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SYSTEMS-LEVEL QUALITY IMPROVEMENT

Decision-Making based on Big Data Analytics for People Management in Healthcare Organizations

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Abstract
Big data analytics enables large-scale data sets integration, supporting people management decisions, and cost-effectiveness evaluation of healthcare organizations. The purpose of this article is to address the decision-making process based on big data analytics in Healthcare organizations, to identify main big data analytics able to support healthcare leaders' decisions and to present some strategies to enhance efficiency along the healthcare value chain. Our research was based on a systematic review. During the literature review, we will be presenting as well the different applications of big data in the healthcare context and a proposal for a predictive model for people management processes. Our research underlines the importance big data analytics can add to the efficiency of the decision-making process, through a predictive model and real-time analytics, assisting in the collection, management, and integration of data in healthcare organizations.

Keywords Decision-making · Leaders · Healthcare organizations · Big data · Analytics · Outcomes · Business intelligence; Prisma methodology

Introduction

In the global and connected world, decision-making has turned out to be a complex and progressively unpredictable process and relying upon precise information. This makes difficulties for healthcare organizations (HCOs) and Human Resources Managers (HRM) since they are experiencing tension to answer rapidly to the dynamics of the specific circumstance. The HCOs attempts to overhaul their structures, rethink practices, and improve associated business processes. Analytics are tools that can help in the decision-making process in organizations, this is reinforced by literature which demonstrates that organizations that have effectively implemented Analytics solutions are in position to make better decisions and with more accuracy. These organizations have better and quicker access to the key information about activities and processes and to verify if the goals are accomplished. Organizations define Key Performance Indicators (KPIs) which are management tools to analyze the key goals in HRM.

The literature [1] demonstrates that the capacity of the human mind is presently insufficient to settle on ideal business decisions in the Era of the big data and the complexity of analytical requirements. Analytics is becoming an essential tool device which consolidates the business and technologies (IT), conveying important data to decision-makers, through simulators and scenarization systems which can help the improvement of HCOs advancement and furthermore to forecast business results and customers behaviors.

Analytics implementation in HCOs in light of the [2] scenarios can assume the following strategic levels: 1) Analytics and Human Resources (HR) methodology partition – Analytics does not convey information to the strategic dimensions, it is just used to address a few inquiries on the operational dimension; 2) Passive help for the technique by Analytics – the main job of Analytics is to create reports to help procedure execution; 3) Dialog among Analytics and HR

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strategy – the results of Analytics may modify the strategy; 4) Interpenetration of Analytics and HR methodologies – the results of Analytics are treated as a strategic resource of an organization, which determines the HRM strategy.

This article purpose is to present a model of HR Analytics for HCOs and it is structured as following: methodology, Data Survey and Discussion, literature review, Strategies for Decision-Making Processes about People Management in Healthcare Organizations, Big Data Analytics Predictive Model Proposal for People Management in Healthcare Organizations, HRM Analytics supporting Better Decisions, and Discussion and conclusions.

Methodology

The methods for this systematic review follow the guidelines detailed by the PRISMA methodology [3], as an evidence-based set of items for reporting in systematic reviews and meta-analyses.

This research follows the main phases of PRISMA methodology including the background of the study, the primary goals, the data sources and the eligibility criteria, the methods, the results, and then the limitations, conclusions, and implications of the findings.

Eligibility criteria – inclusion and exclusion criteria

A systematic search of online scientific databases using b-on, a scientific information research tool, was conducted at the end of March 2018. The search was made using several queries, containing the terms "big data," "healthcare," and "literature review."

The criteria for this studies selection were the following: a) studies which involved big data in healthcare but did not measure the effect on the decision-making process were considered ineligible; b) studies involving other groups than managers were also excluded; c) there were also restrictions on language (only English). Moreover, the papers need to d) have full-text available and e) to be published after 2013.

Results of the papers search

The number of papers found with these queries is presented in Table 1. It is interesting to note that, after introducing the time criteria: last five years (since 2013), the number of papers reduced to half of the total papers retrieved (53,238).

