Chetana's

Institute of Management & Research

Journal of Management Research

Chetana's

Institute of Management & Research

Volume IX, Issue 12   **Decmber 2017**

Journal of Management Research

Editorial…..

CIMR has great pleasure to publish the Journal of Management Research (ISSN 0976-0628), December 2017 issue. This edition of our journal is focused on Business Analytics and its application in different fields of management.

Data Analytics has been around for a long time. However, recent developments in technology have brought it to the next level. In today's business environment data comes from many different sources (e.g. social media, mobile devices), in many different formats (e.g. text, pictures), and with much higher frequency than in the past (e.g. orders and trades in stock markets around the world are recorded at a micro-second level). Consequently, the volume of data collected, processed and stored by organizations has been growing exponentially (i.e. Big Data), and new analytics and data management techniques have been developed in order to handle and extract intelligence from such large volume of information.

In such a context it is important for researchers, students and practitioners to come together to share the most recent developments in analytics. This special edition has encouraged researchers, faculty and students to come up with original research which contributes significantly to the knowledge and application of analytics to Marketing, Finance, Human Resource, Operations and Society.

A good number of research papers and working papers were received for publication and we appreciate every author personally for their contribution to research in Business Analytics in Management Functions. The current issue of the journal has papers comprehended from all streams of management making it an interesting reading.

Here is a snapshot of the articles included in the journal;

Data Analytics for Sales Team Management: A study of the usefulness of data analytics for appraisal of individual performance in a sales team.

Getting ready to usher Analytics: The HR Way- an insight on the alchemy of HR functions and the ways to manage the vexing challenges faced in analytics

Role of People Analytics for Employee Retention: A qualitative study- Transforming "gut feeling" decision making to data driven decision making to data driven decision making for employee retention.

A Study of Training Need Analysis in Operations Department, HPCL-HR Analytics Perspective- a study to identify the core and important competencies of every job through analytics

The language of wine- An analytical study of wine knowledge of women wine consumers in the city of Mumbai focuses on understanding of women wine consumers.

This edition of the research journal also has a series of working papers by students and faculty guides, as follows:

Using Analytics to study the impact of News Items on Stock Market- forecasting the impact of news on different categories of news articles in the stock market

Big Data Analytics in Supply Chain Management, a case base study

Bartering Privacy-, studying the major issues of data sharing, privacy and discrimination.

Application of Big Data in Management Education- Helping teachers and students to make more focused choices in the sector of education.

The articles in this edition are spread across application of Business Analytics on Marketing & Sales, Finance, Supply Chain, HR and Education. The writers and researchers have put in their best efforts to convey the application of data analytics in different fields.

We sincerely thank all the writers and supporters for their whole- hearted support and seek to have the continued support in our research endeavor.

— **Editor**

Dr. Nandita Mishra

CONTENTS

.

Chetana's
Institute of Management & Research

Data Analytics for Sales Team Management

* **Mr. Shirish Moghe**
** **Prof. Rashmi Kanitkar**

Abstract
Data analytics is a process of analyzing data for drawing conclusions about the information they contain. These conclusions help to plan workable solutions to obtain the desired output. In short, it is a tool which helps to generate a picture of given aspect of the management function.

The present research paper studies the usefulness & support of data analytics for appraisal of the individual performance of sales team members. The role of data analytics is studied with the help of two case studies based on real-life experience. The results show how data analytics can help in understanding the root cause / causes of the problems & impacted performance of each team member ; which can be used for improving team performance as well as for taking decisions about new recruitment.

Keywords: Data analytics, team, Performance

INTRODUCTION

Big Data & Data Analytics
According to **Gartner,** the definition of **Big Data** reads, "Big data is high-volume and high-velocity and/or high-variety information assets that demand cost-effective, innovative forms of information processing that enable enhanced insight, decision-making, and process automation." Big Data analytics find insights that help organizations make better business decisions.

Data Analytics is the science of examining raw data with the purpose of finding patterns and drawing conclusions about that information by applying an algorithmic or mechanical process to derive insights.(12)

Big data analytics is the application of data analysis methods and techniques to big data. There are three types of analysis: descriptive, predictive, and prescriptive. Descriptive analysis provides a summary of what happened in the past. The predictive analysis predicts future behaviors and facts to support decision-making based on information about the past. Finally, prescriptive analysis prescribes

* (Head –Front End Manager Monitoring-All India – GSK Pharma Ltd.) &
** Chetana's R K Institute of Management & Research

future actions (10)

Strategic Role of Sales Function

The strategic decisions taken at the corporate, business levels are translated into sales strategies. These strategies set the direction for sales management activities. Rather these sales strategies are implemented by the sales team. Hence the performance management of sales team is a crucial function for the achievement of corporate goals.

Role of Data Analytics in Sales Team Management Data analysis can play an important role to improve companies' performance, to support decision-making, and to minimize the risks. Using the term analytics can motivate companies to apply more sophisticated mathematic and statistical tools to solve business problems (10)

Sales managers are always interested in the activities of their sales reps. Analytics can help them to get a total grasp of not only what these reps are doing but also on how efficiently they are performing. Managers can track the sales call activities, conversion ratios and can also gauge profitability trend of each team member. The records can also point out neglected areas.

Data Analytics and Performance Management

Today's performance decides tomorrow's outcome. Hence it is imperative to measure and interpret the performance of all functions of an organization from time to time.

To interpret the performance it is necessary to define the "bench mark" performance for each activity. To measure the individual performance management defines relevant **KPIs - Key Performance Indicators.(8)**

Key Performance is those acts which are essential for the successes of the specific managerial function. For example for sales function the KPs can be sales calls, selling expense ratio, territorial net profit or gross margin ratio etc.

The Indicator is the one which provides leading information about resultant performance for which those acts are carried out e.g. No of sales calls made, the selling expense ratio etc.

KPI's provide well-defined objectives and helps to make activities more purposeful. They also provide visibility into a current activity that will impact final productivity.

Usually, a continuous measurement and evaluation of performance on predefined KPIs are done to check any deviation. This process is termed as Four Step Processor "Management Cycle"

Four Step Process

The Four Steps are as follows
1. Establishing performance standards
2. Recording Performances (Collecting the Data)
3. Evaluating performances against standards (Analysing the Data)
4. Taking Action (to check deviations)

These four steps constitute what is known as control.

Control has both static and dynamic facets. The first three steps are static. They enable the management to measure progress towards achieving department objectives. To make the contribution of these three steps meaningful the implementation of fourth step (Action) is necessary.

Each company selects the combination of quantitative performance standards of KPIs that fits it's marketing situation and selling objectives.

Wikipedia (9) states that there are various types of KPIs. It is the **leading indicators** that predict the outcome of a process. These indicators identify the gaps and indicate the various action areas like training, counseling etc. Leading indicators include activities like –

- How many calls is a sales maker making per week?
- Who is the sales maker calling on
- How many of these calls turned into wins

The sales management team collects the data (Measure) analyze the same (Measurement) and evaluate the same against a benchmark.(7). This complete process indicates whether the sales team is performing as expected or has it reversed or diverged.

LITERATURE REVIEW

According to Davenport, Harris & Shapiro Leading-edge companies are increasingly adopting sophisticated methods of analyzing employee data to enhance their competitive advantage (1). Harrah's entertainment has extended employee analytics for people's decision. They have used insights derived from data to put the right employees in the right jobs and creating models that calculate the optimal number of staff members to deal with customers at the front desk and other service points.

Jennifer Polk, research director, Gartner for Marketers and conference chair for the Gartner Digital Marketing Conference, discussed how data and analytics are empowering marketers and fueling customer-centric marketing programs that deliver business results (13). According to her Marketers do not need to be data scientists. However, they should know how to use data to plan, execute and measure marketing efforts,

An Article Titled "How Sales Analytics Is Useful For Your Sales Team" in Tenfold Sales Blog States – (14)
Sales data analysis provides you with the information you need for setting long- and short-term goals that are clear-cut, measurable and timely. Because it is data-driven, your team will see your goals as something they can achieve. It gives them something they can focus on and measure themselves against.

Sales analytics provides you with the best insight into your team's performance, and what works and what doesn't.Sales analytics is a way to make several aspects of your sales processes and data visible to your team members, such as the number of calls, new accounts, and sales value. This can be used as a basis in "gamifying" your team's sales efforts.

With performance metrics visible and accessible, your team members know exactly where they stand. They know how far they've gone to achieve sales goals.It makes a huge difference when you provide your mobile workforce with real-time access to up-to-date information and performance metrics. They don't suffer from information lapses that might cost them a sale or waste their time on bad visits.

The present study affirms the importance of the role of analytics in the management of sales team. The study is based on a case study of an organization which has used data analysis to understand pain areas of a sales team.

OBJECTIVE OF THE STUDY

To Study usefulness of Data Analytics in Sales Team Management

RESEARCH METHODOLOGY

Any live data is a prerogative of an organization. The use actual sales data and its analysis helps the management in making strategic, managerial as well as executive decisions, these decisions give a competitive edge to an organization. Hence revelation of such confidential information is avoided in the research paper. Dummy data sets have been created based on the real-time sales observations at various places in central India.

To understand the role of Data Analysis in managerial decisions; case study method has been used in the study.

The analysis of the data in the case study shall help to understand the role of Data & Data analytics in "understanding the performance" of team members as well as of team leader.

Explanation of a few Terms in Case Study
Budget – Target

Power Brand – Those brands which earn more profit to the company. These are also lead brands in their product category

CME -   Continuous Medical education
OPD Camps - Out Door Patient Camps (To be conducted in Hospitals)

ANALYSIS OF THE DATA

CASE STUDY

Challenges for Philip

Having a successful Track Record for 4 Years Philip was promoted to First Line Sales Manager during early 2011. In the history of Magnum Pharmaceuticals, he was the youngest promotee and Philip was proud of it. Being methodical Philips was quite serious in working in a discipline and had a lot of control measures. But initial 3 months performance was not even 75% . Realizing that too much of the controls are affecting the performance, Philips let all his subordinates work as per their old system and then there was a complete turnaround. The performance was much more than expectations. However, last 6 months were the worst months for Philips. Sanjay, his Seconds Line Sales Manager has called him for a meeting as the performance was worst and. Each month Philips promised performance but the outcome was always bad. After 3 days Sanjay planned to meet Philips and is expected to give recovery plans for the remaining 9 months of the year 2015.

Table 1 - Sales Record of Philips.

Year	Total Target / yy Budget (in Cr.)	Sales% Perf.	% Growth
2011	1.20	106	12
2012	1.38	90	-2
2013	1.30	88	-8
2014	1.10	90	-13
2015	1.20		

Philips handles 10 brands out of which 4 Brands are power brands. The details of those 4 Power Brands and 6 Other Brands given below.

Table 2: Sales Performance of Brands

Year	Power Brand's Budgeted Contribution to Total Budget	Power Brand Performance	Other Brands' Contribution to Total Sales
2011	65%	78.2%	53%
2012	66%	70%	49%
2013	64%	55%	60%
2014	58%	57%	63%
2015	60%		

Philips has 6 Business Associates reporting to him. Their 2014 performance details are as below.

Table 3: Region and Team wise Performance Record of Sales

Name	HQ	Experience	Total Rs. Performance	Power Brands' Performance to PBs' Budget
Vipul Sinha	Delhi	10 years	100%	50%
Dinesh Singh	Delhi	11 months	100%	50%
Neha Kakkar	Chandigarh	6 years	82%	58%
Sanjay Narula	Chandigarh	2 year	82%	58%
R S Rathod	Patiala	8 years	90%	78%
Kaushal Kapoor	Jalandhar	6 months	75%	50%

While preparing for his review, Philip plotted his Team's activity details as below,

Table 4: Sales Activity Details of Each Team Member

Name	HQ	Dr. Call Average (Co. expectation 11)					CME's	OPD Camps
		2011	2012	2013	2014	2015 for 3 months		
Vipul Sinha	Delhi	11.2	10.9	10.6	10.6	10.5	1	1
Dinesh Singh	Delhi				11.1	11.0	2	1
Neha Kakkar	Chandigarh	11.1	11	10	10	10.8	1	3
Sanjay Narula	Chandigarh			11.1	11	11	0	1
R S Rathod	Patiala	11.3	10.8	10.5	10.8	10.6	1	4
Kaushal Kapoor	Jalandhar					11.5	0	1

Other Facts

Philip's Analysis for last 6 months about the territories

- Delhi is an institutional business-driven market and almost 70% of business comes from AFMSD, ESIS, & Government Medical College,

- Chandigarh has large dependencies on corporate hospitals with some big Key accounts in private practice
- Patiala is performing territory for last 4 years with strong equity in trade
- Jalandhar has few corporate hospitals and institutional business from Army, ESIs, and Railways

● Kaushal, Business Associate based at Jalandhar is basically from Delhi and this is his first posting.

Before meeting Sanjay, Philip planned to conduct a review of his team and assess the present opportunities and challenges.

During his Team Meet, following points were raises by his team for his nonperformance.
1. Huge expiries of Power Brands from Delhi.
2. Only 3/4 Power brands availability since 2013
3. Inadequate samples inputs for OPD camps
4. Doctors not giving adequate time
5. Key accounts becoming more demanding.
6. Jalandhar and Chandigarh rate contract expired for other 4 brands in March 2015.
7. Kaushal wants to go back to his hometown.
8. Philip, listening to these issues got perturbed but he wants to enable his team to perform.

CASE ANALYSIS

Part I Top to Bottom Performance Analysis – Data Analysis of Sales Activity

KPI in this table are the budgeted sales

Analysis of (Table 1) **Sales Record of Philips the Manager (This means the performance of his team)**

The table shows –
In the Year 2011 – Sales Target of Mr. Philips was 1.20 Crore INR. He did 106% performance (Total sale made by Team 1.272 Lakhs).Showed 12% growth compared to his last year performance.

In the Year 2012 – Sales Target of the team was 1.38 Crore INR. The team did 90% performance.

That means the team did Sale of INR 1.242 Cr. 2% negative growth compared to earlier year's performance

In the Year 2013– Sales Target gave to the team was1.30 Cr. INR. The team achieved 88% of the target (INR1.144Cr. INR) 8% decline in performance compared to the year 2012 sales performance

In the Year 2014 – Sales Target given to the team was 1.10Cr. INR. The team achieved 90% of the target (INR 99 Lakhs) which is 13% decline in performance compared to the year 2013

The additional facts state that one power brand was not available for sale since 2013

Conclusion - The above analysis indicates that there is a continuous decline in performance of Philips (Total Performance of his team)

Due to lack of performance the company has also reduced the budgeted (target) sales given to the team. Considering that from 2013, the company has removed one power brand from the market; the company has reduced the budgeted (target) of the team. The budgeted (targeted) sales Of the team (1.10 Cr. INR) is even less than the earlier year's performance of the team (1.144 Cr. INR)

Again in the year 2015, the company has increased the budgeted (targeted) sale of the team than team sales performance of 2014. The thinking behind this is the team has got a window of one year to put in the efforts to jack up the sales performance of other power brands and non power brands and these efforts should now reflect in the performance of the team.

1. Analysis of Sales Record of 10 Brands handled by Philip. (Table 2)

Out of 10 brands, 4 are power brands
KPIs in this table is the target for sale of power brands.

A. Sales value performance of power brands is continuously decreasing from the year 2011-2013. In the year 2014 the percentage performance has increased marginally (from 55% to 57%) but in reality, the performance in value sales has decreased from INR 46 Lakhs to INR 36 Lakhs.

In 2011-The total Target of the team was 1.20 cr. INR
The expected contribution of power brands was 65% of the target i.e. INR
78 Lakhs. The team's performance on power brand was approx.INR 61 Lakhs

Conclusion - The above-mentioned facts indicate that the team had started faltering in it's performance of sales from the very first year that is from the year 2011. This was the outcome of team management style of Mr. Philip.

The decline in sales of power brand was compensated by the sale of other brands in 2011 but the sales took a deep dive in the subsequent year (2012). This was again the result of team management style of Mr. Philip.

Analysis of (Table 3 & 4) **details of individual team members' performance for the year 2014**.

KPIs in this data is the average individual sales calls as well as achievement of overall targets and of targets of power brands.Table 3 refers to the performance of 6 business associates of Mr. Philip.

Table 4 gives sales activity details of each team member.

Delhi Region has two personnel. Out of which Mr. Vipul is the oldest member of Mr. Philips Team; whereas Mr. Dinesh is a comparatively young player (11 months experience). Between both of them, although they have done 100% sales performance, the performance of power brand is only 50% compared to the expected performance of 58%. There could be two possible reasons for the decline in performance of power brands. One the removal of one power brand from the market by the company and the other is the sales activity of team members.The additional facts of the case show "Huge Expiries of power brands from Delhi". The call history of both team members over the years show that there is a decline in call average.

Conclusion - None of the team members has apparently taken extra efforts to compensate the absence of power brands by increasing CMEs of OPD camps.Return of power brands indicates that the trade is ordering the power brands but the doctors are not prescribing the same. Hence there is an unsold stock of power brands in the market. This again indicates lack of effective call performance of Delhi Team.

Chandigarh Region has two personnel. Between two of them, they have 8 years consolidated experience. The overall performance of the team is 82%. The performance of the power brands is as per the benchmark set for the year. The call average of old team member Neha has decreased substantially over the years. The call rate of other member is also on the decline.Other facts inform us that Chandigarh market is dependent on corporate hospitals. This can be translated as that Chandigarh is a quality product market. Hence the team would have ben-

efitted with more number of CME calls. Further Chandigarh team could not renew its rate contract for the year 2015-16.

Conclusion – The drop in calls, failure in the renewal of rate contract reflects on the quality of sales calls and lax attitude of the team.

Patiala Region has one sales personnel with 8 years of experience. He has performed little less than given target (90%), His sale of Power brands (78%) is above the benchmark. There is a slight drop in his call average (10.8)

The other facts say that Patiala is a performing territory.

Conclusion – Although Patiala is a performing territory with extra efforts on CMEs it would have not only achieved the target but could have exceeded the same and could have earned the additional incentives.

Jalandhar Region has a very new personnel (6 months old). Compared to his tenure his Call rate is good. His performance is 75% although his power brand performance should have been better (Only 50%). He needs improvement CME performance. Other facts show that Jalandhar is more of an institutional sales market. To develop such market the company needs a long-term relationship to be built over the period. Whereas Mr. Kaushal is asking for a transfer within 6 months of his tenure with the company.

Conclusion – Mr. Kaushal has to substantiate his performance to become eligible for transfer & also has to improve his performance in next 9 months.

Part II – Use of results obtained from Data analysis – Bottom to Top Strategy

This part includes designing of Action Plan and designing of objectives & Strategies for Sales Team Members

The analysis in part I indicates –
Delhi region team needs "Pulling up" strategy as they are faltering on each aspect.

Chandigarh Team needs to be told to and ask to plan for the sale they have lost due to non- renewal of rate contract.

Patiala team has to be motivated to excel their performance

Jalandhar salesperson has to be told that he cannot get the transfer unless he proves himself and prepares the replacement

Mr. Philips should also implement the strategy of periodical review to take necessary action if any members slip in performance

Conclusion – The analysis of above case study shows the role of data and data analysis in sales team management.In the above case data analysis helped.

In identifying areas of problems - decline in performance of Philips. **It also shows strategies and thinking of the company** – In the year 2014 company reduced the target of the team as one power brand has been removed from the market. After giving one year's window to adjust to this change the company has increased the target of the team for the year 2015.

In identifying nature of the problem of each team member –

Vipul & Dinesh –Delhi Region – Drop in sales

calls, no extra efforts taken to make up for the absence of power brand

Neha & Sanjay – Chandigarh – Drop in quantity & quality of calls along with the lax attitude

Rathod –Patiala – Performance is satisfactory but has potential to perform better.Kapoor – Jalandhar – Performance not bad but has unreasonable expectations from the organization

Way Forward:-
Identification of individual problems also helps in identifying a course of action - like a penalty, counseling, motivation etc. required to manage each team member.Role of data analytics ends at this point and the art of management comes into the picture. In case of Mr. Philips data analysis informs him what improvement is required for each team member. How to make each one of them perform is the management skill of the manager.

BIBLIOGRAPHY

1. Devenport T.H, Harris J & Shapiro J. (HBR October 2010 issue). Competing on Talent Analytics Retrieved from https://hbr.org/2010/10/competing-on-talent-analytics

2. Bersin J. (www.forbes.comFeb.17,2013) Big Data in Human Resources: Talent Analytics (People Analytics) Comes of Age. Retrieved from https://www.forbes.com/sites/joshbersin/2013/02/17/bigdata-in-human-resources-talent-analytics-comes-of-age/#6961205a4cd0

3. CIPD in Partnership with ORACLE Human Capital Management Cloud; (Research Report 2013) Talent analytics and big data – the challenge for HR. Retrieved from http://www.oracle.com/us/products/applications/human-capital-management/talent-analytics-and-big-data-2063584.pdf

4. Atkins C., De Uster M.V., Mahdavian M., and Yee L (Mckinsey & Company- Marketing & Sales , Article December – 2016) Unlocking the power of data in sales . Retrieved from https://www.mckinsey.com/business-functions/marketing-and-sales/our-insights/unlocking-the-power-of-data-in-sales

5. Valluri A.(Economic Times October 5,2014)How data analytics is becoming important to enhance the performance of sporting fraternity Importance of data analytics in team management . Retrieved from https://economictimes.indiatimes.com/how-data-analytics-is-becoming-important-to-enhance-performance-of-sporting-fraternity/articleshow/44337632.cms

6. Brynjolfsson E & McAfee (Harvard Business Review, October 2012 issue) A.Big Data: The Management Revolution. Retrieved from https://www.thebalance.com/you-can-t-manage-what-you-dont-measure-2275996 You can't manage what you don't measure

7. Rogers W. (Forbes business Sept. 24,2014) The Power Of Key Performance Indicators For Sales Teams – Forbes Retrieved from https://www.forbes.com/sites/salesforce/2014/09/24/key-performance-indicators/#603eec0742e8

8. Performance Indicator –Wikipedia, Performance indicator Retrieved from https://en.wikipedia.org/wiki/Performance_indicator

9. De Mello R G S, Martins R. A., Xavier J.E.M. (Research Gate, Conference Paper, DOI: 10.13140/RG.2.1.4071.4083 Conference: Conference: 2015 ISERC, May 2015) Use of Big Data Analytics in Performance Measurement

Systems Retrieved from https://www.researchgate.net/publication/280078025_Use_of_Big_Data_Analytics_in_Performance_Measurement_Systems Wordstream, Marketing Analytics - Success Through Analysis http://www.wordstream.com/marketing-analytics

10. Simpli Learn, Monnappa A. (October 5, 2017)Data Science vs. Big Data vs. Data Analytics https://www.simplilearn.com/data-science-vs-big-data-vs-data-analytics-article

11. Gartner, Contributor –Forni A., (March 16,2017), Data and Analytics Empower Modern Marketers Retrieved from https://www.gartner.com/smarterwithgartner/data-and-analytics-empower-modern-marketers/

12. TenFold- Sales Blog – Sincavage D., How Sales Analytics Is Useful For Your Sales Team Retrieved from https://www.tenfold.com/how-sales-analytics-is-useful-for-your-sales-team

13. Govoni A.P., R. R. Richard Sales Management – Decisions, Strategies, and Cases Fifth edition printed Prentice –Hall of India Pvt. Ltd. Chapter 19 Controlling Sales Personnel: evaluation and supervising.

Chetana's

Institute of Management & Research

Getting Ready to Usher Analytics: The HR Way

* Dr. Richa Sharma
** Ms. Pooja Wagh

Abstract

There is a dawning awareness that data, as a commodity in itself, has little value to an organization unless it is transformed into meaningful intelligence. The sheer volume of Big Data that organizations can and do amass is overwhelming. The business has changed dramatically with data analytics becoming a way of life for HR personnel worldwide. HR analytics is the buzzword among practitioners and consultants in the field of human resource management. Advanced Analytic drivers such as increased data, increased computational power, analytical algorithms have developed and positioned HR analytics as a necessary solution. The ease to use HR analytics will ascend once we are able to overcome the challenges faced in HR analytics. HR managers are familiar with the concept of HR Analytics but lack the analytical muscle to execute it. HR is all about people and automation technology should augment the efficiency with which people work, not replace them. When it comes to a company's annual HR strategy and planning cycle, much of work is still done manually by expert HR researchers, analysts, and data scientists. A changing landscape in both technology and talent means HR must frequently seek out better tactics, processes and tools to survive in the disruptive environment. This paper gives insights on the alchemy of HR function and the ways to manage the vexing challenges faced in analytics.

Keywords: *HR analytics, big data, talent management*

INTRODUCTION

The buzz word analytics is on every manager's mind today! So what exactly is analytics?

According to one heavily cited industry report, big data is anything too large for typical database tools to be able to capture, store, manage and analyse – a necessarily subjective and flexible definition, which ranges from 'a few dozen terabytes to multiple petabytes'.

The latter definition would encompass data held on existing HRIS: small by the standards of large unstructured data, but big by the standards of the quantitative data sets used in academic social sci-

*   Associate Professor, Chetana's Institute of Management & Research
**   MMS II Year Student

ence and able to generate 'smart' insights by virtue of the longitudinal nature of the data.

HR ANALYTICS

By contrast, the former definition would focus exclusively on unstructured data, including email content, communication through social networks, web searches, digital images and video footage, and location data from smart phones and other electronic devices. Therefore, in practical terms, analytics involves both traditional relational database and spreadsheet-based analysis, new forms of database software that allow very large quantities of data to be stored and organised more efficiently and new techniques for representing and understanding data through visualisation. (**Andy et al., 2016)** Human resource analytics (HR analytics) is an area in the field of analytics that refers to applying analytic processes to the human resource department of an organization with the view of improving employee performance, hence getting a better return on investment. HR analytics is all about building bridge of effectiveness between what HR does and outcomes of the business – and then creating strategies based on that information. The key aspect of HR analytics is to provide data on the impact the HR department has on the organization as a whole. (**Frost & Sullivan, 2017)**

More specifically, data held in HRIS typically are composed of basic information on the workers. Additionally, there are a variety of 'soft' performance data that might be collected from appraisal and performance management systems, along with information on training and development that the worker has experienced, information on grievances, capability and disciplinary cases, dispute resolution, internal communications, participation schemes and staff attitudes surveys.

Historically, the data gathered is stored in separate pieces of software designed to carry out different HR processes, but increasingly, as organisations invest in upgrading HRIS, data is being gathered together and held in cloud-based data warehouses. Conceivably, these data could be combined with 'bigger' data on what a worker does (location data from mobile phones, Internet browsing histories, electronic calendars and other handheld electronic devices used in production or service delivery), who they communicate with (email and phone records and online collaborative tools) and what they communicate about (the content of email, instant messenger conversations and SMS messages, and recordings of interactions with clients).

