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A Study on AIS Quality in the use of the ERPS

Annu Aggarwal*

Abstract

The use of the Enterprise Resource Planning Systems (hereafter, ERPS) in India showed a significant growth. This growth has led to the need to have an empirical evidence about the accounting benefits from using that systems. The existences of accounting research on ERPS has created an opportunity for further research on the Accounting Information Systems (AIS) quality and effectiveness in the decision making process related to the level of the use of the ERPS. This research is using alternative methods of Partial Least Square (PLS). The result suggest that the manager's perceptions of the AIS quality affect the effectiveness of the decision making process. The breadth of the use of the ERPS can be a moderating factor in the relationship between manager's perception of the AIS quality and the effectiveness of the decision-making process. Finnally, there was no difference between the perceptions of the different department managers regarding the AIS quality and the effectiveness of the decision making process on the breadth of the use of the ERPS.

Key Words: ERPS capabilities, AIS quality, Decision Making Process Effectiveness, manager perceptions

1. Introduction

According to market research of reportbuyer for information technology (IT), the use of the ERPS in India in 2018, showed a significant growth rate compared to other ASEAN countries. There are more than 10 companies that have implemented SAP, and more than 100 companies have implemented Microsoft Dynamics AX in India in 2018. In the same year Metrodata has recorded a market growth of 20-30% per year for the ERPS. This growth has led to the need to have an empirical evidence about the accounting benefits from using that systems. Besides the large investment, the use of such system has openend a great opportunity for reseach in the accounting field.

- Is the manager's perception of the AIS quality affects the effectiveness of the decision making process in the use of ERPS?

- Is the breadth of the use of ERPS becomes a moderating factors in relation to the manager's perception of the AIS quality with the effectiveness of the decision making process?
- Are there differences in the managers perceptions of the different departments regarding the AIS quality and the effectiveness of the decision making process and in the breadth of the use of the ERPS?

2. Theoretical Background

2.1 Theory of Information Systems Success

This study will apply the information system (IS) success model by DeLone and McLean (1992) and the model that is proposed by Doll and Torkzadeh (1988) to measure the end user's satisfaction. The measurement consists of five dimensions, namely 1) content, indicates that the systems has provided the information in accordance with the user requirements; 2) accuracy, indicates that the systems has provided accurate information; 3) format, indicates that the system has provided information in the appropriate display format; 4) ease of use, indicate that the system is easy to use; 5) timeliness, indicates that the system has provided information in a timely manner.

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2.2 The Extent of the Use of The Enterprise Resource Planning System

The extent of the use of the ERPS will vary between companies. This depends on the urgency or the level of the company needs and the availability of funds for implementation. This research will use the capability concept that is proposed by Karimi *et al.*(2007). The capability implies the extent of the use of the ERPS in such company. The difference in the breadth of the use is expected to give a different impact to the company. Further, according to Karimi *et al.* (2007), the extent of the use of the ERPS can be viewed through 1) the number of the functions in the company that is using the ERPS, 2) the number of the divisions or departments that are using the ERPS, and 3) the number of offices that are geographically dispersed in various regions that are using the ERPS.

With the more extensive use of the ERPS the more widely the information is disseminated to all functions of the company. This is important because the information is the key for the decision making process. The wider the use of the ERPS, the more integrated the data that will help the manager in solving the problem and making decisions. Besides, the integrated system is expected to provide a rapid analysis reporting in a timely maner (Gupta, 2000; Shebab *et al.*, 2004).

2.3 The Effectiveness of the Accounting Information Systems and the Decision Making Management

The effectiveness of an information system can be described through a number of different perspectives. Evaluation of an effective systems can be shown through the output produced as required, increased productivity, improve performance, and increased control over the decision related to the information that is produced by the AIS. Thus, the information generated expected can make the decision making process more effective. The information delivered is easier to interpret and understand, as well as that the dissemination of information to all functional departments could be improved (Ugboma, 2004). According to Kim (1999) the assessment of the effectiveness of AIS relies on the use of AIS as perceived by the user regarding the quality of the information produced. The quality of

information depends on the reliability, report forms, timeliness and relevance for the decision maker. Nicolao (2000) defined effectiveness of AIS as a decision, the decision maker perceives about the information output generated by the transaction processing system, the management reporting, and the whether the budgeting systems meets their needs in the coordination and the control of tasks.

Nicolaou (2000) and Yeunyong (2007) stated that there is a relationship between the use of an integrated system and the effectiveness of AIS. Alzoubi (2012) found that the use of the ERPS has effected the effectiveness of AIS. The effectiveness of AIS can be described through quality of the accounting information output and the firm's internal control. Other studies have been conducted by Spathis and Constantinides (2004), Spathis (2006), and Spathis and Ananiadis (2005). They examine the reasons why companies convert their conventional information system to ERPS, and how the use of ERPS has brought changes, especially in the accounting process. They found that most benefits perceived from adopting ERPS is for the accounting application integration, increasing flexibility in generating information and improving the quality of financial reporting and decisions with respect to timelines and the reliable accounting information produced. Brazel and Dang (2005) examine the ERPS adoption to the relevance of the information and reliability of the information in financial reporting for external users. They found that after the implementation of ERPS, the company will decreased the reporting lag simultaneously. Whereas Poston and Grabski (2001) have shown that the use of ERPS can reduce costs by increasing efficiency through the computerized system, and improved decision making by providing accurate and timely informations.

However it is not the company's main goal in using the ERPS. Other researcher, Xu *et al.* (2012) has conducted a case study in an Australian company about the quality of the data related to the implementation of the ERPS. They have found out that the quality of the data is important and the main reason for implementing the system.

Sajady et al. (2014) stated that the effectiveness of the AIS depends also on the perception of the decision maker about the usefulness of the information generated by the system. How the information satisfies their needs about the operational processes, managerial reporting, budgeting, and control of the organization. The results of Sajady et al. (2014) indicated that the implementation of AIS will lead to improvements in the process of decision making by managers, internal control and financial reporting quality, and facilitation of the transaction processing companies. Therefore in this study, assessment of the effectiveness of the AIS is based on the user perceptions about the usefulness of the information. Measurements were performed by assessing user's satisfaction for the quality of information, including the form, content, and appearance.

The Perceive of the AIS Quality and the Decision Making Management Differences

The Previous studies on differences in the manager's perspectives from various departments related to ERPS, showed inconclusive results. Chang (2006), Ifinedo and Nahar (2007), Esteves (2009), have found that there is no differences in the perception of the managers of the various departments in terms of the benefits of information system's implementation. However Holsapple et al. (2006) suggested that user satisfaction was higher in the system-level managers than in the non-managers level. Similarly Longinidis and Gotzamani (2009), have found differences in the user's perception of the network departments within the sales and supporting department. Kanellou and Spathis (2011) have also suggested that there is a difference on perception on system performance between IT professional and accountants, but no differences in perceptions regarding the benefits of accounting of the use of ERPS.

Based on the theoretical framework discussed above, the hypotheses are formulated as follows:

H1: AIS quality has positive direct effect on effectiveness of decision making process

H2: More extensive the use of the ERPS mediates the positive direct effect of Manager's perception of the

AIS quality on effectiveness of decision making process

H3: There are no differences on manager of different department perceptions regarding the AIS quality and effectiveness of decision making process in the breadth of the use of the ERPS.

3. Methodology

The data was collected by sending questionnaires by mail or e-mail and sent directly to the companies. This research is using alternative methods of Partial Least Square (PLS). The reason underlying the use of PLS is the small sample size. In addition to estimating the complex models with small samples, PLS does not assume the data should be normally distributed. Moreover, the use of PLS is also very appropriate when the conceptual and measurement models are either well undeveloped or it's still in the exploratory stage of the development of the theory, PLS is specifically useful in analyzing and modeling for a minimal measurement scale and small sample size. The program used is Visual PLS. Meanwhile, for the purposes of testing the differences perception the SPSS is used.

Testing hypotheses using PLS will be conducted in three phases. The first step is done to ensure the validity of the model. The criteria used is that any indicator has a factor loading greater than or equal to 0.50 with a significance level of 0.05. Thus, the indicators with the factor loading of less than 0.50 were excluded from the analysis. The second stage, re-estimate the model after removing the indicators with the factor loading of less than 0.50 from the analysis. The third stage is to read the results of the outer model (measurement model) and analyze the inner model (structural model).

Because the indicators used in this study is entirely reflexive, the measurement model was evaluated by the convergent validity and discriminant validity of the indicators and the composite reliability for the block indicator. Further, to assess the discriminant validity it also used comparison of square root of average variance extracted (AVE) of each construct with the correlations between the constructs in the model.

The model has good discriminant validity. Recommended value of AVE is greater than 0.50. The

next is the reliability test, which measures the internal consistency of the indicators of a construct that indicates the degree to what extent each of the indicators indicates a common construct. Minimum reliability values of variables forming latent dimensions that can be received is equal to 0.70.

The second stage is to assess the Inner model (structural model) describing the relationship between latent variables was evaluated by looking at the percentage of variance explained by the value of R-square for the dependent latent constructs and the amount of structural path coefficients. Changes in the value of R square can be used to assess whether the effect of certain independent latent variables on the dependent latent variable does have a substantive effect or not. Furthermore hypothesis testing is done by taking into account the significant value of the estimated structural paths. Cut of Point used in this study, is the value of the Critical Ratio (CR) and to calculate the probability value (p-value). If the probability value of the Critical Ratio is less than 5% ($t > 1.96$), the hypothesis is accepted. If the probability of the Critical Ratio values are greater than 5% ($t < 1.96$), the hypothesis is rejected.

4. Result and Discussion

From 100 companies as ERPS users, only 64 companies agreed to be surveyed. Data collection was carried out for four months, starting in October 2017 until February 2018. Up to the time limit, the rate of return via mail and e-mail has collected 12 copies, while visits directly collected 38 copies. It is still far from the expected. Therefore, the researchers extended the time of data collection until April 2018..

The profile of the respondents can be seen in ERPS users consist of various types of industries, but most were firms in the Miscellaneous Industry. Based on the position of the respondents in the company, the position of the department managers varies. Managers who are in the Non IT/Accounting field are 41% and 30% are in the IT, while in the accounting field 29%. This indicates that the ERPS users do not only exist in one department, but are also in different departments that have already been acquainted with

the use of ERPS. Furthermore, most respondents have used ERPS vendors of SAP, as many as 43%. Based on the description of the respondents, it can be concluded that the sample is fairly representative of the kind of industry, the department's managers who have filled the questionnaires, and the type of vendors used.

Non-response bias testing is done to detect the possibility of individual differences in the responses between individuals who have participated and who did not participate in this study. Testing is done by comparing the characteristics of the subjects who participated with a subject that is not willing to participate. Because the data of the subjects who are not willing to participate can not be known, respondents who replied late are used as proxy respondents for those who are not willing to participate.

Testing is done by t-test with SPSS 16.0, to compare the scores of respondents within each group on each of the study variables. If the significance of the average scores indicates $p\text{-value} > 0.05$, then the inferred average scores did not differ between the groups tested. As presented in., the results of the non-response bias, using the t-test on a nonparametric test with SPSS 16.0, have shown a score of the $p\text{-value} > 0.05$. Thus, it can be concluded that there was no significant difference between an early respond and a late respond. Therefore the data of this study can be used to explain the conclusions of the study.

The Construct of AIS quality (AISQ) was measured with six items of the question, "is the output displayed in a useful format?" (FOR), "an accurate accounting information system" (AKUR), "to obtain the information needed in a timely manner" (TIME), "the content information needs" (ISI), "information systems are easy to use" (EASE), "overall, the system provides useful information for the ongoing monitoring of the decisions and actions" (PEM).

The Square root of AVE values to construct ERPC was 0.830, AISQ constructs 0.840, constructs EDM 0.858. Furthermore, a comparison between the values of the square root of AVE and correlations between the construct is presented in Table 6. On the whole it

can be seen that the value of the square root of the AVE of each construct was greater than the correlation between the construct. Thus it can be said that the model has a good value for a discriminant validity.

Conclusions

This research was conducted with three objectives: (1) assess whether the manager perception of the accounting information systems quality affects the effectiveness of the decision making process, (2) assess whether the breadth of the use of ERPS can be a moderating factor in the relationship between manager's perception of the accounting information systems quality and the effectiveness of the decision-making process, (3) assess whether there are differences in perception between managers of different departments about the accounting information systems quality and the effectiveness of the decision-making process in the breadth of the use of ERPS.

Based on the above objective hypothesis testing has been performed and obtained the following results;

- The manager's perceptions of the accounting information system's quality affect the effectiveness of the decision making process.
- The breadth of the use of the ERPS can be a moderating factor in the relationship between manager's perception of the accounting information system quality and the effectiveness of the decision-making process.
- There was no difference between the perceptions of the different department managers regarding the accounting information systems quality and the effectiveness of the decision making process on the breadth of the use of the ERPS.
- As the results of testing the outer model, the

breadth of the use of the ERPS, can be measured with the capability concept proposed by Karimi et al. (2007) The level of usage can be seen from the wide range of systems using either functional or geographic systems. Therefore, the concept of information system capabilities can be used in future studies related to information systems.

- Measurement of the accounting information system's quality in this study followed the theory of Information Systems (IS) Success. The effectiveness of the accounting information system can be assessed by user satisfaction in processing task, storing, and disseminating information that can be used for decision making. Therefore the theory of Information Systems (IS) Success can be used in the literature related to accounting information systems especially in data processing and the utilization of information due to the information system implementation.
- This study has not used the random sampling data because there is no information indicating the number and names of companies that have officially used the ERPS. To overcome the difficulties experienced in the data collection with the company as unit of analysis, further research can be performed with the user ERPS as the unit of analysis. This is done to get an breadth idea of the benefits from the end user to the intended use of the system.
- This study has used a survey method, so that more in-depth information about the perceptions of the respondents have not been not obtained. For future research it is necessary to use other methods to explore a more detailed picture of the overall benefits from the level of the use of the ERPS.

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Dividend Policy and Stock Return: A Study on Some Select Stock in Indian Stock Market

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Abstract

Dividend is that portion of profits of a company which is distributable among its shareholders according to the decision taken and resolution passed in the meeting of Board of Directors. Dividend policy plays an important role for maintaining good image of company in the capital market and in providing source of low cost finance for financing for the profitable future investment proposals. Objective of the study is to calculate the three measures of (dividend per share, earning per share, earning retention ratio) dividend policy of the five selected companies Hero Motor Corporation Limited, Tide water oil company, oracle financial services software limited, Indiabulls housing finance limited and Vedanta limited and correlate the factors of dividend policy and return on share price for a period of five years. It was found from the study that only in case of Indiabulls housing finance limited DPS, EPS, ERR and ROS are positively related. So it can be said that only in case of Indiabulls housing finance limited company factors of dividend policy are positively related with ROS.

Key Words: Correlation, dividend per share, earning per share, earning retention ratio.

1. Introduction

Dividend is that portion of profits of a company which is distributable among its shareholders according to the decision taken and resolution passed in the meeting of Board of Directors. Dividend may be paid as a fixed percentage on the share capital contributed by them or at a fixed amount per share. There is always a problem before the top management to decide how much profits should be transferred to reserve funds to meet any future contingencies and how much should be distributed to the equity shareholders as dividend. The corporation has to follow a sound dividend policy to solve the problem. Dividend policy determines the division of earnings between payments to shareholders and retained earnings. The firm's dividend policy represents a plan of action to be followed whenever

the dividend decision must be made. Dividend policy plays an important role for maintaining good image of company in the capital market and in providing source of low cost finance for financing for the profitable future investment proposals. Different investors purchase shares of a company with different objectives. Generally the risk taking investors buy shares for short term capital gain. But institutional investors like hedge fund and pension fund, invest in equity for long term capital appreciation. And old aged investors and low risk taking investors purchase the shares of a company for regular dividend income which is more than the fixed rate of interest income on fixed interest bearing government securities like bond, fixed deposit, gilt etc.

2. Literature Review

Pandey (2001) looks at the corporate dividend payout behaviour of companies listed on the Kuala Lumpur stock exchange during 1993-2000. He categorizes the

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sample into six industries for examining the variation in the payout ratio. He also establishes a relationship between current earnings and past dividend rate. He finds that the Malaysian companies (by following Lintner's model) exhibit unstable dividend behaviour with high adjustments in dividend payments in order to meet the target payout ratio.

Myers (2004) finds strong support for earnings, profit margin, institutional ownership and debt-equity ratio on the dividend decision.

Eriotis (2005) finds that Greek firms have a long-run constant dividend payout policy. He adjusts the firms' distributed earnings and size in the Lintner model and reports that an increase in the earnings does not change the dividend distribution pattern of firms.

Kania and Bacon (2005) find that variables such as sales growth, expansion and insider ownership have a negative impact on dividend decision but institutional ownership has an inverse relation with dividend payout, which is contrary to the existing literature.

Denis and Osobov (2008) find that the tendency for paying dividends declined for countries such as United States, Canada, United Kingdom, Germany, France and Japan during 1994-2002. They also report that the international evidence does not support the investors' preference for dividend, the signaling and the clientele interpretations as prominent variables. Rather, they go along with the distribution of free cash flow as the chief element of the dividend decision.

Kevin (1992) analyzes the dividend payment behaviour of 650 Indian companies during September 1983 to August 1984 and finds that profitability and earnings of the firms are the two foremost factors determining dividends. He concludes that Indian firms strive for achieving a stable dividend rate. However, keeping in view that the time period of his study was only one year; his results cannot be taken as conclusive.

Mahapatra and Sahu (1993) find that cash flows, current earnings and past dividends are prominent

factors that have an impact on the dividend decision. Their results are in contrast to Lintner's model.

Bhat and Pandey (1994) find that current year's earnings, pattern of past dividends, expected future earnings, changes in equity base of the firm have an impact on the dividend decision.

Narasimhan and Asha (1997) look at the changes in dividend tax regime proposed in the Indian Union Budget of 1997-98 and analyze the impact of dividend tax on a firm's dividend decision. They conclude that the burden of tax payment fell in the hands of companies rather than their shareholders.

Mohanty (1999) studied more than 200 Indian companies for a period of fifteen years to understand the relationship between bonus-issuing and dividend-paying behaviour of companies. He found that in the Indian context, it is the dividend rate that is an important determinant of dividend policy in comparison to the dividend payout ratio.

Reddy (2002) analyzes the trends and determinants of dividend of all Indian companies listed on two major Indian stock exchanges—The Bombay Stock Exchange (BSE) and The National Stock Exchange (NSE) during 1990-2001. He investigates three factors viz., number of firms paying dividend, average dividend per share and the average payout. His results indicate that only few companies maintain the dividend payout rate and that firms forming a part of small indices pay higher dividend compared to firms forming a part of broad market indices. Deviations in the tax regime are also examined using the trade-off theory and it is found that this theory does not apply to the Indian corporate sector. He concludes that the omission of dividends have information content i.e. such companies expect lower earnings in the future whereas the same does not hold true in case of dividend initiations.

Anand (2004) questioned 81 CFOs to find out the determinants of dividend policy of Indian companies. He finds that Indian companies use dividend policy as a signaling mechanism to convey information about their present and future prospects, therefore, affecting their market value. He also reports that while designing

a dividend policy, companies take into consideration the investors' preference for dividends and the clientele effect.

Bhayani (2008) has examined the influence of earnings and lagged dividend on dividend policy of companies listed on the BSE. He found that the current year's earnings is the foremost factor affecting the dividend behaviour of a firm and concludes that Indian Decision, Vol. 37, No.2, August, 2010 The Determinants of Corporate Dividend Policy 66 companies follow a stable cash dividend policy.

Kanwal and Kapoor (2008) examine the dividend policies of companies in the information technology sector in India. They explore various factors such as profitability, cash flows, corporate tax, sales growth and growth opportunities that have an impact over the dividend policies of such companies.

Sobha rani and Patha Sarathi (2013) focused on the determinants of dividends and its performance of select pharmaceutical companies in India. This study evaluates the performance of various pharmaceutical companies and their annual compound growth rate.

