SMART HUMAN RESOURCE ANALYTICS FOR HAPPINESS MANAGEMENT

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Abstract

Purpose- The COVID-19 pandemic changed the lives of people around the world. In a post pandemic era, leaders have a role to enable the changes needed to make workplaces smart and happier. The aim of this paper is to look at human resource management from new perspectives: being smart and happy in the workplace. Some research questions are proposed: What do we know about smart human resources (Smart HR)? What do we know about human resources analytics (HRA)? and how can future research on smart and happy human resources management be oriented?

Methodology - A bibliometric technique is used to identify the main topics studied in Smart HR and HRA. And a logical reasoning is applied to propose future research models.

Findings - For Smart HR, the roadmap considers the approaches, practices and purposes. For HRA, the roadmap shows what are the perspectives HR processes, tools and its usefulness. Considering the context of industry 5.0 and post pandemic era, a future research line for studying smart human resources analytics for happy management is proposed.

Originality - This paper has developed a proposed model to guide future research on the application of human resource analytics to manage smart and happy workers.

Keywords: smart human resource, human resource analytics, happiness management, co-word analysis.

Article classification: Research paper.

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Introduction

In recent years, the world has undergone significant transformations, most notably the COVID-19 pandemic, which has had a profound impact on people's lives worldwide. The business environment has also felt the effects, particularly in its human resources (Collings et al., 2021). This situation has underscored the need to adopt new perspectives and paradigms in the field of human resource management (HRM) (Harney and Collings, 2021). Megatrends such as workforce flexibility, the digitization of business models, and the rise of artificial intelligence and machine learning are reshaping HRM (Minbaeva, 2021). In a post pandemic era, managers and leaders have a role to enable the changes needed to make workplaces smart, happier and more productive.

The academic literature studying happiness has developed since the beginning of this century applied to areas such as economics, psychology, and education. These studies consider happiness to be related to well-being and/or life satisfaction (Ravina-Ripoll *et al*., 2019a; 2023). But companies have seen an unexpected breakdown in the person-organisation psychological employment contract model that existed before the advent of the Covid-19 pandemic. One of the ingredients of this change is the toxic corporate cultures undertaken by many companies since the Great Resignation.

In that context, attention has been paid to the study of human resources in industry 4.0, and the interest in analysing aspects such as organisational and employee happiness has been highlighted (Ravina-Ripoll *et al*., 2019b; c; 2023). In addition, the constant technological development has suggested a shift from Industry 4.0 - where 'smart' factories use robotics to achieve high performance - to the concept of Industry 5.0 - where technological and social systems work in harmony to provide mass customisation of products and services (Bednar and Welch, 2020).

Therefore, the future of work depends on the reactions of individuals and companies and their adaptability to new technological scenarios (e.g., "smart work") (Bednar and Welch, 2020). In this context, disruptive technological developments influence work practices, business strategies and organisational structures (Cancio and Montealegre, 2016). Indeed, the competitive advantages of firms will depend on the ability to constantly adapt to innovative technologies by developing new capabilities (Bertello *et al*., 2020) and the firms' efforts to align strategies with the skill sets of employees for reskilling and upgrading competencies and, more generally, their ability to manage people (Bresciani *et al*., 2021). Companies that want to be adapted for industry

5.0 must design attractive leadership styles and management models that imbue their employees' lifestyles with the cultivation of an empathetic and happy work climate (Bryson and White, 2019; Ravina-Ripoll *et al*., 2023).

Human Resource Analytic (HRA) offers important opportunities for companies that want to create a culture of data-driven critical decision making and recruit new HR professional profiles (Kapoor and Kabra, 2014). Therefore, in this body of work we set ourselves the mission of fusing intangible (people's knowledge and skills) and tangible issues (data, statistics, results); that is, to make the invisible visible and understandable to bring out its full potential. The vision that led us to propose this study is to bring to light that which has yet to be revealed with regard to the adoption and implementation of HRA in companies, and to seek ways to generate new light. Researchers have the challenge of helping to lay the theoretical foundations of HRA and providing models and metrics for a better understanding of how to adopt and implement it, as well as the changes that companies need to make in order create more value.

