INTERNATIONAL JOURNAL OF RESEARCH IN COMMERCE & MANAGEMENT

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HR ANALYTICS: ITS USE, TECHNIQUES AND IMPACT

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ABSTRACT

This paper gives insights on using analytics in the HR area. Various forms and uses of analytics have been highlighted in the paper. Prescriptive, descriptive and optimizing analytics have been discussed in this paper. This paper also intends to report the empirical findings of the surveys conducted on use of analytics and its applicability in the HR field. Techniques that can be used in analytics are listed in this paper. Link of HR analytics with the individual performance and organization performance has also been established.

KEYWORDS

HR Analytics, HR modelling and techniques, Human Capital Workforce Analytics.

CONCEPT AND BACKGROUND

The term analytics has become popular in the past few years but the first decision support applications back to the late 1960s and early 1970s. These applications were most often called decision support systems (DSS). Over the time period other decision support applications such as executive information systems (EIS) and online analytical processing (OLAP) emerged to become part of the decision support applications portfolio. In the late 1980s and early 1990s, data warehousing (DW) and Business Intelligence (BI) were also included in the decision support applications portfolio. Today, the word analytics is often used as an umbrella term (Watson 2010). Today, the different types of analytics are frequently used in different settings to discover the drivers of tangible business outcomes. For example, banks use predictive analytics to assess credit risk associated with the client. Market researchers often use consumer demographics data to predict consumer buying behaviors. These approaches help in making educated, informed decisions based on facts and figures. Heads of finance department do the same thing when they produce financial forecast reports or perform cost and benefit analysis of the projects (Mondore et al. 2011). Therefore, the employees' related data can also be scientifically and rationally related to tangible business outcomes based on facts and data. HR analytics include statistics research design, identifying meaningful questions, using appropriate data, applying scientific standards to evaluate the results and translating the results into meaningful business reports (Levenson 2005).

HR METRICS AND HR ANALYTICS

To perform appropriate analytics establishing the linkage between HR practices and business outcome some basic things are required. First the appropriate HR metrics are required. But only metrics are not sufficient; appropriate analytic models and measures of company performance are also required to link the effectiveness of HR programs with company performance (Edward et al. 2004). There is difference between HR metrics and HR analytics. Metrics are data driven (numbers) document that reflect some detail about given processes or outcomes, such as, success in recruiting new employees, effectiveness of training program. Analytics refer to approaches for combining data indicators (such as % of hiring externally, source of recruitment) into metrics and for examining relationships or changes in the metrics. Understanding these combinations is done in HR analytics to inform managers about the changing state of human capital in an organization to facilitate managerial decision making based on facts and figures (Carlson & Kavanagh n.d.). To become a true strategic partner HR needs to develop better metrics and analytics (Lawler & Mohrman 2003).

HR analytics use the information maintained on human resource information system. It consists of number of component systems that are interdependent. The various components may be broadly classified into the following four main sub-systems: data warehousing, data analytics, performance management system, and information delivery (Kapoor & Sherif 2012). Data warehousing system deals with design, implementation, and operations of a data warehouse including data extraction, data cleansing, data transformation, and loading of data from different sources. The system also includes meta-data management, security management, backup and restore, and disaster recovery.

TYPES OF HR ANALYTICS

Different forms of analytics can be categorized into descriptive, predictive, and optimization analytics (Watson 2010). Optimization analytics involves mathematical programming (e.g. linear, integer), simulation etc. Predictive analytics involves decision trees, genetic algorithms, neural networks etc. Descriptive analytics involves the use of Data visualization, Dashboards/scorecards, OLAP reports, Published reports and SQL queries.

