

Human Resources Analytics: Obstacles and Prospects for Enterprises

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Abstract—Today, it is essential to adopt a new strategy that enables the HR function to make informed decisions. Research indicates that Human Resources (HR) analytics could become an integral part of HR managers' routines. The purpose of HR analytics is to facilitate decision-making through robust statistical and econometric tools that allow for the cross-referencing of a vast array of data and variables. Analyzing historical data can guide us in making sound decisions for the future. Analytics fundamentally represents a methodology, a systematic approach that is inherently quantitative, utilizing data analysis techniques. This study aims to offer a thorough classification of literature concerning human resources analytics, complete with an extensive bibliography and a proposed research agenda for the future. To accomplish this, a systematic literature review methodology was employed, relying on a database of numerous articles and books published in prominent journals from 2013 to 2021. The findings of this analysis encapsulate the key advancements in human resources analytics research. Notable discoveries, as well as deficiencies in current studies, are also emphasized. This research has the potential to inspire future research trajectories.

Index Terms—Human Resources, Data Analysis, HR Reporting, Large Scale Data.

I. INTRODUCTION

Human Resource Management (HRM) is a crucial domain within organizations, focused on enhancing human capital. It includes a diverse array of functions, policies, and practices aimed at selecting, training, motivating, and retaining employees within a firm. At present, it is vital for the Human Resources function to continuously innovate and adjust to achieve its objectives while facilitating organizational change. This perspective currently occupies a significant position in conversations about the future of a function that aspires to earn the recognition and respect it merits

to effectively contribute to organizational management. It is critical that the principles and tools employed in this area are directed towards decision-making that relies on structured data derived from information systems.

Decision-making entails selecting the most pertinent action from a range of possible actions to attain the desired outcome while maximizing the use of available resources. In this context, data pertaining to the outcomes of human resources activities, along with the extent of various social phenomena, act as significant indicators. These indicators empower the HR function to participate in a process of diagnosis, selection, evaluation, and optimization.

Human Resource Management includes a diverse array of activities, aims for multiple objectives, and can affect numerous aspects of organizational performance. Considering the vast number of potentially measurable indicators, HR professionals must concentrate on the processes and methodologies that inform the design and selection of suitable indicators.

Whether for making strategic decisions or for tactically adjusting HR policies, the information accessible to decision-makers is vital. Decision-making necessitates a comprehensive analysis that extends beyond HR considerations, as HR metrics alone frequently fall short of justifying HR decisions. Today, it is imperative to embrace a new methodology that will empower the HR function to make well-informed decisions. Research highlights the considerable potential of HR analytics to establish itself as a permanent element in HR management practices. This possibility is increasingly likely as the application of analytics has become standard within the organization, especially in its finance and marketing divisions.

Human Resources Analytics, commonly referred to as HR analytics, is a developing field within HR that depends on data and statistical methods to facilitate informed decisions in personnel management. Its objective is to support decision-making through robust statistical and econometric tools, which enable the analysis of extensive data sets and numerous variables. Insights from past analytics can inform the correct decisions for the future.

It facilitates the gathering, examination, and interpretation of data concerning employees, their performance, satisfaction, and various other facets of human resources. The main aim of HR analytics is to improve decision-making by supplying accurate and reliable information to managers and business leaders. HR analytics presents numerous benefits, including the optimization of recruitment processes, the reduction of employee turnover, the enhancement of employee productivity, talent management, and strategic workforce planning. By utilizing HR analytics, organizations can achieve a deeper understanding of their workforce, recognize trends and challenges, and implement proactive strategies to enhance their human resources management.

This raises the question of how to motivate researchers to explore the field of HR analytics. The purpose of this research is to offer a fundamental overview of HR analytics and its relationship with human resources management. This article seeks to answer the following key question: What is the importance of HR analytics in human resources management?