The aim of this paper is to look at human resource management from new perspectives: being smart and happy in the workplace. And consider the analytics for measuring the new perspectives. Some research questions are proposed: What do we know about smart human resources (Smart HR)? What do we know about human resources analytics (HRA)? and how can future research on smart and happy human resources management be oriented/directed?

A bibliometric technique is used to identify the main topics studied in Smart HR and HRA. And logical reasoning is applied to propose two research roadmaps for presenting the main studied themes Smart HR and HRA. Finally, a future research line for studying smart resources analytics for happy management is proposed.

To achieve these objectives, in the second section, an analysis of the issues studied in the smart HR literature is presented. The third section analyses the issues studied in the HRA literature and the fourth section presents a proposal for the development of a research line on smart HR analytics for happiness management. Finally, the last section contains conclusions, contributions, limitations and future lines of research.

Smart Human Resources

Recently, a debate has opened up about the human role in the context of Industry 4.0, and there is talk of the smart worker or 4.0" (Romero *et al*., 2020). Smart Working or Smart Work considers how technologies are used to support people's work. While several studies point out that autonomous machines can replace operational and low value-added activities, the most significant potential of Industry 4.0 is to support workers to do their jobs in a smarter way. Smart

Working considers how to maximise the potential of workers by using advanced technologies to support decision-making processes, manage knowledge, foster creativity and design and increase worker safety and satisfaction (Meindl *et al*., 2021).

Smart Human Resource is defined as the digital revolution in HRM tasks that are executed in a way that relies to some extent on artificial intelligence, cloud computing, big data and automation and has become a necessary tool to drive competitive advantage (Ogbeibu *et al*., 2021). Smart Human Resource is still in the early stages of research in the context of other dimensions, such as smart supply chains. Future research can investigate, for example, how the relationships between individual technologies evolve (Meindl *et al*., 2021).

Methodology

To identify the various themes covered in the literature on smart human resources, a co-word analysis was used in conjunction with the SciMat program (Cobo *et al*., 2012). The first task to complete in a bibliometric analysis is sample selection. We utilized the Scopus database and searched the fields Title, Keywords, and Abstract. The query used on November 23, 2022, is ("smart work*" OR "smart workplace" OR "smart work place" OR "smart employee*" OR "smart human resource*" OR "smart workforce"). The search returned 352 documents. Most of the paper are being published in the last three years (2020-2022): 199 of 352 (56.53%). The main descriptives of the sample are in Table I.

Insert Table I here

The keywords (1247) were filtered, so the plurals and singulars of the same words were automatically grouped, and words were manually grouped by common synonyms, leaving a total of 1031 words or groups of words. Scientific mapping uses co-occurrence between keywords to obtain thematic groups (Cobo *et al*., 2011). In a strategic diagram, following Callon *et al*. (1991), each thematic network is classified in one of the following groups: well-developed and isolated themes, emerging or disappearing themes, basic and cross-sector themes and motor themes, considering the centrality and density measures. Figure 1 presents the strategic diagram obtained from this analysis for the period (1971-2022).

Insert Figure 1 here

Results

Figure 1 shows the motor themes have been coronavirus and behavior-change. Industry 4.0 is moving from being a motor theme to a basic one. Constraints-management is a motor theme that is crossing to well development theme. Stress is positioned as a basic theme and ergonomic-design is a well development theme. Finally, the emerging themes are internet-of-things and smart-work.

4

Considering that results, a research roadmap is proposed. The main themes can be classified into four groups: the approaches (where?), practices / actions (for who? / How?) and purposes (for what?) (Table II). It is observed that the consideration of the behavior-change, constraints-management and stress in the work environment are attracting interest to making better workplaces.

