occupation of the respondents. These characteristics are "response to query, availability of cheque drop box, queues at ATM". These differences are probably related to the availability of time , urgency of work and the nature of business/ occupation. Similarly when we have taken the age as a factor for ANOVA we find that there are only two characteristics where, there is significant difference existing among the different occupation of the respondents. These characteristics are in response to query, availability of cheque drop box. These differences are probably due to the use of technology driven channels by particular age group especially younger generation and not across all age groups. When we look at education as one of the factors for ANOVA analysis we find that there is significant difference that exists among the respondents for the same two characteristics : "response to query, availability of cheque drop box".

However, when we take bank as factor for ANOVA analysis we find that there is significant difference that exists among the of the respondents in many characteristics such as "response to query, availability of cheque drop box, queues at ATM, availability of cash, printed statement of transaction, time required to get a response, account balance enquiry, security of transaction, SMS reminder/ confirmation of transaction and different request through mobile banking . This further strengthens the arguments that there are significant variances in customer responses.

When we look at the overall ANOVA analysis, we find that there are significant difference in the responses in many characteristics such as "response to query , availability of cheque drop box , queues at ATM" on the basis of occupation , educational qualification of the respondents and across and banks. Whereas some characteristics such as "time to process request, cash deposit facility , printed statement of transaction , time required to get a response , availability of Networked (shared) ATMs, account balance enquiry , Security of transaction, SMS reminder / confirmation of transaction, different requests on mobile" are significant characteristics across the banks, which will have an impact on customer satisfaction. Hence we reject H02 and conclude there are significant characteristics related to technology in banking services as indicate above and all the banks should

ensure that these characteristics are taken care of in order to enhance customer satisfaction.

Results of the KMO and Bartlett's test of spherecity are shown in Table 4. Bartlett's test of spherecity was significant at the 0.000 level and that implies the presence of nonzero correlation. The overall measure of sampling adequacy (MSA) was 0.932 which exceeds the recommended cut-off level of 0.5 and individual measures were all well above this cut-off level.

Table -4 : Computation of ANOVA (0.05 Significance level)

Characteristics	Occupation		Age Group		Educational Qualification		Banks	
	F value	Sig.	F value	Sig.	F value	Sig.	F value	Sig.
Location/proximity of ATM	2.725	.044	1.210	.300	1.210	.300	3.406	.018
Availability of cash	1.711	.164	.722	.632	.722	.632	7.350	.000*
Time to process request	1.481	.219	1.803	.097	1.803	.097	1.602	.188
No of ATM in locality	2.678	.047	1.429	.202	1.429	.202	3.737	.011
Response to query	5.106	.002*	2.667	.015*	2.667	.015*	5.003	.002*
Availability of desired forms	3.148	.025	1.589	.149	1.589	.149	2.603	.052
Availability of cheque drop box	4.223	.006*	2.063	.057*	2.063	.057*	4.991	.002*
Queues at ATM	4.043	.008*	1.623	.139	1.623	.139	2.110	.098*
Printed statement of Transaction	3.644	.013	1.485	.182	1.485	.182	4.046	.007*
Cash deposit facility	3.736	.011	2.659	.015	2.659	.015	1.531	.206
Availability of Networked(shared) ATM	1.324	.266	1.453	.193	1.453	.193	9.530	.000*
Fee charged for using other banks ATMs	3.023	.030	1.352	.233	1.352	.233	3.720	.012
Time required to get a response	1.139	.333	1.475	.185	1.475	.185	5.750	.001*
Account balance enquiry	.845	.470	.765	.598	.765	.598	4.339	.005*
Statement of Accounts between specific dates	1.639	.180	1.954	.071	1.954	.071	2.957	.032
Cheque stop payment instruction	1.346	.259	.334	.919	.334	.919	.329	.804
Demand draft facility	2.822	.039	1.133	.342	1.133	.342	3.577	.014
Requisition of new cheque book	2.318	.075	1.298	.257	1.298	.257	3.466	.016
Money transfer between Accounts	2.115	.098	.869	.517	.869	.517	2.486	.060
Payment of utility bills	.535	.659	.844	.537	.844	.537	3.238	.022
Credit card information	.569	.635	1.395	.215	1.395	.215	2.847	.037
Availability of desired information on website	1.185	.315	1.714	.116	1.714	.116	3.750	.011
Security of transaction	.411	.745	1.619	.140	1.619	.140	4.050	.007*
Time to get password & user id	.619	.603	1.525	.169	1.525	.169	3.399	.018
User friendly website	.190	.903	1.582	.151	1.582	.151	2.458	.062
Utility bill payment facility	.453	.716	1.565	.156	1.565	.156	2.290	.078
Prompt response to email query	.924	.429	1.867	.085	1.867	.085	3.192	.024
SMS Reminder/ confirmation of transaction	.711	.546	1.722	.115	1.722	.115	8.218	.000*
Different Request through mobile	.490	.689	1.635	.136	1.635	.136	8.211	.000*

Responses are significant at 0.05 levels

Table -5 KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.932
Bartlett's Test of Sphericity	Approx. Chi-Square	8431.234
	df	406
	Sig.	.000

Table -6 : Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	10.679	36.826	36.826	10.679	36.826	36.826	6.242	21.524	21.524
2	3.776	13.021	49.847	3.776	13.021	49.847	5.836	20.125	41.649
3	2.604	8.978	58.825	2.604	8.978	58.825	4.523	15.596	57.245
4	1.143	3.943	62.768	1.143	3.943	62.768	1.326	4.572	61.818
5	1.041	3.591	66.359	1.041	3.591	66.359	1.317	4.541	66.359
6	.936	3.228	69.586						
7	.830	2.861	72.447						
8	.764	2.633	75.081						
9	.674	2.323	77.403						
10	.634	2.186	79.589						
11	.617	2.129	81.717						
12	.559	1.927	83.645						
13	.509	1.756	85.400						
14	.492	1.698	87.098						
15	.454	1.565	88.663						
16	.447	1.540	90.203						
17	.425	1.465	91.668						
18	.364	1.256	92.924						
19	.310	1.070	93.994						
20	.303	1.044	95.037						
21	.257	.886	95.924						
22	.215	.741	96.664						
23	.193	.666	97.330						
24	.168	.579	97.910						
25	.156	.538	98.448						
26	.130	.448	98.896						
27	.127	.440	99.335						
28	.113	.391	99.726						
29	.079	.274	100.000						

Extraction Method: Principal Component Analysis.

Factor Analysis

To reduce the factors influencing the satisfaction level of the customers in availing the technology enabled services offered by banks in India, there are 29 different factors that have been taken into study and admitted into factor analysis to predict the most influencing factors which will determine the satisfaction level of the customers. Overall, the set of

Table -6 :Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Location/proximity of ATM	.065	.150	.624	.154	.287
Availability of cash	.045	.014	.704	-.022	-.007
Time to process request	.070	.091	.699	.013	-.134
No of ATM in locality	.083	-.027	.689	.089	.268
Response to query	.164	.000	.685	.000	-.083
Availability of desired forms	.148	.026	.632	-.071	.016
Availability of cheque drop box	.104	.050	.716	.093	.039
Queues at ATM	.118	.128	.647	.092	.039
Printed statement of Transaction	.053	.209	.523	.091	-.409
Cash deposit facility	.209	.118	.423	.379	-.314
Availability of Networked(shared) ATM	.227	.157	.444	.574	-.072
Fee charged for using other banks ATMs	.126	.144	-.011	.826	.124
Time required to get a response	.808	.224	.132	.097	.068
Account balance enquiry	.839	.166	.124	.058	.039
Statement of Accounts between specific dates	.817	.195	.159	.098	.060
Cheque stop payment instruction	.637	.054	.103	.140	.029
Demand draft facility	.832	.186	.143	.003	.014
Requisition of new cheque book	.801	.223	.107	.056	.083
Money transfer between Accounts	.748	.302	.136	.040	.052
Payment of utility bills	.777	.304	.080	.088	.044
Credit card information	.727	.351	.126	-.005	-.040
Availability of desired information on website	.307	.875	.073	.083	.026
Security of transaction	.264	.912	.077	.079	.016
Time to get password & user id	.258	.892	.045	.070	-.010
User friendly website	.251	.896	.062	.071	-.006
Utility bill payment facility	.291	.841	.112	.061	.158
Prompt response to email query	.251	.855	.135	.095	.129
SMS Reminder/ confirmation of transaction	.254	.561	.143	.063	.590
Different Request through mobile	.274	.472	.131	.114	.658

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
A. Rotation converged in 6 iterations.

data meets the fundamental requirements of factor analysis satisfactorily (Hair et al, 1998). In analyzing the given data, the 29 response items were subjected to a factor analysis using the principal component method. Using the criteria of an Eigen value greater than 1, five clear factors emerged accounting for 66.35 % of the total variance. As in common practice, a Varimax rotation with Kaiser Normalization was performed to achieve a simpler and theoretically more meaningful factor solution. The Cronbach's alphas score for all the factors was 0.936 (Table 2).

It is clear from the factor loadings as highlighted in Table 7 that five factors emerged. These five factors represent different elements of technology related to services that form the underlying factors from the original 29 scale response items given. Referring to the Table 7 above, factor 1 represents elements of the internet banking directly related to function of websites of banks; it is therefore labeled as "Functionality of Internet banking ". These elements are: time required to get a response, account balance enquiry, Statement of Accounts between specific dates, demand draft facility, and requisition of new cheque book. Factor 2 represents operation of websites and has been labeled as "Operation of Internet Banking". These elements are: availability of desired information on website, security of transactions, time to get password & user id, user friendly website, utility bill payment facility, and prompt response to email query.

Factor 3 represents elements directly related to operation / function of the ATM . Therefore are labeled as "Operational / Functionality of ATM". These elements are availability of cash, time to process request, availability of cheque drop box, response to query. Factor 4 represents sharing of ATMs of others banks; it is therefore labeled as "Sharing of ATM". The elements are availability of shared/ networked ATM and fee charged for using shared ATM. Factor 5 represents elements of mobile banking and are labeled as "Mobile Banking

Factors". These elements are SMS reminder/ confirmation of transaction and different request through mobile phone. Factor analysis leads us to rejection of Ho2, as we have found out there are five factors related to technology as described above which will have significant impact on the customer satisfaction.

CONCLUSION

Analysis of the customer responses indicates that technology has a positive impact on the customer satisfaction on banking services in NCR Delhi. It indicates that inclusion of technology driven channels such as ATM , Internet banking, Tele-banking and Mobile banking has helped the banks to improve the customer satisfaction and increased retention of customers which is a win-win situation for both banks and customers. The study has found that there are characteristics which will have an impact on the satisfaction levels of the customers. The most significant characteristics are "response to query, availability of cheque drop box, queues at ATM" across occupation , educational qualification of the respondents and across banks. Other characteristics such as "time to process request, cash deposit facility , printed statement of transaction , time required to get a response , availability of Networked (shared) ATMs, account balance enquiry , Security of transaction, SMS reminder / confirmation of transaction, different requests on mobile" are significant characteristics across the banks. In general, today's people live in an IT era, so the technological advancement and interaction in banking service industry is completely inevitable and most invited. The technological development has enhanced all the segments to update their business and individual operations in a simplified and most convenient manner and banking industry is not a exception to it. The technological advancement and intervention in the banking sector not only facilitates the banks to offer value added financial services to its customers, but also helps to maintain the bulk volume of daily financial

transactions and constructing a wide range of data warehousing, so that the bank can construct, develop and maintain a complete data base of the customer. This database will be used to build up strong customer relationship management. The technology enables retail delivery channels such as ATM, Internet banking, Mobile banking, Tele-banking which has helped the banks to reduce their transaction cost and enhanced the convenience to the customers to a great extent. The 24x7 banking was made possible because of technology enabled services and one click banking is the result of the technology.

LIMITATION OF THE STUDY

The study has been carried out in the National Capital Region, which is the metropolitan city area, where the education level and income level of the population is very high as compared to the rest of India, except the other metropolitan cities. Hence, the finding of the research can be generalised only for urban areas and cannot be generalised for the whole country.

IMPLICATION FOR THEORY AND PRACTICE

This research focused on determinants of e delivery channels and the significant factors associated with these delivery channels and how the technology has changed the way retail banking is carried out in India now by the customers. However, the research did not study the association between customer satisfaction and retention of customers. Additional research may well explore the relationship between these two constructs. Future research may explore the association between age and attitude and determine its effects on the delivery channels' quality and customers' satisfaction. Similar research can be undertaken in the rural area to find the differences between the customer satisfaction level of urban and rural customers.

MANAGERIAL IMPLICATIONS

Even though there is a rapid increase in the number of automated delivery channels but many a time the customers experiences that uninterrupted services are not available due many factors including the technological factors such as non availability of internet or server which hampers the smooth operation of e- delivery channels .The study provides necessary input to the bank management to increase customers' satisfaction through improving delivery quality of e-channels . Although banks have undertaken many measures related to security of transaction, the perception of the customer has not changed to that extent. It is more important in case of internet banking and mobile banking which has wide potential to reach to different segments of customer and reduce the transaction cost as well as lower the volume of transaction at bank. To further improve the service delivery quality, banks may provide enhanced interactivity, diversified offerings, and facilitate customers to participate in improving the service encounter with them and make it a memorable and pleasant experience. The banks should focus not only on the customer satisfaction, but also aim at delighting them to ensure their retention.

REFERENCES

Aladwani, A.M. (2001). "Online banking: A field study of drivers, development challenges, and Expectations", International Journal of Information Management, Vol. 21, pp 213225.

Avgerou, C. (1998). "How can IT enable economic growth in developing countries?" Information Technology for Development, Vol. 8(1), pp 1528.

Baliamoune, M.N. (2002). "The new economy and developing countries: Assessing the role of ICT diffusion" (Discussion Paper No. 2002/ 77). Helsinki: World Institute for Development Economics Research. Retrieved from http:// www.wider.unu.edu/ publications/ dps/ dps2002/ dp200277.pdf

Buckley, J. (2003) "E-service and the public sector," Managing Service Quality, Vol. 13, pp. 6, pp. 453-62.

Bhatnagar, S.C. (Ed.). (1992). "Information technology manpower: Key issues for developing countries", Tata McGraw-Hill, New Delhi.

Bhatnagar, S.C., & Odreda, M. (Eds.). (1992). "Social implications of computers in developing Countries", Tata McGraw-Hill, New Delhi.

Bhosale, T N and Sawant,SB ,(2011). "Technological Developments in Indian Banking Sector" http:/ / www.isrj.net/ PublishArticles/ 306.aspx accessed on 02July, 2012.

Boon, O.H., and Yu, C.M., (2000). "Success factors in e-channels: The Malaysian banking Scenario". International Journal of Bank Marketing. Vol. 21 (6), pp 369-77.

Bughin, J. (2004). "Attack or convert? Early evidence from European on-line banking". Omega, Feb 2004, Volume: 32 no 1, pp.1-7.

Buchanan, R. and Gilles, C. (1990) "Value managed relationship: The key to customer retention and profitability", European Management Journal, Vol. 8, no 4, pp 523-526.

Calin Gurau (2005). "ICT Strategies for Development: Implementing Multichannel Banking in Romania", Information Technology for Development, Vol. 11 (4), pp 343362.

Courchane, M., Nickerson, D., & Sullivan, R. (2002). " Investment in internet banking as a real option: Theory and Tests", Journal of Multinational Financial Management, Vol.12, pp 347363.

Committees on Computerization : http:/ / www.rbi.org.in/ scripts/ PublicationsView.aspx?id=162

Debnath, R.M. and Shankar, R. (2008) ."Measuring performance of Indian banks: an application Data Envelopment Analysis", International Journal of Business Performance Management, Vol. 10, No. 1, pp 5785.

Gefen, D. (1999). "Customer loyalty in e-commerce". Journal of the Association for Information Systems, Vol.7, pp 2751.

Goodman, M. (1999). "Checking the foundation of banking sites", Banking Systems and Technology, Vol. 36(10), pp 3-14.

Gunasekaran, A., & Love, P.D. (1999). " Current and future applications of multimedia technology in business", International Journal of Information Management, Vol. 9,no-2, pp 105120.

Heeks, R. (2002). "Information systems and developing countries: Failure, success and local improvisations" , The Information Society, Vol. 18, pp 101112.

Hadidi, R. (2003). "The status of e-finance in developing countries", The Electronic Journal on Information Systems in Developing Countries, Vol. 11(5), pp 15.

Jaffe, D. (2003). "Asia/ Pacific internet banking forecast 20022006". Singapore: International Data Corporation.

Jarvenpaa, S.L., Tractinsky, N., & Vitale,M. (2000). "Consumer trust in an Internet Store". Information Technology and Management, Vol.1, 12, pp 4571.

Kalakota, R., & Whinston, A.B. (1997). "Electronic commerce: A Manager's Guide". Reading, MA: Addison Wesley.

Kannabiran, G. and Narayan,P.C.(2005), "Deploying Internet Banking and e-CommerceCase Study of a Private-Sector Bank in India", Information Technology for Development, Vol. 11 (4) pp 363379.

Kanungo, S., Sadavarti, S., & Srinivas, Y. (2001). "Relating IT strategy and organizational culture: An empirical study of public sector units in India", The Journal of Strategic Information Systems, Vol.10, pp 2957.

Madon, S. (1992). "Computer-based information systems for development planning: Significance of cultural factors", Journal of Strategic Information Systems, Vol.15, pp 250257.

Montealegre, R. (1998). "Managing information technology in modernizing 'against the odds':

Lessons from an organization in a less-developed country". Information & Management, Vol.34, pp 103116.

Liao, Z., & Cheung, M.T. (2002). "Internet-based e-banking and consumer attitudes: An empirical study", Information & Management, Vol.39, pp 283295.

Lucas, H.C., & Spilter, V.K. (1999). "Technology use and performance: A field study of broker Workstations", Decision Sciences, Vol.30(2), pp 291311.

McNamara, K.S. (2003). "Information and communication technologies, poverty and development: Learning from experience", a background paper for the info Dev annual symposium, Geneva, Switzerland. Retrieved from http:/ / wbln0018.worldbank.org/ ict/ resources.nsf/ d045b0dd4 551da0885256b29005fce67/ 1e51786cd26a825585256e750063a3e7 / $FILE/ Learning%20From%20Experience.pdf

Meuter,M.L., Ostrom, A.L., Roundtree, R.I.,& Bitner,M.J. (2000). "Self service technologies: Understanding customer satisfaction with technology-based service encounters". Journal of Marketing, Vol.64, pp 5064.

Orr, W. (1999). "ABAecom poised for e-commerce growth". ABA Banking Journal, 91(10), pp 8488.

Palvia, S., Palvia, P., & Zigli, R.M. (Eds.). (1992). "The global issues of information technology Management". Harrisburg, PA: Idea Group.

Pawar, R.S. (1992). "IT manpower in India: The burning issues: Information technology manpower". In S.C. Bhatnagar (Ed.), Key issues for developing countries (pp. 719).: Tata McGraw- Hill, New Delhi.

Raihan A. (2001). "Computerization and Information Technology in Banking sector: Hindrances and Remedies." Bank Parikrama, Vol. 26 No. 1, March 2001 p-95.

Stamoulis, D., Panagiotis, K., & Drakoulis, M. (2002). "An approach and model for assessing the business value of e-banking distribution channels: Evaluation as communication". International Journal of Information Management, Vol. 22, pp 247261.

Suh, B., & Han, I. (2002). "Effect of trust on customer acceptance of Internet banking". Electronic Commerce Research and Applications.

http://www.rbi.org.in/Scripts/Bs_viewRTGS.aspx assessed on October 08, 2012

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Structural capital: Concept and its Application in Service Sector of India with Special Reference to Banking and Reality Sector

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Intellectual capital constitutes Human Capital, Structural Capital & Relational Capital. Structural capital is the supportive infrastructure, processes and databases of the organization that enable the human capital to function (Maddocks, 2002). Because of its diverse components, structural capital can be classified further into organization, process and innovation capital. Organizational capital includes the organization philosophy and systems for leveraging the organization's capability. Process capital includes the techniques, procedures, and programs that implement and enhance the delivery of goods and services. Innovation capital includes intellectual properties and intangible assets (Edvinsson, 1997).

Structural Capital includes culture, spirit of firms, copyrights, trademarks, patents, internal databases; management processes (Seetharaman et al., 2004). Many other authors like Abdel Aziz, Ahmad Sharabati, Shawqi Naji Jawad, Nick Bontis, Yusuf Topal, M. Kemalettin , Conkar Mustafa Saudah Sofian, Mike Tayles, Richard Pike, Mark A. Youndt and Scott A. Snell have used questionnaires to identify the factors of structural capital which were read and analyzed and incorporated in this study.

After an in depth analysis of literature related to the subject a questionnaire was formulated. This questionnaire was circulated amongst the middle management level of the service sector and then analyzed using PASW. The reliability test was conducted, descriptives were calculated, levene's test and correlation was applied.

The author tries to find the relevant factors of structural capital for banking sector and reality sector. It was also analyzed if there is a difference in the private and public sectors banks with regard to structural capital. Also, the difference in structural capital in reality sector and banking sector was analyzed.

Keywords: Culture, Process and Internal Database.

INTRODUCTION

Structural capital is the supportive infrastructure, processes and databases of the organization that enable human capital to function (Maddocks, 2002). Structural capital includes such traditional things as buildings, hardware, software, processes, patents, and trademarks. In addition, structural capital includes such things as the organization's image, organization information system, and proprietary databases. Because of its diverse components, structural capital can be classified further into organization, process and innovation capital. Organizational capital includes the organization's philosophy and systems for leveraging the organization's capability. Process capital includes the techniques, procedures, and programs that implement and enhance the delivery of goods and services. Innovation capital includes intellectual properties and intangible assets (Edvinsson, 1997). Intellectual properties are protected commercial rights such as copyrights and trademarks. Intangible assets are all of the other talents and theory by which an organization is run.

LITERATURE REVIEW

Many researches have been conducted on the structural capital and have identified the various factors of structural capital; the effect of structural

capital on profitability, productivity etc. but this subject is relatively new for India. Thus, this was the motivation behind this paper. In order to understand the Indian perspective on the topic, literature on the subject was reviewed.

RESEARCH OBJECTIVES

- To identify the key factors of structural capital in service sector of India.
- To study the key characteristics and interrelationships among them that define structural capital concept.
- To do a comparative analysis of structural capital between private and public banks.
- To do a comparative analysis of structural capital in banking and reality sector.

HYPOTHESES

Accordingly, the following hypotheses were framed for the study:

HO1: There is no significant difference between different factors that contribute towards structural capital process in private and public sector banks.

HA1: There is significant difference between different factors that contribute towards structural capital process in private and public sector banks.

HO2: There is no relationship between different factors of structural capital concept.

HA2: There is relationship between factors of structural capital concept.

H03: There is no significant difference between different factors that contribute towards structural capital process in banking and reality sector.

HA3: There is significant difference between different factors that contribute towards structural capital process in banking and reality sector.

RESEARCH METHODOLOGY

It is not sufficient to rely only on the human capital but also emphasize on structural capital. Twelve of its characteristics were identified as follows:

System: This factor concentrates on whether organizations have systems and programs in place, like recruitment, succession training, and reward systems. A system refers to a detailed, step by step approach or process followed consistently throughout the organization all the time.

Research and Development: This factor assesses whether organizations invest in research and development. Research and development means searching for better methods, product- ideas and developing them into products, processes etc.

Intellectual Property Rights: This factor emphasizes if organizations invest in copyrights, trademarks etc.

Information System: It depicts whether organizations have strong information systems or not. Information system is a system by which information can be stored, retrieved and used.

Culture: Depicts if companies have positive culture. Culture refers to shared beliefs that people have about the organization.

Learning Organization: Assesses if organizations believe in learning from each other and knowledge sharing. A learning organization has a belief that the organization should never stop learning; it is an ongoing process that helps the organization improve and get better and better.

New Ideas: If companies promote suggestions from employees and develop new and better ideas and products. It means that there is an effort to promote new ideas.

Documentation: Whether companies documents

their knowledge. Everything should be documented so that it acts as ready made reference for future.

Strategy: Emphasizes if companies have a strategy in place. A strategy is a plan of action which is formulated keeping in mind the environment both internal and external, customers, marketing mix etc.

Communication: Are there open communication channels. Communication is significant for an organization, if there is lack of proper communication then the organization can never achieve its objectives.

Authority Responsibility: This factor focuses on if the job responsibility and roles are clearly defined. Does the company have a well defined hierarchy?

Participation: Means promoting democratic set up. It means all level employees are allowed to participate in the decision making.

Data Collection

The research design of the study categorizes service sector into five major areas i.e., banking, hotels, telecommunication, and realty and information technology. The questionnaire was distributed to 300 respondents personally and via mail, out of which 243 were returned hence the response rate was 81%. Random sampling method was used to collect the data. However, this paper concentrates on

a) 39 responses each from public and private sector banks.

b) 46 responses each from banking sector and reality sector.

Questionnaire

After an in-depth literature review a questionnaire containing 123 questions was formulated. The questionnaire had the following factors (containing various questions) taken from various researches:

Table 1: Conceptualization of Structural Capital	
Authors	Definitions of Structural Capital
(Alama, 2007)	Intangibles that determine the manner of working of a company.
(Carson et al. 2004)	Processes and procedures that arise from employee intellectual contribution.
(Ordoñez de Pablos, 2004)	Knowledge that remains in the organization when employees return to their homes and, therefore, is owned by the firm. In this sense, SC is integrated by organizational routines, strategies, process manuals and databases.
(CamisónZornosa et al. 2000)	Knowledge that the organization has internalized and that remains within its structure processes or culture although employees leave.
(Kogut& Zander, 1996)	Elements that belong to the organization and that facilitates its configuration as an entity providing coherence and superior principles for coordination.
(Euroforum, 1998)	Knowledge that can be reproduced and shared and, therefore, becomes somewhat explicit.
(Bontis, 1996)	Those technologies, methodologies and processes that make the functioning of the organization possible, this is, basically the elements that define the working mode of the firm.

Table 2: Constituents of Structural Capital		
Author Name	Year	Constituents of SC
Maddocks	2002	supportive infrastructure, processes and databases of the organization that enable human capital to function
Edvinsson	1997	Organization, process and innovation capital. Organizational capital includes the organization philosophy and systems for leveraging the organization's capability. Process capital includes the techniques, procedures, and programs that implement and enhance the delivery of goods and services. Innovation capital includes intellectual properties and intangible assets
Bontis	2000	mechanisms and organizational procedures which support the employees in completing their tasks, and includes all non-human storehouses of knowledge in organizations like databases, process manuals, routines, strategies, and anything whose value to the company is higher than its material value
Seetharaman et al.	2004	Cultural, spirit of firm, copyrights, trademarks, patents, internal databases, management processes
Lönnqvist	2004	Technologies, information systems, databases, processes, culture and values, management philosophy, patents, copyrights, trade secrets & other immaterial properties
Knight	1999	Organization's strategies, internal networks, systems, databases and files, as well as its legal rights to technology, processes, inventions, copyrights, trademarks, trade secrets, brands and licenses.
Saint-Onge, Hubert	1996	• Systems - the way in which an organization's processes (information, communication, decision making) and outputs (products/services and capital) proceed. • Structure - the arrangement of responsibilities and accountabilities that defines the position of and relationship between members of an organization. • Strategy - the goals of the organization and the ways it seeks to achieve them. • Culture - the sum of individual opinions, shared mindsets, values, and norms within the organization.

Table 3: Table showing variables and factors taken from various researches		
S.No.	Factor	Research
1.	System	Bontis 1998, Ali et.al 2010
2.	Research and Development	Bontis 1998
3.	Intellectual Property Rights	Bontis 1998
4.	Information System	Youndt and Snell 2004, Ali et.al 2010
5.	Culture	Ali et.al 2010
6.	Learning Organization	Ali et.al 2010
7.	New Ideas	Bontis 1998, Sofian et.al
8.	Documentation	Youndt and Snell 2004
9.	Strategy	Ali et.al 2010
10.	Communication	Organizational Culture Questionnaire by Human Factors International 2011
11.	Authority Responsibility	Organizational Culture Questionnaire by Human Factors International 2011
12.	Participation	Organizational Culture Questionnaire by Human Factors International 2011

Sample

Multistage Stratified Random Sampling was used. Data was gathered from Prowess. In all the five sectors top 3 companies were selected. Criterion of selection of the companies was Net Sales for March 2012 in Rs Million. Hence the companies selected are as follows:

Table 4: Organizations that are part of the study	
S. No.	Company/ Organization Name
1.	State Bank of India
2.	Punjab National Bank
3.	Canara Bank
4.	ICICI Bank Ltd.
5.	HDFC Bank Ltd.
6.	Axis Bank Ltd.
7.	Indian Hotels Co. Ltd.
8.	EIH
9.	Mahindra Holidays & Resorts India Ltd.
10.	Bharti Airtel Ltd.
11.	Reliance Communication Ltd.
12.	Idea Cellular Ltd.
13.	Jaypee
14.	DLF
15.	Omaxe Ltd.
16.	Tata Consultancy Services Ltd.
17.	Wipro Ltd.
18.	Infosys Ltd.

The idea was to collect 31 responses from each organization but it was not possible thus the detailed company wise response description is given in the next table.

Table 5: Table showing sample description based on companies in which respondents work				
Organisation				
	Frequency	Percent	Valid Percent	Cumulative Percent
ICICI	25	10.3	10.3	10.3
HDFC	20	8.2	8.2	18.5
Axis	13	5.3	5.3	23.9
SBI	31	12.8	12.8	36.6
PNB	30	12.3	12.3	49
Canara	21	8.6	8.6	57.6
Indian Hotels	17	7	7	64.6
Reliance	2	0.8	0.8	65.4
DLF	2	0.8	0.8	66.3
Wipro	10	4.1	4.1	70.4
Omaxe	13	5.3	5.3	75.7
Infosys	3	1.2	1.2	77
TCS	22	9.1	9.1	86
EIH	1	0.4	0.4	86.4
JAYPEE	31	12.8	12.8	99.2
Airtel	2	0.8	0.8	100
Total	243	100	100	

Table 6: Table showing sample description based on gender of respondents					
Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	187	77	77	77
	Female	56	23	23	100
	Total	243	100	100	

Data Analysis

Reliability Analysis: Cronbach alpha was computed using SPSS for all the factors and the entire questionnaire in order to test the internal consistency of the questions.

Table 7: Reliability Test		
S.No.	Name of construct	Value of Cronbach alpha
1.	System	0.809
2.	Research & Development	0.906
3.	Intellectual Property Rights	0.963
4.	Information System	0.879
5.	Culture	0.737
6.	Learning Organization	0.793
7.	New Ideas	0.931
8.	Documentation	0.806
9.	Strategy	0.569
10.	Communication	0.878
11.	Authority Responsibility	0.900
12.	Participation	0.912

The value of Cronbach alpha for all the above factors is more than 0.7 except in case of strategy. Hence, there is internal consistency in all the factors except in the factor strategy.

Descriptives

The descriptive analysis was conducted using SPSS for both private and public banks and the following results were found:

Table 8: Table showing sample description based on banks in which respondents work

Organisation

Organization					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	ICICI	13	16.7	16.7	16.7
	HDFC	13	16.7	16.7	33.3
	Axis	13	16.7	16.7	50
	SBI	13	16.7	16.7	66.7
	PNB	13	16.7	16.7	83.3
	Canara	13	16.7	16.7	100
	Total	78	100	100	

So, from each bank we have taken 13 respondents each. Total 39 responses are from private banks and 39 responses are from public banks.

a) **Comparison of public and private sector banks**

The above table depicts that Information System is the most important factor of structural capital for private banks. After Information System, Culture and Authority and Responsibility are

Table 9: Table showing mean and standard deviation of all factors of structural capital for private and public banks					
PRIVATE SECTOR BANKS			PUBLIC SECTOR BANKS		
Factor	Mean	Standard Deviation	Factor	Mean	Standard Deviation
System	3.92	0.923	System	3.93	0.916
Research and Development	3.86	0.873	Research and Development	3.93	0.860
Intellectual Property Right	3.52	0.719	Intellectual Property Right	3.12	0.884
Information System	4.15	0.765	Information System	4.31	0.758
Culture	3.99	0.755	Culture	4.09	0.792
Learning Organization	3.95	0.789	Learning Organization	4.11	0.797
Documentation	3.57	0.901	Documentation	3.89	0.909
Strategy	3.1	1.174	Strategy	3.64	1.031
Communication	3.95	0.829	Communication	4.03	0.802
Authority Responsibility	3.97	0.713	Authority Responsibility	4.07	0.778
Participation	3.85	0.770	Participation	3.87	0.865
New Ideas	3.68	0.845	New Ideas	3.73	0.963

the most important factors of structural capital for private banks. As noticed, while taking the responses, Intellectual Property Rights is a factor which is not applicable to banking sector especially as they have to follow the Banking Regulations Act and they do not focus on Intellectual Property Rights. Also, it shows that Learning Organization, Communication, Research and Development and Participation are important factors of structural capital in private banks. On the other hand, Strategy, Intellectual Property Rights, Documentation and New Ideas are less important factors for private sector banks as their mean value varied between 3 to 3.7. Maximum variability is noticed in the responses of Strategy, System and Documentation. Minimum variability was noticed in the responses of Authority Responsibility, Intellectual Property Rights, Culture, and Information System.

The table above shows that mean value is highest for Information System (4.15) for private banks while the mean value is highest for Information System (4.31) in public sector banks. The lowest mean value for private sector bank is of strategy (3.1) and that for public sector bank is that of Intellectual Property Rights (3.12). Second highest mean value for private sector bank is that of Culture (3.99). Second highest mean value for public sector bank is that of Learning Organization (4.11).Authority Responsibility has the third highest mean value for private banks of 3.97 while Culture has the third highest mean value for public sector banks of 4.09. Incase of public sector banks five factors have mean value of more than 4 i.e. Information System, Learning Organization, Culture, Authority Responsibility and Communication while in case of private banks only one factor has mean value of more than 4 i.e. Information System.

Minimum variability is observed in the responses for the factor Authority Responsibility (0.713) in case of private sector

banks and incase of public sector banks, minimum variability is observed in the responses for the factor Information System (0.758). Maximum variability is observed in the responses of factors Strategy (1.174, System (0.923) and Documentation (0.901) in case of private banks while in case of public sector banks maximum variability is observed in the responses of the factors Strategy (1.031), New Ideas (0.963) and Documentation (0.909).

HYPOTHESIS TESTING

The T-test examines the difference in mean values of the (twelve) variables among two groups (private and public banking sector organizations) and calculates the probability that the observed difference in mean results from sampling error alone. Table 11 of independent sample t-test compared twelve aspects of Structural Capital and total SC of the two sectors. The results in Table 10 indicated that there was no significant difference in mean score of private and public banking sector employees overall SC score. Hence, H01 is accepted. Table 11 indicates that there was no significant difference in the mean scores of private and public sector organization among any of the structural capital factors.

For second hypothesis testing bivariate pearson correlation (Table 12) was used. It was found that all aspects of Structural Capital were highly positively correlated with each other except Intellectual Property Rights and Strategy, as we have already seen that bank employees feel Intellectual Property Rights has no role to play in banks and also the reliability of strategy is very low. Correlation between all the factors and Intellectual Property Rights variates from 0.231 to 0.391(low) and that between all the other factors and strategy variates from 0.135 to 0.436 (low). Also, correlation between Information System and New Ideas is 0.456 and that between Information System and Documentation is 0.469. The correlation between documentation and culture is 0.493. The correlation amongst all the other factors is greater than 0.501.

