RESEARCH ARTICLE

EFFICIENCY OF THE INDIAN STOCK MARKET - AN EMPIRICAL STUDY

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Manuscript Info	*Abstract*
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	Market efficiency has an influence on the investment strategy of an investor because if the market is efficient, trying to pick undervalued security will be a waste of time. In an efficient market, there will be no undervalued securities offering higher than deserved expected returns, given their risk. On the other hand, if markets are not efficient, excess returns can be made by correctly picking the security. In this paper, an analysis of five popular stocks is carried out to test the efficiency level of the Indian Stock market in semi-strong form and the random walk nature of the stock market by using the event analysis and t-test for the period from 1st April 2016 to 31st March 2017. The study carried out in this paper has presented evidence of the inefficient form of the Indian Stock Market in a semi-strong form. From the event analysis and t-test, we are able to conclude that the series of stocks in the Indian Stock Market is biased random time series. It indicates that the behaviour of share prices does not confirm the applicability of the random walk model in the Indian stock market. Thus, undervalued securities are in the market, and the investors can always get excess returns by correctly picking them.

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Introduction:-

The efficient markets hypothesis (EMH), popularly known as the Random Walk Theory, is the proposition that current stock prices fully reflect available information about the value of the firm, and there is no way to earn excess profits by using this information. It deals with one of the most fundamental and exciting issues in finance – why prices change in security markets and how those changes take place. It has very important implications for investors as well as for financial managers. The first time the term "efficient market" was used in a paper by E.F. Fama (1965) who said that in an efficient market, on average, competition will cause the full effects of new information on intrinsic values to be reflected "instantaneously" in actual prices.

Many investors try to identify securities that are undervalued and are expected to increase in value in the future, particularly those that will increase more than others. Many investors, including investment managers, believe that they can select securities that will outperform the market. They use a variety of forecasting and valuation techniques to aid them in their investment decisions. Obviously, any edge an investor possesses can translate into substantial profits.

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The efficient markets hypothesis (EMH) suggests that profiting from predicting price movements is very difficult and unlikely. The main engine behind price changes is the arrival of new information. A market is said to be "efficient" if prices adjust quickly and, on average, without bias, to new information. As a result, the current prices of securities reflect all available information at any given point in time. Consequently, there is no reason to believe that prices are too high or too low. Security prices adjust before an investor has time to trade on and profit from a new a piece of information. The key reason for the existence of an efficient market is the intense competition among investors to profit from any new information. The ability to identify over- and underpriced stocks is very valuable (it would allow investors to buy some stocks for less than their "true" value and sell others for more than they were worth). Consequently, many people spend a significant amount of time and resources in an effort to detect "mispriced" stocks. Naturally, as more and more analysts compete against each other in their effort to take advantage of over- and under-valued securities, the likelihood of being able to find and exploit such mis-priced securities becomes smaller and smaller. In equilibrium, only a relatively small number of analysts will be able to profit from the detection of mis-priced securities, mostly by chance. For the vast majority of investors, the information analysis payoff would likely not outweigh the transaction costs.

The most crucial implication of the EMH can be put in the form of a slogan: Trust market prices! At any point in time, prices of securities in efficient markets reflect all known information available to investors. There is no room for fooling investors, and as a result, all investments in efficient markets are fairly priced, i.e. on average investors get exactly what they pay for. Fair pricing of all securities does not mean that they will all perform similarly, or that even the likelihood of rising or falling in price is the same for all securities. According to capital markets theory, the expected return from security is primarily a function of its risk. The price of the security reflects the present value of its expected future cash flows, which incorporates many factors such as volatility, liquidity, and risk of bankruptcy. However, while prices are rationally based, changes in prices are expected to be random and unpredictable, because new information, by its very nature, is unpredictable. Therefore, stock prices are said to follow a random walk.

Market efficiency has an influence on the investment strategy of an investor because if the market is efficient, trying to pick up winners will be a waste of time. In an efficient market, there will be no undervalued securities offering higher than deserved expected returns, given their risk. On the other hand, if markets are not efficient, excess returns can be made by correctly picking the winners. In this paper, an analysis of five popular stocks is carried out to test the efficiency level in the Indian Stock market and the random walk nature of the stock market by using the event analysis method.