Insert Table II here

The topic of Smart HR has developed in the context of Industry 4.0 and has been driven by the pandemic that has led companies to modify their ways of working and their business models. One of the keys to its development is the application of the Internet of Things and the future lies in putting the development of this line of research in the context of Industry 5.0. On the other hand, it is aspects such as constraints-management, ergonomic-design and stress management that have motivated the need to develop studies on smart work. The future has to focus on analysing aspects such as well-being, creativity and sustainability in order to promote the creation of value and the achievement of not only smart but also happier workers. Organisational changes are needed.

Human Resource Analytics

Human Resource Analytics (HRA) has established itself as a tool to help develop the capacity of human resource managers to improve individual and organisational performance (Bassi, 2012). HRA offer great opportunities for companies that want to create a culture of data-driven critical decision-making and to recruit new human resource professionals (Kapoor and Kabra, 2014). Thus, HRAs' main aim is to identify qualified individuals who can achieve the maximum return on investment for the organisation (Ameer *et al*., 2020).

Fernández and Gallardo-Gallardo (2021) identify and define some of the terms commonly used to refer to this concept: People Analytics, Talent Analytics, Hyper-personal Analytics, Workforce Analytics y Human Capital Analytics. But, while there is some interest in HRA in both the scientific and business communities, this trend is becoming a fad, so a shift in focus and an approach where HRA become part of business decision-making is essential (Rasmussen and Ulrich, 2015). The literature is still at an early and developing stage so studies on the research and uses of HRAs are required (Singh and Muduli, 2021).

In this regard, Marler and Boudreau (2017) state that there is little academic research on HRAs and their level of adoption in the business environment is low.

Methodology

To identify the various topics covered in the literature on Human Resource Analytics, a co-word analysis is developed. We utilized the Scopus database and searched the fields Title, Keywords, and Abstract. The query used is ("HR analytic*" OR "human resource analytic*" OR "workforce analytic*" OR "people analytic*" OR "talent analytic*" OR "human capital analytic*" OR "employee analytic*" OR "workforce scorecard" OR "people scorecard"). The sample has a total of 389 documents, the 49.6% in the last three years (2020–2022). The main descriptives of the sample are in Table III.

Insert Table III here

Once the sample was created, the keywords were subjected to a filtering and treatment process, so the plurals and singulars of the same words were automatically grouped, and words were manually grouped by common themes and synonyms, leaving a total of 1324 words or groups of words. Figure 2 presents the strategic diagrams obtained from this analysis for the whole period (1970-2022).

Insert Figure 2 here

Results

In Figure 2, the motor themes are learning methods and information management. Quantitative methods are moving from being a motor theme to a basic one. Basic topic is performance measurements. Big data is a motor theme that is crossing to well development theme. In the upper left quadrant are the highly developed themes such as recruitment. And, in the lower left quadrant are the emerging themes: job satisfaction and deep learning.

Considering the results obtained, we have carried out a reflection on the thematic groups obtained and have classified them in order to facilitate their interpretation. In this way, it has been observed that with these groups we can provide answers to four questions and on the basis of them a general research roadmap has been drawn up (Table IV). The four questions around which the HRA literature revolves are: 1) What are the approaches/perspectives from which is HRA being analyzed? 2) To which HR processes is HRA being applied? 3) What tools are being used for its development and adoption? And 4) What is its usefulness (purposes)?

Insert Table IV here

The topic of HRA has developed in the context of Information Management. One of the keys to its development is their application for Smart Human Resources. HRA studies have focused on some of the HR practices such as recruitment and training and have used big data and quantitative methods for their development. Deep learning is one of the emerging themes being developed to develop analytics to help improve performance measurement and job satisfaction. The future clearly has to focus on applying tools such as artificial intelligence analysing for

developing innovative analytics for Smart Human Resource Management in order to promote the creation of value and the achievement of not only smart but also happier workers.

While new studies on these aspects are already being developed, there is still no previous literature that has focused on analysing the adoption of HRA in every HR management practice. We propose an overarching and expanding research question: how can the adoption of HRA in each of the HR practices facilitate value creation, both at the individual and organisational level? Most common in the literature are papers that analyse the effect on organisational performance.