3. Objectives of the study

In the present study an attempt has been made to study the behavior pattern of the dividend policy and correlation between dividend and share price of some selected companies in Indian stock market during the period of study of financial year ending on 31.3.2014 to financial year ending on 31.3.2018 More specifically the following are the objectives of the study:-

1. To calculate three vital measures representing the dividend policy of some selected five companies viz, Hero Motor Corporation Limited, Tide water oil company, oracle financial services software limited, Indiabulls housing finance limited and Vedanta limited in India viz, during the period of study of financial year ending on 31.3.2014 to financial year ending on 31.3.2018 such as dividend per share (DPS), earning per share (EPS) and Earning retention ratio(ER Ratio).
2. To study the behavioral pattern of the dividend

policy of the the dividend policy of some selected five companies viz, Hero Motor Corporation Limited, Tide water oil company, oracle financial services software limited, Indiabulls housing finance limited and Vedanta limited in India viz, during the period of study of financial year ending on 31.3.2014 to financial year ending on 31.3.2018 such as dividend per share (DPS), earning per share(EPS) and Earning retention ratio(ER Ratio) by measuring the different statistical measures mean, standard deviation, co-efficient of variation, kurtosis, skewness and range.

3. Also calculate and present the correlation exist between factors of dividend policy and share price movement of some selected five companies viz, Hero Motor Corporation Limited, Tide water oil company, oracle financial services software limited, Indiabulls housing finance limited and Vedanta limited in India viz, during the period of study of financial year ending on 31.3.2014 to financial year ending on 31.3.2018.

4. Research Methodology

1. **Selection of Data:** Five highest dividend paying companies in India viz, Hero Motor Corporation Limited, Tide water oil company, oracle financial services software limited, Indiabulls housing finance limited and Vedanta limited have been selected for the study on the basis of their percentage of dividend payment which is above 2000% for financial year ending on 31st March, 2018.
2. **Collection of Data:** This study is based on secondary data only. The secondary data have been collected from www.moneycontrol.com. Editing, classification and tabulation of the data collected from the above mentioned sources have been done as per the requirements of the study.
3. **Analysis of Data:** For analyzing the data simple mathematical tool like ratios, percentages etc. and statistical techniques like measures of central tendency, measures of dispersion , karl pearsons' correlation have been used.

Findings and Discussions

Table 1: Descriptive statistics: Earning per share (EPS)

| | Hero Motor Corporation Limited | Tide water oil company | Oracle financial services software limited | Indiabulls housing finance limited | Vedanta limited |
|--------------------|--------------------------------|------------------------|--|------------------------------------|-----------------|
| Mean | 147.23 | 709.11 | 127.29 | 3.84 | 61.19 |
| Meadian | 156.86 | 295.35 | 125.05 | 6.5 | 55.64 |
| Standard deviation | 33.59 | 737.45 | 17.47 | 26.74 | 14.74 |
| Kurtosis | -2.203 | 3.01 | -0.43 | 2.42 | 0.53 |
| Skewness | -0.30 | 1.78 | 0.31 | -1.39 | 0.90 |
| Range | 79.54 | 1741.71 | 45.55 | 69.92 | 38.42 |
| Minimum | 105.6 | 222.94 | 105.8 | -40.16 | 45.2 |
| Maximum | 185.14 | 1964.65 | 151.35 | 29.76 | 83.62 |
| Sum | 736.18 | 3545.55 | 636.44 | 19.24 | 305.97 |
| Count | 5 | 5 | 5 | 5 | 5 |

Source: calculation

Inference: It can be said from the above table that mean, median, standard deviation, kurtosis, skewness and range of EPS was highest for Tide water oil company and lowest for Indiabulls housing finance

limited for the period of study from 31.3.14 to 31.3.18. Also the skewness and kurtosis were negative for Indiabulls housing finance limited and Hero Motor Corporation Limited.

Table 2: Descriptive statistics: Dividend per share (DPS)

| | Hero Motor Corporation Limited | Tide water oil company | Oracle financial services software limited | Indiabulls housing finance limited | Vedanta limited |
|--------------------|--------------------------------|------------------------|--|------------------------------------|-----------------|
| Mean | 75.4 | 207.5 | 213 | 10.3 | 35.6 |
| Meadian | 72 | 175 | 130 | 4.1 | 36 |
| Standard deviation | 14.43 | 81.78 | 260.37 | 9.17 | 8.14 |
| Kurtosis | -1.54 | 3.98 | 3.97 | -3.21 | -2.35 |
| Skewness | 0.50 | 1.96 | 1.90 | 0.62 | -0.06 |
| Range | 35 | 200 | 665 | 17.95 | 19 |
| Minimum | 60 | 150 | 0 | 3.25 | 26 |
| Maximum | 95 | 350 | 665 | 21.2 | 45 |
| Sum | 377 | 1037.5 | 1065 | 51.5 | 178 |
| Count | 5 | 5 | 5 | 5 | 5 |

Source: calculation

Inference: It can be said from the above table that mean, median, kurtosis, skewness and range of DPS was highest for Tide water oil company and lowest for Indiabulls housing finance limited for the period of study from 31.3.14 to 31.3.18. standard deviation of

DPS was highest for oracle financial services software limited and kurtosis of DPS were negative Hero Motor Corporation Limited, Indiabulls housing finance limited and Vedanta limited. Also skewness of DPS was negative for Vedanta limited.

Table 3: Descriptive statistics: Earning Retention Ratio (ERR)

| | Hero Motor Corporation Limited | Tide water oil company | Oracle financial services software limited | Indiabulls housing finance limited | Vedanta limited |
|--------------------|--------------------------------|------------------------|--|------------------------------------|-----------------|
| Mean | 49.6 | 35.44 | -83.23 | -31.9 | 44.64 |
| Meadian | 52.85 | 53.45 | -69.97 | 24.38 | 51.1 |
| Standard deviation | 6.66 | 47.79 | 217.7 | 166.55 | 15.27 |
| Kurtosis | 2.57 | 3.48 | 1.45 | 4.56 | -0.70 |
| Skewness | -1.68 | -1.78 | -1.21 | -2.10 | -0.85 |
| Range | 15.7 | 122.19 | 531.63 | 411.36 | 37.53 |
| Minimum | 38.41 | -46.44 | -431.63 | -326.23 | 22.29 |
| Maximum | 54.11 | 75.75 | 100 | 85.13 | 59.82 |
| Sum | 248.02 | 177.22 | -416.16 | -159.54 | 223.24 |
| Count | 5 | 5 | 5 | 5 | 5 |

Source: calculation

Inference: From the above table it can be said that mean and median of ERR was highest for Hero Motor Corporation Limited and lowest for oracle financial services software limited. Standard deviation of ERR was highest for oracle financial services software limited

and it implied that there was fluctuation in the ERR of oracle financial services software limited during the periods of study. Skewness of ERR were negative for all companies taken into consideration.

Table 4: Descriptive statistics: Return on share price (ROS)

| | Hero Motor Corporation Limited | Tide water oil company | Oracle financial services software limited | Indiabulls housing finance limited | Vedanta limited |
|--------------------|--------------------------------|------------------------|--|------------------------------------|-----------------|
| Mean | 17.08 | 32.21 | 10.52 | 37.38 | 49.83 |
| Meadian | 11.59 | 13 | 3.95 | 11.30 | 24.00 |
| Standard deviation | 12.19 | 39.60 | 8.84 | 99.08 | 49.74 |
| Kurtosis | 4.05 | -2.61 | -0.75 | 3.54 | 3.17 |
| Skewness | 2.00 | 0.63 | -0.35 | 1.67 | 1.81 |
| Range | 28.98 | 85.79 | 22.17 | 263.19 | 118.37 |
| Minimum | 9.4 | -2.46 | -1.83 | -57.18 | 16.49 |
| Maximum | 38.38 | 83.33 | 20.34 | 206.01 | 134.86 |
| Sum | 85.41 | 161.06 | 52.64 | 186.91 | 249.17 |
| Count | 5 | 5 | 5 | 5 | 5 |

Source: calculation

Inference: It can be said from the above table that mean, median, standard deviation of ROS was highest for Vedanta limited and it implied that there was fluctuation in the ROS of oracle financial services

software limited during the periods of study. and lowest for oracle financial services software limited. Kurtosis and skewness was highest for Hero Motor Corporation Limited.

Table 5: Correlation between EPS, DPS, ERR and Return on share: Hero Motor Corporation Limited

| | DPS | EPS | ERR | ROS |
|-----|----------|----------|----------|-----|
| DPS | 1 | | | |
| EPS | 0.918418 | 1 | | |
| ERR | 0.335604 | 0.633258 | 1 | |
| ROS | -0.56762 | -0.82285 | -0.89434 | 1 |

Source: calculation

Inference: There is a positive correlation between DPS, EPS and ERR Hero Motor Corporation Limited. Positive correlation indicates a rise in one variable lead to the rise in other variable and vice versa. Negative

correlation indicates a rise in one variable lead to the fall in other variable and vice versa. But there is a negative correlation between DPS-ROS, ERR-ROS and EPS-ROS of Hero Motor Corporation Limited.

Table 6: Correlation between EPS, DPS, ERR and Return on share: Tide water oil company

| | DPS | EPS | ERR | ROS |
|-----|----------|----------|----------|-----|
| DPS | 1 | | | |
| EPS | 0.986724 | 1 | | |
| ERR | -0.89845 | -0.84117 | 1 | |
| ROS | 0.435445 | 0.373651 | -0.40764 | 1 |

Source: calculation

Inference: There is a positive correlation between DPS-EPS, DPS-ROS, EPS-ROS. But there is a negative correlation between DPS-ERR, EPS-ERR and ERR-ROS. Positive correlation indicates a rise in one variable

lead to the rise in other variable and vice versa. Negative correlation indicates a rise in one variable lead to the fall in other variable and vice versa.

Table 7: Correlation between EPS, DPS, ERR and Return on share: oracle financial services software limited

| | DPS | EPS | ERR | ROS |
|-----|----------|----------|----------|-----|
| DPS | 1 | | | |
| EPS | -0.04345 | 1 | | |
| ERR | -0.93437 | -0.02013 | 1 | |
| ROS | 0.464575 | 0.247238 | -0.55924 | 1 |

Source: calculation

Inference: There is a negative correlation between DPS- EPS, DPS-ERR and EPS-ERR, ERR-ROS. There is a positive correlation between EPS -ROS, DPS-ROS. Positive correlation indicates a rise in one variable lead

to the rise in other variable and vice versa. Negative correlation indicates a rise in one variable lead to the fall in other variable and vice versa.

Table 8: Correlation between EPS, DPS, ERR and Return on share: Indiabulls housing finance limited

| | DPS | EPS | ERR | ROS |
|-----|----------|----------|----------|-----|
| DPS | 1 | | | |
| EPS | 0.705056 | 1 | | |
| ERR | -0.70058 | -0.45637 | 1 | |
| ROS | 0.593508 | 0.755391 | 0.065182 | 1 |

Source: calculation

Inference: There is a positive correlation between EPS –DPS, DPS-ROS, EPS-ROS and ERR-ROS. There is a negative correlation between DPS-ERR and EPS-ERR. Positive correlation indicates a rise in one variable

lead to the rise in other variable and vice versa. Negative correlation indicates a rise in one variable lead to the fall in other variable and vice versa.

Table 9: Correlation between EPS, DPS, ERR and Return on share: Vedanta limited

| | DPS | EPS | ERR | ROS |
|-----|----------|----------|----------|-----|
| DPS | 1 | | | |
| EPS | 0.502629 | 1 | | |
| ERR | -0.39337 | 0.522089 | 1 | |
| ROS | -0.67821 | -0.11344 | 0.553724 | 1 |

Source: calculation

Inference: There is a positive correlation between EPS-DPS, EPS-ERR and ERR-ROS. There is a negative correlation between DPS-ERR, DPS-ROS and EPS-ROS. Positive correlation indicates a rise in one variable lead to the rise in other variable and vice versa. Negative correlation indicates a rise in one variable lead to the fall in other variable and vice versa.

5. Conclusion

It can be said from the analysis that mean EPS, was highest for Tide water oil company and EPS - ROS and DPS- ROS are positively correlated. But ROS-ERR are negatively correlated. Average DPS was highest for oracle financial services software limited and EPS - ROS and DPS- ROS are positively correlated. But ROS-ERR are negatively correlated in

case of that company. And ERR was highest for Hero Motor Corporation Limited and there was negative correlation between EPS - ROS and DPS- ROS and ERR- ROS. In case of Indiabulls housing finance limited DPS, EPS, ERR and ROS are positively related. So it can be said only in case of Indiabulls housing finance limited factors of dividend policy are positively related with ROS.

6. Limitation of the Study

- i) The study is limited for five years from 31.3.2014 to 31.3.2018.
- ii) The study has taken five top dividend paying companies for the study.
- iii) Limited numbers of statistical methods and techniques have been used for the study.

Abbreviations:**DPS**= Dividend per share.**EPS**= Earning per share**ERR**= Earning retention ratio**ROS**= Return on share.**References**

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The Relevance of Gita for Business Management Sector

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Abstract

Management skill is an academic discipline. In this modern world the art of Management has become a part and parcel of everyday life. It has gained application in other areas; governances, political leadership development issues and even ethics. The Holy Bhagavad Gita is essence of the Vedas and Upanisads. Gita is a universal scripture applicable to people of all temperaments and for all times. Bhagavad Gita is one of the most popular and accessible of all Indian scriptures, which is to be studied by anyone interested in Indian philosophy. Management principles come into play through the management of resources, finance and planning, priorities, policies and practice. The *Gita* teaches us that how one's aim in life can be achieved; howsoever it may be difficult, by doing his duty with devotion, and meditation, integrating many different threads of Indian philosophy. It gives correct solution to all the problems in human life. Bhagavad Gita contains the essential ideas and basic principles of business management. Five priority areas described in the *Gita* we must concentrate for better business management sector. These are followings; ethics, energy, efficiency, effectiveness and excellence. If we do follow this properly, we will win.

This paper aims at introducing the holistic vision of management sector enunciated in the *Gita* which is more comprehensive than the 'Holistic View' of the modern management sector's theories and practice. The concept of *Gita* used in modern management field and also try to looks at how the Bhagavad *Gita* plays the important and significant role in the organisation to accomplish various modern business management practices.

Key Words: Bhagavad *Gita*, Business Management, Leadership, Policy and Decision making.

1. Introduction

The Bhagavad *Gita*, as mentioned earlier is a complete tractate on management, on managing one's life with sound ethical principles, on managing the external environment and interpersonal relationships with wide ranging implications in the socio-economic context. It provides a new and an alternative paradigm and is worthwhile trying. In this paper, an attempt has been made to lift certain aspects of management sector from the Bhagavad *Gita*, that are relevant as much to the Business world as to the individual.

2. Paradigm of Management in *Gita*

Management is a systematic way of carrying out

activities in any field of human effort. Management need to focus more on leadership skills, e.g., establishing vision and goals, communicating the vision and goals, and guiding others to accomplish them. It also assert that leadership must be more facilitative, participative and empowering in how visions and goals are established and carried out. Bhagavad *Gita* describes the paradigm of Management in all area of business and other sectors. The notion of Karma Yoga in the Bhagavad *Gita* is to perform duties with a selfless attitude. The fundamental basis of Karma Yoga is that one is entitled to perform actions but not necessarily be attached to the fruits of those actions. The Bhagavad *Gita* offers the true spirit of work for doing work in different areas of life. Management is creative problem solving. This creative problem solving

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is accomplished through four functions of management: planning, organizing, leading and controlling.

Lord Krishna addresses to Arjun to provide guidelines regarding the science of work; that do your duty, but do not expect outcomes and do not think yourself as the cause of the results of your actions. While performing the actions, we must remember that the fruits of our actions are not meant for personal enjoyment. Even while working, give up the pride of doership. Do not be attached to inaction.

The main theme in the Bhagavad Gita is man's bounden duties and their efficient accomplishment to attain the goal. The philosophy of management in the Gita propound that all human actions are directed towards a goal and that man will not concede unless he attains the goal. Management is all about getting things done by others. It is only through direction, coordination, motivation and leadership that one can lead others to attainment of the goal. Modern management is more concerned about productive potentials and spiritual efficiency. According to the Bhagavad Gita, Karma Yoga is efficiency in action.

***Yoga-sthaḥ kuru karmāṇi saṅgaṁ tyaktvā dhanañjaya /
Siddhy-asiddhyoḥ samo bhūtvā samatvaṁ yoga uchyate //***

(Bhagavad Gita – 2/48)

Krishna explains to Arjun that how to get the Skill in action. Lord Krishna explains that Arjun ! Endowed with equanimity, one sheds in this life both good and

evil. Therefore, strive for the practice of this Yoga of equanimity. Skill in action lies in the practice of this Yoga.

***Buddhi-yukto jahātīha ubhe sukṛita-duṣhkṛite /
Tasmād yogāya yujyasva yogaḥ karmasu kauśhalam //***

(Bhagavad Gita – 2/48)

Whether being the head of the multinational company, than we must know how to utilize our energies to accomplish our objectives. The *Bhagavad Gita* emphasizes the importance of managing oneself whereas most of the modern management theories and practices deal with the problems of managing the raw materials, manpower, finances, infrastructure and other external factors. The *Gita* clearly points out the strategic role which managing oneself plays in the well

being of the individual and the society.

Arjun was fighting because it was his duty to God, and Shree Krishna would be pleased by it. He was still a warrior; however, his internal motivation had changed. The fact that he did his duty without attachment did not make him any less competent than before. In fact, he fought with greater inspiration because his work was directly in service of God.

Mind can be one's friend or enemy. Mind is the cause for both bondage and liberation. The work proceeds through intellectual knowledge of the playing field (jnana yoga), emotional devotion to the ideal (bhakti yoga) and right action that includes both feeling and knowledge (karma yoga). With ongoing purification we approach wisdom. The Bhagavad-Gita is a message addressed to each and every human individual to help him or her to solve the vexing problem of overcoming the present and progressing towards a bright future.

4. The Challenging Task

In the Bhagavad-Gita, Lord Krishna urges Arjun to fight his own cousins, not for personal gain, but as God's work, as his duty or darma, without getting distracted with the possible outcome. Once he understood this, Arjuna's work became worship and he was free from the consequences of his actions. Modern Manager is expected to be more creative and innovative. But his creativity depends on the stimulus of reward in cash or kind.

It is more or less a 'conditioned response' promoted by Stimulus Response (SR) bond. Several corporate sectors are now willing to create an atmosphere where creativity and innovation is encouraged. Conceptually, it means a situation where in a company uses the talents and dynamic abilities of its manager to develop innovative in-house project services. Such conditioned response has its limitations too. Though it helps creating 'surplus' for himself and for his company, it hardly makes any substantial contribution in the larger context of social equity and justice. In the Western world also this paradigm shift from mechanistic view of life to the systems view has been gradually taking place.

**“Work is worship”
“Karmanyevadhikaraste”**

(Bhagavad Gita – 2/47)

Krishna advises Arjuna to perform every action in a spirit of devotion, for common welfare, without being attached to the fruits of action. You can experience oneness with the Supreme Being if you perform noble deeds with a spirit of total detachment, without any expectations in return.

5. Control of Mind for Business Management

Mind makes the personality of a person. We observe that the mind runs towards the objects of its attachment, towards the direction it has been habituated to in the past. The elimination of attachment eradicates the unnecessary wanderings of the mind, but the Mind is indecisive. The Bhagavad Gita first of all puts a great emphasis on the control of the mind. Arjun in Chapter 6 of Gita says to Lord Krishna, *“Mind is very restless, forceful and strong. O Krishna, it is more difficult to control the mind than to control the wind through practice of Yoga; because the mind is indeed very difficult to restrain. I consider it as difficult to control as the wind. But by practice and detachment, it can be controlled”*

(Bhagavad Gita- 6/34)

Lord Krishna to explain to Arjun that the controlling of mind; mind is restless no doubt, and difficult to curb, Arjun; but it can be brought under control by repeated practice (of meditation) and by the exercise of dispassion.