Literature Review:-

Sharma and Kennedy (1977) compared the behaviour of stock indices of the Bombay, London and New York Stock Exchanges during 1963-73 using run tests and spectral analysis. Both run tests and spectral analysis confirmed the random movement of stock indices for all three stock exchanges. They concluded that stocks on the BSE obey a random walk and are equivalent in the markets of advanced industrialized countries".

Kulkarni (1978) investigated the weekly RBI stock price indices for Bombay, Calcutta, Delhi, Madras and Ahmedabad stock exchanges and monthly indices of six different industries by using the spectral method. He concluded that there is a repeated cycle of four weeks for weekly prices and seasonality in monthly prices. This study has thus rejected the hypothesis that stock price changes were random.

Yalawar (1988) studied the month-end closing prices of 122 stocks listed on the Bombay Stock Exchange during the period 1963-82. He used only the non-parametric tests Spearman's rank correlation test and runs test. 21 out of 122 lag 1 correlation coefficients were significant at 5signifcant differences for 9 out of 122 stocks.

Thus, in the Indian context, except for some of the studies, the available evidence, in general, indicates that the successive price changes are independent and the random walk model is appropriate to describe the stock behaviour.

Research Problem

The purpose of capital markets is to transfer funds between lenders and borrowers efficiently. A market in which prices are determined such that the marginal rates of return are equated for all lenders and borrowers is said to be efficient. The study of capital market efficiency examines how much, how fast, and how accurately, available information is incorporated into security prices. Empirical studies have been attempted to determine whether the

capital market is efficient and to what degree. This study will help to know the efficiency of the stock market by testing whether the market is weak or semi-strong and it helps to make appropriate strategies for investors for their investments.

Objective of the Study:-
To test the validity of the efficient market hypothesis in the Indian Stock Market in a semi-strong form

Research Methodology:-
A descriptive research design is adopted for the study as the study attempts to describe the efficiency of the Indian capital market. The event study methodology is adopted here to test the efficiency of the market in a semi-strong form. An event study is the most popular tool used to measure the effectiveness of an economic event on the value of firms. According to EMH, the effects of an event should be immediately reflected in the security prices and hence, there should be no abnormal gains by investing in the stock. By analyzing security prices before and after an event for abnormal returns, the efficiency of a market in the semi-strong form can be determined. If there is no abnormal gain the market is efficient, otherwise market is not efficient.

Event Study Methodology
An event study is the most popular tool used to measure the effectiveness of an economic event on the value of firms. According to EMH, the effects of an event should be immediately reflected in the security prices and hence, there should be no abnormal gains by investing in the stock. By analyzing security prices before and after an event for abnormal returns, the efficiency of a market in the semi-strong form can be determined. If there is no abnormal gain the market is efficient, otherwise market is not efficient.

Event study methodology may be interpreted as analyzing the market's reaction to 'events' or as an empirical investigation of the relationship between security prices and economic informational events such as mergers, acquisitions, dividends announcements, stock splits, issuing new stocks etc. The event of the study and the period over which the related security prices vary will be examined. The important thing to keep in mind is that event should be a surprise announcement to investors, not an anticipated one. For example, the announcement of a merger and stock split can be a surprise, but generally, a dividend announcement is expected.

Event studies have a long history, including the original stock split event study by FAMA, FISHER, JENSON, and ROLL (1969). As evidence was inconsistent with the efficient market, the hypothesis started to accumulate in the late 1970s and early 1980s, and interest in long-horizon studies continued.

The Methodology of Event Studies is fairly standard and proceeds as follows:

1. Collect a sample of firms that had a surprise announcement (the event)
What causes prices to change is an announcement that is a surprise to investors. For many studies announcement of a merger, bonus issue, stock split, right issue, etc. can be treated as a surprise. For this study bonus issue and stock split are considered as the surprise announcement

2. Determine the precise day of the announcements and designate this day as zero, and define the period to be studied.
In this study 120 days around the event is considered as the period of study, then we would designate –60, -59, -58….,-1 as the 60 days prior to the event, 0 as the event day, and +1, +2,+3,….,+60 as the 60 days after the event.