Scattered blog posts provide hints of what might be possible with big data analysis using these types of data: extracting information on mood and morale from large bodies of email messages, mapping social networks and ties within organisations based on electronic records of communications, using geolocation data from mobile devices to gain a better understanding of what employees do and how they interact with one another.

But there is a challenge, the technical means to integrate, organise and analyse data held in conventional HRIS with data from these larger unstructured sources are as yet not well established due to lack of expertise and practical knowledge. There are also significant issues of privacy, consent and ethics to address when storing and analysing HR data. Making better use of this data to create and capture value is a necessary prerequisite to the more advanced forms of big data analysis that are in development. (David et al., 2016)

THE NEED FOR DATA ANALYTICS

We know about Data analytics and how important it is but why exactly we need analytics?

1. Big Data analytics helps reduction in cost of data storage, increase efficiency of operations, as analysis of the entire value chain of an enterprise is taken care of

2. Gives detailed understanding of employees/customers motivations and desires, and reveals patterns of behavior, helping unlock powerful new opportunities.

3. Helps company to generate predictive scenarios from historical data sets, and enables an organization to stay agile in the face of those predictions.

4. Analytics will drive broadening adoption of IoT and allow it to reach much higher levels of evolution. (**Frost & Suvillan, 2017**)

Firstly, HR analytics was used to establish a relationship between leadership quality and lower turnover levels, which resulted in higher levels of operator competence, which in turn fed through to fewer accidents, less maintenance time and higher customer satisfaction.

Secondly, analytics was used to demonstrate the significant benefits the business derived from the

company's graduate training programme; the programme was doubled in size as a result. Sparrowet al. (2015) cite the example of how Tesco applied the analytics tools developed to understand its customers to better understand its workforce and how McDonalds was able to identify how staff demographics, management behaviours and employee attitudes interacted to optimise restaurant performance. (**David et al., 2016**)

SURVEY

"We're pretty good about collecting data, running data and looking at data," but not at using it for predictive analytics, Michael Rochelle, chief strategy officer and principal human capital management.

Survey data Brandon Hall collected last year showed that only 15 percent to 22 percent of organizations "can use data for predictive analytics" in each of five areas: employee performance, time and attendance, scheduling, absence and leave management, and salary and labor costs. (**Martin Berman-Gorvine, 2015**)

Only 4% of the 435 U.S. and Canadian company respondents to a recent survey reported using predictive analytics to drive their talent management decisions, according to Josh Bersin, an expert on human resources and a contributor to Forbes.com. Contrast that with Deloitte's The Analytics Advantage study which revealed 55% of surveyed companies say they invest in analytics to drive marketing and sales, and you can see the maturity gap between the functional areas. Even within the HR function, only 0.2% of HR professionals are in an analytics function. (**Katherine Koontz, 2017**)

A consistent finding from the annual Sierra-Cedar

HR Systems Survey was that "organizations out-perform with **workforce analytics"**
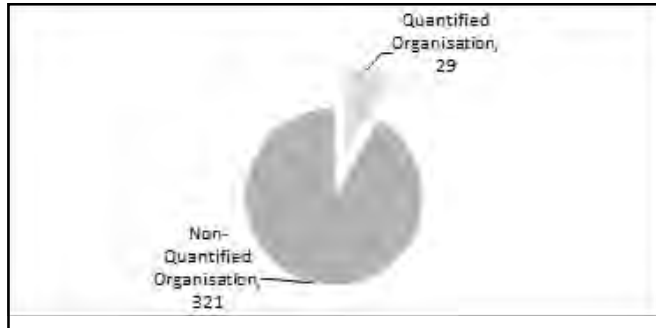
Out of 350 organizations that participated in the study, 29 were identified as Quantified Organiza-tions (QO) —that is, organizations that are data-driven in their decision making.

Four Characteristics of Quantified Organizations, Business Intelligence (BI) Process Maturity, Man-ager Access to Analytics, Data Sources, Metrics Categories.

Higher Return On Equity (ROE) is the measurable factor for outperformance, which quantifies an organization's success at generating profits from every unit of shareholder equity, such as that allo-cated to HR technologies. A company that earns ROE in excess of its cost of equity capital has added value. QO's saw a 79% higher ROE than all other organizations according to the 2014-2015 survey results, suggesting that leadership in HR analytics enables outperformance. In 2013, Bersin by Deloitte research showed that the stock prices of companies with high impact talent analytics outperformed their peers by 30% over the previous three years. Also in 2013, the CEB Analytics Sur-vey found that organizations moving from median to leadership in workforce analytics improved their talent outcomes by 12%, leading to a 4% improve-ment in gross profit margin. This translates into

$12.8 million in savings for every $1 billion in revenue! (**Lexy Martin, 2017)**

(Lexy Martin, 2017)
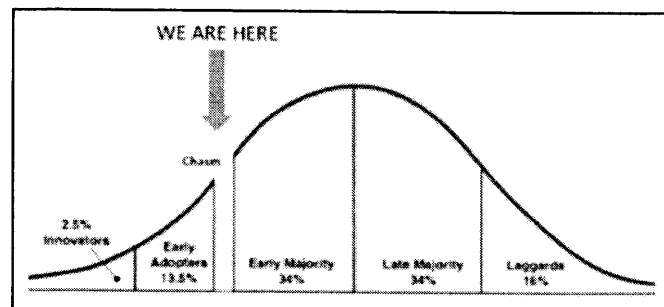
(Lexy Martin, 2017)

Innovators and early adopters implicitly understand that analytics provides a strong competitive advan-tage.

What keeps HR professionals from embracing HRA through the use of BD and adopting this new inno-vation? Some early adopters of HRA who have had positive results are Google, SAP, Xerox, PepsiCo, FedEx Corp., and Aetna Inc., just to name a few. In an article titled "How Google Became the #3 Most Valuable Firm by Using People Analytics to Reinvent HR," Sullivan (2013) writes, "Google has the only HR function on the planet that is managed based on people analytics. Google moved

into the No. 3 position among the most valuable firms in the world". Xerox revolutionized the candidate screening for their call centers by utilizing BD and predictive analytics; the result was a turnover decrease of 20% **(Rafter, 2013).**

Johnson Controls has a newly created function within their Human Resources organization focused solely on workforce analytics. Help enable data-driven people decisions and share the insights from the data. Ride the wave of enthusiasm for workforce analytics and help build the function from the ground up, as it grows into a global center of Expertise. The mission: create an evidence-based culture that endorses analytics at the highest levels Many companies are trying to use advanced analytics to improve organization's decisions but technological challenge is hard enough. Companies have to identify the right data and develop useful tools, such as predictive algorithms. **After this the tougher task is getting people to actually use the new tools.**

New technique of learning and development which involves technology and analytics to counter the boredome in traditional l&D process is use of **gamification** to encourage people to invest the time and learn how to use the new tools. Gamification means using motivational techniques like those the videogame industry has put to such effective use. Such motivational concepts and techniques encourage decision makers to use new analytical tools and collaborate with each other — both to improve the tools and to better their ability to make more informed decisions. (**Lori Sherer, 2015**)

Time to turn to data and analytics
"When the complexity and variation of human decision making for a set of tasks exceeds existing capabilities, it's a perfect time to turn to data and

analytics to provide guidance" -By Katherine Koontz.

Company envision a comprehensive people-analytics approach to ensure that employees are recruited, on boarded, developed, promoted and rewarded in ways that maximize their value to, and satisfaction with, their employer.

Some potential use cases for people analytics include

1. Path analysis developed to understand the education, training, leadership skills and development opportunities that result in the most successful employees.

2. Network analysis of emails and calendar entries highlights the relationships between individuals or specific roles that lead to the high performance.

3. Sentiment analysis of emails and performance reviews for high-performing managers provides insight into their approach to management.

4. Network and graph analysis of employees who commit fraud to identify others who may also be likely to commit the act.

When data engineers and data scientists are paired with HR subject matter experts to iteratively apply analytics against an intractable human management problem is a great way to deliver value quickly. That's why a robust human resources analytics program will become an imperative for companies looking to attract, grow and retain a happy and productive workforce. (**Katherine Koontz, 2017**)

The Future of the Work place ;Such discussions about modifications to HR operations are especially important given the changing nature of the workplace. HR can optimize a business by using data

analytics to build ad hoc teams based on individual skills, talents and strengths.

They can also use data analytics to make sure these different types of workers are compensated in the most efficient way - to maximize performance. Also over the past 10 years, the role of the C-suite has been redefined, many executives recognize big data and predictive analytics as the next opportunity to build competitive advantage. This actually makes it important for HR teams to adapt the approach of data analytics.

THE EVOLUTION OF ADVANCED ANALYTICS

Descriptive Analytics
This stage defines business challenges and oppportunities, comprising data warehousing. Key question answered: What is the current scenario?

Diagnostic Analytics
This stage provides insights as to the reasons for events, using techniques such as drill-down, data mining, correlations. Key question answered: What is the reason?

Predictive Analytics
This uses text and data mining technologies, and primarily deals with forecasting.

Key question answered: What will happen next?

Prescriptive Analytics
This stage of the value chain deals with process optimization, modeling, and simulation for strategic decision making.

Key question answered: What should I do next and why? **(Frost & Sullivan, 2017)**

Key Drivers of Data Analytics
- Increased Data
- Increased Computational Power and Storage
- Evolving Analytical Algorithms
- Business Agility **(Frost & Sullivan, 2017)**

The Benefits of HR Analytics
- Better Employee Engagement and Satisfaction
- Higher Staff Retention
- More Effective Training and Development
- More Successful Talent Acquisition
- Performance Management (**Bosman, Coenette 2017**)

Advanced Analytics Challenges
- Lack of Executive Buy-in
- Shortage of Human Talent
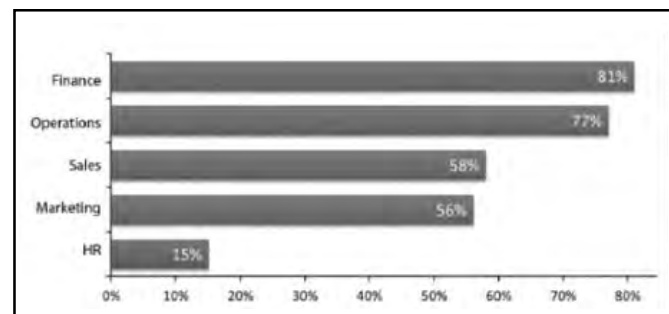- Finding the right mix of Tools (**Frost & Sullivan, 2017**)

Figure Which functions have strong analytics capabilities?
(**Katherine Jones, 2014**)

The HR function is lagging behind other functional areas of management in the adoption of analytics technology and in the analysis of big data. Little evidence can be seen that HR analytics is developing into a 'must have capability', which will ensure HR's future as a strategic management function. Many in the HR profession do not understand analytics or big data, while analytics teams do not understand HR. (**Katherine Jones, 2014**). This it is crucial that analytics team collaborate with HR

professionals for outcomes. Today's talent management programs consistently are providing more and more data points for our use. Consolidating the data is not an issue. But to have the required skills to make accurate business decisions based on the analysis of data is what we have to deal with. The ability to analyze the data is very important, and all HR professionals today should be able to have command of the rudiments of data creation and use. Consider data visualization, It is another requisite skill that enables HR members to analyze and communicate findings from complex data sets. (**Katherine Jones, 2014**). The central problem is, the ideas about HR data and analytics have not penetrated the thinking of much of the HR profession. Many HR professionals are sceptical because they question whether people can be reduced to metrics. Where these ideas have penetrated HR thinking, there remains the problem of praxis, the solution to which is not well understood in HR circles. (**David et al., 2016**)

Silo Mentality, For the potential and usage of analytics in HR and workforce planning – all should talk about it in conferences and meetings to share as much as they can to make sure the learning reaches to all, but it is seen that people don't share too much for reason, nobody can do it better than them or don't want to lose their expertise…! In relation to this, there may be insufficient data to ask the right questions. Silo mentalities within organisations prevent HR-related data being combined with data on other determinants of productivity and performance, so it is often hard to build analytical models that examine the role of HR-related factors while controlling for other relevant factors.

Failing at HR Analytics in 7 Easy Steps for failure

1. Position your program as strategic even if you've done nothing that qualifies it as such.

2. Focus on the solution before defining the problem.

3. Invest most of your resources in technology rather than partnering with the right vendor. "Build vs. buy"

4. Hire experts before they demonstrate any expertise.

5. Accept a role and reporting relationship that compromises your impact and integrity.

6. Delude yourself into believing that others value what you are doing as much as you do. Be realistic about your role in the organization.

7. Believe your own press. (**Mark Berry, 2016)**

Resources managers are facing fresh set of opportunities and challenges as a result of fast-evolving digital technology

1. A ,resilient digital platform that is secure, available on demand, and easy to set up and use –

    The digital platform is at the heart of HR operations. It's where intelligence is leveraged and insights moved around the organization. Increasing the frequency of updates and the likelihood of cyber-attacks – service providers must focus even more on building secure, scalable and agile systems.

2. Anywhere, anytime digital insights that improve business performance.

Predictive analytics can move a business from a reactive to a proactive state, allowing buyers to look around the bend and see what's coming next. Useful and actionable results.

In HR, embracing analytics is critical. There is a

war for talent, particularly in areas such as digital marketing, IT security and programming. (**Publication info: Weblog post. Newstex Global Business Blogs , Chatham: Newstex. Oct 9, 2017**)

CHALLENGES

No practical experience only theoretical knowledge The development of HR analytics is being hampered by a lack of understanding of analytical thinking by the HR profession. It has come to notice that HR practitioners who have engaged with literature of HRA are enthused by its ideas, but feel no better informed about how to put them into practice than they were before they read it. This gets to a situation where, despite the promise, successful strategic HR analytics projects appear to be few. Although many organisations have begun to engage with HR data and analytics, most have not progressed beyond operational reporting. There is little evidence of the strategic use of HR analytics. Many in the HR profession do not understand analytics or big data, while analytics teams do not understand HR (**Publication info: Weblog post. Newstex Global Business Blogs, Chatham: Newstex. Oct 9, 2017**)

Where to find the Right Skills
A bigger challenge is to find the right skills to become a data-driven HR department than rolling out the technology. HR managers need to think about how they will sharpen their own digital skills as well as find specialists such as data scientists to help them exploit their data. Do these skills exist in the organization or must they be recruited from the outside? Increasingly, running a successful HR department will be about blending geeks' technical and analytical skills with the intuition of a seasoned HR leader. (**Bosman, Coenette, 2017**).

The "Why" Debate
"Why should we do HR analytics?" Using HR analytics as a means of proving the value of the HR function is a misuse of analytics that fails to create any lasting value for an organization.

This perspective may fail to capitalize on the tremendous value that can be created for an organization as a whole from the effective application of HR analytics. The purpose of HR analytics is to improve individual and organizational performance. Added side benefits of HR analytics are that it can help identify where not to be spending time, effort and budget, thereby reducing HR workloads and it can enhance the credibility of HR. (**Laurie, et al., 2011**)

HR analytics is probably 5-10 years behind other analytics disciplines.

It was noted that HR analytics is probably 5-10 years behind other analytics disciplines such as logistics and marketing analysis for example. But rather than worrying about this fact, the teams should look at the reasons why and also how to utilize those skills.

Analysts in marketing study mathematics, physics, statistics and then apply these techniques to an industry. They don't know everything about marketing strategies on their first day in the role, but they can design a model to tell with a very high degree of certainty what the propensity for something to happen is.

So if the companies don't utilize these data skills, they may stay behind other analytical disciplines and only be able to do a small proportion of what could be possible with the data available to them.

Organizations usually indicate the following two interrelated reasons:

- Different systems are used to record employee information. Over the years especially large organizations have grown to complex data architectures but haven't defined and implemented a proper data integration solution.

- The quality of employee related data is not sufficient to be used for analytics. Information from employees may be incomplete or has not been controlled for consistency and uniformity.

Of course, If the data is unreliable and incomplete, the outcome of an analysis is unreliable.

But if organisations have the perfect data warehouse and some analysts who can perform exploratory analyses possibility of getting data 100% standardized, up-to-date and available is possible.

How All the departments analytics are inter related For example, a regional senior executive indicates they are seeing a decline in customer satisfaction and says they might actually lose a big client. This is not perceived as an HR issue and it very well could be that it isn't. But it is reason enough to explore all possible causes. The HR has performance data that is reliable, consisting of a performance rating and a potential score and can ask an analyst to analyze these data and slice-and-dice by region, management level and explore further. Perhaps there can be a link drawn between regional performance by managers and customer satisfaction or discovering something else in the analysis that doesn't impact the issue directly but is something that does need attention. For example, if a specific group scores high on 'has reached potential'. (Source: FCTB INDICIA)

Present Practices:
Current Human Capital analytics practices that are prevalent in the industry:

1. Correlation: Correlating people data and business is definitely the future of analytics. However, care must be taken not to use the same for major decision-making as correlation can, sometimes, identify only mere coincidences.

2. Benchmarking: Benchmarking, a powerful data collecting tool, should be used as a way of looking at data, and should not be considered as an analysis procedure.

3. Cause-Effect Analysis: In order to perform cause-effect analysis in Human Capital analytics, Structural Equation modelling methods are being used.

4. Regression Analysis: Regression as a statistical tool helps to view multiple facets of data simultaneously and enables the user prioritize the facets of people data that impact business outcomes. **(Dr. P. Raghunadha Reddy, P. Lakshmikeerthi, 2017)**

Barriers to HR Analytics
The major impediments to the application of HR analytics identified are:
- Inconsistent and inaccessibility of data
- Data quality issues
- Lack of standard/generic methodologies to analyse HR data
- Executive buy-in
- Skill gap in analytical knowledge & experience
- Funding issues
- Wrong or not targeting the right analytical opportunities
- Problems in initiating the project
- Improper timing

These factors are true for countries like India, where companies are trying to develop HR analytics capability. The framework to implement an integrated talent management metric or a HR business driver analytics requires the usage of advanced statistical tools beyond the usual univariate statistical tools (means, quartiles and percentiles). Dooren in his findings questioned the objectives of using HR analytics in a company beyond its basic usages when more than 73.6% of the surveyed organizations admitted of having capability to utilize only the basic univariate statistical tools. His finding suggests that the major impediment in developing HR analytics capabilities is the perceived skill gap in the industry to analyse data using standard research methods. (**Dr. P. Raghunadha Reddy, P. Lakshmikeerthi, 2017**)

Statistics & Modeling uses in HR Analytics
Namely is the leading HR platform for mid-sized companies. They announced Namely Analytics which are new analytics tool that provides HR teams with the data needed to make strategic people decisions.

With 71% of companies rating HR analytics as a high priority, Namely designed Namely Analytics to tackle the challenges so prevalent in growing companies—such as how to attract and keep great talent, how to maintain culture as organizations grow, and how to offer fair compensation.

Namely is used by over 900 clients with nearly 150,000 employees globally (**PR Newswire, 2017**)

Different kind of emerging analytics which will be helpful for HR
Authors feel that Analytics have not been utilized to its full worth in the field of HR , whereas it has been extensively used in marketing and sales/.The

Figure 1.1 Tools of HR analytics

various tools like text, video and emotion analytics can be used in HR to utilize big data to the maximum potential. Figure 1.1 describes the various tools which can be utilized in HR.

TEXT ANALYTICS

Text analytics, also called text mining or opinion mining comprises data analytics techniques that extract rich, meaningful structured data from largely unstructured data in order to inform strategic decision making, discern customer sentiment about products, services, events, extract competitor information, organization of enormous amounts of data, and ultimately suggest predictive models to facilitate business agility.

80% of data today with HR is unstructured, and a large part of this data is in text format. Organizations can gather, store and mine this data for smarter decision-making. The data is generally in the form of tweets, e-mails, and surveys. It is difficult for an organization to gather insights from such data in the absence of advanced analytics.

VIDEO ANALYTICS

Video analytics, digitally analyzes video feeds using algorithms to monitor, analyze and manage large volumes of data. The analytics can be real-time, or retroactive, where events that have already occurred are analyzed. By this we can understand the equation shared in between the departments and also within the departments. This can inturn help to understand the relationship between people in the organization on real time basis and resolve conflict if any. This can be used for Teamfit analysis.

EMOTION ANALYTICS

Emotional analytics involves analyzing the gamut of human moods, sentiments, attitudes and perceptions via a range of tools such as text, image, video and speech. Emotion analytics can be based on facial expression or analysis of speech. Emotion analytics records and analyzes a person's facial and/or verbal cues to identify moods such as happiness, anger, sadness, fear, disgust and surprise. This can be helpful while the post appraisal interview with the superior, in grievance interview & exit interview. By doing this HR can analyse the pattern of behavior of employees and react in particular manner with the employee to get the best out of him. **(Frost & Sullivan, 2017)**

Suggestions
A new concept of "Virtual HR person" should be adopted.

In "Virtual HR person" a device which can monitor your movement, voice modulation, pitch, heart rate and temper can intimate you in advance that you have to stop what you are doing or else you will fall into trouble or a fight at work place, "Increased stress level please take a break"

A "Virtual HR person" can be a device like your mobile phone or a watch at workplace 'BOTs' for sortlisting CVs at workplace.

Bots can be a software, dashboard or technology that has predetermined fed program to sort the CVs according to the Job discriptions.

CONCLUSION

The business world today is more specific in optimistic utilization of resources. As Human resources are the prime valued sources of any organization, more attention needs to be paid on this. All important decisions have be primarily evidence based. This evidence based approach in business demands for HR Analytics. HR Analytics is not only driving best HR decisions with accurate evidence, but also provoking organizations to maintain adequate quality data for justifying ROI in HR Investments. HR analytics is developing into a 'must have capability', which will ensure HR's future as a strategic management function.

It is evident that the HR function is lagging behind other functional areas of management in the adoption of analytics technology and in the analysis of big data.

Many in the HR profession do not understand analytics or big data, while analytics teams do not understand HR. There is a huge gap in knowing the HRA and practically implementing it in the organization for strategic decision making. Here the HR department is lacking behind. If given proper training and education this gap can be bridged. In this scenario, Academics could play a constructive role in these developments, but could also do more to elucidate the praxis of strategic HR analytics. A different approach to HR analytics is needed, which

starts with the question of how HR data can be used to create, capture, leverage and protect value, then seeks to develop answers to these questions through more advanced forms of longitudinal multivariate modelling. However, unless HR professionals upgrade their skills and knowledge to become champions of this new approach, the existing forms of HR analytics are likely to seal the exclusion of HR from strategic, board-level influence while doing little to benefit organisations and actively damaging the interests of employees. Technology is here to help HR professionals, to ease their work and give relief from hardship. This won't result into loss of credibility of human touch, because human touch is always needed. At the end of the day it is human who has to analyse the data sorted by data analytics and take appropriate decisions on it. Also to analyse the data HR professionals should acquire the skills as excellent analysts or else one wrong decision taken can break the organization apart.

REFERENCES

1. Aral, S., Bryjolfsson, E. and Wu, L. (2012). 'Three-way complementarities: performance pay, human resource analytics, and information technology'. Management Science, 58: 5, 913–931.

2. Fitz Enz, J. (2000). The Return on Investment in Human Capital: Measuring the Economic Value of Employee Performance, New York: American Management Association.

3. Boudreau, J. and Jesuthasan, R. (2011). Transformative HR: How Great Companies Use Evidence Based Change for Sustainable Competitive Advantage, San Francisco, CA: Jossey Bass.

4. Boudreau, J. and Lawler, E. (2015a). 'Making talent analytics and reporting into a decision science', Working paper, Centre for Effective Organisations, University of Southern California.

5. Boudreau, J. and Lawler, E. (2015b). Talent analytics measurement and reporting: building a decision science or merely tracking activity? Working paper, Centre for Effective Organisations, University of Southern California.

6. Boudreau, J. and Ramstad, P. (2005). 'Talentship and the evolution of human resource management: from professional practices to strategic decision science'. Human Resource Planning, 28: 2, 17–26.

7. Boudreau, J. and Ramstad, P. (2006). 'Talentship and HRmeasurement and analysis: fromROI to strategic human resource planning'. Human Resource Planning, 29: 1, 25–33.

8. Boudreau, J. and Ramstad, P. (2007). Beyond HR: The New Science of Human Capital, Boston, MA:HBR Press.

9. CAHRS (2014a). CAHRS Working Group on HR analytics summary report part 1. Ithaca NY: Cornell University Centre for Advances Human Resources. Available at http://cahrs.ilr.cornell.edu/

10. CentersofExcellence/data.aspx?n=HR%20 Analytics/Metrics# Research (accessed 31 October 2014).

11. Bersin (2014). Talent Management for the Global Workforce: The Market for Talent Management Systems 2014, Oakland, CA: Bersin by Deloitte.

12. CIPD (2013). Talent Analytics and Big Data – The Challenge for HR, London: Chartered Institute for Personneland Development.

13. Rasmussen, T. and Ulrich, D. (2015). 'Learn-

ing from practice: how HR analytics avoids becoming a fad'. Organizational Dynamics, 44: 3, 236–242.

14. Sturdy, A. (2011). 'Consultancy's consequences? A critical assessment of management consultancy's impact on management'. British Journal of Management, 22: 3, 517–530.

15. O'Mahoney, J., Heusinkveld, S. and Wright, C. (2013). 'Commodifying the commodifiers: the impact of procurement on management knowledge'. Journal of Management Studies, 50: 2, 204–235.

16. Angrave, D., Charlwood, A., Kirkpatrick, I., Lawrence, M., & Stuart, M. (2016). HR and analytics: why HR is set to fail the big data challenge. Human Resource Management Journal, 26(1), 1-11.

17. Bassi, L. (2011). Raging Debates in HR Analytics. People & Strategy, 34(2), 14-18.

18. Jones, K. (2014). Conquering HR Analytics: Do You Need a Rocket Scientist or a Crystal Ball?Workforce Solutions Review, 5(3), 43-44.

19. Berry, M. (2015). How to Fail at HR Analytics in 7 Easy Steps. HR Magazine, 60(10), 20-21.

Chetana's
Institute of Management & Research

Role of People Analytics for Employee Retention: A Qualitative Study

* Prof. Seva Rangnekar
** Ms. Renuka Savant

Abstract

Globalisation and constant change in technology are the two major components of today's business world. The micro and macro-economic conditions are forcing organizations to change the way they do their business. Also due to globalisation, competition gets challenging day by day. Organizations are in a constant competition for market share and top talent – a vital aspect that includes recruiting, engagement, development, and retention, each of which has their own large set of data. This paper discuses the use of this large set of data for employee retention. A scientific method approach towards data is called people analytics which is transforming "gut feeling" decision making to data-driven decision making for employee retention strategy. This paper elaborates about various dimensions of people analytics for employee retention.

Keywords: *globalization, data, employee retention, people analytics*

INTRODUCTION

"People are our greatest assets"- Peter Drucker

Over the years organizations have recognized its people as its assets. People who work for an organization come from diverse backgrounds. They are from different education, economic and social background. They contribute to the organization with their talent and skill sets. In today's era large organization invests a sizable amount of money for recruiting and training its people ie employees. In spite of all these efforts employee retention remains one of the most challenging task for human resource department.