Zeidan and Itani (2020) show that although there is a lot of empirical research linking the positive impact of HRA on organisational effectiveness and business competitiveness, its adoption and implementation rates in companies remain low. In the same vein, Marler and Boudreau (2017) conclude that despite much evidence linking HRA adoption to improvements in organisational performance, its adoption remains low and furthermore, there is not much work analysing HRA implementation in firms. Other authors talk about success factors, employee benefits, performance (Tursunbayeva *et al*., 2018), or financial indicators with ROI (Chalutz Ben-Gal, 2019). Qamar and Samad (2022) proposed some questions related to the value creation of HRA can be developed and extended, namely, how can the use of HRA in existing work practices facilitate a competitive advantage, does the cost of implementing the HRA process justify its financial results?

Singh and Muduli (2021, p. 124) define some indicators to measure HR performance: HR outcomes (satisfaction, engagement, innovation and turnover) and business outcomes (sales growth, profitability and market share). Kiran *et al*., (2022 present a model for analysing the influence of components of human capital management on organisational performance and the mediation effect of HR analytics. In some cases, individual and organisational performance indicators are combined (Cayrat and Boxall, 2022). However, few studies have analysed the effect of HRAs on employees (Khan and Tang, 2016).

For analysing the individual value-creation, a topic that needs to be further explored is the analysis of employee involvement in the implementation of human resource analytics. Profit is not one of the main incentives to encourage and reinforce employee engagement. But the possibilities offered by HRAs to collect a lot of employee information make it necessary not to lose sight of the issue of employee trust and ethics (Bandara *et al*. 2018; Birnbaum and Somers, 2022). In this sense, one of the aspects to consider is the effect that the implementation of HRAs has on the employee, not only in economic terms, but especially in relation to his or her satisfaction and well-being (Bandara *et al*., 2018).

Smart human resources analytics for happines management

In the modern world, employee well-being at work appears to be a critical factor in determining employee attitudes toward change (Al Haziazi, 2021). Some of the literature on well-being is focused on happiness management. Happiness can be defined as an emotional state that comes from the response of individuals to the interaction of different conditions that act on it. This interaction can have positive effects in multiple areas of life that favour the achievement of self-realisation through work and greater economic and social development (Ravina-Ripoll *et al*., 2023). Efficient results and happiness are a well-argued binomial in the literature.

Methodology

In the context of Industry 5.0 and post pandemic era, there is an emerging interest in studying the application of smart human resources and HRA for happiness management. The combined application of smart and happiness can mark a before and after in human resource management. For analysing it, several searches were carried out in Scopus (March, 7, 2023) to see the papers published on Smart HR and happiness, and on HRA and happiness, combining the keywords of each of them with happiness OR happy*.

Results

It can be seen that there are very few papers that have analysed these topics together (three for the former and four for the latter) and there are none that combine all three topics at the same time. There is certainly an opportunity to develop future research on these issues. Several research questions are proposed below: How can we approach HR management to achieve smarter and happier workers? How can we apply HRA to improve the happiness management of Smart HR?

In this sense, from the perspective of HRA, the creation of individual value can be focused on the development of indicators for measuring smart-employees happiness. To this end, companies can consider in a differentiated way the effect of the policies and actions developed in each smart human resources practice on happiness management. HRAs can be used to measure the effect of each Smart HR practice on happiness management. In this way, future studies can be challenged to develop measurement indicators and KPIs to identify the effect on happiness of each of the HR processes -job analysis and planning, recruitment and selection, training and development, evaluation and compensation, and subtractive processes-.

Furthermore, it would be very interesting to create a Smart happy value creation index that looks at how machines (actions, systems, efficiency and smart-places) meet people (emotions, happiness) to achieve smart and efficient happiness in the workplace. In this sense, we pose the

following question: How can a Management Information System (MIS) be developed to drive happiness management models for Smart HR?