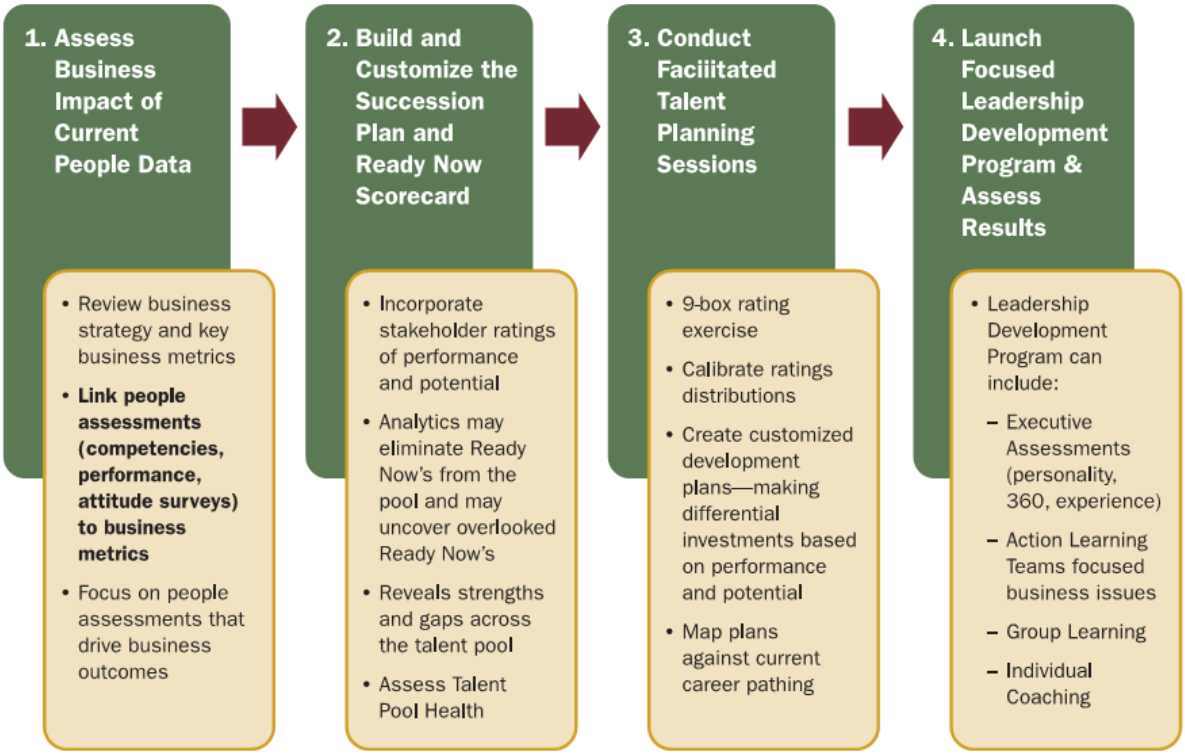
Descriptive analysis is the first level of analysis. It involves understanding of past behavior and outcomes (Fitz-enz 2009). It looks for and describes relationships among data without ascribing meaning to the patterns. It is exploratory rather than predictive. From it, one can see trends from the past. Yet, it is very risky to extrapolate the past into the future in the volatile, rapidly changing markets of today and tomorrow.

HR Analytics tools can be used for predictive analysis to facilitate the HR decision making. Whereas descriptive analytics reveals current data patterns, predictive analytics gives meaning to those patterns for the future. With practice, one can look at historical data and foretell, to some degree, the likelihood of a future occurrence (Fitz-enz 2009). Companies receive large number of job applications that must be screened to select the right candidate for the job. Predictive analytics can be used to identify the attributes that are required for high job performance and thus screen applicants for various job positions (Watson 2010). By using predictive analytics every job application is considered but only the best applicants suitable for the job are interviewed. Analytics is also used for workforce planning and optimization. For example, simulation models can assess the supply and demand for workers with specific skills (e.g. Java developers) over tome to have a right number at the right time. As the conditions change (such as change in workload) the models can be rerun to update hiring and retention plans.

Bersin (2013) have found that only 4% of companies have attained the ability to perform "predictive analytics" about their workforce and 14% of the 480 large organizations surveyed, have done significant "statistical analysis" of employee data.