The next criteria are related to another query with the introduction of the term "literature review," and the number of retrieved papers is significantly lower (31,702) (Table 2).

According to the purpose of the paper and the scope and perspectives of journals in this database we decided to use only the Science Direct database and the number of papers retrieved decreased significantly to 5,248 (Table 3).

The final methodologic decision was to consider only papers from scientific journals and the final number of papers are 1,985. From the 1,985 papers, 1,188 were unique references. Of these, 1,145 were excluded based on title and abstract because they were irrelevant to the review because they were not focused on big data analytics in healthcare and decision-making and remained 43 papers ($n = 43$) for the current research.

Data survey and discussion

All the papers were analyzed with Mendeley (Elsevier), and final 43 papers helped to identify dimensions of analysis, expressions, and methodologies (Table 4) for this research and to develop the literature review.

Literature review

The applications of big data in Healthcare for people management processes have been a critical driver for several different Healthcare Organizations (HCOs), by providing better data processing speed, results from satisfaction and analytics capacity in support to people management processes and functions [5, 17, 19, 46].

The Healthcare industry is gradually shifting from disease centered models to leaner models of patient-centered focus and intrinsically moving to a more data volume value-based healthcare performance model.

This industry traditionally can generate large amounts of data driven by record keeping, compliance, regulatory, data privacy, and dynamic requirements for human resources and people management that are critical for any HCO in providing patient care services [3, 47]. But now the major of those companies need to decrease costs and to provide adequate economic patient care services to better

Table 1 Number of Articles Found Per Query – Keywords "Big Data" And "Healthcare"

Keywords: Big data+healthcare
53,238 Scientific papers in journals since 2013, last five years (2013–2018)
53, 187 peers reviewed journals

Table 2 Number f Articles Found Per Query – Keyword "Literature Review"

Keywords: + literature review
31,702 papers
29,725 Academic journals
29,642 in English

Table 3 Number of Articles Found Per Query – Content Supplier "Science Direct"

Content Supplier	
Complementary Index	13,932
Academic Search Complete	6,725
ScienceDirect	5,248
Business Source Complete	2,112
CINAHL Plus with Full Text	1,539
Psychology and Behavioral Sciences Collection	914
Health Business Elite	658
SPORTDiscus with Full Text	344
Science In Context	203
MedicLatina	18
IEEE Xplore Digital Library	5
Supplemental Index	2
Library, Information Science & Technology Abstracts	1
Directory of Open Access Journals	1

reply to new markets constraints. Connected with this new paradigm, we have now sensitive functions in any HCO like people management, requiring having better mechanisms to analyze data, support the decision-making process (e.g. staff retention, talent acquisition) and ultimately to have new and innovative big data technologies that can answer and overcome the ability of managing healthcare data [6, 20, 48]. Some of the key drivers to invest in big data to support people management operations are the effective alignment of the people to the management with better insights and understanding from the leaders towards the employees, improving the selection of the right people in the right moment and ultimately to better understand the organizational culture by being able to make sense of several different data sources and data sets [8, 9, 49].

Without major surprises, HCOs are becoming more and more data-driven companies and have been collecting massive amounts of data to improve specific people management processes like (1) workforce analysis, (2) human resource management, (3) retention-attrition, (4) talent analysis and management, (5) information management, (6) knowledge management, (7) HR planning, (8) business strategy planning, (9) management information systems, among many others applications [47].

The field of Human resource management in Healthcare includes various stages like planning, organizing, staffing, directing, controlling, recruiting, placement, sales force sizing, hospitals shifts performance, appraisal, compensation, training, etc. And through all of those stages, the analytics capacity from big data can offer new lights and insights from a typical Human resources or people management operational database.

Some of those implementation examples in healthcare are:

- ***Insurance Industry / Payer***

Healthcare Insurance companies/payers are using big data in workforce performance, talent acquisition and capabilities, and leadership capabilities development. Insurance providers are observing further than algorithmic talent skills revealing practices that are leadership-centric, to ones that are still processes–centric. For example how many related new hires have been submitted to HR by a talent pipeline that is being monitored and measured daily, is one of the several questions, that are being replied.