(Bhagavad Gita- 6/35)

What makes the Holy Gita a practical psychology of transformation is that it offers us the tools to connect with our deepest intangible essence, and we must learn to participate in the battle of life with right knowledge. *“Freed from attachment, fear and anger, absorbed in me and taking refuge in me, purified by the penance of knowledge, many have attained union with My Being.”*

(Bhagavad Gita – 4/10)

The controlling of mind gives strength to people for doing their duties in the world. Swami Vivekananda said that –

“Strength is Life, Weakness is Death”

Working skill depends on a level of excellence of doer. Excellence comes through strength of Mind. In the management sector first of all doer must be Healthy. Because *“Healthy Mind in a Healthy Body”* is a proverb we have known since our early days. But we realize its importance and the deeper meaning attached to it only when we are old enough to think it over and give it

some thought. A healthy body refers not only to your physical state but also to your mental and emotional stability. It has now been scientifically proven that your mind governs and controls your body temple. An another famous proverb is that:

“Health is wealth”

It means that there is nothing in our life that is more valuable than good health. Without health there is no happiness, no peace and no success. A person with bad health cannot enjoy the pleasure of being wealthy. Health is more valuable than money. Money cannot buy health and happiness. Without health, we can be done nothing. Doing something is better than doing nothing. In the issue of Health Mahatma Gandhi said:

“Your Health is your real wealth”

6. The Gita’s Theory of Management

The *Gita* develops and presents a profound theory of this *Purushottama Yoga* in the last five Slokas of Chapter XV. The *Gita* finds the Absolute reality in the vision of the *Purushottama*. He is both *Kshara* and *Akshara*, Mutable and Immutable, and, yet he is other because he is more and greater than either of these opposites. *Purushottama*, The Supreme Self, is capable of being both at once. This *Purushottama* consciousness is the highest peak of enlightenment where the individual perceives himself as the ‘Whole Unified Universe’. Whosoever is awakened in this Supreme consciousness is no longer bewildered by the world of *dvandha* (dualities) and *moha* (delusion); and stands firm in the performance of selfless action for the welfare of the world. The technique applied for attainment of this Yoga as mentioned in the XI Chapter is *divyachakshu* which means imparting the direct vision of Truth to the aspirant. The *Gita* calls it *jnanavijnanasambitam* (wisdom fused with vision). These concepts are integrated in the modern Management field.

7. Management guidelines from the Bhagavad Gita

- Performance
- Motivation

- Decision-making
- Realistic self-confidence
- Self-awareness
- Perseverance
- Balance
- Personal integrity
- Self-regulation skills
- Self-care skills
- Clarity and focus
- Physical and mental health etc.

If one does one’s duty efficiently and with single minded devotion, without any fear of success or failure in his/her endeavour, then certainly that person shall succeed in his/her work. His/her mind shall be at peace & ease while doing such work without any fear of success or failure. Any person, whose mind is at peace, certainly works effectively.

7.1 Planning with Vision

Planning is the basic process by which we decide our goals and objectives, and the ways and means to achieve them. Planning involves what is to be done, when it is to be done, where it is to be done, how it is to be done and who is to do it. Hence it is the beginning of the process of management. It identifies the purpose or mission of the organization, strategies, policies and procedures to be adopted, programmes and activities to be undertaken for fulfilment of the mission. Along with information and knowledge planning requires wisdom and vision. The moving force behind every master plan and strategy is vision.

In any management planning cannot be done in isolation. Every management is the inseparable part of bigger organizations that is society, nation, world, natural environment and ultimately of the universe. So the *Gita* advises us to make our short-term and long term planning in harmony with the divine traits which develop awareness of belonging to the universe. It is holistic planning which should be done in a spirit of sacrifice. The *Gita* advises us not to disregard this vision of Truth.

7.2 Vision and Leadership

Visionary leadership is the need of the day that can be developed by acquiring holistic vision of the *Gita*. This

holistic vision enables managers to delve deep into human consciousness, to understand, guide, motivate, innovate and inspire their people by practicing the following profound management principles himself, which set forth the eternal value system. Whatever the leader (manager) does, others also do the same. Whatever standards he sets forth, the values he embodies are hailed as the model by his subordinates, staff members. So he must ever be vigilant in performance of his duties. (*Bhagavad Gita- 3/21*)

The leader must be impartial. He can develop impartial views by practicing the behavioural patterns laid down for the *Sthitaprajna*, *Yogarudha* and *Gunatita*. Business Management is the process of designing and maintaining a suitable environment in which individuals.

7.3 Decision Making

Modern manager faces many dilemmas as Arjuna faced before the commencement of the battle of Mahabharata. The holistic vision of the *Gita* develops an ability to analyze as well as synthesize all aspects of a particular situation to arrive at a particular decision. The man of steadfast wisdom can hardly commit blunders. That is why the *Gita* gives full freedom to a leader and a manager for decision-making.

7.4 Utilization of available resources

An important lesson of business management is to

choose wisely and utilize scarce resources optimally. During the curtain raiser before the Mahabharata War, Duryodhana chose Sri Krishna's large army for his help while Arjuna selected Sri Krishna's wisdom for his support. This episode gives us a clue as to the nature of the effective manager - the former chose numbers, the latter, wisdom. How the manpower management and recruitment is an integral and so also is the capital generation and utilization.

8. Conclusion

The *Gita's* holistic vision of the *Purushottama Yoga* ushers in the dawn of a new Business Management Era which will ensure (a) economic and social justice to all people in the world, (b) healthy social and political order in the individual nations and in the world, and (c) ecological harmony and a sense of belonging to the universe. If this vision is introduced in our Management Schools, we can produce enlightened managers and leaders. One generation of enlightened managers and leaders can transform this world by bringing into it a generation of fearless and selfless individuals having noble character. Thus, as the teaching of the *Bhagavad Gita* is of universal significance, to study it is to study man himself, to study life. It should be understood that all these teachings are for each and every one in the world of human being.

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The Effect of Human Resource Practices on Employee Loyalty: A Study of Banking Sector

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Abstract

The main purpose of this study is to evaluate the effect of human resource practices (HRM) namely compensation, workplace, value & ethics, training, empowerment and leadership on employee loyalty in banking sector organization of Mathura Region. This study was conducted using self-administered questionnaire. Using a cross-sectional study, a valid questionnaire of total 100 employees of banking organization was collected using convenience sampling method. The study has been conducted from the period of April 2018 to July 2018. Regression indicates a significant and positive association of these practices with employee loyalty. The findings revealed that these practices are highly influencing the employee loyalty and thereby enhancing the internal efficiency.

Key Words: HRM Practices, Employee Loyalty

1. Introduction

Human asset is the administration of individuals inside the associations, concentrating on policies and on systems. The changing state of innovation, globalization, and requests of clients reform the associations as well as make extraordinary rivalry among them. Keeping in mind the end goal to rival these associations should execute such procedures that separate it from others (Fanelli and Medhora, 1998). HRM is the key approach towards the most esteemed resources of the association like individuals working who participate in accomplishing the vital objectives of the association (Armstrong, 2006). Human resource practices are well-designed activities and vital plans

that empower enhanced administrations to representatives and expanded benefit for the business. Researchers build up that the trust factor is found in each human asset activity- compensation, workplace, value & ethics, training, empowerment and leadership and causes a great deal to enhance association's execution and the efficiency of its representatives (Lee and Lee, 2007). A number of studies have been led on manufacturing segments yet in the event that we contrast it and service part then we comes to realize that gigantic profitability in the service segment as contrast with manufacturing segments. Face benefit in service association closer the workers and client which is vital in HRM in a service sector (Parkington and Schneider, 1979).

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HRM Practices are strategies and method that portrays the connection among administration and its workers (Beer dwellerset al. 1984). Good HRM practices are instrumental in accomplishing departmental destinations and upgrade efficiency. (Guest's 1997). In the present aggressive condition representatives are considered as vital in deciding the achievement of the association and need to hold them is likewise a test for

the association, the most ideal approach to remunerate them an overabundance of their profit (Sohail et al. 2011). In request to contend in the administration segment, we have required fulfilled and steadfast workforce for all associations and in addition banks (Singh, 2010). The banking sector needs exceptionally fulfilled, roused and faithful representatives (Aleem et al. 2011). To hold representatives and elite viable HRM Practices assume a critical part. So the present examination object is to discover the relationship among HRM practices on worker duty, work fulfillment and loyalty in the banking division of Mathura region.

2. Review of Literature

Analysts have built up various definitions for impact of HRM practices. Arunprasad P (2017) dissected the impact of vital HRM and learning administration exercises of software organizations in India. The investigation presumed that technology, imagination and HRM practices like worker retention, selection process, enhancing development of inward and outside elements shapes a positive preferred standpoint on the organizational development. Bard Kuvass (2017) inspected the HR practices connected with the nature of worker improvement and employee outcome. The test size of study was 593 workers in Norway. The examination found that the HRM factors like powerful authoritative responsibility and saw hierarchical help will emphatically constitute the worker duty towards Organization. Sherin Faruok et.al., (2016) analyzed the reasons for HRM practices on hierarchical proficiency in United Arab Emirates with the example of 168 workers. The examination found that authoritative advancement, execution evaluation, preparing, work outline, enrollment and determination utilized are very impacting hierarchical improvement. Alexandros G Psychogios et.al., (2016) inspected the basic and hierarchical angles in HRM rehearse in little and medium scale enterprises. The investigation led at South Eastern European nations with 168 example respondents. This examination recognized duty, convention, arranging, staff work, skills; pay frameworks have the positive effect on the human asset administration practices. Boselie et al., (2015)

distinguished the beneficial outcome of HRM rehearses among the people through basic equational demonstrating strategy and found that Human asset are the huge factor that impacts the association to achieve its vision and mission through advancement. The discoveries of the investigation distinguished that the HRM practices have constructive outcome on among the people of association. Lepak and Snell (2015) had recognized the hypothesis of human capital portion and advancement utilizing HRM measurements of the associations. The investigation was led utilizing 800 respondents in Muscut securities showcase. The investigation found that there is high contribution of conventional HRM practices in authoritative advancement and in the human capital asset. Shay.S.Tzafir et al.,(2014) inspected the impacts of developing HRM rehearses for representatives trust. The examination was led with the example of 250 respondents utilizing arbitrary testing strategy. The investigation found that the trust of representatives has been fundamentally affected by the HRM rehearses like stream of correspondence, administration push, work put equity. HRM practices like Compensation is the broadest term of payment given to employees in exchange for work they perform (Sarma, 2009). Value & ethics plays as a representation of person-culture fit and shows that employees adapt better to their workplace when the organizational values and their personal value orientations are congruent (Vandenberghe, 1999).

3. Statement of the Problem

HRM is a procedure of uniting individuals and association together in order to achieve organisational goals to meet the desires for the workers. Human resource management practices bridges the gap between employee desires and organisational needs by adopting appropriate HRM practices. The HR practices constitute the competitive advantage to perform activities more particularly and viably than rivals. With suitable HRM practices an organisation can employ, create and use best brains in the commercial center, understand its proclaimed objectives and convey best outcomes superior to others. If the employee is satisfied by the HRM practices

implemented by the organisation, the employee may proceed in the organisation and thereby employee loyalty will be increased. In those circumstances, this study becomes essential.

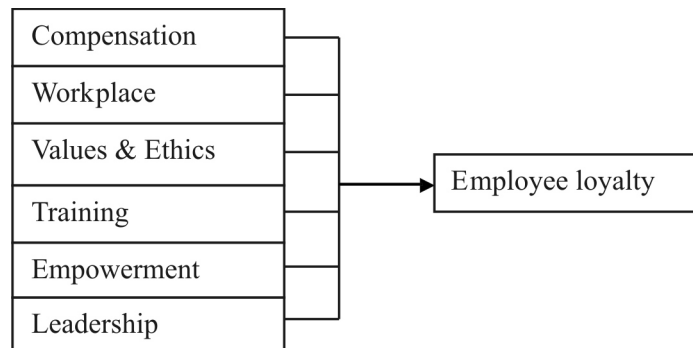
4. Research Gap

Even though several studies has been conducted with

regard to impact of HRM practices on employee loyalty most of the studies has been conducted in western perspective. Only limited studies have been conducted in Indian perspective. Therefore the researcher intended to fill the gap by the way of study the effect of HRM practices on employee loyalty in banking sector.

Proposed Research Model

Figure 1: Shows the Research Framework of the Proposed Study



5. Objectives of the Study

The objectives of the study is confined only

1. To identify the important HRM dimensions
2. To explain the effect of identified HRM dimensions on employee loyalty.

6. Research Methodology

An empirical method of analysis was adopted in this paper to examine the effect of HRM practices on employee loyalty. The study had been limited only to banking sector. Data collected from lower and middle employees. Using convenience sampling technique, the study was conducted during the period of April 2018 to July 2018 in Mathura city. The researchers collected 100 questionnaires for collecting data from the respondents. Before distributing the questionnaire to the respondents the content validity of the questionnaire was checked. The variables relating to the present study is drawn from the previous work of Dang Bao Trung (2014). Suitable modification has been made in the existing questionnaire to suit the requirements of the present study. Basically, the research consists of two stages.

In stage 1, hypotheses are framed. In stage 2, data collected from the questionnaire are analysed with the software SPSS in order to evaluate the hypotheses. The specific steps are shown in the following diagram.

7. Proposed Hypothesis

The study is approached with the following hypothesis

H01: Compensation has no significant impact on employee loyalty

H02: Workplace has no significant impact on employee loyalty

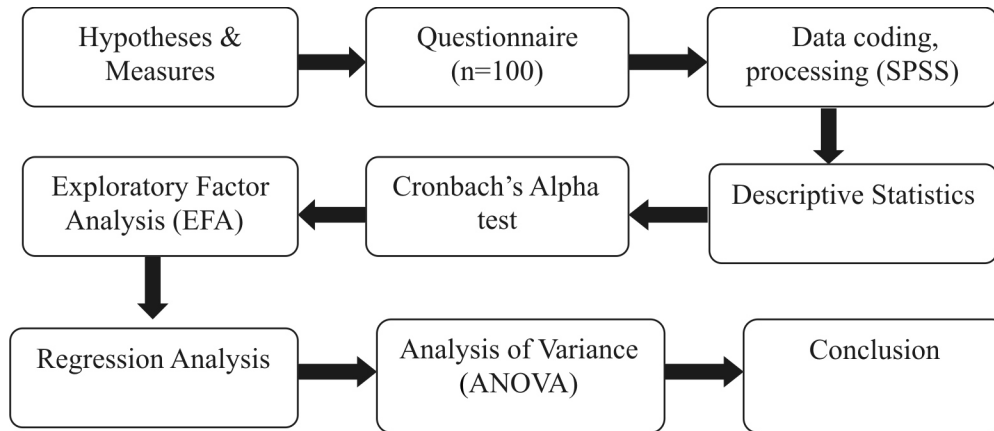
H03: Values & Ethics has no significant impact on employee loyalty

H04: Training has no significant impact on employee loyalty

H05: Empowerment has no significant impact on employee loyalty

H06: Leadership has no significant impact on employee loyalty

Figure 2: Research Framework



Descriptive Statistics

Table 1: Gender

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------|-----------|---------|---------------|--------------------|
| Valid Female | 50 | 50.0 | 50.0 | 50.0 |
| Male | 50 | 50.0 | 50.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

Table 2: Age

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------------|-----------|---------|---------------|--------------------|
| Valid 20-30 Years | 26 | 26.0 | 26.0 | 26.0 |
| 31 to 40 Years | 35 | 35.0 | 35.0 | 61.0 |
| 41 to 50 Years | 26 | 26.0 | 26.0 | 87.0 |
| Above 50 Years | 13 | 13.0 | 13.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

Table 3: Educational

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|-------------------|-----------|---------|---------------|--------------------|
| Valid High School | 13 | 13.0 | 13.0 | 13.0 |
| Under Graduate | 38 | 38.0 | 38.0 | 51.0 |
| Post Graduate | 37 | 37.0 | 37.0 | 88.0 |
| Others | 12 | 12.0 | 12.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

Table 4: Experience

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|--------------------|-----------|---------|---------------|--------------------|
| Valid Below 1 year | 9 | 9.0 | 9.0 | 9.0 |
| 1-3 Years | 25 | 25.0 | 25.0 | 34.0 |
| 3-5 Years | 22 | 22.0 | 22.0 | 56.0 |
| Above 5 Years | 44 | 44.0 | 44.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

Table 5: Monthly Income

| | Frequency | Percent | Valid Percent | Cumulative Percent |
|---------------------------|-----------|---------|---------------|--------------------|
| Valid Less than Rs. 15000 | 15 | 15.0 | 15.0 | 15.0 |
| Rs. 15001 - Rs.30000 | 49 | 49.0 | 49.0 | 64.0 |
| Rs. 30001 - Rs. 45000 | 22 | 22.0 | 22.0 | 86.0 |
| Above Rs. 45000 | 14 | 14.0 | 14.0 | 100.0 |
| Total | 100 | 100.0 | 100.0 | |

The demographic profile of the respondent is depicted in Table No. 1. Out of 100 sample respondents 50 percent was male and 50 percent is female. Regarding age of the respondents 26 percent are between 20-30 years, 32 percent are between 31 to 40 years of age, 26 percent are between 41 to 50 years and 13 percent are above 50 years. Regarding Educational qualification of the respondents, 13 percent of the respondents had higher secondary qualification. followed by 38 percent of respondents had under graduation, 37 percent of respondents had completed post-graduation and 12

percent were others who fall under uneducated category. As, work experience was measured with 9 percent is below 1 year, 25 percent of respondent work experience is between 1 to 3 year, 22 percent respondent experience is between 3 to 5 years and 44 percent work respondent experience is above 5 years. Finally, the income level, it was found that 15 percent earned below Rs. 15000, 49 percent earned between Rs. 15001 to Rs. 30000, 22 percent earned between Rs. 30001 to Rs. 45000 and 14 percent earned above Rs. 45000.

Reliability Analysis

Table 6: Reliability Statistics

| Cronbach's Alpha | N of Items |
|------------------|------------|
| .844 | 20 |

Reliability of statements regarding considered Human Resources Practices and Employee Loyalty was tested and Cronbach's Alpha vale was .844 which is treated as good and is a sign of further procedure can be done.

Exploratory Factor Analysis

Factor Analysis from SPSS 22.0 was applied on the instrument covering Human Resource Practising statements. The statistical test result (KMO = .780, Bartlett's test of = 275.9, significance =

.000) revealed that the factor analysis was appropriate. To extract the various factors under Factor Analysis technique the Principal component Analysis method was used with varimax rotation method. By applying PCA and Varimax as a outcome so many factors were generated during the process, Only those

factors whose eigen value were more than 1 retained and rest factors were not considered. As a result only Six factors were considered for the study who came up with more than 1 eigen value. These 6 factors were accounted for more than 80% variability of the original value.

Table 7: KMO and Bartlett's Test

| | | |
|--|--------------------|---------|
| Kaiser-Meyer-Olkin Measure of Sampling Adequacy. | | .780 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 275.914 |
| | Df | 28 |
| | Sig. | .000 |

Table 8: Results of Total Variance Explained

| Component | Extraction Sums of Squared Loadings | | | Rotation Sums of Squared Loadings | | |
|-----------|-------------------------------------|---------------|--------------|-----------------------------------|---------------|--------------|
| | Total | % of Variance | Cumulative % | Total | % of Variance | Cumulative % |
| 1 | 5.567 | 32.746 | 32.746 | 3.522 | 20.719 | 20.719 |
| 2 | 2.164 | 12.732 | 45.478 | 2.733 | 16.078 | 36.797 |
| 3 | 1.933 | 11.368 | 56.846 | 2.031 | 11.948 | 48.745 |
| 4 | 1.650 | 9.706 | 66.552 | 2.023 | 11.898 | 60.644 |
| 5 | 1.344 | 7.906 | 74.459 | 1.875 | 11.031 | 71.675 |
| 6 | 1.067 | 6.275 | 80.733 | 1.540 | 9.058 | 80.733 |

Extraction Method: Principal Component Analysis.