Mondore et al. (2011) have suggested two strategies in HR analytics to maximize the effectiveness and influence of HR analytics in the organization. First, HR Process Analytics helps connect an individual process, such as on-boarding, selection, performance management, employee opinion surveys, competencies, leadership development, 360 assessments, work-life balance initiatives etc. to important business outcomes. Each of this process can be analyzed separately to show the impact and drive action. Second, Integrated HR Analytics combines the key business drivers from the process analytics approach into an integrated business-focused strategic plan. Succession planning as illustrated in the Fig. I is an important area that consists of several processes, but can be focused upon by an integrated analytics approach. Individual level process data such as competencies, performance, attitudes surveys are assessed and those aspects are identified and focused that drive business results. Then, succession plan is created and talent development plans are chartered out at stage three. To execute the succession plan proper leadership development programs are initiated.

FIG. I: ANALYTICS BASED SUCCESSION PLANNING

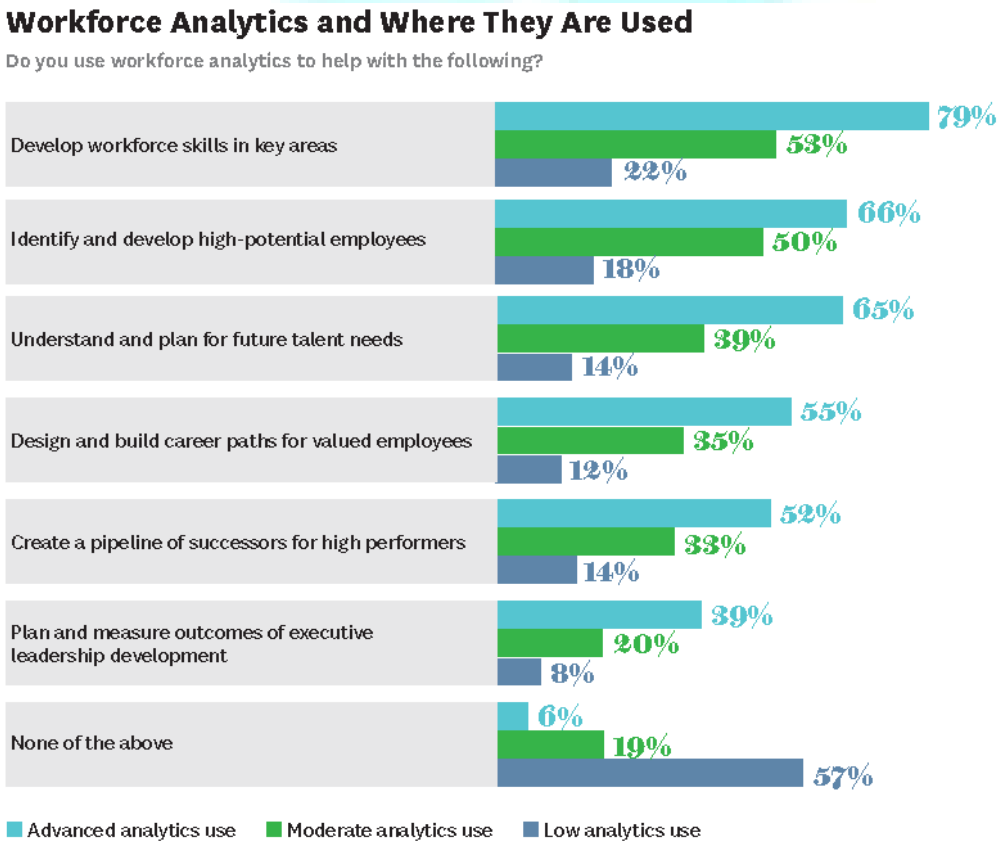


(Source: Mondore et al. 2011)

USE OF HR ANALYTICS

Based on 480 large organizations surveyed by Bersin (2013) more than 60% of companies are investing in Big Data and analytics help make HR departments more data driven. Low users of HR analytics suffer from a lack of investment in any analytics technology. It can be their cultural position, with 51 percent of low users saying analytics is not a priority in their business (HBR sum total report 2013). This can be also due to shortage of analytics skills in low users' organizations. This report also showed that ineffective companies show results similar to those of low analytics users. Ineffective companies do not make analytics a priority (48 percent), lack analytics technology (47 percent) and skills (41 percent), and have little or no integration of HR systems with other enterprise systems (50 percent) according to HBR sumtotal report (2013) based on world wide 498 responses. Fig. II depicts use of HR analytics in human resource development areas by companies with advance analytics use, moderate analytics use and low analytics use.