There are significant costs associated with turnover that include direct recruitment costs incurred whilst searching for a replacement, lost productivity on the part of the departing employee, lost labour between the time the individual quits and a replacement is hired and reduced productivity of the new hire whilst learning the job. Organisations often make a significant investment in training and de-

*   Assistant Professor, Chetana's Institute of Management and Research,
** Phd Scholar Pacific University, Faculty of Management, Pacific University Udaipur, India

veloping their employees and this investment is also lost when employees leave. Estimates of the overall cost of turnover range from 90% to 200% of the departing employee's salary. The median cost of turnover for most jobs is about 21% of an employee's annual salary, according to the Center for American Progress. Additionally, on average it can cost some $3,341 to hire a new employee, according to the Society for Human Resource Management. William Wolf, Credit Suisse's global head of talent acquisition and development, says a one-point reduction in unwanted attrition rates saves the bank $75 million to $100 million a year.

Deloitte Human Capital Trends 2016 shows that 86% of business leaders are deeply concerned about retention and engagement. The solution is a tool that can analyze the employee information in an effective manner. People analytics is one of the effective tools that can be implemented for reducing employee turnover.

Retaining employees in today's competitive landscape is increasingly difficult.

PURPOSE OF THIS STUDY

The purpose of this research study is to understand the role of people analytics for employee retention. This is a qualitative study.

Conceptual Framework of People Analytics:
Today data and people analytics are transforming the workplace. HR is becoming a data-driven function. In simple words people analytics is the use of data and data analysis techniques to understand, improve, and optimize the people side of business. Forbes defines People Analytics as "a segment of business intelligence that uses people-related data to optimize business outcomes and solve business problems".

Three main types of people-related data that can be analyzed are:

Table 1: People-related data

No	Title of data	Components of data
1	**People data**	demographics, skills, and engagement
2	**Program data**	attendance, adoption, participation in training and development and leadership programs, and outcomes of key projects and assignments
3	**Performance data**	Performance ratings and data captured from the use of instruments such as 360 assessments and succession programs.

Source: https://ideal.com

Process of People Analytics Implementation:

a) Goals and KPIs:
The first step in introducing People Analytics in organization is to set goals. Then process of identification of KPIs and KPOs. This will help for current problem solving aspects. It's best to create a collaborative document that all stakeholders can easily access. These goals should be revisited quar-

terly to ensure that the organization is on track.

b) Buy in Across Organization:
Data is locked away in different departmental silos, and the keys are in the hands of many different people. To get the most out of People Analytics platform, all of these decision makers need to get on board with it and offer their help to set everything up.

c) Setup, connect, aggregate from all systems: People Analytics, by nature, needs people data. To get this, organization needs a system that will aggregate all performance data from all of its people's functional data systems. The People Analytics platform must first be deployed by technology team, and then connectors will have to be built to each cloud app organization want to connect. Once all of the connectors are in place, data will need to be pulled from the systems and aggregated into the People Analytics platform. This should take no longer than 60-90 days. The data will then most likely need to be cleaned and correctly formatted for use.

Role of People Analytics to Reduce Turnover:
In their quest to keep turnover to a minimum, HR personnel and managers in shift based organizations are faced with the following questions on a regular basis:

- How can I reduce turnover and its associated costs?
- Which staff members are best suited to shift work?
- Who is best suited to the classic work day (9 am - 5 pm)?
- Who will last the longest in their positions?
- How can we set up effective shiftgs that optimize employee capabilities?
- What compensations and benefits structure is most appropriate for the various shift positions? How can we give employees an opportunity to provide feedback, helping us build more effective teams and nuture a sense of involvement and commitment?

Using workforce analytics tools and techniques enables a shiftbased organization to more efficiently manage manpower, maximize potential, improve organizational capacity and ultimately increase profits.

People Analytics uses algorithm to provide insights that causes employees to leave and what influences them to stay. These insights help an organization to integrate the shared interests of employee and management and contribute to reducing turnover.

People Analytics Approach - How Organizations have implemented.

Case Study of Google
"All people decisions at Google are based on data and analytics." Google is replacing the 20th century subjective decision-making approach in HR. Although it calls its approach "people analytics," it can alternatively be called "data-based decision-making," "algorithm based decision-making," or "fact or evidence-based decision-making." The people analytics team reports directly to the VP and it has a representative in each major HR function. It produces many products, including employee surveys that are not anonymous, and dashboards. It also attempts to identify insightful correlations and to provide recommended actions. The goal is to substitute data and metrics for the use of opinions.

Almost everyone has by now heard about Google's free food, 20% time, and wide range of fun activities but realize that each of these was implemented and are maintained based on data.

Google developed an algorithm for predicting which candidates had the highest probability of succeeding after they are hired. Its research also determined that little value was added beyond four interviews, dramatically shortening time to hire. Google is also unique in its strategic approach to hiring because its hiring decisions are made by a group in order to prevent individual hiring managers from hiring people for their own short-term needs. Under "Project Janus," it developed an algorithm for each large job family that analyzed

rejected resumes to identify any top candidates who they might have missed. They found that they had only a 1.5% miss rate, and as a result they hired some of the revisited candidates. As a result, it develops predictive models and use "what if" analysis to continually improve their forecasts of upcoming people management problems and opportunities. It also uses analytics to produce more effective workforce planning, which is essential in a rapidly growing and changing firm. For retention Google developed a mathematical algorithm to proactively and successfully predict which employees are most likely to become a retention problem. This approach allows management to act before it's too late and it further allows retention solutions to be personalized.

CONCLUSION

People Analytics thus help the organization to design a strategic workforce planning by analyzing the every aspect of HR matrics. The value that people analytics brings to managing employees is in identifying and analyzing the relation between engagement and retention. How and why people are engaged with what they do, how does that translate into the business metrics and what HR can improve to retain them - these are the key insights that can transform the way organisations do business.

REFERENCES

1. Cook Ian (2017),"How to reduce employee turnover with workforce analytics" https://www.visier.com/clarity/reduce-employee-turnover-with-workforce-analytics/

2. Schlechter Anton F., Syce Chantal, Bussin Mark (2016)," Predicting voluntary turnover in employees using demographic characteristics: A South African case study", Acta Commercii - Independent Research Journal in the Management Sciences,page 1 to 10 ISSN: (Online) 1684-1999, (Print) 2413-1903

3. Collins Laurence , Fineman David , Tsuchida Akio (2017),"People analytics: Recalculating the route 2017 Global Human Capital Trends .https://www2.deloitte.com/insights/us/en/focus/human-capital-trends/2017/people-analytics-in-hr.html

4. Collins Laurence , Bennett Carl (2015),"HR and people analytics Stuck in neutral" https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Technology/gx-cons-tech-sap-hr-and-people-analytics-2015.pdf

5. Sullivan John(2013), "How Google became the #3 most valuable firm by using people analytics to reinvent HR, http://www.ere.net/2013/02/25/how-google-became-the-3-most-valuable-firm-by-using-people-analytics-to-reinvent-hr/

6. Romrée Henri de, Fecheyr-Lippens Bruce, Schaninger Bill (2016) "People analytics reveals three things HR may be getting wrong". https://www.mckinsey.com/business-functions/organization/our-insights/people-analytics-reveals-three-things-hr-may-be-getting-wrong

7. Fecheyr-Lippens Bruce, Schaninger Bill, Tanner Karen (2015),"Power to new people analytics" https://www.mckinsey.com/business-functions/organization/our-insights/power-to-the-new-people-analytics

8. Jorg Schalekamp,Marjolein Vlaming,Bart Maninveld (2015),"People Analytics,Replace gut-feelings with data-driven decision making", https://www2.deloitte.com/content/dam/Deloitte/nl/Documents/deloitte-analytics/

deloitte-nl-data-analytics-todays-organizational-challenge.pdf

9. Smith David , Cantrell Susan M.(2015),"Managing Your People as a Workforce of One",

   https://www.accenture.com/.../Accenture-Trends-Reshaping-HR-Workforce-One.pdf

10. Fidalgo, F. and L. B. Gouveia (2012). "Employee turnover impact in organizational knowledge management: The Portuguese real estate case." Journal of Knowledge Management, Economics and Information Technology 2(2): 1-16

11. Handfield-Jones, H., et al. (2001). "Talent management: A critical part of every leader's job." Ivey Business Journal 66(2): 53-74.

12. Kaur Jasleen ( ),"Talent Retention Model and it's significance in the VUCA Environment",

IPASJ International Journal of Management, ISSN 2321-645X, ipasj.org/IIJM/Volume4 Issue1/IIJM-2016-01-21-6.pdf

13. Lee-Anne C. Johennesse, Te-Kuang Chou(2017)," Employee Perceptions of Talent Management Effectiveness on Retention", Global Business and Management Research: An International Journal Vol. 9, No. 3 (2017), https://www.gbmr.ioksp.com/pdf/vol.%209%20no.%203/V9N3-4.pdf

14. Edouard Ribes, Karim Touahri, Benoˆýt Perthame (2017)," Employee turnover prediction and retention policies design: a case study"

15. B. L. Das and M. Baruah, "Employee retention: A review of literature," Journal of Business and Management, vol. 14, no. 2, pp. 08–16, 2013.

Chetana's
Institute of Management & Research

A Study of Training need Analysis in Operations Department, HPCL, MR: HR Analytics Perspective

* Dr. Jyoti Chandwani
** Swamini Chaudhari

Abstract
Human Resource is a vital element of every organization which ensures achievement of organizational goals through the human capital. This can be achieved by deriving strategies that address various areas such as Recruitment and Selection, Training and Development Performance Management, Compensation Management, etc. The prosperity of organizations becomes explicitly dependent on the intellectual capacity of their employees and their ability to change and adjust to the dynamic business environment. Through training, employee morale and satisfaction, organization productivity and service quality improve and it also accelerates the individual and societal growth. Training helps organizations to remain competitive by continually educating their workforce. Creating a pool of cross-trained employees helps to bridge gaps when someone unexpectedly leaves the company - or if they accept a transfer or a promotion. Nowadays, analytics also used in HR to prepare cost and investment in their talent pool like cost per hire cost per participation in training, revenue and expense per employee. It provides an opportunity for defining strategy for retention and hires plan. It can also give a complete picture of an organizational head counts based on demographics – age, gender, geographical, departmental, qualifications etc. This paper entails the importance of Training and Development in Operations Department at HPCL, MR. For this, the survey was conducted to perform a gap analysis to identify the gap between current and expected level of competencies of every job role and current employees. From external data through online portals, training practices implemented at other petroleum organizations such as Bharat Petroleum, Reliance, ONGC were identified. The effectiveness of current training methods was mapped. Core and important competencies for every job role were identified and based on individual as well as departmental performance in those competencies, training calendar was made; focusing on the training which were crucial.

Keywords: *Human Resource, Training, HPCL, Analytics*

INTRODUCTION

Introduction to Industry: Petroleum Refining
Petroleum, along with oil and coal, is classified as a fossil fuel. Fossil fuels are formed when sea plants and animals die, and the remains become buried under several thousand feet of silt, sand or mud. Fossil fuels take millions of years to form and therefore petroleum is also considered to be a non-renewable energy source. Petroleum is formed by

---

*   Assistant Professor, Chetana's Institutes of Management and Research, Bandra (E)
**   Student, Chetana's Institutes of Management and Research, Bandra (E),

hydrocarbons (a hydrocarbon is a compound made up of carbon and hydrogen) with the addition of certain other substances, primarily sulfur. Petroleum in its natural form when first collected is usually named crude oil, and can be clear, green or black and may be either thin like gasoline or thick like tar. There are several major oil-producing regions around the globe. Kuwait and Saudi Arabia's crude oil fields are the largest, although Middle East oil from other countries in the region such as Iran and Iraq also make up a significant part of world production figures. The North Sea crude oil fields are still fairly full and are arguably the second most influential oil field in economic terms. Texas, once the world's major oil region, is now almost completely dry. In 1859 Edwin Drake sank the first known oil well, this was in Pennsylvania. Since this time oil and petroleum production figure grew exponentially. Originally the primary use of petroleum was as a lighting fuel, once it had been distilled and turned into kerosene. When Edison opened the world's first electricity generating plant in 1882 the demand for kerosene began to drop. Without refining, the rich resources of crude petroleum of nature would remain latent. Value-added products from crude petroleum like petrol, diesel, kerosene, liquefied petroleum gas, naphtha and many more products would not be available for growth and development of a nation. HPCL refineries upgrade the crude petroleum into many value-added products and over 300 grades of lubricants, specialties, and greases. The Lubricating Oils Refinery set up at Mumbai is largest lube refinery in India. It produces superior quality lube base oils. The offsite product handling facilities of refineries at Mumbai and Vishakhapatnam has been automated (HPCL Handbook).

Introduction to Company: Hindustan Petroleum Corporation Limited

HPCL is a Government of India Enterprise with a Navratna Status, and a Forbes 2000 and Global Fortune 500 company. For the last 40 years and more, Hindustan Petroleum has meant different things to different people. For some, it represents an abundant supply of Petrol and Diesel. For others, it stands for the easy availability of LPG and lubricants. Thousands of others see in it an inexhaustible reservoir of Kerosene and other petroleum products for meeting their energy needs. For all of them, HP signifies an ever- radiant source of energy. The energy that is making a big difference to millions of lives. HP is all set to unveil an exciting new phase in its growth. Diversifying into oil Exploration and Production, Power Generation, Renewable Energy ventures and much more. Confident of creating a Future full of Energy.

HPCL owns & operates 2 major refineries producing a wide variety of petroleum fuels & specialties, one in Mumbai (West Coast) of 6.5 Million Metric Tonnes Per Annum (MMTPA) capacity and the other in Visakhapatnam, (East Coast) with a capacity of 8.3 MMTPA. HPCL also owns and operates the largest Lube Refinery in the country producing Lube Base Oils of international standards, with a capacity of 428 TMT. This Lube Refinery accounts for over 40% of India's total Lube Base Oil production. Presently HPCL produces over 300+ grades of Lubes, Specialities, and Greases. HPCL in collaboration with M/s Mittal Energy Investments Pte. Ltd. Is operating a 9 MMTPA capacity Refinery at Bathinda with 49% equity in Punjab and also holds an equity of about 16.95% in the 15 MMTPA Mangalore Refinery and Petrochemicals Ltd. (MRPL). HPCL has the second largest share of product pipelines in India with a pipeline network

of more than 3015 km for transportation of petro-leum products and a vast marketing network consisting of 13 Zonal offices in major cities and 106 Regional Offices facilitated by a Supply & Distribution infrastructure comprising Terminals, Pipeline networks, Aviation Service Stations, LPG Bottling Plants, Inland Relay Depots & Retail Outlets, Lube and LPG Distributorships. Consistent excellent performance has been made possible by a highly motivated workforce of over 11,000 employees working all over India at its various refining and marketing locations. View Past Annual Reports to know more about HPCL. The RTI Information Manual provides various details about the operation of the Corporation. HPCL is committed to achieving the economic, ecological & social responsibility objectives of sustainable development consistently through varied operations and activities. HPCL's focus areas are in the fields of Child Care, Education, Health Care, Skill Development & Community Development, touching lives of a weaker section of society (HPCL Handbook on Capability Building).

Training Need Analysis

Goldstein (2001) in A Study of Training Need Analysis Based Training and Development: Effect of Training on Performance by Adopting Development Based Strategy by Chahal (2013), claims that, of all of the best practices, needs assessment is probably the most important part of the process. Therefore, training needs assessment is the foundation of the entire instructional design process. It establishes the content of subsequent training. If not done correctly, or at all, the job -relatedness, effectiveness, and validity of any training program are jeopardized. In addition, needs assessment provides a database to support or justify resource allocation for other human resource functions. There-

fore, Rothwell (2002) indicates effective training as systematically designed learning, based on a complete analysis of job requirements and trainee compatibility. This clarification implies a definite training process, one highly regarded model for describing the systematic development of training programs is the instructional design process. Competency Mapping:

Competency Mapping

Ongoing and unrelenting economic, social and technological changes have spurred the need for flexible, skilled workers who can help their organizations Succeed and sustain a competitive advantage. To be relevant to organizations and indispensable to clients and customers like workplace learning and performance professionals must continually reassess their competencies, update their skills and have the courage to make necessary changes. Businesses and managing business has and will always be complex. There is no denying the need to perform through a combination of utilizing predictive or forecasting tools, techniques, and methods, yet without trivializing the need to sustain and drive a motivated high performing workforce. The company's need to sustain in a competitive environment gave rise to the need to understand and learn to establish the context of competency mapping. Competency Mapping determines the extent to which the various competencies Related to a job are possessed by a job holder. Thus, competency mapping is a process used by an HR expert to identify and list out competencies that are most relevant and significant to carry out a job in an effective manner. Although the definition of competency mapping given here refers to individual employees and job holders, companies also map competencies but form a different perspective (Garrett, 2007) in Effectiveness with special refer-

ence to Sales Staff of Pharmaceutical Industry of Ahmedabad Region by Shah, C. R. (2016).

HR Analytics

HR analytics, also called talent analytics, is the application of considerable data mining and business analytics techniques to human resources data. The goal of human resources analytics is to provide an organization with insights for effectively managing employees so that business goals can be reached quickly and efficiently. HR analytics does not only deal with gathering data on employee efficiency. Instead, it aims to provide insight into each process by gathering data and then using it to make relevant decisions about how to improve the processes. HR analytics does not only gathering data on the employee; instead, it aims to provide insights into each process by using data to make relevant decisions, improve the processes and operational performance. HR collects enough data on employee's personal information, compensation, benefits, retirements, attrition, and performance, succession time to time so it is important to use it properly to interpret the outcome and spots the trends. Analytics also used in HR to prepare cost and investment in their talent pool like cost per hire, cost per participation in training, revenue, and expense per employee. It provides an opportunity for defining strategy for retention and hires plan. It can also give a complete picture of an organizational head counts based on demographics – age, gender, geographical, departmental, qualifications etc. One such is Talent analytics; which is more qualitative and is basically for processes from talent management like personal development, recruitment, succession planning, retention etc. It can help organizations to better analyze turnover, identifying top performers, identifying the gaps and develop the proper training for them. It can also find out reasons for attrition and provide options to take strategic decision for retention as well (Raje, 2013). Workforce analytics is another common one which is more quantitative; it helps leaders to develop recruiting methods and specific hiring decisions, optimizing organization structure, identify quantify factors for job satisfaction; determine the need of new departments and positions. It also helps the organization to identify, motivate and prepare its future leaders. Align and motivate workforce and continuously improve the way of work. Predictive Analytics, based on statistics, data and becoming more attractive. It helps leaders to take more strategic decisions based on the facts. Data are generally presented in a graphic, statistical reports, dashboards which are easy for leaders to understand. It offer leaders to provide solutions to some complex decision making processes and helps them in determining critical situations like tacking pay gaps, set of workers who are always at risk of resigning, understanding the psychographics (personality, interest, work styles etc.) of employees, behavioural qualities of applicants and many more (*Thomas, 2015*).

OBJECTIVES OF THE STUDY

1. To find out the weight of each unit of the Job Role in Operations department in HPCL, MR
2. To find out competencies for each job role in Operations Department in HPCL, MR
3. To carry out a gap analysis of competencies in Operations Department in HPCL, MR
4. To identify the effectiveness of current training practices in Operations Department in HPCL,MR
5. To identify new training needed in Operations Department in HPCL, MR

Literature Review

According to Gould, et al. (2003), training needs analysis is the initial step in a cyclical process which contributes to the overall training and educational strategy of staff in an organization or a professional group. The cycle commences with a systematic consultation to identify the learning needs of the population considered, followed by course planning, delivery, and evaluation.

As Chahal (2013) said, in today's complex and fast-changing organizational environment, developing human resources is of paramount importance and training has now become one of the important segments of Human Resource Development (HRD) process. That is why the efficiency of any organization depends directly on how well its employees are trained. Training motivates employees to work efficiently and it is widely accepted as a problem-solving tool. The Human Resource Development department has to play a more proactive role in shaping the employees to fight out the challenges. Goldstein, (1993) defined training as the systematic acquisition of skills, rules, concepts, or attitudes that result in improved performance in another environment. Garrett, (2007) has explained competency map as a tool which defines the job demands. A competency map is a list of an individual's competencies that represent the factors most critical to success in given jobs, departments, organizations or industries that are part of the individual's current career plan. Competency mapping is a process an individual uses to identify and describe competencies that are critical to success in a work situation or work role.

Shulangana (2013) says, designing the competency mapping based model has always been a challenging task as there are numerous options available in choosing the techniques involved in the process.

There are various models developed for performing competency mapping in an organization. There is no one specific form of conducting competency mapping. Thus, the success or the failure of the model lies with the fact of choice of technique and the application of the techniques based on the nature of the organization.

According to Rawat (2017), the purpose of training and development can be explained as follows: Training and development programs can help in improving the quality of work produced by the workforce of an organization. Employees are able to master the work of their jobs and that's how they develop and grow themselves in a professional way. These programs help employees to keep themselves up to date with the new trends in latest technology, which reduces the chances of termination of the job. These programs help new employees to adjust themselves to a new working environment, culture, and technology. It helps organizations to easily achieve their targets and goals what they actually planned for. Training and development program clearly identifies and teaches employees about the different risk involved in their job, the different problems that can arise and how to prevent such problems. This helps to improve the health and safety measures in the company.

According to Dacee (2008), property-oriented new employees such training. It saves time and effort. Formal orientation programs reduce the time and effort required for supervisors to train new employees. In addition to these, based on the kind of job needs the organization will develop future effectiveness. Some potential objectives are to help the organization grow, to adapt technical development to fulfill responsibilities and to provide greater job satisfaction. Through training and development, important skills such as problem-solving skills,

communication skills, and team building skills are developed.

Baldwin et al (1988) in his research paper "Transfer of training: A review and direction for future research" said that companies that engage in organizational development commit to continually improving their business and offerings. The organizational development process creates a continuous cycle of improvement whereby strategies are planned, implemented, evaluated, improved and monitored. Organizational development is a proactive approach that embraces change (internal and external) and leverages it for renewal. The goal of improving communication is to align all employees with shared company goals and values. Communication is open across all levels of the organization and relevant feedback is recurrently shared for improvement.

According to Campbell (1971), training can help to standardize the operating procedures of the organization. Standardization of work procedures makes high levels of performance rule rather than the exception. Trained personnel are able to make better and economical use of the available resources and reduce wastage. Also, the trained employee reduces the rate of accidents and damage to machinery and equipment within the organization. Training program molds ties and generates better cooperation and greater loyalty as result morale of the employees is increased. Training helps to minimize dissatisfactions, complaints, and absenteeism and employee turnover. A major benefit of organizational development is innovation, which leads to product and service enhancement. Innovation is achieved through employee development, which focuses on rewarding successes and boosting motivation and morale. The top management can identify the talent, who can be groomed for handling

higher positions and responsibilities in the organization. By providing an opportunity for self-development, employees put in their best efforts and contribute maximum to the growth of the organization.

According to Goyal, S., and Chhabra, N. (2015), the training not only cultivate work knowledge and skills, develop productivity for the products and services, but rather to perform work. The prosperity of organizations becomes explicitly dependent on the intellectual capacity of their employees and their ability to change and adjust to the dynamic business environment. Through training, employee morale and satisfaction, organization productivity and service quality improvement and it also accelerates the individual and societal growth. Many challenges are ahead; but now, more than ever, the training field lives in interesting times. Training helps organizations to remain competitive by continually educating their workforce. Training and development directly improve efficiency and productivity of employees. Employees remain up to date with new technology and thus use existing ones in a better way. Creating a pool of cross-trained employees helps to bridge gaps when someone unexpectedly leaves the company - or if they accept a transfer or a promotion.

As in Roffe, I. (1999), training and development help in increasing the job knowledge and skills of employees at each level. A well-trained employee will be well acquainted with the job and hence they need less of supervision. Training creates a feeling of confidence in the minds of the employees. It gives them a security at the workplace. As a result, labor turnover and absenteeism rates are reduced. Career development can lead to higher earnings. Trained workers handle the machines safely. Thus, they are less prone to accidents and

errors. It can be concluded that in light of several benefits, training is an essential activity, which should be taken very seriously by the employees and employers.

Agarwal (2015), training need analysis is an analysis of the business needs or other reasons the training is desired. What is the organization overall trying to accomplish? The important questions being answered by this analysis are who decided that training should be conducted, why a training program is seen as the recommended solution to a business problem, what the history of the organization has been with regard to employee training and other management interventions. This is a detailed analysis of the various tasks being performed by the employee. This is an analysis of the job and the requirements for performing the work. Also known as a task analysis or job analysis, this analysis seeks to specify the main duties and skill level required. This helps ensure that the training which is developed will include relevant links to the content of the job. Analysis dealing with potential participants and instructors involved in the process. The important questions being answered by this analysis are who will receive the training and their level of existing knowledge on the subject, what the learning style is, and who will conduct the training. Do the employees have required skills. To find out changes to policies, procedures, software, or equipment that require or necessitate training.

RESEARCH METHODOLOGY

A systematic plan for conducting research was drawn using a variety of both qualitative and quantitative research methods, including experiments, survey research, participant observation, and secondary data.

In qualitative research, individuals were selected to participate in the research on their first-hand experience. Random Sampling or Probability sampling method was used for collecting the information from the respondents.

Unit of Analysis

— Operations Department, HPCL, MR

Target Population

In this study, the sampling unit was Operations Department, HPCL, MR.

Sampling Size

Though large samples give more reliable results than small samples due to constraints of time, the sample size was restricted to 211 respondents.

Sampling plan and frame:

The data was collected from the homogenous sample that is Operations Department, HPCL, MR. A sample survey was conducted to estimate the population attributes by Probability Simple Random Sampling Method.

Instruments

The development of the survey instrument and interview protocol was based on the research questions, relevant literature and the researcher's observations and prior experiences. The instrument used for this survey was the Questionnaire.

Questionnaire

Questionnaires are effective mechanisms for efficient collection of certain kind of information. A questionnaire is a research instrument consisting of a series of questions and other prompts for the purpose of gathering information from respondents ((Malhotra and Dass).

Data Analysis and Interpretation

The Tabulation was completed in Excel format and then data was analyzed. The survey was constructed so that it could not be submitted unless all questions have been answered. While this minimizes the chances that there will be missing data, data was thoroughly checked for any additional errors that may have occurred during transfer or reformatting.

Analysis and Interpretation

Question 1: How to find out the weight of each unit and that of each competency in operations department?