II. LITERATURE REVIEW

2.1. Human Resources Analytics: Explanation, Structure, and Methods

In recent years, Human Resources departments have undergone significant digitization through the implementation of Human Resource Information Systems (HRIS) that enable them to centralize, prioritize, and monitor information regarding their workforce. Nevertheless, this substantial reservoir of data is frequently utilized exclusively for managing human resources at an operational level. While processes such as time and activity management, payroll, skills management, and training are undeniably critical for any organization, one crucial element is often overlooked: analytics.

Human Resource Analytics first emerged in the HR literature in 2004, as noted in the literature review by Marler and Boudreau (2017). HR analytics is a technique aimed at enhancing both individual and organizational performance by refining the quality of decision-making, as stated by Mishra et al. (2016). This approach is relatively novel, and its adoption has experienced a significant increase in popularity in recent years, according to King (2016). However, studies indicate that the practical implementation of analytics within organizations is still in its early stages, as highlighted by Lismont et al. (2017).

The notion of HR analytics is gaining increasing prominence within the domain of personnel management. Nevertheless, an initial inquiry arises regarding the precise definition of "HR analytics."

Analytics is characterized as the convergence of computer science, decision-making, and quantitative methodologies aimed at organizing, analyzing, and elucidating the growing volume of data produced by contemporary society (Mortensen et al. (2015)). The inclusion of the 'HR' element signifies that these analyses pertain to the individuals within the organization (Heuvel and Bondarouk (2016)). Consequently, HR analytics can be articulated as a systematic identification and quantification of the human factors influencing business outcomes, with the objective of enhancing decision-making processes (Heuvel and Bondarouk (2017)).

The trajectory of the HR profession is increasingly intertwined with analytics. No individual entering this field can anticipate achieving success in their career without a robust comprehension and extensive application of analytical tools to facilitate decision-making related to personnel matters. To effectively execute their business strategies, leaders must navigate personnel issues in a manner that enables them to secure a competitive edge through their workforce (Thomas et al (2013)).

Organizations that will prevail in the 'war for talent' will be those that excel in identifying and retaining key talent, fostering high performance, developing and promoting employees, and accurately forecasting future personnel requirements. HR professionals must leverage analytics to tackle these challenges. For instance, the principle of linking pay to performance has long been a tenet of management; however, recent studies indicate that most incentive schemes fail to elicit the intended behaviors, and that compensation,

in reality, bears little correlation to business outcomes (Boudreau, (2010), Diez (2018)).

To achieve success in the business realm, it is essential for HR to furnish data-driven responses and insights regarding the implementation and execution of strategies through the organization's personnel.

The contemporary HR Function is anticipated to supply senior leadership with enhanced information to manage the business effectively, while also offering more tailored services to employees. These expectations highlight the necessity for HR analytics within organizations: On one side, HR professionals proficient in analytics are better equipped to address business inquiries from top management (for instance, 'Which profile of our sales force will most effectively contribute to increasing sales revenue?'). Conversely, HR analytics tools can also enhance the employment experience for employees (for example, 'Which combination of employee benefits and work-life balance programs yield the highest staff engagement?').

In order for the HR function to fully capitalize on the advantages that HR analytics offers, it must tackle several parameters, beginning with the challenge of establishing a data culture, which is evidently deficient (Storhaye (2016)).

2.2. The domain of Human Resources analytics application

The key characteristic of HR analytics lies in its capacity to enhance decision-making through the concept of "predicting to decide," which entails pinpointing the areas where this methodology is applicable. Currently, the primary application domain recognized is recruitment, particularly in the realm of personnel selection. This process utilizes historical data to establish criteria that forecast the future success of candidates.

The second pertinent domain is employee retention, which focuses on predicting which employees are likely to depart and foreseeing the implications of such anticipated exits. Utilizing a diagnostic approach, one can also depend on performance metrics to identify high-performing employees and/or managers (Beaujolin and Oiry (2021)).

Another pathway involves the establishment of assessment systems for HR policies and practices, guided by a cost-benefit analysis or return on investment framework, and more generally, any aspect

associated with HR decision-making. In this context, Dulebohn and Johnson (2013) suggest an examination of various types of personnel management decisions.

