Journal of Business Research 101 (2019) 627–636

Contents lists available at ScienceDirect

Journal of Business Research

journal homepage: www.elsevier.com/locate/jbusres

# Human resources training: A bibliometric analysis

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ARTICLE INFO

*Keywords:*
Human resources
Training
Bibliometrics
Citation and co-occurrence analysis
Knowledge mapping

ABSTRACT

Research on human resources training has been shaped by a great number of articles published in recent decades. This study contributes to the literature by examining how this research is built on the basis of different intellectual frameworks and by identifying the relevant references, authors, topics, and journals. With this aim, we used bibliometric techniques to examine over 900 articles published between 1975 and 2016. We observed three publication periods that have shaped the evolution of research in this field. In the journals that have published these articles, a wide range of disciplines have been used to address the topic of human resources. The dominant focus is on US and labor-intensive industries, giving researchers the opportunity to undertake further cross-country and cross-industry studies. By considering human capital and performance, the resource-based view provides theoretical support for the articles through which leading authors have built a core grounding for the topic.

## 1. Introduction

Over the last few decades, technological progress and market evolution have led many companies to redesign their strategies. Many studies state that intangible resources might have provided sustainable competitive advantages in this context (Galbreath, 2005; Hall, 1992, 1993; Lim, Chan, & Dallimore, 2010; Villalonga, 2004). There is some consensus in considering human resources-related intangible assets, grouped as human capital, to be among the best explanatory elements for studying improvements in company performance (Carmeli & Tishler, 2004; Edmans, 2011; Hatch & Dyer, 2004; Liu, van Jaarsveld, Batt, & Frost, 2014; Martín-de-Castro, Delgado-Verde, López-Sáez, & Navas-López, 2011; Rangone, 1999; Villalonga, 2004).

Since human capital can be generated and accumulated through training and continuous learning processes (Danvila Del Valle & Sastre Castillo, 2009; Sastre Castillo & Aguilar Pastor, 2003), the literature has sought to understand the relationship between human resources training and human capital generation, and how it may impact performance. This growing interest is soon apparent in the number of articles that endeavor to explore different elements of this relationship. Initially, the bulk of the academic research was aimed at exploring the effects of a combination of human resources practices, and led to a solid line of inquiry (Arthur, 1994; Delaney & Huselid, 1996; Delery & Doty, 1996; Huselid, 1995; Huselid, Jackson, & Schuler, 1997; Ichniowski, Shaw, & Prennushi, 1997; Koch & McGrath, 1996; Pfeffer, 1994). Subsequently, fresh research approaches emerged addressing specific topics, among which the impact of human resources training proved particularly relevant (Aragon-Sanchez, Barba-Aragon, & Sanz-Valle, 2003; Danvila-del-Valle, Sastre-Castillo, & Rodríguez-Duarte, 2007; De Saá-Pérez & Garcia-Falcon, 2002; Lee, Phan, & Chan, 2005; Ubeda-Garcia, 2005). Given the importance and quantity of the research to emerge, it is essential to examine its characteristics and the intellectual framework on which it is based.

The objective of this study is therefore to evaluate research on human resources training. Using bibliometric techniques, the study does so by examining the literature published in leading journals. With the help of these techniques, and by analyzing the articles and citations used by researchers in their studies, we aim to identify and weigh up the relationships and impact of the main articles and contributors in this topic, and which shape the existing foundation for the topic.

As a result, our contribution identifies the most relevant authors, the theoretical grounding, the topics already covered and, consequently, new lines and perspectives for forthcoming investigation. Our study also serves as a quantitatively-supported starting point for a literature

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https://doi.org/10.1016/j.jbusres.2019.02.026
Received 10 June 2018; Received in revised form 12 February 2019; Accepted 13 February 2019
Available online 14 March 2019
0148-2963/ 

review in further studies that address the topic and provides a basis for conducting meta-analyses.

After reviewing the literature on bibliometrics, the following sections of this article describe the methodology adopted to examine the intellectual structure of research on human resources training. The results obtained from the study are then reported and discussed. Finally, we state our conclusions and offer suggestions for future research.