1, Identification of competencies required for a particular role:
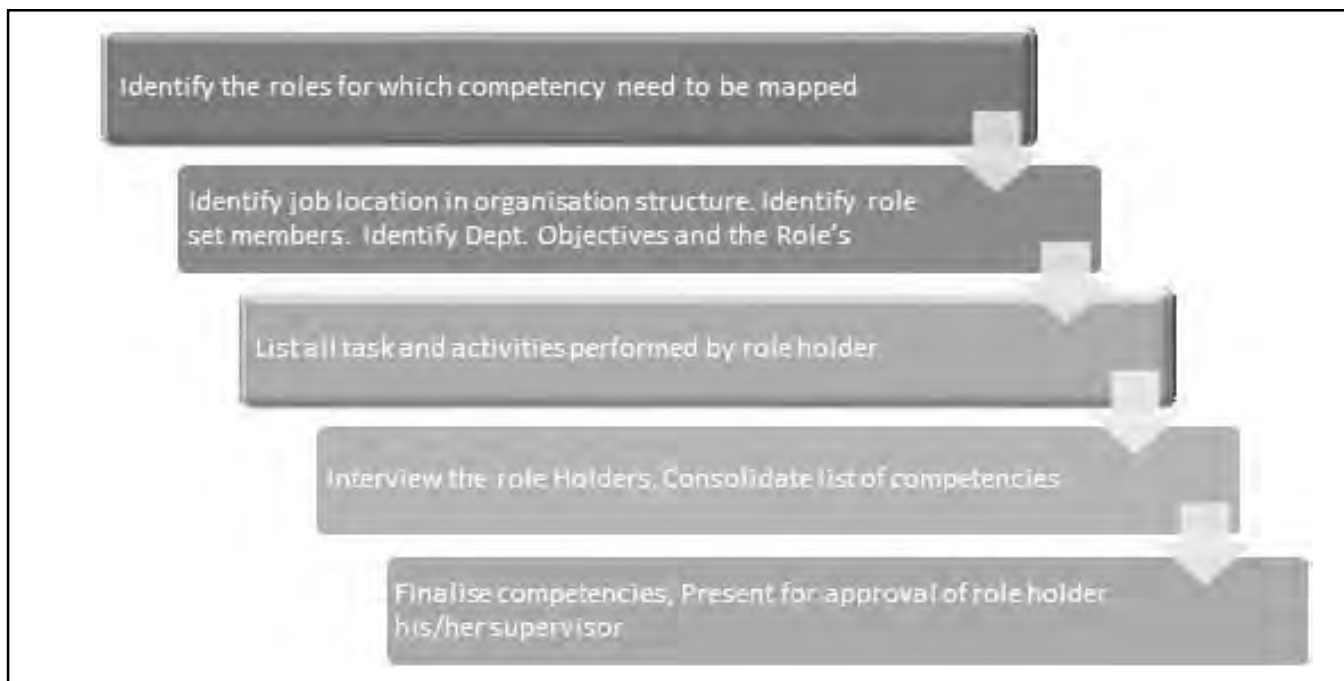
Figure 1: Identification of competencies required for a particular role

Interpretation

There are total 8 departments in HPCL,MR which are: Technical, Maintenance, Projects, Operations, Materials, Inspection, Engineering, and Safety. Out of these departments, Operations is the largest and most important one. There are total 15 roles and 211 officers in operations department with grades ranging from A-D. Each role is responsible for 7 units and each role has a list of competencies ranging from 136-167. Each of this competency is divided into 3 parts: Basic, Semi-advanced, Advanced. Based on the time consumed, importance and frequency need of the competency, each of the competencies is rated between 1-10 e.g. 5 Points to the knowledge of SOP, 1 Point to communication skills etc.

Question 2: How to carry out a gap analysis of competencies in operations department?

1. Rating competency levels:

Assessors used the following guidelines:
• Define quantifiable indicators for each competency
• Find out the level of the workforce by making them rate themselves on each competency
• Finalise and present for approval of role holders' supervisor

2. Competency Scoring:

Step 1: Competencies have been segregated into three levels of expertise (Basic, Semi-advanced, And Advanced) and rated as follows:

1. Y – Adequate Knowledge of the desired competency (100% Point)
2. P – Partial Knowledge (50% Points)
3. N – No knowledge of the required competency (0 Points)

Step 2: Weights are assigned to each competency based on its importance.

Step 3: Competency score is calculated for each employee using the following formula:-

$$\frac{\text{(Competency Level x Weight Assigned to Competency)}}{\text{Total Weight of Competencies for the particular role}}$$

3. Preparing training calendar:

• Based on the results of steps 1, 2 and 3; identification of areas to be focused is done.
• Individual, as well as departmental performance, is mapped and name, number of officers who should attend training are listed down.
• A training calendar is then prepared which includes above-mentioned factors in a systematic format.

Interpretation:

• Sections with highest average
  Competency scores: Onsite Operations -FRE and Power and Utility
• Section with lowest average competency score: P&U : CPP, Offsite Operations -LR Offsite
• Sections above thresh hold: FRE, GFDS, LR, LOUP, Utility, FR, FRE&LR
                                        Managers & RSM
• Sections below Threshold: Combination, LRE, CPP, FR Offsite, FR
                                        Automation, FR Offsite.
• Average Competency Score Basic: 85%
• Average Competency Score Semi Advance: 66%
• Average Competency Score Advance: 63%

Findings:

◉ Sections with highest average competency scores:

Onsite Operations –FRE, Power, and Utility

◉ The section with lowest average competency score:
CPP, Offsite Operations –LR

◉ Sections above thresh hold:
FRE, GFDS, LR, LOUP, Utility, FR, FRE&LR Managers & RSM

◉ Sections below Threshold:
The combination, LRE, CPP, FR Offsite, FR Automation, FR Offsite.

CONCLUSION & RECOMMENDATIONS

Training needs analysis (TNA) addresses the problem of methodically discerning the actual gaps in the needed skills of the workforce. TNA at Organization level takes a critical look at the organization's mission, vision, goals, and objectives and how the organization's internal environment and culture and the existing employees' competencies are conducive for the achievement of the organizational goals. During training need analysis at HPCL, it was found that training effectiveness variables found to be related to post training attitudes. These attitudes were input indicators such as objectives of the organizations and training need analysis and process indicators such as training methods, size of participants, and periodical training. The first step in a successful training calendar is to determine that a training need exists through a process known as a needs assessment. Needs assessment involves three steps: organizational analysis, person analysis, and task analysis. Various methods—including observation, interviews, and surveys or questionnaires—are used to conduct a needs assessment. There were two

types of training programmes for the employees: Behavioural and technical.

• Out of technical and behavioral competencies, technical competencies are needed to be focused more at this point keeping the long-term goal of the project in mind

• Officers are efficient at Basic level of skills. However, semi-advanced and advanced level skills are needed to be enhanced

• There is a shift in average age of A, B, C, D grades. As new and young employees are joining, training related to basic competencies will need more attention in the future.

• Officers prefer external tutor over internal tutor.

• Updating job role competencies, training methods and employee records on a timely basis is required.

Analytics is always an important topic and trend in every part of business and HR is also not far behind. Today many organizations are looking for metrics or analytics in HR which are not just related to people but also on processes such as recruitment, retention, compensation, succession planning, benefits, training & development, performance and appraisal and many others. In short Talent, analytics is becoming more popular these days as companies are doing a lot of efforts to cultivate and align HCM with core business objectives in order to achieve a competitive fringe. HR analytics is the application of advanced data mining and business analytics techniques to employees' data. Thus, HPCL can also benefit from HR analytics by aligning it with different subsystems of HR, which would not only help in the assessment of training need in advance but also in predicting retention and extensive modeling capabilities for workforce planning.

REFERENCES

1. Agarwal, N. (2012). An Analysis of Employability Skills and Associated Training Needs. *Information Technology Industry*. 42-48.

2. Baldwin, T. and Ford, K. J. (1988). Transfer of training: A review and directions for future research. 23-25.

3. Campbell, John P. (1971). Personnel training and development. 174.

4. Chahal, A. (2013). A Study of Training Needs Analysis Based Training and Development: Effect of Training on Performance by Adopting Development Based Strategy. *International Journal of Business and Management Invention, 2*(4).

5. Dawson, C. *Introduction to Research Methods: A practical guide for anyone undertaking a Research Project*. Fourth Edition-ISBN-978 1 84528 367 4.

6. Ferreira , Rodrigo & Abbad, Gardênia (2012). Training Needs Assessment: Where We Are and Where We Should Go. 80-81.

7. Gould, Dinah, Kelly, Daniel, White, Isabel & Chidgey, Jayne (2003). Training needs analysis: A literature review and reappraisal. 1.

8. HPCL Handbook on Capability Building.

9. Jog, Amol (2012). An analytical study of the impact of corporate training compared to mainstream education on the employability today with special reference to Pune, Mumbai, Kolkata, Delhi, and Bangalore. 27—29.

10. Kothari, C. (2016).Research Methodology methods and techniques (2nd edition).

11. Kumar, R. (n. d.). Research Methodology. APH Publishing Corporation.

12. Malhotra, N. K. (2010). *Marketing Research*: An Applied Orientation, 6th Edition, Pearson.

13. Raje, A. (2013). People Team, in https:// startups.sap.com/how-analytics-are-becoming-important-for-hr/

14. Raman, G P (2005). The effectiveness of employees training a study with reference to Chennai Petroleum Corporation Limited. 17-21.

15. Rawat, Babita (2017). Workforce Training and Development for HR Capacity Building in Some Selected SMEs of Uttarakhand. 32-45.

16. Roffe, Ian (1999). Innovation and creativity in organizations: a review of the implications for training and development. *Journal of European Industrial Training, 23*(4/5):224-241.

17. Sarkar, Shulangana (2013). Competency-based Training Need Assessment – Approach in Indian companies. 253-256.

18. Shah, C. R. (2016). The effectiveness with special reference to Sales Staff of Pharmaceutical Industry of Ahmedabad Region. A Thesis submitted to Gujarat Technological University for the Award of Doctor of Philosophy in Management.

19. *Thomas, W. (2015).* https:// www.trainingzone.co.uk/lead/strategy/the-importance-of-hr-analytics.

20. Training material development guide, Swedish Civil contingencies agency.

21. Velayudhan, T. K., and K. Maran. (2009).A study on Mapping Core Competencies and development of Employees for Excellence with reference to HCL Technologies. *Journal of Contemporary Research in Management*, 53-67.

22. Yin, Robert K. (2003). *Applications of Case Study Research.* Sage Publications Ltd., New Delhi.

23. Yin, Robert K. (2003). *Case Study Research: Design and Methods*. Sage Publications Ltd., New Delhi, 3rd Edition.

24. http://www.hindustanpetroleum.com/, Retrieved on 15th May 2017.

25. https://www.mindtools.com/pages/article/kirkpatrick.htm, Retrieved on 21st April 2017.

26. http://www.yourarticlelibrary.com/training-employees/models-of-training-employees-steps-transitional-and-instructional-system-development-model/29548/, Retrieved on 1st May 2017.

27. http://www.london.ac.uk/fileadmin/documents/staff/staff_development/tna.pdf, Retrieved on 3rd December 2017.

28. https://www.slideshare.net/jincegomez/training-evaluation-model, Retrieved on 25th November 2017.

29. http://study.com/academy/lesson/research-methodology-approaches-techniques-quiz.html, Retrieved on 29th August 2017.

30. https://explorable.com/probability-sampling, Retrieved on 26th November 2017.

31. https://www.sutihr.com/blog/role-of-hr-analytics-in-workforce-management/, Retrieved on 18th October 2017.

32. https://www.hrtechnologist.com/articles/learning-management-systems/tips-for-effective-training-needs-analysis/, Retrieved on 22nd September, 2017.

Chetana's

Institute of Management & Research

The Language of Wine: An Analytical Study of Wine knowledge of Women Wine Consumer in the City of Mumbai (India)

* Dr. Aditi Raut
** Mr. Harshal Gangurde

Abstract

Globalisation has brought the significant transition in terms of new products and services in Indian market. Luxury/lifestyle product segment is one of the niche but prominent segment in Indian market .The fermented beverage product made of grape called 'wine" has gained importance in this market over a last decade. The market data shows a positive growth in market size. Consumer base is also increased over the years including youth and women. Women consider wine as a sophisticated drink. Actually wine is a complex product offering. It consists of colour grape variety region, tasting notes, food pairing ect. These aspects are important for a wine consumer while selecting a wine in matured wine market. India is still un matured wine market. As a result the wine related knowledge of Indian wine consumer is yet to evolve to the full extent. The paper focuses on understanding of women wine consumer about various aspects related to wine while choosing a wine. The main objective of the paper is to know consumers' basic understanding about wine in terms of grape variety.

1. INTRODUCTION

Globalisation has transformed Indian way of life. Economic reforms in 1991 opened business opportunities for global companies in India. As a result Indian middle class started enjoying good level of income pattern than their earlier generations. Origen travel became affordable for them. Many professionals travelled abroad frequently for the work purpose. They were exposed to newer type of food and beverages. Wine is one the trend which was adopted by them as an alternative to hard liquors. In 2001, implementation of the 'Maharashtra Grape

Processing Policy' stimulated a boom in the State's wine production from 712 kiloliters in 2002 to over 20 million liters in 2008-09. In 2008, the 'Karnataka Wine Policy' simplified the process for, and reduced the cost of, obtaining a winery license to significantly expand the market. (Dezan Shira 2015) In addition, to further promote investment and production, the States established a number of integrated wine parks which provide basic infrastructure facilities and offer incentives for new units such as: a 100 percent exemption from excise duty for 10 years, relief in sales tax levels and subsidies for production duties. As a result, many new win-

*   Assistant Professor Chetana's R.K.Institute of Management and Research
** Researcher, MCA

eries have since commenced production.

2. INDIAN WINE MARKET

Since last decade India is emerging as an important wine market. Penetration of wine is low: 2-3 million consumers consume total 24 million litres. India is 11th biggest wine consuming country in Asia-Pacific region.

As reported by The Indian Express, by 2017, wine consumption in India will have increased to 2.1 million cases, up 73% from the 1.10 cases consumed in 2013.According to the Vinexpo survey, Indians are likely to drink 1.15 million cases of red wine, 0.63 million cases of white wine and 0.10 million cases of rosé by 2017. More than 61 per cent of the wines drunk in India are red and this segment is expected to grow by 71.6 per cent between 2013 and 2017. Red and White, both are traditional wine in India which will continue to grow in coming years. Whereas sparkling wine and rose wine are comparatively new categories in the country which are expected to catch the market fast. Sparkling wines has the most promising future with many players entering this category and active promotions in five-star and mid-tier hotels. Sula Vineyards dominate the India wine market with other prominent players like Grover Vineyards Majority of India's wine regions are concentrated in the south-western part of the country, primarily in the state of Maharashtra and Karnataka. Among regions, western India has the highest wine sales, followed by north and south. Domestically, 80% of wine consumption is confined to major cities like Mumbai, Delhi, Bangalore and Goa. Moreover sales from retail dominate the market as compared to institutional sales. India's economic growth rate over the past years, growing disposable income, increasing foreign travel, exposure to global lifestyle,

younger screwing demographics, higher social acceptability of women consuming alcoholic beverages, easier availability through newer retail formats, greater awareness of the health benefits of wine, government measurement of delinking wine from hard liquor, are the major factors for growth of wine market in India.

3. INDIAN WINE CONSUMER

The Indian wine drinking community is estimated at two million consumers who, along with expatriates and foreign tourists. Wine drinkers are drawn largely from the estimated 20 million upper income consumers (two percent of the population). These consumers tend to have rising levels of disposable income, greater exposure to foreign foods through travel and a willingness to try new products. Other factors for the development of the wine market such as high levels of education, a young population and fluency in English. A growing awareness of health issues is causing some consumers to switch to wine from drinks with higher alcohol content. In Delhi and Mumbai, serving wine at dinner events is becoming more common and wine consumption is considered a sign of status for some. Given high costs, imported wines are typically consumed on special occasions or given as gifts. Red wine is the most popular wine, accounting for 45 percent of consumption, followed by white wine at 40 percent, sparkling wine at 10-15 percent and rose at 1-5 percent. Wine is primarily an urban drink and the states of Maharashtra (home to Mumbai) and Karnataka (home to Bengaluru), the Delhi metro area and the tourist destination of Goa account for an estimated 75 percent of wine consumption. The states of Andhra Pradesh, Assam, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal are the next largest consuming areas, but consumption levels are low.

Source: http://asia.nikkei.com
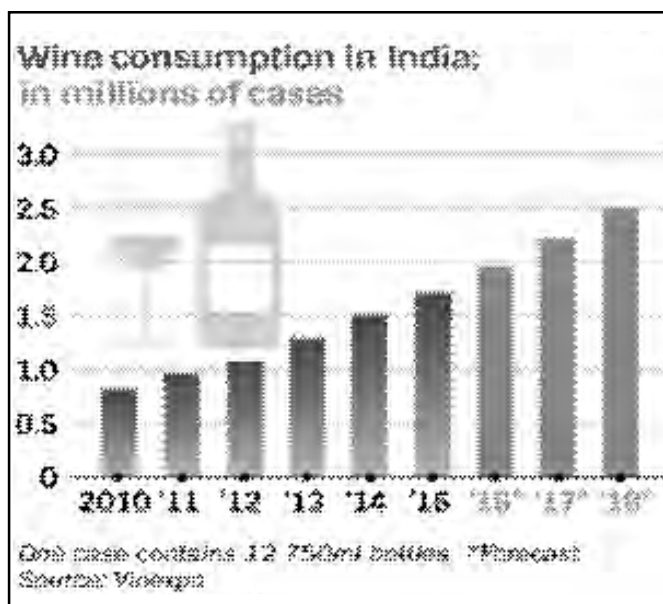
4. WOMEN WINE CONSUMER

One of the dramatic changes occurring in India today is an increase in social freedom for women. Traditionally it was taboo for women to drink alcohol at all, much less in public, but today record numbers of women are starting to sip a glass of wine while dining out. Women themselves are becoming financially independent, thus able to make their own decisions about how they will behave and how they will live their lives. An estimated 75 % of urban affluent young Indian women now drink wine occasionally, according to the Indian Wine Academy. Women are drinking more wine because they consider it a „sophisticated drink that „raises their stature in social gatherings. They prefer to visit exclusive wine retail outlets than a conventional wine shop. Booming metropolitan areas with large middle class communities provided the perfect areas for greater wine consumption. Today drinking for young women in tier 2 cities will be socially acceptable. Increasingly, many consumers are opting to drink wine at home, indicating a move towards changing cultural mindsets. Wine is being regarded as cool, aspirational and a healthy beverage.

5. REVIEW OF LITERATURE

Mukund Padmanabhan (2010) in his article talks about What do Indians like to drink But do we really know? The problem is not merely that we don't have anything remotely close to a proper survey on Indian wine drinking habits. Also, the wine produced in India is not diverse enough to throw much light on consumer preferences. Yes, domestic production accounts for a little over 6 lakh cases, something like 75 per cent of the total wine consumed in the country. But despite the increase in the number of varietals, the consumer is pretty starved of choice when drinking wine produced in India. Red wine is mainly Cabernet Sauvignon, Shiraz or a blend of the two. Most whites in the market are either Chenin or Sauvignon Blanc. There is a preference for reds over whites. Sixty five per cent of the wine he imports are reds. Younger people consume a lot of wine. Over 50 per cent are within the 25 to 35 age bracket and possibly another 25 per cent between 35 and 45.In retail sales, there is a marked preference for new world wines — from countries such as Australia, Chile and South Africa. It's possible that consumers see better value in them. **Manu Vipin (2011)** in his article Raising a toast to Indian wine says that Upwardly mobile Indians are taking to wine drinking. Thanks to the availability of quality Indian and international brands and a high disposable income. The wine connoisseurs say Indian wine has come of age. It is a new industry and there is mass production because of the subsidy allotted by the government. There are a lot of wine floating in Maharashtra, Bangalore, Delhi and Kolkata. But it is yet to trickle down to smaller cities. So wine has

a great scope in Indian market to grow. **Bhisham Mansukhani (2011)** in his article Cheers to new Indian wine Over the past few years, Indians have been steadily increasing their consumption of wine. So much so that until the recent global economic meltdown, the rate of growth of the country's wine market made wine exporters from countries such as France, Italy and Australia giddy thinking about the number of cases they could drop at Indian ports. But despite the hype surrounding the wine market, the choice of local wines has been limited to a quartet of French varieties grown largely in Nashik. **Anumeha Chaturvedi (2017)** from economic times writes in her article in that Sonal Holland Wine Academy commissioned Drshti Strategic Research Services conducted the first-ever comprehensive survey of the urban Indian wine consumer. According to survey results, Consumers' understanding of wine is limited; however, awareness and consumption are positively related. Other than colour, there is very little involvement with other wine styles; names of regions and grape varieties remain under-developed cues. This points out to the nascence of the wine market in India, and the scope for educating and involving the consumer. Price remains the most important choice cue for consumers. Women represent an increasingly important market segment for the wine industry. Indian women view wine as a classy, empowering, healthy beverage and are experiencing fewer cultural inhibitions when drinking wine in the presence of their family members or the society at large. Women are purchasing wine as often as men across all occasions .According to **Zina Ray Chaudhari (2017)** from scroll.in ,Indian wine consumer is still not able to differentiate a Cabernet Sauvignon from a Sauvignon Blanc, or a Pinot noir from a Pinot Grigio.

6. RESEARCH METHODOLOGY

6.1 Purpose of the study:
Based on the above literature review this study attempts to find out women wine consumers knowledge about wine.

6.2 Objectives:
- To find out women wine consumers understanding about different type of wine grapes
- To explore the women wine consumers awareness about wine regions.
- To understand women wine consumers depth of wine knowledge.

6.3 Consumers Responses:
- Data Collection tool- Questionnaire
- Method of Sampling- Snowball Sampling
- Sample Size- 146 Women
- Area- City of Mumbai

6.4 Hypothesis:
(Ho) hypothesis –More than 50% of women wine consumers in Mumbai are with actual deep knowledge about the wine.

(Ha) hypothesis- Less than 50% of women wine consumers in Mumbai are with actual deep knowledge about the wine.

7. ANALYSIS OF DATA

Research focuses on validating women wine consumers from Mumbai are still lack deep knowledge about wine. The quantification of deep knowledge for the scope of study is using Bayesian Technique i.e. expected probability of deep knowledge women wine consumer is still less than 50%.

Thus the key hypothesis for research study of women wine consumers in Mumbai is to statistically validate that for given sample #no of respondent having deep knowledge are less than half (50%).

The answers to research study survey questions (question 8, question 9, question 10, question 11 and question 12) are been used for hypothesis testing.

Based on literature a expected answer from given choice of answer for questions used for hypothesis is initially established based on research literature. Below table indicates question identity used for this hypothesis testing and respective correct answers to identify deep knowledge of wine consumers.

Table 1

Id	Question	Answer options	Correct answer to indicate deep wine knowledge
Q8	When at a restaurant and a small amount of wine is poured to taste, the purpose here is to	See if you like the wine, Make sure it is the wine you thought It was spoiled	spoiled
Q9	Black pepper, plum and blackberry flavors describe which wine	'Chardonnay', 'Riesling', 'Shiraz' 'Chennin Blanc', 'Sauvignon 'Blanc.	Shiraz
Q10	Red wine grape	'Merlot', 'Pinot Grigio', 'Gewürztraminer' 'Muscat', 'Semillon', 'none'	Merlot
Q11	Not a famous Indian wine region	'Bangalore', 'Nasik', 'Satara', 'Sangli', 'Champagne'	Satara
Q12	Not white winegrape	'Malbec', 'Grenache', 'Sangiviose' 'PinotGris', 'Cabernet Sauvignon'	Sangiviose

Source: own data

For hypothesis testing a derived conditional Boolean variable "deep Knowledge" is established which is set to TRUE for each of respondent if he answers all key five questions i.e. Questions referenced in Table1 correctly with expected correct answers. All respondents with all five questions answered correctly are considered as deep knowledge women wine consumers in Mumbai. All count of respondents with all five questions correctly answered is considered as success trails out of total sample size.

On next page Diagram 1 summarize respondent's frequency table for the five of the questions (associated with hypothesis) to ascertain their deep knowledge in wine. As per table among 146 respondents from sample size only 16 respondents answered all five questions correctly (also referred as success trails). The table indicates that there are 119 different combinations of answers out of which only 2 combinations, which form correct answer to deep knowledge of wine. The combination of correct answers rows and their corresponding sum of count of respondents of 16 are been marked in

"yellow" in the table below. This success trails or women wine respondents count sum of 16 will used for hypothesis testing.

Diagram 1: Deep knowledge in wine
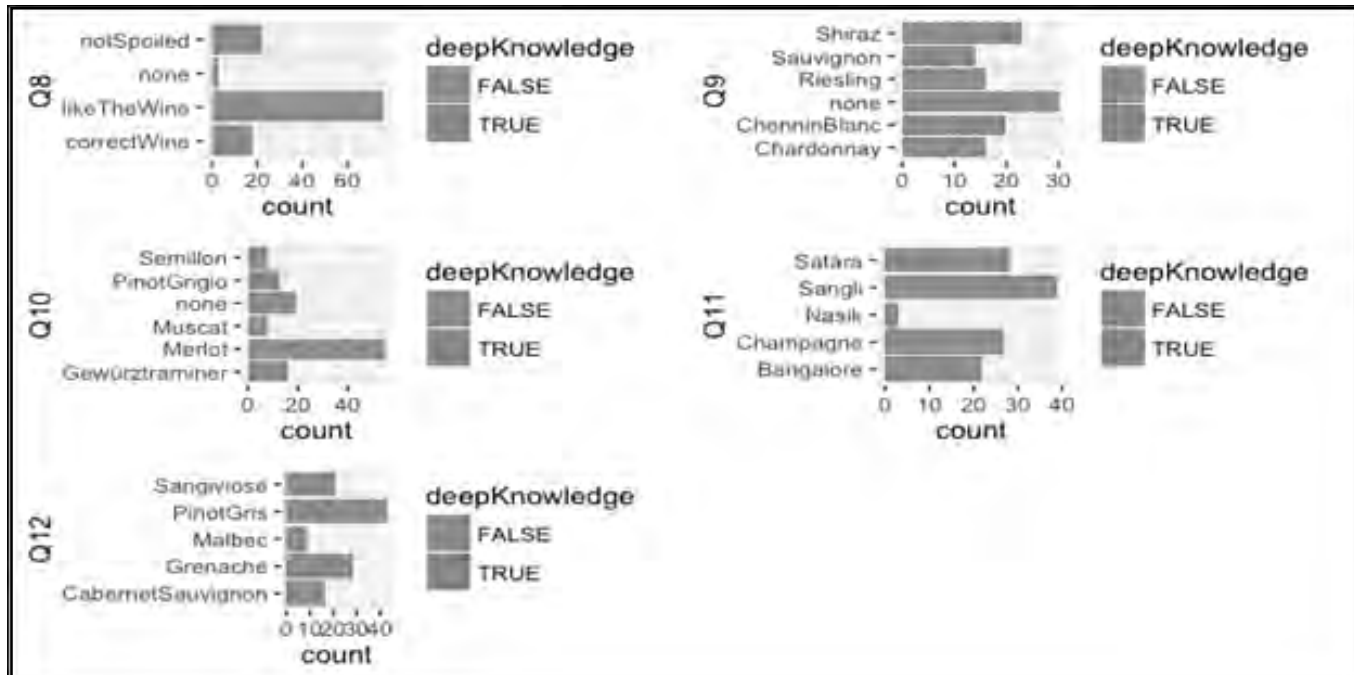
Source- own data

The above diagram is divided in five discrete grids with each of grid charting respondent's response analysis using bar graph. Each of grid panel in diagram has bar plot corresponding to each of question having question identity as they are uniquely reference in table 1. Further for better visualization each of bar indicating correct answer for question is further divided using shaded color to indicate how many respondents who also correctly answered the other four questions related to deep wine knowledge and are part of deep knowledge respondents (also referred as success trails).