Table 10: T-Test Result for overall SC score for public and private sector banks					
	Levene's Test for Equality of Variances				
	F	Sig.	t	Df	Sig. (2-tailed)
Sc	Equal variances assumed	1.122	0.293	-0.923	76	0.359
	Equal variances not assumed			-0.923	73.884	0.359

Table 11: T-Test Result for SC factors for public and private sector banks					
	Levene's Test for Equality of Variances				
	F	Sig.	t	Df	Sig. (2-tailed)
System	Equal variances assumed	0.058	0.811	-0.564	76	0.574
	Equal variances not assumed			-0.564	75.954	0.574
Research and Development	Equal variances assumed	0	0.998	-0.479	76	0.633
	Equal variances not assumed			-0.479	75.781	0.633
Intellectual Property Rights	Equal variances assumed	0.053	0.818	2.744	76	0.008
	Equal variances not assumed			2.744	71.324	0.008
Information System	Equal variances assumed	4.846	0.031	-1.332	76	0.187
	Equal variances not assumed			-1.332	73.951	0.187
Culture	Equal variances assumed	3.41	0.069	-0.935	76	0.353
	Equal variances not assumed			-0.935	72.149	0.353
Learning Organization	Equal variances assumed	0.608	0.438	-1.278	76	0.205
	Equal variances not assumed			-1.278	75.999	0.205
New ideas	Equal variances assumed	1.79	0.185	0.01	76	0.992
	Equal variances not assumed			0.01	73.941	0.992
Documentation	Equal variances assumed	0.956	0.331	-1.866	76	0.066
	Equal variances not assumed			-1.866	75.577	0.066
Strategy	Equal variances assumed	3.401	0.069	-2.81	76	0.006
	Equal variances not assumed			-2.81	71.844	0.006
Communication	Equal variances assumed	0.282	0.597	-0.614	76	0.541
	Equal variances not assumed			-0.614	75.675	0.541
Authority Responsibility	Equal variances assumed	2.036	0.158	-0.81	76	0.42
	Equal variances not assumed			-0.81	75.132	0.42
Participation	Equal variances assumed	2.275	0.136	-0.15	76	0.881
	Equal variances not assumed			-0.15	73.269	0.881

Table 12: Correlation													
Correlations													
		system	rd	ip	is	culture	lo	ni	doc	strategy	com	ar	par
System	Pearson Correlation	1	.799	.311	.584	.510	.575	.567	.501	.316	.623	.567	.481
	Sig. (2-tailed)		.000	.006	.000	.000	.000	.000	.000	.005	.000	.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Research and Development	Pearson Correlation	.799	1	.390	.668	.556	.654	.671	.522	.372	.623	.595	.583
	Sig. (2-tailed)	.000		.000	.000	.000	.000	.000	.000	.001	.000	.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Intellectual Property Rights	Pearson Correlation	.311	.390	1	.264	.199	.315	.380	.231	.135	.298	.314	.394
	Sig. (2-tailed)	.006	.000		.019	.081	.005	.001	.042	.240	.008	.005	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Information System	Pearson Correlation	.584	.668	.264	1	.567	.510	.456	.469	.378	.363	.509	.376
	Sig. (2-tailed)	.000	.000	.019		.000	.000	.000	.000	.001	.001	.000	.001
	N	78	78	78	78	78	78	78	78	78	78	78	78
Culture	Pearson Correlation	.510	.556	.199	.567	1	.635	.559	.493	.270	.568	.586	.525
	Sig. (2-tailed)	.000	.000	.081	.000		.000	.000	.000	.017	.000	.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Learning Organization	Pearson Correlation	.575	.654	.315	.510	.635	1	.725	.681	.349	.654	.700	.673
	Sig. (2-tailed)	.000	.000	.005	.000	.000		.000	.000	.002	.000	.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
New Ideas	Pearson Correlation	.567	.671	.380	.456	.559	.725	1	.741	.379	.756	.769	.838
	Sig. (2-tailed)	.000	.000	.001	.000	.000	.000		.000	.001	.000	.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Documentation	Pearson Correlation	.501	.522	.231	.469	.493	.681	.741	1	.436	.661	.622	.711
	Sig. (2-tailed)	.000	.000	.042	.000	.000	.000	.000		.000	.000	.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Strategy	Pearson Correlation	.316	.372	.135	.378	.270	.349	.379	.436	1	.241	.295	.316
	Sig. (2-tailed)	.005	.001	.240	.001	.017	.002	.001	.000		.034	.009	.005
	N	78	78	78	78	78	78	78	78	78	78	78	78

Correlations													
		system	rd	ip	is	culture	lo	ni	doc	strategy	com	ar	par
Communication	Pearson Correlation	.623	.623	.298	.363	.568	.654	.756	.661	.241	1	.808	.826
	Sig. (2-tailed)	.000	.000	.008	.001	.000	.000	.000	.000	.034		.000	.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Authority Responsibility	Pearson Correlation	.567	.595	.314	.509	.586	.700	.769	.622	.295	.808	1	.790
	Sig. (2-tailed)	.000	.000	.005	.000	.000	.000	.000	.000	.009	.000		.000
	N	78	78	78	78	78	78	78	78	78	78	78	78
Participation	Pearson Correlation	.481	.583	.394	.376	.525	.673	.838	.711	.316	.826	.790	1
	Sig. (2-tailed)	.000	.000	.000	.001	.000	.000	.000	.000	.005	.000	.000	
	N	78	78	78	78	78	78	78	78	78	78	78	78

b) Comparison of banking sector and reality sector

Table 13: Table showing mean and standard deviation of all factors of structural capital for banking and reality sector					
Banking Sector			Reality Sector		
Factor	Mean	Standard Deviation	Factor	Mean	Standard Deviation
System	3.88	0.973	System	3.43	0.835
Research and Development	3.88	0.868	Research and Development	3.70	0.839
Intellectual Property Rights	3.40	0.728	Intellectual Property Riights	3.52	0.705
Information System	4.20	0.809	Information System	3.72	0.715
Culture	4.03	0.777	Culture	3.55	0.741
Learning Organization	4.04	0.807	Learning Organization	3.84	0.592
Documentation	3.74	0.978	Documentation	3.55	0.756
Strategy	3.16	1.183	Strategy	3.58	0.778
Communication	4.02	0.849	Communication	3.78	0.695
Authority Responsibility	4.05	0.775	Authority Responsibility	3.79	0.737
Participation	3.89	0.780	Participation	3.67	0.695
New Ideas	3.69	0.915	New Ideas	3.65	0.743

The above table depicts that Learning Organization is the most important factor of structural capital for reality sector. After Learning Organization, Authority Responsibility and Communication are the most important factors of structural capital for reality sector. Also, it shows that Information System and Research and Development are important factors of structural capital in reality sector. On the other hand, System, Intellectual Property Rights, Documentation and Culture are less important factors for reality sector as their mean value variated between 3.50 to 3.56. Maximum variability is noticed in the responses of Research and Development and System. Minimum variability was noticed in the responses of Learning Organization, Communication and Participation.

The table above shows that mean value is highest for Learning Organization (3.84) for reality sector while the mean value is highest for Information System (4.20) for banking sector. The lowest mean value for reality sector is of system (3.43) and that for banking sector is that of strategy (3.16). Second highest mean value for reality sector is that of Authority Responsibility (3.79). Second highest mean value for banking sector is that of Authority Responsibility (4.05). Communication has the third highest mean value for reality sector of 3.78 while Learning Organization has the third highest mean value for banking sector of 4.04. Incase of banking sector five factors have mean value of more than 4 i.e. Information System, Authority Responsibility, Learning Organization, Culture and Communication while in case of reality sector none of the factors has mean value of more than 4.

Minimum variability is observed in the responses for the factor Learning Organization (0.592) in case of reality sector and incase of banking sector minimum variability is observed in the responses for the factor Intellectual Property Rights (0.728). Maximum variability is observed in the responses of factor Research and Development (0.839) in case of reality sector while in case of banking sector maximum variability is observed in the responses of the factors Strategy (1.183).

The T-test examines the difference in mean values of the (twelve) variables among two groups (banking sector and reality sector) and calculates the probability that the observed difference in mean results from sampling error alone. Table 15 of independent sample t-test compared twelve aspects of Structural Capital and total SC of the two sectors. The results in Table 14 indicated that there is significant difference in mean score of banking and reality sector employees overall SC score. Hence, HA3 is accepted and H03 is rejected. Looking at the group statistics table tells us that mean value of structural capital of banking sector (3.84) is greater than that of reality sector (3.65). Table 15 indicates that there was significant difference in the mean scores of eight factors of structural capital i.e., system, information system, culture, learning organization, strategy, communication, authority responsibility and participation. Looking at the group statistics table tells us that mean value for system is greater for banking sector (3.89) than that of reality sector (3.47). Mean value for information system is greater for banking sector (4.20) than that of reality sector (3.72). Mean value for strategy is greater for reality sector (3.58) than that of banking sector (3.20). Mean value for culture, learning organization, communication, authority responsibility and participation is also greater for banking sector rather than reality sector.

SUMMARY AND FINDINGS

In today's competitive environment, banks have become all the more about the importance of

HYPOTHESIS TESTING

Table 14: T-Test Results for overall SC Score for reality and banking sector					
	Levene's Test for Equality of Variances				
	F	Sig.	t	Df	Sig. (2-tailed)
Equal variances assumed	10.826	0.001	2.397	90	0.019
Equal variances not assumed			2.397	73.028	0.019

Table 15: T-Test Result for SC Factors score for reality and banking sector						
		Levene's Test for Equality of Variances				
		F	Sig.	t	Df	Sig. (2-tailed)
System	Equal variances assumed	3.805	0.054	4.312	90	0
	Equal variances not assumed			4.312	78.926	0
Research and Development	Equal variances assumed	1.251	0.266	1.419	90	0.159
	Equal variances not assumed			1.419	88.065	0.159
Intellectual Property Rights	Equal variances assumed	2.698	0.104	-1.096	90	0.276
	Equal variances not assumed			-1.096	88.044	0.276
Information System	Equal variances assumed	15.732	0	5.105	90	0
	Equal variances not assumed			5.105	77.124	0
Culture	Equal variances assumed	11.018	0.001	6.407	90	0
	Equal variances not assumed			6.407	80.819	0
Learning Organizations	Equal variances assumed	11.285	0.001	2.043	90	0.044
	Equal variances not assumed			2.043	73.416	0.045
New Ideas	Equal variances assumed	15.795	0	0.872	90	0.385
	Equal variances not assumed			0.872	64.63	0.386
Documentation	Equal variances assumed	10.338	0.002	1.281	90	0.204
	Equal variances not assumed			1.281	75.887	0.204
Strategy	Equal variances assumed	23.032	0	-3.216	90	0.002
	Equal variances not assumed			-3.216	65.028	0.002
Communication	Equal variances assumed	11.961	0.001	2.216	90	0.029
	Equal variances not assumed			2.216	75.15	0.03
Authority Responsibility	Equal variances assumed	1.388	0.242	2.526	90	0.013
	Equal variances not assumed			2.526	83.839	0.013
Participation	Equal variances assumed	9.615	0.003	2.322	90	0.022
	Equal variances not assumed			2.322	68.203	0.023

structural capital and are applying its model for their customers as well as for the society's benefit. Human Capital runs for greener pastures and hence, it becomes significant to have systems in place. Based on the analysis, following are the findings:

1. There was no significant difference in mean score of private and public banking sector employees overall SC score.

2. There was no significant difference in the mean scores of any of the factors of structural capital for private and public sector organization.

3. All aspects of Structural Capital were highly positively correlated with each other except Intellectual Property Rights and Strategy. Also, correlation between Information System and New Ideas is low and that between Information System and Documentation is also low. The correlation between documentation and culture is also low. The correlation amongst all the other factors is greater than 0.501.

4. There was significant difference in mean score of banking and reality sector overall SC score.

5. There was significant difference in the mean scores of eight factors of structural capital i.e., system, information system, culture, learning organization, strategy, communication, authority responsibility and participation

6. The mean value for banking sector is greater than that of the reality sector for the factors system, information system, culture, learning organization, communication, authority responsibility and participation.

7. The mean score for reality sector is greater than that of banking sector for the factor strategy.

CONCLUSION AND FUTURE AREAS OF WORK

To conclude, the data supports that private and public sector banks do not award different values to different factors of structural capital. Also, reality sector and banking sector have different opinions for different factors of structural capital.

RECOMMENDATIONS

Structural Capital is an important concept for both banking and reality sector; although the analysis highlights that the different sectors might award different significance to different factors of structural capital. Strategy is a factor which does not

have great significance attached to it in banking sector but it should be given due importance by the banking sector. Reality does not give as much importance to system, culture, learning organization, communication and authority and responsibility but it should. Reality sector gives strategy much more importance than does banking, thus, banking should give more importance to strategy.

REFERENCES

Alama, E.M. (2007). Intellectual capital and business performance in professional service firms in Spain, Doctoral Thesis, Complutense University of Madrid.

Bontis, Nick, (1996)There's a Price On Your Head: Managing Intellectual Capital Strategically, Business Quarterly, Vol 60 No. 4, p. 40-47.

Bontis, Nick (1998). Intellectual capital: an exploratory study that develops measures and models". Management Decision, Vol. 36 Iss: 2, 63 76.

Bontis, N., Chúa, W.C, and Richardson. (2000). Intellectual capital and business performance in Malaysia industries. Journal of Intellectual Capital, 1(1), 85-100.

CamisónZornosa C., Palacios Marqués D. and DeveceCarañana C. (2000). The model of measuring intellectual capital in the enterprise: Nova Model. In Internet: http://www.gestiondelconocimiento.com.(Julio 2002).

Carson, E.; Ranzijn, R., Winefield, A., and Marsden, H. (2004). Intellectual Capital. Mapping Employee and Work Group Attributes. Journal of Intellectual Capital, 5, p443.

Edvinsson, L. (1997). Developing Intellectual Capital al Skandia.Longe Range Planning, (30), 336-373.

Euroforum (1998). Intellect Project, Measuring Intellectual Capital, University Institute Euroforum Escorial, Madrid, Spain.

Knight, Daniel J., Performans Measures For Increasing Intellectual Capital, Planning Review, 27 (2) Mar/ Apr. 1999.

Kogut, B. and Zander, U. (1996). What firms do? Coordination, identity and learning.Organization Science, 3, 383-397.

Lönnqvist, A. (2004) Measurement of Intangible Success Factors: Case Studies on the Design, Implementationand Use of Measures. (Doctoral dissertation) Tampere University of Technology. Publication 475. Tampere.

Maddocks, J. and Beaney, M. (2002). See the invisible and intangible. Knowledge Management, March, 16-17.

Ordóñez de Pablos, P. (2004). Organizational structural capital as a source of corporate competitiveness indicators study of industrial economics.Industrial Economics, 357, 131-140.

Saint-Onge, Hubert, Tacit Knowledge: The Key To The Strategic Alignment Of Intellectual Capital, Planning Review, 24 (2) Mar/ Apr. 1996, p. 10-14.

Sofian, Saudah and Tayles, Mike and Pike, Richard (2006) The implications of intellectual capital on performance measurement and corporate performance. Jurnal kemanusiaan (8). pp. 13-24.

Seetharaman, A., Lock Teng Low, K. and Saravanan, A.S. (2004) "Comparative justification on intellectual capital", Journal of Intellectual Capital, Vol 5 No 4, pp. 522-539.

Youndt, M.A., Subramaniam, M.,& Snell, S.A.2004, Intellectual Capital Profiles: An examination of investments and returns. Journal of Management Studies, 41, 335-362.

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A Portray of Indian Retail Industry:
Changing Facets and Global Competitiveness

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Indian retail industry is an age old pillar of Indian economy, with the continuously changing facets. Over a period of time a big transition has taken place in this industry. Various factors such as increasing disposable income, rapid urbanization, changing FDI climate and mushrooming middle class have created favorable environment for the organized retail to flourish and grow. Viewing the future growth prospects, many of the big business players have entered in the Indian retail industry. This has given birth to large number of new retail formats like super markets, hyper markets, department stores and shopping malls etc. Even the foreign retail giants are also making their ways to enter into India's almost untapped retail market. Although Indian retail has touched great heights over a period of time, still there is long journey to travel. This sunrise sector of India is still at a nascent stage of its development cycle. The unexploited Indian retail backed by supportive growth factors provides huge scope for new entrants. The International consulting firm A.T. Kearney's global retail development index (2013) that compared 30 emerging countries has ranked India as 14th most attractive market for global players to invest in. Thus Indian retail market is the minimal explored market with the right platform to play the retail game.

Keywords: FDI, Indian retail, Retail formats.

INTRODUCTION

Indian retail industry is an age old pillar of Indian economy, with the continuously changing facets. Over a period of time a big transition has taken place in this industry. Once there was a time when weekly markets and village fairs (melas) used to be the place of exchange. Afterwards there was an evolution of the popular concept of neighborhood Kirana stores. Emergence of Government backed Public Distribution System (PDS) and Khadi stores happened thereafter. Soon company owned exclusive outlets like Bombay dyeing, Liberty, and Titan etc. came into existence. In the last decade or so, entire scenario got changed with the entry of gigantic players in the retail sector. This big bang entry of the big players gave birth to large number of new retail formats like super markets, hyper markets, department stores and shopping malls etc. Future group controlled by Mr. Kishore Biyani and the Reliance group headed by Mr. Mukesh Ambani are the two big retail giants of India who have given a new life to the Indian retail industry. Future group has around 800 stores in various formats with a total retail space of 16.30 million square feet (Pantaloon Retail (I) Limited: Q2 / H 1 FY 2012 report). It has registered the net sale of 12212 crores for the year 2010-11 (PRIL annual report: 2010-11). Reliance group has 1300 stores across different formats (Reliance Industries Ltd.: Quarterly report, March 31, 2012) and registered Rs. 7599 crores of revenue for the financial year 2011-12 (The Times of India,

June 7, 2012). The company's membership program 'Reliance One' covers around 9 million members (Reliance Industries Ltd.: Quarterly report as on 31st March 2012). In addition to these, Raheja, Birla and Tata group are the other Indian players that have big hand in revamping the Indian retail industry. Raheja group, under the ownership of retail wing Shoppers stop Ltd. has around 250 stores across brands and formats (Annual report, 2011-12). Such a great expansion of Indian retailers within a short span of time itself highlights the growth potential of Indian retail sector. Table 1 provides a brief overview of India's major retail players.

Indian retail has become so fascinating that not only local investors but also investors from all over the world have become highly interested in it. The market size of Indian retail has been estimated in the range of US$ 350 billion to US$470 billion in the year 2011 by various research agencies. Pricewaterhouse Coopers (PwC) report (Oct. 2011) estimated Indian retail at US$ 350 billion, Deloitte report (2011) put it as US$ 396 billion, A.T. Kearney report (2011) measured the size as around 435 billion and Technopak (2011) put the retail market size as US$ 470 billion. Indian retail market has become Asia's 3rd largest retail market after China and Japan (PwC report, 2011). Contribution of Indian retail towards GDP is around 10% to 12% (Economic survey report, 2010-11). Its contribution towards employment is around 8%. Indian retail industry is gradually taking its steps towards growth. This growth of Indian retail is largely driven by factors like high potential for penetration into urban and rural markets, demographic changes which include more working women, increase in disposable income, increase in number of nuclear families, more spread of education, higher income with youth, change in life style, steady economic growth and growth of middle class segment.

All these changes in consumer profile have given birth to a more empowered, demanding and smarter consumers. Now meaning of shopping has altered

for the consumer. For today's consumer, shopping is much more than just buying the commodity. It has become a leisure activity too. Hence, definition of retailer has also got broadened. Earlier retailer was seen as a person who buys goods in bulk and sells it to consumer in smaller quantity. They were just defined as a middleman who serves as a link between manufacturer and the consumer. But because of increasing customer expectations, retailers have expanded their scope of services. Now a day's retailers are not only supposed to provide basic goods or services but they are expected to sell the total shopping experience to the consumer. All the amenities such as convenient location, parking facility, polite sales personnel, good ambience, credit facility and easy purchase through displays; jointly forms a total shopping experience. This total shopping experience package may differ from retailer to retailer depending upon their positioning strategies and customer to customer depending upon their perceptions. BMI Q1 2012 report revealed that enhancement of middle and upper class consumer base would provide huge opportunities for retail development in Tier II and Tier III cities as well.

STRUCTURE OF INDIAN RETAIL

Way-back in earlier times, Indian retail was confined only to Kirana stores, but now it has become multi facet. Infusion of new blood by organized players has brought several new formats to the Indian retail industry. A brief overview of commonly found formats is given in table 2.

Foreign Players Eying on Indian Retail Industry

India's almost untapped retail market has made the foreign retail giants eager to enter into Indian retail industry. Franchising is most widely used entry route opted by international retailers such as Baskin Robin's, McDonald's, Nike etc. to step into India. Keeping in mind the necessity of foreign investment for the growth of retail sector, Indian Government

has also taken series of steps to open up FDI restrictions. In the year 1997, it allowed foreign investment up to 100% in cash and carry (wholesale) format under the Government approval route. Then to further liberalize the rules, the Government in the year 2006, lifted the restriction of Government approval and allowed the investments through automatic route in cash and carry format. In addition to it, Government also gave permission to foreign investors to invest up to 51% in single brand retail. Due to these liberalized norms we can see the presence of various international retailers such as Mango, Reebok, Sony, Carrefour, Bharti-Walmart etc.

A year back the Government has framed new policy to allow 100% FDI in single brand retailing with a constraint that 30% sourcing must be local (The Economic Times, Jan 14, 2012). It was a positive sign for retailers dealing in single brand only. To grab this opportunity IKEA, a Swedish furniture giant has come forward with its proposal to invest 1.5 billion Euros (10500 crores INR) in India. Its plan is to set up 25 single brand furniture retail stores. The company has planned to invest in two phases. At first it would invest 600 million Euros (around 4200 crores INR) and then additional 900 euro (around 6300 crores INR) will be invested later on. (The Financial Express, June 23, 2012).

To boost the growth rate of Indian retail, Indian Government had been making efforts to open up FDI in multiple brand retailing too for the last few months. Finally after long drawn discussions, Government has succeeded in opening up of FDI up to the limit of 51%. Keeping in mind the interest of Indian country, multi-brand retailing decision is embedded with certain regulatory conditions. As per the rules, foreign players are required to have investment of minimum $100 million and they are supposed to invest 50% of the total FDI in backend infrastructure within the initial three years of investment. Furthermore similar to the single brand retailing condition, they are required to source 30% of products from Indian small scale industries. The

government has also stated condition of compulsory approval from state Government At present foreign investors are kept out of e-commerce retailing. Though restricted, yet opening of doors for foreign investors in multi-brand would provide ample investment opportunities for global retailers who have been waiting to invest in India. This would further shoot up the growth of organized retail and enhance the level of competition too.

UN-EXPLOITED NATURE OF INDIAN RETAIL IN COMPARISON TO GLOBAL COUNTERPARTS

Although Indian retail has touched great heights over a period of time, still there is long journey to travel. This sunrise sector of India is still at a nascent stage of its development cycle. Growth of Indian organized retail is least among BRICS (Brazil, Russia, India, China, and South Africa) nations. As per IBEF (India Brand Equity Foundation) report (2010), the growth of organized retail in India is just 5 percent, lowest compared to Brazil (36%), Russia (33%) and China (20%). The growth of organized share is also very high in South Africa that is 67% (Asipac report, 2010). Fig. 1 represents organized retail share of BRICS nations.

Brazil, Russia, China and South Africa are among those countries who have allowed 100% FDI even in multiple brand retailing. This is the major growth factor due to which organized retail flourished there with a great pace. As far as India is concerned, it has just announced the opening up of FDI in multiple brand retailing. It has yet to taste that growth and expansion. If we compare India's growth of organized retail sector with the developed nations it is far behind. In developed countries, the penetration of organized retail is as high as around 80% or even more. The share of organized retail in France is 80% and in US is 85% (IBEF report, 2010). The low penetration of organized retail in India as compared

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to other nations clearly indicates the growth opportunities available in Indian market for the retailers.

In India organized retail is just the story of few past years. Indian players have just started their journey in this direction. If we look at the world's top 250 retailers (on sales basis), India has no place in it. The list contains several retailers from the BRICS nations other than India.

Table 3 highlights the BRICS nations that have their retailers in the world's list of top 250 retailers.

The absence of Indian retailers from the world top list highlights the unexploited nature of Indian retail sector. In fact till the year 2006 no retailer from entire Asia pacific region was there in the world's top 250 retailers list, but with in a short span of time, 5 retailers from China alone are there in world's top list. Among BRICS nations, maximum numbers of retailers are from South Africa.

The unexploited Indian retail backed by supportive growth factors provides huge scope for new entrants. The International consulting firm, A.T. Kearney, in its global retail development index (2014) that compared 30 emerging countries, has ranked India as 20th most attractive market for global players. Table 4 provides the list of top 10 attractive markets as per A. T. Kearney Index 2012.

The A.T. Kearney report (2012) highlighted that India's strong macroeconomic factors such as GDP growth rate, increasing disposable income, rapid urbanization, changing FDI climate, mushrooming middle class are the key reasons that have made Indian retail sector young and attractive.

Share of private consumption, an important factor influencing the retail growth is highest in India (58%) as compared to Japan (57%) and China (39%). In developed country like USA the share is as high as around 70% (Technopak, 2011).

The satisfactory GDP growth rate around 7.2% as compared to Brazil 2.7%, Russia 4.3%, China 9.2%, Japan -0.7%, US 1.7% and UK 0.7% (CIA world fact book-2011 est.), represents the country's overall potential for the growth of any trade. Moreover India has large base of young population with median age of 23 against the world's median age of 35 (IBEF report, 2010). A large base of 500 million people who are young below 25 and independent, have created positive growth environment for retail in India. In addition to it, vast base of around 300 million people in middle class segment which is almost equivalent to entire US population has made it even more attractive to global eyes (NCAER, 2005; PwC, Oct. 2011).

CONCLUSION

Based on the above facts and discussion, it can be clearly stated that Indian retail market is the minimal explored market with the right platform to play the retail game. Marketers can try their fates to exploit this potential gold mine. The only thing they need is to understand the roots of this market that is the Indian consumers. They should be aware about the consumer preferences and requirements. As today's consumer is very smart and demanding, retailers are required to match the ever increasing consumer's expectations. To survive in Indian dynamic and competitive retail market, retailer should proactively frame the marketing strategies to please the Indian consumers.

REFERENCES

Asipac. (2010). Trading densities of organized retail formats. Retrieved from www.asipac.com/download.php?file...Study...Jan2010.pdf&fl=1

A.T. Kearney. (2012). Global retail expansion: Keeps on moving: Global retail development index. Retrieved from http://www.atkearney.com/ consumer-products -retail/ global-retail-development-index/ full-report/ -asset_ publisher/ oPFrGkbIkz 0 Q / content/ global-retail-development-index / 10192

A.T. Kearney. (2014). Full Steam Ahead for Global Retailers. Retrieved from www.atkearney.com/ consumer-products-retail-development-index/ full-report.

Business Monitor International. (2011, Dec.). India Retail Report Q1 2012. Retrieved from http://www.marketresearch.com/ Business-Monitor-International-v304/ BMI-India-Retail-Q1-6717054/ .

CIA- The world fact book. (2012, June). Retrieved from https://www.cia.gov/ library /publications/ the-world-factbook/ index.html.

Deloitte. (2011, Sept.). Indian retail market embracing a new trajectory. Retrieved from www.deloitte.com/ assets/ Dcom-India/ .../ Indian_Retail_Market.pdf.

Deloitte report. (2012). Switching channels: Global power of retailing. Retrieved from https://www.deloitte.com/ assets/ Dcom-lobal/ Local%20Assets/ Documents/ Consumer%20Business/ dtt_CBT_GPRetailing2012.pdf.

Economic survey report. (2010-11). Retrieved from http:// indiabudget.nic.in/ es2010-11/ echap-10.pdf

IBEF. (2010, April). Retail. Retrieved from www.ibef.org.

ICRIER. (2008). Impact of organized retailing on the unorganized sector. Working Paper No. 222. Retrieved from www.icrier.org/ page.asp?Menu ID=24&SubCatId= 175...258.

NCAER. (2005). The great Indian middle class. Retrieved from http: //www.ncaer.org/ Downloads/ Publications Catalogue.pdf.

Pantaloon Retail India Limited. (2011). Annual report (2010-11). Retrieved from www.pantaloonretail.in/ pdf/ PRIL_annual_Report_2010-11.pdf.

PricewaterhouseCoopers (PwC). (2011,Oct.). Winning in India's retail sector- Factors for success. Retrieved from www.pwc. com / in/ en/ assets/ pdfs/ rc-publications/ WinningSector.pdf.

PRIL (Pantaloon Retail India Limited). (2011). Annual report (2010-11). Retrieved from www.pantalooretail.in/ pdf/ PRIL_annual_Report_2010-11.pdf.

PwC. (2011). Strong and steady 2011 outlook for the retail and consumer products sector in Asia. Retrieved from www.Pwccn.com.

Reliance India Ltd. (2012, March 31). Quarterly report. Retrieved from www.ril.com/ downloads/ pdf/ PR20042012.pdf.

Shoppers Stop Limited. (2012). Annual report 2011-12. Retrieved from http:/ / corporate.shoppersstop.com/ investors/ annual-report.aspx.

Sinha, P. K., Mathew, E., & Kansal, A. (2005). Format Choice of Food and Grocery Retailers (W.P. No. 2005-07-04), Ahmedabad, India: Indian Institute of Management.

Tata Group. (2012). Brochure. Retrived from www.tata.com/ pdf/ Tata_Group Brochure .pdf.

Technopak. (2011). Emerging trends in Indian retail and consumer. Retrieved from http:// www.technopak.com/ resources/ retail/ Emerging%20Trends %20in%20Indian% 20Retail%20and%20Consumer-2011.pdf.

The Economic Times. (2012, Jan 14). FDI in retail: Riders in FDI policy to delay investment from single-brand retail chains. Retrieved from http:// articles . economictimes.indiatimes.com/ 2012-01-14/ news/ 30627664_1_single-brand-product-retail-trading-single-brand-fdi.

The Financial Express. (2012, June 23). Retrieved from http://www.financial express.com/ news /ikea-plans-to-invest-r10500-cr-in-india/ 965703/

The Times of India. (2012, June 7). Reliance retail aims to clock Rs 50,000 crore revenue in 3-4 years. Retrieved from http://timesofindia.indiatimes.com/ business/ india-business/ Reliance-Retail-aims-to-clock-Rs-50000-crore-revenue-in-3-4-years/ articleshow/ 13899311.cms

BIOGRAPHY

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Table 1: A glance at Indian Retail Giants			
Retail Giants	**Retail Umbrella**	**Number of Outlets**	**Source**
• Future group		**795**	Q 2 / H 1
o Pantaloon Retail ltd.	Pantaloon	64	FY2012 report
	Central mall and Brand factory	38	
	e- Zone	43	
	Home town	15	
	Others	156	
o Future Value Retail ltd.	Big Bazaar	157	
	Food bazaar	47	
	Fair Price	224	
	Others	58	
• K Raheja group		**250**	(Annual report 2011-12)
o Shoppers stop ltd.	Shoppers Stop	51	
	Homestop	11	
	Crossword	85	
	HyperCity	12	
	Mothercare	38	
	MAC stores	20	
	Estee lauder	5	
	Clinique	10	
	Timezone	18	
• Tata retail		**942**	Company Brochure
o Trent	Landmark	21	
	Star Bazaar	14	
	Westside	62	
	Zaara	7	
o Infinite Retail	Croma	73	
o Titan industries	Titan watches	420	
	Tanishq Boutiques	130	
	Gold plus	30	
	Titan eye+	185	
• Reliance group			Quarterly report as on 31st March 2012); Company website (http://www.reliance-tracker.in/)
o Reliance Retail ltd.	Reliance Fresh	**1300**	
	Reliance Market		
	Reliance Mart		
	Delight		
	Reliance iStore		
	Reliance Digital		
	Reliance Trends		
	Reliance Footprint		
	Reliance Jewels		
	Reliance Time-Out		
	Reliance Living		
	Reliance AutoZone		

Retail Giants	Retail Umbrella	Number of Outlets	Source
• Birla group		**3116**	Company Website (2011-12 annual report)
o Aditya Birla Retail Ltd.	More.	575 supermarket	
	More. mega store	12 hypermarket	
		1129 exclusive brand outlets	
o Aditya birla nuvo#	Madura Fashion & lifestyles	1400 departmental stores & multi brand outlets	

 # Aditya birla group has recently acquired 50% ownership of Pantaloon retail
(Source: www.timesofindia.com)

Table 2: Retail Store Formats				
Format	**Average Size**	**Products**	**Value proposition**	**Example**
Departmental Store	10000-60000 sq.ft.*	Deals in multiple products such as apparel, footwear, home accessories and furnishings etc. under different departments.	Focus is on ambience and service	Westside
Super market	1000- 4000 sq.ft. #	Deals majorly in food items, limited range of non food items such as cosmetics and general aid products.	Convenience and Service	Food Bazaar
Hyper market	50000-100000sq.ft.*	Food & grocery, apparel, footwear, electronics, handlooms, kitchen appliances, furniture etc.	Shopping under one roof and discounts	Big Bazaar
Specialty Store / Category Killer	-	Extensive range of product under a Single category. Narrow product line with high depth	Choice (product variants)	Crossword, Music world, Vision Express
Cash and Carry Stores	75000 sq.ft.*	High volume of products catering to bulk requirement	Low price	Metro, Bharti-Walmart
Online Stores (e-retailing)	-	Exclusive stores as well as multiproduct stores	Allow shopping under home roof (any location), 24*7 shopping facility	snapdeal.com, flipkart.com

*ICRIER, 2008
*# Sinha, Mathew, and Kansal, 2005*

Table 2: Retail Store Formats		
Retail company	Country	Rank in list of world's top 250 retailers
X5 Retail Group N.V.	Russia	83
Open joint stock comp. Magnitt	Russia	124
Lojas Americanas SA	Brazil	158
Grupo pao de Acucar	Brazil	45
Gome Home Appliances	China	75
Suning appliance co.ltd.	China	84
Dallan Deshang group	China	141
Nonggongshang supermarket	China	220
Ballan group	China	66
Shoprite Holdings Ltd.	S. Africa	92
Massmart Holdings Ltd.	S. Africa	126
Pick n Pay Stores Ltd.	S. Africa	133
The SPAR Group Ltd.	S. Africa	179
Steinhoff International Holdings Ltd.	S. Africa	218
Woolworths Holdings Ltd.	S. Africa	222

Source: Deloitte 'Switching channels: Global powers of retailing2012'

Table 4: Global Retail Development Index	
Country	Rank (2014)
Chile	1
China	2
Uruguay	3
U.A.E.	4
Brazil	5
Armenia	6
Georgia	7
Kuwait	8
Malaysia	9
Kazakhstan	10
India	20

Source: A.T. Kearney: 2014 Global Retail Development Index

Fig 1: Share of Organized Retail - Comparison of BRICS Nations
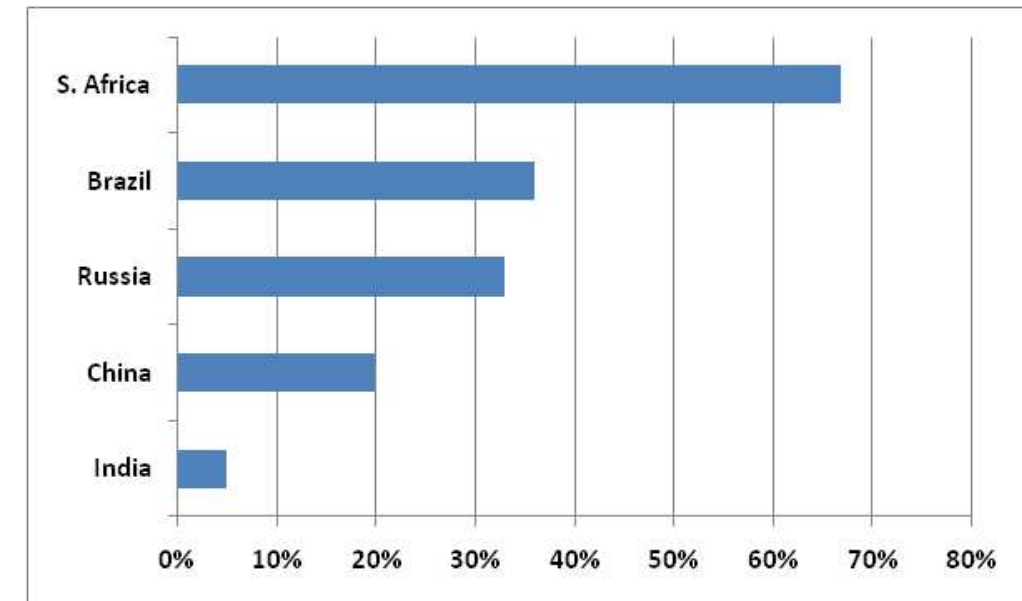
Source: IBEF report, 2010 and asipac report, 2010

Study and Analysis of Market Segmentation for Snacks Food (With Special Reference to Branded Cookies)

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This paper looks at the use of market segmentation as a tool for improving strategies and to understand the needs of the distinct groups of customers in snacks food industry. This paper argues that in spite of the egalitarian approach that underpins the marketing of cookies, market segmentation may be used to better serve the requirements of the distinct customers differently. Theoretical framework was constructed based on the literature. The empirical study was conducted as a quantitative research. Chi square method is used to test the hypothesis and to analyze the association between various parameters. In this paper, the researcher examines the current state of market segmentation and identifies avenues for development. This paper also attempts to address managements concerns about the practicality and usefulness of segmentation

Key Words: *Segmentation, Behavior, Biscuits, price, market*

INTRODUCTION

Gauging the dynamics of today's volatile markets, there is a continuous need to identify the most conducive segmentation strategy. We live in times which are subjected to change, yet the consumers needs, values and behavior will continue to evolve. Marketing consists of organizations with wants, money to spend, accompanied with willingness to spend. A sound marketing strategy begins with identifying the differences that exist within a market, market segmentation, deciding which segment will be pursued as target market and selecting a competitive position that will be conveyed to customers through marketing mix.

However if the market is correctly segmented, a better fit with customers need will actually result in greater efficiency. Deloitte Food and Beverage update (2012) states, "While various social media tools are being used by companies of all types, none have taken advantage of the ability to stay connected with their customers more than large branded multinationals."

In order to make the segmentation effective, emphasis should be made on segmentation which should be measureable with obtainable data. Besides this, the segments must be accessible through existing marketing institutions and should be large

enough to be potentially profitable. Segmentation isolates consumers with similar life styles, needs and the likes, and increases the knowledge of their specific requirements. It aims at one or more homogeneous segments and tries to develop a different marketing mix for each segment. Instead of assuming that the whole market consist of a fairly small set of customers, it sees sub markets with their demand and they believe that aiming at one or some of these smaller markets will provide greater satisfaction to the target customers and greater profit potential for the firm. There are two approaches to market segmentation research ex ante and ex post. An ex ante approach begins by studying the motivating conditions that leads people to the tasks and interests in their lives. Such an analysis provides guidance for product strategy as implemented in brand positioning physical and psychological formulation and marketing communications. In principle, if manufacturers had accurate information on all motivating conditions within the focal behavioral domain, and the ability to produce and deliver unique product offerings at low cost, then even individual customization of offerings would be a viable product strategy. As more data are collected from multiple "touch-points" such as the Internet, point-of-purchase and direct marketing, and were a cost of customization to decline, does market segmentation research become obsolete?

An ex post approach to market segmentation research begins with an individual's reaction to marketplace offerings. This may take the form of ratings of product attributes/ benefits (e.g., benefit segmentation, Haley (1968). By focusing on what people must choose among, rather than what the conditions they experience call for, ex post market segmentation research changes from a task of identifying motivating conditions to guide product strategy, to trying to read wants from reactions, to product attributes and benefits as found in the existing offerings.

The benefits offered by segmentation are as follows-

(a) By developing strong position is a specialized market segments, medium sized firms can achieve a rapid growth note

(b) By tailoring the marketing programs to individual market segment, marketers can do a better job and make more efficient use of marketing resources.

(c) It helps in determining the kinds of promotional devices that are effective and also helps to evaluate their results.

(d) Appropriate decisions making relating to introducing of new products, promotion, pricing could be easily taken.