## 2. Review of the literature on bibliometrics

Bibliometrics is a set of tools that researchers may use to analyze published data, and is a field of research that applies mathematical and statistical techniques to study publishing patterns in the distribution of information (McCain, 1996). Such techniques include impact indicators, citation and co-citation analysis, as well as bibliometric mapping. Citation analysis operates on the premise that authors cite the documents they consider to be significant for the purpose of their research. Accordingly, how often these articles are cited may be linked to the impact they are felt to have on the topic (Culnan, 1987). Co-citation analysis looks at the articles that cite a certain pair of references, collecting data from databases and using analytical and graphic display techniques (McCain, 1990). This means of citation may reflect similarity of content and thus help to identify groups of topics and authors, and how they might be related (Pilkington & Liston-Heyes, 1999; Ramos-Rodriguez & Ruiz-Navarro, 2004). We use the data and results obtained to perform bibliometric mapping using VOS (van Eck, Waltman, Dekker, & van den Berg, 2010), which is particularly important when handling sources from multidisciplinary fields (Börner, Chen, & Boyack, 2005).

Use of bibliometric techniques to map and study the knowledge published in different fields has been growing for years. Several areas of research have already been explored in the management field using these methods: management (Tahai & Meyer, 1999), strategic management (Nerur, Rasheed, & Natarajan, 2008; Ramos-Rodriguez & Ruiz-Navarro, 2004), finance (Alexander & Mabry, 1994; Merigó, Yang, & Xu, 2015), operations management (Pilkington & Liston-Heyes, 1999; Pilkington & Meredith, 2009), supply chain management (Charvet, Cooper, & Gardner, 2008) or innovation (Fagerberg, Fosaas, & Sapprasert, 2012). Human resources management or organizational behavior have also been targeted (Culnan, O'Reilly III, & Chatman, 1990; Fernandez-Alles & Ramos-Rodríguez, 2009; Markoulli, Lee, Byington, & Felps, 2017).

Bibliometric analysis of specific topics or subfields within the management arena has also been employed, with such analyses including studies on corporate social responsibility (De Bakker, Groenewegen, & Den Hond, 2005), family business (Casillas & Acedo, 2007), entrepreneurship (Etemad & Lee, 2003; Landström, Harirchi, & Åström, 2012; Schildt, Zahra, & Sillanpää, 2006), social entrepreneurship (Rey-Martí, Ribeiro-Soriano, & Palacios-Marqués, 2016; Sassmannshausen & Volkmann, 2018), environmental management accounting (Schaltegger, Gibassier, & Zvezdov, 2013), business incubators (Albort-Morant & Ribeiro-Soriano, 2016), creativity (Castillo-Vergara, Alvarez-Marin, & Placencio-Hidalgo, 2018), born global firms (Dzikowski, 2018), female entrepreneurship (Santos, Marques, & Ferreira, 2018), innovation adoption (van Oorschot, Hofman, & Halman, 2018), and absorptive capacity (Apriliyanti & Alon, 2017), etc.

Theories and intellectual frameworks, such as the resource-based theory (Acedo, Barroso, & Galan, 2006), dynamic capability view (Vogel & Güttel, 2012), transaction cost theory (Ferreira, Pinto, & Serra, 2014; Martins, Serra, Leite, Ferreira, & Li, 2010), or institutional theory (Weerakkody, Dwivedi, & Irani, 2009) have also been the focus of such methods.