- ***Medical Device Design and Manufacturing***

Big Data implement facilitates a broader set of rewards and compensation plans, delivery methods, and employee's interactions and nonmonetary configurations to be evaluated. Calculation techniques for rewards schemes and big data can play a significant role in medical system strategy and manufacturing.

- ***Pharmaceuticals***

Big data is used during all phases of the pharmaceutical life cycle but mainly in terms of hiring the right people for the commercialization phases that typically always requires more workforce presence, particularly for post-clinical stages. Big data plays a crucial role in talent acquisition, succession management, workforce planning, and engagement strategies for sales representatives, medical science liaisons and remaining sales, medical affairs, and marketing employees.

- ***Personalized Patient Care Healthcare***

Big Data is already possible to bring best and modified learning measurement models. In nearby future, fresh significant data-derived influences will prompt suitable updates of performance consulting, instructional design, content management, coaching and mentoring and modified simulations or testing and evaluations models to advance enterprise learning models result for HR functions.

Strategies for decision-making processes about people management in healthcare organizations

Big Data analytics programs are helping HCOs to accurately anticipate and make predictions of the nature of job sourcing and posting, its success in future and improve employee

Table 4 Big Data Analytics in Healthcare Organizations for Decision-Making

Dimension of Analysis	Expressions	Methodologies	Authors
Big data in healthcare organizations	Big data; Healthcare informatics; Knowledge management; Knowledge structure Big data analytics; the Business value of IT; Healthcare; IT-enabled transformation; Practice-based view	Bibliometric analyses Systematic literature review In-depth analysis of documentation Surveys; Interviews	[4] Alonso, S., Torre Díez, I., Rodrigues, J., Hamrioui, S., & López-Coronado, M. (2017). [5] Balan, S., & Otto, J. (n.d.). [6] Baldominos Gomez, A., Rada, F., & Saez, Y. (2018). [7] Barkhordari, M., & Niamanesh, M. (n.d.). [8] Barkhordari, M., & Niamanesh, M. (n.d.).
Tools for data analytics (Data process: collection, management, and analysis)	Quality of Service (QoS); Tableau de Bord; Dashboards; Key Performance Indicators; Real-time analytics (indicators and measures)	Statistical Analysis: Hadoop SQL, MS Excel Pivot tables. Forecasting and Aggregations techniques	[9] Batarseh, F. A., & Latif, E. A. (2016). [10] Brock, V., & Khan, H. (n.d.). [11] Brown, B., Smeeth, L., van Staa, T., & Buchan, I. (n.d.). [12] CAO, L., (2017). [13] Chluski, A., & Ziora, L. (n.d.).
Predictive models	Forecasting; Scenarios; Trends; Foresight; Simulations	Statistical Analysis: Scenarios Manager, Solver, What-if-analysis; Artificial Intelligence Models Regressions; Associations; and Correlations.	[14] COATNEY, K., (2018). [15] Dainton, C., & Chu, C. H., (2017). [16] Eisberg, N., (2013). [17] El Aboudi, N., & Benhlima, L. (n.d) [18] Gao, Y., Zhou, Y., Zhou, B., Shi, L., & Zhang, J. (n.d.). [19] George, G., Haas, M. R., & Pentland, A. (2014). [20] Greco, A. N., & Aiss, C. G. (2015). [21] Gu, D., Li, J., Li, X., & Liang, C. (2017). [22] Gupta, N., Ahuja, N., Malhotra, S., Bala, A., & Kaur, G. (2017). [23] Kilsdonk, E., Peute, L. W., & Jaspers, M. W. M. (2017). [24] Kuiler, E. W., (2014). [25] Marino, S., Xu, J., Zhao, Y., Zhou, N., Zhou, Y., & Dinov, I. D. (2018). [26] Mavragani, A., Ochoa, G., & Tsagarakis, K. P. (2018). [27] McCormick, T. H., Ferrell, R., Karr, A. F., & Ryan, P. B. (2014). [28] Mezghani, E., Exposito, E., Drira, K., Da Silveira, M., & Pruski, C. (n.d) [29] Monsen, K. A., Peterson, J. J., Mathiason, M. A., Kim, E., Votova, B., & Pieczkiewicz, D. S. (n.d.). [30] Noor, A. M., Holmberg, L., Gillett, C., & Grigoriadis, A. (2015). [31] Okimoto, G., Zeinalzadeh, A., Wenska, T., Loomis, M., Nation, J. B., Fabre, T., Kwee, S. (2016). [32] Plantier, M., Havet, N., Durand, T., Caquot, N., Amaz, C., Philip, I., Perrier, L. (2017). [33] Purcărea, T. V. (2016). [34] Rao, A. R., & Clarke, D. (2018). [35] Samuels, J. G., McGrath, R. J., Fetzer, S. J., Mittal, P., & Bourgoine, D. (2015).