3. Compute the "abnormal" return for each of the days being studied for each firm in the sample.
Abnormal return is actual return less the expected return. Different authors use different models for expected return. In this study we calculate expected return using **Sharpe Single Index Model.** The return of each security is represented by the following equation:

$$R_i = \alpha_i + \beta_i R_m + e_i$$

Here,

R_i	=	Expected return on security
α_i	=	Intercept of straight line or Alpha coefficient
R_m	=	Expected return on market

e$_i$ =   Random error or error term which mean of zero and S.D which is constant
β$_i$ =   The beta coefficient is the slope of the regression line and such it is a measure of the sensitivity of the stock's return to the movement in the market's return.

The mean value of e$_i$ is zero and hence the equation becomes

$$R_i = \alpha_i + \beta_i R_m$$

4. Compute the average abnormal return for each day in the event period for all the firms in the sample.
We normally look at the average effect of the announcements rather than examine each firm separately, because other events occurring averaging across all firms should minimize the effect of these other events, thereby allowing a better examination of the event under study.

5. Apply the t-test and examine the result.
For applying the t-test in the context of small samples the t value is calculated first of all and then compared with the table value of t at a certain level of significance for given degrees of freedom. If the calculated value of t exceeds the table value (say t$_{0.05}$) we infer that the difference is significant at the 5% level but if t is less than the concerning table value of the t, the difference is not treated as significant.
   The formula for the t-test:

$$t = \frac{\overline{x} - \mu}{SE}$$

x⁻   =   Mean of the sample
μ   =   Mean of the universe
S.E   =   Standard Error, it is (Standard Deviation/√Total No.)

Hypothesis

   H$_0$: *Abnormal return is not statistically significant (*That is market is efficient in the semi strong form or in other words the investor biases do not exist in the Indian capital market.)
   H$_0$: *Abnormal return is statistically significant (*That is the market is not efficient in the semi strong form or in other words the investor biases do exist in the Indian capital market.)

Sources of Data

The major sources of information for the study are collected from the official websites of Bombay Stock Exchange (BSE), Government of India – Ministry of Statistics and some other websites and financial Journals.

Sampling Design

Out of the companies listed in Bombay Stock Exchange 5 companies which announced Bonus share or stock split during period of 1st April   2016 to 31th March 2017 has been selected conveniently for conducting event analysis. Out of five companies three are announced bonus shares and remaining 2 are companies announced stock split.

Table 1:- The list of companies included in the sample

Sl. No	Name of the Company	Event Announced	Effective Date of Announcement
1	ONGC	Bonus Issue in the ratio of 1:2	15-12-2016
2	Berger Paints	Bonus Issue in the ratio of 2:5	15-07-2016
3	ITC	Bonus Issue in the ratio of 1:2	01-07-2016
4	GRASIM	Stock Split, Rs.10 to Rs.2	06-10-2016
5	Karur Vysya Bank	Stock Split, Rs.10 to Rs.2	17-11-2016

Source: moneycontrol.com
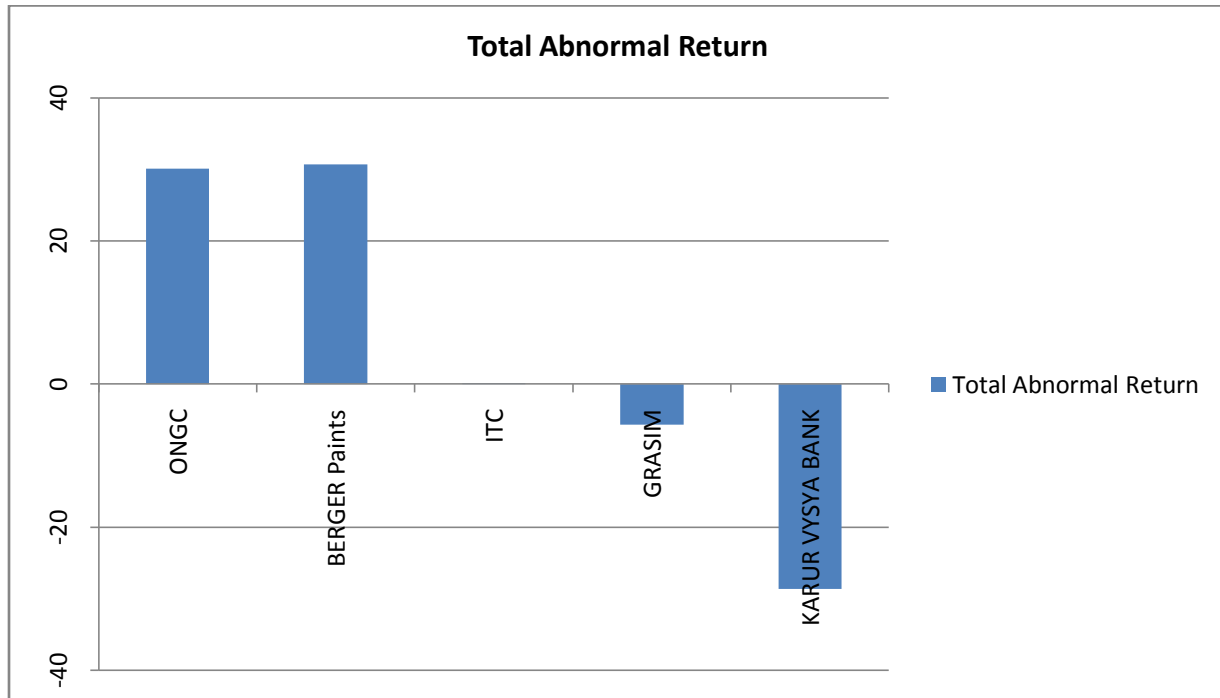
Result and Discussions:-