Price represents the value of goods of service for both the seller and the buyer. Price is the only element of the marketing mix which generate revenue otherwise all the elements have cost. Price planning is systematic decision making by an organization regarding all aspects of pricing. For a broader perspective, price is the mechanism for allocating goods and services among potential purchasers and for ensuring competition among sellers in an open market economy. If there is excess of demand over supply, prices are usually decided by the marketer on the higher and if there is an excess of supply over demand, prices are usually reduced by sellers

LITERATURE REVIEW

Majority of the firms have been focusing on the advantages of placing more emphasis on defensive strategies i.e. to retain existing customers than on offensive strategies i.e. to attract the new customers. The existing customers are already familiar with the company's products and services. A portion of this group is likely to be positively predisposed towards the products and services of the company. Hence, the focus is therefore on the individual customers instead of traditional market share. Effective marketing strategies often consist of a combination

of several marketing tactics that work together in a synergistic way to establish brand, reduce sales resistance, and create interest and desire for the products. Every company wants to focus on customers or segments with the distinct needs and wants. Amandeep Singh (2010) reveals in his study that earlier demographic factors were considered as best basis of segmentation but they are no longer effective for segmentation in FMCG sector. An investigation of 500 consumers purchase routine and their demographic attribute are found non-associated in this study. It means that there is a need for developing more affecting marketing segmentation basis.This study is related to only one industry and may not be related to others. But it is rightly proved that demographics, which were considered as the most effective attribute that influenced the purchase of consumers, are not powerful enough in today's life.

Wells, V.K, Chang, S.W. , and Oliveira, J. (2010) in their study presents an idea that benefit sought are more powerful basis of brand choice . They also related the idea that demographic attributes are not very effective in case of brand choice and in price selection.

Mirza, S. (2010) discusses that the demographic variables of interest were age, gender, household size, occupation, education and level of income. Results of this study shows that demographic influence on the choice of retail outlet is partial with household size, education and income having a significant effect on the choice of retail outlet selected. This study shows that some of the demographical factors such as education, income and household size affect the choice of retail outlet and definitely the choice of brands also.

Wedel, M. (2002) in his editorial article states that the market segmentation has now become a necessity of the marketers. One to one marketing is not feasible because it needs great amount of money and efforts for developing strategies focused on the evolution

rather than on the proliferation of the products and businesses.

Demographic segmentation identifies those characteristics that are identifiable and measurable statistic of the population. These characteristics include age, gender, marital status, income, occupation and education, which can provide the basis for this particular segmentation. Demographic segmentation can be seen as the major factor when marketers need to locate a target market, as it is often the most accessible and cost-effective way (Schiffman et al., 2001)

OBJECTIVES OF THE STUDY

The Objectives of the study are-

1) To study the demographic segmentation to identify the target market.

2) To study the relationship between various brands and factors affecting consumer behavior.

HYPOTHESES

Accordingly, the following hypotheses were framed for the study:

H0 1 : There is no relationship between Age of the respondents and choice of Biscuits.

HA 1: There is a positive relationship between Age of the respondents and choice of Biscuits.

H0 2 : There is no relationship between Income Level and Factors affecting choice of Biscuits.

HA 2: There is a relationship between Income Level and Factors affecting choice of Biscuits

H0 3 :. There is no relationship between Brand and Consumer Behavior towards Products

HA 3: There is a positive relationship between Brand and Consumer Behavior towards Products

H0 4 : . There is no relationship between Income and use of branded biscuits.

HA 4: There exists a relationship between Income and use of branded biscuits

RESEARCH METHODOLOGY

The study area was confined to Meerut city, Western Uttar Pradesh. A convenient sample (non probability sampling method) of 117 respondents was taken up for the current study in which the respondents both male and female were asked to fill up the self -administered questionnaire. The data collection comprised of both primary as well as the secondary data. The primary data was collected by means of self administered questionnaire by the researcher. The questionnaires were distributed among the respondents personally by the researcher. The data was collected on a Likerts type scale where 1 stands for minimum agreement and 5 stands for maximum agreement. The data presented in this report is based on the information received from the respondents. In order to find out whether there is any significant association between the attributes; Chi-square test is applied to find out the association between demographic variables and identified variables. The testing of hypothesis developed earlier revealed the following results

ANALYSIS AND RESULTS

Marketing success, just as business success, depends on the return from management's investment in designing, producing, promoting, and selling an offering. The offering that is the object of marketplace exchange is a brand. Brand purchase/ use, repeat purchase/ use are the prime measures of marketing and business success. Such measures are central to marketing as a managerial function and disciplinary domain. Correspondingly, the essential focus for research and conceptual development in marketing is the intra product level of analysis, which includes all the variables that are relevant to brand use. Since companies vary between what they can offer to their markets, segmentation has been proven to be efficient and effective in regards to selecting and serving their segment of the market, in which they can provide the best service within that segment.

Table -1
Relationship between Age of the respondents and choice of Biscuits.

Table 1 : Relationship between Age & Choice of Biscuit							
Choice of Brand of Biscuit							
	Attributes	Sun feast	Kids Cream	Parle-G	Digestive	Good Day	Oreo	Total
AGE	Below 15 yrs	2	6	5	2	1	3	19
	15--30	5	3	1	0	7	10	26
	30--45	3	0	0	4	5	10	22
	45--60	2	0	0	10	9	5	26
	60 & Above	2	1	3	15	3	0	24
	Total	14	10	9	31	25	28	117

The table value at 20 df. at 5 % Significance level is 31.4 and the calculated value of Chi-Square is 73.2.

The table value at 20 d.f. at 5 % Significance level is 31.4 and the calculated value of Chi-Square is 73.2. Since the Chi-Square value is more than the calculated value, hence, HO 1 is rejected and alternate hypotheses HA1 is accepted ie there exists a relationship between age of the respondents and choice of Biscuits.

6 respondents out of 19 respondents in the age below 15yrs liked Kids-Cream while 5 respondents liked Parle-G Biscuits. However, 10 respondents out of 26 respondents in the age-group 15-30 yrs liked Oreo biscuits while 7 respondents in the same age-group liked Good-day biscuits. Similarly 10 respondents out of 22 respondents in the age group 20-30 yrs also like Oreo biscuits. It is also depicted that 10 and 9 respondents in the 45-60 yrs age-group liked Digestive and Good-Day biscuits respectively. However 15 respondents out of 24 respondents preferred Digestive biscuits in the age group of 60 and above. However none of the respondents preferred Oreo biscuits.

15 respondents out of 42 respondents having Income level of Rs 45K and above, looks for Quality aspects while 4 respondents in the same income level prefers Nutritious value in the biscuits .However 8 respondents out of 18 respondents opted for Attractive Packaging in the Income level between Rs 30K-45K. It is also evident that 15 and 12 respondents in the Income level of Rs 45K and above and Rs 30K-45K preferred taste as major attribute in biscuits.

6 respondents out of 15 respondents buy Sunfeast biscuits because the product is easily available while 5 respondents buy Sunfeast biscuits because of price factor. While 17 respondents out of 26 respondents prefer Kids Cream biscuits due to its Taste.Similarly,8 respondents out of 24 respondents buy Digestive biscuits of Price factor however 5 respondents out of 22 respondents buy Good-Day biscuits due to attractive Packaging.

Table No-2
Relationship between Income Level and Factors affecting choice of Biscuits

Table-2 : Income level and factors affecting choice of Biscuit Brand						
		Income Level (Rs/month)				
	Attributes	Below Rs 15,000	15,000-30,000	30,000-45,000	45,000-Above	Total
	Quality	6	10	11	15	42
	Nutritious	0	0	0	4	4
Factor	Attractive Packaging	5	3	8	2	18
affecting	Price	3	1	2	5	11
Choice	Availability	2	3	2	2	9
	Taste	0	6	12	15	33
	Total	16	23	35	43	117

The table value at 15 d.f. at 5 % Significance level is 24.99 and the calculated value of Chi-Square is 25.17

The table value at 15 d.f. at 5 % Significance level is 24.99 and the calculated value of Chi-Square is 25.17 Since the Chi-Square value is more than the calculated value. HO 2 is rejected and alternate hypotheses HA 2 is accepted i.e. there exists a relationship between Income Level and Factors affecting choice of Biscuits

Table No-3
Relationship between Brand and Consumer Behavior towards Products

Table-3 : Relationship between Brand and Consumer Behavior towards products							
Factor effecting consumer Behavior							
	Attributes	Quality	Nutritious Factors	Attractive Packaging	Price	Availability	Taste	Total
Brands	Sun feast	0	1	2	5	6	1	15
	Kids Cream	2	0	0	2	5	17	26
	Parle-G	1	2	0	3	9	5	20
	Digestive	5	4	1	8	3	3	24
	Good Day	2	3	5	3	7	2	22
	Oreo	3	0	2	4	1	0	10
	Total	13	10	10	25	31	28	117

The table value at 16 d.f. at 5 % Significance level is 26.3 and the calculated value of Chi-Square is 65.97.

The table value at 16 d.f. at 5 % Significance level is 26.3 and the calculated value of Chi-Square is 65.97. Since the Chi-Square value is more than the calculated value, HO 3 is rejected and the alternate hypotheses HA 3 is accepted i.e. there is relationship between Brand and Consumer Behavior towards Products

Table No-4
Relationship between Income and use of branded biscuits

Table-4 : Relationship between Income & branded Biscuits					
Purchase of Branded Biscuits					
	Attributes	Yes	No	Can't Say	Total
Income	Below-Rs 15,000	9	25	1	35
Rs/Month	Rs 15,000-30,000	20	5	5	30
	Rs 30,000-45,000	5	7	5	17
	Rs 45,000 & above	15	15	5	35
	Total	49	52	16	117

The table value at 6 d.f. at 5 % Significance level is 12.6 and the calculated value of Chi-Square is 24.4.

The table value at 6 d.f. at 5 % Significance level is 12.6 and the calculated value of Chi-Square is 24.4. Since the Chi-Square value is more than the calculated value, HO 4 is rejected and alternate hypotheses HA 4 is accepted i.e. there is relationship between Income and use of branded biscuits

25 respondents out of 35 respondents in the Income level below Rs 15K are of the opinion that they do not buy branded biscuits. While 20 respondents in the Income level of Rs 15k-30k prefer to buy branded biscuits. Similarly, 15 respondents out of 35 respondents in the Income level of Rs 30K-45K prefer Branded Biscuits.

The relationship between market segmentation research and the managerial task is the final area where the researcher discusses the opportunities for research. Once management learns of the diverse nature of wants through market segmentation research, it also considers the current state of want satisfaction, reflecting its own and competitive responses, and its own abilities, in deciding whether or not to continue to support in same or altered form, to withdraw its offering, or design a new entry. Methods of taking account of the various considerations, possibly with the use of statistical decision theory, are needed.

FINDINGS

26 respondents out of 117 respondents prefer Kids-cream biscuits mainly due to the taste factor

24 respondents among 117 respondents like Digestive biscuits because of desired quality at the desired price

22 respondents purchase Good-Day biscuits as they are easily available and has attractive packaging, similarly 20 respondents buys Parle-G biscuits as it is easily available.

25 respondents in the income group of less than Rs 15000/ month said that they do not buy branded biscuits.

49 respondents out of 117 respondents admitted that they buy branded biscuits while 52 respondents said that they do not buy branded biscuits.

10 respondents each in age group 15-30 and 30-45 yrs prefer Oreo biscuits

42 respondents in all income groups prefers quality aspects in biscuits

18 respondents in all the income groups purchase biscuits due to attractive packaging

CONCLUSION

Although, much research is needed. It is however clear that the most important task is of segment identification. It is impossible for companies to design a marketing mix that would suit every consumers needs, i.e. the same product, with the same price, place and promotion technique that would appeal to every consumer. In some cases where the product is universally used and unbranded, mass marketing works. Companies therefore need to make choices and to identify what part of the market is best suitable for them and their product.

One of the main objectives of the study was to investigate the relationship between the Age of the consumer and the choice of the biscuits. The results shows that the consumer who were in the age group of 60 years and above preferred Digestive biscuits over taste aspects which the teenagers preferred. The other important parameter was to study the relationship between various brands and the factors influencing consumer behavior.

The results also highlight that there exists a positive and significant relationship between income level of the respondents and the choice of biscuits i.e. income does affect in the choice of biscuits. The results clearly reveal that majority of the respondents with income over fifteen thousand does prefer quality aspects while attractive packaging also plays a vital role in the selection of the brands of biscuits.

The relationship between market segmentation research and the managerial task is the final area where we discuss opportunities for research. Once management learns of the diverse nature of wants through market segmentation research, it also considers the current state of want/ satisfaction,

reflecting its own and competitive responses, and its own abilities, in deciding whether or not to continue to support in same or altered form, to withdraw its offering, or design a new entry.

Note: Tables attached as annexure-1

LIMITATIONS

1) This survey was conducted with very severe time constraint

2) The sample size was limited i.e. size was 117 only

3) Some respondents may have been biased while filling in the questionnaire hence they may not have given all answers truthfully

REFERENCE

Best, R.J. (2004), Market Based Management: Strategies for Growing Customer Value and Profitability, 3rd ed. Upper Saddle River, N.J.: Prentice Hall.

Deloitte (2012), The use of Social Media in the Food Industry, Accessed on June 30, 2014, http:// www.deloitte.com/ assets/ DcomCanada/ Local%20Assets/ Documents/ FA/ ca_en_fa_food _and_beverage_q2_2012_100412.pdf

Dolnicar, S. & Leisch, F. (2003). Winter Tourist Segments in Austria- Identifying Stable Vacation Styles for Target Marking Action. Journal of Travel Research 41 (3), 281-193.

Dolnicar, S. (2002). Activity-Based Market Sub-Segmentation of Cultural Tourists Journal of Hospitality and Tourism Management, 9 (2), 94-105.

Foedermayr , E.K and Diamantopoulos, A (2008), Market Segmentation in Practice: Review of Empirical Studies, Methodological Assessment and Agenda for Future Research, Journal of Strategic Marking, Vol. 16, No.3, July 2008, 223-265.

Bronwyn,H., Ringer and Allison (2007),Trends in Consumer Segmentation, Australia New Zealand Marketing Academy, Conference paper, 3-5 Dec.

Mirza .S (2010), The influence of Demographic factors on the choice of retail outlet selected for food and grocery purchases by urban Pakistanis.

Singh A. (2010), Market segmentation in FMCG: time to drive new basis for market segmentation, International journal of research in commerce & Management, Vol.:1,No.8.

Wells V.K, Chang W.C, Castro-O & Pallister .J (2010), Market Segmentation from a Behavioral Perspective, Journal of Organizational Behavior Management.

.Wedel, M., & Kamakura, W.A. (2002), Introduction to the Special Issue on Market Segmentation, Journal of classification; Vol-19 (179-182)

Weinstein, A. (2006), A strategic framework for defining and segmenting markets. Journal of Strategic marketing, 14 (2), 115-127.

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Potential of Public-Private Partnerships in Agriculture for Inclusive Development: A Study of Uttar Pradesh

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The inclusive progress of economy of any state is not imaginable without adequate agricultural development. It has direct impact on industrialization and investment. The state of Uttar Pradesh is endowed with abundant natural resources in terms of fertile land, good river system, varied soil and climatic conditions, good support in terms of industries and most important, enterprising people & technical talent. This provides an immense opportunity to develop a vibrant agrarian economy.

In this backdrop, the present paper attempts to examine the potential areas for public-private partnerships in agriculture for accelerating inclusive development in Uttar Pradesh. The paper presents a critical assessment of such efforts till date and identifies constraints in public-private partnership. The Government of Uttar Pradesh has done many things to improve the agriculture sector but there is no plan of action to attract the private sector investment in this sector. This will lead to no where and hence, the agenda of inclusive development should be the top most priority of Uttar Pradesh. The question before all of us is "How do we go about?"

Keywords: Agriculture; Inclusive growth; Potential; Public-Private Partnership; PPP.

INTRODUCTION

Uttar Pradesh is the most populous state of India and after Maharashtra, it is the second largest economy in our country. Agriculture forms the primary sector of Uttar Pradesh economy, where the share of agriculture, in the over all economy of Uttar Pradesh is 28 per cent serving as the source of livelihood for seven out of 10 people. Thus, agriculture has been a way of life and continues to be the single most important livelihood of the masses in Uttar Pradesh.

The state is endowed with abundant natural resources in terms of fertile land, good river system, varied soil and climatic conditions, good support in terms of agro-industries and technical talent, which are conducive for agricultural production and thus the state is producing the largest share of food grain in India. The state's share is 19.41% in fruits and 29.55% in vegetables production. The major vegetables cultivated are peas, potato*, cabbage, tomato, okra and other leafy vegetables and the major fruits grown are mango (ranks 1st), aonla (ranks 1st), guava (ranks 4th), banana & litchi. Uttar Pradesh is the largest exporter of processed frozen meat and contributes more than 60% of India's meat exports annually, largest milk producer** (ranks 1st) and contributes approximately 1/ 5th of the total milk production of the country. The state is the largest food grain***

producer. Major food grains produced in the state include rice, wheat, maize, bajra, gram, pea, lentils and second largest producer of rice, accounts for about 13% of the national production. The details are given in Table 1 and 2.

Table 1: Contribution of Uttar Pradesh in Key Agricultural Products (2011-12)			
S.No	Item	India	U.P.
1	Food Grains***	25740	5170
2	Wheat	9390	3170
3	Rice	10430	1400
4	Pulses	1720	240
5	Sugar Cane	35770	12550

All figures are in million tones
Source: Directorate of Agriculture, GoUP

Table 2: Contribution of Uttar Pradesh in Key Agricultural Products (2011-12)			
S. No	Item	India	U.P.	U.P.'s Rank
1	Potato*	39.66	13.58	1st
2	Livestock (excluding Cow)	529.69	60.27	1st
3	Milk Production**	121.85	21.03	1st
4	Vegetables	146.55	43.30	2nd
5	Fruits	74.87	14.53	6th
6	Maize	16.72	1.04	6th
7	Oil Seeds	31.10	0.91	7th

All figures in Million tonnes except Livestock, which is in Million nos.
Source: Source: Dept. of Food Processing, GoUP

In spite of the natural resources strength and developed infrastructure facilities, the numbers of small and marginal farmers and landless farmers have increased considerably. Over the years, the increase in population and inadequate employment generation has stimulated pressure on agriculture. The issues responsible for this have been identified as:-

i. Population increase,

ii. High pressure on Agricultural for livelihood,

iii. Degradation of land.

iv. Inadequate investment in agricultural sector,

v. Lack of adequate infrastructure,

vi. Lack of co-coordinated approach,

vii. Lack of inclusive participation in the growth process,

viii. Rapid urbanization, migration of village people.

In this backdrop, the present paper attempts to examine the potential areas for publicprivate partnerships in agriculture, for accelerating inclusive development in the state through linking the farming systems and agriculture to the value chain and markets, in order to achieve higher economic margins and resource efficiency.

Inclusive growth: The inclusive progress of economy of any state is not imaginable without adequate agricultural development, which has a direct impact on industrialization and investment. This provides an immense opportunity to develop a vibrant agrarian economy. The inclusive growth implies participation in the process of growth and also sharing of benefit from growth. It can be observed from long-term perspective that the focus is on productive employment rather than on direct income sharing, as a means of increasing income for excluded groups. According to absolute definition, the inclusive growth is considered to be pro-poor as long as the poor gets the whole some and meaningful benefits, as reflected in some agreed measures for removing poverty.

Public-Private Partnership: The Public-Private Partnership (PPP) is a collaborative effort between the public and private sectors in which each sector contributes to the planning, resources and other activities needed to achieve a shared objective. A public-private partnership has also been defined by the nature of the parties engaged in collaboration. In this context, the definition is: "public-private partnership is an arrangement entered into-between two or more parties, specifically a nonprofit, publicly-funded institution (e.g. National

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agricultural research agencies), on the one hand and for-profit company (e.g. major multinational, research-based agricultural firms) on the other."

The public-private partnership is a multidisciplinary, integrated and stakeholder approach to address issues for economic growth and development. The literature has referred to the concept of Public-Private Partnership as:-

I)   In the standard neoclassical economics literature, public-private partnerships are the subject matter of traditional welfare analysis, typically evaluated according to the efficiency of their social welfare impact. Public-private partnerships are also a topic of analysis in information economics which studies the level of focus on the relationship and incentives that become the basis for the flow of information between partners (Binenbaum, et. al. 2003).

II) In the institutional economics literature, a public-private partnership is a governance strategy designed to minimize transactions costs or other costs associated with forming and sustaining relationships. It involves contracting, coordinating, and enforcing a relationship between actors engaged in the production of some good or service (Williamson, 1975, 1979). The magnitude of such transactions costs is determined by - the frequency with which public and private parties interact, the uncertainty of these transactions and the limits on actors, rational behavior, and the specificity of assets used in the interactions (Rangan, et. al. 2003). The extent to which the partnerships reduce transactions costs and improve the potential for realization of economic opportunity, may determine the beneficial structure of production than, say, market-based operations, inter-firm research association or vertical integration of production activities into a hierarchical firm structure.

III) In the innovative system's literature, the focus is on the economic and social institutions that affect the opportunities for science-based innovation within a given social or geographic region (Dosi, et. al. 1988; Hartwich, et. al. 2003). This has contributed significantly to the discussion of networks and their effect on the activities and interactions that generate innovation.

IV) In the development policy and public administration literature, the study of public-private partnership represents a recent paradigm shift in the field of organizational thinking. The literature argues that public-private partnerships are an optimal policy approach to promote social and economic development that brings together efficiency, flexibility, competence of the private sector with the accountability, long-term perspective and social interests of the public sector (Richter, 2003; O.Looney, 1992; Etzioni, 1973). While such partnerships blur the classic distinction between the public and private sectors in a modern economy, they also enhance the potential for both efficient and equitable production and distribution of social benefits (Larkin, 1994). These issues receive particular attention in the health and pharmaceutical sectors, where the global and regional public-private partnerships are increasingly common (Buse and Walt, 2000a,b; Buse and Waxman, 2001; Lehman, 2001; Ollila, 2003).

V)   The Indian Council for Agricultural Research (ICAR) states that PPP provides a functional mechanism for collaboration to leverage CPS resources, for adaptation of technology and for commercialization where the costs, risks and benefits can be shared. Improvements are possible as the growing demand for quality agricultural products in agriculture through the integration of producers on the one hand and retailers and processors on the other. This not only creates an opportunity to reduce the

risk in production and price, but also enhances the potential to create partnerships between farmer's groups and market players; besides opening up better links with input suppliers, financial and research institutions (Tiwari, 2012).

VI) Public-Private Partnerships, especially for sustainable agricultural development can also include multi-partner structures that brings together private companies with entities such as non-governmental organizations (NGO), university research institutes and foundations, (Nuziveedu Seeds ,2012).

VII) In agricultural research, the growth of education, extension and infrastructure by Public-Private Partnerships through Private distribution of Public Technologies, Private Purchase of Public Research and Technologies and Public Private collaborative Research Partnership can be made, (Andrew, et.al. 2001)

Private-Public Partnership- Potentials: Public-private sector partnership (PPP) is a new institutional arrangement to bring in synergy, mobilize resources, generate, validate and transfer technologies. Therefore, Public-private partnership provides opportunities to addresses the following:-

•   Reduces public capital investment,

•   Improves efficiency due to strong profit incentive,

•   Private entity is more accountable than government,

•   Specialized expertise,

•   Relieves government from staffing issues,

•   Shares risk/ responsibility,

•   Government can still step in when private entities are not performing.

The state initiatives: The state offers a wide range of subsidies, fiscal and policy incentives, industry friendly policy framework to foster investments coupled with availability of skilled and semiskilled workforce, attractive incentives and a responsive and prompt public delivery system. Some of financial incentives provided by Uttar Pradesh government (Food Processing Industrial Policy, 2012) are as follows:

i)   100% Exemption from Stamp Duty.

ii)   Exemption from Mandi Fees :

iii) Interest subsidy

iv)   Capital Investment Subsidy

v)   Research & Development Grant

vi)   Assistance for Global competitiveness, quality & standardization

vii) Assistance for Patent/ Design Registration

viii) Assistance for Market Development.

ix)   Assistance for Human Resource Development under National Food Processing Mission

Learning from Successful Public-Private Partnership initiatives in Agriculture in India: Public- Private Partnerships have already been developed in agriculture sectors. The success stories of some of them are mentioned as follows:-

The Project Golden Rays is a Public-Private Partnership developed in Rajasthan, where farmers had opted for maize in view of the rising commodity prices. The yields remained sub-optimal, despite hybrid seeds, poor farming practices and a lack of access to appropriate inputs. Monsanto worked together with the State and NGOs on-site in 5 districts to implement credit and farmer capacity building. Yields have reportedly increased as have the farm income. This same model was applied in Odisha / Orissa state, with 30,000 hectares of farm. Maize is mostly grown in the tribal districts in Odisha, (Programme Golden Rays, 2009-10). The learning of Project Golden Rays, Rajasthan can be applied to PPP initiatives in the field of agriculture in Uttar Pradesh.

The NSPL has been running a programme with the

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government of Uttar Pradesh under Private Public Partnership (PPP mode) for carrying out extension work in the state. Under this project, the company has provided extension services in 25 districts of Uttar Pradesh for paddy and maize crops. The extension work involved among other things, were Crop Demonstration, Farmers' Training and Field Visits for Kharif season 2011-12. The project met the desired result successfully and the UP government appreciated this partnership, (Nuziveeedu Seeds, 2012). This project can be replicated in the other districts of Uttar Pradesh.

The NSPL's introduction of high density planting for cotton has found rich response in Maharashtra. The Government of Maharashtra has realized the importance of high density cotton planting to improve productivity of Cotton in Vidharbha region and sanctioned an extension program in PPP with NSPL to cover 10,000 acres with 2000 farmers in Akola, Amravati and Buldhana districts. The project is being implemented to assist poor farmers of major cotton growing districts of Vidharbha region to significantly improve productivity of their cotton crop. The project will include high density planting in 7500 acres under rain-fed conditions and 2500 acres under drip irrigation, (Nuziveeedu Seeds ,2012).

Principles of Public Private Partnership in Agriculture in Uttar Pradesh: In view of the learning from successful efforts of Public-Private Partnership in agriculture sector and the government initiatives, the following principles may be adopted in Uttar Pradesh:

• Represent unique and advanced aspect of agriculture.

• Provide an effective, technical and commercial high-end platform.

• Educate various stakeholders of the state agriculture process.

• Create a direct interface between the various stakeholders.

The above mentioned principles of Public- Private Partnership will not only provide an opportunity to improve the productivity and distribution of agricultural produces but will also help in improving the inclusive development of the state. Some of the likely benefits are:

a. Improve service delivery

b. Improve cost-effectiveness

c. Increase investment in public infrastructure

d. Reduce public sector risk

e. Deliver capital projects faster

f. Improve budget certainty

g. Make better use of assets.

Potential areas of Public-Private Partnership in Agricultural Sector: The Public-Private Partnership in Agricultural Sector in Uttar Pradesh has vast potential and may be tried in the following areas:

i. Post Harvest Management: To provide post harvest infrastructure facilities like Pack Houses/ Central Sorting, Grading, Packaging Centers with Pre-Cooling and Cool Chain facilities at the production centers. The cold storages in the terminal markets can be established.

ii. Food Processing Facilities: To provide supporting infrastructure to meet the need for quality and safe food products facilities like quality testing laboratories can be established.

iii. Agriculture marketing setup: To strengthen the state, the agriculture marketing setup has been accorded the top priority. The partnership for the establishment of infrastructure such as link roads, transport and cold storage, cool chain and processing units for perishable agricultural produce will be the viable area. In order to store the produce in the storage at mandi/ sub-mandis, in the anticipation of getting remunerative prices, facilities for credit on easy terms and condition will be made so that the farmers may bear the cost of storage.

iv. Agricultural Research and Extension: This may be made to strengthen the agricultural innovation systems like research, education, extension and infrastructure through Private distribution of Public Technologies, Private Purchase of Public Research and Technologies and Public Private collaborative Research Partnership.

CONCLUSION AND RECOMMENDATIONS

Agriculture forms the primary sector of Uttar Pradesh economy and the share of agriculture in over all economy of Uttar Pradesh is 28 per cent. The agro-climatic and geographic conditions of the state favours production of crops like paddy, wheat, sugarcane, potato, mustard, groundnut, gram, pea, lentil, various vegetables and fruits. The agricultural development and economic condition of the farmers is not yet appreciable. The inclusive progress of agricultural economy in Uttar Pradesh has immense potential to emerge as one of the most economically developed state in India. The state offers a wide range of subsidies, fiscal and policy incentives; industry friendly policy framework, to foster investments coupled with availability of skilled and semiskilled workforce. In addition to this, the PPP model should be tried for this purpose and a lot more may be learnt from the similar projects else where. This provides a unique opportunity to mobilise resources, generate, validate and transfer technologies, and synergise multiple efforts towards inclusive development. Therefore, the Public-Private Partnership in Agricultural sector in Uttar Pradesh has vast potential and may be a better platform in research and extension, post harvest management, food processing facilities, and agriculture marketing setup.

REFERENCES

Andrew Hall, Rasheed Sulaiman V., Narman Clark, M.V.K.Shvamaohan and B.Yoganand(2001), Agricultural Research Policy, An Era of Privatization: Experience from Developing World, Willingford, U.K., CABI.

Binenbaum, E., P.G. Pardey and B.D. Wright. (2003), Public-private research relationships: the consultative group on international agricultural research, American Journal of Agricultural Economics, 83(3) : 748-753.

Buse, K. and G. Walt. (2000a). Global public-private partnerships: part I . a new development in health? Bulletin of the World Health Organization 78(4): 549-561.

Buse, K. and G. Walt. (2000b), Global public-private partnerships: Part II, What are the health issues for global governance? Bulletin of the World Health Organization 78(5): 699-709.

Buse, K. and A. Waxman.(2001), Public-private health partnerships: A strategy for WHO. Bulletin of the World Health Organization 79(8): 748.754.

Dosi, G., C. Freeman, R. Nelson, F. Silverberg and L. Soete, (1988), Technical change and economic theory. London: Pinter.

Etzioni, A. 1973. The third sector and domestic missions. Public Administration Review 33: 314- 323.

Food Processing Industrial Policy, (2012), Government of Uttar Pradesh, 2011-2012.

Hartwich, F, W. Janssen and J. Tola.(2003), Public-private partnerships for agroindustrial research: Recommendations from an expert consultation. ISNAR Briefing Paper, no. 61.The Hague, The Netherlands: International Service for National Agricultural Research (ISNAR).

Larkin, R.G. (1994), Public-private partnerships in economic development: A review of theory and practice, 12(1): 7-9.

Lehman, V.(2001), New models for public-private partnerships in drug development, Biotechnology and Development Monitor 46 : 2-7.

Nuziveeedu Seeds .(2012), Public Private Partnerships Accelerating Agricultural Development. http:// www. nuziveeduseeds.com/ blog/ , November 5.

Project Goleden Rays (2009-10) http:// www.monsantoindia. com/ public-private-partnership.html Programme Golden Rays (2009-10), http:// www.planning.rajasthan.gov.in

Richter, J. (2003), We the people or we the corporations. Critical reflections on UN-business. partnerships. Geneva: IBFAN-GIFA.

O.Looney, J. (1992), Public-Private partnerships in economic development: negotiating the tradeoff between flexibility and accountability. Economic Development Review 10(4) (Fall1992): 14-22.

Ollila, E. (2003), Health-related public-private partnerships and the United Nations. In Global social governance themes and prospects, ed. Deacon, B. et al. Helsinki: Globalism and Social Policy Program.

Rangan, S., R. Samii and L.N. Van Wassenhove. (2003), Constructive partnerships: When alliances between private firms and public actors can enable creative strategies. Manuscript, July.

Tiwari, R.,(2012), Agriculture ministry releases framework for

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PPP under 'Rashtriya Krishi Vikas Yojana. The Economic Times. http://articles.economictimes.indiatimes.com/2012-08-/news/33249797_1_private-sector-state-government-thousand-farmers.

Williamson, O.E. (1975), Markets and hierarchies. London: Free Press, Collier Macmillan Williamson, O.E., Transaction-cost economics: The governance of contractual relations, Journal of Law and Economics, 22: 233-61.

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He is a life Member of National HRD Network and was Vice President of its Ranchi Chapter. He is a visiting Faculty to many academic institutions and corporate training centers. He has attended several national and international seminars and has chaired technical sessions.

An Empirical Study on Assessing Quality of Educational Service Using SERVQUAL Model

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The purpose of this study is to examine the service quality in Institutions providing higher education using the dimensions of SERVQUAL model. During the last decade, quality initiatives have been the subject of an enormous amount of practitioner and academic discourse, and at various levels have found a gateway into higher education. A modified SERVQUAL instrument along with the focus group interviews are used to generalize the results. The objective of the study is to explore the services offered by the institutions of higher education, finding the perception and expectation of the students and thereby to find the gap between the expectation and the perception of the students from the institutions of higher education. In an attempt to improve the quality of services offered by the institutions of higher education, several recommendations and conclusions are extracted and some direction for further research is suggested.

Keywords: *SERVQUAL, Educational Services, Service Quality, Higher Education*

INTRODUCTION

Over the last decade, Indian business and management schools have experienced an increasing number of under graduate and post-graduate students in hope of obtaining high quality education. India seems to have indeed entered a golden age for higher education. Many progressive steps taken in 12th, 13th and 14th Five Year Plans have come to fruition. The country has emerged to be a global magnet for aspiring learners, and a role model for high-quality affordable educational systems.

Today,

• India is the single largest provider of global talent, with one in four graduates in the world being a product of the Indian system

• India is among top 5 countries globally in cited research output, its research capabilities boosted by annual R&D spends totaling over US$140 billion

• India is in the fourth cycle of its research excellence framework with at least a 100 of Indian universities competing with the global best

• 23 Indian universities are among the global top 200 going from none two decades ago.

• In the last 20 years alone, 6 Indian intellectuals have been awarded the Nobel Prize across categories

• India is a regional hub for higher education, attracting global learners from all over the world

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- The country has augmented its GER to 50% while also reducing disparity in GER across states to 5 percentage points

- The Indian higher education system is needs-blind, with all eligible students receiving financial aid. Two thirds of all government spending towards higher education is spent on individuals, including faculty and students

- India's massive open online courses, started by several elite research universities, collectively enroll 60% of the world's entire student population

- Indian higher education institutions are governed by the highest standards of ethics and accountability with every single one of them being peer-reviewed and accredited

To sum up, the three tiers of Indian universities produce among the best-in-class knowledge creators, problem solvers and process managers, who also display deep social, cultural and ecological sensitivity, and are collaborative leaders and responsible citizens. In effect, the Indian graduate of today is not only an excellent human resource but also an admirable human being. Even as India deserves to fully revel in its resounding success of the last two decades, it must remember that to maintain its position of leadership in higher education, the next twenty years call for just as much leadership, vision and commitment as did the last twenty, and a golden vision 2050 should be India's next aspiration! ("EY - Higher education in India: Vision 2030 - Ernst & Young." 19 Jun. 2014, http://www.ey.com/ Publication/ vwLUAssets/ Higher-education-in-India-Vision-2030/ $FILE/ EY-Higher-education-in-India-Vision-2030.pdf 19 Jun. 2014).

The search of quality has become an important consumer trend (Parasuraman et al. 1985, 1988) and a whole industry centered on the measurement of a consumer and perceived quality satisfaction has arisen (Berry et al. 1988). The nineties can be described as a "decade of heightened interest in

quality" (Srikanthan 1999). The term "quality" has been defined from different perspectives and orientations (Shaney et al. 2004) and according to Tapiero (1996) depends on the person making the definition, the measures applied and the context within which it is considered. "Quality is excellence", "quality is value", "quality is conformance to specifications"(Pariseau and McDaniel 1997) "quality is fitness for use" (Juran and Gryna 1988), "quality is conformance to requirements" (Crosby 1979), "defect avoidance"(Crosby 1984), and "meeting and/ or exceeding customers expectations", claimed Parasuraman et al. 1985). Many of the well-known definitions of quality emphasize the relationship between quality and a customer's need and satisfaction (Zafiropoulos et al. 2005). Petruzzellis et al. (2006: 351) stated, "the higher the service quality the more satisfied the customers". In that way, satisfaction is based on customer's expectations and perception of service quality (Christou and Sigala 2002; Ekinci 2004; Sigala 2004a, b). Stodnick and Rogers's (2008) study applied the SERVQUAL instrument to measure student perceptions of service quality in a classroom setting, and the results demonstrated that a customer-centric quality scale such as SERVQUAL could be applied in a classroom setting.

Since the mid-1990s, a large variety of assessment methods have been used to appraise service quality in higher education, namely: student evaluations, importance-performance analysis (IPA), Servperf analysis, gap analysis, and SERVQUAL gap analysis. The SERVQUAL instrument (Parasuraman, Berry, & Zeithaml, 1991, 1994; Parasuraman, Zeithaml, & Berry, 1988) widely recognized in the service sector as a multi-item scale developed to assess customer perceptions of service quality has been used to assess service quality in higher education at the undergraduate level (O'Neill, 2003; Pariseau & McDaniel, 1997; Stodnick & Rogers, 2008).

The SERVQUAL approach has been applied in service and retailing organizations (Parasuraman et

al., 1988; Parasuraman et al., 1991). Service quality is a function of prepurchase customers, expectation, perceived process quality, and perceived output quality. Parasuraman et al. (1988) defines service quality as the gap between customer's, expectations of service and their perception of the service experience. Based on Parasuraman et al. (1988) conceptualization of service quality, the original SERVQUAL instrument included 22 items. The data on the 22 attributes was grouped into five dimensions: Tangibles, Reliability, Responsiveness, Assurance, and Empathy. Numerous studies have attempted to apply the SERVQUAL. This is because it has a generic service application and is a practical approach to the related area. This instrument has been formed to measure service quality in a variety of services such as hospitals (Babakus & Glynn 1992), hotels (Saleh & Rylan 1991), travel and tourism (Fick & Ritchie 1991), a telephone company, two insurance companies and two banks (Parasuraman et al. 1991). SERVQUAL is a multi-item scale developed to assess customer perceptions of service quality in service and retail businesses (Parasuraman et. al., 1988). The scale decomposes the notion of service quality into five constructs as follows:

* **Tangibles** - physical facilities, equipment, staff appearance, etc.