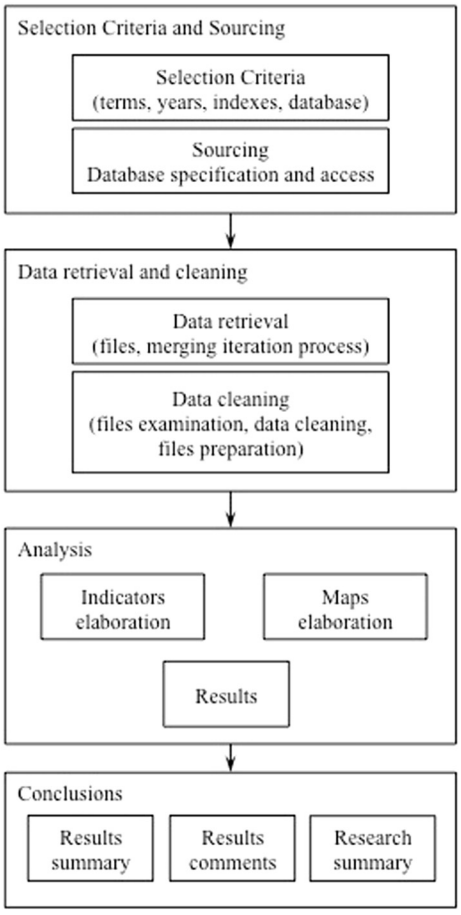


**Fig. 1.** Methodology.

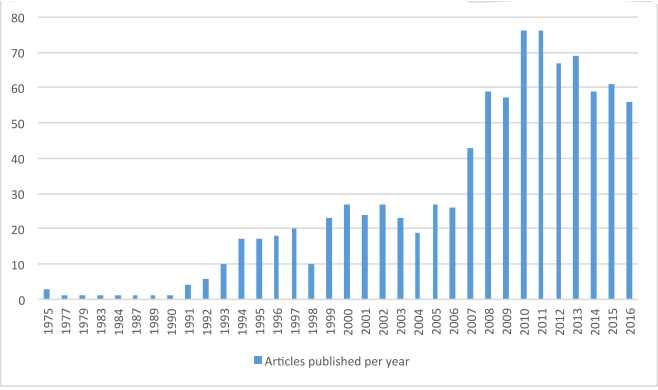


**Fig. 2.** Articles on human resource training per year.

## 3. Methodology

### 3.1. Unit of analysis

Bibliometric analysis examines bibliographical elements quantitatively. We decided to use articles published in journals since they are considered to be "certified knowledge" and because they emerge from an evaluation process, thus endowing the results with reliability (Callon, Courtial, & Penan, 1993; Ramos-Rodriguez & Ruiz-Navarro, 2004). Therefore, we did not consider proceedings papers, news, and other document types found in databases.

We used citation analysis and co-occurrence citation analysis. Citation analysis is based on the importance researchers attach to a