Table 4 (continued)

Dimension of Analysis	Expressions	Methodologies	Authors
			[36] Schmidt, R. N. (2014). [37] Sebaa, A., Chikh, F., Nouicer, A., & Tari, A. (2018). [38] Sharma, N., Panwar, A., & Sugandh, U. (2018). [39] Shirts, B. H., Jackson, B. R., Baird, G. S., Baron, J. M., Clements, B., Grisson, R., & Brimhall, B. (2015). [40] Sigman, B. P., Garr, W., Pongsajapan, R., Selvanadin, M., McWilliams, M., & Bolling, K. (2016). [41] Terry, N., (2015). [42] Tresp, V., Marc Overhage, J., Bundschus, M., Rabizadeh, S., Fasching, P. A., & Yu, S. (2016). [43] Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J. f., Dubey, R., & Childe, S. J. (2017). [44] Wang, Y., Kung, L. A., & Byrd, T. A. (2018a). [45] Wang, Y., Kung, L. A., Wang, W. Y. C., & Cegielski, C. G. (2018b).

retention rates from always complex organizational scenarios like hospitals or pharmacies [1, 3, 10].

After all the economic pressure and regulatory insensitivity across several different global regions, more than ever HCOs are facing growing needs to increase the performance levels and drive analytics to understand better and management all the connected activities [16, 20, 21, 46].

Big data is being growingly valuable to health care and medicines. The specific areas of health care where big data has been playing a decisive role have been: Clinical trials data analysis; Disease pattern analysis; Campaign and sales program optimization; Patient care quality and program analysis; Medical device and Pharma supply-chain management; and, Drug discovery and development analysis.

But also in people management functions, big data have been playing a pivotal role in better understand several different aspects of the business and providing a better decision support role. Ultimately big data analytics helps any healthcare HR department to find out the blind spots in an organization, which departments are doing better and to use the strategy on other departments for improvement.

The practice of big data takes the perspective to encounter future talent needs and new candidates in healthcare establishments. Big data in that sense provides an excellent opportunity for Physicians, pharmaceutical staff, or health policy experts to make data-driven judgments that will eventually develop patient care [4, 5, 49].

Typically due the level of specialization and knowledge that professionals like doctors, nurses, pharmacists, clinical development or scientists in R&D laboratories, presents a complex challenge to any HR department to find the best people, effectively managing their expectations and ambitions and ultimately retain the right people with a primary focus of providing the best care to all the involved patients and overall to the national healthcare systems.

Big data analysis can change the method of healthcare HR practices cultured and equipped to increase efficiency from their overall activities and better understand data repositories and make a declared conclusion or decision. And here big data has been a critical factor to any people management department, not only in terms of retaining employees, as well in being capable to understand all the human surroundings better to make the best judgments and decisions [2, 10, 49].

An approach to decision-making process based on Big Data can be: strategy 1 – define criteria for data selection; strategy 2 – focus on the needs of the business; and strategy 3 – creates measures to make data useful and that can be visualized by the decision-makers. This sequential strategies can contribute for the construction of a model of more efficient decision-making process [4, 7, 8].