* **Reliability** - ability to perform service dependably and accurately

* **Responsiveness** - willingness to help and respond to customer need

* **Assurance** - ability of staff to inspire confidence and trust

* **Empathy** - the extent to which caring individualized service is given

SERVQUAL represents service quality as the discrepancy between a customer's expectations for a service offering and the customer's perceptions of the service received, requiring respondents to answer questions about their expectations and perceptions (Parasuraman et. al., 1988). The use of perceived as opposed to actual service received makes the SERVQUAL measure an attitude measure

that is related to, but not the same as, satisfaction (Parasuraman et. al., 1988). Parasuraman et. al. (1991) presented some revisions to the original SERVQUAL measure to rectify the problems with high means and standard deviations found in some questions and to obtain a direct measure of the importance of each construct to the customer. Later the research analysis reveals that it is possible to integrate the two approaches by integrating Service Quality Gap Analysis and Utility Theory (Robert F Bordley, 2001). The dominant models of Positivistic approach have been created by Christian Gronroos (1984) and A Parsuraman, Valarie A Zeithaml and Leonard L Berry (1985). Both models look at service quality gaps between expected service and perceived service from the point of view of the researcher. They consider service quality as a multidimensional attitude held by consumers where each dimension is made up of a number of attributes. The models assume a rational, rule based review of service quality as an accurate depiction of consumer perception. ("SERVQUAL - IS Theory." 08 Mar. 2014, http://istheory.byu.edu/ wiki/ SERVQUAL 19 Jun. 2014).

However, the Gap Analysis Model of Service Quality created by Parsuraman, Zeithaml and Berry (1988, 1985) is the most widely accepted instrument to measure service quality. They postulated that a-priori factors like Personal Needs, Word-of-Mouth influences and Past Experiences as well as Communication by the service organization create Expectation of service. ("Gap Analysis in Service Through SERVQUAL: A Study of ...." http://papers.ssrn.com/ abstract=2334207 19 Jun. 2014). A service quality gap results when service perceptions fall short of expectations. Whereas when the service is delivered, the customer forms a Perception. The extent of difference between the two contributes to the customer evaluating the service highly or otherwise. Other researchers have concluded similarly, in terms of prior expectation of the service if formed by the customer's mind using intrinsic and extrinsic cues, previous experience and other information sources (Gould and Williams, 1999). ("Comparison of Customers Perception with

Regard to ...." 18 Jan. 2013, http://www.delhi businessreview.org/v_13n2/v13n2f.pdf 19 Jun. 2014).

The first possible gap is the knowledge gap. The second possible gap is that of standard. It is the result of differences in managing knowledge of the client's expectations and the process of service provision (delivery). The fourth possible gap is the communication gap arising when there is a difference between the delivered service and the service that the company promised to the clients via external communications. According to the model 'Service Quality (SQ) =Perception (P) Expectation (E)'. For each respondent, the service quality for each dimension is calculated: where SQ is the service quality of the jth dimension, Eij is the expectations for the ith attribute in the jth dimension, Pij is perception for the ith attribute in the jth dimension and nj is the number of attributes in the jth dimension. An average score for each dimension is

then calculated across all respondents. A global service quality score is also calculated by taking the arithmetic:

The instrument created by the authors of the Gap Analysis Model, called SERVQUAL includes 5 dimensions of service quality Reliability, Responsiveness, Tangibles, Assurance and Empathy. Parsuraman have published studies prior to their paper on the Gaps model wherein they started with 10 dimensions that were tested amongst consumers and judges across various service industries and thus was refined to 5 dimensions before being used in SERVQUAL. Several later models also use the 5 dimensions as bases for evaluating service quality. Research has been conducted across industries and cultural contexts using SERVQUAL (Fornell, C. 1992). Critics of SERVQUAL (Nyeck, S., Morales, M., Ladhari, R., & Pons, F. 2002) argue that depending on the context and the particular service industry, the dimensions

Figure 1. The Service Quality Model

$$SQ_i = \sum_{j=1}^{k} (P_{ij} - E_{ij})$$
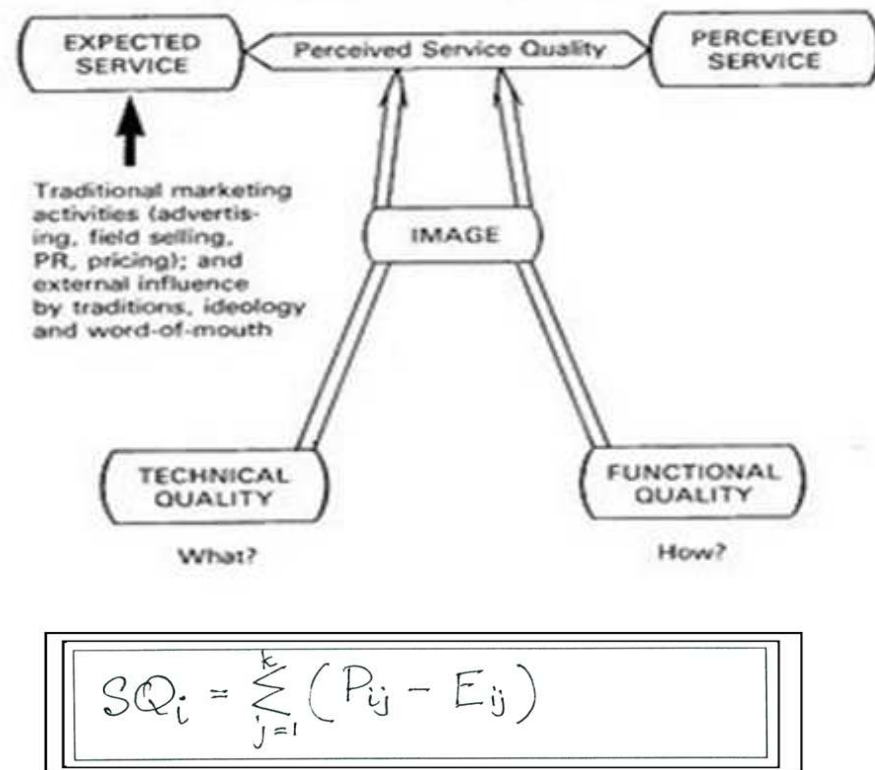
of quality may be prioritized differently and may even be customized. Some service quality researchers even go to the extent of saying that the difference scores between perception and expectation, as computed using SERVQUAL should be avoided (Peter, Churchill and Brown, 1992) and state that there are serious problems in

conceptualizing service quality as a difference score. In their empirical studies, Cronin, Brady and Hult (2000) used a performance-only measure of Service Quality, called SERVPERF, and found that the new scale captured the variation in Service Quality better than SERVQUAL. Where the global service quality score is also calculated by taking the arithmetic:
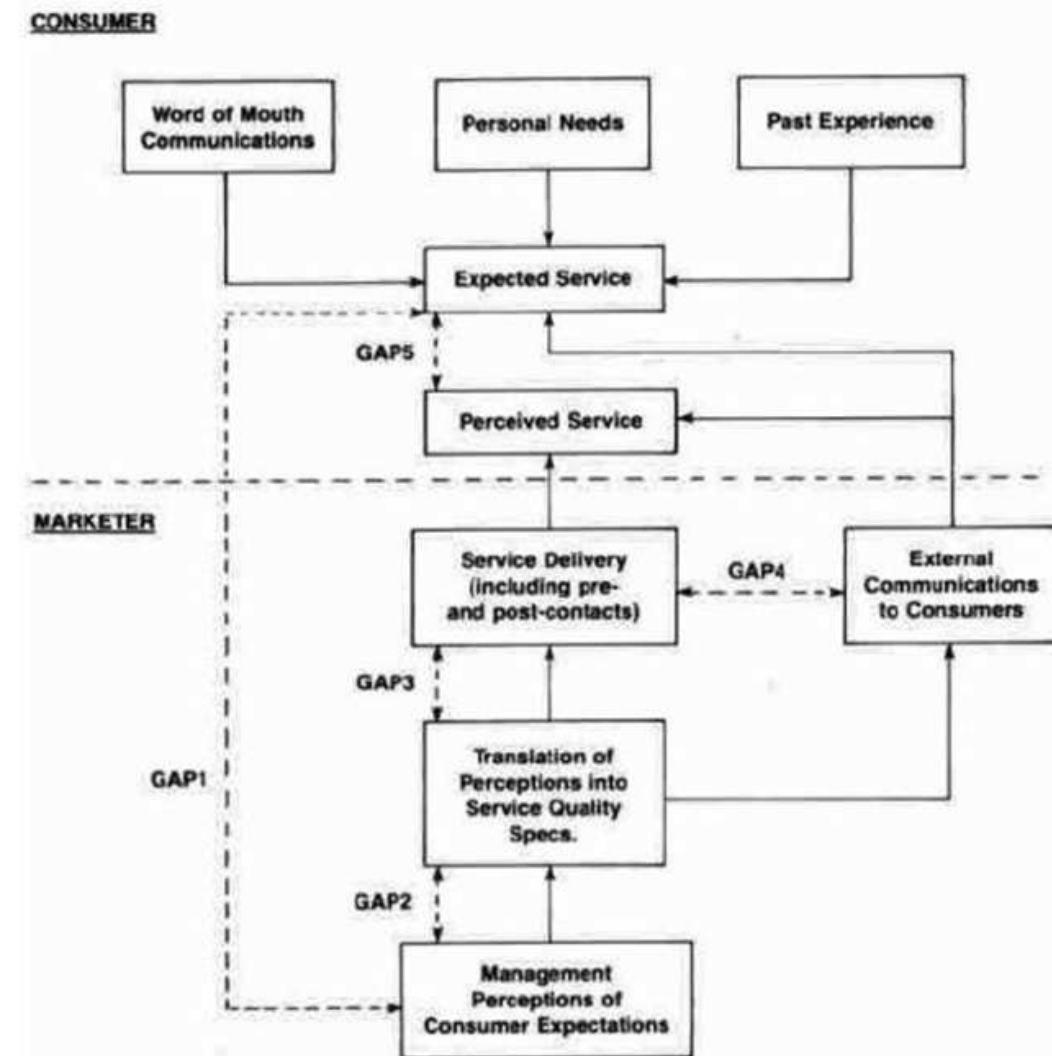
$$SQ_i = \sum_{j=1}^{k} P_{ij}$$

Fig. 2 Source: A. Parsuraman, Valarie A Zeithaml and Leonard L Berry, "A Conceptual Model of Service Quality and its Implications for Future Research", Journal of Marketing, fall 1985, p.44.

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REVIEW OF LITERATURE

Service Quality In Education

During the last decade, quality initiatives have been the subject of an enormous amount of practitioner and academic discourse, and at various levels have found a gateway into higher education (Avdjieva and Wilson, 2002). In the US many academic institutions have implemented such policies in response to a reduction in student funding, complaints by employers and parents, as well as the pioneering success of such drives in many corporate businesses (Kanji and Tambi, 1999).

However, since the early to mid 1990s a stream of work has explored aspects of service quality relating to the teaching and learning factors, and the environmental attributes influencing higher education (Harrop and Douglas, 1996; Narasimhan, 1997; and Shank et al., 1995), with the majority of such investigations using student evaluations to assess quality (Rowley, 1997; Aldridge and Rowley, 1998).

S.NO.	YEAR	AUTHOR	FINDINGS
	1982	Crosby	Quality is conformance to requirements.
	1982	U. Lehtinen and J. R. Lehtinen	Conceptualized service quality as comprised of three dimensions: physical quality; interactive quality, and corporate quality. Physical quality dimensions refers to the quality of physical elements of service, including tangible products elements that accompany the service offer, supporting equipment and the physical environment where service takes place. Interactive quality dimension refers to the quality of interaction between customer and other elements of service experience, i.e. service personnel, other customers, and machinery and equipment. Corporate quality is the quality dimension which is developed through the years of existence of a service company. It has a symbolic nature and refers to the way potential customers view the corporate entity, its image or profile
	1985	Parasuraman, Zeithaml and Berry	They identified ten dimensions of service quality, which were presented together with a model of service quality. They were accessibility, reliability, responsiveness, competence, courtesy, communication, credibility, security, understanding the customer, and tangibles
	1984	Gronroos	Service quality is comprised of two dimensions: technical quality and functional quality. Technical quality concerns the outcome, or what the customer received from the service and can be measured similarly to the assessment of product quality. Functional quality concerns the process of evaluating the manner of delivering the service. 1988JuranQuality is fitness for use, the extent to which the product successfully serves the purpose of the user during usage.
	1991	Parasuraman et al.	Reported that SERVQUAL scale is a very useful starting point for measuring service quality and that SERVQUAL can be supplemented with additional findings regarding gap scores. They support their scale, arguing that SERVQUAL can be used in various industries, modified when necessary according to industry characteristics.
	1991	Stewart and Felicetti	Reported that a majority of students' in their study were dissatisfied with their business school for what they perceived to be insufficient orientation assistance on their arrival at the school.
	1995	Hill	Suggests there may well be a `mismatch' between students' expectations and their perceived quality. Using a framework that he developed to investigate a small sample of accounting undergraduates in the UK, he discovered that negative results (P-E) emerged in terms of academic service factors, including course content, teaching quality, teaching methods, personal contact with academic staff, feedback, and student involvement with curriculum.
	1996	Owlia & Aspinwall	Conceptually arranged thirty `quality characteristics' into six dimensions named `tangibles', `competence', `attitude', `content', `delivery', and `reliability' as a framework for future tests in a SERVQUAL - type structure

S.NO.	YEAR	AUTHOR	FINDINGS
	1996	Tomovick, Jones and Al-Khatib	Examined the factors that influence the service quality perceptions of international students in US business schools. They adapted the SERVQUAL for an educational setting. It contained 20 of the original 22 SERVQUAL items. They dropped, after pretesting, two items deemed inappropriate for the educational setting. They assessed both discriminant and convergent validity of the modified scale, keeping the five dimensions of the SERVQUAL (tangibles, reliability, responsiveness, assurance, and empathy). They found that international business students considered tangibles (e.g. of appealing facilities) one of the two most important factors in their assessment of educational service quality.
	1997	Adee	Suggests that several `university characteristics' may be useful in explaining the perceived quality among students, these being an emphasis on competent teaching, the availability of staff for student consultation, library services, computer facilities, recreational activities, class sizes, level and difficulty of subject content, and student workload.
	1997	Pariseau and McDaniel	used the SERVQUAL framework to draw comparisons between faculty members and undergraduate students regarding their expectations and perceptions of professors.
	1999	Ford et al.	Suggest that because of the high competitive intensity surrounding business related courses, institutions need to better understand the nature and quality of service offered. They also warn that blanket strategies may not be applicable globally, as different cultures could have different service quality needs.
	1999	Long et al.	used `gap analysis' to develop a number of questions in order to compare what students `look for' (expect) and what they `experience' on a course.
	2000	Oldfield and Baron	Empirical findings from a sample of students studying in the UK revealed three factors that appear to be important in a business and management faculty. These were labelled `requisite' - items which were deemed essential to enable students to fulfil their studies, `acceptable' as those aspects students feel are desirable, and `functional' - representing items of a practical or utilitarian value.
	2000	Sander et al.	Examined undergraduates' expectations and preferences in teaching, learning and assessment.
	2001	Lampley	Formed a number of question statements relating to responsiveness / caring, records / paperwork, university services, accessibility / safety, knowledge / scheduling, facilities / equipment, and public relations to measure expectations and perceptions among doctoral students in six US universities.
	2001	Wisniewski	Suggests that SERVQUAL can be applied across a broad range of service organizations coming from different sectors, since it employs psychometric testing and trials. Indeed, since its introduction, SERVQUAL scale has been tested and used in various contents.
	2002	O'Neill	Using a modified SERVQUAL scale undertook a longitudinal study on a sample of undergraduate students in Western Australia. Although his findings demonstrated that the measurement items failed to load on the five prescribed SERVQUAL dimensions, he discovered that student perceptions of quality had deteriorated - suggesting service quality in higher education may be influenced by time.
	2003	Vidal et al.	The researchers suggest that `guidance services', in `professional', `academic' and `personal' matters play an integral part of the education process in Spain.
	2003	Lau	Many American institutions are experiencing a loss in students not returning to campus to complete under graduate programmes. As a result she provides a conceptual framework consisting of three factors based on learning, teaching and resources (Institutional Administrators, Faculty, and Students) which are considered to influence student involvement /learning, which in-turn leads to student retention, and graduation.
	2003	LaBay and Comm	Developed a number of measures to evaluate student expectations and perceptions, concerning their tutor, on a sample of undergraduate and distance learning students. Using a wide range of scales
	2003	Ham and Hayduk	Delineate that the dimensions of SERVQUAL may be intrinsically linked to the overall quality of service as well as customer satisfaction.

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OBJECTIVES OF STUDY

The main objectives of this study are:

(1) To explore the services offered by Institutions of higher education.

(2) To find the expectation and perception of students about the services offered to students studying in Institutions of higher education

(3) To determine whether there is any gap between the expectations and perception of students about services offered by Institutions of higher education.

(4) To determine whether students getting value to their fee against the services offered by the Institutions of higher education.

(5) To determine whether students are overall satisfied with the services offered by the Institutions of higher education and how much satisfied they are to recommend others also.

RESEARCH METHODOLOGY

An action research approach was adopted for this line of investigation. In depth personal interviews were undertaken with the Head of Departments and Director of Post-Graduate and Under-graduate Programmes. Two focus group discussions were also performed at this stage. The first took place with Head of Departments, who have responsibility for the daily operations and welfare of such students. The second was conducted with four postgraduate and four undergraduate students. Such exploratory research methods can prove beneficial for generating ideas and obtaining further insights in order to build on the literature. After each interview and focus group, various modifications were made to the instrument based upon the recommendations offered. The framework was then later tested with a small sample of post-graduate and under-graduate students. The entire procedure proved invaluable in helping to develop, test and refine an instrument designed to measure service quality among

postgraduate and undergraduate students, and thus provided a significant input into the overall research process. The final instrument consisted of three constituent parts. The first section outlined nineteen statements that were modified from the original SERVQUAL instrument, and this part was used to measure students' expectations prior to coming to the college of higher education. Two subsequent dimensions were added, and these were labeled `guidance' (items referring to the guidance and support elements provided), and `institution' (items referring to the facilities that the institute provides). Similar statements were later used in the second section to obtain the students' perceptions. This part also contained a series of questions relating to the performance measures that were earlier highlighted. In an attempt to avoid respondent confusion, seven item likert scales were used throughout, anchored by 1 - Strongly Disagree through to 7 ± Strongly Agree.

For each of the statements, mean values of Perception (P) and Expectation (E) are calculated whereas the third column in the table 1a and 1b represents the gap between the expectation and perception of students towards the higher education institutions. i.e. Gap = P E (Parasuraman et al., 1988). The three columns in the table 1a and 1b given the mean scores of summarized results of the perception, expectation and gap scores. However total mean scores and dimension wise average is also shown so that in order to deep understanding of the dimensions required for improving the quality of services in the higher education. The expectation and perception items were measured using a seven point scale, from 1 = strongly disagree, to 7 = strongly agree, with four serving as a mid point / neutral opinion on the scale. Mean scores greater than four identify a tendency for respondents to agree with a particular statement, whereas means of less than four indicate disagreement.

RESULTS

Table Ia: Mean Scores for the SERVQUAL Expectations and Perceptions			
DIMENSIONS	PERCEPTION(P)	EXPECTATION(E)	P – E
Responsiveness			
1. Prompt services by employees of Institution	4.81	5.77	- 0.96
2. Teaching and Non teaching staff willing to help students	5.24	6.00	- 0.76
3. Prompt response to requests of students by employees	4.65	5.49	- 0.84
TOTAL	**14.7**	**17.26**	**-2.56**
AVERAGE TOTAL	**4.9**	**5.75**	**- 0.85**
Assurance			
4. Instill confidence	4.76	5.57	- 0.81
5. To be courteous	5.01	5.52	- 0.51
6. Have knowledge	5.24	6.08	- 0.84
TOTAL	**15.01**	**17.17**	**- 2.16**
AVERAGE TOTAL	**5.00**	**5.72**	**0.72**
Empathy			
7. Teaching staff provide individual attention to students	4.08	5.28	- 1.2
8. Support staff provide individual attention to students	4.04	5.31	- 1.27
9. Employees of Institution understand needs of students	3.95	5.37	- 1.42
10. Employees of Institution have best interests at heart	4.18	5.23	- 1.05
11. Institutions have convenient hours	4.07	6.16	- 2.09
12. Institutions offfice has convenient hours	4.18	5.78	- 1.6
TOTAL	**24.5**	**33.13**	**- 8.63**
AVERAGE TOTAL	**4.08**	**5.52**	**- 1.44**
Tangibles			
13. Institutions have modern looking equipment	5.29	5.46	- 0.17
14. The employees are neat and clean.	5.34	5.81	- 0.47
15. Materials of the Institution is visually appealing	5.03	5.58	- 0.55
TOTAL	**15.66**	**16.85**	**- 1.19**
AVERAGE TOTAL	**5.22**	**5.61**	**- 0.39**
Reliability			
16. Employees of Institution deliver services on-time	5.19	6.06	- 0.87
17. Employees of Institution are ready to solve problems	4.63	5.84	- 1.21
18. Employees of Institution perform right the first time	4.86	5.77	- 0.91
19. Employees inform of events and services	5.04	5.87	- 0.83
TOTAL	**19.72**	**23.54**	**- 3.82**
AVERAGE TOTAL	**4.93**	**5.88**	**- 0.95**
SERVQUAL TOTALS	**89.59**	**107.95**	**- 18.36**
SERVQUAL AVERAGE	**4.826**	**5.696**	**- 0.87**

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Table Ib: Mean Scores for the Institution and Guidance Dimensions			
DIMENSIONS	PERCEPTION(P)	EXPECTATION(E)	P – E
Institution			
20. Adequate sports and recreation facilities in Instituion	4.22	5.54	- 1.32
21. Location of Campus is suitable	5.45	5.73	- 0.28
22. Layout of campus is suitable	5.15	5.42	- 0.27
23. Library facilities are suitable	5.71	6.52	- 0.81
24. Adequate books are available in library	4.83	6.22	- 1.39
25. Healthcare provisions are adequate in the Institution	4.64	5.50	- 0.86
26. Financial services are adequate in the Institution	3.92	5.21	- 1.29
27. Class sizes are suitable	4.22	5.87	- 1.65
28. Appropriate level / difficulty of study	4.85	5.89	- 1.04
29. Work load is adequate	4.85	5.56	- 0.71
30. Students are treated as a client	4.44	4.87	- 0.43
31. Comfortable lecture theatres available for the students	4.84	6.24	- 1.4
32. Sufficient computing facilities	5.41	6.17	- 0.76
33. Adequate study areas	4.48	5.87	- 1.39
34. Adequate media support	4.49	5.95	- 1.46
35. Refreshment areas are suitable and comfortable	4.07	5.38	- 1.31
36. Reasonably priced refreshments is available for students	3.47	5.84	- 2.37
TOTAL	**79.04**	**97.78**	**- 18.74**
AVERAGE TOTAL	**4.65**	**5.75**	**- 1.10**
Guidance			
37. Suitable career guidance provided by faculty and placement cell	4.66	5.84	- 1.18
38. Suitable academic guidance by the faculty of Institution	5.12	6.08	- 0.96
39. Guidance on personal matters by the Personal contact forum	4.15	5.09	- 0.94
40. Guidance on cultural issues	4.26	5.22	- 0.96
41. Suitable induction facility	4.45	5.48	- 1.03
TOTAL	**22.64**	**27.71**	**- 5.07**
AVERAGE TOTAL	**4.528**	**5.542**	**- 1.014**
SERVQUAL TOTALS	**101.68**	**125.49**	**- 23.81**
SERVQUAL AVERAGE	**4.589**	**5.646**	**- 1.057**

Service Quality gaps (P E) is being shown in the third column of the table 1a and 1b. It is being observed that all the values in this column are negative, which shows that students expect more from the institutions providing higher education. It shows services are falling short of students expectations.

Paired Sample T-Test Statistics about Services offered by Institutions

Table II represent the significant difference between the perception and expectation of services offered by the Institutions to students on all the dimensions and forty one statements. Two of the paired items under

the tangibles dimension modern looking equipment and neat employees were found to be significant at _ <.05. It can be concluded here that there is a significant difference between the students' expectations and perceptions of services offered by Institutions to students at the 95 per cent confidence level. However, for all the other statements, there is a statistical significance of _ <.01, which illustrates a statistically significant gap between the students' perceptions and expectations of services offered to them at the 99 per cent confidence level.

Table II: Paired Sample T-Test Statistics		
DIMENSIONS	t-value	p-value
Responsiveness		
1. Prompt services by employees of Institution	6.87	.000
2. Teaching and Non teaching staff willing to help students	6.45	.000
3. Prompt response to requests of students by employees	5.08	.000
Assurance		
4. Instil confidence	6.37	.000
5. To be courteous	5.05	.000
6. Have knowledge	6.39	.000
Empathy		
7. Teaching staff provide individual attention to students	7.24	.000
8. Support staff provide individual attention to students	6.84	.000
9. Employees of Institution understand needs of students	7.94	.000
10. Employees of Institution have best interests at heart	5.81	.000
11. Institutions have convenient hours	9.55	.000
12. Institutions offfice has convenient hours	8.58	.000
Tangibles		
13. Institutions have modern looking equipment	2.24	.027*
14. The employees are neat and clean.	2.18	.031*
15. Materials of the Institution is visually appealing	4.52	.000
Reliability		
16. Employees of Institution deliver services on-time	6.54	.000
17. Employees of Institution are ready to solve problems	7.95	.000
18. Employees of Institution perform right the first time	7.51	.000
19. Employees inform of events and services	5.49	.000
Institution		
20. Adequate sports and recreation facilities in Instituion	7.55	.000
21. Location of Campus is suitable	2.68	.007
22. Layout of campus is suitable	3.51	.001
23. Library facilities are suitable	5.84	.000
24. Adequate books are available in library	8.24	.000

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DIMENSIONS	t-value	p-value
25. Healthcare provisions are adequate in the Institution	6.54	.000
26. Financial services are adequate in the Institution	8.12	.000
27. Class sizes are suitable	8.44	.000
28. Appropriate level / difficulty of study	5.44	.000
29. Work load is adequate	4.21	.000
30. Students are treated as a client	2.54	.006
31. Comfortable lecture theatres available for the students	8.75	.000
32. Sufficient computing facilities	5.46	.000
33. Adequate study areas	7.48	.000
34. Adequate media support	7.86	.000
35. Refreshment areas are suitable and comfortable	6.33	.000
36. Reasonably priced refreshments is available for students	9.24	.000
Guidance		
37. Suitable career guidance provided by faculty and placement cell	6.48	.000
38. Suitable academic guidance by the faculty of Institution	6.21	.000
39. Guidance on personal matters by the Personal contact forum	5.42	.000
40. Guidance on cultural issues	8.78	.000
41. Suitable induction facility	7.21	.000

Table IIIa: The Correlates of Student Value (in terms of fees paid)			
DIMENSIONS	Beta	t	sig
Responsiveness	0.87	0.766	0.139
Assurance	0.07	0.101	0.912
Empathy	0.370	2.883	0.000
Tangibles	0.034	0.388	0.291
Reliability	0.064	0.562	0.568
R	**0.852**		
R Square	**0.754**		
R Square (Adj)	**0.649**		

ANOVA

Model	Sum of Squares	df	Mean Square	F	sig
Regression	51.11	5	10.222	6.681	.000
Residual	147.02	96	1.53		
Total	198.13	101			

REGRESSION ANALYSIS

In order to analyze and generalize the results regression analysis is being done to find the relationship between certain dimensions and variables. All the five factors i.e. Tangibility, Reliability, Responsiveness, Assurance and Empathy are taken as the independent variables while other factors i.e. value for fees paid, satisfaction with the experience and willingness to recommend are serving as the dependent variables. The data is being represented below. All the dimensions i.e. Tangibility, Reliability, Responsiveness, Assurance and Empathy are regressed against one another to check the problem of multicollinearity. In all cases, no significant multicollinearity exists between the dimensions.

The above table IIIa illustrates that there is a strong correlation of 0.852 between dimensions and value in terms of fees paid. It means there is a strong positive correlation between the service dimensions and the value in terms of fees paid. The value of adjusted R2 is 0.649 this is being taken as it is a case of multiple correlation where dimensions itself can correlate and affect the line of best fit which clearly indicates that 64.9% variances in value in terms of fees paid are explained by the service quality dimensions. From the ANOVA table it is clear that the service quality dimensions are significant to explain the value in terms of fees paid as the significant value is less that 1% level of significance. The beta factor is higher in case of Empathy that is 0.370 it means the institutions has to concentrate more on this service quality dimension as this is the most important dimension for predicting the perception of customers regarding value in terms of fees paid.

The above Table IIIb illustrates that there is a strong correlation of 0.849 between service quality dimensions and overall satisfaction of students in terms of services offered by the institutions of higher education. It means there is a strong positive

Table IIIb: The Correlates of Student Satisfaction with the Experience			
DIMENSIONS	Beta	t	sig
Responsiveness	0.117	0.943	0.348
Assurance	0.062	0.516	0.605
Empathy	0.173	1.270	0.207
Tangibles	- 0.057	-0.559	0.576
Reliability	0.149	1.170	0.245
R	**0.849**		
R Square	**0.703**		
R Square (Adj)	**0.621**		

ANOVA

Model	Sum of Squares	df	Mean Square	F	sig
Regression	19.54	5	3.908	3.591	0.003
Residual	104.50	96	1.088		
Total	124.04	101			

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Table IIIc: The Correlates of the Students' Willingness to Recommend			
DIMENSIONS	Beta	t	sig
Responsiveness	0.094	0.692	0.491
Assurance	0.069	0.513	0.609
Empathy	0.061	0.409	0.684
Tangibles	- 0.034	-0.324	0.747
Reliability	0.165	1.203	0.234
R	0.817		
R Square	0.792		
R Square (Adj)	0.718		

ANOVA

Model	Sum of Squares	df	Mean Square	F	sig
Regression	13.98	5	2.796	1.967	0.000
Residual	136.47	96	1.421		
Total	150.45	101			

correlation between the service dimensions and overall satisfaction of students in terms of services offered by the institutions of higher education. The value of adjusted R2 is 0.703 this is being taken as it is a case of multiple correlation where dimensions itself can correlate and affect the line of best fit which clearly indicates that 70.3% variances in overall satisfaction of students are explained by the service quality dimensions. From the ANOVA table it is clear that the service quality dimensions are significant to explain the overall satisfaction of students as the significant value is less that 1% level of significance.

The above table IIIc illustrates that there is a strong correlation of 0.817 between service quality dimensions and willingness to recommend. It means there is a strong positive correlation between the service dimensions and willingness to recommend. The value of adjusted R2 is 0.718 this is being taken as it is a case of multiple correlation where dimensions itself can correlate and affect the line of best fit which clearly indicates that 71.8% variances in willingness to recommend are explained by the service quality

dimensions. From the ANOVA table it is clear that the service quality dimensions are significant to explain the overall satisfaction of students as the significant value is less that 1% level of significance.

CONCLUSION

It is to suggest that here the Institutions of higher education are performing sufficiently well in terms of the dimensions of the SERVQUAL model. The negative gap score is argued in terms of students' lack of experience and knowledge to judge certain dimensions. Therefore, to some extent the gaps may be inevitable, and the issue of `experience' comes into the equation, which has been previously raised as one of SERVQUAL's limitations (c.f. Buttle, 1996). As each of the dimensions of the SERVQUAL model, containing forty one statements, tested significantly, the institution could adopt a corporate policy drive to improve quality across the board. However, a more focused approach may be to focus on those areas considered to be of most relative importance as perceived among the sample. From the data collected, it was discovered that the Reliability and

Institution dimensions appeared to be the two most relatively important factors. Both had relative percentage scores a few percent higher than the Responsiveness, Tangibles, Empathy, Assurance, and Guidance dimensions. The findings suggest that students were not impressed by certain lecture theatres, the lack of study areas, class sizes, and insufficient media support. Hence, certain lecture theatres need to be re-vamped, and there is a genuine need to create study rooms for post-graduates, reduce class sizes, and provide more technical support facilities.

LIMITATIONS OF STUDY

It is recommended that more research should be undertaken amongst the students studying in institutions of higher education on a global basis. Such kind of research will provide the fruitful data and results can be used in comparing the services being provided by the institution.

REFERENCES

Adee, A. (1997). Linking Student Satisfaction and Service Quality Perceptions: The Case of University Education, European Journal of Marketing, 37(7), 528-535.

Aldridge, S., & Rowley, J. (1998). Measuring Customer Satisfaction in Higher Education, Quality Assurance in Education, 6(4), 197-205.

Avdjieva, M., & Wilson, M. (2002). Exploring the Development of Quality in Higher Education, Managing Service Quality, 12(6), 372-383.

Babakus, E., & Mangold, W. G. (1992). Adapting SERVQUAL Scale to Hospital Services: An Empirical Investigation, Health Services Research, 26(1), 767-86.

Barnes, B. (2007). Analysing service quality: the case of postgraduate Chinese students, Total Quality Management and Business Excellence, 18(3), 313331.

Bordley, R. (2001). Integrating Gap Analysis and utility theory in service research , Journal of Service Research, 3, 4.

Berry, L. L., Parasuraman, A., & Zeithaml, V. A. (1988). The service-quality puzzle, Business Horizons, September/ October.

Christou, E., & Sigala, M. (2002). Conceptualising the measurement of service quality and TQM performance for hotels: the HOSTQUAL model, Acta Touristica, 14(2), 140169.

Cronin, J. J., Brady, M. K., & Hult, G. (2000). Assessing the Effects of Quality, Value, and Customer Satisfaction on Consumer

Behavioral Intentions in Service Environments. Journal of Retailing, 76(2), 193-218.

Crosby, P. B. (1979). Quality is Free. McGraw Hill, New York, NY.

Crosby, P. B. (1984). Quality without Tears. McGraw Hill, New York, NY.

Ekinci, Y. (2004). An Investigation of the Determinants of Customer Satisfaction, Tourism Analysis, 8, 197203.

Fick, G.R., & Ritchie, J. R. B. (1991). Measuring Service Quality in the Travel and Tourism Industry, Journal of Travel Research, 30(2), Autumn, 2-9.

Ford, J. B., Joseph, M., & Joseph, B. (1999). Importance-Performance Analysis as a Strategic Tool for Service Marketers: The Case of Service Quality Perceptions of Business Students in New Zealand and the USA, The Journal of Services Marketing, 13(2), 171-181.

Fornell, C. (1992). A national Customer Satisfaction Barometer: The Swedish Experience. Journal of Marketing, 56(1), 621.

Gould-Williams, J. (1999). Impact of Employee Performance Cues on Guest Loyalty, Perceived

Value and Service Quality, Service Industry Journal, 19(3), 97118.

Gronroos, (1984). A Service Quality Model and its Marketing Implications, European Journal of Marketing, 18(4), 73-82.

Ham, L., & Hayduk, S. (2003). Gaining Competitive Advantages in Higher Education: Analyzing the Gap between Expectations and Perceptions of Service Quality, International Journal of Value Based Management, 16(3), 223-238.

Harrop, A., & Douglas. (1996). Do Staff and Students see Eye to Eye?, New Academic, 5, 8-9.

Hill, F. M. (1995). Managing Service Quality in Higher Education: The Role of the Student as Primary Consumer, Quality Assurance in Education, 3(3), 10-20.

Juran, J. M., & Gryna, F. M. (1988). Juran's Quality Control Handbook. Jr (Eds.) McGraw-Hill, New York.

Kanji, G. K., & Tambi, A. M. B. A. (1999). Total Quality Management in UK Higher Education Institutions, Total Quality Management, 10(1), 129-153.

LaBay, D. G., & Comm, C. L. (2003). A Case Study Using Gap Analysis to Assess Distance Learning versus Traditional Course Delivery, The International Journal of Education Management, 17(6&7), 312-317.

Lampley, J. H. (2001). Service Quality in Higher Education: Expectations versus Experiences of Doctoral Students, College and University, 77(2), 9-14.

Lau, L. K. (2003). Institutional Factors Affecting Student Retention, Education, 124(1), 126-136.

Long, P., Tricker, T., Rangecroft, M., & Gilroy, P. (1999). Measuring the Satisfaction Gap: Education in the Market Place, Total Quality Management, 10(4&5), 772-778.

Narasimhan, K. (1997). Improving Teaching and Learning: Perceptions minus Expectations Gap Analysis Approach, Training for Quality, 5, 121-125.

Nyeck, S., Morales, M., Ladhari, R., & Pons, F. (2002). 10 years of service quality measurement: reviewing the use of the SERVQUAL instrument. Cuadernos de Diffusion, 7(13), 101-107.

Oldfield, B. M., & Baron, S. (2000). Student Perceptions of Service Quality in a UK University Business and Management Faculty, Quality Assurance in Education, 8(2), 85-94.

O'Neill, M. (2003). The influence of time on students' perceptions of service quality: The need for longitudinal measures, Journal of Educational Administration, 41(3), 310325.

Owlia, M. S., & Aspinwall, E. M. (1996). A Framework for the Dimensions of Quality in Higher Education, Quality Assurance in Education, 4(2), 12-19.

Parasuraman, A., Zeithaml, V.A., & Berry, L.L. (1985). A Conceptual Model of Service Quality and Its Implications for Future Research, Journal of Marketing, 49, 41-50.

Parasuraman, A., Zeithaml, V.A., Berry, L.L. (1988). SERVQUAL: A Multiple Item Scale for Measuring Service Quality, Journal of Retailing, 64(1), 12-40.

Parasuraman, A., Zeithaml, V., & Berry, L.L. (1991b). Refinement and reassessment of the SERVQUAL scale, Journal of Retailing, 67(4), 420-450.

Parasuraman, A., Zeithaml, V., & Berry, L.L. (1993). Research note: more on improving service quality measurement, Journal of Retailing, 69(1), 140-147.

Parasuraman, A., Zeithaml, V., & Berry, L.L. (1994). Reassessment of expectations as a comparison standard in measuring service quality: implications for future research, Journal of Marketing, 58, January, 111-124.