For developing a research line, a model is proposed to guide future research on smart human resource analytics for happiness management (Figure 3).

Insert Figure 3 here

Based on the happiness management models developed, analytics can be proposed to help measure the happiness of smart workers. In that line, a happiness management certification has been developed as a tool for human resources management in the post-COVID-19 era (Ravina-Ripoll *et al*., 2021). Ravina-Ripoll *et al*. (2021) propose considering the effects of organisational, relational and individual commiment on happiness. Following Ravina-Ripoll *et al.* (2019d; 2023), happiness management is a lighthouse for social wellbeing, creativity, sustainability, internal communication and intrapreneurship. In this sense, Ravina-Ripoll et al. (2019b) develop a corporate happiness management model in which a series of factors are proposed to improve work performance: creativity, commitment, technological innovation, internal entrepreneurship, and social responsibility. For Smart HR, these aspects can be interesting to analyse and relate to HRA.

The model proposed in Figure 3 presents the consideration of HR practices in smart work contexts and the factors for developing happiness management. Their combination can lead to new analytics to measure value creation at both organisational (corporate governance, entrepreneurship, innovation), individual (internal customers, intra-entrepreneurship, creativity) and relational (external customers, social responsibility) levels.

Conclusions

Human resources represent a significant factor for competitive advantage in the knowledge economy. In Industry 4.0 considering human resource management, managers should focus primarily on supporting innovation and learning in the organisation (Puhovichova and Jankelova, 2020). In that industry, Smart Working is especially important when companies seek to increase the flexibility of their system considering workers the most adaptable and resilient element in the socio-technical system. Smart Working focuses on 'doing work differently' and is enabled by digital tools (Bednar and Welch, 2020; Dornelles *et al*., 2022).

The implementation of Smart Human Resource 4.0 brings many benefits such as attracting, developing and retaining new talent and achieving more efficient and faster processes (Puhovichova and Jankelova, 2020) so the challenge now is to include the emotional dimension to achieve happier workers and metrics to demonstrate this (HRA). The development of Industry

5.0 has shown that, in addition to the combination of technology and human skills, smart workers are looking for well-being and job satisfaction. Considering the post pandemic era and the industry 5.0, having smart and happiness workers can make the difference between being a successful value-creating company or not.

In that context, this paper has shed light on some of areas of research into Smart Human Resources and HRA and its application in companies for happiness management.

For future research, this paper proposes a new research line focus on the interest of analysing the well-being, creativity and sustainability to promote the creation of value and the achievement of not only smart but also happier workers. In that sense, tools such as intelligence analysing can be considered for developing innovative analytics for Smart Human Resource Management.

This paper has some contributions. The first contribution of our research is the identification of thematic groups in which the literature on Smart Human Resources and HRA has been structured. On the other hand, future papers can be identified the trends in research on the application of HRA to Smart Human resource processes. Other contribution is the proposed model for analysing value creation through HRA for measuring the effect of each HR practice on smart-employees happiness.

This research has some limitations owing to the use of bibliometric analysis. Future studies could complement co-word analysis with other techniques such as bibliographic coupling and co-citation analysis. Furthermore, new theoretical and empirical models are needed to develop the research line on "Smart human resources analytics for happiness management". For this purpose, qualitative methodologies such as case studies and quantitative methodologies can be applied to develop statistical models such as structural equation models. Another interesting topic for future studies would be to carry out studies on the good practices of companies that are carrying out happiness management actions in the context of smart human resources and their analytics.

To conclude, Smart Human Resource Analytics for happiness management clain to consider the synergistic effect of their three words. "Smart Human" leads us to prioritize the human, intangible and differentiating component, i.e., talent and its importance in contexts such as the present. "Resource" reminds us of the application of people's knowledge and know-how to achieve greater efficiency and well-being. Finally, "analytics" introduces the quantitative, analytical and predictive component that fosters an understanding of the value of people within organizations and helps improve employee happiness to create more value.