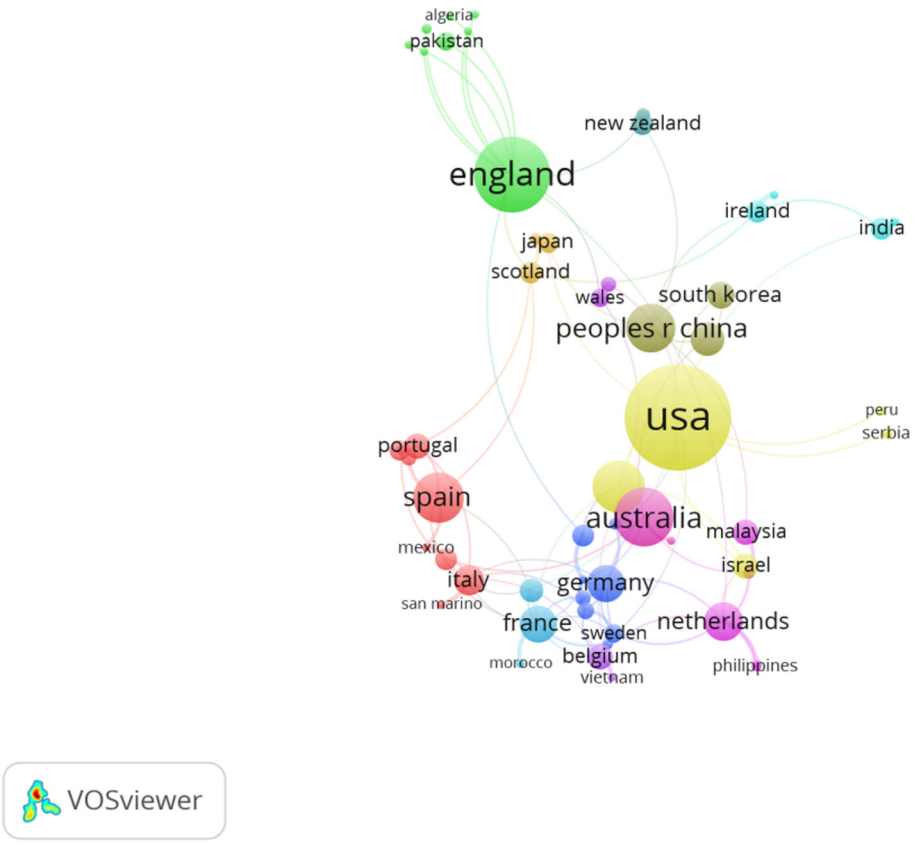


**Fig. 3.** Authors' nationalities map.
Note: The size shows the relative proportion of articles and the closeness shows the collaboration between authors of those countries.

publication when referring to it as a source. Consequently, it may be concluded that the more often an article is cited, the more influential it will prove to be for the research community in developing said area (Ramos & Ruiz, 2008).

### 3.2. Database sourcing and management

We collected article data from journals stored on the Clarivate Analytics Web of Science site database. As our aim was to examine the different approaches and structure of contributions, we limited the initial search to articles that included “training” and “human resource” in the title, the keywords, or the abstract. We thus tried to encompass possible combinations of words that studied our topic. After continuous checking processes, we then also filtered articles, removing those classified under unrelated categories, which were mainly those from medical disciplines. In addition, we checked the remaining articles so as to filter those related to the topic. We were therefore able to obtain the main figures and overall research configuration on boards of directors before delving into certain core intellectual nodes, subtopics or publications. Systematic filtering of registers was then carried out to ensure consistency in authors and citations. The articles obtained were published up to 2016.

We considered each publication as a possible contribution to research in this arena. Once the dataset had been generated, we used several software packages to examine it. In the case of specific bibliometric data management, we employed BibExcel software to analyze the data and obtain indicators, classify items, etc. We used SPSS to verify the main elements of the intellectual framework via factor analysis, and VOSviewer software as a tool to build and visualize relationships graphically, as well as to perform analyses based on the networks underlying the research on the topic (Van Eck & Waltman, 2010).

### 3.3. Indicators and results visualization

For the purpose of our study, we decided to use descriptive and relational bibliometric indicators and tools. Languages, countries, and institutions provide a certain degree of sociodemographic context explanation. Publishing year frequency helps to visualize and establish stages in the history of research into this topic. Keywords help to understand authors' self-assessment of how the concepts and studies are classified and related in this context. This clarifies which of these concepts have not been subject to sufficient analysis. Main contributors and journals show who has conducted most research and which publication has served to accumulate the majority of those studies.

Co-occurrence in authors provides a structure of research communities, and co-occurrence in citations helps to understand the intellectual framework. Finally, maps provide a clearer picture of what has been done, the communities involved, and also points to possible lines of future research.

### 3.4. Data analysis process

The figure below (Fig. 1) shows the different stages we followed when performing data analysis. We first established the selection criteria for terms, years, target indexes, and specified database before then retrieving and cleaning the information. We processed the retrieved data in order to apply homogenous criteria that would allow the proposed objective to be achieved. Data cleaning included capital letter standardization, checking authors' initials, removing duplicities in cited references, data completion, etc. This usually involves undertaking an iterative process until the researcher obtains the right information registers, which are then analyzed and subsequently cleaned. With the help of the indicators and maps mentioned, analysis is then performed to obtain the results. Some final remarks and conclusions are then put