Pariseau, S. E., & McDaniel, J. R. (1997). Assessing Service Quality in Schools of Business, The International Journal of Quality and Reliability Management, 14(3), 204-215.

Petruzzellis, L., D'Uggento, A. M., & Romanazzi, S. (2006). Students'Satisfaction and Quality of Service in Italian universities, Managing Service Quality, 16(4), 349364.

Rowley, J. (1997). Beyond Service Quality Dimensions in Higher Education and Towards a Service Contract, Quality Assurance in Education, 5(1), 7-15.

Sahney, S., Banwet, D. K., & Karunes, S. (2004). A SERVQUAL and QFD approach to total quality education: A student perspective, International Journal of Productivity and Performance Management, 53(2), 143166.

Saleh, F., & Ryan, C. (1992), Analysing service quality in the hospitality industry using the SERVQUAL model, Services Industries Journal, 11(3), 324-343.

Sander, P., Stevenson, K., King, M., & Coates, D. (2000). University Students' Expectations of Teaching, Studies in Higher Education, 25(2), 309-323.

Shank, M., Walker, M., & Hayes, T. J. (1995). Understanding Professional Service Expectations: Do we Know What our Students Expect in a Quality Education?, Journal of Professional Services Marketing, 13, 71-89.

Srikanthan, G. (1999). Universities and quality: A world view, in 11th International Conference on Assessing Quality in HE, Manchester, UK.

Tapiero, C. S. (1996). The Management of Quality and its Control, Chapman and Hall, London.

Vidal, J., Diez, G., & Vieira, M. J. (2003). Guidance Services in Spanish Universities, Tertiary Education and Management, 9(4), 267-280.

Zafi ropoulos, C., Fragidis, G., Kehris, E., Dimitriadis, S., & Paschaloudis, D. (2005). Service quality assessment in higher education, the case of Technological Educational Institute (T.E.I.) of Serres, Greece, in 9th International Conference on Marketing and Development: Marketing Contributions to Prosperity and Peace, Thessaloniki, Greece, June 811.

BIOGRAPHY

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A Comparative Study on Statistical Software Packages with Reference to Graphical Tools

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Software packages provide good platform to perform the statistical computations and data analysis. One of the important features of these packages is the tools available for drawing statistical graphs. Since graphs are considered to be important tool for analyzing data, often comparisons are made among the software packages based on the graphical tools available in them by default. This paper attempts to make a comparison among the statistical software packages based on the graphical tools available in these packages. Information about the graphical tools is collected from the various web sites. Ranks of the packages were calculated and a final list is prepared as per the ranks.

Keywords: Statistical Graphics, ICT, Data Visualization.

INTRODUCTION

During the late 50s and 60s three statistical software packages, BMDP, SPSS and SAS were developed. The first among them was BMDP and its development started in 1957, at the UCLA Health Computing Facility. Three Stanford University graduate students, Norman H. Nie, Dale H. Bent and C. Hadlai Hul, developed SPSS in the year 1968. SAS was developed almost simultaneously with SPSS, since 1968 by computational statisticians at North Carolina State University (Leeuw, 2009). With the development in the field of personal computer the second generation of statistical software started to appear in the market in the 80's. The two main statistical software packages that appeared in the market during the period were Data Desk in the year 1985 and JMP in 1989. Data Desk and JMP gave much emphasis on the graphical user interface as they were mainly developed for Macintosh platform. Features like dynamic graphics and graphical widgets to portray and interactively manipulate data sets were the main attractions in those software packages. While these two packages were famous for their graphical interfaces, second generation statistical software STATA was having command line interface. Development of STATA started in the year 1985. While the main features of Data Desk and JMP were graphical user interface (GUI) and interactive graphics, they were too difficult to

extend. On the other hand, STATA mainly emphasized on extensibility and user generated code. In the early eighties, John Chambers and his team started developing S language, which was thought to be the alternative of MATLAB in Statistics. For history and development of S one can look into the works of Chambers (2008) and Becker (1994). Initially, S was distributed free of cost in academic institutions and was only used by the researchers in higher educational institutions. Insightful corporation later purchased S from AT & T and marketed it as S plus. S plus was fully dominating the market until R and LISP-STAT came in. In the year 1990, Luke Tierney developed LISP-STAT, a statistical environment embedded in the LISP interpreter. It became a good alternative to R, as it was more readily available and friendlier to personal computers. It became easier to extend the code written in either C or LISP. It had dynamic graphics capability and these graphics could be programmed and extended easily. During 2000, active development of LISP-STAT was stopped and R was available as an alternative. Ihaka and Gentlemen (1996) developed R incorporating some of the features from two earlier languages, S and Scheme.

In 1996, SPSS acquired BMDP and after that BMDP started disappearing from the market. Again in the year 2009, IBM acquired SPSS and changed its name to Predictive Analytics Software (PASW). As the name reflects, the focus of SPSS shifted from social science research to social science data analysis and business analytics. The same development is going on in SAS as well. Originally SAS was the abbreviated 'Statistical Analysis System'.

For history and development of Statistical software packages, one may go through the book by Francis (1981). He discussed about sixty software packages for statistical analysis. Hayes (1982) provided detailed study of various features and origin of 213 software packages available till 1980. Francis (1981) made the first systematic effort to measure the efficiency of the statistical software packages used in industry and academics. For history and development of statistical software one may see Foxwell (1984), an issue of Capital PC Monitor specially dedicated to statistical software packages available for IBM PCs. Other studies in this regard include Longley (1967), Wampler (1970), Wilkinson and Dallal (1977), Anscombe (1967), Hayes (1982), Wilkinson (1985), Simon and Lesage (1988, 1989), etc.

The developments in the field of Information and Communication Technology (ICT) take place in rapid speed. There are number of new software packages introduced into the market and old ones are modified several times to survive in this competitive market. Robertson and Nelson (2010) reviewed some software packages capable of space time disease surveillance analysis and analyzed some of their salient features, shortcomings and usefulness. Some more literature in this area includes Callert (2003), Oster (2003), Proctor (2006), Altman and Jackman (2011).

Because of the recent development of information and communication technology, collection and storage of large dataset has become easier. At the same time the complexity in analyzing these datasets also increased. Earlier when the size of the dataset used to be comparatively smaller, managing and analyzing the data were easy as well. If the result was to be reproduced, that too could be done without much effort. But, large datasets needs lots of calculations before they can be made ready for analysis and reproducing the result of analysis also got complex. With the near-exponential growth of PC computing power, many statistical techniques are available at the desk-top, provided by software packages that cover a wide range of analyses and statistical graphics (Morgan, 1998). A wide range of statistical software packages are available in the present market. The users often get perplexed to choose one package among them. Every software package seems to have its own set of unique features

and ready to provide the user the best bid. Although the exact number of software packages available is hard to determine, but by a careful investigation through various websites, one can find existence of some several hundreds of software packages of these type. There are several websites providing such information, but specific mention can be made to the following web addresses,

http:// statpages.org/ javasta2.html

http:// www.math.yorku.ca/ SCS/ StatResource.html

http:// www.stata.com/ links/ statistical-software-providers/

http:// www.amstat.org/ careers/ statisticalsoftware.cfm

http:// en.wikipedia.org/ wiki/ Comparison_of_statistical_packages

These web addresses provide information about a large number of statistical software packages available in the current market. One can follow the links to visit the home pages of the software packages. Most of the packages are standalone, while a few are there which can be used as Add-Ins for various packages like Microsoft Excel. The software packages are mostly priced, while some of them are open sourced and can be downloaded free of cost. Most of the companies providing the priced software packages offer free trial versions for a limited period.

OBJECTIVES OF THE PAPER

The objective of the paper is to make a comparative study of the statistical software packages currently available in the market, based on the graphical tools available in those packages.

SELECTION OF THE SOFTWARE PACKAGES

The web addresses were visited in search of statistical software packages available. A total of 112 statistical software packages were found from the various sources. Table 1 shows the complete list in alphabetic order.

Table 1 List of Statistical Software Packages	
Alphabet	**Software Packages**
A	ADaMSoft, Algebrator, Analyse-it, ASReml
B	Baudline, BMDP
C	CoStat and CoPlot - from CoHort Software
D	DADiSP, DAP, DataDesk, Dataplot, DataScene, Descartes (plotting tool)
E	EasyPlot, EditGrid, Epi Info, EpsTk, EViews
F	Fityk, FlexPro, FreeMat
G	GAUSS, GenStat, GeoGebra, GLE, GLIM - Genstat from the Numerical Algorithms Group (NAG), GNU Octave, Gnumeric, Gnuplot, Grace, GrADS, Graph, Graphis GraphPad Prism, Graphviz, Gretl
I	IDPS, IGOR Pro
J	JFreeChart, jHepWork, JMP
K	KChart, Kig, Kst
L	LabPlot, LabVIEW
M	Maple, Mapping Contouring System, MathCad, Mathematica, MATLAB, Mavis, Maxima, MedCalc, Minitab, MLPlot, Monarch Charts,
N	NCSS Statistical Software, NMath Stats, Nucalc, Numbers (iWork), NumXL
O	OpenEpi, OpenPlaG, Origin, OxMetrics
P	Paraview, PDL, PGPLOT, Physics Plot, ploticus, PLplot, Primer, PSPP
Q	QtiPlot
R	R, RATS, Revolution Analytics, RLPlot, RRDtool
S	SAGE, Salstat, SAS, SAS System, SciDAVis, Scilab SciPy, NumPy, matplotlib modules for Python, SHAZAM SigmaPlot, SigmaXL, S-Lang, SOCR, SPlus, S-PLUS, SPSS, Stata, Statgraphics, STATISTICA, Statistical Lab, StatPlanet, StatPlus, SymPy, Sysquake, Systat
T	Tableau, Teechart
U	UNISTAT
V	Visifire, VisIt
W	Winpepi, WPS
X	XploRe

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After collecting names of the software packages, web sites of the respective software packages were visited for the purpose of collection of information regarding the availability of the data visualization tools in the packages. Some of the packages were not having any data visualization tools and hence those names were discarded from the list. Also, in case of some other packages, the websites were not having enough details about the data visualization tools in those packages. Hence, those were not considered further as well. After making a careful investigation, a list of 17 software packages were made from that list of 112. The rest were discarded mainly because either those were not having the sufficient data visualization tools in their packages or the websites were not having enough information regarding the availability of data visualization tools in the software packages. Table 2.2 lists the 17 software packages selected after filtering the list.

Table 2 List of software selected finally for comparison	
SI No	Name of the software
1	Analyse IT
2	BMDP
3	CoPlot
4	Data Plot
5	E View
6	Gauss
7	JMP
8	Mapple
9	Minitab
10	SAS
11	SPSS
12	STATA
13	Statgraphics Centurion
14	STATISTICA
15	SYSTAT
16	UNISTAT
17	Winks

METHODOLOGY

The information about the availability of the graphical tools in different software packages were collected visiting the websites. In some cases, where the information was not adequate in the respective websites, trial versions of those packages were installed and relevant information was collected. The whole list of data visualization tools were divided in three different categories, i.e., one dimensional, two dimensional and 3 or n-dimensional graphics. Then the frequency (number) of visualization tools for each packages under each category were collected. Appendix I shows the list of software and availability of the data visualization tools under above mentioned three categories. The table in Appendix I consider the name of software along the columns and the plots along the rows. The entry '1' in the cell indicates the presence of the corresponding plot in the software named along the column and '0' indicates its absence. The analysis can be performed in two steps.

Step I: Initially we perform Cochran's Q test to check if the different software have identical effects for the different graphical tools for the three different categories of plots viz. one dimensional, two dimensional and 3 or n-dimensional graphics separately. The Cochran's Q statistic (Cochran, 1950) is defined as,

$$Q = [K(K-1)]\frac{\left[\sum_{j=1}^{m}\left(C_j - \left[\frac{G}{K}\right]\right)^2\right]}{\sum_{i=1}^{n} R_i(K - R_i)} \sim \chi^2_{k-1} \qquad ...(1)$$

where K is the total number of software packages

C_j is the column total for the jth software under a given category

R_i is the row total for the ith graphical tools in a given category

G is the grand total for the category under consideration

In case the test results indicates significant difference in the effect of the software then step 2 is taken up which is a type of composite index based on ranks.

Step 2: The software packages were having different frequencies under the three categories. If a single category is given importance and ranks are calculated depending on this, the calculated rank may not reflect the importance of the other two categories. Thus, in the next step of calculation, the ranking, weight for each of the categories were calculated. Generally the simple average gives equal importance to each of the categories, but when variables are weighted to a composite measure, the relative importance of the variables is considered. Iyenger and Sudarshan (1982) opined that the weights vary inversely as the variance in the respective variables. This definition of weight has been used to calculate the weights for the three categories of the graphical tools.

Let x_{ij} be the frequency of graphical tools in the ith category for j^{th} software, where i = 1, represents one dimensional graphical tools, i = 2, represents two dimensional graphical tools and i = 3, represents 3 or n-dimensional graphical tools and j (= 1,2,…, 17) represents the different software packages in the list. If wi be the weight of ith category then it is given by

$$w_i = \frac{c}{\sqrt{var(x_i)}}, i = 1,2,3 \qquad ...(2)$$

Where $\sum w_i = 1$ and C is a normalizing constant which follows $c = \left[\sum_{1}^{3}\frac{1}{\sqrt{var(x_i)}}\right]^{-1}$

The choice of the weights in this way would ensure that the large variation in any one of the factor would not unduly dominate the contribution of the rest of the factors (Iyenger and Sudarshan, 1982).

Following this we calculate a score S_j (j=1,2,…17) for each software using the formula in (3).

$$s_j = \sum_{i=1}^{3} w_i * x_{ij} \qquad ...(3)$$

The next step is to calculate the ranks for the different software packages and for that a well-established method by Olson (2004) was used. The steps of calculation in this method are stated below:

a) Identify the ideal alternative (extreme performance on each criterion) s+:

b) Identify the nadir alternative (reverse extreme performance on each criterion) s-:

c) Develop a distance measure over each criterion to both ideal (D+) and nadir (D-).

d) For each alternative, determine a ratio R equal to the distance to the nadir divided by the sum of the distance to the nadir and the distance to the ideal,

$$R = \frac{D^-}{D^- + D^+} \qquad ...(4)$$

e) Rank order alternatives by maximizing the ratio in Step d.

Following the above mentioned steps , the researchers calculated the ideal alternative of S_j i.e., maximum of S_j and nadir alternative of S_j i.e., minimum of S_j. Then the authors calculated the differences D+, the differences of each S_j from maximum of S_j and D-, differences of each S_j from minimum of S_j. The ranks for each software packages are calculated by using formula in (4).

RESULTS

Table 3. shows the result of the Cochran's Q test. The performance of the packages under different categories of plots viz. one dimensional, two dimensional and 3 or n-dimensional graphics are not same indicated by p-value (less than 0.05) for each of the cases.

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Table 3: Result of Cochran's Q test on data in Appendix			
	Calculated value of Cochran's Q-Statistic	p-value of $\chi^2_{0.05}$ for 16 df	Conclusion
1Dimensional	33.643	0.006	Difference is significant
2Dimensional	41.798	0.0004	Difference is significant
3D/N dimensional	34.949	0.004	Difference is significant

As the effect of the different software varies significantly in each of the different categories so a composite index is developed based on the procedure explained in Step 2 of the previous section. Table 4 provides list of 17 software packages along with their composite score and calculated ranks. The calculations of the ranks are shown in the Appendix II.

CONCLUSION

The ranks calculated for the 17 software packages here are totally based on the graphical tools available in those packages. From Table 4, one can observe that relatively lesser known software package 'Mapple' secured the top position amongst the 17 packages considered for calculation. One of the most popular software used in statistical analysis, SPSS (now IBM SPSS) could only secure the 4th position in the list preceded by Mapple, Statistica and Statgraphics Centurion. SPSS is mainly used in the field of social science research and business analytics. SAS is also in the same field of business analytics and it needs its user to write codes to get the computation done. Minitab commonly used for teaching statistics to the students. The ranks calculated here are only based on the graphical tools and it may change if other analytical features of the software are considered.

Table 4 Calculated scores and ranks of the software packages depending on the available graphic features		
Software	Score	Rank
Mapple	1.0000	1
STATISTICA	0.9252	2
Statgraphics Centurion	0.8826	3
SPSS	0.8772	4
JMP	0.8077	5
UNISTAT	0.6065	6
Minitab	0.5962	7
SAS	0.5728	8
Data Plot	0.4815	9
E View	0.4712	10
Analyse IT	0.3949	11
STATA	0.3729	12
CoPlot	0.3716	13
SYSTAT	0.1703	14
Gauss	0.1511	15
BMDP	0.0220	16
Winks	0.0000	17

Appendix I

	Analyse IT	CoPlot	BMDP	Data Plot	E View	Gauss	JMP	Mapple	Minitab	SAS	STATA	Statgraphics Centurion	STATISTICA	SYSTAT	UNISTAT	Winks	SPSS
One dimensional																	
Bar Plot	1	0	1	0	1	1	1	1	0	1	1	1	1	1	1	1	1
Histogram	1	1	0	1	0	1	1	1	1	0	1	1	1	0	0	0	1
Boxplot	1	0	1	1	1	1	1	1	1	1	1	1	1	0	0	0	1
Mean Error Bar Plot	1	0	0	0	1	0	0	0	0	0	0	0	1	0	0	0	1
XY Graph / Contour Plot	0	1	0	1	0	1	1	1	1	1	0	1	1	0	1	0	0
Error Plot	0	1	0	0	1	0	0	1	0	0	0	0	1	0	1	0	1
Stacked Bar Plot	0	1	0	0	0	0	0	0	0	0	0	1	0	0	0	0	1
Block Plot	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
Mean Plot	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1
Normal Probability Plot	0	0	0	1	0	0	1	1	1	0	0	1	1	0	0	0	1
Hi-Lo-Open-Close chart	0	0	0	0	1	0	0	0	0	0	0	1	0	0	1	0	1
Two dimensional																	
CDF Plot	1	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0
Scatter Plot	1	0	0	1	1	0	1	1	1	1	1	0	1	1	1	0	1
Normal QQ Plot	1	0	0	0	0	0	1	1	0	0	0	1	1	0	0	0	1
Frequency Plot	1	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0
Polar Graphs	0	1	0	0	0	1	0	1	0	0	0	0	0	0	1	0	1
Bi Histogram	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1
Control Chart	0	0	0	1	0	0	1	1	1	0	0	1	0	0	0	0	1
SD Plot	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1
Area Plot	0	0	0	0	1	0	1	1	0	1	1	0	0	1	1	0	1
Spike Plot	0	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0
Seasonal Plot	0	0	0	0	1	0	0	1	1	0	0	0	0	0	0	0	1
Bland Altaman Plot	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0
Pareto Curve	0	0	0	0	0	0	0	1	1	0	0	0	0	0	0	0	1
Density Chart	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	0	0
Three/n dimensional																	
Scatterplot Matrix / correlation matrix	1	1	0	0	0	0	1	0	1	0	1	1	1	0	0	0	1
3D Graph	0	1	0	0	0	0	0	1	1	0	0	1	1	0	0	0	1
Triangle Graph	0	1	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
Star plot	0	0	0	1	0	0	0	0	0	1	0	0	0	0	0	0	0
3D Scatter Plot	0	0	0	0	0	0	1	0	0	0	0	0	1	0	1	0	1
Bubble Plot	0	0	0	0	0	0	1	1	0	1	0	1	0	0	0	0	0
Surface Plot	0	0	0	0	0	0	0	1	0	1	0	1	1	0	1	0	0
Radar Chart	0	0	0	0	0	0	0	0	0	1	0	1	0	0	0	0	0
Icon Plot	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	0	0

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Appendix II

Software	Uni Dimensional	Two Dimensional	Thee/n Dimensional	Sij	diff with maximum	diff with minimum	D+	D-	R	Rank
Analyse IT	4	5	1	3.01522	-3.34969	2.1863366	3.34969	2.186337	0.394929	11
CoPlot	4	1	3	2.886024	-3.478886	2.0571414	3.478886	2.057141	0.371592	13
BMDP	2	1	0	0.950622	-5.414288	0.121739	5.414288	0.121739	0.02199	16
Data Plot	6	4	1	3.494412	-2.870498	2.6655293	2.870498	2.665529	0.481488	9
E View	5	7	0	3.437271	-2.927639	2.6083879	2.927639	2.608388	0.471166	10
Gauss	4	1	0	1.665529	-4.699381	0.8366463	4.699381	0.836646	0.151128	15
JMP	5	8	4	5.300312	-1.064598	4.4714293	1.064598	4.471429	0.807696	5
Mapple	6	11	4	6.36491	0	5.5360269	0	5.536027	1	1
Minitab	4	8	2	4.129195	-2.235715	3.3003123	2.235715	3.300312	0.596152	7
SAS	4	4	4	4	-2.36491	3.171117	2.36491	3.171117	0.572815	8
STATA	3	6	1	2.893481	-3.471429	2.0645976	3.471429	2.064598	0.372939	12
Statgraphics Centurion	7	5	5	5.714907	-0.650003	4.8860243	0.650003	4.886024	0.882587	3
STATISTICA	7	6	5	5.950622	-0.414288	5.121739	0.414288	5.121739	0.925165	2
SYSTAT	1	6	0	1.771742	-4.593168	0.9428586	4.593168	0.942859	0.170313	14
UNISTAT	5	5	3	4.186337	-2.178573	3.3574537	2.178573	3.357454	0.606474	6
Winks	1	2	0	0.828883	-5.536027	0	5.536027	0	0	17
SPSS	9	12	3	7.266154	0.901244	6.4372709	0.901244	6.437271	0.87719	4
SD	2.124783726	3.222165877	1.866894244							
1/SD	0.470636135	0.310350254	0.535648981							
K	0.759511724									
Weight	0.357453662	0.235714657	0.406831681							
max (Sij)	6.364909921									
min (Sij)	0.828882976									

REFERENCES

BMDP Statistical Software. (2012). Retrieved May 28, 2013, from http://www.statistical-solutions-software.com/: http://www.statistical-solutions-software.com/bmdp-statistical-software/bmdp/

The GAUSS™ Mathematical and Statistical System. (2012). Retrieved May 29, 2013, from http://www.aptech.com/: http://www.aptech.com/products/gauss-mathematical-and-statistical-system/

About IHS EViews. (2013). Retrieved May 29, 2013, from http://www.eviews.com/: http://www.eviews.com/general/about_us.html.

Analyse It Standard Edition. (2013). Retrieved May 28, 2013, from http://analyse-it.com/: http://analyse-it.com/products/standard/

JMP® STATISTICAL DISCOVERY SOFTWARE. (2013). Retrieved May 29, 2013, from http://www.jmp.com/: http://www.jmp.com/software/jmp10/

Altman, M., & Jackman, S. (2011). Nineteen Ways of Looking at Statistical Software. Journal of Statistical Software, 1-11.

Anscombe, F. (1967). Computing in Statistical Science through APL. New York: Springer-Verlag.

Becker, R. (1994). A Brief History of S. Technical report. Retrieved March 6, 2013, from http://www2.research.att:http://www2.research.att.com/areas/stat/doc/94.11.ps.

Callaert, H. (2003). Comparing Statistical Software Packages: The Case of the Logrank Test in StatXact. The American Statistician, 214-217.

Chambers, J. M. (2008). Software for Data Analysis Programming with R. California: Springer.

Cochran, W.G. (1950). The Comparison of Percentages in Matched Samples. Biometrik, 37 (3/4), 256–266.

CoPlot Software for Great Scientific Graphs, Maps, and Technical Drawings. (n.d.). Retrieved May 28, 2013, from http://www.cohort.com/: http://www.cohort.com/coplot.html

Foxwell, H. J. (1984). Capital PC Monitor. Gaithersburg.: Capital PC User Group.

Francis, I. (1981). Statistical Software: A comparative Review. New York.

Hayes, A. (1982). Statistical Software: A Survey and Critique of its developement. Arlington: Office of the Naval Research.

Heckert, A., & Filliben, J. (2002, October 9). Dataplot summary. Retrieved May 28, 2013, from http://www.itl.nist.gov/: http://www.itl.nist.gov/div898/software/dataplot/summary.htm

Ihaka, R., & Gentleman, R. (1996). R: A Language for Data Analysis and Graphics. Journal of Computational and Graphical Statistics, 299-314.

Leeuw, J. D. (2009, December 23). Statistical Software - Overview. Retrieved February 12, 2013, from http://statistics.ucla.edu: http://statistics.ucla.edu/system/resources/BAhbBlsHOgZmSSI+MjAxMi8wNS8xNi8xNF81MV8yNF8xNzhfU3RhdGlzdGljYWxfU29mdHdhcmVfT3ZlcnZpZXcuGRmBjoGRVQ/Statistical%20Software%20-%20Overview.pdf.

Longley, J. W. (1967). An appraisal of least-squares for the electronic computer from the point of view of the user. Journal of the American Statistical Association, 819-841.

Morgan, W. T. (1998, February). A Review of Eight Statistics Software Packages for General Use. The American Statistician, 52, 70-82.

Oster, R. A. (2003). An Examination of Statistical Software Packages for Categorical Data Analysis Using Exact. The American Statistician, 201-213.

Oslon, D. L. (2004). Comparison of Weights in TOPSIS Models. Mathematical and Computer Modelling, 721-727.

Proctor, J. L. (2006). SPSS vs. excel: Computing software, criminal justice students, and statistics. Journal of Criminal Justice Education, 433-442.

Robertson, C., & Nelson, T. A. (2010). Review of software for space-time disease surveillance. International Journal of Health Geographics, 9-16.

Simon, S. D., & Lesage, J. P. (1988). Benchmarking numerical accuracy of statistical algorithms. Computational Statistics and Data Analysis, 197¬-209.

Simon, S. D., & Lesage, J. P. (325--332). Assessing the accuracy of ANOVA calculations in statistical software. Computational Statistics and Data Analysis, 1989.

Tanenbum, A. S., & Woodhull, S. A. (2001). Operating Systems Design and Implementations. New Delhi: Prentice Hall of India.

Tierney, L. (1990). LISP-STAT: An Object-Oriented Environment for Statistical Computing and Dynamic Graphics. New York: John Wiley and Sons.

Wampler, R. H. (1970). A report on the accuracy of some widely used least squares computer programs. Journal of the American Statistical Association, 549-565.

Wilkinson, L. (1985). Statistics Quiz. Evanston: SYSTAT, Inc.

Wilkinson, L., & Dallal, G. E. (1977). Accuracy of sample moments calculations among widely used statistical programs. The American Statistician, 128-131.

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A Study on Financial Literacy and Its Determinants among Gen Y Employees in Coimbatore City

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Financial literacy is the mix of one's knowledge, skill and attitude towards financial matters. It helps to make informed decisions and contributes to the well being of an individual. Research has been conducted globally for measuring the level of financial literacy. And also financial literacy survey has been conducted at country level by the governments. Most of the surveys have thrown light on their poor level of financial literacy. This study focuses on financial literacy among Generation Y employees and to examine how well-equipped they are to make financial decisions. An attempt has been made through this study to measure the level of financial literacy of Gen Y employees. Findings of the study depict that gender, education, income and age impacts the level of financial literacy. This study would help in adopting appropriate strategies to improve the level of financial literacy amongst the Gen Y employees.

Keywords: Financial Literacy, Financial decisions, Gen Y.

INTRODUCTION

Financial literacy is the major challenge faced by all countries globally. Financial literacy is the mix of one's acquaintance, skill and attitude towards financial matters. It helps to make informed decisions and contributes to the well being of an individual. In today's world which has a market with complicated products, the need for financial literacy becomes predictable. Country like India which has high young population, the government is in a position to increase the level of financial literacy. The government and other private institutions have taken ladder through financial education programs.

Financial literacy goes beyond the provision of financial information and advice. It is the ability to know, monitor, and efficiently use financial sources to enhance the welfare and economic refuge of an individual, his family, and his business. The OECD defines financial literacy as "A combination of awareness, acquaintance, skill, attitude and behaviour necessary to make sound financial decisions and ultimately achieve individual financial well being."

Financial literacy is mainly concerned with better planning of retirement life, gradual wealth accumulation and better financial decision making. So to be financially literate becomes important from the initial stages of one's career. But due to some personal or professional hindrances they become financially illiterate. This leaves them with incompetent knowledge about financial dealings, unacceptable decisions etc., So, they have to be enhanced with financial knowledge and tools which are needed to make informed decisions. Financial literacy impacts the promotion of financial inclusion which ultimately results in financial stability of any economy. The need for financial literacy in India has benefited importance because of low level of literacy and large section of population which is financially excluded from the formal financial set up.

Research has been conducted worldwide for measuring the level of financial literacy. And also financial literacy survey has been conducted at country level by the governments. Most of the surveys have thrown light on their poor level of financial literacy. This study focuses on financial literacy among Generation Y employees and to examine how well-equipped they are to make financial decisions. The research also concentrates on their sources, their knowledge and the challenges faced by them in financial matters.

NEED FOR THE STUDY

Complicated financial products, low level of awareness and lack of knowledge about financial matters makes the want of financial literacy noteworthy. The level of financial literacy differs from individual to individual. Gender gap also plays an important role is deciding the level of financial literacy. A woman's decision or relationship with money is often determined by her personal life experience. Emotion, money and family are interlinked in the life of a woman. Lack of equipped access to consistent information to make informed decision leads to low level of confidence and knowledge about financial issues. Life changes like, new employment, divorce or separation, demise of the partner, are some of the stressful stimulators in an individual's life.

The reforms introduced in financial markets have reduced the scope of governments and employers in supporting the employees to plan their future financial needs. So, the responsibility of managing and deciding their future financial needs has increased among the young employees. High job insecurity, uncertain income and easy access to consumption credit have a great influence on their financial behaviour. Very less research has been done on financial literacy. A country like India with high young demographic dividend and socio-economic diversities should undergo researches in this topic. With 65 percent of its population under the age of 35, India today asserts one of the largest available workforces in the world. A large segment of this demographic belongs to the Gen Y group. So, measuring financial literacy among the people under the age of 35 becomes important. This research focuses on measuring the financial literacy among Generation Y employees in Coimbatore city.

OBJECTIVES

The objectives of the study includes

1. To determine the level of financial knowledge of the young employees

2. To understand the challenges and goals youth have with the financial matters

3. To measure the level of financial literacy of young employees

4. To find out the relationship between financial literacy and various demographic and socio-economic factors.

REVIEW OF LITERATURE

Increased variety of financial products and the instability of the global economy in twenty first century caused increasing complexity of financial decisions and also caused consumers to face the challenges in economic and financial activities. For this reason, in the last decade, the significance of

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financial management skills in personal and work life has increased and researches in this area has been done. Financial Development is widely recognized as an important determinant of economic growth, with a large literature examining the determinants of the supply of banking and financial intermediation services (Levine (2005).Yet, the determinants of the demand for financial services are much less well understood, particularly in emerging market countries.

Some of the reviews of the existing studies are listed below.

Studies by Marcolin and Abraham (2006); Schuchardt et al., (2008); Remund (2010) and Huston (2010) found that " Despite the rapid growth of interest in and funding for financial literacy and financial education programs, it remains the case that the field of financial literacy has a major obstacle to overcome: the lack of a widely disseminated measure of financial literacy, developed through rigorous psychometric analyses".

Michael (2009) argues that "a lack of financial literacy can hamper the ability of individuals to make well-informed financial decisions. For people who exhibit problems with financial decision making, financial advice has the potential to serve as a substitute for financial knowledge and capability".

Agarwalla Sobhesh Kumar, Barua Samir, Jacob Joshy, Jayanth R. Varma (2012) conducted a study among 3000 individuals, and found that " Financial knowledge among Indians is very low than the International standards. But the financial behaviour and attitude of the employees who are retired seems to be positive. The financial knowledge among the women are marginally higher than the men. Greater access to consumption credits has influenced the financial behaviour of the young employees".

Financial literacy was examined among wave11 individuals which showed that the financial literacy is low and lesser than what one third of the young adult possess in terms of the basic knowledge of interest rates, inflation and risk diversification. Financial literacy was strongly related to socio demographic characteristics and family financial sophistication. Specifically, a college educated male whose parents had stocks and retirement savings was about 45 percentage points more likely to know about risk diversification than a female with less than a high school education whose parents were not wealthy (Lusardi, Mitchell and Curto 2006).

Sages and Grable, (2009) in their study found that "the individuals who has the lowest level of financial risk tolerance is the least competent in terms of financial matters, have the lowest subjective evaluation of net worth and are less satisfied with their financial management skills. The level of financial risk tolerance of the individuals determines the financial behaviour".

Ansong and Gyensare (2012) conducted a study among 250 UG and PG University students of Cape Coast which reveals that " the age and work experience are positively related to Financial literacy. Also, mother's education is positively correlated with respondents' financial literacy. But, level of study, work location, father's education, access to media and the source of education on money has no influence on financial literacy".

Responsibility of money management lies with parents. Parents are the source of financial information. They are confident about their financial future. Their parents are successful in money management and they take them to be their role models in deciding upon financial matters, as per the Canadian Institute of Chartered Accountants CICA Youth Financial Literacy Study 2011.

The level of financial literacy required depends upon the financial needs and behaviour of an individual. From the above studies, it is inferred that financial literacy is highly influenced by age, region or country in which the individual resides, the financial environment which he experiences, the level of income, socio demographic factors like his family,

number of dependents, mother's education, financial advice etc. And most of the studies have focused either on college students or adults as a whole. The need to know the level of financial literacy of various groups and especially Gen Y employees becomes inevitable.

METHODOLOGY

For the purpose of the study, a survey was conducted amongst Generation Y employees of Coimbatore City. Respondents were selected conveniently. Primary data from the respondents was collected by using a structured questionnaire. A total of 200 respondents constituted a sample for this study. Out of the 200 questionnaires only 189 were duly filed and were used for the study.

To measure the financial literacy level, questions about personal finance were asked from the respondents. The questions were asked in order to measure the respondent's knowledge in the areas of financial numeracy, savings and investments, borrowings, insurance, risk and return.

Along with which questions related to financial attitude and behaviour were also asked.

Total score for each respondent is calculated. The total for each respondent was further converted into their percentage score and financial literacy index is developed. The following hypotheses are developed.

Hypothesis 1:

H0: There is no association between gender and financial literacy level of Gen Y employees.

H1: There is an association between gender and financial literacy level of Gen Y employees.

Hypothesis 2:

H0: There is no association between age and financial literacy level of Gen Y employees.

H1: There is an association between age and financial literacy level of Gen Y employees.

Hypothesis 3:

H0: There is no association between education and financial literacy level of Gen Y employees. H1: There is an association between education and financial literacy level of Gen Y employees.

Hypothesis 4:

H0: There is no association between income and financial literacy level of Gen Y employees.

H1: There is an association between income and financial literacy level of Gen Y employees.

Hypothesis 5:

H0: There is no association between marital status and financial literacy level of Gen Y employees.

H1: There is an association between marital status and financial literacy level of Gen Y employees.

The hypothesis of this study has been tested with the help of ANOVA. The hypothesis has been tested at 5% significance level.

RESULTS AND DISCUSSIONS

The above table depicts the demographic profile of the respondents. Nearly 60% of the respondents are male. Majority if the respondents fall under the age group of 31-35 yrs. 41% of the respondents have completed their post graduation. Majority of them are married. Most of the respondents have 1 dependent and the respondents who earn Rs.10001 to Rs.20000 is relatively low when compared to other categories. The above profile shows that majority has completed at least their under-graduation and are married.

Association between Gender and financial literacy level

Based on gender, the results it is clear that male employees working are more financial literate as compared to female employees .The mean score of male employees working is 69.80% as compared to mean score of female employees working (41.2%).

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Table 1. Demographic and Socioeconomic Details of the Respondent			
S.No	Demographic factors	No. of respondents (Frequency)	Percentage
1	GENDER		
	a) Male	113	59.8
	b) Female	76	40.2
2	AGE		
	a) 20-25 yrs	47	24.9
	b) 26-30 yrs	56	29.6
	b) 31-35 yrs	86	45.5
3	EDUCATIONAL QUALIFICATION		
	a) Schooling	21	11.1
	b) Diploma / ITI	27	14.3
	c) Undergraduate	63	33.3
	d) Post graduate	78	41.3
5	MARITAL STATUS		
	a) Married	122	64.5
	b) Unmarried	67	35.5
6	NO. OF DEPENDENTS		
	a) 1	76	40.2
	b) 2	64	33.9
	c) 3	32	16.9
	d) Above 3	17	9.0
7	MONTHLY INCOME		
	a) Rs.10000	52	27.5
	b) Rs.10001-20000	34	17.9
	c) Rs. 20000–30000	49	25.9
	d) > Rs. 30000	54	28.7

Source: Primary data

From the table it can be seen that F value is significant- at 5% significance level, hence H0 of hypothesis 1-There is no association between Gender and financial literacy level is rejected. Thus it can be concluded that the level of financial literacy differs between male and female respondents.

Association between age and financial literacy level

Table 2 shows the mean score of financial literacy level for different age groups. There is no great difference in the level of financial literacy among the different age groups. From the table, it can be seen that F value is not significant at 5% significance level, hence H1 of hypothesis 2-There is an association between age and financial literacy level is rejected. Thus it can be concluded that financial literacy level does not depend on age.

Association between education and financial literacy level

Table 2 shows that financial literacy level is correlated with the level of education. More the education level more is the level of financial literacy. Table 2 shows that financial literacy level is highest for respondents who have PG degree (61.4%) followed by those respondents who have under graduate degree (48.3%). From the table it can be seen that F value is significant- at 5% significance level. Hence H0 of hypothesis 3-There is no association between education level and financial literacy level is rejected. Thus it can be concluded that financial literacy level depends on the education level.

Association between Income and financial literacy level

The results of the Table 2 indicates that more the income, more will the level of financial literacy. Table 2 shows that financial literacy level is highest for respondents having income level above 30,000 (63.7%) per month followed by those who earn between Rs. 20-30 thousand (52.9.06%) per month. From the table it can be seen that F value is significant- at 5% significance level. Hence H0 of hypothesis 4 - There is no association between income and financial literacy level is rejected. Thus it can be concluded that financial literacy level depends on the income of a person.