Abnormal return before and after surprise Event has been calculated and given in the following table:

Table 2:- Total abnormal return from securities.

Sl. No	Stock	Total Abnormal Return
1	ONGC	30.10158077
2	BERGER Paints	30.67326848
3	ITC	0.086564616
4	GRASIM	-5.728916004
5	Karur Vysya Bank	-28.70400494

Source: Secondary data

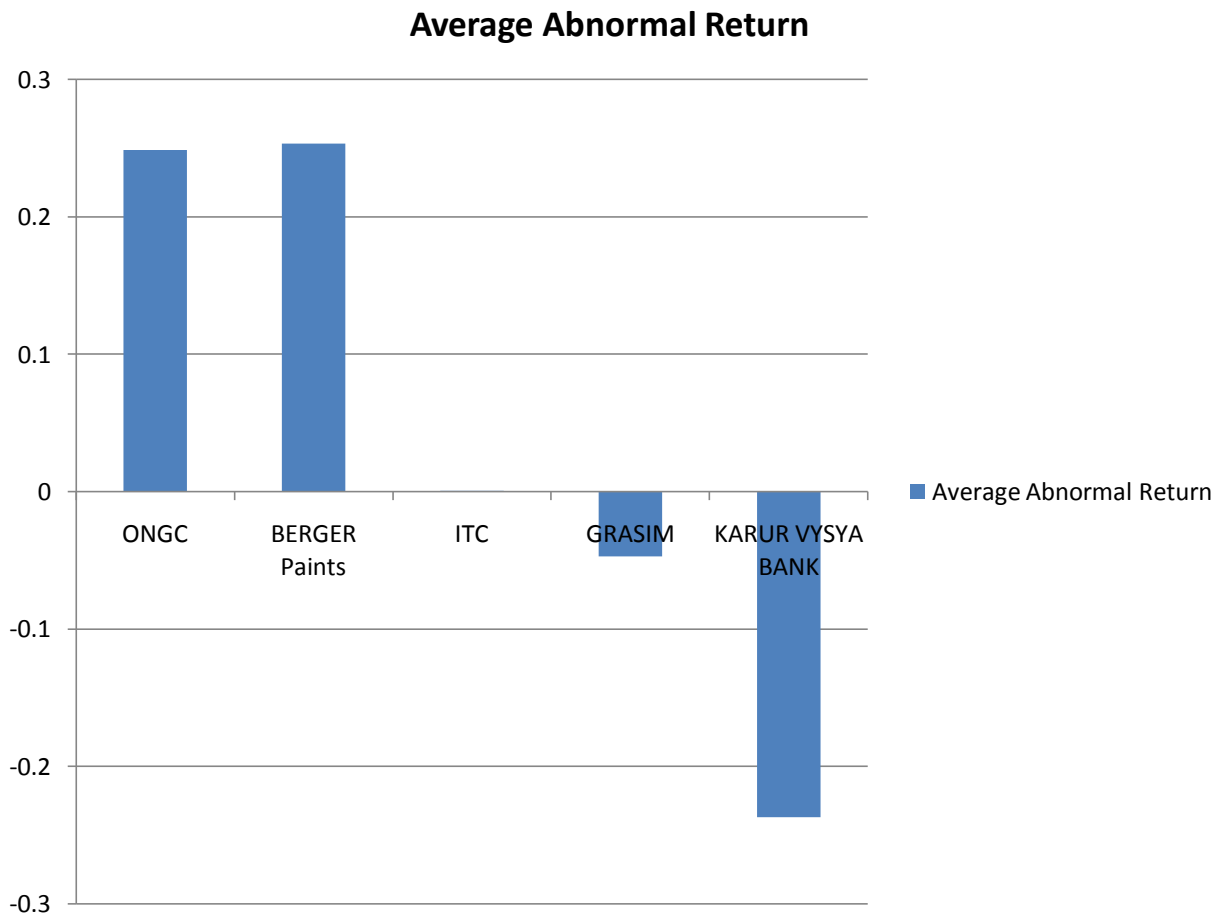**Chart. 1:-** Total abnormal return from securities.