FIG. II: USE OF WORKFORCE ANALYTICS



(Source: HBR sumtotal report 2013)

SERVICE PROVIDERS IN THE AREA OF HR ANALYTICS

SAP, IBM, SAS, Oracle, and Microsoft are the mega vendors in the area of Business Intelligence. They have made BI software their focal product to develop or acquire. Each also offers HR modules with BI and data analytics capabilities embedded in them (Kapoor & Sherif 2012). The vendors claim that the following features and functions are included in their software:

- HR planning by identifying those in the high-risk group by job category pinpoints the employees most likely to voluntarily leave, predicted turnover percentage, causes of voluntary termination, understand and manage employee turnover.
- HR cost planning and simulation, to get a comprehensive view into employees' absence events; using absence trends to predict employee engagement levels.
- HR benchmarking by assessing HR's overall performance and employee performance using industry standards such as revenue generated per employee, contribution per employee, and return on human capital.
- HR process analytics and measurement by monitoring workforce demographics in line with recruitment and retention objectives, analyzing efficiency of the entire recruitment process lifecycle, understanding learning needs by analyzing course registration by job delivery methods.
- Talent management analytics and measurement to engage and develop internal talent, by tracking the movement of high and low performers in the company.
- Aligning organizations goals with the strategy, understands the linkage between compensation and performance, ensure equitable and consistent compensation, and align variable compensation with the company's goals and strategies..

SOME SELECT CASES ON HR ANALYTICS

Two cases (Motorola and Hewlett-Packard) make the point of the business value of analytics (Fitz-enz 2009). In the 1990s, Motorola could not reconcile diverging curves of bookings and hiring. As bookings grew, hiring was stagnant. As hiring ramped up, bookings dropped. This went through three cycles and cost the company over $1 billion in hiring and layoffs, not to mention lost business. The company never recovered its 1980s market leadership.

In case of Hewlett-Packard (HP), the workforce planning function constantly monitors the relationship of revenue and profits to labor costs. This allows the business leaders to identify rapidly any misalignment of workforce costs and revenue. They also use the data as levers to improve productivity. As the economy fell off the cliff in late 2008, HP was able to rapidly assess and realign the workforce. Each small business unit (SBU) reacted quickly to control costs while retaining the "muscle" of the company. An ironic side note is that when the planning and analytics function was formed, management found no one inside the HR function who had the skills for this type of work. The analytics unit was staffed from outside.

The analytics leads to predictive action, in which companies can anticipate employees' preferences and future behaviors and tailor HR practices to help them hold on to their valuable talent (Harris et al. 2011). This was the approach taken by Convergys, a company that manages billing, payroll, benefits and pensions for businesses in 40 countries. After the company's initial public offering in 1999, the Convergys workforce doubled to 35,000, but turnover was a major headache – the company had to recruit 50,000 new people in 1999 to maintain that level of staffing. To reduce attrition, Convergys turned to a consumer marketing technique, conjoint analysis. When used with products, such analysis helps companies deter mine how people value different combinations of features. When used with employees, it helps companies figure out the mix of benefits most likely to encourage people to stay with the organization. Using this tool, Convergys learned, for example, that employees were more likely to stay with the company if they got half their annual pay raises every six months instead of the entire amount only once per year. Instituting that change was a low-cost way to keep people longer. In addition, the company found it needed to offer a customized mix of benefits to different locations. It established Employee Engagement Teams at each of its 57 customer contact centers to work out the right mix for each location, with items such as flexible scheduling, tuition aid and employee recognition on the table for negotiation. While this analytical effort required real investments of time, it paid off. The company estimates that attrition over a four-year period was reduced by nearly 58,000 employees, with savings in recruiting and training estimated at $57 million (Mullich 2005).