TABLE: 2 MEAN & F VALUES OF FINANCIAL LITERACY LEVEL					
S.No	Demographic factors		Mean	F Value	Significance
1	GENDER	a) Male	69.8	55.07	0.000
		b) Female	41.2		
2	AGE	a) 20-25 yrs	48.9	1.354	0.241
		b) 26-30 yrs	49.6		
		b) 31-35 yrs	45.5		
3	EDUCATIONAL QUALIFICATION	a) Schooling	31.1	12.87	0.002
		b) Diploma / ITI	42.3		
		c) Undergraduate	48.3		
		d) Post graduate	61.3		
5	MARITAL STATUS	a) Married	64.5	30.94	0.000
		b) Unmarried	45.2		
6	NO. OF DEPENDENTS	a) 1	40.2	7.9	0.002
		b) 2	53.9		
		c) 3	61.9		
		d) Above 3	49.6		
7	MONTHLY INCOME	a) Rs.10000	57.5	30.51	0.000
		b) Rs.10001-20000	47.9		
		c) Rs. 20000–30000	52.9		
		d) > Rs. 30000	63.7		

Source: Primary data

Association between marital status and financial literacy level

On the basis of marital status we have divided the respondents into four categories i.e. married, unmarried, separated and widow. But we have respondent from married and unmarried category. Table 2 shows that married employees have higher financial literacy level as compared to unmarried employees. From the table it can be seen that F value is significant- at 5% significance level. Hence H0 of hypothesis 5-There is no association between marital status and financial literacy level is rejected. Thus it can be said that nature of marital status influences financial literacy level of the respondents.

Association between number of dependents and financial literacy level

When we look the level of financial literacy with respect to number of dependents, it can be observed that financial literacy is high with the respondents who have 3 dependentOverall financial literacy level of 50.9% among generation Y employees is not very

encouraging. Financial literacy level of males is higher than that of females. Financial literacy does not depend on age. From the study we can say that the respondents whose age is less than 30 has high financial literacy than those who fall under the age group of 31-35 yrs. Level of financial literacy is positively related to education and income level i.e. our results indicate that financial literacy level increases with increase in education and income level. The results are statistically significant. The employees who got married are more financially literate as compared to those in unmarried employees and the difference is statistically significant.

CONCLUSION

From the above analysis it can be concluded that overall financial literacy level of 50.90% among all respondents is not encouraging. This shows that in our city people are still not much aware about their finance related issues. Earlier studies have shown that the savings habit among young people is not so high. Likewise the whole burden of planning their future in terms of finance is on the young individuals, as employee benefits are reduced. Early purchased through credit cards have changed the financial behaviour of the current generation employees. All this has an impact on their financial position. Need for proper financial literacy and information related to financial matters becomes inevitable.

The results of the study suggest that level of financial literacy varies significantly among respondents based on various demographic and socio-economic factors. It can be concluded that financial literacy level gets affected by gender, education, income, marital status and number of dependent whereas it does not get affected by age. Overall it can be concluded that financial literacy level is low among Gen Y employees in our Coimbatore city and necessary measures should be taken by government to increase awareness about financial related matters.

REFERENCES

Abraham Ansong, Michael Asiedu Gyensare (2012). Determinants of University Working-Students' Financial Literacy at the University of Cape Coast, Ghana, International Journal of Business and Management, 7(9), 126-135.

Bruine de Bruin, Wandi, Wilbert van der Klaauw, Julie S. Downs, Baruch Fishhoff, Giorgio Topa, and Olivier Armantier. 2010. Expectations of Inflation: The Role of Demographic Variables, Expectation Formation, and Financial Literacy. The Journal of Consumer Affairs, 44: 381-402.

Edwards, Michael C., and Maria O. Edelen. 2009. Special Topics in IRT. In Quantitative Methods in Psychology, edited by Roger E. Millsap and Alberto Maydeu-Olivares (178-198). Los Angeles, CA: Sage.

Marcolin, Sonia and Anne Abraham. 2006. Financial Literacy Research: Current Literature and Future Opportunities. Paper presented at the Proceedings of the 3rd International Conference on Contemporary Business Conference. Leura, NSW, Australia.

Huston, Sandra. J. 2010. Measuring Financial Literacy. The Journal of Consumer Affairs. 44: 296-316.

Joyce K.H. Nga, Lisa H.L. Yong, Rathakrishnan D. Sellappan, (2010). A study of financial awareness among youths. Young Consumers: Insight and Ideas for Responsible Marketers, 11 (4), 277 290.

Lusardi, A., Mitchell, O.S., and Curto, V. (2006). Financial literacy among the young. Journal of Consumer Affairs, 44(2), 358380.

Lusardi, Annamaria and Olivia S. Mitchell. 2007. Financial Literacy and Retirement Planning: New Evidence from the RAND American Life Panel. CFS Working Paper Series, 2007/ 33.

Lusardi, Annamaria and Olivia S. Mitchell. 2009. How Ordinary Consumers Make Complex Economic Decisions: Financial Literacy and Retirement Readiness. Working Paper, Dartmouth College. http:/ / www.dartmouth.edu/ ~alusardi/ Papers/ LusardiMitchellOrdinaryConsumers.pdf.

Remund, David. L. 2010. Financial Literacy Explication: The Case for a Clearer Definition in an Increasingly Complex Economy. The Journal of Consumer Affairs, 44:276-295.

Ronald A. Sages, John E. Grable (2009). Financial Numeracy, Net Worth, and Financial Management Skills: Client Characteristics That Differ Based on Financial Risk Tolerance. Journal of Financial Service Professionals, 57-65.

Schuchardt, Jane. Sherman D. Hanna. Tahira K. Hira, Angela C. Lyons, Lance Palmer. and Jing Jian Xiao. 2008. Financial Literacy and Education Research Priorities. Journal of Financial Counseling and Planning, 20: 84-95.

Volpe, Ronald P., Joseph E. Kotel, and Haiyang Chen. 2002. A Survey of Investment Literacy Among Online Investors. Financial Counseling and Planning, 13: 1-13.

Wainer, Howard. 1995. Precision and Differential Item Function on a Testier-Based Test: The 1991 Law School Admissions Test as an Example. Applied Measurement in Education, 8: 157-186.

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The Conditional Performance of
Indian Mutual Fund Managers: A New look

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This study seeks to examine the market-timing performance of the selected open-ended mutual fund schemes of Unit Trust of India (UTI) based on traditional as well as conditional measures. It is assumed that use of predetermined public information variables and capture of time variation in Treynor & Mazuy (1966) measure produces better market-timing performance than the traditional measures. Here, the expectation of market-timing performance is conditioned on public information variables. In conditional model, beta is a function of a set of predetermined public information. Similarly, the term gamma in Treynor & Mazuy (1966) model is also a function of the vector of public information variables, which is discussed and finally, modified the conditional model. The study reports that after conditioning public information variables in Treynor & Mazuy (1966) measure the market-timing performance looks better than the traditional model.

Key Words: *Mutual Fund, Treynor& Mazuy, Ferson & Schadt, Market-Timing*

INTRODUCTION

The analysis of investment performance has been a source of academic interest for many years. Generally, the investment performance concerns with three dimensions namely 1. Successful prediction of security prices, 2. Efficient estimation of market movement and 3. the ability of the portfolio manager to minimise the degree of diversifiable risk through the activities of portfolio diversification (see. Jensen 1968). The present study confines into the second issue. A considerable study is dealt with the problem of market-timing performance by employing the well known measures of Treynor & Mazuy (1966) and Henrikson & Merton (1981). However, the traditional measures suffer from a number of problems in practice when stock selection or market timing ability is measured. In particular, the traditional measures implicitly assume that risk and expected returns are constant overtime through the evaluation period and hence, the problem of unconditional measures do not take into consideration the fact that risk and expected returns vary with the change of time and therefore, such an unconditional approach is likely to be untrustworthy. Most of the past performance studies have encountered with many problems that ultimately disclosed inability to capture the dynamic behaviour of market returns. As a consequence, Ferson & Schadt (1996) developed an approach to address this problem. They believed that conditional approach is especially popular in investment

performance for two reasons. One is discussed above and the other is trading behaviour of the managers that results in more complex and interesting dynamics than even those of the underlying assets they trade.

In conditional approach, a mechanical market timing rule using such as lagged interest rate data does not add value. Only managers who efficiently use more information than is generally publicly available are considered to have potentially superior investment ability. Some recent studies have documented that the returns and risk of stocks and bonds can be predicted with the change of time, using the relevant information variables like dividend yields, interest rates and many others. If this estimation reflects changing the required returns in equilibrium, then measures of investment performance should capture the time variation.

The present study examines the market-timing performance of the selected mutual fund managers based on traditional measure of Treynor & Mazuy (1966) and the same is examined by conditioning relevant public information variables by applying conditional approach, which is developed by Ferson & Schadt (1996) and finally disclosed the possible explanations for the difference in outcomes, which are derived from the traditional as well as conditional approaches.

The remaining study is organised as follows: section II reviews the existing literature. Section III describes the objectives of the study. Section IV deals with the data and study period. Section V explains about the methodology and hypothesis formulation. Section VI presents the empirical results and analysis. At the end section VII recommends concluding remarks.

LITERATURE REVIEW

The investors have always been willing to invest in mutual funds with the expectation of earning satisfactory return with a minimum degree of expected risk. The performance of the managers

must be examined in the light of the results. However, this seemingly straightforward endeavour is deceptively difficult owing to two foremost issues 1. the choice of benchmark, and 2. the choice of appropriate model. Regarding these two issues no strong consensus has been reached. Although, the issue related to performance evaluation of investment has received serious attention after the establishment of portfolio selection model developed by Markowitz (1952). His contribution has completely revolutionized the way of thinking on that particular issue. Other prominent contributors include Sharpe (1964 &1966), Linter (1965), Treynor (1965), Jensen (1968), Fama (1972) and Modigiliani & Modigiliani (1997) etc whose contributions in investment performance have still been considered as path breaking. With regard to mutual fund performance whose contribution comes first is J. Close (1952). He analyses the differences between the closed-ended and open-ended mutual funds. He reports that the open-ended portion of the industry passes closed-ended funds by the end of 1943. He argues that the growth of open-ended fund is primarily related to the continuous, and well-compensated, sales effort via loads that is undertaken by these funds. After Markowitz, some economists develop normative models dealing with asset choice under condition of risk. In 1958 James Tobin shows that under certain conditions Markowits's model implies that the process of investment of choice can be attributed to two phases: one is the choice of a unique optimum combination of risky assets and the other is a separate choice concerning with the allocation of funds between such a combination of assets and single risk less asset. After a few years, Hicks (1962) develops a model, which is similar to Tobin's measure, which is able to derive corresponding conclusions about the individual investor behaviour, dealing somewhat more openly with the nature of the conditions under which the process of investment choice can be dichotomized. In line with this, Gordon & Gangolli (1962) have elaborately discussed the Hick's process including a rigorous

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proof in the context of a choice among lotteries. However, the above discussion is related to behavioural finance (see. Grossman 1976, Kahneman & Tversky 1979 and Kahneman & Tversky 1979 etc). But, it is true that Markowitz has shown the way of thinking on the issue relating to portfolio selection on which the CAPM is based. The subsequent studies have crystallized discussion on the subject with added refinement, up-gradation and extension of the dimension of the earlier contributions. Since then, various improvements and innovations have been taking place.

The performance evaluation of investment fund has got considerable momentum after the development of CAPM independently by Sharpe (1964), Linter (1965) and Mossin (1966), which is a set of predictors concerning equilibrium expected return on risky assets. This gives birth to security market line (SML). The central difference between the CML and SML is the measure of risk. It is observed from the CAPM that the expected return on a risky asset should be proportional to its sensitivity to the market. This implication is made among others by the assumption that asset prices fully reflect available public information, which is commonly known as efficient market hypothesis (EMH).

In the area of mutual fund performance J.L. Treynor (1965) develops a risk-adjusted performance measure that shows firstly the direction of future researches of mutual fund performance. Sharpe's (1966) article is among the earliest research to evaluate the performance of mutual funds using some of the concepts from modern portfolio theory. He posits that if sound mutual fund management requires the selection of incorrectly priced securities, effective diversification and selection of a portfolio in a given risk class, then there is ample room for major and persistent difference in fund returns. Large number of studies have evaluated portfolio performance by taking into consideration the relative measures of performance and mainly confined into ranking of portfolios. In this very situation Jensen (1968) proposes an absolute

measure of portfolio performance that is able to examine the efficiency of the portfolio managers and provides adequate control over the risk component. His model is a practical application of the theoretical results of the CAPM which is independently developed by Sharpe (1964), Linter (1965) and Mossin (1966). After the establishment of Jensen measure in the perspective of stock selection and market timing, a large number of researchers have empirically examined the above issues. The evidences of those studies in some cases are consistent with the result of Jensen and many of them are contradictory with the Jensen's evidence (see Kon & Jen 1978, Chang & Lewellen 1984, Lee & Rahman 1990, Coggin et al 1993, Moreno et al 2003, Kader & Kuang 2007, Koulis 2011 and Roy & Ghosh 2013 etc).

A large number of studies have focused on the problem of market-timing performance of the mutual fund managers, which is a long standing issue. There are some studies in the past that have attempted to identify the market timing and stock-selection skills of the mutual fund managers. Most of the recent empirical studies of investment performance have focused on selectivity which is based on a mean-variance CAPM framework. Treynor & Mazuy (1966) discuss the fund manager-investor relationship wherein the investors frequently expect that the managers are able to predict the market volatility, and the dilemma of whether or not the managers should attempt to market time. To address the issue, the authors devise a test of mutual fund historical success in predicting major moves in the market by adding a quadratic term in the CAPM. They explain the way that a fund can translate ability to outguess the market into higher return which results in an upwardly concave characteristic line and they report that there is no curvature in characteristic lines for any of the mutual funds and conclude that none of the managers have outguessed the market and the managers should not be held responsible for failing to foresee changes in market direction. Jensen in 1972 reformulates the

model (Jensen 1968) and corrects the results in Jensen (1968) for a portfolio manager's performance when he engages in forecasting the prices of individual securities (stock selection) and for forecasting the general behaviour of the security prices (timing). The analysis indicates that managers who successfully engage in timing activities are penalized by downward biased estimates of performance when using OLS regression. In 1978, Kon & Jen evaluate mutual fund performance by taking into consideration four issues. One of them is the formulation of an econometric model to evaluate an investment manager when he explicitly engages in forecasting the prices of individual securities and in forecasting the future realizations of market factors. They design their performance model in the context of the SLM, Black (1972) and Jensen (1972) models. Although, they develop estimation procedure with the help of switching regression model, which is proposed by Quandt (1972) by including a new identifiably condition. Their empirical evidence regarding their sample mutual funds indicate that a large number of funds have significantly changed their risks pattern during the measurement intervals and the behaviour regarding change in risk level reveals significantly different selectivity, market-timing and diversification performances. To test the market-timing performance of the managers, Merton (1981) develops an equilibrium theory where the predictor guesses the market movement when stocks will outperform the bonds and consequently, bonds will outperform the stocks. But, the model does not predict the magnitude of the superior market-timing performance. Therefore, Henrikson & Merton (1981) extend the work of Merton (1981) to solve the above problem that is highlighted in the Merton's model. They exhibit that the pattern of returns from successful market timing has an isomorphic correspondence to the pattern of returns from certain option investment strategies where the implicit prices paid for the options are less than their fair or market values. They derive an equilibrium theory of value for market skills by using this

isomorphic correspondence. They opine that investment managers can effectively break up events related to security analysis from those related to market timing. They also depict that the market timing performance of the portfolio managers depends on the asset allocation policy regarding investment in the market portfolio of equities and risk less bonds. Similarly, Henrikson (1984) also analyzes the market timing performance of the mutual fund managers based on CAPM. The study reports absence of market-timing performance. He argues that the managers have no valuable information by which they can generate higher returns because the market is informationally efficient, which supports EMH. Jagannathan & Korajczyk (1986) examine the market timing performance of the mutual funds based on parametric test that is proposed by Henrikson & Merton (1981). Similarly, Chang & Lewellen (1984) also examine the market timing performance of the investment managers by using parametric statistical procedure that is proposed by Henrikson & Merton (1984). They report that the managers are inefficient to time the market. Most of the earlier studies use traditional measures of market-timing performances and reports inefficient market-timing activities, which is consistent with the assumptions of EMH (see, Lee & Rahman 1990, Filippas & Psoma 2001, Athanassakas et al 2002, Ibrahim, M.M., 2004, Artikis, G., 2004, Drew, Veeraghvan & Wilson 2005, Santos, Costa et al 2005, Kader & Kuang 2007, Thanou 2008, Koulis et al 2011, M. Joydev 1996, Rao & Venkateswarlu 2000, Amitava Gupta 2002, Irissappane et al 2003, etc). However, some of the earlier studies, which are conducted by using the unconditional measures, have shown positive and sometimes significant market-timing performances (see, Bollen et al 2001, Comer 2006, Jiang et al 2007, Mansor et al 2011, Dhar 2005 etc).

The efficiency of traditional mutual fund performance measures (Treynor 1965, Sharpe 1966, Jensen 1968) does not provide satisfactory results because criticisms are pointed out both at conceptual

and econometric level. The main drawback of those measures is that the assumption of risk and return are constant overtime. But practically it is not applicable. In fact, these measures represent an unconditional approach to performance evaluation in the sense that they do not consider publicly available information about the state of the economy in the estimation of expected returns and risk, assuming that these are constant over time (Leite & Cortez 2005). Practically, both expected return and risk are changed with the change of time. Under these state of affairs, traditional measures (Unconditional) cannot produce the correct performance estimates, since the earlier studies are run off speechless in the normal variation in risk and risk premiums with manager's performance. In piece of evidence, it is well known that the traditional measures are unbiased when portfolio managers exhibit macro-forecasting (market-timing) skills or pursue some vibrant investment strategies resulting in time-varying risk (see Jensen 1972, Grant 1977, Dybvig & Ross 1985, Grinblatt & Titman 1989 etc.).

Studies (see Fama & French 1989, Ilmanen 1995, Pesaran & Timmermann 1995, Silva., Cortez & Armada 2003 etc) have shown that some important public information like dividend yields of index or exchange rates or interest rates if included in the CAPM based performance evaluation model, then stock and bond returns are improved. The findings of those studies have led to significant improvement in the asset-pricing model as well as performance appraisal measures. As, these types of information are publicly available and allow for an assessment of the state of the economy, the investors can frequently use them and keep updating about the expected returns. The conditional measures evaluates the managers' performance after consideration of publicly available information at the time of return creation process (Farnsworth 1997). It is observed from the empirical analysis (see Ferson & Schadt 1996, Ferson & Warther 1996, Chen & Knez 1996, Christopherson, Ferson & Glassman 1998,

Christopherson, Ferson & Turner 1999, Ferson & Qian 2004 etc) that the conditional measure appear to provide better estimates as compared to the traditional measures. According to the arguments of some studies, it is said that conditional model may produce better performance estimates and the model is relevant from an economic point of view because of its ability to detect blueprints in fund betas and sometime allow the investors to scrutinize the dynamic behaviour of the mutual fund managers (Otten & Bams 2004).

USA has widely studied the fund managers performances based on conditional measures. The performance evaluation of the investment managers by using conditional model in the Asian markets particularly in India remains unexplored. A limited numbers of studies have examined mutual fund performances based on conditional model (see Roy & Sovan 2000, and Shanmugham & Zabiulla 2011 etc). The findings of those studies in relation to the majority of other empirical studies are in fact that conditional performance measures look better than those of the unconditional measures.

OBJECTIVES OF THE STUDY

The performance evaluation of mutual fund by using traditional measures has been widely questioned in the literature, as criticism, both at the conceptual and econometric level prevails. One of the most important limitations of these measures is the assumption of existence of a constant risk measure over the evaluation period and the traditional measures do not also consider the publicly available information about the state of the economy changing overtime. But in reality, both expected returns and risk are changed with the state of the economy. Therefore, the unconditional measures tend to produce incorrect performance estimates. In fact, it is well recognised that these measures are biased when portfolio managers exhibit market- timing skills or follow some vibrant investment strategies resulting in time varying risk. Conditional measures evaluate portfolio managers'

performance by taking into consideration the relevant available public information variables, which are available to the investors at the time of generating returns. It is assumed that risk and returns are changed in conditional framework as public information changes with the state of the economy that allows for better estimation of performance coefficients. Practically, it is empirically examined that conditional model provides more reliable estimates in terms of statistical significance. In particular, the objectives of the study are given below:

1. To examine the market timing performance of the open-ended mutual fund schemes based on traditional measure.

2. To analyse the same performance of the open-ended mutual fund scheme based on conditional measure.

3. To make a comparison among such performance based on two measures.

DATA & STUDY PERIOD

Different types of data & their sources:

The objective of the study is to examine the mutual fund performance in relation to end result variables in the form of ex-post returns. Therefore, it is necessary to evaluate mutual fund performance with regard to their adequacy and effectiveness in terms of ex-post returns. The study intends to accumulate required familiarity to make new insights into mutual fund performance based on conditional framework. Accordingly, an attempt is made to analyse managers' performances of sampled open-ended mutual fund schemes and commented on the adequacy of this performances by attributing it to the market timing activities of the managers. Hence, the market timing activities of the mutual fund managers are examined, based on the results of a sample of open-ended mutual fund schemes of Unit Trust of India (UTI). The secondary data is used to examine and evaluate the market timing performance of the open-ended mutual fund

schemes. For the empirical examination of market outguessing, the study primarily considers all the open-ended equity mutual fund schemes, which are solely provided by UTI. Although, the study considers those schemes, which are having at least three years existence in the mutual fund market. It is highlighted that some of the schemes that had stopped their operation during the study period, were also taken into consideration. Hence, the study is not free from survivorship bias. However, some of the authors have addressed this issue that there is no consensus as to the magnitude and significance of this bias and also suggested that its impact is very negligible and / or not statistically significant (see Grinblatt & Titman 1989a, Brown et al 1992, Brown & Goetzmann 1995 and Romacho & Cortez 2006 etc). The study considers the monthly closing net asset values (NAVs) of the individual equity mutual fund schemes. The preference for using such data over price data is guided by the consideration that these are not affected by the double incidence of market volatilities. The information of NAV obtains from the secondary sources like the website of AMFI (www.amfiindia.com) and other sources which provide mutual fund data. The respective sources are crossed checked with other sources that to ensure validity of the data and observed no differences.

Selection of Benchmark Index:

In order to evaluate the investment performance of sample mutual fund schemes it must be compared with the selected benchmark portfolio. As, the sample schemes are having greater equity exposure hence, the study uses BSE sensex as a benchmark portfolio, which is considered an appropriate measure of market proxy for the comparison of investment performance. The choice in favour of BSE sensex over other sensexes existence in India is primarily on account its superiority for a larger standing points apart from the following other considerations favouring its choice:

• As, the large section of mutual fund investors are small and their minds psychologically favour to BSE sensex.

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- BSE sensex is the most preferred indicator in the securities market and regarded as the sensitivity of the capital market barometer.

- About 60% of market capitalisation is accounted for by the BSE sensex and hence, it gets greater weightage.

- A majority of mutual fund resources are invested in equities and the growth funds are however, excessively invested therein.

- BSE sensex being an all equity benchmark is based on blue chip equities of high profile companies, which yields regular return in the form of dividend and also has good potential for capital appreciation.

- It is registered as the pulse of domestic stock market in India.

- Foreign investors heavily rely on BSE sensex.

The monthly information with regard to monthly closing index value is obtained from the website of Bombay Stock Exchange (www.bseindia.org).

The predetermined Information Variables:

The study uses a set of public information variables, which are used by the previous studies for predicting security returns and risk with the change of time with more accuracy. This study uses a set of information variables with the assumption that these information vectors will produce better performance estimates with the change of the state of the Indian economy. The performance evaluation of mutual fund by using conditional measures is scanty in Indian context and the studies have used a very limited number of information variables for the estimation of performance coefficients under the assumption that risk and expected returns are time variant with the state of the economy. This study uses a set of relevant publicly available information which is expected to produce the estimated coefficients with more accuracy under the assumption that risk and expected returns are time variant with the change of the economy. The one month lagged information variables are 1. Monthly

91-day Treasury bill yield of Govt. of India obtained from the website of RBI that carries a fixed rate of return and enjoys a high rate of liquidity and safety since they are backed by the Govt. 2. Monthly Rupee-dollar exchange rates that obtained from the website, www.xrates.com, 3. Monthly Inflation rate that is obtained from the Centre of Statistical Organisation, 4. Monthly Dividend yield of the BSE sensex obtained from the website of Bombay Stock Exchange, 5. Monthly Sales volume of mutual fund schemes obtained from the Association of Mutual Funds of India (AMFI), 6. Monthly Repurchase / Redemptions of mutual fund schemes also obtained from the Association of Mutual Funds in India (AMFI) and 7. Monthly total assets under management of the mutual fund companies that is also obtained from the Association of Mutual Funds of India (AMFI). As Ferson & Schadt (1996), these information variables are demeaned in the conditional test in order to avoid biases in the regression and to allow an easier interpretation of the estimated coefficients.

Study Period:

With a view to examine the conditional performance of the open-ended mutual fund schemes, a period of twelve calendar years (1st January 2001 December 2012) is taken into consideration, which is long enough to have seen a variety of ups and downs in the stock market and recent enough to reflect the complete picture about mutual fund performance. This is because the mutual fund industry in India is newly developed.

RESEARCH METHODOLOGY

The methodology is the tool which is used to attend the purpose of an investigation, a way of solving problems and creating knowledge. It is usually divided into two forms namely qualitative and quantitative methods, which are distinguished in the way the researchers analyse and treat information (Holme & Solvang 1997). Quantitative research is used to describe, explain and aim to

generate validity. Likewise, qualitative research is characterised by the investigators who trying to understand how people experience themselves, their existence and environment (Lundahl & Skarvard 1999).

This study deals with quantitative in nature. A huge number of data is obtained and processed for the estimation of required coefficients. In a quantitative method information is converted into figures and quantities from which statistical inference is drawn. The advantage of quantitative method is its efficiency and it is easier to process a large quantity of figures (Holme & Solvang 1997).

Several research techniques can be adopted when mutual fund performance is evaluated. An explorative study can be used when the area of interest is not yet fully covered. If there already exists a considerable research within the area of interest and the purpose of the study is to explain or describe some parts of the subject, a descriptive research technique can be used. In cases when extensive information is available for the subject in mind and when theories and models have already been formulated, the study is said to be hypothesis verifying. This technique concentrates on tests of given assumptions to examine their accuracy (Davidson & Patel 2003).

Traditional performance measure:

The performance evaluation of a risky investment is the central problem in Finance. Basically, the evaluation of investment performance is mainly concerned with three important issues: 1. Maximisation of investment return through prediction of security prices, 2. Minimisation of the extent of diversifiable risk through the strategy of diversification activities and 3. Maximisation of portfolio return through successful prediction of market movement. In the literature, a lot of studies have dealt with these issues but encountered with the problems of nature and measurement of risk. The past evidences have suggested predominance of risk

in the capital market and the investors perceived that higher return is caused by higher risk. In this respect Sharpe (1964), Linter (1965) and Mossin (1966) have independently developed the CAPM as previously proposed by Markowitz in 1952 to measure the portfolio performance of the risky investment. In 1968, Jensen has proposed an absolute measure of portfolio performance by specifying with the problems of evaluating the predictive abilities of the portfolio managers. Jensen's (1968) differential return measure is based on the assumption of CAPM framework where the risk premium of a mutual fund scheme i (excess return of mutual fund scheme i over the risk free rate) is a linear function of the systematic risk (beta) of the scheme and market risk premium $(R_m\text{-}R_f)$. The CAPM based Jensen's model is as under:

$$R_{it} = \alpha_i + \beta_i(R_{mt}) + e_{it} \qquad (1)$$

Where, R_{it} is the excess return of the ith mutual fund scheme at time period t, R_{mt} is the excess return on the market portfolio at time period t, β_i is the index of systematic risk of scheme i, α_i is the unconditional alpha coefficient and e_{it} is the random error term of the scheme i at time period t that has zero mean and constant standard deviation with the following properties: $E(e_{it}) = 0$, $Var(e_{it}) = \sigma 2e_{it}$ and $Cov(e_{it}, e_{ij}) = 0$. The statistical significance of alpha may be judged by the t statistic, which is measured by the estimated value of the alpha divided by its variances. If the values of alphas are assumed to be normally distributed then the t statistic greater than 2 implies that the probability of having obtained the result through luck, and not through expertise, is strictly less than at 5% level of significance and thus, the average alpha is significantly different from zero. It is assumed that in unconditional model both alpha and beta are constant over time. Like Treynor measure, the Jensen measure also considers systematic risk. Unlike Sharpe and Treynor measures, Jensen measure does not permit portfolios with different level of risk to be compared. Here, the value of alpha is actually proportional to

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the level of risk taken that is measured by beta. However, the unconditional Jensen measure is subject to same criticism like Treynor measure in respect of choice of reference benchmark. Even if, at the time of market timing activity that involves changing beta as per anticipated movements in the stock market, Jensen alpha often becomes negative and that time the Jensen alpha does not reveal the real efficiency of the portfolio managers. Although, performance measures often try to distinguish security selection, or stock picking ability, from market-timing (ability to predict the future direction of the market). But it is true that Jensen alpha be a sign of both types of ability (selectivity and market-timing). Subsequent, market-timing models have tried to take apart these two facets of performances.

Treynor & Mazuy (1966) is the first who have tried to enumerate the timing component of stock return in a meticulous way and so, they just insert a quadratic term in the CAPM based regression model, which is become a standard for measuring market timing ability of the investment managers. The unconditional measure of timing-ability is given below:

$$R_{it} = \alpha_i + \beta_i(R_{mt}) + \gamma_i(R_{mt})^2 + e_{it} \qquad (2)$$

Where, R_{it} is the excess return of the mutual fund scheme i at time period t, R_{mt} is the excess return of the market at time period t, α_i, β_i and γ_i are the coefficients of the mutual fund scheme i and e_{it} is the error term with zero mean and constant standard deviation. A cursory look into the above measure would reveal that the return of the mutual fund scheme i and that of the market are in the excess return forms. Treynor & Mazuy (1966) argue that if the managers are able to predict the market return efficiently then they will clutch a greater proportion of the market portfolio when the return of the market is high and hold a smaller proportion when the return of the market is low or in other words, adjust the portfolio's beta according to the market condition. Thus, the portfolio return is a non-linear

(convex) function of the market return that is captured by the coefficient of the parabolic term (gamma, γ_i). Treynor & Mazuy (1966) report evidence in favour of market-timing for only 1 out of 57 mutual funds. Most of the studies have empirically examined the timing performance by using the measure of Treynor & Mazuy (1966) have shown similar evidence of no market-timing or vicious timing-ability (see Lehman & Modest 1987, Lee & Rahman 1990, Cumby & Glen 1990, Cogging et al 1993, Grinblatt & Titman 1994 etc).

Conditional Performance Measure:

Market-timing ability can only be accurately measured under the assumptions of highly stylized models (Ferson & Schadt 1996). The traditional market timing models, in addition to their strong assumptions about how managers' use their abilities have taken the view that any information correlated with future market returns is said to be superior information. Yet any ability to predict the market that can be matched using the public information should not be considered to truly reflect market timing ability on the part of fund managers beyond that of the funds' investors. Ferson & Schadt (1996) use basically the same simplifying assumptions as the traditional models, but to assume semi-strong-form of market efficiency. The idea is to distinguish market timing based on public information from market timing information that is superior to the lagged information variables.

However, this approach is based on the conditional version of the CAPM that is consistent with the semi-strong-form of market efficiency where the influence of public information for the estimation of returns present a little that is interpreted earlier by Fama (1970). According to the conditional version of the CAPM, the return of a mutual fund scheme i can be written as follows:

$$R_{it} = \beta_{im}(A_{t-1})R_{mt} + e_{it} \qquad (3a)$$

With $E(e_{it} / A_{t-1}) = 0$ $\qquad$ (3b)

And $E(e_{it} R_{mt} / A_{t-1}) = 0$ $\qquad$ (3c)

Where, R_{it} is the excess return of mutual fund scheme i between the time period t and t-1, R_{mt} is the excess return of the benchmark index over the risk free asset and A_{t-1} denotes a vector of instruments for the information available at time period t-1. The beta of the regression equation $\beta_{im}(A_{t-1})$ is the conditional market beta of excess return of the mutual fund scheme i at time period t-1 that depends on the information vector A_{t-1}. Thus, beta varies over time due to certain number of factors. The conditional market beta of excess return of the mutual fund scheme i can be defined as follows:

$$\beta_{it-1} = Cov(R_{it}, R_{mt} / A_{t-1}) / Var(R_{mt}/ A_{t-1}) \qquad (3d)$$

The equation 3a does not provide the alpha term because it uses information variables A_{t-1} when the latter is null. The error term in the above regression equation is independent as per equation 3b that leads to the assumption of efficient market hypothesis (EMH) and equation 3c tells that the $\beta_{im}(A_{t-1})$ is the conditional regression coefficient.

Equation 3 entails that any unbiased forecast of the difference between the return of a scheme and the product of its beta and the excess return on the market factor which differs from zero must be based on an information set that is more informative than A_{t-1} (Ferson & Schadt 1996). Hence, the forecast of this difference will be zero if only information A_{t-1} is used. Then, the portfolio return relationship can be established by using the asset return relationship with the assumption that the investors use no information other than the public information. So, it may be said that the investors' portfolio beta β_{pm} depends on public information At-1 or in other words $\beta_{pm}(A_{t-1})$ is a function of A_{t-1}. Then, beta can be approximated of a mutual fund scheme i through a linear function by using a development from Taylor series following Shanken (1990) as under:

$$\beta_{im}(A_{t-1}) = b_{oi} + B'_i a_{t-1} \qquad (4)$$

This relationship can be interpreted as an average beta i.e. that corresponds to the unconditional mean of the conditional beta that can be defined as under:

$$b_{oi} = E(\beta_{im}(A_{t-1})) \qquad (5)$$

The elements of vector B_i are the response coefficients of the conditional beta with respect to the information variables A_{t-1}. a_{t-1} denotes a vector of the differentials of A_{t-1} from the unconditional means that can be written as follows:

$$a_{t-1} = A_{t-1} - E(A_{t-1}) \qquad (6)$$

Now, it is possible to formulate a conditional measure of managed portfolio return by combining the above equations as under:

$$R_{it} = b_{oi}R_{mt} - B'_i(at_{-1})R_{mt} + e_{it} \qquad (7)$$

Where, $E(e_{it} / A_{t-1}) = E(e_{it}R_{mt} / A_{t-1}) = 0$ $\qquad$ (8)

The stochastic factor of the above measure is a linear function of the market return in excess of the risk free rate (R_f). Where, the coefficients of the above measure are conditional on public information A_{t-1}.

The model thereby developed enables the traditional performance measures, which came from the CAPM to be applied by incorporating a time component and only then the risk and return of a mutual fund scheme can be predicted with more accuracy by using the CAPM version of conditional performance measure which is proposed by Ferson & Schadt (1996).

Application to Performance Measure:

The traditional unconditional measures do not draw a distinction between the skill in using public information, which is available to everybody and a manager's specific stock picking ability. The conditional approach allows these to be separated. Therefore, to evaluate mutual fund performance the empirically developed model (Ferson & Schadt 1996) incorporates a conditional term in the Treynor

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& Mazuy model (1966). Where, the classical market-timing regression model when there is no conditioning publicly available information as follows:

$$R_{it} = \alpha_i + \beta_i(R_{mt}) + \gamma_i(R_{mt})2 + e_{it} \qquad (9)$$

The conditional model of Ferson & Schadt (1996) is as under:

$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + B'_i(a_{t-1}R_{mt}) + \gamma_i(R_{mt})2 + e_{it} \qquad (10)$$

Where, the coefficient vector Bi captures the linear response of the manager's beta to the public information variables A_{t-1}. The set of information vector a_{t-1} represents information available at time t-1 for estimating schemes' returns that indicates changing nature of the state of the economy that finally changes the beta coefficient. The term $B'_i(R_{mt}a_{t-1})$ controls public information effect, which would bias the coefficients in the original Treynor & Mazuy (1966) model. By capturing information available to managers at time t-1, the set of vector $(R_{mt}a_{t-1})$ precludes strategies that can be replicated using public information from being ascribed with superior selectivity or market-timing ability on the basis of this information. Here, the interaction term measure the covariance between conditional beta and the expected value of the market return using lagged instruments. The coefficient of γci measures the sensitivity of the manager's beta to the private market timing signal. The study does not consider the impact of conditioning alpha because the study is exclusively devoted to examine market timing performance. Although, the conditional alpha is a linear function of the conditional public information a_{t-1} that can be shown as under:

$$\alpha_i(a_{t-1}) = \alpha_{0i} + \theta'_i(a_{t-1}) \qquad (11)$$

At the beginning it is very much important to determine the kind of information variables to be used. This is almost same as using explanatory variables. Ferson & Schadt (1996) propose a link to the portfolio risk to market indicators, such as dividend yield of market index and the return on short term T-Bills lagged by one period compared to the estimation period. This study uses a set of one month lagged publicly available information which is assumed to be reliable and important market indicators in the Indian context at the time of examine conditional market timing performance. The one month lagged information variables are dividend yield of market index (DY_{t-1}), the return on 91-day T-Bills (TB_{t-1}), the monthly inflation rate (FL_{t-1}), monthly rupee-dollar exchange rates (EX_{t-1}), monthly sales of mutual fund schemes (SK_{t-1}), monthly redemption / Repurchase of mutual fund schemes (MV_{t-1}) and monthly total assets under management of the mutual fund companies (UM_{t-1}) respectively. The last three information variables are assumed to be relevant to measure mutual fund prospect and also helpful to the managers as well as investors to measure stock selection and market timing performances with the prediction of future returns and risk as per the state of the economy.

