DIGITAL HRM TRANSFORMATION THROUGH ANALYTICS: A REVIEW AND BIBLIOMETRIC ANALYSIS

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ABSTRACT

The emergent field of digital human resource management has been rapidly evolving the number of academic publications in this field. This article reviews the main lines of research on Digital HRM Transformation and provides input for future research.

We set well-established selection criteria to select relevant literature from the Web of Science and identified 44 articles about the topic. In the literature review, we used the bibliometric analysis method. Studies on HR Analytics are still recent, and maturity is low. It seems to have a gradual interest in HR Analytics and the proof of this is that the journals with most publications are leading journals in the area. In this study it was possible to see that the available information is scarce and dispersed, requiring more attention from researchers.

This article helps researchers to identify the main lines of research, the main authors, and the explored and unexplored research questions.

Keywords: HRM, HR Analytics, People Analytics, Workforce Analytics, Business Analytics.

INTRODUCTION

The world is increasingly digitalized and the term "*digital*" is in fashion. Associated with "*digital*", a bet that has been increasingly consistent in concepts such as Big Data, Data Mining, or Business Intelligence & Analytics has emerged through the business world and associated with these, marketing intelligence, HR Analytics, or Fintech. As stated by Angrave et al., (2016) the HR world is convulsed with the appearance of concepts such as Big Data and the potential for the transformation it will have for HRM. Furthermore, according to the authors, the idea that Human Resource Analytics (HR analytics) is the future of Human Resource Management (HRM) as a strategic management function is being sold.

Analytics is a discipline that was developed in the relationship between engineering, computer science, decision-making strategies, and quantitative methods to organize, analyze and create meaning to a wide range of data that were generated in various contexts (Mortensen et al., 2015). In HRM, the topic analytics appears as workforce analytics, people analytics and HR analytics (Van den Heuvel & Bondarouk, 2017; Mishra et al., 2016).

According to Marler & Boudreau (2017) HR Analytics can be defined as "*an HR practice enabled by information technology that uses descriptive, visual, and statistical analyses of data*

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related to HR processes, human capital, organizational performance, and external economic benchmarks to establish business impact and enable data-driven decision-making" (pp. 15). It is a multidisciplinary approach that integrates methodologies to improve the quality of decisions (Mishra et al., 2016) and that takes responsibility for identifying and quantifying relevant data about people and their impact on business results (Van den Heuvel & Bondarouk, 2017). HR Analytics is not a new profession, but a technological advance that promotes the improvement of an organization's effectiveness and efficiency (Stone et al., 2018).

In the academic context, there are conflicting views on the potential of HR Analytics for HRM. Angrave et al., (2016) state that HR analytics may have a set of negative consequences for the HRM profession, workers, and organizations because there is a risk that the data will further incorporate the perspective of finance and engineering in HR decisions, particularly in the strategic dimension. Authors add that there is little evidence that HR Analytics can become the future of HRM as a strategic management function. According to Rasmussen & Ulrich (2015), the current form of HR Analytics will not allow enhancing the actual value of organizations. This because it´s based on products and services from the business sector of new technologies, which, according to Angrave et al., (2016), often cannot provide the tools for HRM to promote the strategic value of HR data. However, for the authors, it is possible to draw positive points from HR Analytics, being necessary to work HR Analytics in four dimensions:

- Start with a business problem (find a problem and only then use structured data analysis)
- Withdraw HR Analytics from HRM (HR Analytics to increase its impact on the organization must be associated with Business Analytics).
- Emphasize the "*human*" concept in HRM (despite the focus on an analysis of aim data and information in decision-making, people should not be secondary)
- Train HR professionals to have analytical skills (it is not enough to have data; it is necessary to prepare people so that can get the most out of this data).

Although these positions, researchers are unanimous about HR Analytics' potential for HRM (Van den Heuvel & Bondarouk, 2017; Marler & Boudreau, 2017; Rasmussen & Ulrich, 2015). There is still little scientific evidence on the use of HR Analytics (Marler & Boudreau, 2017). However, the opportunities for HR professionals are immense in supporting HRM decision making (Van den Heuvel & Bondarouk, 2017).

