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Human Resources Analytics: An Approach Towards Business Intelligence

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***Abstract*—This study aims at identifying various Human Resources (HR) analytics as part of Business Intelligence (BI), for systematic and effective handling of HR issues. Further, this study identifies the importance ofBI in the field of Human Resource Management (HRM) through various established models of BI like SAP ERP Workforce Analytics, SAS Human Capital Predictive Analytics and Retention Modeling, Oracle Human Resources Analytics and IBM Cognos Business Intelligence. The study focuses on how these BI models helps in attaining sustainable business growth through the strategic alignment of HR issues with the overall business objectives. The study follows a descriptive approach. The published works (mainly from Emerald, Science Direct and EBSCO) are being reviewed to identify various HR analytics that contributes to the overall BI. The study concludes that HR analytics as a part of BI helps an organization in systematically handling Human Resources with the use of data management and warehousing technologies across different functions of HRM. Thus it leads to work force stability within the organization. On the other hand a stable work force leads to continuous business growth and helps an organization in its sustainability and thereby creates competitive advantage for the organization in its external business environment. The implication drawn out of this study states that HR analytics as a form of BI helps in simplifying HR functions and creates strategic alignment with the overall business objectives. The present study is a modest attempt to compile various existing studies in a meaningful direction in order to generate a need for the use of BI in the field of HRM.**

***Keywords*: HR analytics, Business intelligence, Data management, and Data warehousing.**

I. INTRODUCTION

A significant transformation in the field of Human Resources (HR) has been drawing the attention of corporate houses in the last decade. HR has undergone a paradigm shift in its focus from a qualitative to a quantitative and more effective approach. Business intelligence (BI) on the other hand helps in bringing people skills and technologies together in order to maximize the value of a firm.

The modern approach in HR is driven by Evidence Based Management (EBM).This approach helps in making the right choice in businesses. It is revealed by the studies that the impact of EBM on management practices and business performances are significantly rising. Although, the studies related to HR has been drawing attention of the researchers and there is a felt need to give sufficient attention to this field in practice, yet very few organizations are capable of measuring the real value that people bring to their business [10]. Hence there is a need for HR to grow itself from descriptive measures and metrics to predictive and prescriptive analytics.

HR Analytics, Workforce Intelligence and Human Capital Analytics are some of the synonymous terms which can be called all together as Workforce Analytics. The global economic crisis is a significant period that has given rise to the studies on workforce analytics.

The Modern organizations are now very much interested in collecting more and more HR and Business Data than ever before. According to the Center for Advanced Human Resource Studies[1] (CAHRS) 2010, the current practices of HR Analytics are in the following directions:

a) Identifying and managing leaders to drive performance
b) Better Risk management
c) Traits of front line supervisors linked to performance.
d) Dissecting the differences to uncover Key Success Factors.

It is apparent from the evidences that the companies which have used HR analytics as their business policies are performing significantly higher than those which are not making use of such practices. As a mark of evidence it is observed that MIT, IBM and other top companies with respect to performance are three times more sophisticated users of analytics than the lower performers. Technology giant Oracle (2011) explains the two critical factors that help to identify the impact of work force on the organizational performance. The first factor is the ability of the data user to easily get access to and uses the analytic capabilities and the second is concerned with the data accessibility of not only the workforce but also the operational, financial and customer data at various levels

[1] Retrieved from https://est05.esalestrack.com/eSalesTrack/Content/Content.ashx?file=23217acb-5e27-4c3f-b413-798ef6f8e57d.pdf

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of the organizational hierarchy. HR Analytics can improve an organization's bottom line by effective work force cost control.

Business Intelligence is a broad field that combines people skills, technologies, applications, and business processes together to make better strategic and tactical business policies and decisions. The technologies and applications include data management techniques for planning, collecting, storing, and structuring of data into data warehouses and data marts and also analytical tasks for querying, reporting, visualizing, generating online reports, and running advanced analytical techniques for clustering, classification, segmentation, and prediction of business prospects in future. Data warehouse focuses on enterprise wide data, and data mart is restricted to a single process or a department, such as Human Resources (HR) department.

A. Background Study

A transformation of HR practices into HR analytics is observed significantly in the last decade. In the academic arena this area has been drawing the attention of the researchers and eventually the present study has come across various models and frameworks towards the studies of HR analytics.