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Tables

Table I. Smart Human Resources: main descriptives and keywords

Years / (% docum.)	2013–2022: 303 (86.08%); 1970–2019: 153 (43.47%); 2020–2022: 199 (56.53%)
Top authors	Davies, M.J.; Edwardson, C.L.; Li, X.; Munir, F.; Yates, T.; Gray, L.J.; Chi, H.l.; Dunstan, D.W.; Jiang, P.; O'Connell, S.E.; Shen, G.Q.; Wu, P.
Top affiliations	Sapienza Università di Roma; Hong Kong Polytechnic University; Università degli Studi di Padova; Loughborough University; Kyung Hee University; The University of Hong Kong; Australian Catholic University; Xi'an Jiaotong University; Alma Mater Studiorum Università di Bologna; University Hospitals of Leicester NHS Trust; Baker Heart and Diabetes Institute; State Key Laboratory for Manufacturing Systems Engineering; College of Life Sciences
Top countries	Italy; South Korea; United States; China; United Kingdom; Australia; Germany; India; Spain; Hong Kong; Belgium; Sweden; Brazil; France; Netherlands; Pakistan; Malaysia; Poland; Portugal; Saudi Arabia
Top keywords	Smart-working; Covid-19; smart-work; industry-4.0; lockdown; internet-of-things; telework; pandemic; smart-manufacturing; smart-workpiece; machine-learning; job-satisfaction; work-life-balance; sustainability

Source: own elaboration

Table II. A research roadmap for smart human resource

	Basic topics	Motor topics	Emerging topics	Future topics
Approaches (where?)	Industry-4.0	Coronavirus	Internet-of-things	Industry 5.0
Practices / actions (for who? / How?)	Stress	Constraints-management	Smart-work	Well-being Creativity Sustainability
Purposes (for what?)		Behavior-change		Value creation Happiness management

Source: own elaboration

Table III. Human Resource Analytics: main descriptives and keywords

Years / (% docum.)	2013–2022: 372 (95.6%); 1970–2019: 196 (50.4%); 2020–2022: 193 (49.6%)
Top authors	Varshney, K.R.; Mittal, A.; Arora, M.; Escolar-Jiménez, C.C.; Gustilo, R.C.; Matsuzaki, K.; Prakash, A.; Singh, S.; Vincent, E.; Bagga, T.; Fang, D.; Guerry, M.A.; Gupta, S.; Levenson, A.; McCartney, S.; Saxena, M.; Singer, G.; Wang, J.
Top affiliations	Amity University; IBM Thomas J. Watson Research Center; National Defence and the Canadian Forces; Bar-Ilan University; University of Southern California; Chitkara University, Punjab; Tel Aviv University; Tokyo City University; Tilburg University; De La Salle University; USC Marshall School of Business; Symbiosis International Deemed University; K.R. Mangalam University
Top countries	India; United States; Germany; United Kingdom; Australia; Netherlands; Canada; China; France; Israel; Italy; Indonesia; Belgium; Japan; Russian Federation; Spain
Top keywords	Big-data; machine-learning; decision-making; artificial-intelligence; predictive-analytics; human-resource-analytics; information-management; data-mining; data-analytics; forecasting; talent-management; human-capital; employment; learning-algorithms; productivity; job-satisfaction; talent-analytics; organization; decision-trees; learning-systems; human-resources-management; behavioral-research; human-capitals