Table 9: Rotated Component Matrix^a

| | Component | | | | | |
|--|-----------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Training is provided for job requirements | .233 | .045 | .943 | .201 | -.060 | .011 |
| The values and beliefs I respect and those the company pursues are matching. | .225 | .159 | .209 | .922 | .047 | -.017 |
| My supervisor gave me a clear path for my personal development. | .058 | .945 | -.008 | .130 | -.063 | -.008 |
| My supervisor always listens to my opinions and care about my interests. | .611 | .641 | .180 | .067 | .109 | .043 |
| My supervisor lets me perform my tasks by myself. | .873 | -.004 | .078 | .048 | -.101 | -.026 |
| My supervisor lets me make decisions. | .852 | .062 | .119 | .146 | -.070 | .017 |
| My supervisor lets me set my own goals for work | .690 | .093 | .204 | .285 | -.186 | .063 |
| My wage/salary corresponds to my capacity and responsibility. | .145 | .039 | .015 | -.033 | .106 | .856 |
| Allowances, rewards, and fringe benefits are adequate. | -.126 | -.022 | .002 | .009 | .031 | .867 |

Table 9: Rotated Component Matrix* (Contd.)

| | Component | | | | | |
|--|-----------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| Equipment in the workplace is very good. | -.127 | -.037 | -.148 | .174 | .713 | .083 |
| The work environment is comfortable. | -.028 | -.130 | .016 | -.214 | .749 | .175 |
| The workplace's temperature, light, and noise are appropriate. | -.076 | .110 | .019 | .083 | .836 | -.079 |
| I feel motivated and happy with training | .233 | .045 | .943 | .201 | -.060 | .011 |
| My supervisor believes in my work evaluation. | .731 | .159 | .125 | .097 | -.050 | -.036 |
| I commit to follow the company's strategies. | .225 | .159 | .209 | .922 | .047 | -.017 |
| My capabilities are improved thanks to my supervisors' training. | .058 | .945 | -.008 | .130 | -.063 | -.008 |
| I admire supervisor acceptance for innovation | .611 | .641 | .180 | .067 | .109 | .043 |

Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 6 iterations.

Six factors were extracted from Factor Analysis which is referred as Human Resource Practices factors:

Table: 10

| Factor | Variables | Factor Name |
|--------|--|---------------------------|
| 1 | My supervisor lets me perform my tasks by myself. My supervisor lets me make decisions. My supervisor lets me set my own goals for work. My supervisor believes in my work evaluation. | Empowerment |
| 2 | My supervisor gave me a clear path for my personal development. My supervisor always listens to my opinions and care about my interests. My capabilities are improved thanks to my supervisors' training. I admire supervisor acceptance for innovation | Leadership |
| 3 | Training is provided for job requirements. I feel motivated and happy with training. | Training |
| 4 | The values and believes I respect and those the company pursues are matching. I commit to follow the company's strategies. | Value & Ethics |
| 5 | Equipment in the workplace is very good. The work environment is comfortable. The workplace's temperature, light, and noise are appropriate. | Workplace |
| 6 | My wage/salary corresponds to my capacity and responsibility. Allowances, rewards, and fringe benefits are adequate. | Compensation |

8. Influence of HRM Practice on Employee Loyalty

To study the effect of HRM practices on employee loyalty, multiple regressions was carried out. The factor

scores of the six HRM variables obtained from the factor analysis represent the independent variables, whereas employee loyalty and work engagement represented the dependent variables.

Table: 11

| Model | | Standardized Coefficients | Sig. |
|-------|----------------|---------------------------|------|
| | | Beta | |
| 1 | (Constant) | | .000 |
| | Empowerment | .804 | .000 |
| | Leadership | .104 | .023 |
| | Training | .266 | .000 |
| | Value & Ethics | .274 | .000 |
| | Workplace | .258 | .000 |
| | Compensation | .342 | .000 |

The study stipulates that there is a significant effect of all the factors on “Employee loyalty” with the result, all Sig. values are less than 5%, VIF value less than 10. For those reasons, these independent variables are suitable for multiple regression equation.

Testing of Hypothesis

It exhibits the result of the hypothesis. All the six hypotheses revealed a “p” value less than 0.5, The Researchers tested the Hypothesis with the help of Multiple Regression.

Table 12: Exhibits the Testing of Hypothesis on “Employee Loyalty”

| S.No. | Hypothesis | Results |
|-------|--|----------|
| H01 | Compensation has no significant impact on employee loyalty | Rejected |
| H02 | Workplace has no significant impact on employee loyalty | Rejected |
| H03 | Value & Ethics has no significant impact on employee loyalty | Rejected |
| H04 | Training has no significant impact on employee loyalty | Rejected |
| H05 | Empowerment has no significant impact on employee loyalty | Rejected |
| H06 | Leadership has no significant impact on employee loyalty | Rejected |

Multiple Regression Analysis

Table 13: Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | | Durbin-Watson |
|-------|-------|----------|-------------------|----------------------------|-------------------|----------|-----|-----|---------------|---------------|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change | |
| 1 | .901a | .811 | .799 | 1.04869 | .811 | 66.475 | 6 | 93 | .000 | 2.101 |

a. Predictors: (Constant), REGR factor score 6 for analysis 1, REGR factor score 5 for analysis 1, REGR factor score 4 for analysis 1, REGR factor score 3 for analysis 1, REGR factor score 2 for analysis 1, REGR factor score 1 for analysis 1

b. Dependent Variable: Employee Loyalty

The value of adjusted R square came .799 which signifies that 79.9% of dependent value is predicted by various independents variables.

Analysis of Variance (Anova)

Gender

Null Hypothesis Ho: There is no significant difference in Employee Loyalty based on Gender. A one-way ANOVA was conducted to compare the difference of Gender on Employee Loyalty for male and female.

Table 14: Test of Homogeneity of Variances

Employee Loyalty

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| .008 | 1 | 98 | .928 |

ANOVA

Employee Loyalty

| | Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|------|------|
| Between Groups | 1.690 | 1 | 1.690 | .307 | .581 |
| Within Groups | 539.220 | 98 | 5.502 | | |
| Total | 540.910 | 99 | | | |

There was no significant difference in Employee Loyalty based on Gender at the $p > .05$ level for three conditions [F (1, 98) = .000, $p = .581$]. The results suggest that null hypothesis is accepted and it can be said that employee loyalty does not differ for male and female.

Age

Null Hypothesis Ho: There is no significant difference in Employee Loyalty based on Age.

A one-way ANOVA was conducted to compare the difference of Age on Employee Loyalty.

Table 15: Test of Homogeneity of Variances

Employee Loyalty

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 1.233 | 3 | 96 | .302 |

ANOVA

Employee Loyalty

| | Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|-------|------|
| Between Groups | 19.272 | 3 | 6.424 | 1.182 | .321 |
| Within Groups | 521.638 | 96 | 5.434 | | |
| Total | 540.910 | 99 | | | |

There was no significant difference in Employee Loyalty based on Age at the $p > .05$ level for three conditions [F(3,96) = .000, $p = .321$]. The results

suggest that null hypothesis is accepted and it can be said that employee loyalty does not differ for different age groups.

Experience

Null Hypothesis Ho: There is no significant difference in Employee Loyalty based on Experience. A one-way

ANOVA was conducted to compare the experience on Employee Loyalty.

Table 16: Test of Homogeneity of Variances

Employee Loyalty

| Levene Statistic | df1 | df2 | Sig. |
|------------------|-----|-----|------|
| 1.857 | 3 | 96 | .142 |

ANOVA

Employee Loyalty

| | Sum of Squares | Df | Mean Square | F | Sig. |
|----------------|----------------|----|-------------|-------|------|
| Between Groups | 39.544 | 3 | 13.181 | 2.524 | .062 |
| Within Groups | 501.366 | 96 | 5.223 | | |
| Total | 540.910 | 99 | | | |

There was no significant difference in Employee Loyalty based on Experience at the $p > .05$ level for three conditions [$F(3,96) = .000, p = .062$]. The result suggests that null hypothesis is accepted and it can be said that employee loyalty does not differ for different age groups.

9. Analysis and Discussion

The primary purpose of the study is to examine the effect of HRM practices on employee loyalty towards banking sector in Mathura District. Factor analysis was performed to examine the underlying dimensions of HR practices. Factor analysis resulted six factors namely Compensation, workplace, value & ethics, training, empowerment and leadership which explained 80.733 percent of the variation. The findings of this study support past research work, such as Trung (2014), Choi and Lee (2013), and Jiang et al. (2012), who observed the impact of HRM practices on organization and employee performance. The study found that HRM practices build the employee fairness towards organization thereby increasing the importance of HR practices. These study findings proved this by exhibiting that employees are subject to developmental and empowering HR practices like training & development, workplace, empowerment and compensation which has positive effect on employee loyalty.

10. Conclusion

The present study identified six important dimensions of HRM practices, namely, Compensation, workplace, value & ethics, training, empowerment and leadership. These identified dimension, of this study found that there is significant effect of HRM practices on employee loyalty that enhancing the internal efficiency and thereby increase the organizational efficiency.

11. Managerial Implications

This research makes several practical contributions. The effect of HRM practices on employee loyalty can direct the approach producers and future specialists to focus on employee satisfaction. Employee loyalty can be viewed on the administrative level prompting the esteem formation of the representatives. The proposed model can assist the administration with analyzing the reach out of the arrangement of their vital HRM practices and it's relating sway on workers loyalty. This study confirms that selection of good HRM practices can build up a unique pool of employee's behavior that can help organization performance. With this information, organizations can focus on their endeavors to create HRM practices to upgrade better employee loyalty and their morale. The

study findings assist the administration with formulating appropriate approaches identifying with HRM practices.

12. Scope for Future Research

This study considers only banking sector. In future this can be extended too many large scale industries. Only limited numbers of variables of HRM practices

are considered for this study. In future, more number of variables can be used. The study considers the total employees views on implementation of HRM practices. The study employed only one dependent variables namely employee loyalty. In future, these can be extended to other dependent variables like employee commitment, employee morale, work engagement etc.

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A Comparative Study on Customer Experience and Social Media Marketing of Amazon and Flipkart

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Abstract

Customer experience is the consequence of association between an association and a customer amid the length of their relationship. This relationship is comprised of three sections: the client venture, the brand contact focuses the client associates with, and the conditions the client encounters amid their great client encounter implies that a person's understanding amid all purposes of contact coordinates a person's desire. Social media marketing provides discovery of new content and also builds the link with the customers. Many people use social media to search various products and services to which social media marketing acts as an effective tool. This paper shows the comparative trend in customer experience and social media marketing of Amazon and Flipkart.

Key Words: Social Media Marketing, Consumer Experience

1. Introduction

Customer experience includes client association at different levels –, for example, balanced, enthusiastic, sensorial, physical and so forth. Customers powerful reaction to immediate and backhanded contact with an organization. Coordinate contact generally happens when the buy or utilize is started by the client. Circuitous contact generally includes promoting, news reports, spontaneous experiences with deals agents, verbal suggestions.

Social media marketing is a form of online marketing that involves creating and sharing content on social media networks in order to achieve your marketing and branding goals. Social media marketing includes activities like posting text and image updates,

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videos, and other content that creates audience engagement.

Established in October 2007, Flipkart is one of India's driving web based business commercial centers, with central station in Bengaluru. Flipkart was established by Sachin Bansal and Binny Bansal and the organization at first began as an online book shop. Afterward, as the organization's ubiquity developed, it likewise began offering different things, for example, music, motion pictures and cell phones. As the internet business unrest picked up force in India, Flipkart developed at a quickened pace and included a few new item runs in its portfolio. Starting at now, the organization offers in excess of 80 million items spread crosswise over in excess of 80 classes, for example, cell phones and frill, PCs and adornments, workstations, books and ebooks, home machines, electronic products, garments and extras, games and wellness, infant care, recreations and toys, gems, footwear, and so forth.

Flipkart has 100 million enrolled clients and in excess of 100 thousand merchants on its internet business stage. The organization has put resources into 21

cutting edge distribution centers to guarantee provoke conveyance to its clients. The Flipkart site draws in 10 million page hits each day and around 8 million shipments are handled each month. Flipkart has likewise presented its portable application, which has turned out to be very well known, with in excess of 50 million application clients. Flipkart is a billion dollar organization and its valuation in 2016 was Rs 15,129 crore (US\$2.3 billion). It utilizes in excess of 33,000 individuals.

For Flipkart, October of 2016 was a represent the moment of truth month for the internet business organization. Confronting serious rivalry from Amazon, Flipkart had surrendered piece of the pie on multi month-on-month premise and it seemed as though it would inevitably surrender its authority position. For Flipkart, October of 2016 was a represent the deciding moment month for the internet business organization. Confronting extreme rivalry from Amazon, Flipkart had yielded piece of the overall industry on multi month-on-month premise and it seemed as though it would in the end surrender its authority position.

Amazon.com Inc., is an American trade and distributed computing organization situated in Seattle, Washington. It was started by Jeff Bezos on July 5, 1994. The company is the biggest Internet retailer on the planet as per their income and market capitalization, and second biggest after Alibaba Group as far as aggregate sales. The amazon.com site began as an online book shop and later started to offer video downloads/spilling, MP3 downloads/gushing, book recording downloads/gushing, programming, computer games, hardware, attire, furniture, sustenance, toys, and adornments. The company offer shopping of gadgets—Kindle tablets, Fire tablets, Fire TV and is the world's biggest supplier of cloud framework administrations.

Amazon has different retail sites for the United States, the United Kingdom and Ireland, France, Canada, Germany, Italy, Spain, Netherlands, Australia, Brazil, Japan, China, India, and Mexico. In 2016, Dutch, Polish, and Turkish dialect adaptations of the German Amazon site were likewise propelled. Amazon

additionally offers global transportation of a portion of its items to certain different nations.

Amazon is the second most profitable company in the world, the biggest Internet organization by income and the second biggest manager in the United States. In 2017, Amazon bought stake in whole Foods Market for \$13.4 billion, which tremendously expanded Amazon's essence as a block and-cement retailer. On September 4, 2018, Amazon achieved US\$1 trillion market cap, second after Apple Inc.

The organization stepped into the Indian market in February 2012 when it started with Junglee.com, a webpage which enables customers to look at costs on the web yet not buy things specifically. India has more than 50 million dynamic web clients, around 40% of whom have beforehand made buys on the web. Outsider retailers now offers their merchandise through Amazon's site utilizing a "commercial center" model, for eg - retailers in India sending their products to Amazon's stockroom close Mumbai.

Amazon.com's product lines available at its website include several media (books, DVDs, music CDs, videotapes and software), apparel, baby products, consumer electronics, beauty products, gourmet food, groceries, health and personal-care items, industrial & scientific supplies, kitchen items, jewelry, watches, lawn and garden items, musical instruments, sporting goods, tools, automotive items and toys & games. Amazon is now gearing up in India to play a role in the grocery retail sector aimed at delivering customer needs.

2. Literature Review

Writing surveys is a depiction of distributed data regarding the exploration. This part comprises of survey of writing related with effect of web based life advertising regarding on the web customers. It audits the present issues in internet advertising and persuasive components influencing the web based promoting. Examined web based life promoting destinations, factors affecting for utilizing informal communication locales. It gives a study audit of different examinations related with internet based life advertising and web based promoting regarding FMCG individual items.

This is trailed by featuring the holes between the examination and commitment of the present investigation.

Priyaet. Al (2011) considered that online networking is on the most imperative instruments correspondence channels. Customers do access to data about products and enterprises to be acquired according to require by methods for online networking as it were. Likewise considered web based life which influences our live lately that conveys another measurement to Internet and decide the impacts of online networking systems on obtaining conduct of customers.

Priyanka P. (2015) examined that web-based social networking can be utilized for expanding client dependability. With the assistance of persistent client bolster administrations prompts change in client maintenance. New applications and social stages will prosper and permit significantly more prominent personalization and continuous, area based commitment in media.

R.A.Gbadeyan (2010) ponder analyzed that there are open doors for organizations in the market, organizations can develop with the assistance of internet based life advertising. Employments of SNS investigated that association can do coordinate showcasing for online interpersonal organization there are individuals who invest more energy in SNS. Concentrate additionally finds the purposes behind individuals were utilizing long range informal communication destinations because of wellbeing concerned reason, in fact inability because of absence of trust in utilizing web, scholarly rejecters who feel exercise in futility.

Priti S. et al (2013) examined the viability of putting brand correspondence on long range informal communication destinations which demonstrates that there is impact of online remarks and audits of items/marks on the purchasing conduct of buyers. Study uncovered that individuals do go over different ads on long range informal communication destinations additionally like to experience the online remarks and surveys with respect to the brand/items before purchasing the items for them mark

correspondence on interpersonal interaction locales assumes essential part to impact purchasing conduct of the clients.

Mehmood Rehmani (2011) examined as a result of internet based life it was less demanding for web based business advertisers to discuss specifically with their intended interest groups. This is because of individuals can take finish data of item additionally make examination with various brands which results to purchasing of item according to decision which prompts mark duty. Study investigated because of expanding number of cell phone clients and web clients, individuals have a tendency to get impact for acquiring of items. The investigation plans to investigate the effect of internet based life on buy goal of cell phone clients in Pakistan.

TesfayeNekatibeb (May 2012), Studied web-based social networking gives advantages of long haul commitment amongst brands and shoppers likewise gave a chance to everybody to convey adequately and productively in a route uncommon by some other media it tends to be considered as the specialized apparatus of current period.

Amrita Pani and Mahesh Sharma (2011) ponder uncovered that Social systems administration locales like Myspace, Orkut and Facebook were generally utilized. To get affected by Gen-next customers in India, there ought to be changes in their image decisions, shopping conduct and way of life design which coming about through their online life. Advertiser should execute very much planned showcasing effort for entering new media fragment.

SisiraNeti (2011) researched about outlined via web-based networking media showcasing in India. It examined about procedures of online life and their part and significance in the development and advantages parts of the advertisers. The blast of online networking wonder perceived by worldwide organizations which was used potential stage for showcasing with new intensity of publicizing efforts by utilizing web based life. The key discoveries of study was blogging have an exceptionally positive effect on organizations marking & growth.

Prasad and Aryasri (2009) have explored the determinants of shopping behavior such as convenience, customer service, trust, web store environment and web shopping enjoyment and examine the effect of these factors towards online buying behavior.

Taprial and Kanwar (2012) concluded that the social media is easily accessible and takes minimal or no costs to use. Social media is easy to use and doesn't require any special skills, knowledge to use.

Wells et al. (2012) in his study entitled that online impulse buying: understanding the interplay between consumer impulsiveness and website quality focused

on the direct relationships between the website and online impulse buying. The study found and proposed the model considered the direct influence on website quality on the urge to buy impulsively.

Samadi and Ali (2013) compared the perceived risk level between internet and store shopping, and revisit the relationships among past positive experience, perceived risk level, and future purchase intention within the internet shopping environment

Q1. Which online site provides good quality of products?