To successfully implement predictive analytic methods for identifying potential improvements for key people management HR services models like payroll & compensation, benefits & wellness, among many others, several challenges must be considered.

First, what approach should be used to predict which specific people would adopt or perceive positively? Second, what new measurement sources can be incorporated to improve

those predictions? Attributes associated with complex HR measurement and service models may include behavioral health problems or socioeconomic.

Factors such as workforce planning, global workforce management, organizational design, or engagement strategies. Thus, integrating data about career management or leadership management or other issues may significantly change the quality of the predictions that can be made.

A third issue is how to make predictions actionable, by identifying which employees are most likely to benefit from a people culture & performance initiatives and what specific engagement approaches can most improve the global awareness of the HR service models [14, 19, 50].

The practical implementation of new analytic systems to identify potentially new mechanisms or further actions in core HR services, talent management, and people performance and engagement, will require making predictions readily available with minimal changes to procedural workflows, this will potentially increase the chances that employees will act based on the projections.

Big data analytics predictive model proposal for people management in healthcare organizations

Application of big data in healthcare people management processes will better support in delivering improved HR services and all connected processes. Big data is still in an emerging phase with developments in several different HR areas and HCOs, for example, employee recognition programs, enterprise learning, onboarding, resource planning, HR reporting, competency management, talent acquisition, learning and development, succession management, rewards among many others.

Predictive analytics comprise a variety of techniques that predict future outcomes based on historical and current data. In practice, predictive analytics can be applied to almost all disciplines or organizational functions – from predicting the failure of a new employee adaptation to the corporate culture, to predict an employee' next career step (ambitions, desires, and even messages posted on social media [49].

At its core, predictive analytics seeks to uncover patterns and capture relationships in data that can effectively support an HR department part of an HCO. Predictive analytics techniques in the healthcare space are subdivided into two groups. Some methods, such as "moving averages," attempt to discover the historical patterns in the outcome variable(s) and extrapolate them to the future. And others, such as linear regression, aim to capture the interdependencies between outcome variable(s) and explanatory variables and exploit them to make predictions.

Usually Big data healthcare analytics has five processes: a) Data Acquisition; b) Data Storage; c) Data Management; d) Data Analytics; e) and Data Visualization & Report.

We will be focusing not on those five connected processes but more on a predictive model proposal for people management and adapted from the developed framework by [51] and as presented in the Fig. 1.

The application of big data on this study is to realize the strategies of using predictive big data methods to better support HR service models in the healthcare arena, where