Additional **Diagram 2** below is Venn diagram showing small overlap area of intersections at the center indicating 16 women respondents who an-swered all five questions about deep knowledge of wine questions correctly.

Diagram 2: Intersections at the center indicating 16 women respondents who answered all five questions about deep knowledge of wine questions correctly.
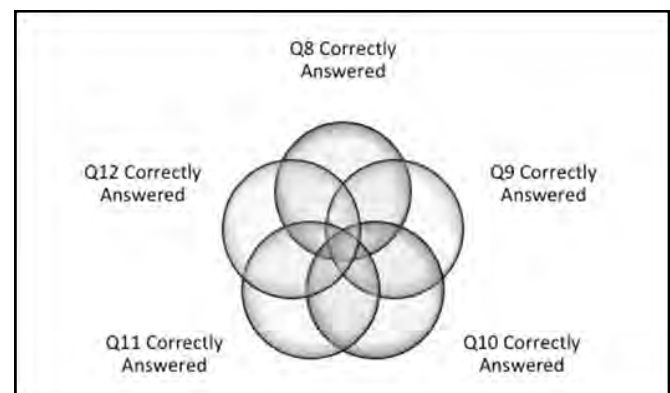
8. TESTING OF HYPOTHESIS

Hypothesis – Less than 50% of women wine consumers in Mumbai are with actual deep knowledge about the wine. The data indicating deep knowledge is built as binary Boolean variable derived from interaction of respondents count who answered all five questions (associated with hypothesis and mentioned in table <table id> above) correctly.

Null hypothesis – More than 50% of women wine consumers in Mumbai are with actual deep knowledge about the wine.

Alternate hypothesis - Less than 50% of women wine consumers in Mumbai are with actual deep knowledge about the wine.
Sample size (n) – 146

Expected portion to have deep wine (p) – 0.5 (i.e. 50%)

Success trails counted from sample survey data (x) – 16

Type of test (alternative=less) – One tail sign test also called one tail binomial test

Confidence Interval – 0.95 (i.e. 95%)

Since survey sample data is not a normal distribution and does not have representative quantified data (i.e. population mean or standard deviation) that represents true population a non-parametric test is preferred. The outcome variable of deep knowledge flag is binary response variable a non-parametric sign test that represent statistical test for binomial random response.

Table 2 Statistical output

R Stusio 1.1.383 (GNU Desktop distribution)
>binom.test(x=16,n=146,p=0.5,alternative = "less",conf.level=0.95)
Exact binomial test
data: 16 and 146
number of successes = 16, number of trials = 146, p-value < 2.2e-16
alternative hypothesis: true probability of success is less than 0.5
95 percent confidence interval:
0.0000000 0.1616813
sample estimates:
probability of success
0.109589
>

A desktop based R Studio version 1.1.383 software was used for statistical analysis. The above table 2 shows actual as-is output from non-parametric single tails sing test run using binom package of R. The statistical sign test shows p-value of 2.2e-16 which is much less than 0.05 critical p-value. The output of statistical test indicates that for given parameters our test p-value fall well outside 95% confidence interval for single tail. As result or inference of test is that, null hypothesis is rejected and alternate hypothesis that less than 50% of women drinking wine consumers in Mumbai have deep knowledge about wine.

9. CONCLUSION AND SUGGESTIONS

From the above data it is clear that women wine consumers still need to know more about wine in terms of region ,wine grapes, storage of wine ect. Wine marketers should come up with frequent wine tasting sessions about their flagship brands. This would alter the price challenge in market to some extent. They should also emphasis on food and wine pairing with a particular combination of wine. They can also come up with wine basics sessions in corporate offices which would talk about their wine region, grape type, year of vintage ect. Social media can be also used for the same. Wine companies can come up with basic wine knowledge quiz app and discount coupons through it. As Indian wine consumer is price sensitive, this would help to increase consumer knowledge base as well as sales of wine manufacturer.

REFERENCES

1. Caroline Verghote, Barry J. Babin, Caroline Verghote (2012)," Personality Matters to Young Wine Consumers",

   http://academyofwinebusiness.com/wp-content/uploads/2016/03/12.-Personality-Matters-to-Young-Wine-Consumers.pdf

2. Ponnam, A., Acharya, A., Mitra, A. N., Banerjee, P. (2017)," Deterrents to wine consumption in the emerging market of India: A qualitative study", International Food Research Journal 24(3): 1034-1045

3. INDIA WINE INSIDER 2017 The Consumer Outlook

4. Zinnia Ray Chaudhuri (2017), "The average Indian wine drinker can't tell a Cabernet Sauvignon from a Sauvignon blanc", https://qz.com/944731/the-average-indian-wine-drinker-cant-tell-a-cabernet-sauvignon-from-a-sauvignon-blanc/

5. S. S. Gawande, Priyanka Shukla, Atul Anand Mishra (2017), "Study on Wine Policies, Regulations and Standards in Maharashtra, India",

   http://article.sciencepublishinggroup.com/pdf/10.11648.j.stpp.20170102.11.pdf

6. Brunner T. and M. Siegrist (2011b) Lifestyle determinants of wine consumption and spending on wine, International Journal of Wine Business Research Vol. 23 No. 3, pp. 210—220

7. Jarvis, W., Rungie, C., & Lockshin, L. (2003). Analysing Wine Behavioural Loyalty . Paper presented at the 1st International Wine Marketing Colloquium, University of South Australia, Adelaide.

8. R.K. Srivastava (2013) 'Perception Study of Wine Market Culture of an Emerging Market-India- Will it Emerge from Infant to Growth Stage?' ttp://www.omicsgroup.org/journals/perception-study-of-wine-marketculture-of-an-

emerging-marketindia-will-it-emerge-from-infant-to-growth-stage-2169-0286.1000106.pdf

9. Bheemathati S. (2015), An Overview: Recent Research and Market Trends of Indian Wine Industry. J Food Processing & Beverages.

10. Resnick, E. "Wine Brands. Success Strategies for New Markets, New Consumers and New Trends." Palgrave Macmillan Editor – (2008) p 36

11. Adrian Stancu (2015), "An analysis of the relation between wine consumption and cultural models", Economics of Agriculture, http://www.ea.bg.ac.rs/images/Arhiva/2015/Broj%201/14%20-%20Stancu%20Adrian%20-%20EP%201%202015.pdf

12. Ahsan (November 9, 2011) Wine Consumption Explodes in India [online] retrieved from http://daringsearch.com/2011/11/09/wineconsumption-explodes-in-india

13. Dezan Shira & Associates (2015), ‾Investing in India's Emerging Wine Industry, India Briefing, http://www.india-briefing.com/news/india-wine-9761.html/

14. Reporter, The Hindu (2014), ‾Wine is the word, http://www.thehindu.com/features/metroplus/wines-theword/article5814608.ece

15. Lucy Shaw (2014), India's wine consumption to rise by 73% , The drinks business, http://www.thedrinksbusiness.com/2014/03/wine-consumption-in-india-to-be-up-73-by-2017

16. Editor, Customer Click (2014), ‾Consumer's taste in wines is evolving, even though the awareness about wines is still low, ustomerclick.in/2014/03/06/consumers-taste-in-wines-is-evolving-even-thoughthe-awareness-about-wines-is-still-low

17. Lockshin, L. and Hall, J. (2003), Consumer purchasing behaviour for wine: what we know and where we are going, paper presented at International Wine Marketing colloquium, Adelaide.

18. Barber, N., Ismail, J., & Dodd, T. (2008). Purchase attributes of wine consumers with low involvement. Journal of Food Products Marketing, 14(1), 69–86.

19. McCutcheon, E., Bruwer, J., & Li, E. (2009). Region of origin and its importance among choice factors in the wine-buying decision making of consumers. International Journal of Wine, 21(3), 212–234

20. Anumeha Chaturvedi (2017), "50% of Indian consumers order wines exclusively by glass: Wine survey",economictimes.indiatimes.com/articleshow/57648478.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst

21. Mukund Padmanabhan (2010),"Pairing the Indian way", The Hindu,http://www.thehindu.com/life-and-style/Pairing-the-Indian-way/article12572623.ece

22. Manu Vipin (2011),"Raising toast to Indian wine", The times of India, https://m.timesofindia.com/raising-a-toast-to-indian-wine/amp_articleshow/9694365.cms

23. Bhisham Mansukhani (2011), "Cheers to new Indian wine", The times of India, https://timesofindia.indiatimes.com/Cheers-to-new-Indian-wine/articleshow/6094824.cms

Chetana's
Institute of Management & Research

A study of the Impact of News Items on Stock Market

* Prof. Rabindra Kumar Singh, Prof. Rashmi Kanitkar
Rohit Thorat, Yogesh Neve, Priya Tiwari, Sahil Patel

Abstract
Data analytics is a process of examining and processing the data quantitatively as well as qualitatively for better understanding and to draw the conclusion that will help in improving business gains. Firms are analyzing huge volumes of numbers and data, to understand stock trends. Article published in business newspaper impact the decisions of the investors and thus can change the stock market price trends. Forecasting the impact of news on different categories of news articles in the stock market have been recently developed and researched. This research paper aims to find out the appropriate newspaper and further, it's specific section that can help investors in their effort of identifying market trends. For this purpose, the stock market data and various news items for last three years have been analyzed and a few conclusions have been drawn.

Keywords: *Data analytics, Stock market, Business newspaper*

1. INTRODUCTION

It is a dream of every investor to invest wisely and profitably in the stock market. For this purpose, every investor would like to pre-judge the trends in the stock market.

The stock market and its trends are dynamic in nature. The stock price of a company or a sector are also affected by the news articles and feeds. Incoming news can be of various types - such as latest earnings statements, the announcement of dividends by a company, information about new products, and trend analysis and prediction by financial experts [G]. This news and articles influence an investors' decision about an investment.

Different newspapers have different competencies. Between all business newspapers a sea of information is generated every day. Due to time constraint, it becomes tedious for a general investor to sieve the news and focus on the most pertinent news. Therefore, if an investor can identify newspapers which mostly gives "influential" news then it will be welcomed.

* MMS Students, Chetana's R K Institute of Management & Research, Working Papers Series

With the help of various statistical tools like regression analysis, an effort is made in the present study to understand the relationship between different types of news, coverage of news and the company performance on the stock market.

2. LITERATURE REVIEW

Prediction of Stock market price has always been an active area of research as effectiveness is directly linked to returns in stock. Therefore, over the recent years, more emphasis is given to improve effectiveness by considering various parameters. Various researchers showed the strong correlation between news articles and fluctuation of the stock market. This research motivated to push further the work for prediction of news source and location of the news in the source.

X. Zhao (2007) [D] The impact of financial news articles on Chinese stock markets was investigated where Support Vector Regression (SVR) was used to show that releases of online financial news have negative impacts on the market.

Wüthrich et al. (1998) [A] made the first attempt to use textual information for stock market prediction. A dictionary of terms obtained from a domain expert was utilized for assigning weightings to features and generating probabilistic rules to predict daily price changes of five stock indices. A trading strategy based on the system predictions demonstrated that positive returns can be gained using financial news.

R. P. Schumaker (2009) [E] Trading systems provide a huge amount of textual data to capital market traders. Official announcements, analysts' recommendations, financial journals, discussion boards and news feeds from news wire services are examples of information available to investors.

Yauheniya Shynkevich (2015) [B] studies how the results of financial forecasting can be improved when news articles with different levels of relevance to the target stock are used simultaneously. They used multiple kernels learning technique for partitioning the information which is extracted from different five categories of news articles based on sectors, sub-sectors, industries etc.

Elkan (2001) [F] created a system for predicting short-term price movements. News articles were aligned scored using linear regression in relation to the NASDAQ index and then assigned with an "up", "down" or "unchanged" label. The author concluded that the stock behavior is strongly correlated with the content of a news article from 20 minutes prior to 20 minutes after the publication.

Lavrenko et al. (2000) [C] developed the Analyst system that included language models, used the price time series and classified the incoming news. The authors showed that profits can be produced using the designed system.

Tetlock (2007) [D] examined the interactions between the content of daily articles published by the Wall Street Journal and the stocks. The findings showed that highly pessimistic news cause a decrease in market prices and notably increase trading volume.

Anurag Nagar (2012) [G] explored whether the simultaneous usage of different financial news categories can provide an advantage in financial prediction system based on news. Five categories of news articles were considered: news relevant to a target stock and news relevant to its sub-industry, industry, group industry, and sector.

The above studies show that news is an important parameter in predicting stock prices. Considering time constraint of a general investor, predictive newspaper with specific sections shall be helpful. With this view, the following study has been undertaken.

3. OBJECTIVE OF THE STUDY

The purpose of the study is to find out appropriate business news-paper & specific sections in the same for the convenience of the general investor.

A. To identify the business newspaper that covers the extensive news about the companies under study

B. To study the impact of nature of news on the stock return

C. To study the impact of the category of news on the stock return

D. To study the impact of page number category of news on the stock return

E. To study the impact of news source on stock return

F. To guide the investor about the choice of business newspaper and specific business section

Defining hypothesis

H_0 (Null Hypothesis): $\beta_1 = 0$ (There is no significant relation between Stock return and News Type)
$\beta_2 = 0$ (There is no significant relation between Stock return and Page category)
$\beta_3 = 0$ (There is no significant relation between Stock return and Nature of news)
$\beta_4 = 0$ (There is no significant relation between Stock return and Source of news)
H_1: β_1 "0 (There is a significant relation between Stock return and News Type)
β_2 "0 (There is a significant relation between Stock return and Page category)
β_3 "0 (There is a significant relation between Stock return and Nature of news)
β_4 "0 (There is a significant relation between Stock return and Source of news)

4. RESEARCH METHODOLOGY:

For this purpose, the circulation of various business newspapers was considered and following the news, business newspapers were identified.

Economic Times   - 620000 copies
Business Line   - 177000 copies
Business Standard   - 14000 copies
Financial Express   - 84000 copies
Financial Chronicle   - 77000 copies

We choose these newspapers for our research paper because these newspapers hold a large share in all business newspapers.

For the study, various major sectors were identified but due to time constraint three most volatile sectors – Banking, Power & Automobile; were considered. Further, from each sector, a lead player was considered.

HDFC Bank – 8.9% share in Nifty Index
Reliance Industries – 6.63% share in Nifty Index
Maruti Suzuki India – 2.49% share in Nifty Index

In the present study share prices and news articles from **1st October, 2014 to 30th September 2017** were analyzed. These three 3 years were specifically chosen because this period experienced several tax reforms, amendments in the constitution, changes in tax policy and major happenings like demonetization etc. took place in last three years.

The news that had an impact on stock prices and the actual stock prices of above-mentioned companies were studied.

In the present study different statistical tools like regression analysis, average, standard deviation, normal distribution, frequency calculation, confidence interval etc. have been used.
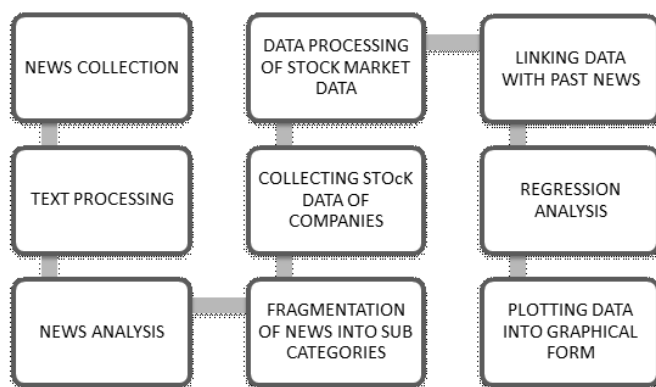
5. RESEARCH PROCESS

Figure 1

5.1 NEWS COLLECTION:
In present research paper, we collected news from www.indiabusinessinsight.com[J] of above-mentioned newspapers for past three years, from 1st October 2014 to 30th September 2017.

5.2 TEXT PROCESSING:
Text data is unstructured data. So, we cannot provide raw test data to the classifier as an input. Text processing is manipulation of text especially the transformation of text from one format to another.

5.3 NEWS ANALYSIS:
In an analysis of news, we measured various qualitative attributes of news stories. For example, what was the impact of news and which news had more impact on the stock market

5.4 FRAGMENTATION OF NEWS INTO SUB CATEGORIES:
In present research paper, we fragmented news into following news related subcategories:
- Financial reports
- Sector-related
- Company related
- Ranking & Awards

5.5 COLLECTING STOCK DATA OF COMPANIES:
In present research paper, we extracted data related to capital market from www.yahoofinance.com.

5.6 DATA PROCESSING OF STOCK MARKET DATA:
In present research paper, we compute daily return for selected time. Then we calculate the average and standard deviation of data, considering a daily return as normal distribution [K]. To reduce the number of news & to make study feasible, we consider **80% confidence interval**. So any daily return out of confidence interval is taken for news study.

5.7 LINKING DATA WITH PAST NEWS:
We linked the data which was collected from above-mentioned source with the news that we had collected. By linking data with news, we were able to draw a conclusion.

5.8 REGRESSION ANALYSIS:
In present research paper, we have carried out regression data analysis with the stock return as output variable and news category, page category, nature of the news (positive or negative) as an input variable.

For the present study news is categorized into following variables:

- Nature of News: Here, Nature of news is defined as the attribute of the news affecting the target company either in the positive or negative way.
- News Categories: News categories is fragmentation of news into following sub categories as News related to Company, Company's Sector, Financial Reports of Company and ranking and awards of Company.
- News Paper section: The section of the news is categorized according to the page number of the newspaper.
- Source of News: The news where it is being published.

5.9 PLOTTING RESULTS IN GRAPHICAL FORM:

After classification and analysis of raw data, we plotted the observation into the graphical form such as Bar charts, Pie charts, pivot table etc.

6. RESULTS

6.1 REGRESSION ANALYSIS TABLE:

SUMMARY (A)						
Regression Statistics						
Multiple R	0.875064933					
R Square	0.765738638					
Adjusted R Square	0.760957794					
Standard Error	0.013198687					
Observations	201					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	4	0.111608548	0.027902137	160.1680827	1.29336E-60	
Residual	196	0.034144249	0.000174205			
Total	200	0.145752796				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 80.0%*	*Upper 80.0%*
Intercept	-0.03565624	0.006717564	5.307911894	2.9872E-07	0.044294261	-0.02701822
News Type	0.001724589	0.000873395	1.974581189	0.049719983	0.000601503	0.002847675
Page category	0.003119778	0.001929201	1.617134874	0.107457442	0.000639046	0.005600509
News Nature	0.053855387	0.004335119	12.42304819	1.63149E-26	0.04828092	0.059429854
Source of news	0.000138978	0.000718475	0.193435278	0.846818399	0.000784899	0.001062856

Above analysis shows that the p-value of Source of news is more than $\alpha=0.2$, so the null hypothesis of $\beta4=0$ is accepted. Hence, there is no significance of news source in predicting stock returns.
So, Source of news is to be omitted.

The new regression analysis table is given below:

SUMMARY (B)						
Regression Statistics						
Multiple R	0.87503938					
R Square	0.765693916					
Adjusted R Square	0.762125803					
Standard Error	0.013166402					
Observations	201					
ANOVA						
	df	*SS*	*MS*	*F*	*Significance F*	
Regression	3	0.111602029	0.037200676	214.5935195	8.26411E-62	
Residual	197	0.034150767	0.000173354			
Total	200	0.145752796				
	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 80.0%*	*Upper 80.0%*
Intercept	-0.03563362	0.006700117	-5.31835791	2.82804E-07	-0.04424906	-0.02701818
News Type	0.001714769	0.000869785	1.971485163	0.050068361	0.000596343	0.002833194
Page category	0.003211516	0.001865424	1.721600789	0.086711611	0.000812835	0.005610197
News Nature	0.054062729	0.004190238	12.90206784	5.25693E-28	0.048674654	0.059450803

REGRESSION EQUATION:

X = -0.0356 + (0.0017 * 7') + (0.00321 * P) + (0.054 * N)   [K]

Where,

X = Stock return

T = News type

P = Page number category

N = Nature of news

Above analysis shows that the p-value of News type, page category & News nature is less than á=0.2, Coefficients of the News type, page category & News nature is within the lower and upper 80% limit and the value of Significance F is lesser than F, so **Reject Null hypothesis**.

Hence, $\beta_1 \neq 0$, $\beta_2 \neq 0$, $\beta_3 \neq 0$

So, it can be interpreted that there is linear relationship between Stock return and News type, page category & News nature.

6.2 GRAPHICAL RESULT   [L] [M]

6.2.1 RELIANCE INDUSTRIES LTD.:
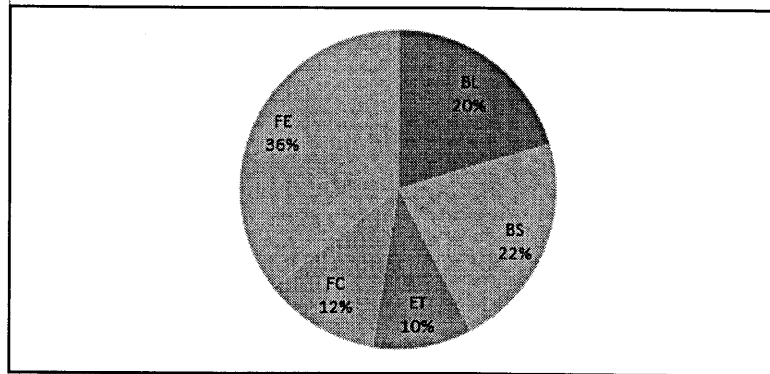
PROPORTION OF NEWS SOURCE

Figure 2

Figure 2 shows that Financial Express (36%) and Business Standard (22%) nearly covers more than half of the news coverage.
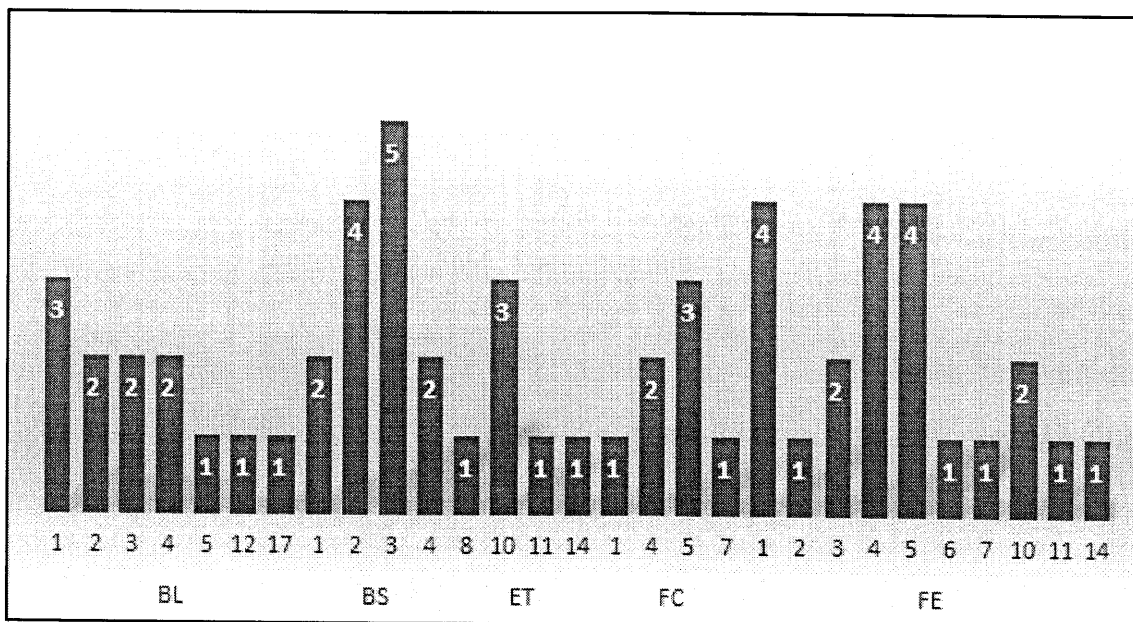
NUMBER OF NEWS AS PER SOURCE AND PAGE NUMBER

Figure 3

PROPORTION OF NEWS SOURCE WITH RESPECTIVE TOP PAGE NUMBERS

Figure 4

Source	Page number	Percentage Share
Business Line	1	12
Business Standard	3	19
Economic Times	10	12
Financial Chronicle	5	12
Financial Express	1,4,5	45

Page number 1,4, &5 of Financial Express covers 45% of news coverage of Reliance Industries Ltd.

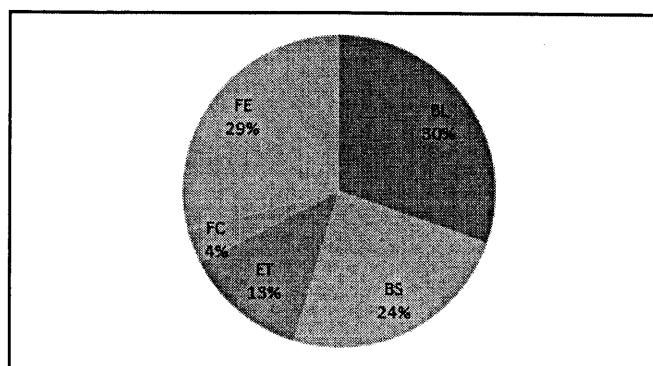### 6.2.2 MARUTI SUZUKI INDIA LTD.:

PROPORTION OF NEWS SOURCE

Figure 5

Figure 5 shows that Business Line (30%) and Financial Express (29%) nearly covers more than half of the news coverage.