Google uses operational experiments to assess the effectiveness of the ad text used on its web site (Ayres 2007). They have created an experiment for this purpose than simply relying on hunch or perceptions. It configures its site to alter the presentation of competing ad text for the visitors and then tracks the number of clicks on the ad for a time period. Based on the number of hits, Google can get quantitative and specific data on the impact of the various advertisements in a relatively short time period and then adopt the ad text proved to be most effective.

ANALYTIC TECHNIQUES

The first challenge in applying analytics is in choosing from the wide array of statistical and analytic techniques that are available. Table I lists categories of analytic competencies divided by type and level of complexity. The top panel of Table I focuses on analytical competencies related to statistical techniques, and the bottom panel contains other analytic competencies. The second column provides examples of techniques and concepts, while the third column provides a rough approximation of the coursework and on-the-job experience needed to become proficient for each competency, as well as the general education level associated with people who are proficient.

TABLE 1: HR ANALYTICAL COMPETENCIES

ANALYTICAL COMPETENCIES RELATED TO STATISTICAL TECHNIQUES		
Category	Examples	Level of statistical expertise required (and approximate educational equivalent)
Basic data analysis	•Mean •Median •Minimum & maximum; range •Percentiles	•Beginning course in basic statistics •Minimal on-the-job experience applying the techniques •High school / undergraduate level education
Intermediate data analysis	•Correlation •Statistically significant differences •Standard deviation	•One to two courses in basic statistics •3-6 months on-the-job experience •High school / undergraduate education
Basic multivariate models	•ANOVA / ANCOVA •Regression •Factor analysis	•Course in advanced statistics •1-2 years on-the-job experience •Undergraduate / MBA education
Advanced multivariate models	•Structural equations models •Hierarchical linear models •Bivariate / multivariate choice models •Cross-level models, including adjustments for grouped and non-normal errors	• Degree or concentration in statistical methods •Substantial experience applying the techniques on-the-job (multiple years) •Graduate degree (Masters or Ph.D.)
OTHER ANALYTIC COMPETENCIES		
Data preparation	•Identify data for analysis •Prepare / clean the data for analysis (transform, identify outliers, etc.)	•One to two courses in basic statistics •3-6 months on-the-job experience •High school / undergraduate education
Root cause analysis	•Identify causal paths •Six Sigma analysis	•One to two courses in basic statistics •6-12 months on-the-job experience •High school / undergraduate education
Research design	•Treatment vs. control groups •Experimental design (exogenous variation created by researcher) vs. "natural" experiments (exogenous variation that already exists in the data)	•Course in advanced statistics •1-2 years on-the-job experience applying the techniques •Undergraduate / MBA education
Survey design	•Sample selection •Survey item design; validity; reliability	•Course in advanced statistics •1-2 years on-the-job experience •Undergraduate / MBA education
Qualitative data collection and analysis	•Interview techniques •Interview coding •Content analysis	•Course in research design •1-2 years on-the-job experience •Undergraduate / MBA education

(Source: Levenson 2011)

BOTTOM LINE IMPACT OF HR ANALYTICS

HR analytics is an evidence-based approach for improving individual and organizational performance by making better decisions on the people side of the business. Although it is not its purpose to prove the worth of HR, analytics can certainly enhance the credibility of the HR function by improving the effectiveness of HR policies and practices and contributing to the competitive advantage of organizations that develop it as a core competency. An added side-benefit is that HR analytics can help expose where effort, resource and budgets are not producing their intended impacts, and in so doing reduce the workload while improving the effectiveness of HR (Bass 2011).

Organizations can use three different kinds of metrics to assess the impact of HR activities and to evaluate business strategy and performance. These are efficiency, effectiveness and impact. Efficiency of the HR function means how HR function performed its basic routine and administrative tasks. The second kind of HR metrics focus on effectiveness: whether HR programs have the proposed effect on the people toward which they are directed. For example in the case of training and development effectiveness metrics should offer information whether employees build needed skills and not just on how many employee participated and completed training successfully (Edward et al. 2004).