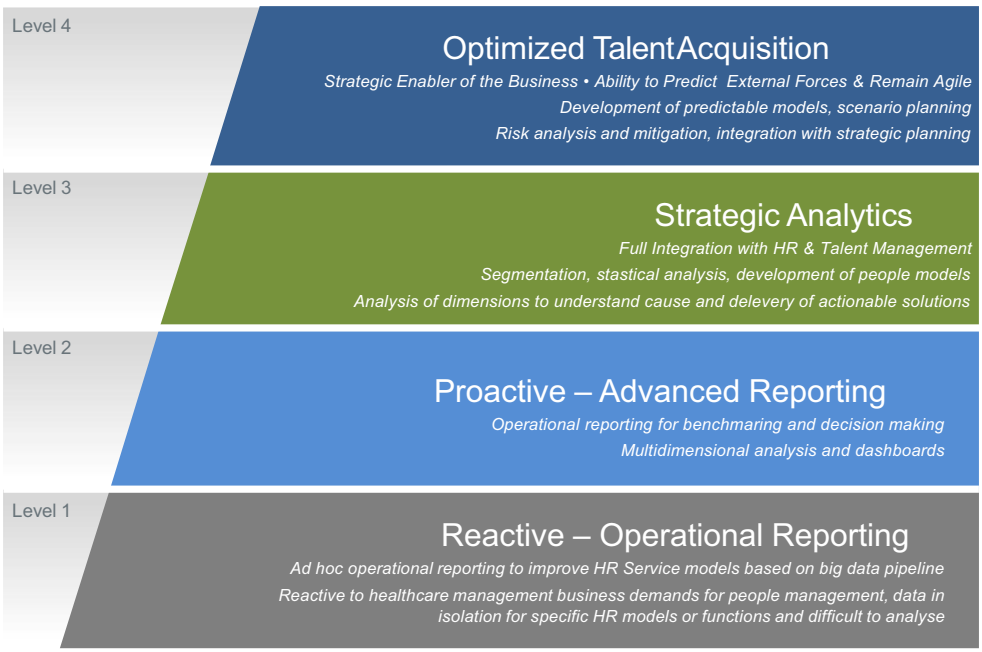

Fig. 1 - Big Data Analytics Predictive Model Proposal for People Management in Healthcare Organizations adapted from Bersin (2017)

Table 5 HRM Analytics Model

Operational Reporting	
Payroll	Implementation and execution of the payroll systems to make it accurate and in time for employees and also to give information for managers to make decisions about the retention and progress of employees.
Advanced Reporting	
HR Processes	Knowledge base about job functions, positions, roles, and capabilities that are required to drive the business performance.
HR Reports	Give business users the ability to access reports and continuously monitor organizational performance using KPIs, which are compared to the strategic goals and objectives. The results are utilized to monitor, further analyze, and act to improve performance. The advanced analytics subsystem enables organizations to make informed decisions to align their goals and objectives, as well as programs and budgets to the performance indicators.
Measures/Metrics	Deliveries of performance indicators concerning human resources may include employee retention, job satisfaction, compensation and rewards, employee training, accident levels, employee absenteeism, and employee performance. Measuring conventional core HR processes, such as payroll, employee administration, time management, and benefits. Analyse organizational structures, relationships, and attributes of jobs and positions.
Strategic Analytics	
HR Development	Analysis of the training and development processes to maximize employee performance.
Optimized Talent Acquisition	
Cost Savings	Support HR professionals in all workforce cost-planning tasks.
Align individual and organizational goals	Ensure that the business activities are in line with the strategic goals of the organization and help employees to have common objectives.
Recruit talent	Monitor workforce demographics in line with your recruitment and retention objectives. Analyse the efficiency of the entire recruitment process lifecycle, understand, and prevent the drivers of employee turnover.
Better decision-making	Empower HR executives to develop effective strategies, providing access to a broad range of workforce-related data to support proper planning, facilitate simulated planning scenarios, and enable continuous monitoring of actual performance relative to plan to achieve better strategic decisions.
	The organizations can adjust their goals and objectives, modify programs, and re-allocate resources and funds. Performance measures, in essence, provide a feedback loop in the process of business performance management.

employees retention, talent research, and motivation are critical dimensions for an effective business.

HRM analytics supporting better decisions

Based on previous literature and the model proposal of Analytics consist of 9 dimensions, which includes: payroll, business process automation, HR reports, measures/metrics; HR development, cost savings, align individual and organizational goals, recruitment of talent, and better decision-making. These dimensions are hypothesized to be associated with the process of decision making by the Human Resources Managers, as showed in Table 5.

In Table 6 were associated the measures to the analytics dimensions presented before on Table 5. It shows the potential relation between HRM Analytics and the decision-making process, and represents how Analytics tools can help to analyze the employee's development and evaluate the efficiency of the recruiting and selection processes. It helps to assess how well the succession plans prepare the employees to assume key positions in the organization and monitor the progress of aligning employee goals with corporate goals. It also helps to analyze the cost-effectiveness of employee compensation systems.