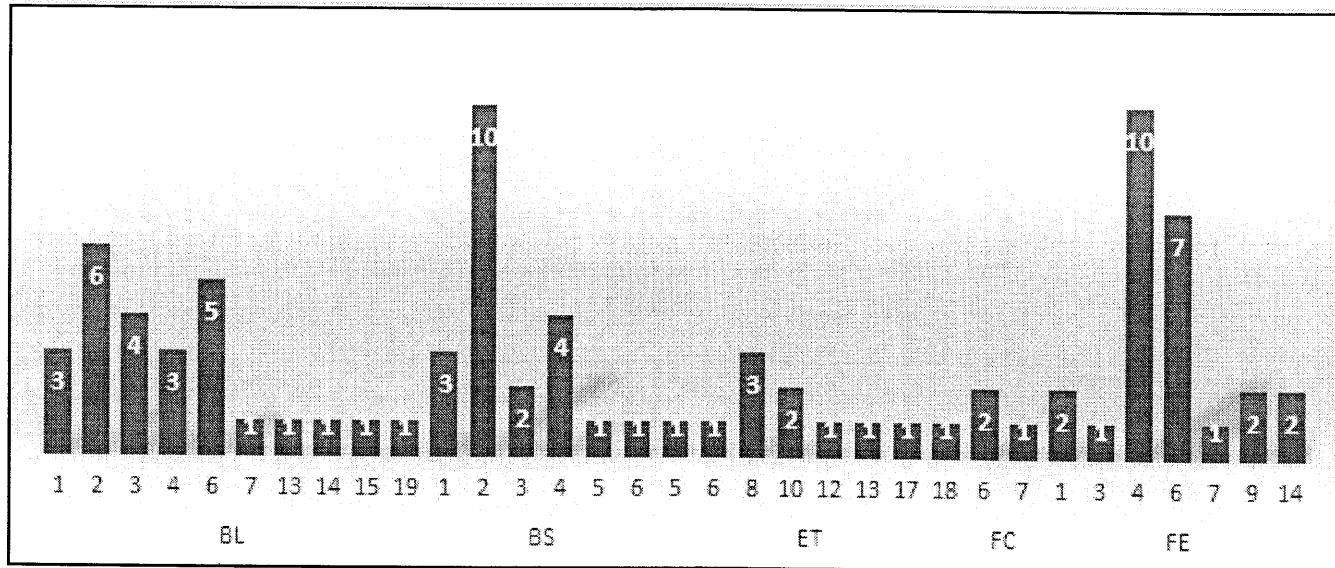## NUMBER OF NEWS AS PER SOURCE AND PAGE NUMBER

Figure 6

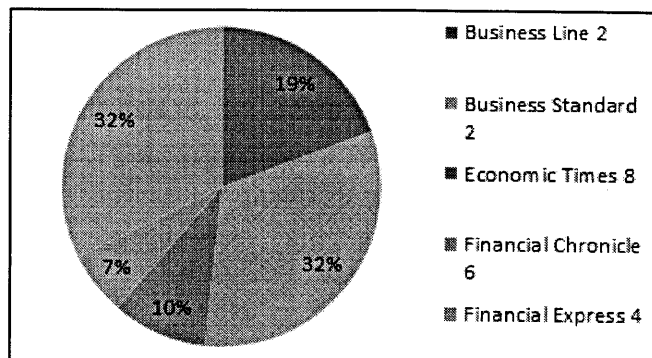## PROPORTION OF NEWS SOURCE WITH RESPECTIVE TOP PAGE NUMBERS

Figure 7

Source	Page number	Percentage Share
Business Line	2	19
Business Standard	2	32
Economic Times	8	10
Financial Chronicle	6	7
Financial Express	4	32

Page number 4 of Financial Express and Page number 2 of Business Standard covers 64% of news coverage of Maruti Suzuki India Ltd.

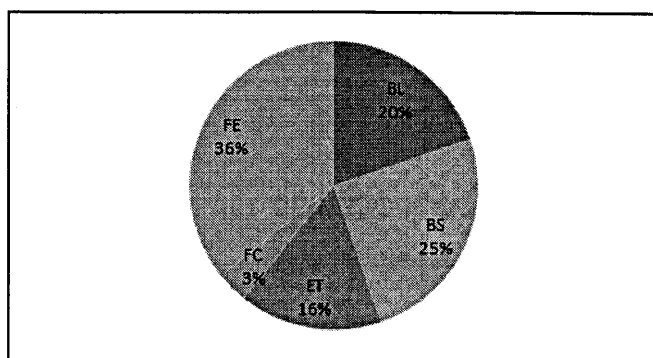## 6.2.3 HDFC BANK LTD.:

PROPORTION OF NEWS SOURCE

Figure 8

PROPORTION OF NEWS SOURCE

Figure 8 shows that Financial Express (36%) and Business Standard (25%) nearly covers more than half of the news coverage.
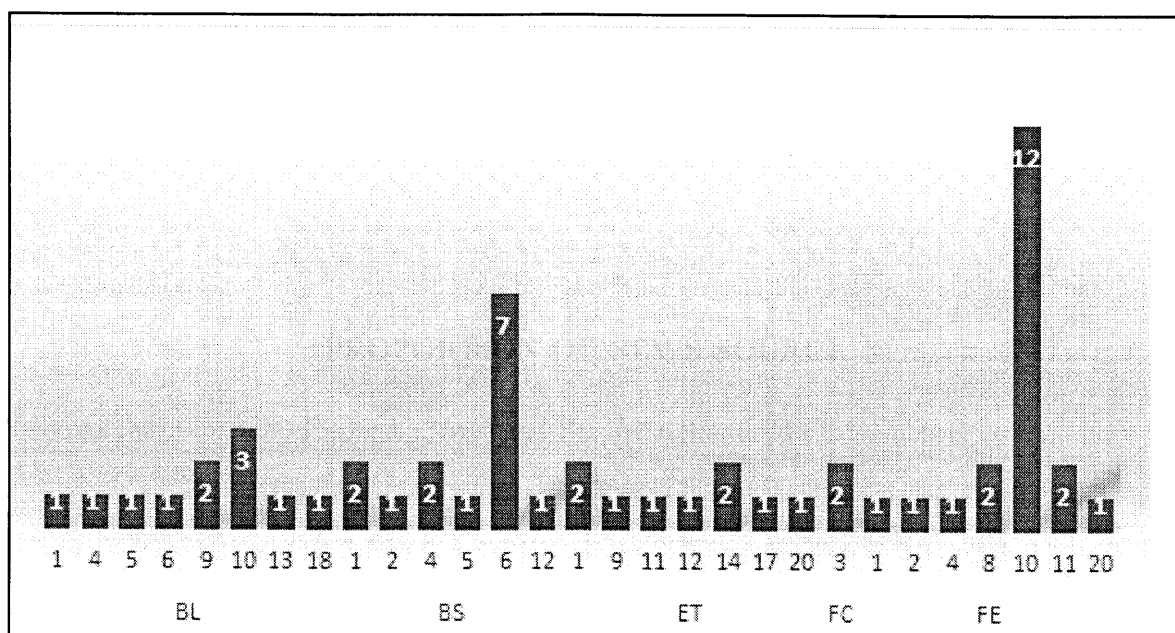
NUMBER OF NEWS AS PER SOURCE AND PAGE NUMBER

Figure 9

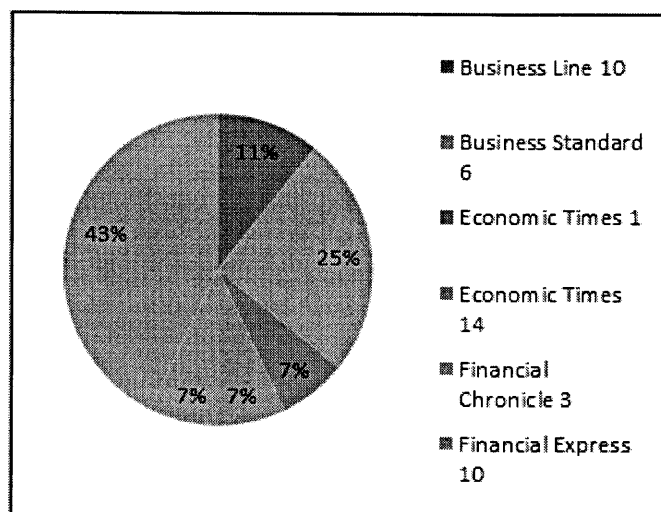## PROPORTION OF NEWS SOURCE WITH RESPECTIVE TOP PAGE NUMBERS

Source	Page number	Percentage Share
Business Line	10	11
Business Standard	6	25
Economic Times	1,14	14
Financial Chronicle	3	7
Financial Express	10	43

Figure 10

Page number 10 of Financial Express covers 43% of news coverage of HDFC Bank.

6.2.4 ALL THREE COMPANIES:

OVERALL DISTRIBUTION OF NEWS SOURCES

Figure 11

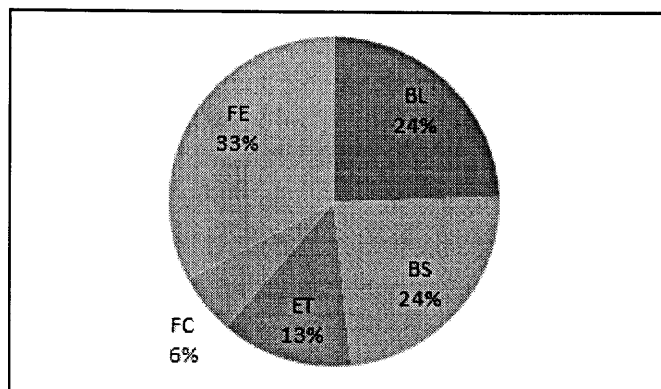### OVERALL DISTRIBUTION OF NEWS CATEGORIES

Figure 12

Figure 11 shows that Financial Express (33%), Business Line (24%) and Business Standard (24%) contributes more than 80% of the coverage.
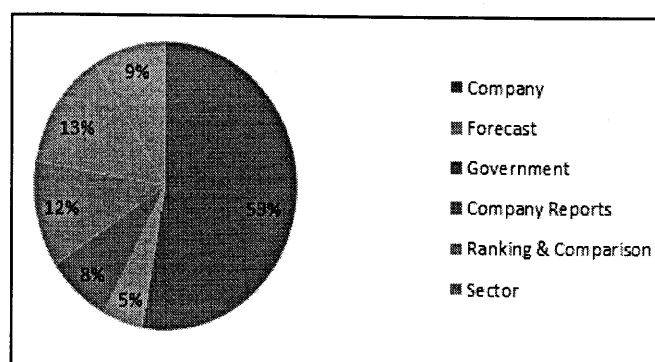
Figure 12 states that News related to company (53%) directly have an influence on the price fluctuation. Company related news is most covered by Financial Express (32%) and Business Standard (26%).
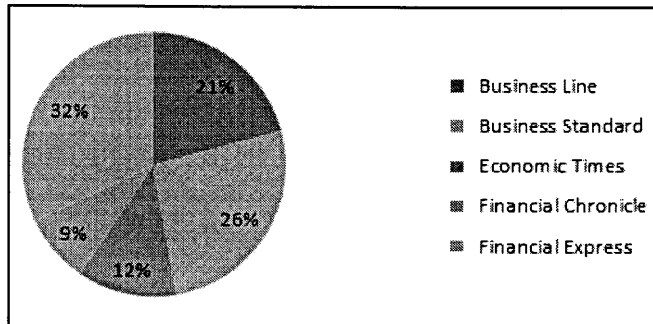
PROPORTION OF NEWS SOURCE IN COMPANY RELATED NEWS

Figure 13

For company related news, Financial Express and Business Standard covers more than half of the total coverage.
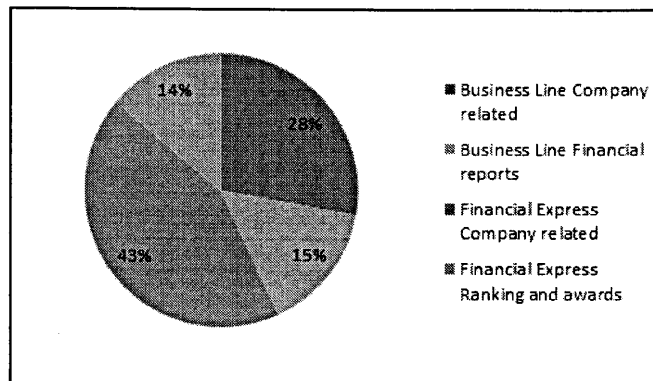
TOP 2 NEWS SOURCE WITH RESPECTIVE TOP NEWS TYPE

Figure 14

Figure 14 states that

Source	News Category	Percentage Contribution
Financial Express	Company related	43
Business Line	Company related	28
Business Line	Financial Reports	15
Financial Express	Ranking and Awards	14

So company related news in Financial Express covers 43% of news.

7. CONCLUSION

Stock trends depend upon various factors therefore finding future trend is very challenging task. Our research believed that newspaper and stock prices are correlated to each other.

A. Financial Express covers the extensive news about the companies under study.

B. There is linear relationship between stock returns and nature of news with p-value of 5.25693E-28 showing strong relation.

C. There is linear relationship between stock returns and news type with p-value of 0.050068361 showing good relationship.

D. There is linear relationship between stock returns and page category with p-value of 0.086711611 showing relationship.

E. There is no linear relationship between stock returns and source of news with p-value of 0.846818399.

F. Company related news have huge impact on stock fluctuation caused due to news.

Above research also states that there is no direct relationship between the effectiveness of news and circulation of newspapers.

8. RECOMMENDATION

For an investor it is better to read Financial Express and Business Standard as it covers most of the news. The page number of news is depending

upon type of industries, so it is conditional. But it do have an impact on predicting stock returns.

9. FUTURE WORK

We would like to extend this research by adding more company's data and check the prediction accuracy. For those companies where availability of financial news is a challenge, we would be using online news for similar analysis.

10. REFERENCES

1. Anurag Nagar and Michael Hahsler, "Using Text and Data Mining Techniques to extract Stock Market Sentiment from Live News Streams" International Conference on Computer Technology and Science, 2012 retrieved from www.sciencedirect.com

2. Conference on Knowledge Discovery and Data Mining, 1998 retrieved from www.sciencedirect.com

3. G. Gidófalvi and C. Elkan, "Using news articles to predict stock price movements," Department of Computer Science and Engineering, University of California. 2001 retrieved from www.sciencedirect.com

4. P. C. Tetlock, "Giving Content to Investor Sentiment: The Role of Media in the Stock Market," Journal of Finance, vol. 62, no. 3, pp. 1139–1168, 2007 retrieved from www.sciencedirect.com

5. R. P. Schumaker and H. Chen, "Textual analysis of stock market prediction using breaking financial news," ACM Transactions on Information Systems, vol. 27, no. 2, pp. 1–19, 2009 retrieved from www.sciencedirect.com

6. V. Lavrenko, M. Schmill, and D. Lawrie, "Mining of concurrent text and time series," in Proc. of the 6h ACM Intl Conference on Knowledge Discovery and Data Mining, 2000 retrieved from www.sciencedirect.com

7. Wiithrich, D. Permunetilleke, and S. Leung, "Daily prediction of major stock indices from textual www data," in Proc. of the 4th Intl

8. Yauheniya Shynkevich, T.M. McGinnity, Sonya Coleman, Ammar Belatreche, "Predicting Stock Price Movements Based on Different Categories of News Articles", 2015 IEEE Symposium Series on Computational Intelligence retrieved from www.sciencedirect.com

9. www.auditbureau.org

10. www.yahoofinance.com

11. www.indiabusinessinsight.com

Chetana's
Institute of Management & Research

Big Data Analytics in Supply Chain Management

* **Rohit Deorukhkar**

Abstract
This research paper offers the information about use big data analysis in supply chain management. Big data is a new driver of the world economic and societal changes. The world's data collection is reaching a tipping point for major technological changes that can bring new ways in decision making and management. The big data complexities are increasing including data's volume, variety, velocity and veracity, the real impact hinges on our ability to uncover the 'value' in the data through Big Data Analytics technologies. Big Data Analytics poses a grand challenge on the design of highly scalable algorithms and systems to integrate the data and uncover large hidden values from datasets that are diverse, complex and of a massive scale. Potential breakthroughs include new algorithms, methodologies, systems and applications in Big Data Analytics that discover useful and hidden knowledge from the Big Data efficiently and effectively. This paper deals with Big Data solutions focusing on Supply Chains which represents a key discipline for handling the increased collaboration next to vast amounts of data. The main focus lays on optimizing Supply Chain Visibility to handle complexity and to support decision making for handling risks and interruptions along supply chains. Therefore, Big Data concepts and technologies will play a key role in supply chain management. This paper describes the current situation, actual solutions for use of big data analysis in supply chain management and presents exemplary cases for illustration.

INTRODUCTION TO DATA ANALYSIS

The process of evaluating data using analytical and logical reasoning to examine each component of the data provided. This form of analysis is just one of many steps that must be completed when conducting a research experiment. Data from various sources is gathered, reviewed and then analyzed to form some sort of finding and conclusion. There are varieties of specific data analysis method some of which include data management, hadoop, data mining, text analysis, predictive analysis and data visualization.[1]

Big Data Analysis
Big data analytics is the process of examining large and varied data sets i.e. big datato uncover hidden patterns, unknown correlations, market trends, customer preferences and other useful information that can help organizations make more-informed busi-

*   MMS, Chetana's R K Institute of Management & Research, Working Papers Series

ness decisions.With today's technology it is possible to analyze your data and get answers from it almost immediately than slower and less efficient traditional business data analysis methods.

History and Evolution of Big Data Analytics

The concept of big data has been around for years. Now most organizations understand that if they capture all the data that streams into their businesses, they can apply analytics and get significant value from it. But even in the 1950s, decades before anyone uttered the term "big data", businesses were using basic analytics to uncover insights and trends.The new benefits that big data analytics brings to the table because its speed and efficiency. Whereas a few years ago a business would have gathered information, run analytics and unearthed information that could be used for future decisions. Today business can identify insights for immediate decisions. The ability to work faster and stay agile gives organizations a competitive edge they didn't have before.

Why is Big Data Analytics Important?

Big data analytics helps organizations harness their data and use it to identify new opportunities. That in turn leads to smarter business moves, more efficient operations, higher profits and happier customers.

The benefits of big data analysis in business are as follows:

1. **Cost reduction:** Big data technologies such as Hadoop and cloud-based analytics bring significant cost advantages when it comes to storing large amounts of data, plus they can identify more efficient ways of doing business.

2. **Faster, better decision making:** With the speed of Hadoop and in-memory analytics, combined with the ability to analyze new sources of data, businesses are able to analyze information immediately .And make decisions based on what they have learned.

3. **New products and services:** With the ability to gauge customer needs and satisfaction through analytics comes the power to give customers what they want.

How it Works?

There's no single technology that encompasses big data analytics. There's advanced analytics applied to big data, but in reality several types of technology work together to help you get the most value from your information.

Data Management: Data needs to be high quality and well-governed before it can be reliably analyzed. With data constantly flowing in and out of an organization, it is important to establish repeatable processes to build and maintain standards for data quality. Once data is reliable, organizations should establish a master data management program that gets the entire enterprise on the same page.

Data Mining: Data mining technology helps one examine large amounts of data to discover patterns in the data and this information can be used for further analysis to help answer complex business questions. With data mining software, one can sift through all the chaotic and repetitive noise in data, pinpoint what is relevant, use that information to assess likely outcomes and then accelerate the pace of making informed decisions.

Hadoop: This open source software framework can

store large amounts of data and run applications on clusters of commodity hardware. It has become a key technology to doing business due to the constant increase of data volumes and varieties, and its distributed computing model processes big data fast. An additional benefit is that Hadoop's open source framework is free and uses commodity hardware to store large quantities of data.

In-memory Analytics: By analyzing data from system memory (instead of from your hard disk drive), one can derive immediate insights from the data and act on them quickly. This technology is able to remove data prep and analytical processing latencies to test new scenarios and create models. It is not only an easy way for organizations to stay agile and make better business decisions. It also enables them to run iterative and interactive analytics scenarios.

Predictive Analytics: Predictive analytics technology uses data, statistical algorithms and machine - learning techniques to identify the likelihood of future outcomes based on historical data. It Is all about providing a best assessment on what will happen in the future, so organizations can feel more confident that they are making the best possible business decision. Some of the most common applications of predictive analytics include fraud detection, risk, operations and marketing.

Text Mining: With text mining technology, one can analyze text data from the web, comment fields, books and other text-based sources to uncover insights you had not noticed before. Text mining uses machine learning or natural language processing technology to comb through documents, emails, blogs, Twitter feeds, surveys, competitive intelligence and more to help you analyze large amounts of information and discover new topics and term relationships.[2]

Supply Chain Management (SCM)

If you go to a Supermarket and pick up a few items off the shelf from electronics and white goods or even clothes and look at the labels, the chances are that you will find them having been manufactured in China or Mexico. The coffee pods one buy to use for your everyday use comes from Africa. Computers have been shipped out of South American Factories and Soft furnishings on the shelves are from India and Hong Kong.

Global markets are expanding beyond borders and re-defining the way demand and supplies are managed. Global companies are driven by markets across continents. To keep the cost of manufacturing down, they are forced to keep looking to set up production centers where the cost of raw materials and labor is cheap. Sourcing of raw materials and vendors to supply the right quality, quantity and at right price calls for dynamic procurement strategy spanning across.

With the above scenario one find companies procuring materials globally from various vendors to supply raw materials to their factories situated in different continents. The finished goods out of these different factory locations then pass through various chains of distribution network involving warehouses, exports to different countries or local markets, distributors, retailers and finally to the end customer.In simple language, managing all of the above activities in tandem to manage demand and supply on a global scale is Supply Chain Management.

Supply chain management is the oversight of materials, information, and finances as they move in a process from supplier to manufacturer to wholesaler to retailer to consumer. Supply chain management involves coordinating and integrating these flows both within and among companies. It is said that the ultimate goal of any effective supply chain management system is to reduce inventory with the assumption that products are available when needed. As a solution for successful supply chain management, sophisticated software systems with Web interfaces are competing with Web-based Application service provider who promises to provide part or all of the SCM service for companies who rent their service.

Supply chain management flows can be divided into three main flows:
- The product flow
- The information flow
- The finances flow

The product flow includes the movement of goods from a supplier to a customer, as well as any customer returns or service needs. The information flow involves transmitting orders and updating the status of delivery. The financial flow consists of credit terms, payment schedules, and consignment and title ownership arrangements. [3][4]

Big Data Analytics Affects Supply Chain Management

Big data analysis is changing supply chain management for the better. The technology is producing quantifiable improvements in supply chain operations around the globe. Manufacturing logistics is an increasingly complex process, and companies are incorporating big data analysis to manage operations throughout their enterprises. As engineers create more innovative technologies, it is helping firms track and efficiently allocate their vast new resources and even though big data is fledgling, it is making a positive and powerful impact on daily business operations.

Big Data Matters in SCM

According to veteran shipping executives, big data is a making a substantial impact in logistics and is poised to reshape the shipping industry. Almost all supply chain managers are familiar with the concept as well as how it can improve their production and distribution processes. Most consumers will cease patronizing a firm if they are not satisfied with their services or goods. By analyzing big data, firms will realize significant efficiency improvements and retain clients longer. For a third of all companies, tracking goods is an issue paralleled only by environmental issues. Big data can help companies increase their troubleshooting response efficiency.

Big Data Makes Sense out of the Information Milieu

Big data analytics can consolidate and interpret the

increasingly massive amounts of information produced by logistics operations. The information comes mostly from sources outside of an enterprise and varies in qualities such as size, interval, and structure. Innovative companies can use analytics to gather information from disparate data points and produce actionable reports.

Big Data Analysis Make Complex Logistics Work

Modern logistics is growing increasingly complex. Big data analytics allows companies to keep pace with supply chain logistics as the practice develops. Logistics experts can use the technology to share information as needed, allowing firms to produce more goods with unsurpassed efficiency.

The Technology Is Prevalent Throughout the Enterprise

Manufacturers are integrating big data analytic capabilities across their entire legacy systems. This incorporation mostly takes place across optimization, demand forecasting and planning and risk analysis platforms. To a slightly lesser but still it is significant extent, firms integrate big data analytics with 3D Printing ,Computing processes, Location services, Logistics controls, Parcel tracking, Robotics, Wearable technology devices.Although very few supply chain executives actually incorporate artificial intelligence and cutting-edge delivery technologies into their big data analytic frameworks and overwhelming majority of them predict that this will change in the near future.[5]

Big Data Analytics at Walmart

Big data provides a way for companies to gain a better understanding of their customers and make better business decisions. Walmart relies on big data

to get a real-time view of the workflow in the supply chain, distribution centers and throughout our stores and e-commerce. Walmart uses big data to make the company's operations more efficient to improve the customer service. Walmart is analyzing data in distinct way. The five key area where Walmart leverages big data to enhance customize and optimize the supply chain management are as follows.

1. To make Walmart more efficient: Walmart uses simulations at the stores to find out how many sales are filled in a day and to determine the busiest time during the day and month. This data helps the company for staff scheduling and to reduce the amount of time for sales.

2. To improve store checkout: Walmart is testing how to use big data to improve the store checkout experience. By using the predictive analysis, store can anticipate demand hours and determine how many associates are needed at the counters. By analyzing the data , Walmart can determine the the best forms of checkout for each store.

3. To manage the steps in supply chain: Walmart uses the stimulation to track the number of steps from the dock to the store. This allows the company to optimize routes to the shipping dockand track the number of times the product gets touches along the way to the customer. The company also uses the data to analyze transportation lanes and routs for the company's fleet of trucks. The data helps Walmart keep transportation cost down and schedule diver times.

4. To optimize product assortment: Through analysis of customer preferences and shopping pattern, Walmart can accelerate decision making on how to stock store shelves and display merchandize. Big data provides insight on new items, discontinued product on which private brands to carry.