The abnormal return for ONGC and Berger Paints is high around 30%, for ITC it's around zero and in case of GRASIM and Karur Vysya Bank its an abnormal Loss.

Table 3:- Average Abnormal Return.

Sl. No	Stock	Average Abnormal Return
1	ONGC	0.248773395
2	BERGER Paints	0.253498087
3	ITC	0.00071541
4	GRASIM	-0.047346413
5	Karur Vysya Bank	-0.237223181

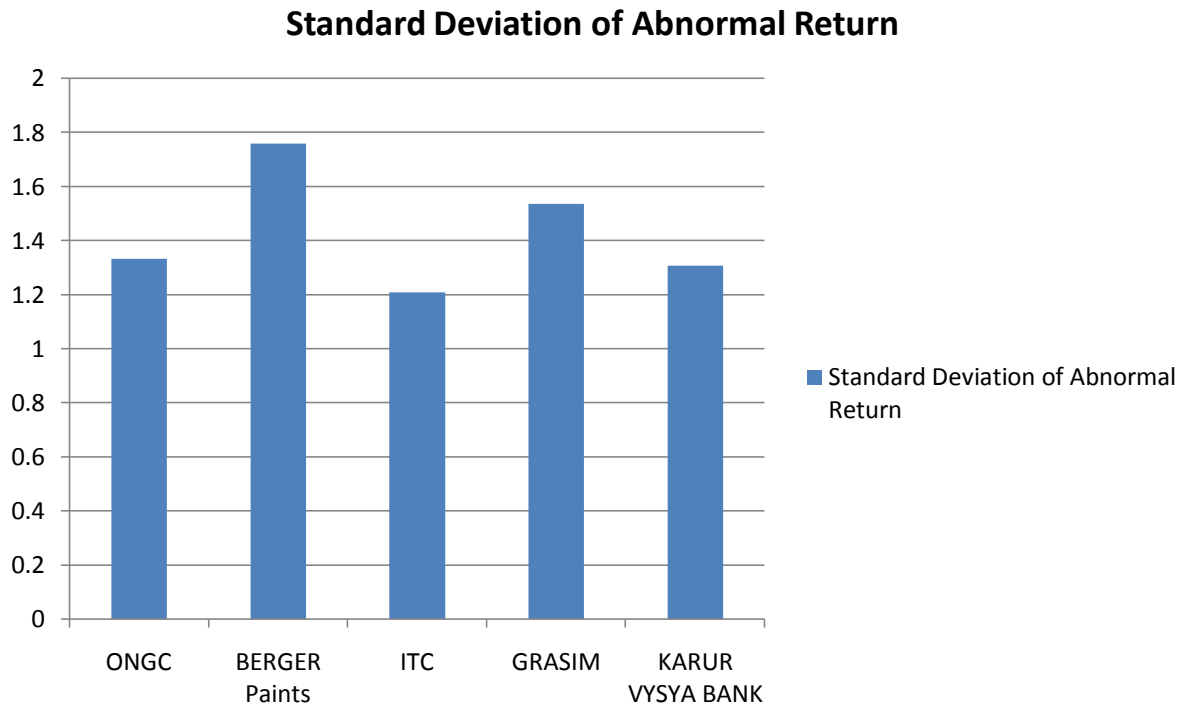*Source: Secondary data*

Chart 2:- Average abnormal return.