Human capital initiatives impact how work is organized and executed; have ripple effects that can invade a wide variety of product or process outcomes, including teamwork, innovation, cycle time, customer satisfaction, organization learning, and knowledge management (Levenson 2005). Based on the survey of 480 large organizations Bersin (2013) found that the companies, who use analytics in their HR related decisions, generate high returns in the stock market, deliver high impact recruiting solution and have strong leadership pipeline. Their HR teams are more likely to be valued by their business counterparts for their data and fact based decision making.

Effective HR Analytics can help organizations in their efforts to:

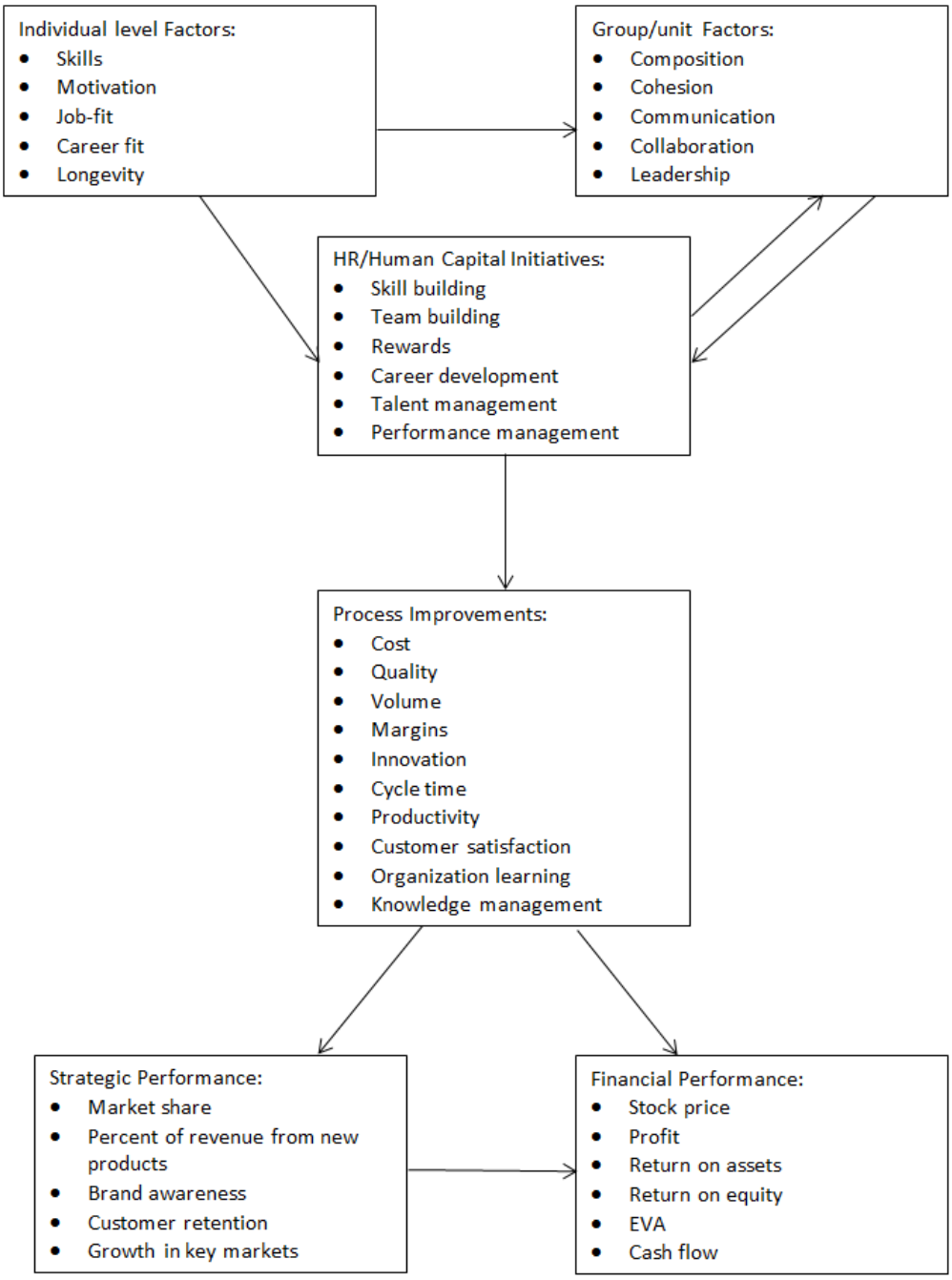
- Embed analytics as a foundation of management decision-making
- Improve workforce planning and forecasting
- Shorten recruiting cycles
- Reduce separation and recruiting costs
- Retain critical talent