Currently, dy_{t-1}, tb_{t-1}, fl_{t-1}, ex_{t-1}, sk_{t-1}, mv_{t-1} and um_{t-1} represent the differentials compared to the average of the variables DY_{t-1}, TB_{t-1}, FL_{t-1}, EX_{t-1}, SK_{t-1}, MV_{t-1} and UM_{t-1} that can be written as follows:

$$Dy_{t-1} = DY_{t-1} - E(DY_t), \ tb_{t-1} = TB_{t-1} - E(TB_t), \ fl_{t-1} = FL_{t-1} - E(FL_t), \ ex_{t-1} = EX_{t-1} - E(EX_t), \ sk_{t-1} = SK_{t-1} - E(SK_t), \ mv_{t-1} = MV_{t-1} - E(MV_t) \text{ and } um_{t-1} = UM_{t-1} - E(UM_t) \qquad (12)$$

Then, the relationship can be written as under:

$$a_{t-1} = \begin{bmatrix} dy_{t-1} \\ tb_{t-1} \\ fl_{t-1} \\ ex_{t-1} \\ sk_{t-1} \\ mv_{t-1} \\ um_{t-1} \end{bmatrix} \text{ and } B_i \begin{bmatrix} b_{1i} \\ b_{2i} \\ b_{3i} \\ b_{4i} \\ b_{5i} \\ b_{6i} \\ b_{7i} \end{bmatrix} \qquad (13)$$

Hence, the conditional beta is the function of a set of information vector. The conditional beta can be interpreted by using the approach of Rosenberg & Mckibben (1973) and Rosenberg & Marathe (1975) as under:

$$b_i = b_0 + b_{1i}dy_{t-1} + b_{2i}tb_{t-1} + b_{3i}fl_{t-1} + b_{4i}ex_{t-1} + b_{5i}sk_{t-1} + b_{6i}mv_{t-1} + b_{7i}um_{t-1} + e_{it} \qquad (14)$$

Hence, the conditional measure of market timing can be formulated as follows:

$$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + b_{1i}dy_{t-1}R_{mt} + b_{2i}tb_{t-1}R_{mt} + b_{3i}fl_{t-1}R_{mt} + b_{4i}ex_{t-1}R_{mt} + b_{5i}sk_{t-1}R_{mt} + b_{6i}mv_{t-1}R_{mt} + b_{7i}um_{t-1}R_{mt} + \gamma_{ci}(R_{mt})^2 + e_{it} \qquad (15)$$

Where, α_{ci} represents the conditional alpha. In other words it is the difference between a scheme's excess return and the excess return to the particular combination of market index and the set of information variables that replicates the scheme's time varying risk exposure. The term b0i represents the conditional beta, however, it no longer represents the systematic risk of the scheme with respect to the market, nor should one assume that it takes the same value because of the multiplicative nature in the way the market indicators enter into the model. In other words, it can only be viewed as the separate influence of the market after taking into consideration the influence of public information variables. The coefficients b_1, b_2, b_3, b_4, b_5, b_6 and b_7 measure the variations of the conditional beta to the lagged information variables.

The coefficient γ_{ci} measures the sensitivity of the scheme's beta to any private market timing signals above and beyond the information about the future shape of the market return, which is contained in the above described information variables. Hence, the gamma coefficient also changes like the changes of beta. As, the set of information variables assists to the investment managers to take at most possible decision on stock selection or market-timing or combination of them and that's why the expected future return is maximum. If the strategy of the investment managers is to change the beta composition of the risky portfolio according to the changing nature of the market with respect to the information variables At-1 then, the market-timing strategy may provide successful outcome, which is measured by the gamma coefficient. Where, the sensitivity of the gamma coefficient depends on the sensitivity of the beta coefficient. The conditional beta coefficient is measured by the average beta (b0i) and the response of conditional beta to the lagged information variables $B'_i (R_{mt}ta_{t-1})$. Therefore, the shape of expected future portfolio return is a convex function of the market return that is captured by the conditional gamma coefficient. Hence, the gamma coefficient is also a non-linear function of beta sensitivity and the expected value of the future market return with the lagged instruments that can be written as follows:

$$\gamma_{ci} = f(\varphi'_i R^2_{mt}a_{t-1}) \qquad (16)$$

Therefore, the conditional CAPM for each mutual fund scheme i for each period t will be as follows:

$$E(R_{it}/ a_{t-1}) = \alpha_{ci} + b_{0i}R_{mt} + B'_i(a_{t-1}R_{mt}) + \varphi_{0i}R^2_{mt} + \Omega'_i(a_{t-1}R^2_{mt}) + e_{it} \qquad (17)$$

Where, the coefficient φ0i measures the sensitivity of the scheme's beta or the average sensitivity of the scheme's beta. Where, the term $\Omega'_i(a_{t-1}R^2_{mt})$ manages the effect of the parabolic term that is attributed to the lagged public information variables. Consequently, the conditional gamma coefficient in equation 15 can be written as under:

$$\gamma_{ci} = \varphi_{0i} + \varphi_{1i}dy_{t-1} + \varphi_{2i}tb_{t-1} + \varphi_{3i}fl_{t-1} + \varphi_{4i}ex_{t-1} + \varphi_{5i}sk_{t-1} + \varphi_{6i}mv_{t-1} + \varphi_{7i}um_{t-1} \qquad (18)$$

Then the relationship between the conditional gamma coefficients and the set of lagged information variables can be written as under:

$$\varphi_i = \begin{bmatrix} \varphi_{1i} \\ \varphi_{2i} \\ \varphi_{3i} \\ \varphi_{4i} \\ \varphi_{5i} \\ \varphi_{6i} \\ \varphi_{7i} \end{bmatrix} \text{ and } a_{t-1} = \begin{bmatrix} dy_{t-1} \\ tb_{t-1} \\ fl_{t-1} \\ ex_{t-1} \\ sk_{t-1} \\ mv_{t-1} \\ um_{t-1} \end{bmatrix} \qquad (19)$$

Finally, the traditional model of Treynor & Mazuy (1966) can be presented in the conditional framework following the model of Ferson & Schadt (1996) as under:

$R_{it} = \alpha_{ci} + b_{0i}R_{mt} + b_{1i}dy_{t-1}R_{mt} + b_{2i}tb_{t-1}R_{mt} + b_{3i}fl_{t-1}R_{mt} + b_{4i}ex_{t-1}R_{mt} + b_{5i}sk_{t-1}R_{mt} + b_{6i}mv_{t-1}R_{mt} + b_{7i}um_{t-1}R_{mt} + \varphi_{0i}R^2_{mt} + \varphi_{1i}dy_{t-1}R^2_{mt} + \varphi_{2i}tb_{t-1}R^2_{mt} + \varphi_{3i}fl_{t-1}R^2_{mt} + \varphi_{4i}ex_{t-1}R^2_{mt} + \varphi_{5i}sk_{t-1}R^2_{mt} + \varphi_{6i}mv_{t-1}R^2_{mt} + \varphi_{7i}um_{t-1}R^2_{mt} + e_{it}$ (20)

Where, the coefficients $\varphi_0, \varphi_1, \varphi_2, \varphi_3, \varphi_4, \varphi_5, \varphi_6$ and φ_7 capture the non-linear variations of the conditional gamma in respect of sensitivity of scheme's beta that attributed to the lagged information variables about the future shape of the expected market return. The coefficients of the above model (equation 20) are estimated through the regression equation.

The monthly rate of return of each mutual fund schemes and the market index (BSE Sensex) are computed as follows:

$$R_{i,t} = \log \frac{NAV_{i,t}}{NAV_{i,t-1}}$$ (21)

$$R_{m,t} = \log \frac{Market\ Index_t}{Market\ Index_{t-1}}$$ (22)

Where, R_{it} is the logarithm return of the ith mutual fund scheme at the end of time (month) t. $NAV_{i,t}$ is the net asset value of the ith mutual fund scheme at time (month) t and $NAV_{i,t-1}$ is the net asset value of the ith mutual fund scheme at the end of the previous time (month) period 't-1'. Similarly, R_{mt} is the logarithm return of the market.

Hypothesis Formulation

The traditional market-timing model of Treynor & Mazuy (1966) cannot estimate the quadratic term properly when risk and future expected return are constant over time. But, the use of conditional measure of Treynor & Mazuy (1966), which is later developed by Ferson & Schadt (1996) assume that risk and expected future return are time variant with

the change of the state of the economy. Thus, the present study also examines the superiority of the gamma coefficient which is derived from the application of two measures and hence, the following hypothesis is formulated and tested:

Hypothesis:

H_0: Traditional market timing performance = Conditional market timing performance

H_a: Conditional market timing performance is superior

Distribution of data:

To observe the pattern of the time series data Jarque-Bera test of normality is applied. The skewness and kurtosis are measured of the return distribution of each scheme as well as the information variables. The skewness measures the symmetry of the distribution whereas the kurtosis implies the peaked ness of the distribution. A distribution with equal kurtosis is called mesokurtic whereas, a distribution with small tail is platykurtic and a distribution with a large tail implies leptokurtic. The J-B statistic can be computed as under:

$$JB = n\left[\frac{S^2}{6} + \frac{(K-3)^2}{24}\right]$$ (23)

Where, n = number of observations, S = Skewness of the residuals, K = Kurtosis of the residuals. The distribution is said to be normal if the values of S and K are zero (0) and three (3) respectively so that JB becomes equal to zero.

Unit Root Test:

A test of stationarity (or non-stationarity) that has become widely popular over the past several years is the unit root problem. It can be started with this regression equation

$\Delta R_{i(t)} = \delta R_{i(t-1)} + \mu_t$ (24)

Where, $\delta = (\rho-1)$ and Δ, as usual, is the first-difference operator. Generally, in practice, it is tested that the (null) hypothesis δ = zero. If δ is equal to zero (0), then ρ is one (1) that is a unit root which, means the time series under consideration is non-stationary. Now let us turn to the estimation of the above regression equation. This is simple enough, first takes the first differences of $R_{i(t)}$ and regress them on $R_{i(t-1)}$ and observe if the estimated slope of the coefficient in this regression (=δ) is 0 or not. If it is zero, then $R_{i(t)}$ is non-stationary. But, if it is negative, then $R_{i(t)}$ is stationary. Here, the only question is which test should we use to find out if the estimated coefficient of $R_{i(t-1)}$ in the above regression equation is zero or not. Dickey & Fuller have shown that under the null hypothesis that δ = zero (0), the estimated t value of the coefficient of $R_{i(t-1)}$ in the above regression equation follows the τ (tau) statistic. The critical value of tau statistic is computed based on Monte Carlo simulations. In the literature, the tau statistic or test is known as Dickey-Fuller (DF) test. The actual procedure of implementing the DF test involves several decisions. Here, random walk model with drift is considered as under:

$R_{i(t)}$ is a random walk with drift: $\Delta R_{i(t)} = \alpha_i + \delta R_{i(t-1)} + \mu_t$ (25)

Where, t is the time or trend variable. The null hypothesis is that δ = zero (0), which means there is a unit root and the time series is non-stationary. The alternative hypothesis is that δ is less than zero that means the time series is stationary. If the null hypothesis is rejected, then $R_{i(t)}$ is stationary with a nonzero mean [$= \alpha_i / (1-\rho)$]. It is extremely important to note that the critical value of the tau test to test the hypothesis that δ = zero (0), is different of the above specification of the DF test. The actual estimation procedure is as follows: Estimate the above equation (with drift) by OLS; then, divide the estimated coefficient of $R_{i(t-1)}$ by its standard error to compute the tau statistic and refer to the DF table (or any statistical package). If the computed absolute value

of the tau statistic ($| \tau |$) exceeds the DF, then reject the hypothesis that δ = zero (0), in which case the time series is stationary. On the other hand, if the computed tau statistic ($| \tau |$) does not exceed the critical tau value, then do not reject the null hypothesis, in which case the time series is stationary.

Test of Autocorrelation:

The Autocorrelation problem is common in any regression-based model. In this study Durbin-Watson (d) test is applied to correct the above problem. The d statistic can be computed as under:

$$d = \frac{\sum_{t=2}^{t=n} (\hat{\mu}_t - \hat{\mu}_{t-1})^2}{\sum_{t=1}^{t=n} \hat{\mu}^2_t}$$ (26)

Test of Heteroscedasticity:

An important assumption of any regression-based model is that the disturbances are homoscedastic that means they all have the same variances. Inversely, the disturbances in the regression equation do not have the same variances, which mean the disturbances are heteroscedacticity. There are several methods to test this problem. The study uses White's (1980) general heteroscedasticity test that does not rely on the normality assumption. Hence, the residuals are estimated from the original regression model and then the residuals are squared and regressed on the original independent variables, their squared values, and the cross product(s) of the regressors and find out the R^2 value, which is 'n' times of the sample size obtained from the auxiliary regression asymptotically follows the Chi-square distribution with degree of freedom equal to the number of regressors (excluding the constant term), which is as under:

$n.R^2 \sim \chi^2 df$ (27)
$\quad$ asy

If the value of chi-square, which is obtained from the auxiliary regression exceeds the critical chi-square

value at the chosen level of significance then heteroscedasticity exist and if opposite is happened then there is no heteroscedasticity that may be shown as $\alpha^2 = \alpha^2 = \alpha^2 = \alpha^2 \ldots\ldots = 0$

Test of Multicollinearity :

The term multicollinearity is due to Ragnar Frisch. Generally it means the existence of a perfect or exact, linear relationship among some or all independent variables of a regression model. The study examines the problem of multicollinearity to observe the individual effect of independent variable on market timing activities. Earlier research studies have used the techniques like simple correlation, R^2, and VIF for examining the presence of multicollinearity among the independent variables. In addition to R^2 value and VIF, the present study also uses the tolerance value to test the problem of multicollinearity.

RESULT AND ANALYSIS

Table.1 represents the summary statistic for monthly raw returns of the individual open-ended equity mutual fund schemes of Unit Trust of India (UTI). The computed J-B statistic of the individual return series of the mutual fund schemes is far from zero (J-B>0) which confirms rejection of null hypothesis of a normal distribution.

Similarly, Table.2 shows the summary statistic of the pre-determined information variables namely market index R_m, dividend yield DY, 91-day treasury bill rate TB, inflation rate FL, Ruppe-Dollar exchange rate EX, monthly sales volume of mutual fund schemes SK, monthly redemption / repurchase of mutual fund schemes MV and monthly total asset under management UM. The computed J-B statistic of the information variables is different from zero which indicates rejection of null hypothesis of a normal distribution.

The empirical work based on time series data assumes that the underlying time series is stationary

that means its mean, variance and auto-covariance (at various lags) remain the same. In this study Dickey-Fuller (DF) test is used to test stationarity of the individual time series data. Table.3 presents the summary statistic of the individual time-series data. It is observed from the table that the computed absolute tau statistic (IτI) of fourteen (14) individual time series return data exceed the DF critical absolute tau values at 5% significance level which indicates rejection of null hypothesis that means that the time series return data of 14 schemes is stationary. In case of the remaining individual time series return data the computed tau statistic is lower than the DF critical absolute tau statistic at 5% significance level which means acceptance of the null hypothesis. Hence, in this case, the return data is seen to be non-stationary.

An important assumption of any regression based model is that the disturbances are homoscedastic, which means they all have same variances. Practically, it is also recognised that the disturbances may not have the same variances or in other words they are heteroscedasticity. To test this problem, White's (1980) general heteroscedasticity test is applied. Table.4 presents the individual regression based test statistic of heteroscedasticity. The table shows that the computed chi-square values of the individual regression are lower than the critical chi-square value at 5% level of significance and hence, it may be argued that there is no existence.

The problem of multicolinearity in the explanatory variables of a regression equation is a matter of thought. This type of problem is diagnosed through the techniques like analysis of R^2, tolerance value (TOL) and variable inflation factor (VIF). The test statistic of multicolinearity is presented in Table.5. The R^2 value higher that 0.800 is considered to be harmful because of the presence of multicolinearity problem. The computed R^2 values of the individual schemes' are lower than the cut-off point (0.800), which necessarily proves that the explanatory

variables in the regression model is free from the problem of multicolinearity. VIF is another popular measure of multicolinearity. It is generally held that the value of VIF higher than ten (10) is likely to cause a multicolinearity problem. In the present study the values range between 1.0471 and 1.9685 (i,e. less than 10) that means absence of multicolinearity problem. Tolerance may also be used as a measure of examine multicolinearity problem. The tolerance value more than 0.20 may be used as a criterion for considering the influence of explanatory variables in the regression model being free from the problem of multicolinearity. Here, the computed tolerance value ranges between 0.508 and 0.955 which clearly demonstrates the fact that the individual regression models are free from the problem of multicolinearity of the explanatory variables.

Finally, the paper analyses the market-timing performance of the open-ended mutual fund schemes of UTI based on both approaches (unconditional & conditional). It is observed from Tab.1 that the average return performance of the schemes is positive. Generally, the positive return performance is caused by two reasons. One is manager's ability to select the under priced securities (stock-selection) and the other is prediction of market movement (market-timing). The present study deals with market-timing performance of the mutual fund managers. The prediction of market movement requires specialised knowledge of the managers that ensure higher rate of return. It is assumed that positive gamma value adds extra return to the mutual fund portfolios. It is also assumed that statistically significant positive gamma value adjoin abnormal return to the mutual fund portfolios, which is delivered by the superior managers. Most of the past studies reveal that the mutual fund managers are not successful in market-timing activities. Few of them are superior by providing significant gamma values (abnormal return) and some of them are average performers by providing positive gamma values (normal return)

and many of them are very poor in market-timing activities by providing negative gamma values.

Table.6 represents the market-timing performance of the open-ended mutual fund schemes based on un-conditional model developed by Treynor & Mazuy (1966). It is observed that the gamma values of six schemes are positive and the remaining is negative. The cause of probable reason of obtaining negative market-timing performance may be considered as the reflection of inability of the managers to predict the market movement. Therefore, those managers have failed to earn extra return from the activities of market-timing. Although, six schemes have offered extra return from the activities of market-timing. The earlier researchers have shown poor performance and in most of the cases negative performance in this regard. But, in un-conditional model, the managers cannot earn abnormal return by capturing the activities of market movement and hence, the mangers have failed to generate statistically significant gamma values.

Table.6 also presents the test statistic of autocorrelation problem. Here, the most celebrated test of D-W (1951) is used. According to this test if the value of 'd' is found to be '2' one may assume that there is no first order autocorrelation in the regression model. The observed 'd' values of all the schemes are more or less are two (2) that indicates the returns data are free from the problem of first order autocorrelation.

The main issue of this paper is to examine the market-timing performance of the selected open-ended mutual fund managers based on conditional approach proposed by Ferson & Schadt (1996) and then to make a comparison between the market-timing performances of the selected schemes using the results derived from un-conditional model and conditional model. Ferson & Schadt argue that conditional model provides better market-timing performance than the un-conditional model. Now,

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come to the result, which is depicted in Table.7. It is observed from the table that the gamma values of seven schemes are positive and the remaining schemes have provided negative gamma values. Hence, the managers of those schemes (7 schemes) have provided to the investors a better return. If we compare the results about positive gamma values which are derived from both the approaches could be found that the number of positive performers in conditional model is more than the un-conditional model. Although, it may not be said a radical improvement in market-timing performance. In conditional model the number of positive market timers is only seven as compared to the traditional approach where the positive market timers are only six. Here, the difference is only one after the inclusion of available public information variables. It may be said that the managers cannot properly predict the market movement at right time. Only then the managers are said to be superior when they predict the market movement correctly as a result they generate statistically positive significant gamma values. In conditional approach two schemes have provided statistically significant gamma values where in un-conditional model such statistically significant performance is absent. So, it may be said that after incorporation of publicly available information variables in the un-conditional model (Treynor & Mazuy 1966) the managers have been able to generate statistically significant positive gamma values and thus the evidence is similar to the evidences of Ferson & Schadt 1996, Ferson & Warther 1996, Chen & Knez 1996, Christopherson et al 1998, Christopherson et al 1999 and Ferson & Qian 2004 etc.

Finally, it is observed from the above analysis that the market-timing performance based on conditional measure is better than that of un-conditional approach. But, without any further enquiry with the help of statistical testing it may not be concluded that conditional market-timing performance is superior to un-conditional market-

timing performance. The hypothesis in this regard is formulated in methodology section. The computed value of the test statistic is 1.3561 which is lower than the table value of 'z' at 5% level (1.96) of significance. This prompts us to accept the null hypothesis. Based on this finding, it may be concluded in respect of market-timing performance that no significant difference is observed between the evidences offered by the two measures.

CONCLUSION

Most of the earlier research studies use traditional measures to examine the market-timing performance of the investment managers. The traditional measures assume that the variance is not changed over time and therefore, those performance measures are unable to predict the market movement correctly. Although, those models are extensively used in the measurement of investment performance before the development of conditional model. But, after the development of conditional measures, the measurement of investment performance can be possible to make more accurately. It is observed from the above analysis that six schemes have offered positive market-timing performances based on traditional model. But, the traditional measures cannot provide significant market-timing performance. Hence, it may be concluded that the managers are inefficient to provide superior market-timing performances in traditional measure. After inclusion of public information variables in the traditional model, the market-timing performance looks better. In conditional measure the number of positive market-timing performance is increased to seven from six. The conditional measure has also provided significant market-timing performance which is absent in traditional measure. Hence, it may be argued that the market-timing performance based on conditional model is better than the traditional model. But, the statistical test reveals that the market-timing performance based on two measures is same.

SI.No	OB	Mean	Median	Max	Min	SD	Skewness	Kurtosis	JB
Tab.1 : Descriptive Statistic of the mutual fund schemes									
1	53	1.4957	0.6700	13.3600	-15.10	5.8981	-0.563	0.969	11.9092
2	53	1.5865	1.3318	55.6109	-28.5257	9.9336	2.600	17.791	542.738
3	77	1.0777	0.0734	17.0146	-17.0508	4.0599	0.380	8.374	94.5094
4	64	0.9752	0.6071	13.6538	-3.8353	3.0247	2.407	7.314	111.427
5	64	1.1996	0.4901	13.7101	-2.1758	2.9803	2.579	6.991	113.421
6	64	0.9642	0.3984	26.0180	-19.4558	5.1211	1.309	13.534	314.184
7	64	1.0323	0.3303	11.9102	-2.6877	2.5794	2.670	7.513	130.354
8	64	1.1651	0.6321	16.8589	-31.3171	5.5334	-2.824	19.482	809.483
9	64	1.1534	0.7722	9.0226	-2.6769	2.1275	1.588	3.626	27.943
10	64	1.2089	0.8649	9.0226	-2.6718	2.0654	2.012	5.443	59.095
11	88	1.1987	0.3097	16.2653	-0.7813	2.8903	3.132	11.340	398.808
12	88	1.0364	0.5808	7.4351	-3.8996	1.9145	0.981	1.844	19.0145
13	88	1.1028	0.6938	10.6253	-1.7241	1.6367	2.403	11.976	380.109
14	88	1.1153	0.6684	13.5190	-2.8174	2.5517	2.689	9.692	2701.25
15	88	1.0139	0.9081	6.6657	-7.5124	2.0520	-0.620	4.072	9.8515
16	88	0.6055	0.4599	9.5172	-6.3826	2.1786	0.544	4.717	15.1501
17	88	1.0311	0.7229	7.3243	-4.8402	1.5966	1.185	6.241	59.1103
18	88	0.1790	0.5393	7.6243	-19.2277	3.3710	-2.945	14.469	609.510
19	88	0.9714	0.7024	4.4293	-0.2300	0.9097	1.743	2.970	44.5614
20	88	1.2178	0.7434	7.7535	-1.8719	1.4838	1.981	5.335	77.5488
21	88	0.6787	0.7175	5.6174	-13.8577	2.3626	-3.091	17.373	897.600
22	88	1.0674	0.7576	9.3563	-4.1256	1.7232	1.894	7.686	133.127
23	88	0.5056	0.7913	13.8023	-9.7287	3.4064	0.447	5.192	20.5484
24	88	1.4247	0.6368	37.5249	-11.2652	5.1631	4.582	29.454	2873.90
25	88	1.0864	0.6999	20.6603	-13.3468	3.0958	1.851	22.870	1497.91
26	88	0.7663	0.5799	4.7118	-13.3468	2.0154	-3.777	27.346	2382.56
27	88	0.8897	0.8012	32.0503	-26.8475	4.6964	1.035	35.818	3964.78
28	88	0.7743	0.4735	16.8589	-10.4888	2.7322	2.010	17.123	790.604
29	88	0.6193	0.5359	4.9342	-2.2624	1.0504	1.021	4.236	20.8907
30	88	1.1879	0.8228	6.9450	-3.0958	1.4325	1.038	4.238	21.4222

Source: Primary data

Tab.2 : Descriptive Statistic of the pre-determined Variables									
SI.No	OB	Mean	Median	Max	Min	SD	Skewness	Kurtosis	JB
1	144	1.4496	0.9457	49.94	-30.24	9.07	0.578	6.366	75.9978
2	144	1.5794	1.5266	2.52	0.85	0.42	0.329	-0.963	96.83
3	144	0.3739	0.6024	59.19	-39.65	9.17	0.531	15.644	965.995
4	144	2.4207	2.5333	5.60	-2.10	1.35	-0.716	1.337	28.9872
5	144	0.2019	0.5393	7.16	-6.80	2.22	0.545	2.291	1.1447
6	144	944510.20	521514.50	2669515.00	2219c1.00	879955.60	0.523	-1.225	107.104
7	144	925459.10	471821.00	2667929.00	20097.00	879900.00	0.566	-1.164	104.033
8	144	362465.20	318526.50	759452.00	79464.00	240919.30	0.254	-1.575	125.583

Tab.3 : Unit root test of the return series of the schemes				
SI.No	Estimated Coefficient	Standard Error	Tau Statistic	DF Statistic
1	0.337	0.134	2.5149	-2.89
2	-0.276	0.136	-2.0294	-2.89
3	0.288	0.112	2.5714	-2.89
4	0.427	0.119	3.5882	-2.89
5	0.398	0.120	3.3167	-2.89
6	-0.224	0.126	-1.7778	-2.89
7	0.328	0.125	2.6240	-2.89
8	0.084	0.128	0.6563	-2.89
9	0.679	0.116	5.8534	-2.89
10	0.557	0.127	4.3858	-2.89
11	0.560	0.094	5.9574	-2.89
12	0.628	0.094	6.6809	-2.89
13	0.738	0.113	6.5310	-2.89
14	0.618	0.098	6.3061	-2.89
15	0.612	0.092	6.6522	-2.89
16	0.503	0.099	5.0808	-2.89
17	-0.123	0.119	-1.0336	-2.89
18	0.114	0.111	1.0270	-2.89
19	0.339	0.107	3.1682	-2.89
20	0.231	0.093	2.4839	-2.89
21	0.292	0.104	2.8077	-2.89
22	0.449	0.114	3.9386	-2.89
23	0.381	0.106	3.5943	-2.89
24	0.228	0.107	2.1308	-2.89
25	0.104	0.108	0.9630	-2.89

SI.No	Estimated Coefficient	Standard Error	Tau Statistic	DF Statistic
26	0.204	0.105	1.9429	-2.89
27	0.009	0.110	0.0818	-2.89
28	0.112	0.108	1.0370	-2.89
29	0.470	0.096	4.8958	-2.89
30	-0.067	0.108	-0.6204	-2.89

Tab.4 : Test of Heteroscedasticity			
SI.No	R^2	χ^2	Table Value (5% level)
1	0.065	3.445	19.6751
2	0.054	2.862	19.6751
3	0.049	3.773	19.6751
4	0.168	10.752	19.6751
5	0.028	1.792	19.6751
6	0.159	10.176	19.6751
7	0.084	5.376	19.6751
8	0.094	6.016	19.6751
9	0.094	6.016	19.6751
10	0.159	13.992	19.6751
11	0.186	16.368	19.6751
12	0.105	9.240	19.6751
13	0.105	9.240	19.6751
14	0.105	9.240	19.6751
15	0.094	8.272	19.6751
16	0.083	7.304	19.6751
17	0.059	5.192	19.6751
18	0.253	22.264	19.6751
19	0.159	13.992	19.6751
20	0.084	7.392	19.6751
21	0.062	5.456	19.6751
22	0.062	5.456	19.6751
23	0.205	18.04	19.6751
24	0.205	18.04	19.6751
25	0.159	13.992	19.6751
26	0.094	8.272	19.6751
27	0.056	4.928	19.6751
28	0.179	15.752	19.6751
29	0.084	7.392	19.6751
30	0.094	8.272	19.6751

Tab.5 : Test of Multicolinearity problem			
Sl.No	R^2	χ^2	Table Value (5% level)
1	0.492	1.9685	0.508
2	0.174	1.2107	0.826
3	0.291	1.4104	0.709
4	0.248	1.3298	0.752
5	0.350	1.5385	0.650
6	0.045	1.0471	0.955
7	0.234	1.3055	0.766
8	0.072	1.0776	0.928
9	0.421	1.7271	0.579
10	0.374	1.5974	0.626
11	0.148	1.1737	0.852
12	0.357	1.5552	0.643
13	0.340	1.5152	0.660
14	0.345	1.5267	0.655
15	0.297	1.4225	0.703
16	0.351	1.5408	0.649
17	0.115	1.1299	0.885
18	0.188	1.2315	0.812
19	0.260	1.3514	0.740
20	0.232	1.3021	0.768
21	0.062	1.0661	0.938
22	0.209	1.2642	0.791
23	0.178	1.2165	0.822
24	0.169	1.2034	0.831
25	0.192	1.2376	0.808
26	0.237	1.3106	0.763
27	0.120	1.1364	0.880
28	0.072	1.0776	0.928
29	0.332	1.4970	0.668
30	0.074	1.0799	0.926

Tab.6 : Market-timing performance based on Un-Conditional model					
Sl.No	Beta value (β)	t-Statistic	Gamma value (γ)	t-Statistic	D-W statistic
1	0.538	5.669	-0.010	-0.983	1.998
2	0.577	3.068	-0.004	0.184	2.873
3	0.200	3.923	-0.002	-0.718	1.808
4	0.094	2.176	0.003	-1.043	1.885
5	0.077	1.781	-0.004	0.349	1.852
6	0.004	0.053	-0.001	-0.840	2.444
7	0.054	1.419	-0.001	-0.446	14.956
8	0.120	1.471	-0.003	-0.204	1.920
9	0.072	2.379	-0.001	0.152	1.903
10	0.054	1.785	-0.002	-0.578	1.948
11	-0.008	-0.021	-0.002	-0.589	1.891
12	0.027	1.025	-0.002	-1.364	1.830
13	0.051	2.335	-0.002	-1.423	1.759
14	0.114	3.585	0.004	1.807	1.874
15	0.068	2.509	-0.003	-1.495	1.987
16	0.051	1.771	-0.004	-2.019	2.131
17	-0.014	-0.657	0.005	0.030	2.036
18	0.004	0.088	0.002	0.712	1.747
19	-0.015	-1.180	-0.001	-0.600	2.294
20	0.010	0.480	-0.002	-1.430	2.326
21	-0.016	-0.483	-0.001	-0.449	1.894
22	0.011	0.466	-0.001	-0.743	2.070
23	0.028	0.607	-0.004	-1.252	2.341
24	0.108	1.543	-0.002	-0.500	1.681
25	0.048	1.139	-0.001	-0.149	1.865
26	-0.006	-0.203	-0.001	-0.424	1.683
27	0.049	0.757	-0.001	-0.130	1.986
28	0.061	1.633	-0.002	-0.693	1.809
29	0.000	3.224	-0.004	-1.623	1.809
30	0.003	0.147	0.001	0.947	2.113

Tab.7 : Market-timing performance based on Conditional model					
Sl.No	Name of the Scheme	Beta (β)	t-Statistic	Gamma (γ)	t-Statistic
1	UTI-Grand Master 1993	-4.720	-1.555	2.056	0.161
2	UTI-PEF 95	-2.673	-0.560	-0.642	-0.043
3	UTI-Sunder	3.714	2.457	-1.981	-0.738
4	UTI-Dynamic Equity Fund-Dividend	3.655	2.374	-4.138	-0.568
5	UTI-Dynamic Equity Fund-Growth	5.030	3.025	-0.187	-1.157
6	UTI-Growth&Value Fund- Annual Dividend	6.478	1.923	-0.105	-0.320
7	UTI-Growth&Value Fund-Growth	3.872	2.737	-0.001	-0.007
8	UTI-Gr&Value Fund-Semi Annual Dividend	5.165	1.513	-0.403	-1.213
9	UTI-India Advantage equity Fund-Dividend	2.889	2.748	0.027	0.261
10	UTI-India Advantage equity fund-Growth	3.008	2.810	-0.020	-0.193
11	UTI-Equity fund-Growth Option	1.191	0.988	0.036	0.326
12	UTI-Equity fund-Income Option	1.125	1.543	-0.126	-1.879
13	UTI-Master index fund-Growth Option	0.030	0.056	-0.056	-1.118
14	UTI-Master index fund-Income Option	1.008	1.148	-0.055	-0.676
15	UTI-Master plus unit scheme-Growth Option	2.213	2.895	-0.253	-3.595
16	UTI-Master plus unit scheme-Income Option	0.455	0.537	-0.022	-0.281
17	UTI-Master Share-Growth Option	-1.652	-2.749	0.156	2.813
18	UTI-Master share-Income Option	-0.854	-0.606	-0.024	-0.184
19	UTI-Master Value Fund-Growth Option	0.220	0.645	-0.079	-2.498
20	UTI-MNC fund (UGS 10000)-Growth Option	0.176	0.280	-0.048	-0.835
21	UTI-MNC fund (UGS 10000)-Income Option	-0.799	-0.875	0.197	2.345
22	UTI-Nifty index fund-Growth Option	0.034	0.049	0.005	0.083
23	UTI-Banking sector fund-Income Option	2.952	2.284	-0.331	-2.779
24	UTI-Banking sector fund-Income Option	-0.080	-0.038	-0.267	-1.390
25	UTI gr sector funds-UTI-GSF-pharma-Gr Op	1.702	1.360	-0.199	-1.726
26	UTI-Gr sector funds-UTI-GSF-Pharma-Inc Op	0.991	1.184	-0.102	-1.320
27	UTI-Gr sector funds-UTI-GSF-Service-Gr Op	0.933	0.491	-0.154	-0.878
28	UTI infrastructure fund-Growth Option	1.424	1.222	-0.103	-0.958
29	UTI Mid cap fund-Growth Option	0.481	1.261	-0.102	-2.892
30	UTI opportunities fund-Growth Option	0.076	0.127	0.018	0.328

REFERENCES

Artikis, G. (2004), "Bond mutual fund managers performance in Greece", Journal of Managerial Finance, Vol. 30(10), pp. 1-6.

Athanassakas., Carayannopoulos, & Racine. (2002), "How effective is aggressive portfolio management? Canadian Investment Review, pp. 39-49.

Black, F (1972), "Capital market equilibrium with restricted borrowing", Journal of Business, Vol. 45(3), pp. 444-454.

Brown, Stephen, Goetzmann, Ibbotson, & Ross, A. (1992), "Survivorship bias in performance studies", Review of Financial studies, Vol. 5, pp. 553-325.

Brown., & Goetzmann, W. (1995), "Performance persistence", Journal of Finance, Vol. 50, pp. 679-698.

Bollen, N; & Busse, J.A. (2001), "On the timing ability of mutual fund manager", Journal of Finance, Vol. 56, pp. 1075-1094.

Close, J. (1952), "Investment companies: Closed end versus open-end", Harvard Business Review, Vol. (29), pp. 79-88.

Coggin., Fabozzi, & Rahman. (1993), "The investment performance of US equity pension fund managers: An empirical investigation", Journal of Finance, pp. 1039-1055.

Chang., & Lewellen. (1984), "Market-timing and mutual fund investment performance", Journal of Business, Vol. 57, pp. 57-72.

Cumby, R., & Glen, J. (1990), "Evaluating the performance of international mutual funds", Journal of Finance, Vol. 45, pp. 497-521.

Christopherson, Jon., Ferson, Wayne, & Glassman, Debra. (1998), "Conditioning manager alphas on economic information: Another look at the persistence of performance", Review of Financial Studies, Vol. 11(1), pp. 111-142.

Christopherson, Jon., Ferson, Wayne, & Turner, Andrew. (1999), "Performance evaluation using conditional alphas and betas", Journal of Portfolio Management, Vol. 26(1), pp. 59-72.

Chen, Zhiwu., & Knez, Peter. (1996), "Portfolio performance measurement: Theory and applications", Review of Financial Studies, Vol. 9(2), pp. 511-555.

Comer, G; (2006), "Hybrid mutual funds and market timing performance", Journal of Business, Vol. 79, pp. 771-797.

Dybvig, Philip., & Ross, Stephen. (1985), "Differential information and performance measurement using a security market line", Journal of Finance, Vol. 40(2), pp. 383-399.

Drew, E. M. Veeraraghavan, M., & Wilson, V. (2005), "Market-timing, selectivity and alpha generation: Evidence from Australian equity superannuation funds", Investment Management and Financial Innovations, Vol. 2, pp. 111-127.

Dhar, J. (2005), "Investment Management of Mutual Funds: Evidence of timing and selectivity from India during 1997-2003", UGC sponsored minor research project, pp. 1-28.

Fama, E. F. (1970), "Efficient capital markets: A review of theory and empirical work", Journal of Finance, Vol. 25(2), pp. 383-417.

Fama, E. F. (1972), "Components of investment performance", The Journal of Finance, Vol. XXVII(3), pp. 551-567.

Ferson, W., & Schadt, R. (1996), "Measuring fund strategy and performance in changing economic conditions", Journal of Finance, Vol. 51(6), pp. 425-461.

Fama, Eugene., & French, K. (1989), "Business conditions and expected returns on stocks and bonds", Journal of Financial Economics, Vol. 25(1), pp. 23-49.

Fransworth, H. (1997), "Conditional performance Evaluation", In paxson, D., Wood, D. (eds), Blackwell Encyclopedic Dictionary of Finance, Blackwell Business, pp. 23-24.

Ferson, W., & Warther, V. (1996), "Evaluating fund performance in a dynamic market", Financial Analysts Journal, Vol. 52(6), pp. 20-28.

Ferson, W., & Qian, M. (2004), "Conditional performance evaluation, revisited", Working Paper, Boston College-EUA.