In a study there was a felt need revealed by the authors for the use of metrics and analytics in the HR function of an organization to play a strategic role. The growing use of information technology is a clear positive sign that introduces change in the field of HR about its functionality [6]. However, in the process of bringing such change the major concern is over the usefulness of Return on Investment (ROI) and the cost benefit and impact analysis [7].But the issue of information overload in the HR field with the maturity of an organisation has brought relevance for the use of analytics for effective handling of HR issues [1].In a study, a framework named Human Capital Management (HCM) has been introduced that describes how the HR function can move beyond benchmarking the operating variables and focus on more strategic issues. The same study also explains how the value of a firm is derived in the future via leading indicators and intangibles and an increase in the value of intangibles is due to the adoption of technology and information in the place of physical assets.

Although, in general there are lots of empirical evidences supporting the relationship between a firm's financial performance and the HR metrics, yet the intellectual community reveals that specific frameworks are not yet created to strengthen such relation and to enforce better HR strategies [2]. Another study signifies that HR management is not yet completely aligned with the strategic business objectives of a firm, so that it can become a strategic business partner. The same study recommends that the use of Human Capital framework can be used as a method to link up human capital processes with business strategy to leverage financial results and to demonstrate value-addition to a firm [8].

In a study the author suggests that the best way to tie up the entities of analytics and strategy is through a human capital (HC) scorecard. The scorecard is derived from a strategy map like the original balanced scorecard, which connects inputs, human resource activities and human capital outputs together and also depicts how these are linked to the growth of bottom line human resources of a firm [4].In this connection, one of the most critical problem is educating multinational companies to align their HR processes and practices to the changing global labor market conditions. By adding BI and Data analytics in the field of HRM protocols and database strategies they can very well attract, develop and retain their top talent and be a fore runner in the global business competition [5].

The result of another study reveals that having an end to end range of analytics capabilities supported by an integrated analytics strategy, organizations are advised to enlarge or shorten, the distance between themselves and competitors to their own competitive advantage at large [3]. It was suggested that with the adequate use of data and analytical methods, business dynamics can be controlled. These are called Performance Analytics. In this way, analytics can provide the added competitive advantage which is not totally considered with regard to conventional or advanced Performance management systems (PMS) [9].

B. Aim and Objectives

This study aims at identifying various Human Resources (HR) analytics as part of Business Intelligence (BI) for systematic and effective handling of HR issues. Further, this study identifies the importance of BI in the field of Human Resource Management (HRM) through various established models of BI like SAP ERP Workforce Analytics, SAS Human Capital Predictive Analytics and Retention Modeling, Oracle Human Resources Analytics and IBM Cognos Business Intelligence. The study focuses on how these BI models helps in attaining sustainable business growth through the strategic alignment of HR issues with the overall business objectives.

C. Methodology

The study follows a descriptive approach. The published works (mainly from Emerald, Science Direct and EBSCO are being referred) and the official websites of a few corporations are being reviewed to identify various HR analytics in practice that contributes to the overall BI.

D. Elements of business Intelligence

The modern business organizations have access to more data than ever before. Companies produce, collect and store large amount of data generated from customer feedback surveys to manufacturing and delivery of goods and services. Business intelligence is a series of methodologies that puts this data in a systematic order to make it more meaningful. This in turn helps in raising the profits of an organization. On the other hand such a process of transforming raw data into meaningful information helps an organization in making strategic decisions of the same. Though the studies related to BI is very extensive in nature, yet it can be segregated under the

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following major components[2]. The five primary components of BI include:

a) *OLAP (Online Analytical Processing)*
This component of BI allows executives to sort and select aggregates of data for strategic monitoring. With the help of specific software products on OLAP, the corporates can make adjustments to the overall business processes.

b) *Advanced Analytics or Corporate Performance Management (CPM)*
This component of BI helps the business leaders in observing the statistics related to the demands, supply and satisfaction related to a particular product or service. Considering such meaningful information business houses can expand or contract their businesses across different geographical regions. This is even a potential source for identifying prospective markets.

c) *Real-time BI*
In today's mobile environment, where people require all comfort and information on the tip of their fingers, this component has become increasingly demanding and popular. In this tool by using software applications, a business can respond to real-time trends in email, messaging systems or even digital displays. Because of its real time orientation the traders can have the scope of publicizing special offers on a customized basis with respect to specific needs and preferences of its end-users. Use of coupons is one among such popular services in business practice.