They categorize decisions based on their level of structuring (structured, semi-structured, non-structured) and the level of the decision itself (strategic, functional, operational), resulting in nine distinct categories of HR decisions. Examples of strategic-level decisions include workforce forecasting (structured), HR policy planning (semi-structured), and the effects of mergers/acquisitions (non-structured).

At the functional level, there are challenges including recruitment (structured), succession planning management (semi-structured), and the deployment of an HR information system (non-structured).

At the operational level, one encounters involvement in employee benefits (structured), candidate selection (semi-structured), and absenteeism management (non-structured).

According to the authors, HR information systems are fully equipped to generate indicators for decision-making regarding structured issues and can assist in decision-making for semi-structured challenges.

Consequently, they represent key application areas for HR analytics.

Ben-Gal (2019) identifies three key functions of HR analytics: enhancing decision-making in recruitment, retention, and personnel development; providing insights into personnel management; and aiding in the execution of the company's strategy. The author reviews articles published in peer-reviewed journals and notes a transition in the focus of contributions, shifting from a predominance of conceptual articles to more technically focused contributions. This transition indicates that inquiries regarding the implementation of HR analytics are surfacing now that the broader issues have been thoroughly explored.

However, it is noteworthy that, due to the limited number of studies, many consist of analyses of articles within the field, with few empirical contributions (Beaujolin and Oiry (2021)).

This indicates a significant reflexivity in this area, despite its still nascent development. An exception to this trend is the research conducted by Van den Heuvel and Boudarouk (2017), which demonstrates the efforts undertaken by practitioners predominantly concentrate on gathering conventional HR metrics,

neglecting the predictive aspect that is usually linked to HR analytics. Tursunbayeva et al. (2018) further observe that most articles in peer-reviewed journals are written by consultants or personnel from technology firms, akin to those concerning HR information systems.

Nonetheless, it remains difficult to discern the reasons behind this phenomenon, despite the possibility that they may be alike for both researchers and practitioners. This includes the necessity for sophisticated analytical abilities, which may not be prevalent within the academic HR community.

III. METHODOLOGY

The literature review centers on the compilation of academic resources, encompassing research papers and books, that explore HR Analytics, particularly focusing on the factors that influence its effective implementation within organizational settings. This review was carried out utilizing scholarly databases, such as Scopus and Google Scholar, and incorporated search terms like "HR Analytics" and "Human Resource Analytics."

The research indicated that there exists a plethora of references, books, and reports concerning the notion of HR analytics. As a result, it may not be regarded as a highly prioritized subject for management researchers. This has led to a predominance of articles that are non-empirical in nature. The majority of the articles cited in this literature review are characterized by their non-empirical content.

Nevertheless, this non-empirical literature has played a significant role in shaping the current definitions of HR analytics and has deepened our comprehension of the subject matter being examined.

Furthermore, the literature review addresses the HR Analytics Process, which is a cyclical procedure that encompasses the gathering, analysis, and application of data to improve decision-making within the realm of human resources.

In conclusion, the key findings related to the subject under consideration are presented.

3.1. The domain of Human Resources analytics application

Human resources analytics (HR analytics) involves the development, modeling, and analysis of metrics derived from diverse sources to enhance human

resources decision-making. This process enables organizations to elevate their HR performance by offering critical insights into their workforce, operational processes, and results. The HR analytics procedure generally includes the subsequent steps:

The initial step involves establishing the goals of HR analytics. These goals must be in harmony with the strategic objectives of the organization. For instance, an organization might aim to enhance its employee retention rate, lower its recruitment expenses, or boost employee productivity.

- Gather data:

The second step involves gathering the necessary data for analysis. This data may originate from various sources, including HR systems, surveys, social media, and financial records.

- Prepare data:

After the data has been gathered, it must be prepared for analysis. This process may include cleaning the data, normalizing it, and aggregating it.