5. To personalize the shopping experience: Big data allows the Walmart to identify the shopper's preferences to develop the consistent and delightful shopping experiences. If a user is shopping for the baby product Walmart can use data analysis to personalize mobile rollback deals for parents and help them live better by anticipating their needs.[6]
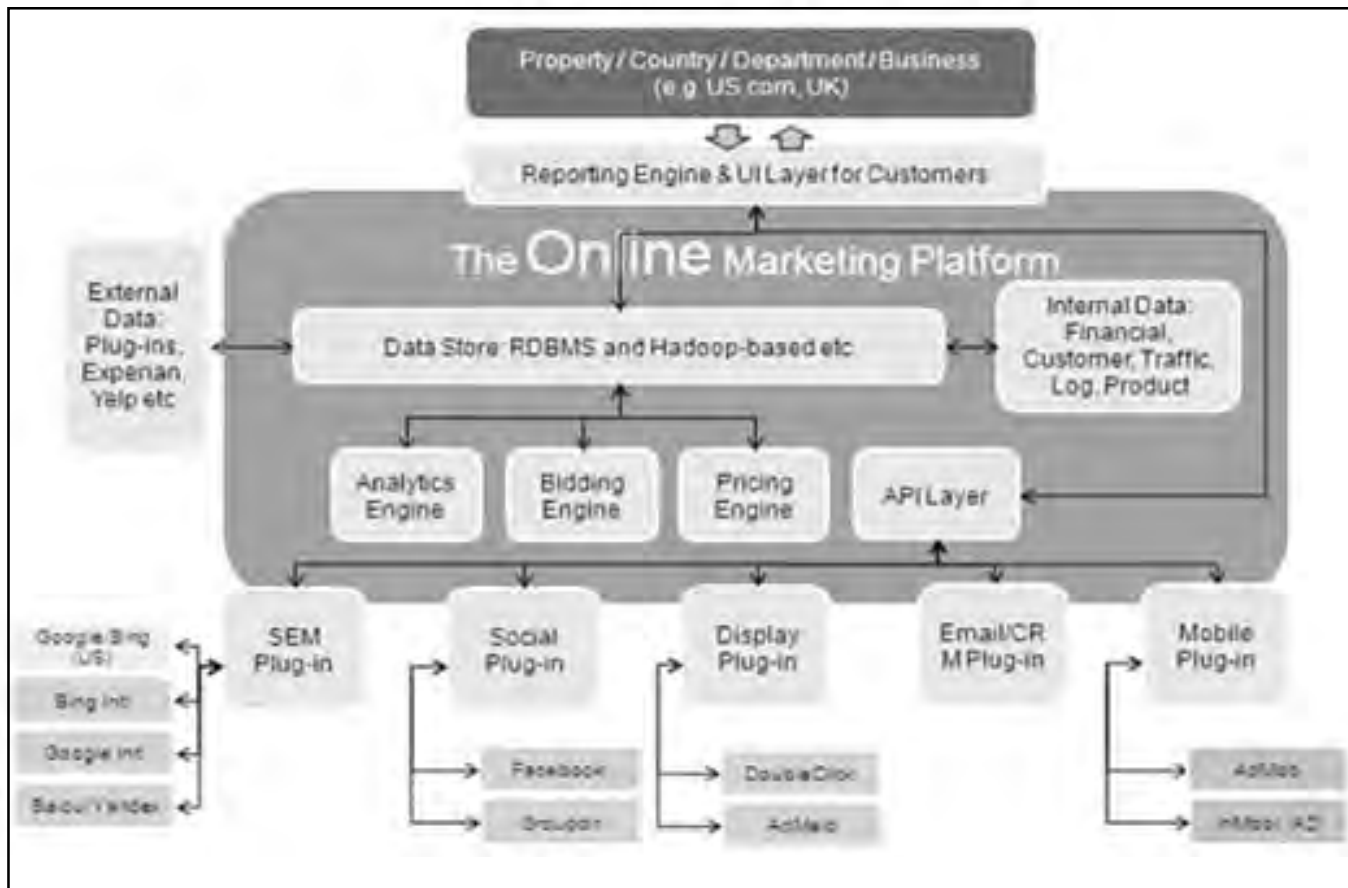
CASE CONCLUSION

Big Data Analysis helped Increase Walmart's Sales Turnover

American multinational retail giant Walmart collects 2.5 petabytes of unstructured data from 1 million customers every hour. One petabyte is equivalent to 20 million filing cabinets; worth of text or one quadrillion bytes. The data generated by Walmart every hour is equivalent to 167 times the books in America's Library of Congress. With tons of unstructured data being generated every hour, Walmart is improving its operational efficiency by leveraging big data analytics. Walmart has created value with big data and it is no secret how Walmart became successful. Walmart was the world's largest retailer in 2014 in terms of revenue. Walmart makes $36 million dollars from across 4300 retail stores in US, daily and employs close to 2 million people.

Architecture for Big Data Analysis

Walmart started making use of big data analytics much before the term Big Data became popular in the industry. In 2012, Walmart made a move from the experiential 10 node Hadoop cluster to a 250 node Hadoop cluster. The main objective of migrating the Hadoop clusters was to combine 10 different websites into a single website so that all the unstructured data generated is collected into a new Hadoop cluster. Since then, Walmart has been speeding along big data analysis to provide best-in-class e-commerce technologies with a motive to deliver pre-eminent customer experience. The main objective of leveraging big data at Walmart is to optimize the shopping experience of customers when they are in a Walmart store, or browsing the Walmart website or browsing through mobile devices when they are in motion. Big data solutions at Walmart are developed with the intent of redesigning global websites and building innovative applications to customize shopping experience for customers whilst increasing logistics efficiency. Hadoop and NOSQL technologies are used to provide internal customers with access to real-time data collected from different sources and centralized for effective use.

Walmart has transformed decision making in the business world resulting in repeated sales. Walmart observed a significant 10% to 15% increase in sales for $1 billion in incremental revenue. Big data analysts were able to identify the value of the changes Walmart made by analyzing the sales before and after big data analytics were leveraged to change the retail giant's e-commerce strategy.[7]

REFERENCES

1. http://www.businessdictionary.com

2. https://www.sas.com
3. http://searcherp.techtarget.com

4. http://www.managementstudyguide.com

5. https://graduatedegrees.online.njit.edu

6. https://blog.walmart.com/innovation/20170807/5-ways-walmart-uses-big-data-to-help-customers

7. https://www.dezyre.com/article/how-big-data-analysis-helped-increase-walmarts-sales-turnover/109

Bartering Privacy – Side Effects of Data Analysis

*Shradha Bhuran
**Khushboo Desai (MMS B)
***Prof. Rashmi Kanitkar

Data analysis is an important tool in the hands of today's marketers. The analysis of the data collected from various sources helps a marketer to understand buying patterns, timings, behavior of the customer. Most important it offers a window into customer's "thinking" and thus can help into choice making.

The sources of collection of data are a plenty. It includes convenience monetary pay vehicles like plastic money, mobile phones, mobile wallets. It also includes self accepted social medias like facebook, twitter, e mail accounts. The latest source is government source like "Aadhar Card".

The data collected from sources like mobile phones to social media are with the "consent" of the consumer. Where consumer has signed the contract; with the service provider, to use the services free of charge in exchange with allowing the provider to use the information

Betheny Brookshire in her article titled "On social media, privacy is no longer a personal choice" states that – Sharing your personal information is your friend's choice too..

Aadhaar Card:

The UID Aadhaar is one of the prestigious projects in India where Biometric Card with Unique Identification Number is issued to every citizen. AADHAAR is a 12-digit number issued by the government as proof of identity and residence in India, verifiable by means of a biometric identification system

The main argument of the government to kick-start the Aadhaar system, was to facilitate direct and transparent delivery of benefits and subsidies to the Indian citizens that require them. The system of payments making their way to people's bank accounts directly was pursued with the goal of preventing fraud and corruption that otherwise took place.

In case of "Aadhar" card the government has not made it statutory but has made it compulsory to link with basic aspects like bank accounts, mobile service and various government schemes like subsidy on LPG supply etc. The range of compulsory items is vast. As a result Aadhar has become almost like statuary.

*(MMS B), **(MMS B), ***Asst. Prof. -CRKIMR

CONCERN

The two major issues arise from data sharing are privacy and discrimination

Data (Privacy) Protection

The issue is not just sharing the information but the efficiency of protecting the personal data and handling of the data by social media.

Today most of the social media users use smart phones to access their social media account. This increases the threat to privacy and security as the user can be stalked by social media.

Social platforms' ability to collect and curate this extra information into what are called shadow profiles first came to light with a Facebook bug in 2013. The bug inadvertently shared the e-mail addresses and phone numbers of some 6 million users with all of their friends, even when the information wasn't public.[6,7]

Facebook immediately addressed the bug. But afterward, some users noticed that the phone numbers on their Facebook profiles had still been filled in — even though they had not given Facebook their digits. Instead, Facebook had collected the numbers from the contact lists innocently provided by their friends, and filled in the missing information for them. A shadow profile had become reality.[6]

In case of Aadhar card, the other issue with binding so much information of a citizen, including their bank accounts, to their Aadhaar card is if another country were to hack to Aadhaar database. Furthermore, there is the question of whether or not the government's bureaucracy is equipped to handle something like the Aadhaar database

Discrimination

Advertisers on social media need to reach to "target customers". This brings a thin line between targeting and discriminating. Facebook has already faced criticism over its ad targeting engine, which in some cases was illegally discriminating against certain types of people.[5]

Whether social media or AadharCard either way it is a situation of "Big Brother is Watching". Further it is not only somebody watching but also knowing or unknowingly influencing one's thought process.

LITERATURE REVEIW

Social Network

Social networks have opened up a new avenue of communication for millions of people around the world. The major attraction of this technology is the ease with which people can share their personal information with their friends.

This phenomenon started with the tool known as Six Degrees, launched in 1997 by Andrew Weinrich in New York, New York, USA.. In 2000, Richard Ericsson launched a social network in Sweden called the Lunar Storm for use by teenagers. Facebook adopted a staggered-launch approach to meet the demand. Today, Facebook has grown to be the number-one social network around the world with a subscriber base of 845 million. Jack Dorsey and his friends launched Twitter in 2006 from San Francisco, California, USA, as a way to share one's thoughts with 140 characters at most in the message. Today, Twitter has more than 600 million customers worldwide.[3] Many people follow the tweets of others, not necessarily their friends.

Social media users believe that convenience comes first. Users do not have any reservations about providing personal information as part of their profile. When the user gives personally identifiable information (PII), such as address and date of birth, the intent is for the benefit of friends.

Issues arise when access to the information is extended beyond the circle of friends by transferring of privileges. This is where the initial privacy compromises take place. In many cases, the customer is unaware of the extent to which the PII has spread. People in 17 – 24 age group tend to trust systems more and do not have concerns about their personal information getting misused. Also, they might unwittingly provide their information and do not see reasons to be cautious in social networks. According to a 2007 research survey, nearly 90 percent of teenagers post a video and expect feedback from their friends. This attitude lends itself to keeping some privacy settings open to a larger group of people. These kinds of benefits of social networks, especially Facebook, are further reinforced by the study of M. D. Roblyer.

An innate problem that many Facebook users seem to overlook is the possibility that personal information could be released to unintended people. [1]. Privacy concerns with social networking services The concept of privacy in general dictates that no one should be able to observe things about a person without that person's knowledge. In social networks, privacy is greatly ignored unwittingly. Many people perceive that rejecting a request to be your friend based on one of your other friends' recommendations might be considered rude. According to a 2011 research survey, social networks provide "a concentrated posse of easily contactable friends."

Social networks keep track of all interactions used on their sites and save them for later use. Issues include cyberstalking, location disclosure, social profiling, 3rd party personal information disclosure, and government use of social network websites in investigations without the safeguard of a search warrant. [1].

User Awareness in Social Networking Sites
Users are often the targets as well as the source of information in social networking.

As per reference, a survey conducted among social networking users at Carnegie Mellon University was indicative of following as reasons for lack of user awareness:

1) People's disregard of privacy risks due to trust in privacy and protection offered on social networking sites.

2) Lack of awareness with respect to availability of user's personal details to third-party tools/applications.

3) APIs (Application programming interface) and Frameworks also enable any user, who has the fair amount of knowledge to extract the user's data.

4) Cross-site forgery and other possible website threats.

There is hence a dire need for improving User's awareness swiftly, in order to address growing security and privacy concerns caused due to merely user's unawareness. Social networking sites themselves can take a responsibility and make such awareness possible by means of participatory methods by virtual online means. [2].

Benefit from Data

This accessible data along with data mining technology, users' information can be used in different ways to improve customer service. According to what you re-tweet, what you like and the hash tag, Twitter can recommend some topics and advertisements. Twitter's suggestions for who to follow is done by this recommendation system. Commerce, such as Amazon, make use of users' information to recommend items for users. Recommendations are based on at least prior purchases, shopping cart, and wish list. Affinity analysis is a data mining technique that used to understand the purchase behavior of customers.

By using machine learning method, whether a user is a potential follower of Starbucks can be predicted. In that case, it is possible to improve the quality and coverage of applications. In addition, user profiles can be used to identify similar users. More than 1,000 companies are waiting in line to get access to millions of tweets from users that are using the popular social networking website. Companies believe that by using data mining technologies they would be able to gather important information that can be used for marketing and advertising.

According to Gary Kovacs's speech about Tracking our online trackers, when he used the internet to find an answer to a question, "We are not even 2 bites into breakfast and there are already nearly 25 sites that are tracking me", and he was navigated by 4 of them. [2].

Privacy Concerns
Social profiling allows for Facebook and other social networking media websites of filtering through the advertisements, assigning specific ones to specific age groups, gender groups, and even ethnicities.

Studies have also pointed to most social networks unintentionally providing 3rd party advertising and tracking sites with personal information. It raises the issue of private information inadvertently being sent to 3rd party advertising sites via Referrer strings or cookies. [2].

Potential Dangers:
1. Identity theft.
2. Sexual predators.
3. Stalking.
4. Unintentional fame.
5. Employment – intention to acquire negative information about candidates.
6. Online victimization.
7. Surveillance.
8. Law enforcement prowling the networks.
9. Mob rule.
10. Location updates.
11. Invasive privacy agreements.[3]

OBJECTIVES OF THE STUDY

The study was undertaken to understand awareness amongst youth about data collection, use & security by the social media, mobile apps.

The objectives are as follows:

A. To understand level of awareness amongst youth about personal data collection by social media

B. To know whether the youth are aware about analysis of personal data by social media and it's use for commercial purpose

C. To study perception of youth about tracking of their e-surfing by social media

D. To understand level of awareness amongst youth about Aadhar card and it's linkages to various transactions

E. To understand the perception of youth about issue of right to privacy

RESEARCH METHODOLOGY

Quantitative Study
Source of Data Collection – Primary Data
Respondents – Young adults who are graduate and active on social media
Tool of Data Collection – Questionnaire
Sample Size   - 50 Nos.
Sampling Method – Convenience Sampling
Geographical Scope – Mumbai

Limitations of the Research

A. Locational/ Geographical Limitation – The present study is restricted to Mumbai Suburban District. The views might differ in other locations

B. Demographic Limitation – The age group of respondent was 21 to 27 years.

C. Behavioral Limitation – Majority of respondents were students (and monetarily dependent on their parents) so an element of casualness might exist in their responses.

However there is scope for further research by collecting information from a broader group of respondents.

DATA & DATA ANALYSIS

1. Are you on social media?

Social media users	Non social media users
50	0

All the respondents under observation are social media users, they are accessing at least 1 social media app.

All the people being considered for the research work falls in the age group of 21 – 25 (average age is 23) in general and this age group is the age group who has got highest level of usage of social media apps/platforms. If the respondents would have been of different age group for example in the age group ranging from 35-45 then the scenario might have changed that we may have observed some people who are not active on any of the social media platform.

2. List down the social media platform's that you are using?

Social media apps	Number of users amongst the respondents
Facebook	40
Instagram	28
Youtube	3
Twitter	7
LinkedIn	2
Snapchat	10
Whatsapp	38
Hike	4

The average number of apps used by the number of people under observation is approximately 3.

Majority of the respondents are active on facebook and Instagram and very less amount of respondents are observed to be active on some other social media platforms such as twitter, LinkedIn, Hike, Snapchat, etc.

Taking into consideration the average age group of respondents it is observed that facebook is the most famous or the most accessible social media platform to be used by the young generation. If the age

group of respondents would have been different then the scenario would have hardly changed as nowadays there are hardly people found who are not active on social media platforms irrespective of their age.
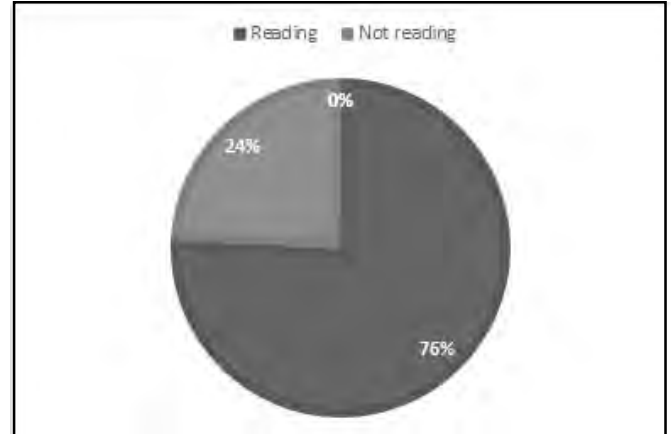
3. Do you really read the terms and conditions of the various apps of the social media and understand what they ask for while enrolling for the same?

Terms and conditions Read	Terms and conditions not Read
10	40

It is observed that only 10 out of total 50 respondents (20%) under observation do read the terms and conditions that every social media or android application asks to agree; without which a person cannot get access to the applications.

Terms and Conditions are a set of rules and guidelines that a user must agree to in order to use your website or mobile app. It acts as a legal contract between the company who has the website or mobile app and the user who access the website or mobile app.

The respondents for this research work lies in the age group of 21-25 and this age group seems not much concerned about reading of terms and conditions placed by various different mobile applications. The reason behind ignoring of some legal contractual activities may be either that they do not really feel the need to read and understand that what are that mobile application wants from them or may be, they are not bothered or they are aware that they have no option.
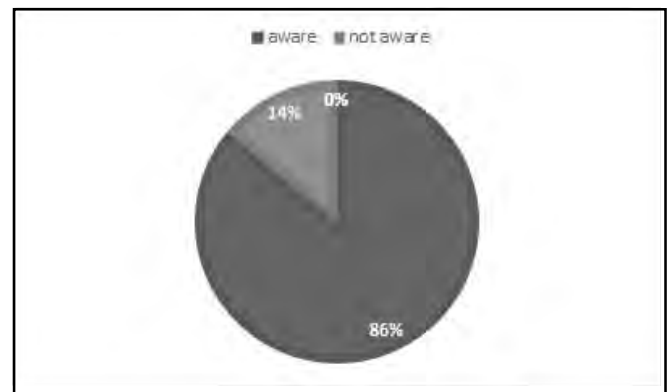

4. Are you aware that your gallery, contact details, location settings, etc are being accessed by apps like Facebook, Instagram from your phone?

Aware	Unaware
43	7

43 out 50 respondents (86%) under observation are aware about the device data being accessed by the various social media as well as various other apps available for android users. The information such as phone gallery pictures, contacts, etc. is accessible to the app developers.

These respondents are also aware that they are bartering their personal information to mobile application for cost free access of social media applications.
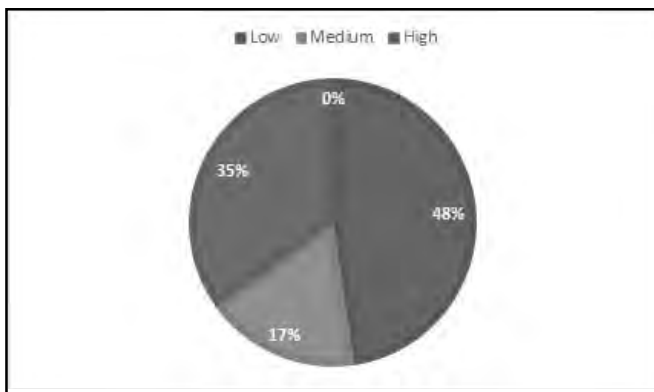
5. Are you aware that you are bartering your personal information for free access of certain apps? Do you willingly agree to barter your personal information?

- Level of awareness can be observed as

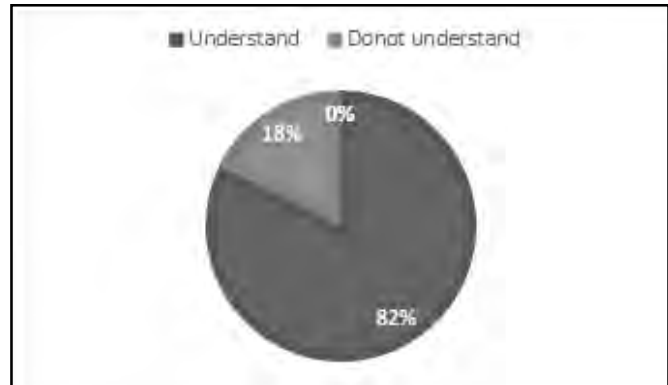| Low (not willing)	41
Medium (neutral)	3
High (willing)	6

In the age group of 20-25 who are the youths of our nation seem to show least willingness towards bartering of personal information to the applications but they end up sharing their information as they need the free access to the mobile applications. The youths to certain extent are very less insecured about privacy or sharing of information as they are from middle class background and at this stage of age they hardly do posses anything to loose. But if the age group under observation would have changed then there are chances of completely opposite opinion or may be we can say that the elderly people will not willingly agree to barter information.

The people in the age group under observation are students and belonging to middle class background and they do not hold any extreme opinion but are just concerned about personal safety.

6. Do you know the reason behind any app asking for details like contact or asking for access to your gallery? If yes give details.

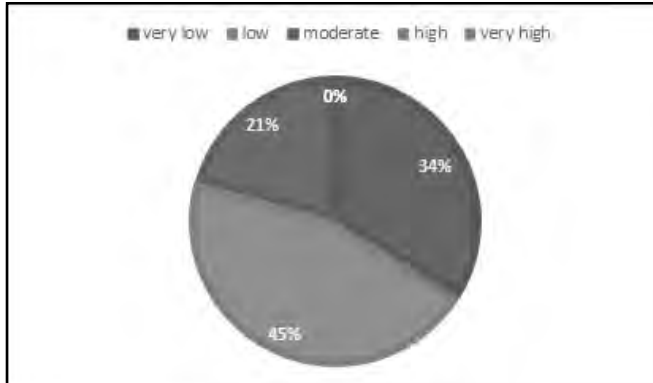Only 15 out of 50 really do know about why the apps ask for accessing of device information.

As its' is observed that only 15 out of all 50 respondents(30%) know the reason for which the mobile applications ask for the personal information. This means that the respondents are really not bothered about how n where they share their personal information but are just accessing the mobile applications to suffice their needs of entertainment.

7. Level of supportiveness (sharing personal information to mobile applications)

Very low (do not agree at all)	34
Low (do not agree)	11
Moderate (agree to some extent)	05
High (agree)	0
Very high (willing agree)	0

The respondents supportiveness towards bartering their personal information to mobile application is way too low as it is observed that 34 respondents which accounts to be almost 45% of total respondents do not agree at all for sharing their personal information. In spite of low level of willingness for bartering of personal information still the youths

end up sharing their private information on social media platform as the craze for social media is increasing day by day and being active on social media has become the parameter of an individuals' social behavior.
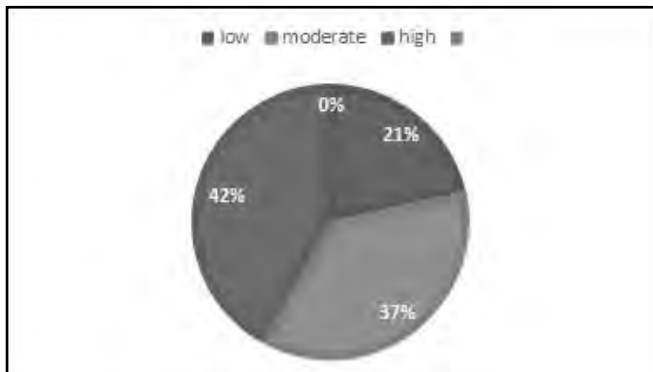

AADHAR CARD

1. Are you aware that to which all documents is the Aadhar card supposed to be linked to?

Awareness level about govt. schemes of linking Aadhar card

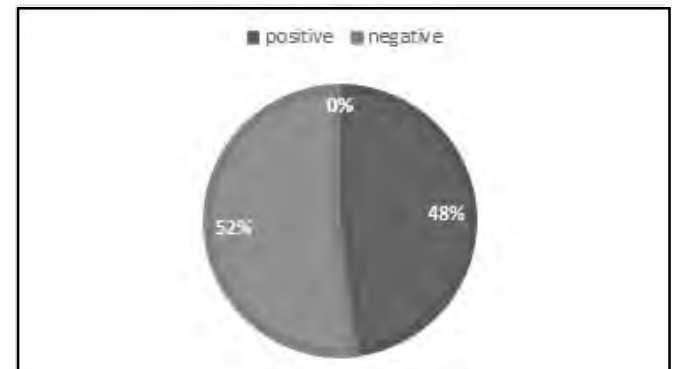| Low	20
Moderate	14
High	16

The respondents are not even completely aware that to which all documents the Aadhar card needs to be linked to as per directed by the government of

India. The youth of India who are well educated and are competing with intellects from all across the world are not completely aware that what really the scheme of linking Aadhar card to various different personal identification documents is.

Linking of Aadhar is not only a chaos for the illiterate or aged population of India but same is the case with the youth of India.

2. What's your opinion about sharing your bank details, sim details, pan card details by linking adhaar card to all the above?

Positive	24
Negative	26

When the respondents were asked about their opinion of linking Aadhar card to various different documents like bank accounts, sim cards, pan cards, etc it is observed that the people show mixed feelings towards the governments move of making linking of Aadhar mandatory to every citizen of India. This shows that the people of India especially the youth are not taking this step of linking Aadhar card in a very positive manner.

3. Do you think this move of government of linking Aadhaar card is really essential? Have you linked your Personal documents to Aadhar willingly or do you feel any insecurity?

Supportive	21
Non supportive	29

It is observed from the data collected from the respondents that the people are not linking their Aadhar card to simcards , bank accounts and pan card whole heartedly but they posses some fear in their minds that are they really safe after linking of Aadhar as after which all their personal details are shared on various platforms and by chance of any criminal activity they will have to suffer due to this. The people doubt about the linking of Aadhar being secured.

4. Rate your level of insecurity towards sharing of all your official details with the government from a scale of 1 to 10 (1- lowest insecurity, 10- highest insecurity)

1 to 5	23
6 to 10	26

Insecurity level	No. of respondents
10	4
9	4
8	5
7	10
6	3
5	13
4	4
3	1
2	0
1	2

The respondents show varied differences in their views towards linking of aadhar as about half of them do feel in secured about linking Aadhar whereas the other half do not feel much insecure. The youth have not completely accepted this new idea which the government of india has come up with to avoid hassels in the legal work related to various benefit schemes but is facing a dilemma about am I really secured after sharing my personal information like the biometrics.

5. Share your suggestions and opinions regarding bartering of your private details by sharing of information with some medium inexchange of some facilities i.e. the direct benefit schemes of government.

Low acceptance	36
Medium acceptance	12
High acceptance	2

From the observations gathered from the respondents it is visible that this move of government of India about linking every citizens Aadhar to his or her bank accounts, sim cards, etc is not wholeheartedly accepted by the masses and especially the youth they have not yet arrived at the conclusion that yes we do accept this move of government which will really benefit in the long run.

6. Are you aware about what is right to privacy?

22 out of 50 people under observation are aware that what is right to privacy. People in the age group under observation are not very much aware about what right to privacy is and what is its impact on a commoners life.

CONCLUSION

The study shows –

A. On an average the every respondent uses 3 Apps.

B. Most of the respondents are aware about the device data being accessed by the various social media as well as by various apps available for android users. Interestingly only 30% of respondents are aware about why social media ask the personal information

C. Most of the respondents did not read terms and conditions of different social media. The reason for this may be the age group of the respondents.