Discussion and conclusions

HR Analytics includes complex HR information about employees, and also HR policies as compensations, careers, performance appraisal, skills and more processual information. It

Table 6 HRM Analytics Dimensions and Measures

	HR Analytics Dimensions	Measures
Operational Analytics	Payroll	Payroll Budget Compensation and Rewards Medical insurance Overtime pay Absenteeism Taxes
	Cost Savings	Employee Wages Cost Workforce Planning Cost Labour Costs Training Costs HR Projects Costs
Advanced Analytics	HR Processes	Job functions, positions, and roles Organizational structures Relationships Attributes of jobs and positions
	HR Reports	Employee Engagement Employee Satisfaction Organizational Climate
	Measures/Metrics	Employee Retention Employee Training Accident Levels Employee Absenteeism Employee Performance Time Management Hiring Metrics Induction Orientation and On-boarding Travel Management Turnover
Strategic Analytics	HR Development	ROI (Return on Investment) ROE (Return on emotions) Employment Sustainability Human Governance
Optimized Talent Acquisition	Align individual and organizational goals	Succession plans Workforce planning Performance Appraisal
	Talent Management	Leadership gap Recruitment analysis Performance data Employee mobility Candidate success profiles Targeting available talent supplies Conducting cause analysis of attrition Forecasting workforce requirements
	Decision-making Models	Productivity forecasting model: to help predict and diagnose problems and define training solutions. A predictive model for employee mobility: to look at customer and employee traffic patterns, identifying new locations where salespeople should be positioned. Artificial intelligence for talent recruitment: analyze video interviews and help evaluate candidate personality and improve the quality of hire.

consists of integrating data from different internal functions and data from external entities. To gather, analyze and store that information several types of technologies can be used to control, and report information, in order to supporting people-related decisions. HR Analytics creates strategic information, helping to link HR decisions to business outcomes and to organizational performance. The results are indicators, metrics, but also predictions based on simulations and scenarios about the future direction of the organization. It also have the capability to associate HR procedures with organizational performance, transforming HRM in a strategic partner on the organizations board.

HR Analytics measures organization results and outcomes, using different methods: descriptive and inductive statistics,

and estimations processes to help defining the future strategy of the organization. Those measurements provide data, indicators, and results which can be analyzed by corporate management and used to help influence the new strategies of the organization.

Organizations that compete in today's knowledge-based economy recognize the importance of the data analysis accuracy, in order to promote competitiveness and helping to improve the performance of organizations. The evolution of information technology has contributed to the growing sophistication, of the HR Analytics, this will allow to analyze data for better decision-making processes. These transformations are a paradigm shift in the HR function in order to assume a new role as a partner of top management in decision-making processes about strategic issues.

The main empirical findings of the research emerged in line with the literature review and demonstrated that HRM supported by Analytics, depends on the maturity of the organization because it conditionate the use of Analytics to achieve the HRM strategy.

The HR analytics can be seen as a measurement process with Scorecards and Dashboards, summarizing talent management strategies and associated measurements; Benchmarks, compared with an organization's actual practices; Correlations, describing the statistics where two or more variables move together; Predictive analytics helping to identify future directions; and optimization, which offers insight into where HR investments are working and presents options for improvement.

In this context, this main research goal was achieved - creating knowledge to help predict HRM decisions regarding future workforce planning and management based on the Analytics models concerning workforce process, talent management, and strategic alignment. In summary, it is possible to say that Analytics models facilitate the process of data analysis to make better decisions and helps organizations to achieve their strategic goals.

The main findings will be shared with the organizations part of the sample to help them to improve their HRM Analytics systems as a mean of sharing good practices and also to give this research a practical nature.

Limitations and future research

The main limitation of this study is the difficulty to make a good selection of the articles focused on big data analytics in healthcare organizations, regarding HRM practices because of the diversity of the journals scientific domain and the diversity of methodologic approaches to this theme.

For future research it will be essential to develop a literature review on the main HR analytics tools: BSC (HR Balance Scorecard); dashboards; tableau de board and on the primary indicators in this area: recruitment metrics; training metrics; evaluation metrics, and about the workforce analytics technological systems, adapted to the healthcare organizations specificities. Also it is interesting to do a study to analyze big data according to strategies proposed by this article.

Compliance with ethical standards

Conflict of interest The authors declares that they have no conflict of interest.

Ethical approval This article does not contain any studies with human participants or animals performed by any of the authors.

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