Table and Figure 1.1 (Good Quality of Products)

| QUALITY | NO. OF RESPONDENTS | PERCENTAGE (%) |
|----------|--------------------|----------------|
| AMAZON | 45 | 45% |
| FLIPKART | 55 | 55% |
| TOTAL | 100 | 100% |



3. Data Analysis and Interpretation

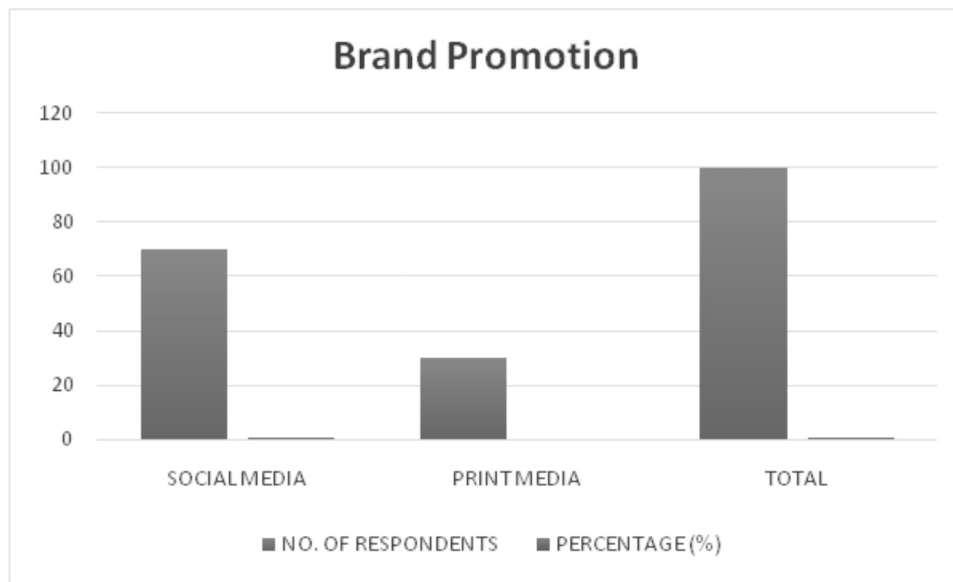
As we can see in the above figure- 1.1, most of the people think that Flipkart provides good quality of products as compared to Amazon, it means that Amazon should improve its product quality so that it

will attract the customers to either purchase from Amazon or Flipkart as they will have a option for a product if not available at Flipkart then they may purchase it from Amazon if it has good quality of products.

Q2. Which is the most effective solution for brand promotion of online sites like Amazon and Flipkart?

Table and Figure 1.2 (Brand Promotion)

| BRAND PROMOTION | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-----------------|--------------------|----------------|
| SOCIAL MEDIA | 70 | 70% |
| PRINT MEDIA | 30 | 30% |
| TOTAL | 100 | 100% |



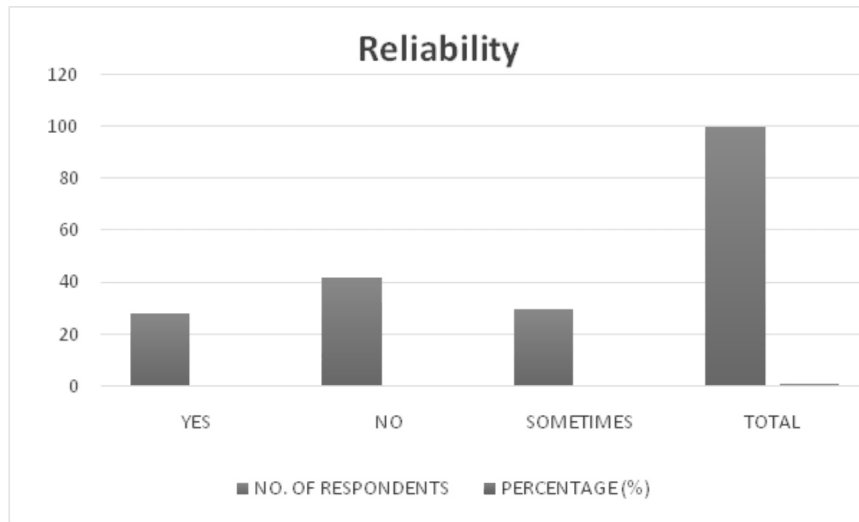
The above figure- 1.2 represents that 70% of the people find social media as an effective solution for brand promotion of online sites like Amazon and Flipkart as in current scenario people get most of the information from social media sites like facebook, instagram and etc. and they are more aware of these kind of information. For making an online purchase people mostly collect information from

the social media sites rather than print media materials so it is beneficial for the companies like Amazon and Flipkart to make effective brand promotion strategies on social media to attract a large number of customers.

Q3. Do you find Flipkart more reliable than Amazon?

Table and Figure 1.3 (Reliability)

| RELIABILITY | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-------------|--------------------|----------------|
| YES | 28 | 28% |
| NO | 42 | 42% |
| SOMETIMES | 30 | 30% |
| TOTAL | 100 | 100% |



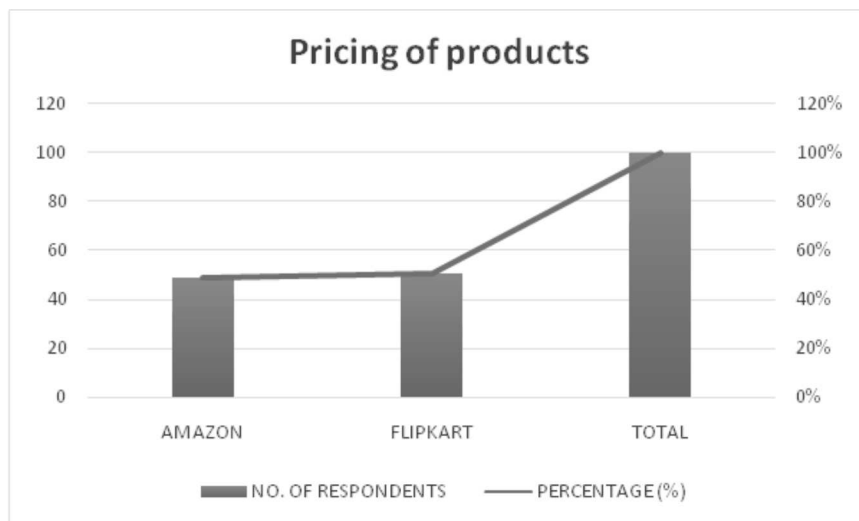
The above figure- 1.3 represents that 42% of the people feel that Flipkart is not reliable than Amazon whereas 30% of the people feel that sometimes Flipkart is reliable than Amazon and remaining feel that Flipkart is reliable than Amazon. This means that Flipkart needs to improve a lot so as

to make it more consistent so that it will be able to sell a larger number of products and services to its customers.

Q4. Which online site has products at a lower price as compared to others?

Table and Figure 1.4 (Pricing of Products)

| PRICE | NO. OF RESPONDENTS | PERCENTAGE(%) |
|----------|--------------------|---------------|
| AMAZON | 49 | 49% |
| FLIPKART | 51 | 51% |
| TOTAL | 100 | 100% |



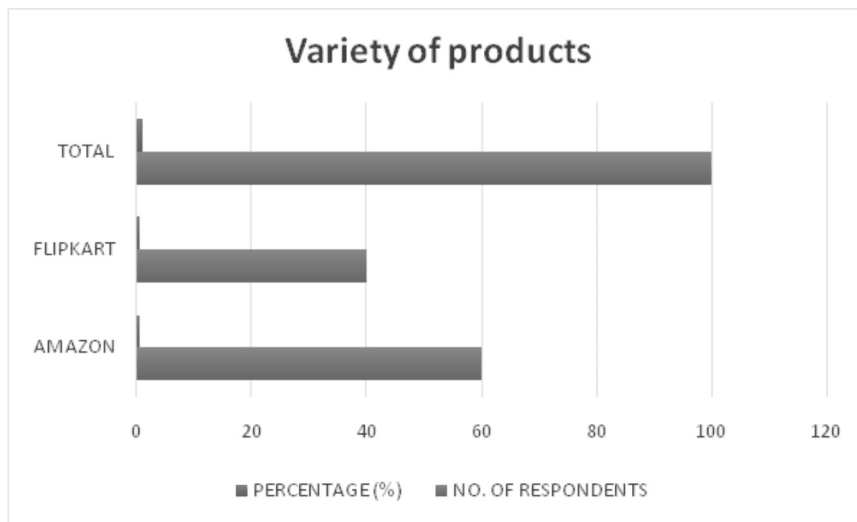
As we can see in the above figure- 1.4, Flipkart provides products and services at a lower price as compared to Amazon, this means Amazon should improve little bit in its price segment because people prefer those sites which provide better quality of products at a reasonable/lower price, so Amazon should provide

filters to its site so that people can choose their affordability while choosing products and services.

Q5. Which online site has a variety of products choices in terms of sorting and filtering as per individual requirements and sellers rating?

Table and Figure 1.5 (Variety of Products)

| VARIETY OF PRODUCTS | NO. OF RESPONDENTS | PERCENTAGE (%) |
|---------------------|--------------------|----------------|
| AMAZON | 60 | 60% |
| FLIPKART | 40 | 40% |
| TOTAL | 100 | 100% |



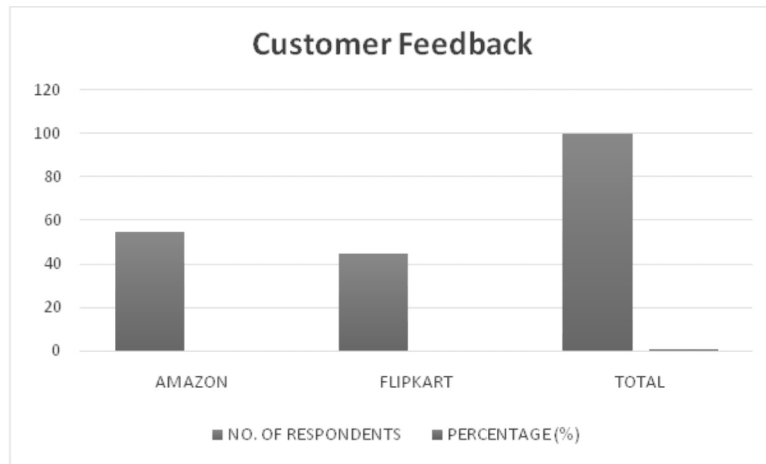
The above figure- 1.5 represents that Amazon provides more variety of products as compared to Flipkart in terms of sorting and filtering as per individual requirements and sellers rating, we can interpret that Flipkart should also provide more variety of products to customers so as to target a large number of audience

to purchase from it, the company should promote itself through social media sites in order to compete with Amazon.

Q6. Which online site gives you the better customer feedback, rating and reviewing system?

Table and Figure 1.6 (Customer Feedback)

| CUSTOMER FEEDBACK | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-------------------|--------------------|----------------|
| AMAZON | 55 | 55% |
| FLIPKART | 45 | 45% |
| TOTAL | 100 | 100% |



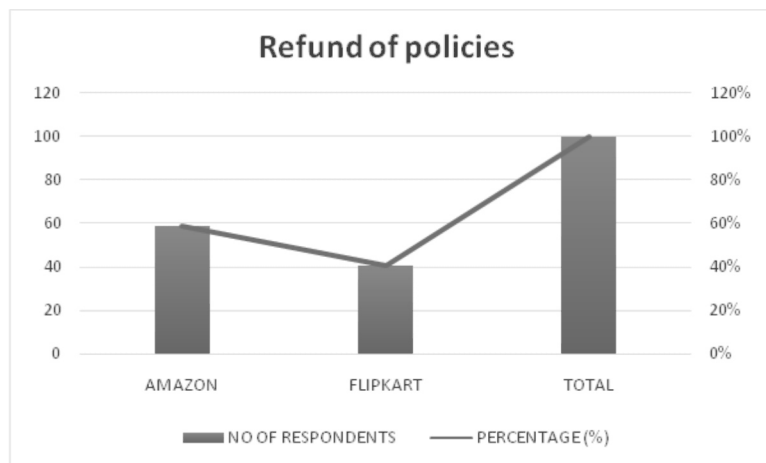
For a company customer feedback, ratings and reviews matter a lot because it is the point where the company gets to know about its products, services and other things which a customer provides after making a purchase from the company. The above figure- 1.6 shows that 55% of the customers feel that Amazon has a better customer feedback, ratings and reviewing system than Flipkart, so Flipkart should change its existing ratings and reviewing system with a new one

so that it will help the company to know about their products and services from the customers that whether they liked it or not and if the customer feedback or ratings is not good of the company then the customers may not likely to purchase it.

Q7. Which online site has a better customer friendly exchange, return, replacement and refund policy?

Table and Figure 1.7 (Refund Policies)

| REFUND POLICIES | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-----------------|--------------------|----------------|
| AMAZON | 59 | 59% |
| FLIPKART | 41 | 41% |
| TOTAL | 100 | 100% |



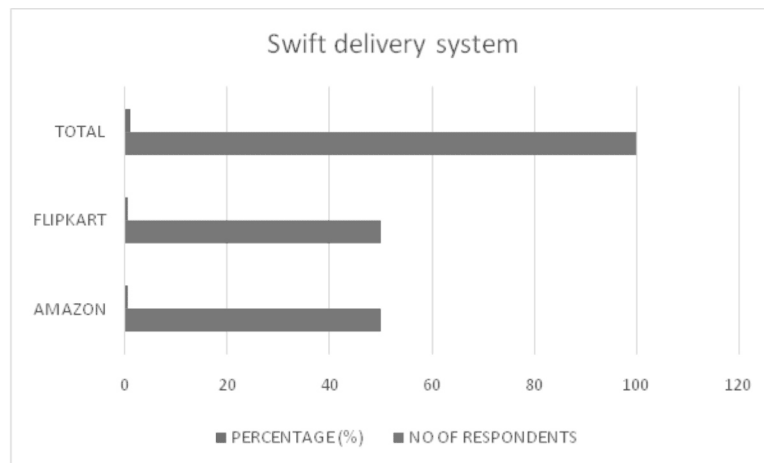
For customers it is more important to have a good exchange policy, refund policy or customer friendly exchange of products which is provided by the company. The above figure- 1.7 shows that Amazon has a better refund policy or customer friendly exchange policy for the customers because sometimes customers face defects in products and services for which they do not get refund or exchange of products

with a new one for which they do not make a online purchase again, but in case of Amazon customers are happy with the refund policy of company whereas some customers feel that Flipkart should improve a bit in its refund policy so as to make customers happy and also to make the customer repeat the purchases.

Q8. Which online site has a swift delivery system?

Table and Figure 1.8 (Swift Delivery System)

| SWIFT DELIVERY SYSTEM | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-----------------------|--------------------|----------------|
| AMAZON | 50 | 50% |
| FLIPKART | 50 | 50% |
| TOTAL | 100 | 100% |



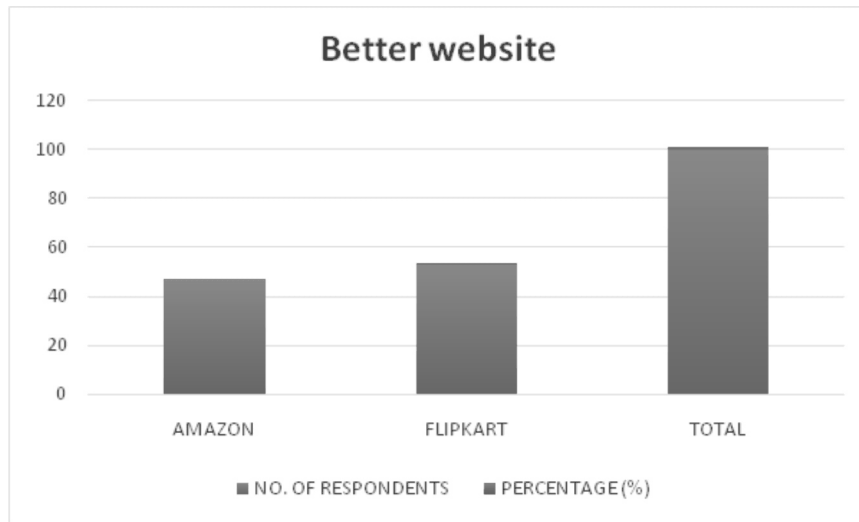
So 50% of the respondents feel that Amazon has a swift delivery system while the rest 50% respondents feel that Flipkart has a swift delivery system. This clearly states that both of the sites need to improve their emerging competent to make it their core or strong component. This is going to get them a better customer

base and far perhaps improve their sales percentage which is going to benefit them get more profit and also increase their footfall.

Q9. Both of these websites are catering to all sorts of products, which one do you feel is better?

Table and Figure 1.9 (Better Website)

| BETTER WEBSITE | NO. OF RESPONDENTS | PERCENTAGE (%) |
|----------------|--------------------|----------------|
| AMAZON | 47 | 47% |
| FLIPKART | 53 | 53% |
| TOTAL | 100 | 100% |



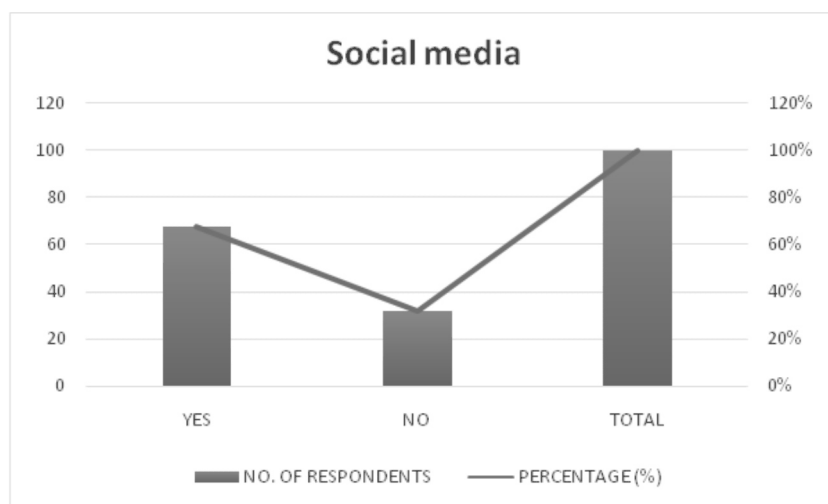
53% of the respondents feel that out of both of the competitive websites who are catering to all sorts of products and customers Flipkart is better than Amazon. While on the other hand only 47% of the respondents feel that Amazon is better than Flipkart. This means that Amazon needs to improve its customer

base and improve its overall customer efficiency.

Q10. Do you think it's beneficial to have a social media presence to gain footfall of customers onsite like Amazon and Flipkart?

Table and Figure 1.10 (Social Media)

| SOCIAL MEDIA | NO. OF RESPONDENTS | PERCENTAGE (%) |
|--------------|--------------------|----------------|
| YES | 68 | 68% |
| NO | 32 | 32% |
| TOTAL | 100 | 100% |



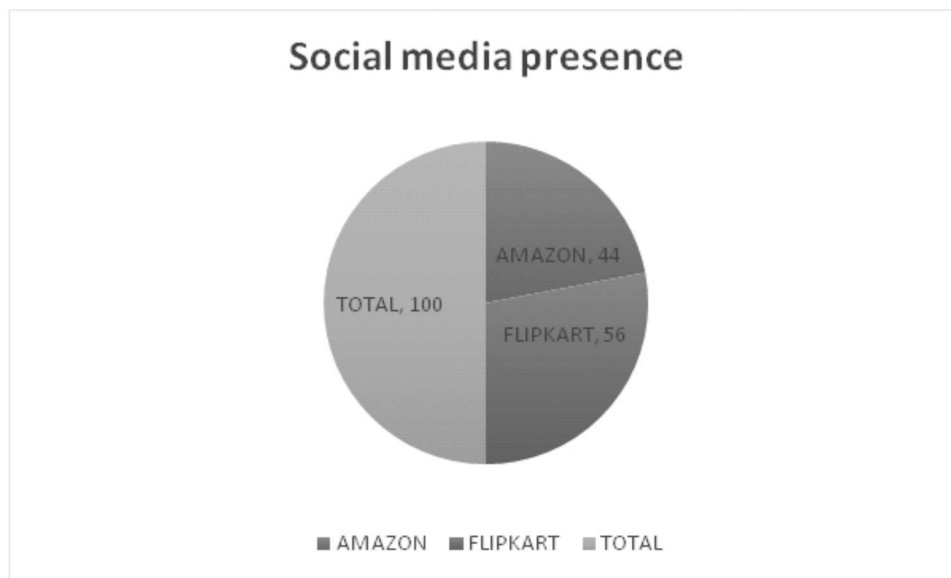
Considering the fact in today's world the major customer base a company can gain is through social media has become very important for companies these days to have an online presence. Here too, 68% people feel that it is important for websites like amazon and Flipkart to have a social media presence and only 32%

feel that it's not really required to gain customers and an online presence.

Q11. Which website has a larger social media presence?