METHODOLOGY

The present study aims to review the principal contributions to the relationship between new technologies and HRM, specially, the value of HR Analytics to HRM.

In this literature review, we intend to use the bibliometric analysis method because it is the most frequently used content analysis method, it allows the manipulation of large amounts of data effectively and it is well-rooted in solid and well-defined theories (Zhu & Wang, 2018). According to this, bibliometric studies are a set of methods used to study and measure texts and information, especially in large databases. The software used in the present study was Bibexcel (Persson et al., 2009) and VOSViewer (van Eck & Waltman, 2010).

The database we used to search for academic papers was the Web of Science's Core Collection. This database was chosen because it is one of the most used and respected databases in academia and because it is compatible with most bibliometric tools. During the review of the literature, a set of keywords were identified, which were used in the bibliometric analysis.

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The keywords used were: "*HRM*" and "*HR Analytics*"; "*HRM*" and "*People Analytics*"; "*HRM*" and "*Workforce Analytics*"; and "*HRM*" and "*Business Analytics*". A total of 48 publications were identified between 1990 and 2020, using the Web of Science search engine.

FINDINGS

Results show that the researched topic is recent, with a particular emphasis on the period of 2006 and 2020. As evidenced by the data in Figure 1 below, we can observe a boom between 2016 and 2017, but with a decrease thereafter. The period with the most publications occurred in 2017, and the average number of publications per year is 0.25.

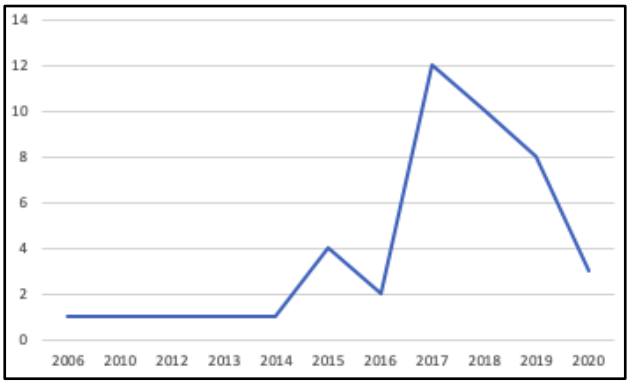

FIGURE 1
DISTRIBUTION OF PUBLICATIONS BY YEAR (2006-2020)

Most of the publications were in an article format and proceedings papers, as presented in Table 1.

Table 1
NUMBER OF PUBLICATIONS BY FORMAT

Type of Publications	#
Article	27
Proceedings Papers	9
Book Review	4
Book Chapter	4
Review	1
Letter	1
Early Access	1
Editorial Material	1

Authors with a greater number of publications in the sample are Marler, J.H., Sousa, M.J., & Thakur, S.J. Other authors have only one publication about the topic (Table 2).

Table 2
NUMBER OF PUBLICATIONS BY AUTHOR

Author	#
Marler, J.H.	2
Sousa, M.J.	2
Thakur, S.J	2

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Co-citations are defined as the frequency that two papers are cited together with other papers. In Figures 2 and 3 it is possible to identify a high number of co-citations, with several levels of intensity (Figure 2).

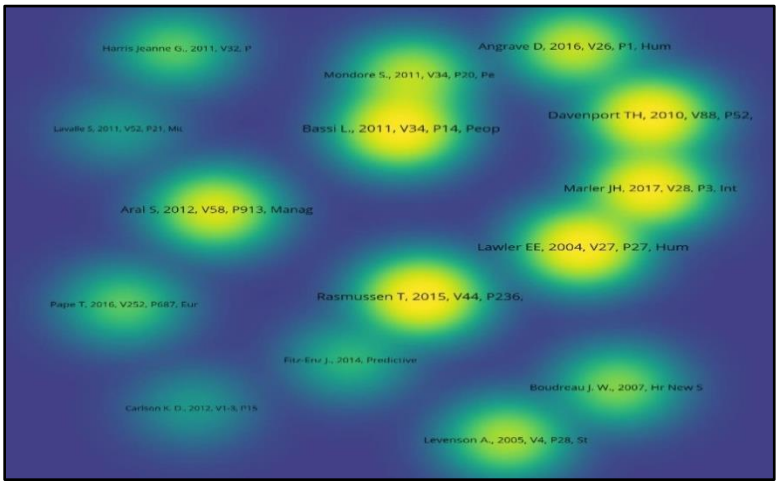

FIGURE 2
CO-CITATION ANALYSIS INTENSITY

The most frequently quoted articles are Bassi, Davenport, Lawler, Marler & Rasmussen.