- Analyze data:

The fourth step is to conduct an analysis of the data. This may require the application of statistical methods, machine learning, or artificial intelligence techniques.

- Communicate results:

The findings from the analysis should be conveyed to HR decision-makers. This enables them to make well-informed decisions.

- Implement actions:

The outcomes of the analysis should be translated into specific actions. These actions may focus on enhancing HR processes, developing employee skills, or optimizing compensation.

HR analytics can be utilized to enhance various facets of human resources management. It can be employed, for instance, to:

- Identify skill requirements
- Enhance recruitment and selection
- Cultivate employee skills
- Oversee employee performance
- Minimize HR expenses

3.2. The difficulties associated with Human Resources Analytics

We have outlined the complete analytical process along with its value proposition. There are several challenges that must be addressed for it to be fully realized.

- The initial challenge pertains to the gathering of social data. Organizations need to engage in both qualitative and, more crucially, quantitative initiatives to effectively utilize existing data and produce new data with significant descriptive strength. This "data culture" should be fostered by leadership and reflected in committed resources.
- The second challenge pertains to showcasing the concrete added value of analytics through proof of concepts. Although such proofs are available, they remain insufficient and too subtle to instigate significant change. HR analytics signifies a transformation in practice, and this transformation must be supported by appropriate measures.
- The subsequent issue relates to enhancing awareness among HR professionals regarding this innovative methodology. Even if they are not responsible for spearheading HR analytics initiatives, HR professionals ought to have a robust knowledge base to comprehend, assess, and, naturally, endorse these initiatives.
- Finally, prioritizing the development of HR analytics specialists is essential. While expertise in statistics is accessible, it is rarely focused on the analysis of a company's social data.

Difficulties in Human Resources Analytics Challenges in Implementing Predictive Analytics in Human Resource Management Software



IV. PRESENTATION OF THE FINDINGS

The majority of literature concerning HR analytics is grounded in theoretical frameworks and concepts,

offering minimal empirical support for its practical use and application. Presently, the research landscape is largely characterized by qualitative case studies that depend on established management frameworks at a broad level. Consequently, the findings from these studies are frequently challenging to extrapolate to different contexts.

As a result, there exists a lack of agreement regarding the efficacy of HR analytics. Certain scholars view it as a promising advancement capable of enhancing organizational performance, whereas others express a more cautious perspective.

In order to advance the field of HR analytics, it is essential for academic researchers to engage in thorough scientific investigations that analyze the effects of this methodology on specific metrics, including productivity, employee satisfaction, and profitability. Such research should be performed across diverse organizational settings to ensure its generalizability.

V. CONCLUSION

The domain of HR analytics is still in its nascent phase, and as of now, there is no objective evidence to substantiate the significance of adopting HR analytics (Marler and Boudreau, 2017).

This is in spite of the plethora of articles in professional publications, blogs, white papers, consulting reports, and testimonials that have amassed over the last fifteen years. This indicates a certain disinterest from researchers, the origins of which would be intriguing to investigate.

It is also quite plausible that HR analytics may persist as merely a trend in management. Rasmussen and Ulrich (2015) offer a rather critical evaluation of existing practices and contend that only by integrating into the overall management system of the company can HR analytics secure a future.

Stuart et al. (2016) expresses a rather bleak outlook on the feasibility of implementing HR analytics and even propose the potential for counterproductive outcomes. Regardless of the capabilities of HR analytics - in conjunction with its two primary allies, big data and artificial intelligence, as noted by Yano (2017) - to create concepts, methodologies, and tools that enable it to meet its promises, it remains that the foundational justifications for quantifying the HR function will

continue to hold validity in the future, and a demand for information will perpetually exist.

The application of social dashboards - within an internal management framework - and social reporting - within an external legitimization framework - will continue to be vital for the HR function.

It remains to be determined whether these practices will be adequate to legitimize the role of the HR function and the competence of its practitioners. It is also crucial to acknowledge that this raises numerous conceptual, methodological, and ethical challenges. These present numerous avenues for investigation for researchers.

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