Table and Figure 1.11 (Larger Social Media Presence)

| SOCIAL MEDIA PRESENCE | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-----------------------|--------------------|----------------|
| AMAZON | | 44 44% |
| FLIPKART | 56 | 56% |
| TOTAL | 100 | 100% |



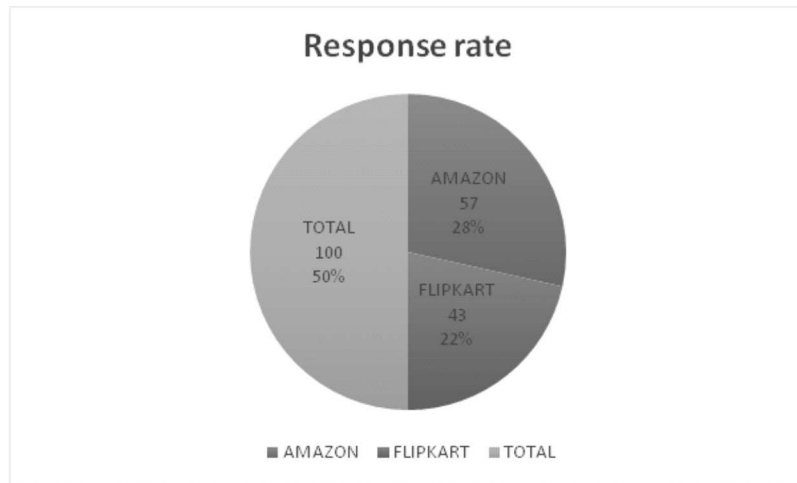
Flipkart has been in this business in India since a little more than what Amazon has. And according to the survey that we conducted, 56% respondents feel that flipkart's social media presence is higher than that of Amazon, while Amazon contributes to only 44% of

the positive response from the customer to this question.

Q12. Whose response rate on social media is quicker and provides better solutions?

Table and Figure 1.12 (Response Rate on Social Media)

| RESPONSE RATE | NO. OF RESPONDENTS | PERCENTAGE (%) |
|---------------|--------------------|----------------|
| AMAZON | 57 | 57% |
| FLIPKART | 43 | 43% |
| TOTAL | 100 | 100% |



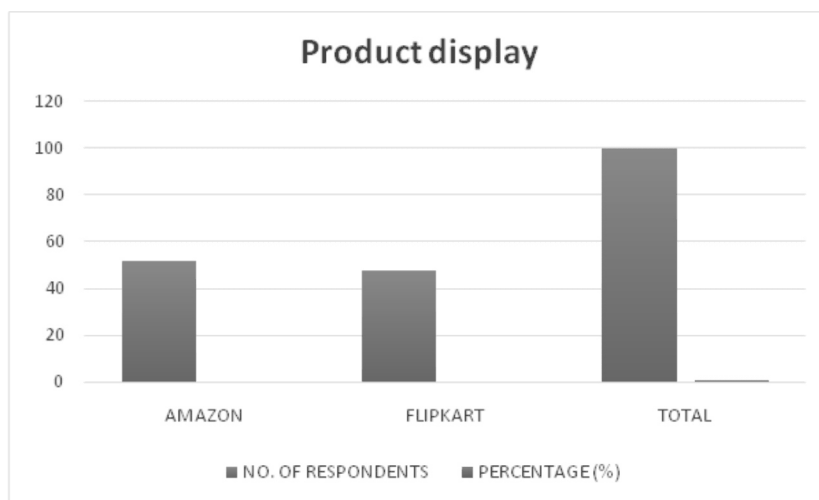
Websites these days have started posting offers and goodies hampers on their social media sites in return customers can enquire or ask queries of any related products and the company’s social media people can solve their queries. 57% of the respondents feel that Amazon has a quicker response rate and provides better solutions while only 43% customers feel the same for

Flipkart. This shows that Flipkart needs to improve its social media response rate and start providing effective solutions to the customers.

Q13. When you search for a product over the internet which out of the two companies’ products are displayed first?

Table and Figure 1.13 (Product Display)

| PRODUCT DISPLAY | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-----------------|--------------------|----------------|
| AMAZON | 52 | 52% |
| FLIPKART | 48 | 48% |
| TOTAL | 100 | 100% |



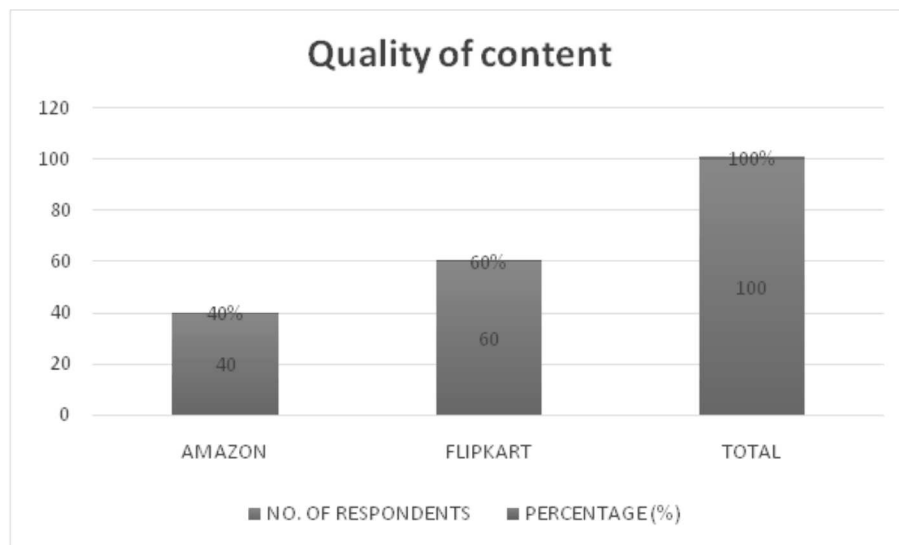
While we're searching anything on Google, Facebook or whatever websites there are several ads that keeps on popping up there. Out of the survey that we conducted 52% respondents feel that Amazon have more products being displayed online while only 48% feel that Flipkart has it. This clearly shows that Flipkart

need to work on his marketing add too.

Q14. Whose social media presence is more interesting and with quality content? (Foreg- better deal, fun giveaways, exciting content, etc.)

Table and Figure 1.14 (Quality of Content)

| QUALITY OF CONTENT | NO. OF RESPONDENTS | PERCENTAGE (%) |
|--------------------|--------------------|----------------|
| AMAZON | 40 | 40% |
| FLIPKART | 60 | 60% |
| TOTAL | 100 | 100% |



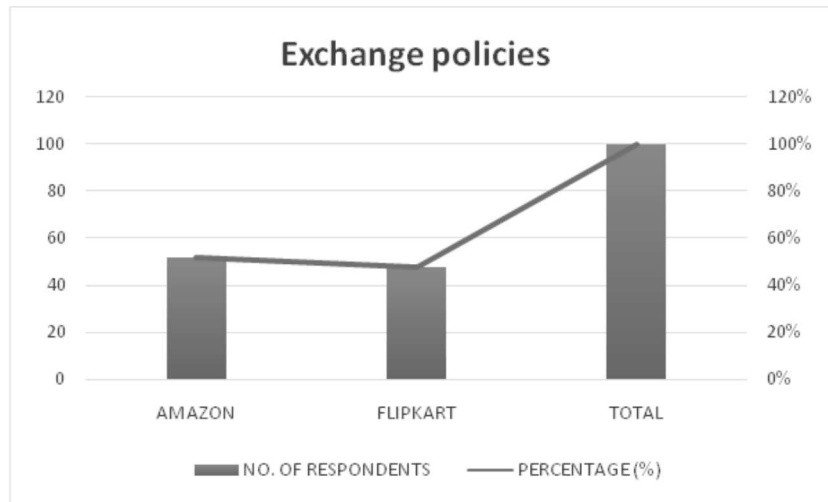
The above figure 1.14 shows that maximum no of people i.e., 60% find Flipkart social media presence more interesting which means that Flipkart has better promotional strategies for gaining and retaining the more and more customers it provides more exciting deals and offers so that more and more customers are

attracted towards the buying of the product and also their content over the social has better quality as compared to amazon as per the survey.

Q15. Out of the two whose return/ exchange pickup is quicker and timely return of the money?

Table and Figure 1.15 (Exchange Policies)

| EXCHANGE POLICIES | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-------------------|--------------------|----------------|
| AMAZON | 52 | 52% |
| FLIPKART | 48 | 48% |
| TOTAL | 100 | 100% |



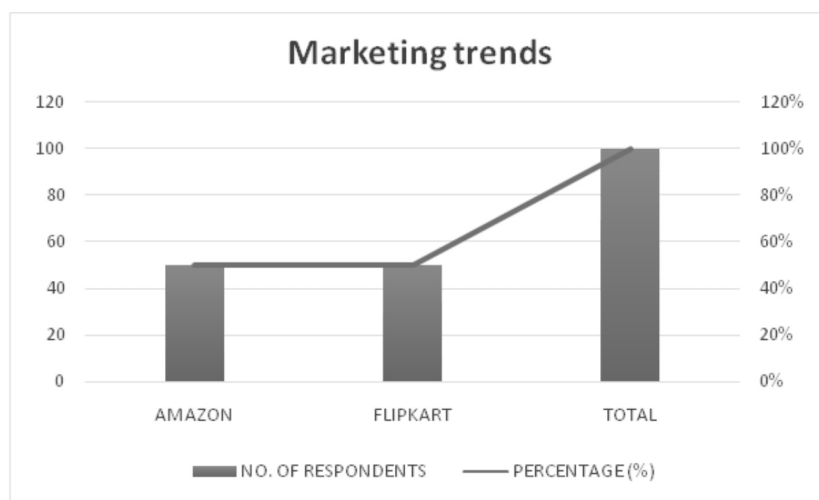
In the above figure 1.15 it can be clearly seen that amazon exchange is quicker and timely as compared to Flipkart which depicts that amazon has better exchange policies as compared to flipkart which is a plus point for the company as if the company has good exchange policies the customers are always satisfied

with the company and hence makes the repeat purchases hence amazon is able to retain more customers by providing quick exchange of goods.

Q16. Which company is following better social media marketing trends?

Table and Figure 1.16 (Marketing Trends)

| MARKETING TRENDS | NO. OF RESPONDENTS | PERCENTAGE(%) |
|------------------|--------------------|---------------|
| AMAZON | 50 | 50% |
| FLIPKART | 50 | 50% |
| TOTAL | 100 | 100% |



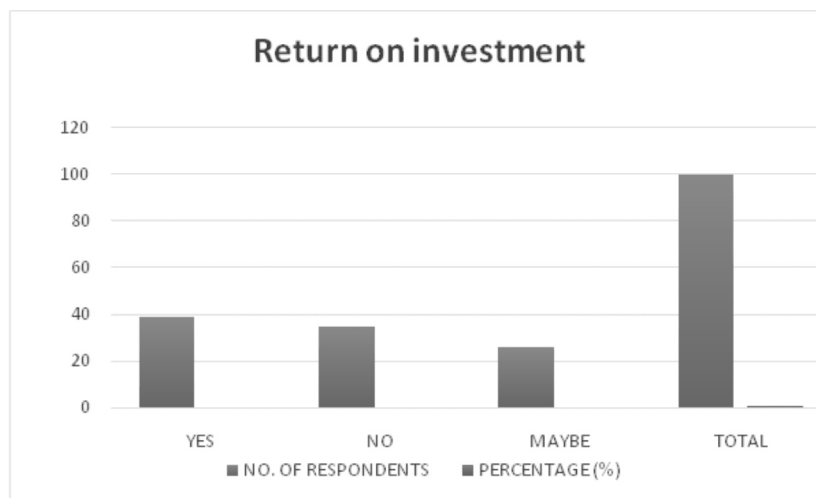
In the above figure 1.16 it can be clearly seen that both the companies amazon and flipkart have same social media marketing trends as both are online retail companies and both have tough competition with each hence so there social media trends are equally good for the customers and the customers are not able to differentiate between the social media marketing trends

of the 2 companies. Hence the companies should try to differentiate between each other's trends.

Q17. Do you feel that social media marketing helps online retail companies like amazon and flipkart to have better ROI?

Table and Figure 1.17 (Return on Investment)

| ROI | NO. OF RESPONDENTS | PERCENTAGE (%) |
|-------|--------------------|----------------|
| YES | 39 | 39% |
| NO | 35 | 35% |
| MAYBE | 26 | 26% |
| TOTAL | 100 | 100% |



In the above figure it can be seen that maximum number of people i.e 39% feels that social media marketing helps online retail stores to have better return on investment whereas 35% does not agree with the statement and 26% are not sure about it hence according to the survey it can be said that social media marketing is an effective tool for online retail stores to have a better return on investment which means more profits more customer and less cost.

4. Major Findings

1. Most of the people think that flipkart provides better quality than amazon.

2. Maximum number of people found social media as effective solution for brand advertising as compared to print media.
3. A large number of people do not find flipkart more reliable than amazon.
4. Although there is not much difference but according to the survey flipkart is better in providing lower prices to the customers.
5. Amazon provides more variety of products as compared to flipkart in terms of sorting and filtering.

6. Amazon has a better customer feedback, rating and reviewing system.
7. Amazon has a better refund policy for the customers as compared to flipkart.
8. According to the survey both amazon and flipkart are equal in terms of swift delivery system.
9. Maximum number of people that flipkart is catering better to the needs of the customers.
10. Maximum number of people agree that it is important for the websites like amazon and flipkart to have a social media presence.
11. According to survey flipkart has a larger social media presence as compared to amazon.
12. Amazon provides a better response rate on social media as compared to flipkart.
13. Amazon has a better response when it comes to the displaying of the company's product first as compared to flipkart.
14. It has been found in the survey that flipkart has more interesting content for its customers as compared to amazon.
15. Amazon return policy is quicker than flipkart according to the survey.
16. When it comes to social media marketing trends both the companies amazon and flipkart are following the same trends.
17. Few people feel that social media marketing helps the online retail companies to have better ROI while some feel not and some are not sure about it.

5. Managerial Implications

1. The study suggests that amazon is better in terms of quality, variety customer feedback and reviewing system and customer refund and

exchange policy hence it is clearly visible that amazon is giving a tough competition to flipkart hence it is important for the flipkart to work on all these aspects so as amazon is not able to take away its customers it is important for flipkart to improve the quality, its exchange policies and provide more variety in the products.

2. Today online companies are giving a tough competition to each other not only amazon but flipkart also have few strong points against amazon like is offers a lower price for its products, it caters better to all kind of the customer needs better than flipkart, has a larger social media presence and has more interesting and quality content for its customers hence amazon has to focus more on its marketing strategies to be better than flipkart inn all these aspects.
3. Today social media has become an important aspect of every business especially for the promotion of online retail companies like amazon and flipkart so as the survey also says hence it is important for the companies to more promote their products on social media.
4. Social media marketing trends are trends which the company's like amazon and flipkart adopt to have a better promotion with latest trends of their products online according to the survey both the company follow same social media marketing trends but it is important for them keep on adopting latest trends.
5. Social media marketing has become an integral part of the online retail businesses today but still people are not sure that whether it would give better results in the business or not i.e better ROI hence online business should focus more on making customer aware about its social media marketing for its products.

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Measuring Service Standards of a Logistics Company: A Case Study of Delhivery Private Limited (Indo-China)

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Abstract

Logistics continually meets new challenges, and is changing faster now than at any time in the past. Every business whether it is B2B or B2C all requires an efficient logistics service provider which delivers goods to the final customers timely. Now a days, there are many examples like zomato, swiggy, amazon in which the main element of success in the market and to win over competitor is an effective delivery/logistics mechanism. As the competition in logistics industry increasing day-by-day, almost all logistics companies are trying hard to satisfy their customers in terms of time promised for delivering the shipment to the final destination also called as TAT (Turn Around Time). Business always wants to choose those logistics service provider who's TAT is minimum as compared to others and at the same time efficiency in promising TAT is greater than others. Therefore, in logistics industry the key factor for analysing the effectiveness of a company in the industry is TAT and this TAT is also a main factor for measuring & analysing service standards of any logistics company. Thus this research paper which is based on primary data collected from real time data processing at Delhivery Private Limited, aims to measure and analyse service standards at different stages and also highlighting the main causes of discrepancies in breaching TAT in each individual stages.

Key Words: TAT (Turn Around Time), Logistics, B2B, B2C

1. Introduction

For analysing the effectiveness of a logistics company, the promised time also called as TAT (Turn Around Time) should be compared with the actual time taken to deliver the shipment to the final destination.

TAT i.e. Turn Around Time, means a particular time period(in days, weeks, months) promised by a company to its customer to deliver the shipment

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to the final destination. This TAT is a key factor in every logistics company to measure the effectiveness of a company and also to win competition over others.

TAT when defined by a company has several parameters or stages which are defined individually for every situation/shipment. Generally there are 6 main stages in defining overall TAT these are:-

- First Mile
- Origin Custom Clearance
- Line Haul
- Destination Custom Clearance
- Last Mile
- Final Delivery

1. First Mile

The first mile refers to the movement of products from a retailer/shipper to a courier service or to anyone who will deliver these goods to the final users or to other intermediaries. In this process a shipper places request for pickup shipment/parcel from their store then a logistic company to whom the pickup request is made will reach the shipper's location to pickup the shipment.

Generally, First Mile is done by the logistic company who will be responsible for delivering the shipment to the end consumer. But, now a days, many company/shippers also choose different logistics partner for different operations in logistics so in this case first mile operations will end at airport custom houses (in case of Import/Export) and the further operations will be carried out by other logistics service provider(s) to whom the shipment will be handed over.

Generally, for a normal parcel/shipment the first mile operations are done in a same day of raising pickup request or within 1 day if pickup request rose after the cut-off time.

Illustration: Delhivery Logistics defined pickup request time as 12:00pm, then only those pickup request are fulfilled which are made on or before 12:00 pm. If a shipper places request after 12:00 pm his/her request will be fulfilled in next business day.

First Mile has 2 stages:

- a) **From Shipper's location to Processing center:** This stage deals with fulfilling shipper's pickup request and after collecting all shipments the same are sent to processing center for further processing & movement. It includes sorting the shipments according to their nature, size, destination, etc. In this stage HAWB are generated and assigned to each individual shipment for tracking purposes.
- b) **From Processing Center to CHA:** Once all the shipments are bagged and labeled properly, all the bags are handover to CHA who will be responsible for customs clearance.

2. Origin Customs Clearance

Once the shipment is reached at airport or seaport, it must satisfy all the customs rules & regulations before

it fly for destination city. In India, there are several rules & regulations which are defined by Govt. of India to import or to export goods. If any shipment (goods) doesn't fulfil the rules & regulations of customs it may be returned back to the shipper or will be ceased as the case may be.

It is one of the critical aspect which may hinder the performance of the company and may lead to some extra cost & time which adversely affect the TAT defined by the company. There are some Clearance Houses which are responsible for making shipments cleared from customs and ensure that the shipment is connected to the flight or ship.

Some of the Clearance Houses or Agents are GrandSlam, Navlai, Eagle International, etc. Almost all logistics companies' uses clearance agents for getting shipments cleared from customs successfully and timely.

Generally, customs clearance process takes 1 day and it also depends on type of shipment.

3. Line Haul

After fulfilling all the rules and applicable laws of customs, a shipment is now ready to arrive at destination country. This process includes choosing the appropriate flight, cost & time incurred on sending shipment to destination country, bagged the goods according to their nature, **for example**, all the goods which having battery or some flammable products are bagged separately from those who are non-battery and simple in nature, etc.

In other words, **Line Haul** simply means sending the shipment from origin country to destination country with some optimum combination of several things like choosing airline, timings of airline, cost of sending shipment, usual delays in airline service, etc.

The time taken in this process is totally depends on Airline and Destination Country.