d) *Data Warehousing*
Data warehousing refers to the process of storing huge amount of data in a logical and meaningful ways so that different subsystems in an organization can make use of that for their benefits within the company. It helps in creating interrelationship among various subsystems of an organization. It helps in the analysis of business statistics in future by identifying how different subsets in business units are related to each other and how one may have influence on the other in a given condition. For example business owners can compare shipping times in different facilities to find which process or teams work more efficiently over the others.

e) *Data Sources*
Data sources is the component of BI that involves in storing huge data and it makes use of several software applications in order to convert them into meaningful information. Using software applications the divisions or subsystems of an organization can make use of these sources of data for their own benefits in specific format as compatible to their needs. The BI analysts using this strategy may create data tools that allow data to be put into a large cache of spreadsheets, pie charts, tables or graphs etc. and that can be used for a variety of business purposes. It in fact helps an organization in making fact driven business decisions.

II. Major Areas of Application for BI in HR

Organizations make operational and financial plans to achieve their strategic goals, and then initiate projects to implement those goals in the form of plans.

A. *Performance Measurement and Monitoring*

For measuring performance, key performance indicators are identified and measurements are done according to those key performance indicators (KPIs). The KPIs need to be designed for each functional area and for each of the levels in the organization starting from the highest to the lowest on the basis of their unique performance features . Further these KPIs are the indicators for examining incremental progress of the project. Performance indicators with respect to human resources may include employee retention, job satisfaction, compensation and rewards, employee training, accident levels, employee absenteeism, and employee performance.

B. *Analyzing Performance*

With the use of Management by objective (MBO) approach, KPIs are compared to the strategic goals and objectives. The results drawn are further utilized to monitor performance and to determine the acts to improve the same. The Advanced Analytics subsystem enables organizations to make decisions in alignment with their goals and objectives as well as programs and budgets to the performance indicators.

C. *Decision Making and Performance Feedback*

By using BI, the organizations are able to modify their goals and objectives, programs, and re-allocate resources in the best possible way. Performance measures in essence provide a feedback loop in the process of business performance management.

III. Business Intelligence And Data Analytics Features In Human Resources

HR analytics as tools under BI helps organizations in simplifying the process of managing human resources in an organization. It has been observed that larger the size of an organization and if the organization has reached its maturation, there is a stronger need for HR analytics to address various issues in HR field. The use of HR analytics even helps in forecasting future trend in Human resources including succession planning and thus helps in aligning HR functions with the strategic business functions of a corporate house.

Several technological giants have come up with many useful HR analytics to enhance the efficiency of HR functions within an organization. Some of those HR analytics are discussed as under:

[2] Retrieved from https://www.villanovau.com/resources/bi/overview-of-business-intelligence-bi-components/#.WA7aDfl94_4

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A. SAP ERP Workforce Analytics[3]

This product includes features and functions that support these business activities

a) Workforce Planning

This analytics uses work force demographics to understand current trends in human resources and determine the plan for desired state of human resources in future. It takes under consideration the reports related to turnover rates and work force composition. The results obtained from this analytics can be directly linked to headcount planning, budgeting, and key talent processes, such as recruiting and learning.

b) Workforce Cost Planning and Simulation

This analytics Support HR professionals in all workforce cost-planning tasks, and empower HR executives to develop effective strategies. Provide access to a broad range of workforce-related data to support accurate planning, facilitate simulated planning scenarios, and enable continuous monitoring of actual performance in relation to the plan.

c) Workforce Benchmarking

This HR analytics measure workforce processes against certain set standards and compare the measurements with external benchmarks and internal operating systems.

d) Workforce Process Analytics and Measurement

This analytics is used to measure and analyze the core HR processes, such as payroll, employee administration, time management, and other benefits. It also analyzes organizational structures, relationships, and attributes of jobs and positions.

e) Talent Management Analytics and Measurement

Analyzes employee skills and qualifications, Evaluate the efficiency recruitment processes. Measures the effectiveness of various training and learning programs, Assesses how well the succession programs prepare the employees to assume and acquire key positions and also ensures continuity of operations. It monitors the progress of aligning employee goals with corporate goals through definite career planning programs. It also analyzes the cost-effectiveness of employee compensation programs.

f) Strategic Alignment

This analytics ensures that all business activities are in line with the strategic goals of the organization. It also helps Employees' team work towards common objectives, regardless of location through the digital systems. It uses a balanced scorecard framework, with predefined workforce scorecards that integrates department and individual together with the help of management-by-objective (MBO) documents in order to align employee goals with corporate strategy.