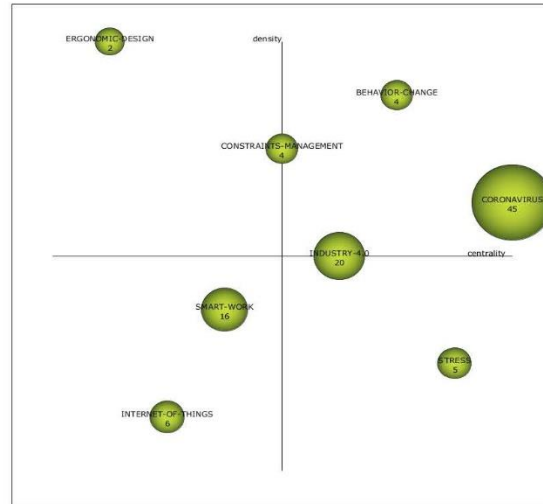Source: own elaboration

Table IV. A research roadmap for HRA

|	Well-developed topics	Basic topics	Motor topics	Emerging topics	Future topics
Approaches (where?)			Information management		Smart HR
HR practices	Recruitment		Learning-methods		All HR process
Tools	Big data	Quantitative methods		Deep learning	Artificial intelligence
Purposes (for what?)		Performance-measurement		Job Satisfaction	Value creation Happiness management

Source: own elaboration

Figures

Figure 1. Strategic diagrams by number of documents for all the period (1971–2022)
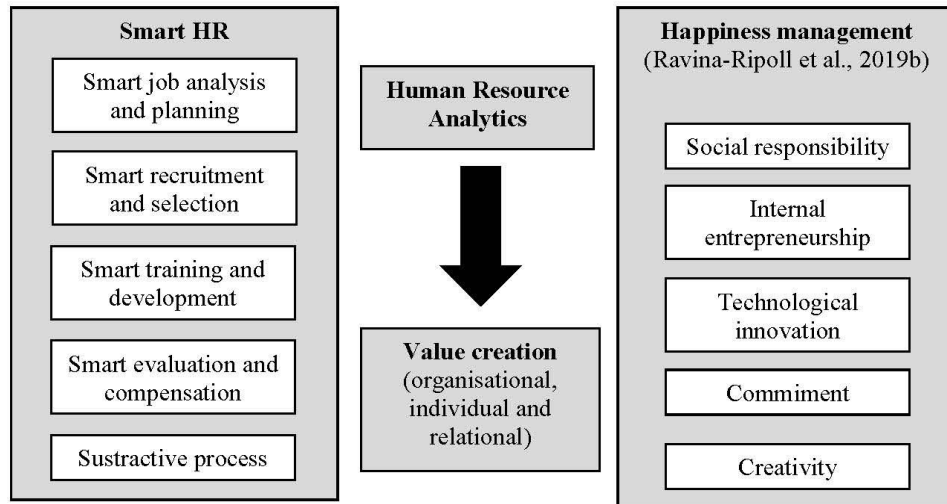

Source: results from SciMat

Figure 2. Strategic diagram for the 1970–2022 (no. docs.)
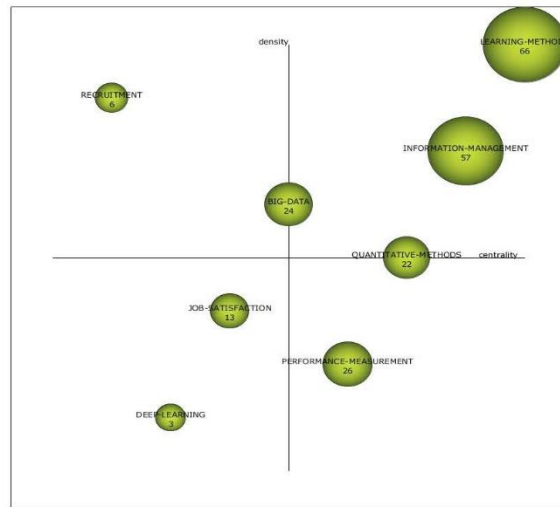
Source: results from SciMat

Figure 3. Smart human resources analytics for happiness management and value creation

Smart HR		Happiness management (Ravina-Ripoll et al., 2019b)
Smart job analysis and planning	**Human Resource Analytics**	Social responsibility
Smart recruitment and selection		Internal entrepreneurship
Smart training and development		Technological innovation
Smart evaluation and compensation	**Value creation** (organisational, individual and relational)	Commiment
Sustractive process		Creativity

Source: own elaboration