Line Haul has 3 stages:

- a) **From origin's CHA to Airline:** When the shipments are released from customs they are ready to take off to destination country. For this purpose,

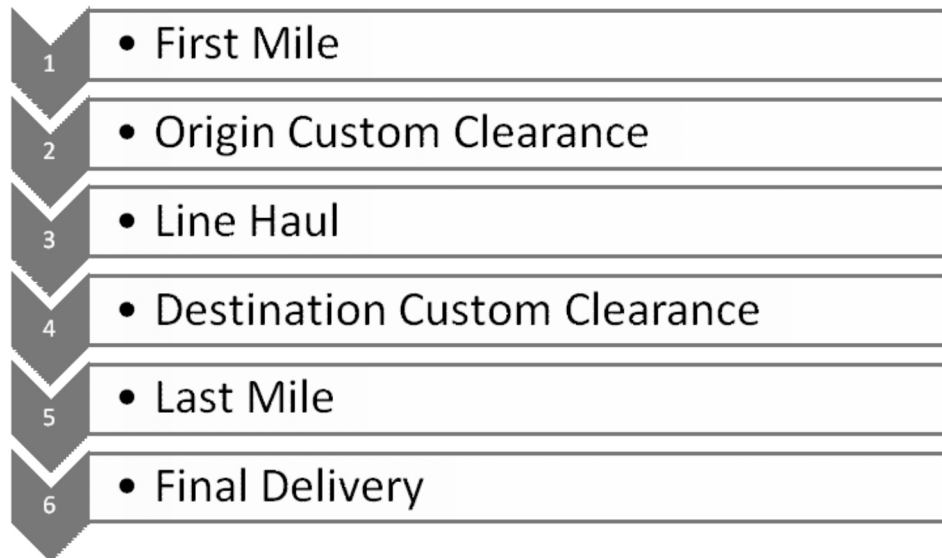
various modes of transportation are used like air, water, road, etc.

- b) **From Airline to Destination Country's processing hub:** Once the shipments are handover to the airline, it will reach destination's country as soon as they take off from origin's country. It include bagging the shipments according to battery shipments and non-battery shipments and retrieval of shipments from airline.

- c) **Handover to CHA:** After retrieving shipments from airline all the shipments are handover to CHA for customs clearance at destination country.

4. Destination Customs Clearance

Once the shipment is arrived at destination country, it has to go under customs clearance process again as every country has its own law & regulations regarding import/export of goods.



Flow Chart shows stages in logistics process

The process is almost same as the “origin customs clearance” here; also there are some clearance agencies which are responsible for getting the shipment cleared from customs timely by adhering to all the rules & regulations of customs.

This process usually takes a day or two depends upon the type of shipment and country's law.

5. Last Mile

When the shipment fulfils all the applicable laws of the destination country then it moves to the next step i.e. Last Mile. In this, a shipment which is now being cleared from customs successfully moves to the final destination or to some processing centre from where all the shipments are delivered to the final customers.

Again, there are some logistics companies which

provide last mile service separately, which means these logistics companies pickup the shipment from the port and delivers it to the ultimate consumer or destination.

This process may takes 1 or 2 day, depending upon the final destination or the consolidation facility.

It includes 2 stages:

- a) **From CHA to consolidation facility (first dispatch):** Shipments after clearing all the customs rules and policies are reached at consolidation facility which is also known as first dispatch.
- b) **From consolidation facility to final dispatch center:** After consolidation facility shipments are sent to final dispatch center which are very near to final destination of shipments.

6. Final Delivery

This is final step, as in this step the shipment is handed over or is delivered to the final customer. This step may be eliminated if in last mile the shipment is



2. Review of Literature

- Christopher emphasised that, ‘Logistics has always been a central and essential feature of all economic activity’.
- Lai et al. (2004) examine the factors that encourage firms in Hong Kong’s logistics industry to implement quality management system to ensure quality in their work processes. A generic ten-step approach for Quality Management system (QMS) has been introduced and discussed the cost and service advantages achieved in the case firm. The approach offers Procedural guidelines for firms in the industry contemplating the implementation of Quality Managements.
- Angappa and Bulent (2006) highlight that Effective Performance measurers and metrics are essential for effectively managing logistics operations in a global economy. For improved organizational competitiveness the managers have to develop suitable performance measurers and metrics to make the right decisions. A question has raised that whether traditional performance measurers can be used and out of them which ones should be given priority for measuring the performance in a new enterprises environment. Some of the traditional measurers and metrics may not be suitable for the new environment wherein many activities are not easily identifiable.
- VonderGracht and LenaDarkow (2010) propose a scenario planning and present the findings of an extensive Delphi-based scenario study on the future of the logistics services industry in the year 2025. The major contribution of this study is the development of probable and unforeseen scenarios

directly delivered to the consumer (in case of b2b).

The shipment is delivered to the end customer on the same day at which shipment is arrived at consolidation facility (processing centre).

of the future which may provide a valuable basis for strategy development in the logistics services industry. The logistics services industry will be significantly affected by future developments throughout the world. Therefore, developing future scenarios is an important basis for long-term strategy development.

- Miguel (2004) indicates performance measurement systems truly applicable in Logistics Management and control. The impact of using performance measurers on management style has been largely neglected. The author sets out to explore this gap using an approach based on Simons’ diagnostic versus interactive modes of control.

3. Objectives

The following are the objectives of the research paper:

1. To understand international supply chain operations (Imports) focused mainly on China – India.
2. To measure service levels for First-Mile, Line-Haul and Custom-Clearance.
3. To identify the discrepancies and shortcomings in various process and in day-to-day business activity and derive a solution for corrective action.
4. To know about what all are the checkpoints of tracking the shipments, to ensure that business is running smoothly and adhere to all rules & regulations of customs.

4. Research Methodology

This study is based on both primary and secondary data. Primary data is collected on real time data

processing at Delhivery Private Limited. While secondary data include books on logistics management and some websites.

5. Research Analysis

For measuring the service standards of Delhivery Private Limited i.e. to measure TAT with actual time taken for delivering the shipment to final destination,

each individual sector was analysed carefully.

Section 1, First Mile

a) From shipper to processing center

This stage starts from shipper’s location and after collecting all the shipments from various shippers all shipments are sent to processing centre for making bags of shipments.

| Bag detail | Pickup location | Pickup date | HAWB |
|------------|------------------------|-------------|------------|
| 5234500008 | shenzhen ordinary shpt | 4-June-2018 | 8112097744 |
| 5234500007 | suzhou ordinary shpt | 3-Jun-2018 | 8112097685 |
| 10029 | dainel | 3-Jun-2018 | 8112097696 |
| 5234500014 | suzhou ordinary shpt | 4-June-2018 | 8113770840 |
| 5234500013 | shenzhen ordinary shpt | 4-June-2018 | 8113770862 |

Table 1: This is a sample of recording and tracking each & every shipment (China – India) for First Mile operations at Delhivery Private Limited.

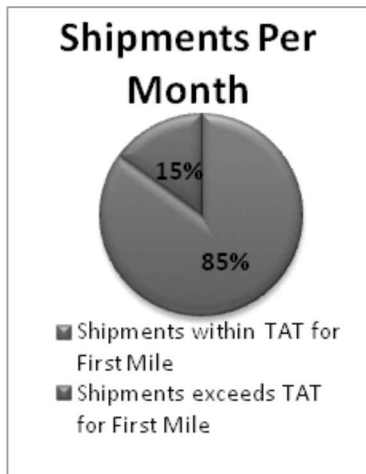
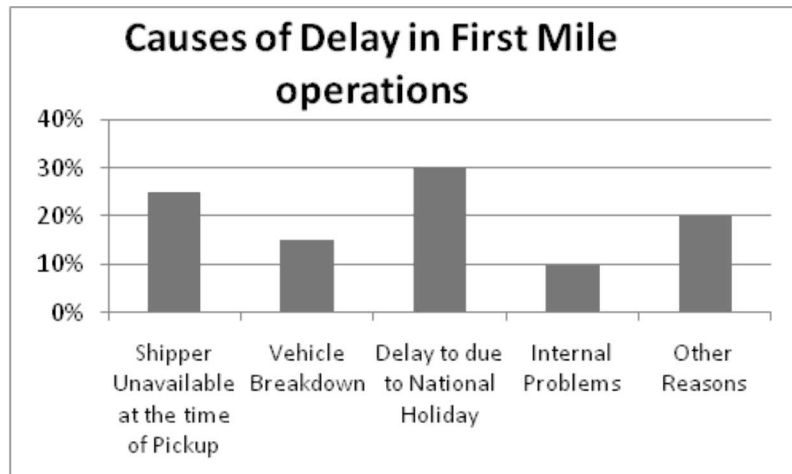


Figure 1: % of Shipments (Per Month) fulfils TAT & % of Shipments that breaches TAT (2018)

Interpretation: From the above facts and figures, only 15% of the total shipments per month breaches TAT and among them most of the shipment breaches TAT because of unforeseen strikes and unavailability of shipper during pickup.



Graph 1: Causes of delay in first mile operations (2018)

b) Processing center to CHA

In this, after receiving all the shipments at processing centre, the shipments are bagged according to their nature, size, country, etc and are handover to CHA for further movement.

| Pickup location | Pickup date | HAWB | Handover to CHA |
|------------------------|-------------|------------|-----------------|
| shanghai battery shpt | 1-June-2018 | 8113770442 | 5-Jun-2018 |
| shenzhen ordinary shpt | 4-June-2018 | 8112097744 | 6-June-2018 |
| suzhou ordinary shpt | 3-Jun-2018 | 8112097685 | 6-June-2018 |
| dainel | 3-Jun-2018 | 8112097696 | 6-June-2018 |
| suzhou ordinary shpt | 4-June-2018 | 8113770840 | 7-Jun-2018 |

Table 2 : This is a sample of recording and tracking each & every shipment (China – India) for First Mile operations at Delhivery Private Limited.

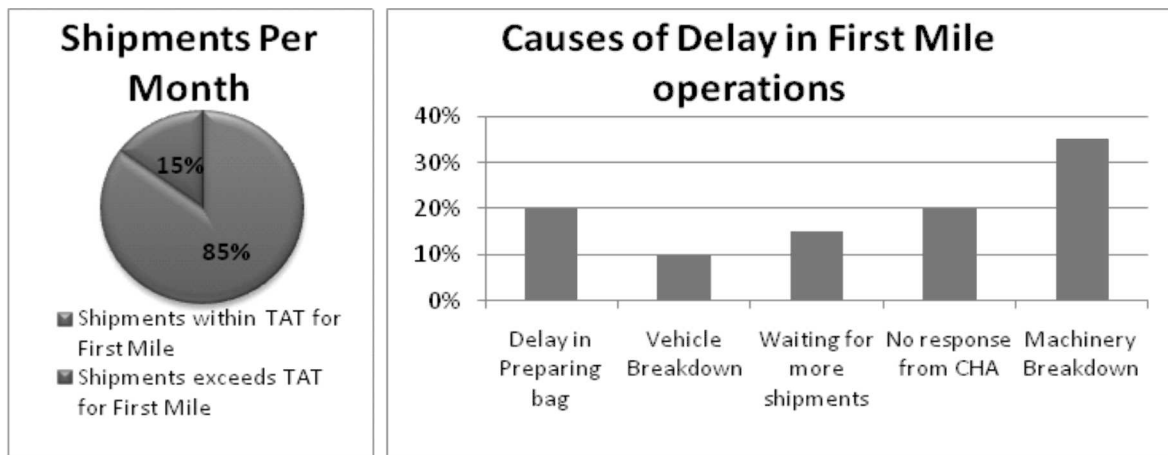


Figure 2: % of Shipments (Per Month) fulfils TAT & % of Shipments that breaches TAT (2018)

Graph 2: Causes of delay in first mile operations (2018)

Interpretation: From the above facts and figures, only 15% of the total shipments per month breaches TAT and among them most of the shipment breaches TAT because of machinery breakdown at processing centre.

Section 2, Origin Customs Clearance

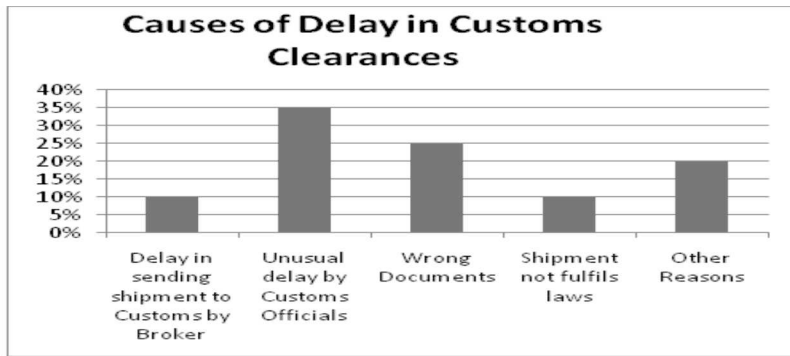
It starts from entering to customs house or handover the shipment to Customs Clearance broker and ends at clearing all applicable rules & laws of customs of Origin Country.

| Shipment sent to Customs house | HAWB No. | Connecting Shipment to Flight for Line Haul | AIRLINE MASTER (MAWB) |
|--------------------------------|------------|---|-----------------------|
| 30 June 2018 | 8113777976 | 2 July 2018 | BOM098-74259382 |
| 30 June 2018 | 8113777965 | 2 July 2018 | BOM098-74259382 |
| 2 July 2018 | 8113778562 | 3 July 2018 | BOM098-74259496 |
| 2 July 2018 | 8113778573 | 3 July 2018 | BOM112050146 |

Table 3: Sample of recording shipments for tracking number of days taken by custom clearance process.



Figure 3: % of shipments fulfils TAT for customs procedure & % of shipments breaches TAT



Graph 3: Causes of delay in Customs Clearance process.

Interpretation: From the above facts & figures, 28% of the total shipment per month not fulfils TAT defined for customs procedures. The main causes were unusual delay by customs officials and attaching wrong documents with the parcel by shipper.

Section 3, Line Haul

It starts from connecting the shipment to the flight which includes bagging the shipments according to their nature (battery & non-battery) and loading the shipment onto the flight and ends at offloading the shipment from the flight at destination country.

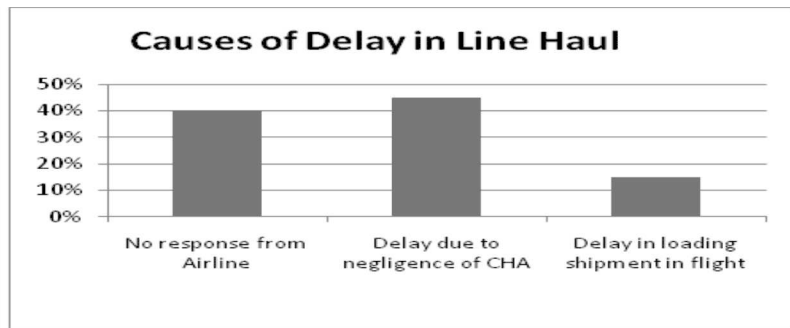
a) From CHA to Airline

| HAWB | Handover to Airline | AIRLINE MASTER (MAWB) | Airline name |
|------------|---------------------|-----------------------|--------------|
| 8113770442 | 5-Jun-2018 | DEL369-7097 5494 | 5Y |
| 8112097744 | 6-June-2018 | BOM111599666 | CX |
| 8112097685 | 6-June-2018 | BOM111599666 | CX |
| 8112097696 | 6-June-2018 | BOM111599666 | CX |
| 8113770840 | 7-Jun-2018 | BOM111599703 | cx |

Table 4: Sample of recording & tracking shipment and flight used for sending shipment to destination country.



Figure 4: % of shipments fulfils TAT for Line Haul & % of shipments breaches TAT for Line Haul



Graph 4: Causes of delay in Line Haul

Interpretation: From above data, only 1% of the total shipments per month breaches TAT defined for Line Haul. The common reason for the same was negligence of CHA & delay in response from Airline.

b) From Airline to Destination Country

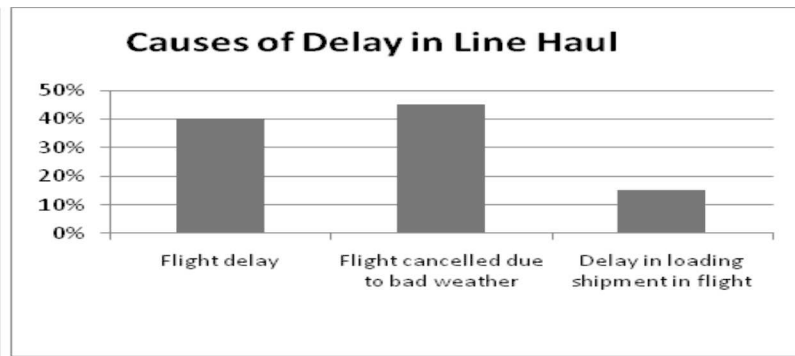
After connecting all shipments to airline, the airline will perform its function and delivers all the shipments to destination country's airport.

| Waybill | Type (Bat/N bat) | Origin | HAWB | India Incoming date & Time |
|---------------|------------------|----------|------------|----------------------------|
| 1852510010393 | Battery | shenzhen | 8111909201 | 5-15-2018 16:21:00 |
| 1852510010404 | Battery | shenzhen | 8111909201 | 5-15-2018 16:21:00 |
| 1852510010426 | Battery | shenzhen | 8111909201 | 5-15-2018 16:26:00 |
| 1852510010430 | NonBattery | suzhou | 8111908976 | 5-18-2018 14:42:00 |
| 1852510010441 | NonBattery | suzhou | 8111908976 | 5-18-2018 14:41:00 |
| 1852510010452 | NonBattery | suzhou | 8111908976 | 5-18-2018 14:42:00 |
| 1852510010463 | NonBattery | suzhou | 8111908976 | 5-18-2018 14:41:00 |

Table 5: Sample of recording & tracking shipment and flight used for sending shipment to destination country (from china to India)



Figure 5: % of shipments fulfils TAT for Line Haul & % of shipments breaches TAT for Line Haul



Graph 5: Causes of delay in Line Haul

Interpretation: From above data, only 1% of the total shipments per month breaches TAT defined for Line Haul. The common reason for the same was bad weather conditions due to which flight may delay.

c) Handover shipments to CHA

Once all the shipments received at destination country, the same are handover to destination country's CHA for further processing and movement.

| HAWB | Received at Destination Country | AIRLINE MASTER (MAWB) | Airline name | LOCATION | CLEARANCE PARTNER |
|------------|---------------------------------|-----------------------|--------------|----------|-------------------|
| 8113777976 | 2 July 2018 | BOM098-74259382 | AI | BOM | GS |
| 8113777965 | 2 July 2018 | BOM098-74259382 | AI | BOM | GS |
| 8113778562 | 3 July 2018 | BOM098-74259496 | AI | BOM | GS |
| 8113778573 | 3 July 2018 | BOM112050146 | CX | BOM | GS |
| 8113777910 | 3 July 2018 | BOM112050146 | CX | BOM | GS |
| 8113777943 | 3 July 2018 | BOM098-74259496 | AI | BOM | GS |

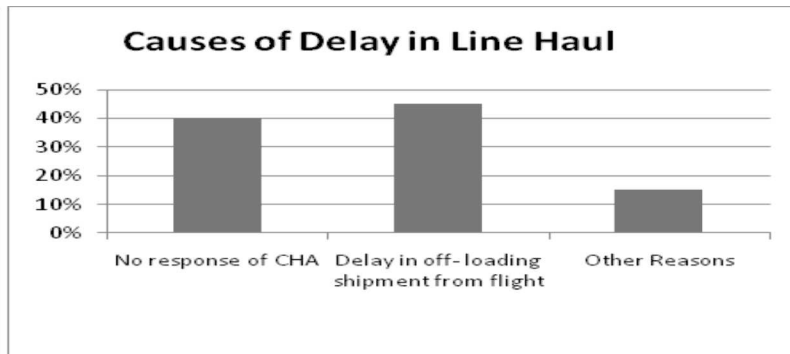
Table 6: Sample of recording & tracking shipment and CHA used for clearing shipment from customs.



Figure 6: % of shipments fulfils TAT for Line Haul & % of shipments breaches TAT for Line Haul

Interpretation: From above data, only 1% of the total shipments per month breaches TAT defined for Line Haul. Delay in off-loading shipments from flight was the main reason for delay in TAT.