Return on investments, cost benefit analysis, and impact analysis are the widely used measures used in HR analytics to evaluate Human capital initiatives (Levenson 2005). ROI converts all costs and benefits into single number. It oversimplifies complex process and its calculation may require excessive time and resources. Thus, relying on ROI without any context or consideration of the underlying assumptions can lead to incorrect decisions.

Cost benefit analysis preserves the rich details of the individual costs and benefit. This enables decision makers to see each cost and each benefit detailed, with a monetary value assigned to each. Impact Analysis involves identifying the causal links between individual and group factors on one hand and process improvements on the other hand.

The real challenge to assess the impact of HR practices on organization performance lies in establishing a causal link from the individual level and group factors to the process improvements. This can be done by behavioural modelling as depicted in Fig. III.

FIG. III: BEHAVIOUR AND PREDICTIVE MODELLING FRAMEWORK



Source: Levinson 2005

HR ANALYTICS: CHALLENGES AHEAD

Most of the HR teams find it hard to find the people who can combine "data" and "business" and people who can translate a "finding" into a solution that drives business results. High performing analytics/team of analytics must have multidisciplinary skills. These include business acumen, data visualization and management, statistical analysis and presentation skills. They should be capable of translating finding into a solution or program delivery. Finding the person with the right mix of skill set is a daunting task for the organizations. Lack of adequate analytical competency possessed by the HR professionals is the major challenge. Edward et al. (2004) found that eighty percent of the organizations responding to the survey based on responses of 37 medium and large corporations in US on the Fortune 500 list had an enterprise-wide HR information system that could be linked to business data, and far fewer reported metrics and analytics link HR investments with business results. The reason can be HR team do not have competencies in analysis, research design, and data interpretation. Even when these exist, they are applied only to specific areas such as surveys or instrument validation. Organization areas that depend on data analysis and reports (such as Research & Development, market analysis, operations management, finance) often have competent analysts in their teams who can connect business decisions to business success. HR organizations can have partnerships with these organization areas in order to achieve analytic competencies. However, in the long run, some analytic skills need to developed and retained within the HR team, and should become an important HR competency. In future, analytics will be viewed as a source of competitive advantage for the companies who have rights competencies and commitment to use analytics in their decision making.

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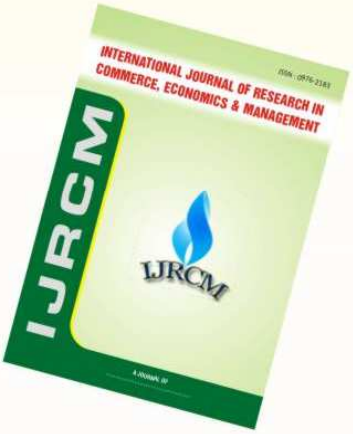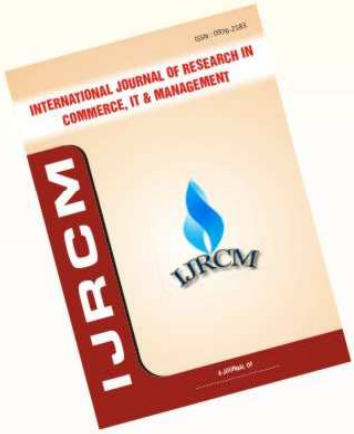
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