B. SAS Human Capital Predictive Analytics and Retention Modeling[4]

SAS Institute has introduced this purely HR focused BI model, which helps in making various decisions related to HR issues. The general features of this Human Capital Predictive analytics comprises of the following:

a) It predicts turnover percentage by listing the employees under the risk of voluntarily leaving their jobs under high, medium and low risk categories.
b) Finds the causes of voluntary turnover or terminations.
c) Identifies the top performers.
d) Finds the reasons why high performers leave their jobs voluntarily
e) Ranks employees under the categories of high, medium and low risk for termination.

C. Oracle Human Resources Analytics[5]

The HR analytics developed and designed by Oracle comprises the following features:

a) Workforce Insight: monitors workforce demographics in alignment with recruitment and retention. It also gives measures to prevent employee turnover.
b) Targeted Workforce Development: this focuses on talent management. Considers both top and bottom performers and uses appropriate measures for managing talent.
c) Improved Compensation: creates an understanding about how compensation impacts performance, ensure compensation is equitable and consistent across roles, and align variable compensation with the organization's objectives and goals.
d) Leave and Absence: Monitors the rate of employee absenteeism and determines a future trend to predict the employee engagement.
e) Better Understanding of HR Performance: determines the overall performance and employee productivity using industry benchmarks such as revenue per employee, contribution per headcount, and return on human capital.
f) Statutory Compliance: Monitors compliance of HR policies with various legal requirements.
g) Workforce Planning: Monitor workforce demographics in line with recruitment and retention objectives. Workforce Cost Planning and Simulation

[3] Retrieved from http://www.sap.com/solutions/business-suite/erp/featuresfunctions/workforceanalysis/index.epx

[4] Retrieved from http://www.sas.com/solutions/hci/hcretention

[5] Retrieved from http://www.oracle.com/us/solutions/ent-performance-bi/hr-analytics-066536.html

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D. IBM Cognos Business Intelligence and Human Resource Performance Management[6]

This product includes the following features pertaining to the following five HR core areas

a) *Organization and Staffing*: determines job functions, positions, roles and capabilities with respect to the requirements of business performance.
b) *Compensation*: determines the process of rewarding employees to retain and motivate them for better performances in due courses of time.
c) *Talent and Succession*: determines appropriate measures for talent management and also identifies and develops the candidates for future replacement of key positions.
d) *Training and Development*: determines appropriate interventions for attaining definite performance standards.
e) *Benefits*: offers measures for cost benefit analysis in order to balance capital and returns.

IV. Summary And Conclusion

It is apparent from the studies that today's business houses are becoming more competitive than ever before. The core reason behind such fast developments is due to the technological advancement. With the growth and maturity of business houses data management becomes a difficult task, yet important for future and further growth and development. It is Business intelligence that solved this problem of business houses.Because the business environment is constantly changing, decision making in organizations has become increasingly complicated. But Business Intelligence is helping organizations to make faster and more reliable information based business decisions.

Business Intelligence has been seen as consisting of four major interdependent sub systems namely, Data Management, Advanced Analytics, Business Performance, and Information Delivery subsystem. The Data Management subsystem transforms data storage into databases, data warehouses, and data marts. With Online Analytical Processing (OLAP), it is possible to do multi-dimensional analysis of data. The Advanced Analytics processing system on the other hand includes analytical methods based on statistics, data mining, forecasting, predictive modeling, predictive analytics, and optimization of data. The Business Performance system consists of processes for performance measurement and making decisions to improve business performance. Apparently the Key Performance Indicators (KPIs) take a prominent role in this sub system. KPIs are defined to measure progression of organizational goals. The Information Delivery subsystem provides information to users in real time and in a format they desire. End users are able to monitor the key activities in easy-to-understand formats, such as configurable information portals, scorecards and dashboards. Thus the BI simplifies the whole business activities into a systematic and simplified process.

HR analytics as a part of BI helps an organization in systematically handling Human Resources with the use of data management and warehousing technologies across different functions of HRM. Thus it leads to work force stability within the organization. On the other hand a stable work force leads to continuous business growth and helps an organization in its sustainability and thereby creates competitive advantage for the organization in its external business environment.

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