Section 4, Destination Customs Clearance



Graph 6: Causes of delay in Line Haul

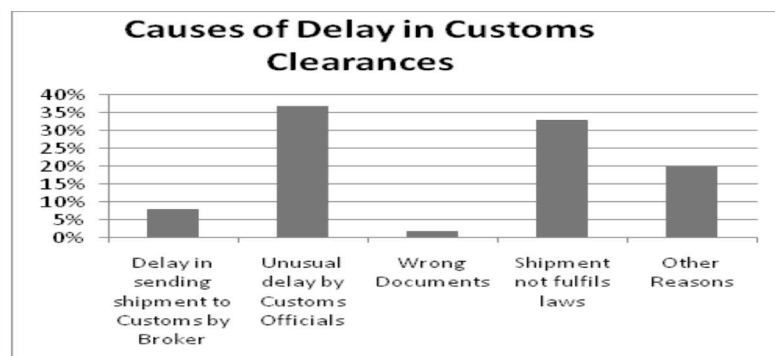
This stage starts from offloading shipment from flight and sending the shipment to the customs houses or broker for clearances. This process is same as the "Origin Customs Clearance" the only difference is changing in laws according to the country.

| Shipment sent to Destination's Customs house | HAWB No. | Shipment cleared from destination's customs |
|--|------------|---|
| 2 July 2018 | 8113778503 | 3 July 2018 |
| 3 July 2018 | 8113778525 | 4 July 2018 |
| 3 July 2018 | 8113778536 | 6 July 2018 |
| 4 July 2018 | 8113778514 | 5 July 2018 |
| 5 July 2018 | 8113778746 | 6 July 2018 |

Table 7: Sample of recording & tracking shipment sent to customs house and their clearance date.



Figure 7: % of shipments fulfils TAT for customs procedure & % of shipments breaches TAT



Graph 7: Causes of delay in Customs Clearance process.

Interpretation: From the above facts & figures, 27% of the total shipment per month not fulfils TAT defined for customs procedures. The main causes were unusual delay by customs officials and shipment not fulfils the laws of destination country.

Section 5, Last Mile

Last Mile starts when the shipment fulfils all laws of customs and now bagged for final delivery or for some consolidation facility of the company.

a) From CHA to consolidation facility (First Dispatch)

| HAWB | India Incoming date & Time | Amount | COD Amount | First dispatch |
|------------|----------------------------|--------|------------|--------------------|
| 8111909201 | 5-15-2018 16:21:00 | 3957 | 3999 | 5-17-2018 10:28:00 |
| 8111909201 | 5-15-2018 16:21:00 | 3212 | 3253 | 5-16-2018 16:50:00 |
| 8111909201 | 5-15-2018 16:26:00 | 1143 | 1184 | 5-16-2018 15:05:00 |
| 8111908976 | 5-18-2018 14:42:00 | 1000 | 1042 | 5-24-2018 11:25:00 |
| 8111908976 | 5-18-2018 14:41:00 | 2188 | 2229 | 5-20-2018 10:06:00 |

Table 8: Sample of recording & tracking shipment’s first dispatch date and time (from China to India)

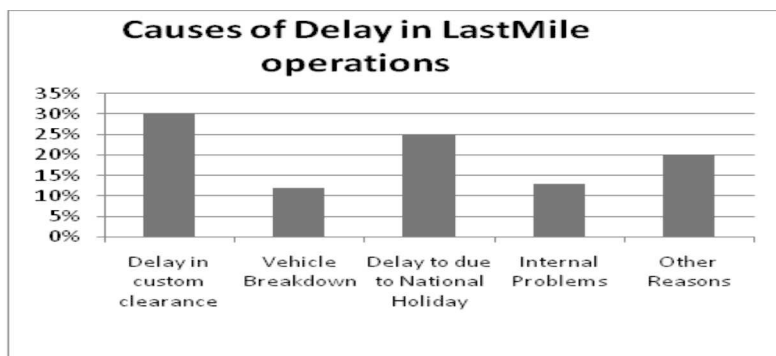


Figure 8: % of Shipments (Per Month) fulfils TAT & % of Shipments that breaches TAT (2018)

Graph 8: Causes of delay in last mile operations (2018)

Interpretation: From the above facts and figures, only 13% of the total shipments per month breaches TAT and among them most of the shipment breaches TAT because of delay in customs clearance and vehicle breakdown.

b) From consolidation facility to final dispatch center

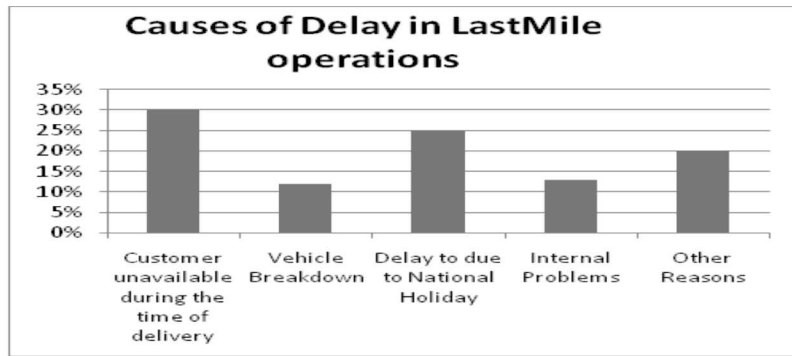
After consolidation facility shipments are sent to final dispatch centre from where shipments are delivered to final customers.

| Waybill | Client location | Current Status | Dispatched | Delivered |
|---------------|-----------------|----------------|------------------|------------------|
| 1852510010393 | LITBxB EXPRESS | Delivered | 17-05-2018 10:28 | 17-05-2018 20:38 |
| 1852510010404 | LITBxB EXPRESS | Delivered | 16-05-2018 16:50 | 16-05-2018 20:26 |
| 1852510010426 | LITBxB EXPRESS | Delivered | 16-05-2018 15:05 | 16-05-2018 16:33 |
| 1852510010430 | LITBxB EXPRESS | RTO | 16-05-2018 15:05 | 16-05-2018 16:33 |
| 1852510010441 | LITBxB EXPRESS | Delivered | 16-05-2018 15:05 | 16-05-2018 16:33 |
| 1852510010452 | LITBxB EXPRESS | RTO | 16-05-2018 15:05 | 16-05-2018 16:33 |

Table 9: Sample of recording & tracking shipments and their status of delivery



Figure 9: % of Shipments (Per Month) fulfils TAT & % of Shipments that breaches TAT (2018)



Graph 9: Causes of delay in last mile operations (2018)

Interpretation: From the above facts and figures, only 13% of the total shipments per month breaches TAT and among them most of the shipment breaches TAT because of unavailability of customer at the time of

delivery and due to unforeseen strikes.

Section 6, Final Delivery

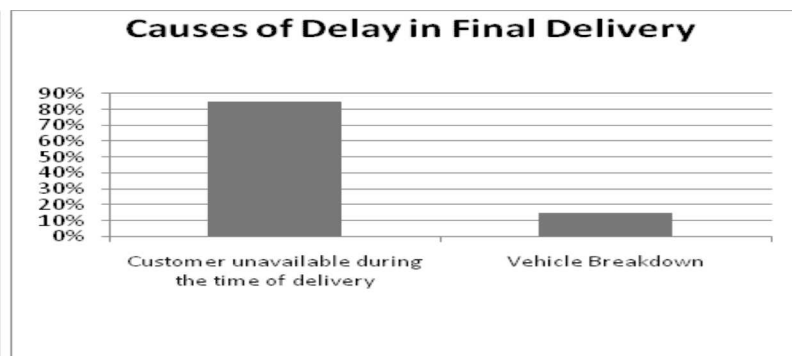
This is last step in logistics, in this step the shipment or parcel handed over to the final consumer.

| HAWB | Delivery Date | Amount | Weight | Waybill |
|------------|--------------------|--------|--------|---------------|
| 8111909204 | 5-15-2018 16:21:00 | 3957 | 1 | 1852510010393 |
| 8111909210 | 5-15-2018 16:21:00 | 3212 | 5 | 1852510010404 |
| 8111909285 | 5-15-2018 16:26:00 | 1143 | 7 | 1852510010426 |
| 8111908976 | 5-18-2018 14:42:00 | 1000 | 12 | 1852510010430 |
| 8111908979 | 5-18-2018 14:41:00 | 2188 | 8 | 1852510010441 |

Table 10: Sample of recording date of delivery of shipment and amount



Figure 10: % of Shipments (Per Month) fulfils TAT & % of Shipments that breaches TAT (2018)



Graph 10: Causes of delay in final delivery (2018)

Interpretation: From the above facts and figures, only 5% of the total shipments per month breaches TAT and among them most of the shipment breaches TAT because of unavailability of customer at the time of delivery.

6. Conclusion

With the expansion of business, whether it is B2B or B2C all requires a good mechanism for delivery of goods to the final destination. For this good mechanism all logistics companies are trying hard to keep TAT minimum and at the same time deliver the goods to the final destination within defined TAT.

However, it has been seen that there are some discrepancies in routine function of logistics which adversely affects the TAT promised to the customer by a logistics company. In order to remove these discrepancies following points should be used to reduce discrepancies in TAT and to increase efficiency in logistics:

1. **Identify all Checkpoints:** While defining TAT for a particular shipment, there is a need to identify all the major & minor checkpoints that may take some more time for clearing shipment and for further movement.
2. **Redefine SOP:** SOP i.e. Standard Operating

Procedures, should be redefined time to time with latest updates in market which may affect the performance of logistics. This ensures that the entire team is moving the right wheel at the right time.

3. **Proper training of team:** It is necessary to train the entire team and to familiarize team with all exceptions that may occur in defining TAT for a shipment. They should know how to define each single element effectively and to minimise the TAT wherever possible.
4. **Proper Trackers:** This is a big problem with business as not everyone has trackers to track the shipments at all stages. Proper trackers should be maintained and continuous tracking is required to highlight the discrepancies and for taking corrective actions timely.
5. **Benchmarking:** Benchmarking is one of the best methods for start-ups to set their standards according to the companies which are already succeeding in the same industry. Benchmarking is a metric that measures how a company's distribution network performs in terms of quality, value and time in the same industry. Benchmarking is used to identify best practices and gives management the ability to measure and compare metrics to other organizations.

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- <https://www.marketing91.com/logistics-activities>

Books:

- An Introduction to Supply Chain Management-Palgrave Macmillan (2003) - Donald Waters
- Logistics and Supply Chain Management – Martin Christopher

An Optimal Solution to an Assignment Problem Using Zero Neighbouring Method

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Abstract

Assignment problem is a type of optimization problem which deals with allocation of different resources to different activities on one-to-one basis. It has a lot of relevance in practical life as many real world problems are formulated in the form of an assignment problem. In this research paper, a different approach (other than the existing methods in literature) for solving an assignment problem has been introduced along with the algorithm and numerical example.

Key Words: Assignment problem, Zero neighbouring method, Hungarian Algorithm, Optimization.

1. Introduction

A major challenge faced today by business organizations is that of allocation of resources that can be put to different uses. Every individual does not have the same ability to perform a given job. Different persons have different abilities to execute the same task and these different capabilities are expressed in terms of cost/profit/time involved in executing a given job. Therefore, the need arises to work on the constraints of assigning different workers to different jobs so that the cost of performing such jobs is minimized thereby providing more outcome with the resources available than just reacting to the demands of the moment.

The assignment problem is a type of optimization problem that deals with the assignment of different tasks to different workers with an objective to minimize the cost of assigning the task. It is a special type of transportation problem wherein the supply at each origin is one unit and the demand at each destination is one unit.

Various methods have been developed to find an optimal solution to the assignment problem. Dantzig [1] formulated the assignment problem as a linear programming problem and solved it using simplex method. Kuhn [2] proposed a method, popularly known as the Hungarian method, of solving an assignment problem. Later on, numerous methods

were proposed for solving an assignment problem (see [4]-[9]).

Thiagarajan, K., et al. [5] proposed a Zero Neighbouring method to find an optimal solution to a Transportation problem. In this paper, we have used Zero Neighbouring method to find an optimal solution to an assignment problem. This method is easy to understand and use. Also it helps in finding an optimal solution to an assignment problem in limited number of iterations.

The rest of the paper is organized as follows. Section 2 presents the mathematical formulation of Assignment problem. Section 3 shows the steps of Zero Neighbouring method. In section 4, a numerical example is solved using the steps of zero-neighbouring algorithm and the results are compared with the Hungarian Method. The conclusion is presented in Section 5.

2. Mathematical Formulation of Assignment Problem

Let there be n tasks that are to be performed by n workers so that one job is assigned to only one worker and define

$$x_{ij} = \begin{cases} 1, & \text{if worker } i \text{ is assigned job } j \\ 0, & \text{otherwise} \end{cases}$$

Then the mathematical formulation of the assignment problem is

$$\text{Minimize } z = \sum_{i=1}^n \sum_{j=1}^n c_{ij} x_{ij}$$

subject to

$$\sum_{j=1}^n x_{ij} = 1 \quad , i = 1, 2, \dots, n.$$

$$\sum_{i=1}^n x_{ij} = 1 \quad , j = 1, 2, \dots, n.$$

$$x_{ij} = 0 \text{ or } 1$$

where c_{ij} is the cost of assigning worker i to job j .

3. Algorithm of Zero Neighbouring Method

Consider a balanced assignment problem with n rows and n columns. The steps of Zero Neighbouring method are as follows:

1. Select the minimum element from each row and subtract it from all the elements of the corresponding row.
2. Select the minimum element from each column and subtract it from all the elements of the corresponding column.
3. Now each row and each column has at least one zero. In the reduced matrix, corresponding to each zero, find s_{ij} where
 s_{ij} = average of all the costs in the cells adjacent to zeros
4. Select the cell with highest value of s_{ij} . If there is a tie in the value of s_{ij} , break the ties arbitrarily. Assign i^{th} person to j^{th} job.
5. Delete i^{th} row and j^{th} column. The resultant matrix must possess at least one zero in each row as well as in each column, else repeat steps 1 and 2.
6. Repeat steps 3 to 5 until all the persons are assigned a job.

4. Numerical Example

Illustration 1. Consider the following problem of assigning four tasks W,X,Y,Z to four workers A,B,C,D. The cost (in thousand rupees) of performing each job by each worker is given in the table below.

| | W | X | Y | Z |
|---|----|----|----|----|
| A | 7 | 9 | 8 | 13 |
| B | 16 | 16 | 15 | 11 |
| C | 16 | 19 | 10 | 15 |
| D | 16 | 17 | 14 | 6 |

4.1. Optimal solution by Zero-Neighbouring method

After using step 1 and 2 of the algorithm on Illustration 1, the following matrix/table is obtained

| | W | X | Y | Z |
|---|---|---|---|---|
| A | 0 | 0 | 2 | 5 |
| B | 5 | 3 | 5 | 0 |
| C | 5 | 6 | 0 | 4 |
| D | 2 | 1 | 0 | 2 |

Applying Step 3 and calculating the suffix, s_{ij} , corresponding to each zero, the resultant matrix/table is

| | W | X | Y | Z |
|---|-------------------|-------------------|-----------------|-----------------|
| A | 0 _{2,5}} | 0 _{1,3}} | 1 | 6 |
| B | 5 | 3 | 4 | 0 _{5}} |
| C | 6 | 7 | 0 _{4}} | 5 |
| D | 2 | 1 | 0 _{1}} | 2 |

From all the s_{ij} 's obtained, the maximum value of s_{ij} is corresponding to the cell (B,Z). Therefore, worker B is assigned job Z. Eliminating the row corresponding to B and column corresponding to Z, the resulting matrix/table is

| | W | X | Y |
|---|---|---|---|
| A | 0 | 0 | 1 |
| C | 6 | 7 | 0 |
| D | 2 | 1 | 0 |

As each row and each column has at least one zero, finding s_{ij} 's corresponding to zeros, we have

| | W | X | Y |
|---|----------------|------------------|------------------|
| A | 0 ₃ | 0 _{2,7} | 1 |
| C | 6 | 7 | 0 _{2,7} |
| D | 2 | 1 | 0 _{0,5} |

From among the s_{ij} 's obtained, the maximum s_{ij} is corresponding to the cell (A,W). Therefore, worker A is assigned job W. Eliminating the row corresponding to A and column corresponding to W, the resulting matrix/table is

| | X | Y |
|---|---|---|
| C | 7 | 0 |
| D | 1 | 0 |

As the first column does not have a zero, using step 2 of the algorithm we get the following matrix/table,

| | X | Y |
|---|---|---|
| C | 6 | 0 |
| D | 0 | 0 |

Using Step 3 of the algorithm the s_{ij} 's corresponding to zeros are

| | X | Y |
|---|----------------|----------------|
| C | 6 | 0 ₃ |
| D | 0 ₃ | 0 ₀ |

As there is a tie between the maximum value of s_{ij} 's, so using Step 4 of the algorithm we arbitrarily select cell (C,Y) i.e. worker C is assigned Job Y. As after eliminating the row corresponding to C and column corresponding to Y, we are left with only one cell i.e. (D,X), therefore, worker D is assigned job X.

Thus, the Zero Neighbouring method gives the following assignment :

| Worker | Job | Cost (in thousand rupees) |
|------------------------|-----|---------------------------|
| A | W | 7 |
| B | Z | 11 |
| C | Y | 10 |
| D | X | 17 |
| Total Cost = Rs. 45000 | | |

4.2. Optimal Solution by Hungarian Algorithm

After using row and column reduction on Illustration 1, the matrix/table obtained is

| | W | X | Y | Z |
|---|---|---|---|---|
| A | 0 | 0 | 2 | 5 |
| B | 5 | 3 | 5 | 0 |
| C | 5 | 6 | 0 | 4 |
| D | 2 | 1 | 0 | 2 |

Making the initial assignment, we have

| | W | X | Y | Z |
|---|---|---|---|---|
| A | 0 | 0 | 2 | 5 |
| B | 5 | 3 | 5 | 0 |
| C | 5 | 6 | 0 | 4 |
| D | 2 | 1 | 0 | 2 |

As worker D has not been assigned any job, so the solution is not optimal. Drawing the minimum number of lines to cover all zeros, we have

| | W | X | Y | Z |
|---|---|---|---|---|
| A | 0 | 0 | 2 | 5 |
| B | 5 | 3 | 5 | 0 |
| C | 5 | 6 | 0 | 4 |
| D | 2 | 1 | 0 | 2 |

As the number of lines are less than the order of the matrix so we will select minimum element from the uncovered elements and subtract it from all the uncovered elements and add it to the elements that are at the intersection of two line. Thus, the revised matrix/table is

| | W | X | Y | Z |
|---|---|---|---|---|
| A | 0 | 0 | 3 | 5 |
| B | 5 | 3 | 6 | 0 |
| C | 4 | 5 | 0 | 3 |
| D | 1 | 0 | 0 | 1 |

Doing the assignment in the above matrix/table, we have

| | W | X | Y | Z |
|---|---|--------------|--------------|---|
| A | 0 | 8 | 3 | 5 |
| B | 5 | 3 | 6 | 0 |
| C | 4 | 5 | 0 | 3 |
| D | 1 | 0 | 8 | 1 |

As the number of assignments are equal to the order of the matrix and in each row as well as each column there is one and only one assignment so an optimal solution to the given problem has been attained. The optimal assignment along with the optimal cost is:

| Worker | Job | Cost (in thousand rupees) |
|------------------------|-----|---------------------------|
| A | W | 7 |
| B | Z | 11 |
| C | Y | 10 |
| D | X | 17 |
| Total Cost = Rs. 45000 | | |

5. Conclusion

The application of Zero Neighbouring method to solve an assignment problem is discussed in this paper. This approach is simple to understand and easy to use. In certain cases, it has been observed that zero-neighbouring method obtains an optimal solution in a fewer number of steps as compared to Hungarian Algorithm. A numerical example is solved using Zero-Neighbouring method to show its efficacy. Also the optimal solution obtained by this method is compared with the optimal solution obtained by Hungarian Algorithm to show its validity.

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