D. Most of these respondents (82%) are aware that they are bartering their own personal information for free use of social media.68% respondents did not mind bartering this information

Aadhar Card

A. Most of the respondents are not even aware what are the various accounts to which Aadhar card is to be linked.

B. Almost 50% of respondents did not mind the compulsion of linking of Aadhar to various accounts but some where they are uneasy about linking of Aadhar card with various accounts

C. The collected data shows that people The results show that only 44% of the respondents were aware about " Right to Privacy"

RECOMMENDATION

With increased usage of social media the concern that is arising is the security of privacy of user. This can be achieved with the help of high quality data governance which consists of –availability, integrity, security. The youngsters may not be concerned about the privacy issue today; but that day is not far away when the society as a whole shall start raising the voice about the same. Data governance may become USP of the social media.

REFERENCE NOTES

1. *S. Srinivasan,* Lack of Privacy Awareness in Social Networks, ISACA (Article 2012) Retrieved from -

   https://www.isaca.org/...6/.../Lack-of-Privacy-Awareness-in-Social-Networks.aspx

2. Wikipedia, Users awareness in social networking sites, Benefit from data & Privacy concerns: https://en.wikipedia.org/wiki/Privacy_concerns_with_social_networking_services

3. Potential dangers: https://www.nidirect.gov.uk/.../social-networking-sites-online-gaming-and-keeping-child...

4. D INCI, (Optimum 7, August 11, 2011), Dangers of Social Net working sites; Business, Job seekers, Children and Adults be aware, Retrieved from -

    www.people-communicating.com/dangers-of-social-networking-sites.html

    https://www.optimum7.com/.../social-media/dangers-of-social-networking-sites.html

    https://www.reference.com › Technology › Social Media

5. Dani Deah, Facebook restricts ad targeting after anti-Semitism controversy (Sep 15, 2017, 11:17am EDT) Retrieved from https://

    www.theverge.com/tech/2017/9/15/16313916/facebook-restricts-targeting-fields-anti-semitism-ads

6. *B Brookshire,* On social media, privacy is no longer a personal choice, Science News, August 24, 2017, Retrieved from https://www.sciencenews.org/blog/scicurious/social-media-privacy-no-longer-personal-choice

7. Shih G, Facebook admits year-long data breach exposed 6 million users, (Reuter, Technology News June 22, 2013 / 4:37 AM) Retrieved from https://www.reuters.com/article/net-us-facebook-security/facebook-admits-year-long-data-breach-exposed-6-million-users-idUSBRE95K18Y20130621

Chetana's

Institute of Management & Research

Applications of Big Data in Management Education

* Mayur Suthar, * Preshita Khanolkar,
* Kshama Shetty, * Vihang Jadhav,
* Girishchandra B Sharma, * Shantanu Mandavgane,
** Vaibhav Shashikant Mahajan,
Co Author: Prof. Kavita Khadse

Abstract

Education is an important factor in determining the entrepreneurial orientation in individuals. The management education in India highlights the person's effectiveness towards gaining knowledge. Technologies such as Data mining and Data analytics can provide a fast feedback to students and teachers about their academic performance. These methods can provide a deep analysis of some education patterns and extract valuable knowledge from them. [1]

Big Data Analytics is used to analyse these large volumes of data which can be both structured and unstructured. Big Data are datasets whose size is beyond the ability of typical database software tools to capture, store, manage and analyse. Big Data uses techniques such as Hadoop framework and Data mining for extracting information from databases [2].

In this paper we are analysing the learning benefits from Big and giving a brief description of how this technology can contribute to a renowned education system. Helping teachers and students to make more targeted choices in the sector of education. Data is not just a back-office, accounts-settling tool any more. And can be used as a real-time decision-making tool.

Keywords: *Data mining, Big Data Analytics Datasets, Sector of Education, Decision making tool.*

INTRODUCTION

In the modern economic scenario all over the world - "Management" - as a stream of education and training has acquired new dimensions. Management is an exciting field where you can have an immediate impact on the operations of any business. The field of Management is dynamic in nature. New tools and techniques are continually being introduced to improve the efficiency, productivity and profitability of any organization. All organizations and their departments, functions, or groups use Management methodologies, which include problem solving techniques and guidelines for various

* PGDM, Marketing CIMR
** MMS –A CRKIMR

related activities. [1]

An overhaul of the system of planning and the management of education will receive high priority. The guiding considerations will be Evolving a long-term planning and management perspective of education and its integration with the country's developmental and manpower needs, decentralization and the creation of a spirit of autonomy for educational institutions, giving pre-eminence to people's involvement, including association of non-governmental agencies and voluntary effort, inducting more women in the planning and management of education and establishing the principle of accountability in relation to given objectives and norms.

EVOLUTION OF MANAGEMENT EDUCATION IN INDIA

Management education in India has not grown in an evolutionary manner. American experience was grafted on to an existing educational system and did not emerge from the native educational and business context and culture. Its development has been random and its objectives, content, pedagogy and other aspects need re-examination in relation to the needs of India, in an increasingly globalizing economy. Organizations are becoming more complex and businesses more competitive. The demands on the skills of Indian managers are changing. It has become essential to re-examine the entire structure, content, purpose of management education in India. [1]

MANAGEMENT EDUCATION PRESENT SCENARIO

In India the management education courses start at undergraduate level, as a three-year Bachelor Degree in Business Administration (BBA), offered in some colleges in the country. This course provides basic knowledge about management concepts and business structure and follows a yearly / semester - wise examination system. This is followed by two years' Postgraduate MBA / PGDBM programme. MBA and PGDM education is currently available through residential, full-time, and distance education modes. Most B-Schools follow a semester or trimester examination system.

BIG DATA IS CHARACTERIZED BASED ON 3 V'S

1. Volume: We currently see the exponential growth in the data storage as the data is now more than text data. We can find data in the format of videos, music and large images on our social media channels. It is very common to have Terabytes and Petabytes of the storage system for enterprises. As the database grows the applications and architecture built to support the data needs to be re-evaluated quite often. Sometimes the same data is re-evaluated with multiple angles and even though the original data is the same the new found intelligence creates explosion of the data.

2. Velocity: The data growth and social media explosion have changed how we look at the data. There was a time when we used to believe that data of yesterday is recent. The matter of the fact newspapers is still following that logic. However, news channels and radios have changed how fast we receive the news. Today, people reply on social media to update them with the latest happening. On social media sometimes a few seconds old messages (a tweet, status updates etc.) is not something interest's users. They often discard old messages and pay attention to recent updates. The data movement is now almost real time and the update

window has reduced to fractions of the seconds.

3. Variety: Data can be stored in multiple format. For example, database, excel, csv, access or for the matter of the fact, it can be stored in a simple text file. Sometimes the data is not even in the traditional format as we assume, it may be in the form of video, SMS, pdf or something we might have not thought about it. It is the need of the organization to arrange it and make it meaningful. It will be easy to do so if we have data in the same format, however it is not the case most of the time. The real world has data in many different formats and that is the challenge we need to overcome with the Big Data.

VALUE OF BIG DATA IN EDUCATION

Big Data can support the classic educational system helping teachers to analyse what students know and what techniques are most effective for each pupil. In this way, also teachers are able to learn new techniques and methods about their education work.

Technologies such as Data mining and Data analytics can provide a fast feedback to students and teachers about their academic performance. These methods can provide a deep analysis of some education patterns and extract valuable knowledge from them. In this way, collective and big scale data can predict who student needs more help from the education system, avoiding the danger of failure or drop out.

the online education has a very big development at recent years and has a very increasing impact of the education sector. Furthermore, digital learning is actually a collection of data and analytics which can contribute to teaching and learning. In this way

many students participate in online or mobile learning, where are crated new data. These new data, also with the help of social networks, are helping the students with the different background to correlate between them and help them to understand core course concepts. [2]

APPLICATIONS OF BIG DATA IN EDUCATION

Big Data has a future to change not just research but education too. Big data collects and analyses student data, to discover patterns and trends in those data, to make new discoveries and test hypotheses about how students learn. Data collected from online learning systems can be aggregated over large numbers of students and can contain many variables that data mining algorithms can explore for model building [3].

Educational data mining generally emphasizes on reducing learning into small components that can be analysed and then influenced by software that adapts to the student. Student data collected by online learning systems are being explored to develop predictive models by applying educational data mining methods that classify data or find relationships. These models play a key role in building adaptive learning systems in which adaptations or interventions based on the model's predictions can be used to change what students experience or even to recommend outside academic services to support their learning [6].

Big Data can support classic educational systems helping teachers to analyse what students know and what techniques are effective for them. They can then create new techniques that can assist in making the subjects more interesting and impactful [4]. The faculty can provide a faster feedback to the

students about their performances which would further speed up the process of learning and improvising. It will also help in understanding which student requires more attention by providing a deeper analysis and understanding of each student. The data in Educational data mining is hierarchical. Data at the student level, the classroom level, the teacher level, and the school level are nested together. Other important features are time, sequence, and context. Time is important to capture data, such as length of practice sessions or time taken to learn. Sequence represents how concepts build on and how tutoring should be ordered. Context is important for explaining results and knowing where a model may or may not work. Methods for hierarchical data mining and longitudinal data modelling have been important developments in mining educational data [6].

Educational Data mining follows some technical methods in understanding the student behavioural pattern and associating a student with a particular model.

1. **Prediction** entails developing a model that can infer a single aspect of the data from some combination of other aspects of the data. Examples of using prediction include detecting such student behaviours as when they are gaming the system, engaging in off-task behaviour, or failing to answer a question correctly despite having a skill. Predictive models have been used for understanding behaviours on the basis of the information from discussion forums, practice tests, etc. that will predict which students might fail a class [7].

2. **Clustering** refers to finding data points that naturally group together and can be used to split a full dataset into categories. Examples of clustering applications are grouping students based on their

learning difficulties and interaction patterns, such as how and how much they use tools in a learning management system. Data from online learning resources, student cognitive interviews, and postings in discussion forums can be analysed using techniques for working with unstructured data to extract characteristics of the data and then clustering the results. Clustering can be used in any domain that involves classifying, even to determine how much collaboration users exhibit based on postings in discussion forums [8].

3. **Relationship** mining involves discovering relationships between variables in a dataset and encoding them as rules for later use. For example, relationship mining can identify the relationships among products purchased in online shopping.

Sequential pattern mining builds rules that capture the connections between occurrences of sequential events, for example, finding temporal sequences, such as student mistakes followed by help seeking. This could be used to detect events, such as students regressing to making errors in mechanics when they are writing with more complex and critical thinking techniques, and to analyse interactions in online discussion forums.

Key educational applications of relationship mining include discovery of associations between student performance and course sequences and discovering which pedagogical strategies lead to more effective or robust learning.

4. Distillation for human judgment is a technique that involves depicting data in a way that enables a human to quickly identify or classify features of the data. This area of educational data mining improves machine-learning models because humans can identify patterns in, or features of, student learn-

ing actions, student behaviours, or data involving collaboration among students. This approach over-laps with visual data analytics.

OBJECTIVE

Objective of this paper is to identify Big Data Applications in Management Education.

METHODOLOGY

New technologies allow schools, colleges and universities to analyse absolutely everything that happens. From student behaviour, testing results, careers developments of students as well as educational needs based on changing societies. A lot of these data has already been stored and is used for statistical analysis by government agencies such as the National Centre for Educational Statistics. With the rise of more and more online education and the development of MOOC's all the data gets a completely new meaning. Big data allow for very exciting changes in the educational field that will revolutionize the way students learn and teachers teach. This paper will be based on published sources. Methodology adopted is case study method.

CASE STUDIES

Case Study 1: Institutional Analytics and the Data Tsunami

The business intelligence (BI) architectures of the 1990s & early 2000s and the days of a data ware-house–only solution are aging. The ETL (Extract, Transform, Load) process served the institutions well, providing data in enriched table formats or star schema designs that aligned closely with re-porting requirements. However, new advanced ana-lytic platforms must support an unlimited number of new data sources beyond the relatively simple structured database data. They must ingest data at a greatly accelerated rate. This transforms an ETL process to an ELT (Extract, Load, Transform) pro-cess. In ELT process the data is ingested, stored, digested and then organized later.

Arizona State University (ASU) have adopted this ELT process to store and analyse the flood of data to serve the university's mission [10].

Case Study 2: About ARIZONA STATE UNIVERSITY (ASU)

ASU was established in 1885 with 33 students and now it has around 98,137 students enrolled, 25,722 of them in ASU Online. It has been named as the most innovative university in the country by US News & World Report for the past two years in a row.

ASU'S Data Lake

With such a huge number of students enrolling in ASU, it has merged a "DATA LAKE" to its exist-ing BI architecture. Built on Hadoop, "DATA LAKE" is a collection of applications provides a framework to add new, varied and large data sources and make them available quickly. The value of data lakes is likely to escalate with the growth of the Internet of Things (IoT), as they swell with data from countless networked objects. It is an advanced analytics platform that will enable big data model-ling and forecasting, conducting what-if analyses to predict the effects of potential changes in busi-ness strategies. The results of the same can be trans-lated into improved institutional performance in many ways: optimized building maintenance plans; the ability to predict and prevent system failures; improved utilization of energy and physical re-sources (sustainability); enhanced service offerings

to students, faculty, staff, and visitors; the increased ability to deliver a highly personalized educational experience for every student; and, ultimately, the potential to significantly improve student outcomes [10].

"DATA LAKE" is been used as a solution to the unstructured data which is experiencing explosive growth, currently making up over 80 percent of ASU's data. Examples of such unstructured data (or semi-structured data) that ASU is exploring come from social media (Twitter, Facebook, Instagram), help centre chats or calls converted to texts, surveys, e-mails, documents, scientific and research data, learning management system (LMS), discussion boards, videos, audio, digital images, network traffic, web logs, machine/device output, and

streaming data from sensors increasingly placed throughout its environment. The goal is to support all these varied data types, assuming the data has reporting or analytical value.

Use of Cloud in Analytic Services & Systems Initially, use of cloud can be the best solution for the challenges faced by the institutes in modernizing existing analytics platforms in addition to maintaining and refreshing their existing IT and BI infrastructures. Flexibility, scalability, reliability, elasticity, agility, security, and cost efficiencies make these cloud environments attractive in the ongoing pressure to rapidly adapt and deliver (ASU already partners with the major public cloud Vendors-Amazon AWS, Microsoft Azure, Google, and Century Link).

Skills & Technologies Needed to Become 'DATA SCIENTIST'

ANALYTICS ROLE	SKILLS/CAPABILITIES	TECHNOLOGY
BI analysts	Data analysis/domain expertise, communication/collaboration, visualization	SQL, BI tools, Python
ETL analysts	Programming, data integration, data warehousing	SQL, Python, Hadoop/HDFS
Institutional researchers	Data analysis/domain expertise, modelling, communication/collaboration	SAS/SPSS, BI tools, SQL
Statisticians	Modelling, algorithms, prediction	SAS/SPSS, R, SQL
Data scientists	Modelling, machine learning/data mining, communication/collaboration	Hadoop/HDFS, R, Python
Business user	Communication/collaboration, spreadsheets, reporting/dashboards	BI tools, SQL, Excel

FINDINGS

Applications of Big Data in Management Education are as follows:

1. The Value of Big Data in Assessing Complex Skills

Conventional assessments in higher education classrooms are infrequent and constrained, both in their design (e.g., essay prompts, multiple-choice questions) and in their feedback (which is usually delayed and sometimes subjective). Progress in educational technology can provide tools for measuring students' performance on more authentic tasks, such as engineering design problems and free-form text answers. Measuring these types of tasks can increase the relevance and the precision of the results regarding what students learn, can allow the tailoring of instruction to specific students' needs, and can give individualized feedback across a range of learning issues. In addition, social interactions have increasingly moved from in-person to online. Big data can include detailed traces of student-to-student interactions. By integrating these and other sources of data, we may be able to measure more complex problem-solving and collaborative skills. Fulfilling this promise requires finding ways to analyse complex data from heterogeneous sources to extract such measurements, parallel to similar advances already taking place in the sciences and engineering. Over the past two decades, this fundamental progress in educational technology has been combined with its broad-based adoption at scale. Digital assessments allow more direct review of relevant, authentic performances. Previously, widely available data for large numbers of students principally came from standardized exams or standardized research instruments, such as the Force Concept Inventory in Physics. These assessments are limited to a short time window; as a result, they contain either a large number of small problems (which ensures that the results are precise but generally fail to capture complex skills requiring more than a minute or two to demonstrate) or a small number of large problems (which lacks any precision on a per-student basis).

2. Improved Students Results

The overall goal of Big Data within the educational system should be to improve student results. Better students are good for society, organisations as well educational institutions. Currently, the answers to assignments and exams are the only measurements on the performance of students. During his or her student life however, every student generates a unique data trail. This data trail can be analysed in real-time to deliver an optimal learning environment for the student as well to gain a better understanding in the individual behaviour of the students.

It is possible to monitor every action of the students. How long they take to answer a question, which sources they use, which questions they skipped, how much research was done, what the relation is to other questions answered, which tips work best for which student etc. Answers to questions can be checked instantly and automatically (except for essays perhaps) give instant feedback to students.

In addition, Big Data can help to create groups of students that prosper due to the selection of who is in a group. Students often work in groups where the students are not complimentary to each other. With algorithms it will be possible to determine the strengths and weaknesses of each individual student based on the way a student learned online,

how and which questions were answered, the social profile etc. This will create stronger groups that will allow students to have a steeper learning curve and deliver better group results. [9]

3. Create Mass-customized Programs

All this data will help to create a customized program for each individual student. Big data allows for customization at colleges and universities, even if they have 10.000s of students. This will be created with blended learning; a combination of online and offline learning. It will give students the opportunity to develop their own personalized program, following those classes that they are interested in, working at their own pace, while having the possibility for (offline) guidance by professors. Providing mass customization in education is a challenge, but thanks to algorithms it becomes possible to track and assess each individual student.

We already see this happening in the MOOC's that are developed around the world now. When Andrew Ng taught the Machine Learning class at Stanford University, generally 400 students participated. When it was developed as a MOOC at Coursera in 2011, it attracted 100.000 students. Normally this would take Andrew Ng 250 years to teach the same amount of students. 100.000 students participating in a class generate a lot of data that will deliver insights. Being able to cater for 100.000 students at once, also requires the right tools to be able to process, store, analyse and visualize all data involved in the course. At the moment, these MOOC's are still mass made, but in the future they can be mass customized.

With 100.000 students participating in a MOOC, it will give universities the possibility to find the absolute best students from all over the world. Based on the individual behaviour of the students, their grades, their social profile and their networking skills algorithms can find the best students. These students can then receive a scholarship that will increase the overall level of the university.

4. Improve the Learning Experience in Real-time

When students start working on their own, in their customized blended learning program, the vast amount of teaching, which most of the time is covered by general topics that have to appeal to all students from different levels, can be done online and by themselves. The professor can monitor all students in real-time and start a much more interesting and deeper conversation on the topic of choice. This will give students the possibility to gain a better understanding of the topics.

When students are monitored in real-time, it can help to improve the digital textbooks and course outlines that are used by the students. Algorithms can monitor how the students read the texts. Which parts are difficult to understand, which parts are easy and which parts are unclear. Based on how often a text is read, how long it takes to read a text, how many questions are asked around that topic, how many links are clicked for more information etc. If this information is provided in real-time, authors can change their textbooks to meet the needs of the students thereby improving the overall results.

Even more, Big Data can give insights in how each student learns at an individualized level. Each student learns differently and the way a student learns affects the final grade of course. Some students learn very efficiently while other may be extremely

inefficient. When the course materials are available online, it can be monitored how a student learns. This information can be used to provide a customized program to the student or provide real-time feedback to become more efficient in learning and thus improve their results.

5. Reduced Dropouts

All these analyses will improve the student results and perhaps also reduce dropout rates at universities or colleges. Dropouts are expensive for educational institutes as well as for society. When students are closely monitored, receive instant feedback and are coached based on their personal needs, it can help to reduce dropout rates as mentioned as well in a post by Horton works.

Using predictive analytics on all the data that is collected can give educational institute insights in future student outcomes. These predictions can be used to change a program if it predicts bad results on a particular program or even run scenario analysis on a program before it is started. Universities and colleges will become more efficient in developing a program that will increase results thereby minimizing trial-and-error.

After graduation, students can still be monitored to see how they are doing in the job market. When this information is made public, it will help future students in their decision when choosing the right university. [9]

CONCLUSION

Big data Applications supports Management education in various ways:

1. Improved Instructions: Big Data can help in providing personalised instructions to students de-pending on their analysis so that there is a better learning.

2. Matching students to programs: Big Data can help both the students and the parents to choose the right course and programs according to their area of expertise.

3. Matching students to type of employment: Big Data can also help students to discover the jobs that match their abilities in order to increase their productivity and interest.

4. The data include which courses students have signed up for, and their attendance records and grades. But not every variable is relevant to each student: much depends on specific course choices and behaviours. For example, getting a C- in an initial maths class may not be an issue for an English major, but it could be a sign of trouble ahead for chemistry major. In such cases, the system automatically sends the student and their adviser an email or text asking them to meet to discuss the issue. This can be applied as a part of education system. So that we can lower the rate of drop outs in education system.

5. Data which is often collected via surveys coordinated by Office of Institutional Research and Evaluation can use big data tools to measure its performance and compare how it is doing against other institutions worldwide. Which will help an educational institute to know their weak areas so that they can use this to increase their ranking?

6. Monitoring the diversity of students and staff by school and also using analytics to track research productivity and understand exactly where research funding is spent; to carry out internal audits to flag up potential fraud; and to look at student evaluations of teaching to better understand staff performance. Having data and dashboards

to look at that helps administrators, faculty, trustees and advisers make better decisions.

7. Administrators can take decisions on different efficiency and effectiveness measures based on the analytical information of real time data. So, it becomes easy for them to identify retention, progress and completion factors of the organization. It is also possible to reduce attrition through the early detection of at-risk students and generating alerts for learners and educators.

SUGGESTIONS & RECOMMENDATIONS

1. An advanced analytics platform helps to prepare the institute for the volume, variety, and velocity of data coming their way.

2. Tremendous opportunities exist from using non-traditional data sources to find new ways to advance student success and institutional performance.

3. While data scientist is the hot new job title, the rest of the institution's analytics workforce must develop and strengthen their skills and technology tools to engage, evaluate, and leverage these new, impending, and inevitable analytics platforms

LIMITATIONS

This paper is based on published sources. All the aspects are focussed only on Indian Management Education system.

REFERENCES

1. International Journal of Academic Research, Vol.2, Issue-2(8), April-June, 2015

2. IJCSI International Journal of Computer Science Issues, Vol. 11, Issue 5, No 1, September 2014 ISSN

3. Mark Logic, Big Data's Next Step: Applications, March 2012.

4. Athanasios S. Drigas and Panagiotis Leliopoulos, "The Use of Big Data in Education," Institute of Informatics & Telecommunications, Telecoms Lab - Net Media Lab, N.C.S.R. "Demokritos" Agia Paraskevi, Athens, 15310, Greece, IJCSI International Journal of Computer Science Issues, Vol. 11, Issue 5, No 1, September 2014.

5. B R Prakash, Dr. M. Hanumanthappa and Vasantha Kavitha, International Journal of Innovative Research in Computer and Communication Engineering((An ISO 3297: 2007 Certified Organization), Vol. 2, Issue 12, December 2014.

6. Koedinger, K. R., R. Baker, K. Cunningham, A. Skogsholm, B. Leber, and J. Stamper. 2010. ⁻A Data Repository for the EDM Community: The PSLC DataShop. In Handbook of Educational Data Mining, edited by C. Romero, S. Ventura, M. Pechenizkiy, and R.S.J.d. Baker. Boca Raton, FL: CRC Press, 43–55.

7. New Media Consortium. 2012. NMC Horizon Project Higher Ed Short List. Austin, TX: New Media Consortium.

8. Siemens, G., and R. S. J. d. Baker. 2012. ⁻Learning Analytics and Educational Data Mining: Towards Communication and Collaboration. In Proceedings of LAK12: 2nd International Conference on Learning Analytics & Knowledge, New York, NY: Association for Computing Machinery, 252–254.

9. https://datafloq.com/read/big-data-will-revolutionize-learning/206

10. Institutional Analytics and the Data Tsunami, By Gordon Wishon and Rome, Published: Monday, December 12, 2016.

11. Big Data Analysis in Higher Education: Promises and Pitfalls, Authors: by Chris Dedes and Ho, Published: Monday, August 22, 2016.

12. Big Data Analytics in the Education Sector: Needs, Opportunities and Challenges, Shikha Anirban, International Journal of Research in Computer and Communication Technology, Vol 3, Issue 11, November - 2014.

.

GUIDELINES TO AUTHORS

1) Journal of Management Research is an yearly journal of Chetana's Institute of Management & Research, Mumbai. It invites contributions on all aspects of Management thoughts, research and practices. The journal welcomes innovative and preferably research based articles in the area of Management. The case-studies from the practitioners in the said field are also welcome. Papers are processed through a blind referral system.

2) The paper/article should be typed in MS-Word on A-4 size paper in double space with 1-1/2"margin on the left side and 1/2" margin on the right side, typed in New Times Roman Font in 12 pt font size.

3) The cover page of the paper must contain (a) Title of the article, (b) Names (s) of other(s), (c) E-mail and affiliation of other(s), (d) an abstract of the paper in 100-150 words including keywords and (e) Acknowledgments, if any. The first page of the paper must also provide the title of the paper.

4) The paper/article should not exceed 15 typed pages including graphs/ tables/ appendices. The tables and figure should appear in the documents near/after where they are refereed in the text. The paper/article should start with an introduction and should end with the conclusion summarizing the findings of the paper.

5) All notes must be serially numbered and may be given either at the end of the paper as notes or on every page as footnotes.

6) References should be complete and in Harvard style. They should contain full bibliographical details and journal titles should not be abbreviated. For multiple citations in the same year use a, b, c immediately following the year of publication. References should be shown within the text by giving the author's last name followed by comma and year of publication, all in round brackets.

7) The first author of every published paper will be given one copy of the journal.

8) The views expressed in the articles are those of authors and do not represent the views of Chetana Management. The management reserves the right to accept or reject any of the articles without giving any notice/initimaton to the author/s.

9) Every paper must be accompanied by a statement that the paper has not already been published nor submitted to any journal for publications.

10) All the papers/articles should be sent in electronic form to:

The Editor,
Chetana's Institute of Management & Research,
Survey no. 341, Govt. Colony, Bandra (East) Mumbai 400 051, Maharashtra.
Tel.: (022)2651 3346/ 2651 6643
Email: director@cimr.in and/ or seva.rangnekar@cimr.in

Chetana's

Institute of Management & Research

Survey No. 341, Govt. Colony, Bandra (East), Mumbai - 400 051.
Tel.: (022) 6251 7800 / 01 / 02 / 03 /, (022) 2651 3346 / 2651 6643
Fax : (022) 2642 3392
Email : info@cimr.in * Website : www.cimr.in