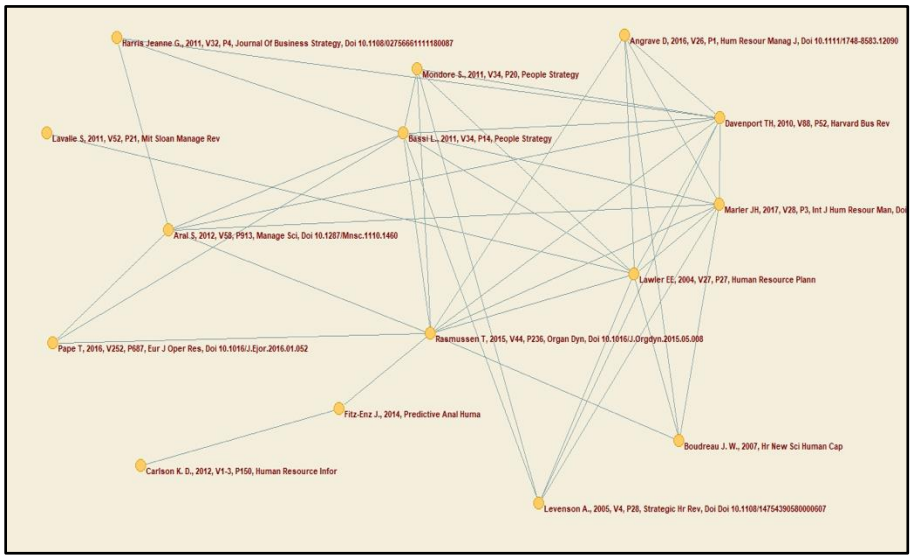

FIGURE 3
CO-CITATION ANALYSIS INTERACTIONS

Figure 4 presents a local map of co-citations that estimates the influence of works, authors, and journals through citation rates. It´s a local map because is about the information available in references presented by the papers study. The evidence suggests that Marler & Rasmussen have a larger number of local co-citations and represent two different clusters of works, which can be easily recognized in Figure 4.

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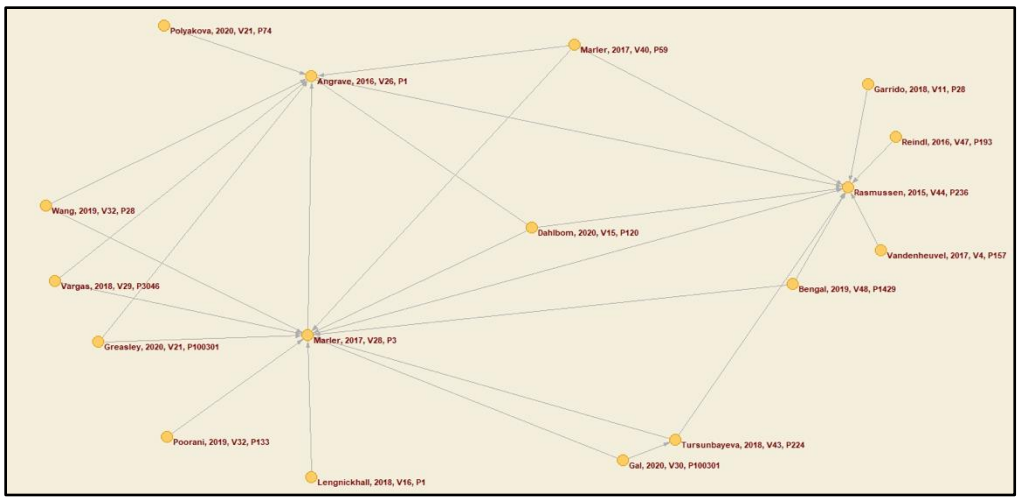

FIGURE 4
LOCAL CO-CITATIONS CLUSTERS

The topic has interested to prestigious journals and is present in the main scientific journal's rankings. Personnel Psychology published the largest number of articles on the subject (Table 3).