Average Abnormal Return

The average abnormal return for ONGC and Berger Paints is high around 0.25 %, for ITC it's around zero and in the case of GRASIM and Karur Vysya Bank it's abnormal Loss.

Table 4:- Standard Deviation of Abnormal Return.

Sl. No	Stock	Standard Deviation
1	ONGC	1.3329
2	BERGER Paints	1.7596
3	ITC	1.2086
4	GRASIM	1.5365
5	Karur Vysya Bank	1.3077

Source: Secondary data

Chart 3:- Standard Deviation of Abnormal Return.

Standard Deviation of Abnormal Return

The standard deviation of abnormal return is comparatively high for Berger Paints and low for ITC.

Result of t-test

A t-test is performed to test the significance of abnormal return. The hypothesis is set up as follows:

H_0: *The abnormal return is not statistically significant; i.e., the market is efficient in a semi-strong form.*
H_1: *The abnormal return is statistically significant; i.e., the capital market is not efficient in a semi-strong form.*

Table 5:- Result of t-test

Population Mean (μ)	Sample Mean $\overline{X}$	Standard Deviation σ	No. Of Observations N	Degree Of Freedom (N-1)	Standard Error SE=$\frac{\sigma}{\sqrt{N}}$	t value $\frac{\overline{X}-\mu}{SE}$	Table Value At α=0.05
0	**0.0436**	**0.6315**	**121**	**120**	**0.0574**	**0.7609**	**1.96**

Source: Secondary data

Since the calculated value of t is less than the table value of t, H_0 is rejected. That is, the abnormal return is statistically significant and the Indian capital market is not efficient in semi-strong form. In other words, investor biases are present in Indian Capital Market.

Conclusion:-

The assumption that the stock prices are random is basic to the Efficient Market Hypothesis and Capital Asset Pricing Models. The study carried out in this paper has presented evidence of the inefficient form of the Indian Stock Market in a Semi-strong form. From event analyses, we are able to conclude that stock prices in the India Stock Market are biased random time series. Thus, undervalued securities are in the market, and the investors can always make excess returns by correctly picking them.

References:-

1. Pandey, Anand (2003) "Efficiency of Indian Stock Market", SSRN, October,2003.
2. Muhammad Shaker, Abu Towhid (2013) " Testing the weak-form efficiency of The finnish and swedish stock markets" European Journal of Business and Social Sciences, Vol. 2, No.9 , pp 176-185, December 2013.
3. Nikunj R. Patel, Nitesh Radadia and Juhi Dhawan (2012), "An Empirical Study on Weak-Form of Market Efficiency of Selected Asian Stock Markets" Journal of Applied Finance & Banking, vol.2, no.2, 2012, 99-148 ISSN: 1792-6580 (print version), 1792-6599 (online) International Scientific Press, 2012
4. Yalawar, Y.B. (1988) " Bombay Stock Exchange: Rates of Return and Effciency", Indian Economic Journal, Vol. 36, No.4 (April-June), 68-121
5. Kulkarni, S.N. (1978) "Share Price Behaviour in India: A spectral Analysis of RandomWalk Hypothesis", Sankhya, Vol. 40, series D, Pt. II, 135-162
6. Sharma J. L. and Robert E. Kennedy (1977) "A Comparative Analysis of Stock Price Behaviour on the Bombay, London and New York Stock Exchanges", Journal of Financial and Quantitative Analysis Sep 1977.
7. Avadhani, V. A. (2009). Securities Analysis and Portfolio Management (Nineth Revised Edition ed.). Mumbai, Maharastra, India: Himalaya Publishing House.
8. Kevin,S, (2014), "Portfolio Management" Second Edition, PHI Learning Private Limited, Delhi.
9. Kothari,C R, and Garg, Gourav. "Research Methodology: Methods and Techniques-Third Edition", New Age International (2014)
10. Krishnaswami,O R. and Ranganatham, M. "Methodology of Research in Social Sciences". Mumbai. Himalaya Publishing House. (2008).