Filippas N.D. & Christine Psoma. (2001), "Equity mutual fund managers performance in Greece", Journal of managerial finance, Vol. 27(6), pp. 68-74.

Grossman, S. (1975), "On the efficiency of competitive stock markets where trades have diverse information", The Journal of Finance, vol. 31 (2), pp. 572-585.

Grossman, S., & Stiglitz, E. J. (1980), "On the impossibility of informationally efficient markets", The American Economic Review, vol. 70 (3), pp. 393-408.

Grinblatt, M., & Titman, S. (1989), "Portfolio performance evaluation: Old issues and new insights", Review of Financial Studies, Vol. 2(3), pp. 393-422.

Grinblatt, M., & Titman, S. (1989a), "Mutual fund performance: An analysis of quarterly holdings", Journal of Business, Vol. 62, pp. 393-416.

Grant, D. (1977), "Portfolio performance and the cost of timing decisions", Journal of Finance, Vol. 32(3), pp. 837-846.

Gordon, M.J., & Gangoli, R. (1962), "Choice among and scale of play on lottery type alternatives", College of Business Administration, University of Rochester, pp. 1-25.

Gupta, A. (April 2002), "Market timing abilities of Indian mutual fund manager" The ICFAI Journal of applied Finance, Vol. 6(2), pp. 1243-1250.

Hicks, J.R. (1962), "Liquidity", The Economic Journal, Vol. LXXII, pp. 787-802.

Henrikson, R., & Merton, R.C. (1981), "On market timing and investment performance II. Statistical procedures for evaluating forecasting skills", The Journal of Business, Vol. 44, pp. 513-533.

Holme, I.M., & Solvang, B.K., 91997), "Forskningsme todik- am kvalitativa och kvantitativa me toder. Lund: studentliterature.

Henrikson, R. (1984), "Market timing and mutual fund performance: An empirical investigation", Journal of Business, Vol. 57(1), pp. 73-96.

Ilmanen, A. (1995), "Time-varying expected returns in international bond markets", Journal of Finance, Vol. 50(2), pp. 481-506.

Ibrahim, M. (2004), "Performance evaluation of mutual fund industry in Nigeria: 1990-2002", Working paper, http//papers.ssrn.com, 1-25.

Irissappane., Murugaesan, & Chandrasekara. (2003), "Portfolio selection skill and timing abilities of fund managers: An empirical evidence on Indian mutual funds", www.uticam.com. Pdf, pp. 1-18.

Jensen, M. C. (1968), "The performance of mutual funds in the period 1945-1964", The Journal of Finance, Vol. 23, pp. 389-416.

Jensen, M. (1972), "Optimal utilization of market forecasts and the evaluation of investment performance", In Szego; G; Shell, K. (eds), Mathematical methods in Investment an d Finance, North-Holland, pp. 310-335.

Jagannathan., & Korajczyk. (1986), "Assessing the market timing performance of managed portfolios", Journal of Business, Vol. 59, pp. 217-235.

Jiang, G.J., Yao, T., & Yu, T. (2007), "Do mutual funds time the market? Evidence from portfolio holdings", Journal of Financial Economics, Vol. 86, pp. 724-758.

Jaydev, M. (March 1996), "Mutual fund performance: An analysis of monthly returns", Finance India, Vol. X(1), pp. 73-84.

Kahneman, D., & Tversky, A. (1979), "Prospect theory: An analysis of decision under risk", Econometrica,

Kader, M., & Kuang, Y. (2007), "Risk-adjusted performance, selectivity, timing ability and performance persistence of Hong Kong mutual funds", Journal of Asia-Pacific Business, Vol. 8(2), pp. 25-28.

Kon, & Jen. (1978), "The investment performance of mutual funds: An empirical investigation of timing, selectivity and market efficiency", Journal of Business, Vol. 52, pp. 263-289.

Koulis., Beneki., Adam, & Botsaris. (2011), "An assessment of the performance of Greek mutual equity funds selectivity and market-timing", Applied Mathematical Science, Vol. 5(4), pp. 159-171.

Linter, J. (1965), "Security prices, risk and maximal gains from diversification", The Journal of Finance, Vol. XX(4), pp. 587-615.

Lehmann, B. N., & Modest, D. M, (1987), "Mutual fund performance evaluation: A comparison of benchmarks and benchmark comparisons", Journal of Finance, Vol. 42, pp. 233-266.

Lee, C.F., & Rahman, S. (1990), "Market-timing, selectivity and mutual fund performance: An empirical investigation", Journal of Business, Vol. 63, pp. 261-278.

Leite, A.P. & Cortez, C.M. (2005), "Conditional performance evaluation: Evidence for the Portuguese mutual fund market", www.ssrn.com.pdf, pp. 1-24.

Lundhal, U., & Skarvard, P.H. (1999), "Utredningsmetodik for samhallvetare och economer (3ed). Lund: Student literature.

Mossin, J. (1966), "Equilibrium in a capital asset market", Econometrica, Vol. 34, pp. 141-183.

Markowitz, H. M. (1952), "Portfolio selection", Journal of Finance, Vol. 12, pp. 77-91.

Merton, R.C. (1981), "On market timing and investment II an equilibrium theory of value for market forecast" Journal of Business, Vol. 54(3), pp. 363-406.

Modigliani, F. & L. Modigliani (1997), "risk-Adjusted performance", The Journal of Portfolio Management, Vol. 23(2), pp. 45-54.

Mansor., & Bhatti. (2011), "The Islamic mutual fund performance: New evidence on market-timing and stock selectivity", International conference on Economics and Finance Research, IPEDR, 4, ACSIT press, Singapore, pp. 477-484.

Otten, R., & Bams, D. (2004), "How to measure mutual fund performance: Economic versus Statistical relevance", Journal of Accounting and Finance, Vol. 44(2), pp. 203-222.

Pesaran, M.H., & Timmermann, A. (1995), "Predictability of stick returns: Robustness and economic significance", Journal of Finance, Vol. 50(4), pp. 1201-1228.

Rosenberg, B., & Mckibben, W. (1973), "The prediction of systematic and specific risk in common stocks", Journal of Financial and Quantitative Analysis, Vol. 8(2), pp. 317-333.

Rosenberg, B., & Marathe, V. (1975), "Common factors in security returns: Microeconomic determinants and macroeconomic correlates", Research Programme in Finance, Working Paper, pp. 1-57.

Rao., & Venkateswarlu. (2000), "Market timing abilities of fund managers: A case study of unit trust of India", Indian capital markets, Vol. 55-66.

Romacho, J. & Cortez, M.C. (2006), "Timing and selectivity in Portuguese mutual fund performance", Research in International Business and Finance, Vol. 20(3), pp. 275-374.

Roy., & Ghosh, (2013), "Market-timing performance of the open-ended income and growth mutual fund schemes: An empirical study", International Journal of Financial Management, Vol.3, Issue.3, pp. 47-50.

Sharpe, W. F. (1964), "A simplified model for portfolio analysis", Management Science, pp. 277-293.

Sharpe, W. F. (1966), "Mutual fund performance", Journal of Business, Vol. 39, pp. 119-138.

Shanken, J. (1990), "Intertemporal asset pricing models: An empirical investigation", Journal of Econometrics, Vol. 45, pp. 99-120.

Santos., Tusi., Costa, & Silva. (2005), "Evaluating Brazilian mutual funds with stochastic frontiers", www.economicsbulletin.com / volume13/ EB-05M20002A.pdf, pp. 1-37.

Silva, Florinda., Cortez, M. & Armada, M. (2003), "Conditioning information and European bonds fund performance", European Financial Management, Vol. 9(2), pp. 201-230.

Shanmughan., & Zabiulla. (2011), "Stock selection strategies of equity mutual fund managers in India", Middle Eastern Finance and Economics, Vol. 11, pp. 19-27

Treynor, J. L. (1965), "How to rate management of investment funds", Harvard Business Review, Vol. 43(1), pp. 63-75.

Treynor, J. L., & Mazuy, J. (1966), "Can mutual fund outguess the market", Harvard Business Review, Vol. 43(1), pp. 63-75.

Tobin. J. (1958), "Liquidity preference as behaviour towards risk", The Review of Economic studies, Vol. XXV, pp. 65-86.

Thanou, E. L. (2008), "Mutual fund performance evaluation during up and down market condition: The case of Greek equity mutual funds", International research Journal of Finance and Economics, Vol. 13, pp. 84-93.

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Relevance of Efficient Market Hypothesis with Special Reference to BSE India

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The stock market efficiency is one of the important concerns as it performs a significant role in providing fair chance to the trading members by providing access to complete and accurate information and reflects fair current market prices. The present study has been conducted with the purpose of analyzing the efficiency in the context of Indian stock market. The objective is to analyze whether the prices in Indian stock market follow random walk movement and also to evaluate the efficiency of Bombay Stock Exchange on the basis of its index known as SENSEX. Runs test and Serial Correlation test have been used on the closing values of SENSEX for a period of five years i.e. December 2007 to December 2012. The results of Z test and t test help us conclude that BSE India is an inefficient and behavioral market rather than a rational one.

Keywords: Efficient Market Hypothesis, SENSEX, Runs Test and Behavioral Market.

INTRODUCTION

Market Efficiency is the efficiency and ability of the market to perform all the operations in an adequate manner and to depict the information in a quick and efficient manner. It is the analysis of the efficiency of capital markets. This looks at how fair are the current market prices for an asset, given in the current market situations. For example, if major news breaks out for a company, an analysis would occur on the stock's price to see how it should be valued and given in the news. Capital market efficiency measures the extent of the accuracy of the stock's price. Market Efficiency has been one of the important aspects of capital markets and a keen interest for the profitability of the investors as it affects the extent to which the investors can earn profits and can beat the market. On the basis of their nature, there are two types of market efficiency: informational and operational efficiency. Informational efficiency deals with the ability of the market to collect and depict the information in a quick and efficient manner. Operational efficiency states the capability of the market to perform the routine operations efficiently as the market is required to perform various operations like listing, clearing and other trading operations.

According to Efficient Market Hypothesis markets are rational and prices of stocks fully reflect all available information. The securities prices quickly adjust to new information as readily that information is available. But according to Behavioral Finance this kind of efficient market cannot explain the observed anomalies in Market anomalies, which are the unusual occurrences or abnormality in smooth patterns of the stock market. Different researchers exhibited the existence of observed anomalies with their evidences in different stock exchanges of the world. But yet the evidences on anomalies are debatable.

There are three major versions of the hypothesis: Weak, Semi-Strong, and Strong. In weak form of EMH, all the past information including past prices and returns is already reflected in the current prices of stocks. The assumption of weak form is consistent with Random Walk Hypothesis i.e. stock prices move randomly, and the price changes are independent of each other. So if the weak form holds, no one can predict the future on the basis of past information. And no one can beat the market by earning abnormal returns. Therefore, the Technical (trend) Analysis, wherein the analysts make the chart of past price movements of stocks to accurately predict future price changes, is of no use. However, one can beat the market and get abnormal returns on the basis of fundamental analysis or on the basis of private information.

In the semi strong form, current stock prices reflect all the publicly available information as well as the past information. So no one can make extra profit on the basis of fundamental analysis. However, one can beat the market by insider trading.

In the strong form of market efficiency, all relevant information including past, public and private information is reflected in the current stock prices. So if the strong form persists, then no one can beat the market in any way, not even by insider trading. It is clear that no market can attain full efficiency all the time. Changes in the share prices are always possible when they are caused by newly disclosed information.

REVIEW OF LITERATURE

The paper in hand tries to evaluate the efficiency of Bombay Stock Exchange Limited commonly known as BSE India established in 1875 which till now enjoys a status of repute. There are various studies which have been conducted on the various stock markets across the globe to analyze the efficiency.

Asma & Keavin (2000) tested weak-form market efficiency on Dhaka Stock Exchange. They took daily price indices of all listed securities of DSE for period from 1988 to 1997. The null hypothesis has been rejected by the parametric tests such as Auto-correlation, Auto-regression, and ARIMA model and the study revealed that emerging markets such as Dhaka Stock Exchange are weak-form efficient and investors can generate excessive returns.

A number of studies conducted in India reveal contradictory results. The study by Poshakwale (1996) argued that the efficiency of the emerging markets is of much greater importance. His study provided empirical evidence on weak form efficiency in Bombay Stock Exchange over a period of 1987-1994.The Serial Correlation Coefficients Test and Runs test have been applied to the selected data. The results concluded that the market is not weak form efficient. On the other hand, Pant and Bishnoi (2001) found that the Indian stock market was weak form efficient using Dickey Fuller Test. The similar results were achieved by Mall, Pradhan, and Mishra (2011) who used daily returns data from June 2000 to May 2011 and found that the Indian stock market is weak form efficient. Harper and Jin (2005) tried to determine whether the Indian the stock market is an efficient market and the stock returns followed a random walk. They used autocorrelation, Box-Ljung test statistics and the run test and concluded that the Indian stock market was not efficient in the weak form during the testing period. The stock prices did not reflect all the information and abnormal returns could be achieved by the investors exploiting the market inefficiency. Gupta and Basu (2007)

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evaluated market efficiency in the Indian stock market from 1991 to 2006. They used the Augmented Dickey-fuller test, Phillip Perron, and KPSS procedures to test for unit roots. The results indicated that Indian Stock Markets do not follow a random walk. Thomas and Kumar (2010) used the runs test and Kolmogorov- Smirnov test and found the similar results for daily returns in the Indian Stock Market from 2004 to 2009. Mahindra and Sharma (2009) tested the efficiency hypothesis of the stock market by taking the data of various companies like ACC, Bajaj, Bharti airtel, Dr.Reddy, Grasim, HDFC, Hindalco, Maruti Suzuki etc.

In their study, Akber and Muhammad attempted to seek evidence for weak-form of market efficiency for KSE 100 Index. Index returns have been studied from 1st January, 1992 to 30th April, 2013 using Non-Parametric tests (Kolmogrov-Smirnov goodness of fitness test, Runs test and Phillips-Perron test) and Parametric tests (Auto-correlation test, Box-Pierce (Q) statistic test, Ljung and Box (Q) Statistic test, Augmented Dickey-fuller test, Dickey-fuller GLS test, Jarque-Bera test, Kwiatkowski, Phillips, Schmidt and Shin test, Auto-regression and ARIMA model). The study concluded that KSE 100 Index has found to be weak-form inefficient, but the last 4 years have shown some signs of efficiency. Companies return series from KSE 30 Index are found to be more random than companies return series from KSE100 Index.

Chung (2006) examined Efficient Market Hypothesis on two major Chinese stock markets Shanghai and Shenzhen for the period from 1992 to 2005. The study used autocorrelation test, runs test, unit root test and multiple variance ratio. The results revealed that the two major Chinese stock markets are not weak-form efficient markets.

Chakraborty (2006) analyzed the weak-form efficiency of the Pakistani market using daily closing prices for the period from January 1st 1996 to 31st December 2000. Applying the serial correlation and variance tests, the study rejected the random walk

behavior in stock price movement and considered the stock market inefficient. Rabbani et al. (2013) analysed weak-form market efficiency hypothesis emerging stock market Karachi stock exchange Pakistan. Secondary data has been taken for twelve years from January 1999 to December 2010 of KSE 100 Index. This time period is divided into four groups including three years each. Weak-form efficiency tests such as Augmented Dickey-fuller test, Auto-correlation function test, Phillip Perron test and Runs test are applied to analyze the data. All these tests rejected efficient market hypothesis (EMH) in its weak-form except Runs test , which suggested weak-form market efficiency for two groups of years 1999-2001 and 2005-2007.Overall KSE of Pakistan is weak-form inefficient and investors are compensated for taking augmented risk.

Suleman et al. (2010) conducted a study to test the weak-form market efficiency of the stock market returns of Pakistan, India, Sri Lanka, China, Korea, Hong Kong, Indonesia, Malaysia, Philippine, Singapore, Thailand, Taiwan, Japan and Australia. Monthly observations are taken for the period January 2004 to December 2009. Autocorrelation, Ljung-Box Q-statistic Test, Runs Test, Unit Root Test and the Variance Ratio are used to test the hypothesis that the stock market follows a random walk. Monthly returns are not normally distributed, because they are negatively skewed and leptokurtic. In aggregate we concluded that the monthly prices do not follows random walks in all the countries of the Asian-Pacific region. The investors can take the stream of benefits through arbitrage process from profitable opportunities across these markets.

Khan et al. (2011) interpreted the theory and evidence on market efficiency. The paper comprised of the Analysis of BSE and NSE with the help of Run Test. This paper tested the market efficiency of Indian Capital Market in its weak form based on the indices of two major stock exchanges of India viz; National Stock Exchange (NSE) and Bombay Stock

Exchange (BSE). The efficiency of the Indian capital market is tested using the daily closing values of the indices of NSE and BSE over the period of ten years.

Patel, Radadia and Dhawan (2012) investigated the weak form of market efficiency of Asian four selected stock markets. This paper took a daily closing price of stock markets under the study ten years and also divided full sample in three interval periods, and applied various test The paper concluded that BSE Sensex has given the highest mean returns to the investor followed by SSE Composite and Hangseng. This study considered BSE Sensex as high risk markets as it reported the highest Standard Deviation.

Nisar and Hanif (2012) examined the weak form of efficient market hypothesis on the four major stock exchanges of South Asia including, India, Pakistan, Bangladesh and Sri Lanka. Historical index values on a monthly, weekly and daily basis for a period of 14 Years (1997-2011) were used for analysis. Applying runs test, serial correlation, unit root and variance ratio test, findings suggested that none of the four major stock markets of south-Asia follows Random-walk and hence all these markets are not the weak form of efficient market.

The perusal of the literature reveals that till today, EMH is considered as a puzzle as its relevance with reference to the capital markets has not been studied thoroughly. In order to analyze that perspective of EMH, effort has been made by the present study. The usability of the parameters and the time period considered can be taken as foundation factors for the research gap between the studies which were conducted earlier and the present study.

DATA AND METHODOLGY

The objective of the study is to analyze the efficiency of BSE India on the basis of Runs test and Serial Correlation Test on closing values of Sensex from December 2007 to December 2012. Runs test is a non-parametric test, which is used to test the randomness

of the series which auto correlation fails to do. Runs Test is a traditional method used in the Random Walk model and ignores the properties of distribution. It has been used to judge the randomness in the behavior of Indian Stock market. It determines whether successive price changes are independent. In this test, actual number of runs is compared with the expected number of runs. If the actual number of runs is not significantly different from the expected number of runs, then the price changes are considered independent, and if this difference is significant then the price changes are considered dependent. The Runs test provides the systematic interpretation to the movement of the prices as it analyses the upswings and downswings of the value. The expected number of runs can be obtained by applying the following formula:

$$E(r) = \frac{2(n_1 n_2)}{n_1 + n_2 + 1}$$

Where, $E(r)$ = Expected number of runs.

n_1 = Number of positive runs.

n_2 = Number of negative runs.

The standard error of the expected number of runs of all signs may be obtained as-

$$S.E = \sqrt{\frac{2n_1n_2(2n_1n_2-n_1-n_2)}{(n_1+n_2)2(n_1+n_2-1)}}$$

Where, S.E = Standard Error

Daily closing values of Sensex for a period of five years from December 2007 to December 2012 have been used. Considering the movements in the prices, runs are calculated. The number of positive and negative runs is calculated which further serves as the basis for calculating the mean of runs. Then the standard error of the runs distribution is found. In order to find out the limit range which can be used to determine the efficiency and inefficiency of the market, t-test, Z test or F test has been applied. If the number of total runs lies in the range given by the test, market is said to be in weak form of efficiency and if it lies outside of the range, it is said to be inefficient.

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Table 4.1 Runs taken by BSE SENSEX from December 2007 to December 2012							
Month	Positive Runs (N1)	Negative Runs (N2)	Number of Runs (N or r)	Month	Positive Runs (N1)	Negative Runs (N2)	Number of Runs (N or r)
Dec-07	3	4	7	Jul-10	6	7	13
Jan-08	5	5	10	Aug-10	7	7	14
Feb-08	5	4	9	Sep-10	4	4	8
Mar-08	4	4	8	Oct-10	7	7	14
Apr-08	4	4	8	Nov-10	6	6	12
May-08	5	5	10	Dec-10	6	5	11
Jun-08	4	4	8	Jan-11	4	4	8
Jul-08	5	6	11	Feb-11	4	5	9
Aug-08	5	4	9	Mar-11	5	4	9
Sep-08	4	5	9	Apr-11	3	3	6
Oct-08	3	3	6	May-11	5	7	12
Nov-08	3	4	7	Month	Positive Runs (N1)	Negative Runs (N2)	Number of Runs (N or r)
Dec-08	5	6	11	Jun-11	5	4	9
Month	Positive Runs (N1)	Negative Runs (N2)	Number of Runs (N or r)	Jul-11	5	6	11
				Aug-11	4	4	8
Jan-09	6	5	11	Sep-11	6	5	11
Feb-09	5	5	10	Oct-11	5	5	10
Mar-09	5	6	11	Nov-11	4	5	9
Apr-09	3	3	6	Dec-11	5	5	10
May-09	5	5	10	Jan-12	5	5	10
Jun-09	7	7	14	Feb-12	5	4	9
Jul-09	5	5	10	Mar-12	5	6	11
Aug-09	6	5	11	Apr-12	6	5	11
Sep-09	3	4	7	May-12	5	6	11
Oct-09	6	5	11	Jun-12	5	4	9
Nov-09	5	6	11	Jul-12	4	5	9
Dec-09	7	6	13	Aug-12	6	5	11
Jan-10	4	3	7	Sep-12	4	5	9
Feb-10	5	6	11	Oct-12	7	7	14
Mar-10	5	4	9	Nov-12	4	3	7
Apr-10	4	4	8	Dec-12	5	6	11
May-10	6	6	12	Total	300	303	603
Jun-10	6	6	12				

Analysis by Run Test:

Total number of Runs (r): 603

Number of Positive Runs (n1): 300

Number of Negative Runs (n2): 303

Mean (μr)

$$E\,(\,r\,) = \frac{2\,(n_1\,n_2)}{n_1 + n_2 + 1}$$

$$\frac{2(300)\,(303)}{603+1}$$

$$= 301.49 + 1 = 302.49$$

And Standard Error (σr)

$$= \sqrt{\frac{2n_1 n_2\,(2n_1 n_2 - n_1 - n_2)}{(n_1 + n_2)2\,(n_1 + n_2 - 1)}}$$

$$= \sqrt{\frac{2(300)\,(303)\,(2\,(300)\,(303)\;603}{(603)^2\,(603 - 1)}} = 150.49$$

Standard Error (σr) = $\sqrt{150.49}$ = 12.267

To test the randomness of the prices, a two tail test has been used as:

Null Hypothesis (H_0): Market is operating in weak form of efficiency

Alternate Hypothesis (H_1): Market is Inefficient

Calculation of Limits using t Stat:

Test at 5% significance level or at α = 0.05, using t-table at 10 degrees of freedom

The Lower Limit: $\mu(r) - t*\sigma r$

$$302.49\ 2.228\,(12.267) = 275.15$$

The Upper Limit: $\mu(r) + t*\sigma r$

$$302.49 + 2.228\,(12.267) = 329.82$$

Thus the limit range comes out to be: 275.15 to 329.82. As observed, the value of r or N = 603, does not lie in these limits, so null hypothesis is rejected.

Calculation of Limits using Z Stat:

Test at 5% Significance Level or at α = 0.05, using Z table where the Value of Z statistic is = 1.96 in Two

Tail Test:

The Lower Limit: $\mu(r) - Z*\sigma r$

$$302.49\ 1.96\,(12.267) = 280.26$$

The Upper Limit: $\mu(r) + Z*\sigma r$

$$302.49 + 1.96\,(12.267) = 324.71$$

Thus the Limit Range comes out to be: 280.26 to 324.71. As observed the Value of r or N = 603, does not lie in these limits, so Null Hypothesis is Rejected.

The market efficiency on the basis of run test has been analyzed using Z and t test, using five years data ranging from December 2007 to December 2012. Analysis reveals the null hypothesis was rejected which leads to the acceptance of the alternate hypothesis that market is inefficient. The analysis of the market efficiency using Z test presented the same results when the two tailed test was applied to the runs of Sensex.

Serial Correlation Test

In Serial Correlation test two series of prices is taken to identify the degree of association between the prices at different points of time. As for the existence of efficiency, the correlation (r) between the prices should be zero. If r is zero, it depicts the absence of association in prices, indicating that prices are moving in an independent manner. Thus it provides the evidence that market is operating in Weak Form of Efficiency. In this test, Karl Pearson's Coefficient of Correlation was found between two price chains by using the formula as:

$$r = \frac{N(\Sigma xy) - (\Sigma x)(\Sigma y)}{\sqrt{[N\Sigma x^2 - (\Sigma x)^2][N\Sigma y^2 - (\Sigma y)^2]}}$$

Correlation Analysis between closing values of 2009 and 2010:

In the efficient market, there should be no correlation between the price movements of different time periods. In this it has been analyzed by taking different price series at different points of time.

Table 2 Closing values of 2009 and 2010			
Date	Close Value	Date	Close Value
01-01-2009	9,903.46	04-01-2010	17,558.73
02-01-2009	9,958.22	05-01-2010	17,686.24
05-01-2009	10,275.60	06-01-2010	17,701.13
06-01-2009	10,335.93	07-01-2010	17,615.72
07-01-2009	9,586.88	08-01-2010	17,540.29
09-01-2009	9,406.47	11-01-2010	17,526.71
12-01-2009	9,110.05	12-01-2010	17,422.51
13-01-2009	9,071.36	13-01-2010	17,509.80
14-01-2009	9,370.49	14-01-2010	17,584.87
15-01-2009	9,046.74	15-01-2010	17,554.30

Source: http/www/bseindia.com/
Coefficient of Correlation (r) = 0.768843

Table 3 Closing values of 2010 and 2011			
Date	Close Value	Date	Close Value
04-01-2010	17,558.73	03-01-2011	20,561.05
05-01-2010	17,686.24	04-01-2011	20,498.72
06-01-2010	17,701.13	05-01-2011	20,301.10
07-01-2010	17,615.72	06-01-2011	20,184.74
08-01-2010	17,540.29	07-01-2011	19,691.81
11-01-2010	17,526.71	10-01-2011	19,224.12
12-01-2010	17,422.51	11-01-2011	19,196.34
13-01-2010	17,509.80	12-01-2011	19,534.10
14-01-2010	17,584.87	13-01-2011	19,182.82
15-01-2010	17,554.30	14-01-2011	18,860.44

Source: http/www/bseindia.com/
Coefficient of Correlation(r) = 0.639683

Table 2 reveals that in the price series of January 2009 and January 2010, there exists a positive correlation between the prices of different time periods. Thus market is inefficient as association between the prices indicates the non randomness in the movement of the prices.

Correlation Analysis between values of 2010 and 2011

Table 3 indicates that in the price series of January 2010 and January 2011, there exists a positive correlation between the prices of different time periods. Thus market is inefficient as association between the prices indicates the non randomness in the movement of the prices.

CONCLUSIONS OF THE STUDY

The theoretical and empirical studies of the efficient market hypothesis have made an important contribution to the understanding of the stock market, although the present state of understanding of the issue, especially in the emerging financial markets, is far from being conclusive. The present study used runs test to analyze whether the market is operating in the weak form of efficiency or not. The

results of the present study show that there is an association between the prices which indicate that the prices are not moving randomly, hence the market is inefficient which suggests that the investors can earn abnormal profits by following certain strategies on the basis of the movement of the market.

REFERENCES

Asma, M. & Keavin, K. (2000). Weak-form Market Efficiency of an Emerging Market: Evidence from Dhaka Stock Market of Bangladesh. ENBS Conference paper Oslo.

Akber, U. & Muhammad, N. (2013). Is Pakistan Stock Market moving towards Weak-form efficiency? Evidence from the Karachi Stock Exchange and the Random Walk Nature of free-float of shares of KSE 30 Index. MPRA Paper No. 51980, Retrieved from http://mpra.ub.uni-muenchen.de/51980/1/MPRA_paper_49128.pdf

Chakraborty, M. (2006). Market Efficiency for Pakistan Stock Market: Evidence from Karachi Stock Exchange. South Asia Economic Journal, 7(1), 67-81.

Chung, 2006. Testing Weak-Form Efficiency of the Chinese Stock Market. Working paper presented on February 14th, 2006, at Lappeenranta University of Technology Department of Business Administration Section of Accounting and Finance.

Gupta, R., & Basu, P. K. (2007). Weak form Efficiency in Indian Stock Markets. International Business and Economics Research Journal. 6(3), 57-64.

Harper, A. Jin, Z. (2005) Examining Market Efficiency in India: An

Empirical Analysis of the Random Walk Hypothesis. Journal of Finance and Accountancy, 2(3), 1-6.

Khan A. Q., Ikram, S. & Mehtab, M. (2011). Testing Weak form Market Efficiency of Indian Capital Market, African Journal of Marketing Management, 3(6), 115-127.

Mahendra, M., & Sharma, G. (2009). Efficiency Hypothesis of the Stock Markets: A Case of Indian Securities. International Journal of Business and Management, 4(3): 136-144.

Mall, M., Pradhan, B. B., & Mishra, P.K. (2011). The Efficiency of India's Stock Market: An Empirical Analysis. International Research Journal of Finance and Economic, 69, 178-184.

Nisar, S., Hanif, M. (2012). Testing Weak Form of Efficient Market Hypothesis: Empirical Evidence from South-Asia. World Applied Sciences Journal 17 (4): 414-427.

Pant, B., & Bishnoi, T. T. (2001). Testing Random Walk Hypothesis for Indian Stock Market Indices. Proceedings of the Fifth capital markets conference 2001, UTI Capital Markets.

Patel, N. R., Radadia,N. & Dhawan, J. (2012). An Empirical Study on Weak-Form of Market EFFiciency of Selected Asian Stock Markets. Journal of applied Finance and Banking. 2(2), 99-148.

Poshakwale, S. (1996). Evidence on Weak Form Efficiency and Day of the Week Effect in the Indian Stock Market. Finance India, 10(3), 605-616.

Rabbani, S., Kamal, N. & Salim, M. (2013). Testing the Weak-Form Efficiency of the Stock Market: Pakistan as an Emerging Economy. Journal of Basic and Applied Scientific Research , 3(4), 136-142.

Suleman, M. T., Hamid, K., Ali Shah, S. Z., & Imdad Akkash, R.S. (2010). Testing the Weak Form of Efficient Market Hypothesis: Empirical Evidence from Asia-Pacific Markets. International Research Journal of Finance and Economics. 58, 121-127.

BIOGRAPHIES

Anurag Pahuja, Ph.D. is Associate Professor at Institute of Management Studies, Ghaziabad. With her Ph.D. in the area of Corporate Governance, she has around 15 years of experience in academics. She has served as Asstt. Professor (Selection Grade) and Editor, Apeejay Journal of Management and Technology (a Bi-annual Refereed Journal listed in Cabell's directory) at Apeejay Institute of Management Technical Campus, Jalandhar for thirteen years. She is associated with various professional bodies like AIMA as member and MTC Global as chapter head. She has authored two books and attended various National and International conferences/seminars, presented around 30 research papers (including the one organized by International Innovative Scientific and Research Organization (IISRO) in Pattaya, Thailand. She has conducted more than 10 FDPs/EDPs/Workshops as resource person. She has been a prolific researcher and has published 26 research papers/articles in international and national journals of repute and chapters in edited books. She has been associated as Submission Reviewer with the InSITE Conference, the joint conference organized by Informing Science Institute and Information Technology Education in different countries, for past 7 years. A research guide for doctoral students with PTU, Jalandhar, and her research interests include Corporate Governance, Behavioral Finance, Mutual Funds and Stock Market etc. She may be contacted at anurag.pahuja@imsgzb.com

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Book Reviews

The Impact of E-Marketing on E-Buyer Behaviour

Author: Dr. Bijal Zaveri Amin

Publisher: Biztantra, Delhi,
ISBN-9789350043202,
Pages- 368, One CD

With the rapid growth of science and technology, internet in laptops and mobile phones is being used increasingly even by the middle class households. The life of people has become tedious, occupied and busy, that one often finds difficult to spend quality time at the market place. E-marketing has become a boon in the modern times giving the customer ample opportunities to know about the products, services and their quality and cost. It gives the customer ample choice to decide what he wants without bothering unnecessarily and haggling about the cost of the product.

E-marketing has opened flood gates of meaningful and attractive advertisements which attracts the customer, entice him to procure the product, and reaches his home at the earliest possible time.

The book is divided into two parts. In part one there are following six chapters; 'Marketing perspective in the internet age: E-marketing', 'E-marketing-mix: marketing mix in internet era', 'The e-consumer perspective: typology of e-buyers and adoption process in electronic environment', 'E-buyer behaviour in electronic environment', 'E-buying and online customer experience & CRM', 'E-branding: Branding in electronic era'. In part two, the author has given six case studies on e-marketing which makes the book more precious. The author has covered various aspects on e-marketing by adopting interdisciplinary approach.

There is a flood of books and published material on e-marketing today. This opens a plethora of choices before the customers in deciding about the products and its quality. The media is constantly hammering upon his choice to buy the product on certain initial discounts also. The book is of immense value not only to the students and teachers of e-marketing but also to those high profile multinationals and institutions who should also know the theory and practice of e-marketing and how to seek new customers and promote buyer's behaviour to suit their interest.

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Corporate Finance: A Focused Approach

Author:Michael C. Ehrhardt
        Eugene F. Bringham

Publisher: Cengage Learning

ISBN : 10! 81-315-0414-X

ISBN : 13! 978-81-315-0414-7

The world today recognizes. the relevance of financial theory and applications which have dramatically expanded during the last decade. This book combines theory with the practical applications. An understanding of the theory of Finance along with a good working knowledge of financial environment is essential if people are to develop and implement effective financial strategies. This book is written by Michael C. Ehrhardt who is currently teaching at university of Tennessee, and Eugene F. Bringham, who is a renowned faculty at the University of Florida. Eugene F. Bringham is a powerful critique of Corporate Finance strategies.

This book is a master piece where in the author presents the counter agreement towards the policy of Good Financial Management. Finance, in real sense, is the cornerstone of the free enterprise system. Good Financial Management is therefore not only vital for the economic health of the business firms, but also to the nation and the world. Because of its importance, corporate Finance should be thoroughly understood. However, this is easier said than done since the field is relatively complex, and it is undergoing constant change in response to the shifts in economic scenarios. The constantly changing dynamics makes corporate finance not only stimulating and exciting, but also challenging and sometimes perplexing. The author sincerely hopes that 'Corporate Finance: A focused approach' will help readers comprehend and solve the financial problems faced by business today.

This book consists of seventeen chapters. The early coverage of risk analysis, discounted Cash flow techniques and Valuations permits us to use and reinforce these concepts throughout the book. Chapter 3 which introduces risk, return and the CAPM also demonstrates how beta is calculated for an actual company. Chapter7 covers the basic capital budgeting techniques, with an emphasis on spreadsheet Analysis. Chapter 13 blends capital structure theory and application. Drawing on both the corporate valuation model in chapter12 and the Hamada model, the chapter analyses the impacts of changes in the capital structure.

This book has major themes where in the author discusses how the manager should strive to maximise shareholders' value, which requires a focus on cash flow. The book emphasizes on a chapter that ties together free Cash flow, corporate valuation, value based management, corporate governance and in centre compensation. Each chapter has a mini case that covers all the essential issues.

The book is well structured and it gives the basic background information and essential concept including the economic and financial environment, the time value of money, the relationship between risk and return, and stock and band valuation. With this background, a reader can understand the specific techniques, decisions, rules and financial policies that are used to help maximize the value of the firm.

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Management Information Systems

Author: Sahil Raj

Publishers: Pearson Publications

ISBN No: 9789332502550

Pages-398(406 including index)

The script of the book is well crafted, sorted out and executed properly. The writing style is quite lucid, giving clarity to the reader about the topic mentioned. There exists complete flow in the concepts with well defined cases and live examples. The summary at the end of every chapter is quite helpful for better understanding of the whole concept. The author has focused on the interdisciplinary approach and has co-related a single concept with many live examples. The overall script is well drafted. The book is focusing on budding managers to get a better idea of the various aspects of Management Information System.

Table of contents:

The book is divided into 15 chapters where each chapter is well connected to other chapters. In chapter 1 the whole focus is to put across concepts of MIS (Business information system) and its characteristics as well. Chapter 2 emphasizes on the relevance of functional information systems. It talks about the inter-organizational dependencies and how processes are carried out to accomplish the job within an organization. Chapter 3 focuses on the strategic planning by top management using DSS as a tool to make the decisions. Chapter 4 emphasizes on how organizations can integrate its business processes using IT tools and technologies. It also introduces ERP software as a collaborative tool. Chapter 5 further elaborates on the key application areas of an information system. The book is explaining all the critical aspects of hardware and software related to MIS. It talks about the network, protocol and architecture. It gives detailed account of the identification, feasibility, and planning issues related to MIS. Chapter 9 gives in detail about the system analysis and development which is another aspects related to information systems. Chapter 10 deals with the analysis part of the software and it also elucidates the various concepts related to requirement analysis for an MIS. Chapter 11 deals with the modeling tools like decision flow diagram, data dictionary etc. Chapter 12 provides a detailed description of various CASE tools. Chapter 13 and 14 emphasizes on the practical aspects of development of IT projects. Chapter 15 deals with the understanding of various IT Tools and it gives hands on experience to the beginners to adapt the IT Ever-changing environment.

Summary

Information technology is dominating the business world. It is giving edge for corporates to survive and compete in the globalized environment The book elaborates on the functions and sub functions of Information systems and its role in today's business. The concepts have been well explained with the help of sufficient number of examples, caselets, tables & figures. The book provides an in-depth coverage of technological concepts, products, and solutions being currently applied to the contemporary business. It covers all the latest tools and technologies used in IT. With the problem solving approach and user friendly presentation, the book is useful for budding managers to master the concepts of Information Technology and to know how it can be used effectively and timely to have a profitable business .This book is giving insight into various challenges and realities of implementing IT solutions as well, which is a learning to the students, researchers and IT professionals.

Anita Venaik
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