Table 3
PEER-REVIEWED PUBLICATIONS BY JOURNALS

Journal Publication	#	IF (2019)	SJR (2019)
Personnel Psychology	4	6.571	8.77
Human Resource Management Journal	2	3.816	2.36
International Journal of Human Resource Management	2	3.756	1.26
Journal of Organizational Effectiveness - People and Performance	2	-	0.58

The most used keyword in the publications is HR Analytics. This evidence helps us to identify the concept most used in scientific works because literature refers that are used three topics: workforce analytics, people analytics, and HR analytics (Van den Heuvel & Bondarouk, 2017; Mishra et al., 2016). The topics used are in line with what is described in the literature (Table 4).

Table 4
KEYWORDS MOST USED

Keywords	#
HR Analytics	12
People Analytics	8
Human Resource Management	6
Big Data	6
Workforce Analytics	5
Business Intelligence	4
Analytics	4
Human Resource Information Systems	3

Figure 5 presents the keywords cluster by using all the papers' keywords. In this study, we have three clusters:

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- 1st Cluster: Human Capital; Management; People Analytics; HR Analytics; Human Resource Management; Workforce Analytics; Performance.
- 2nd Cluster: Business Intelligence; Model; Big Data; Human Resources; and Systems.
- 3rd Cluster: Innovation; Strategy; Impact; Productivity; and Information Technology.

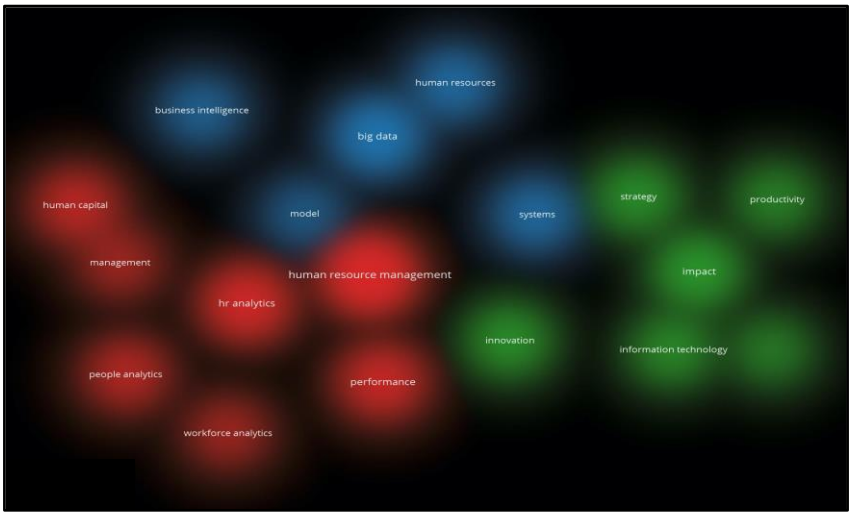

FIGURE 5
KEYWORDS CLUSTERS

Red cluster represents the analytics dimension being related to performance and management. Blue cluster represents smart data for business (analytical models and big data). Green cluster represents innovation and productivity (individual and organization level).

CONCLUSIONS

Studies on HR Analytics are still recent, and maturity is low, which requires further reflection on the associated dimensions, such as what represents the HR Analytics to HRM? What is the use of HR analytics? And what is the best way to fit (or not) into the HRM practices?

It seems to have a gradual interest in HR Analytics and the proof of this is that the journals with most publications are leading journals in the area; however, the number of publications has been decreasing after the 2017 boom. Reference studies are still much focused, particularly on what HR Analytics means, and it seems to us be essential to identify good practices for implementing HR Analytics in organizations.

In this study, it was possible to see that the information is scarce and dispersed and that requires more attention from researchers. These and other issues need to be clarified in further research for a more concrete assessment of what HR Analytics is and what it is for.

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