**Table 1**
Journals with publications on human resources training.

| Rank | Journal | h-Index | Articles | Citation sum within h-core | All citations | All articles |
|---|---|---|---|---|---|---|
| 1 | International Journal Of Human Resource Management | 16 | 130 | 1043 | 1259 | 66 |
| 2 | International Journal Of Manpower | 9 | 44 | 255 | 311 | 23 |
| 3 | Human Resource Management | 8 | 61 | 159 | 198 | 24 |
| 4 | International Journal Of Contemporary Hospitality Management | 8 | 16 | 432 | 443 | 14 |
| 5 | Employee Relations | 8 | 12 | 119 | 126 | 12 |
| 6 | Human Resource Development Quarterly | 6 | 13 | 175 | 184 | 11 |
| 7 | Asia Pacific Journal Of Human Resources | 6 | 20 | 109 | 130 | 18 |
| 8 | Personnel Review | 6 | 49 | 175 | 203 | 16 |
| 9 | African Journal Of Business Management | 6 | 14 | 203 | 215 | 14 |
| 10 | European Journal Of International Management | 5 | 8 | 105 | 105 | 5 |
| 11 | Amfiteatru Economic | 5 | 8 | 94 | 103 | 8 |
| 12 | Cornell Hospitality Quarterly | 5 | 12 | 93 | 98 | 8 |
| 13 | Management Decision | 4 | 9 | 29 | 38 | 7 |
| 14 | Total Quality Management & Business Excellence | 4 | 8 | 33 | 35 | 6 |
| 15 | Asia Pacific Business Review | 4 | 5 | 106 | 107 | 5 |
| 16 | E & M Ekonomie A Management | 3 | 5 | 58 | 59 | 4 |
| 17 | Disaster Prevention And Management | 3 | 3 | 78 | 78 | 3 |
| 18 | Journal Of Knowledge Management | 3 | 4 | 52 | 52 | 4 |
| 19 | Career Development International | 3 | 5 | 241 | 244 | 5 |
| 20 | International Journal Of Technology Management | 3 | 13 | 15 | 15 | 3 |
| 21 | Human Resource Management Review | 3 | 9 | 21 | 21 | 4 |
| 22 | Human Resource Development Review | 3 | 7 | 33 | 35 | 7 |
| 23 | Technological Forecasting And Social Change | 3 | 5 | 57 | 57 | 5 |
| 24 | International Journal Of Operations & Production Management | 3 | 8 | 25 | 26 | 4 |
| 25 | Industrial Relations | 2 | 8 | 37 | 37 | 3 |
| 26 | Journal Of Labor Research | 2 | 6 | 189 | 189 | 2 |
| 27 | Inzinerine Ekonomika-Engineering Economics | 2 | 7 | 28 | 30 | 4 |
| 28 | International Journal Of Project Management | 2 | 5 | 6 | 7 | 4 |
| 29 | Industrial And Corporate Change | 2 | 3 | 72 | 72 | 2 |
| 30 | Journal Of Applied Psychology | 2 | 8 | 58 | 58 | 2 |
| 31 | Journal Of Management & Organization | 2 | 4 | 39 | 40 | 3 |
| 32 | Personnel Psychology | 2 | 8 | 9 | 9 | 3 |
| 33 | Rae-Revista De Administracao De Empresas | 2 | 2 | 30 | 30 | 2 |
| 34 | Management International Review | 2 | 2 | 26 | 26 | 2 |
| 35 | Organizational Psychology Review | 2 | 2 | 20 | 20 | 2 |
| 36 | Relations Industrielles-Industrial Relations | 2 | 16 | 41 | 42 | 4 |
| 37 | Transformations In Business & Economics | 2 | 4 | 8 | 8 | 3 |
| 38 | Zeitschrift Fur Personalforschung | 2 | 4 | 12 | 13 | 3 |
| 39 | Service Industries Journal | 2 | 4 | 38 | 38 | 2 |
| 40 | Technology Analysis & Strategic Management | 2 | 3 | 18 | 18 | 2 |

forward based on the results. Limitations and lines for future inquiry are stated at the end of the process.

## 4. Results

We applied the selection criteria to search the Web of Science main collection database, performed the previously stated data preparation tasks, and retrieved 931 articles.

### 4.1. Publications per year

The articles we analyzed were published between 1975 and 2016. As the following figure (Fig. 2) shows, different periods can be seen, which we establish for better analysis and discussion.

There is a first period, from 1975 to 1993, when just a few articles are published indicating the usual seminal timeframe. In the second period, from 1994 to 2006, the number of papers is almost ten times the previous number, on average. The third period, from 2007 to 2016, although it displays a lower growth rate, still reflects a substantial increase in the number of articles and a solid baseline of over 43 per year, a clear indication of the research field having entered a stage of development. Within this latter period, 2010 and 2011, with 76 articles, were the years when most papers were published. The growth in the number of published articles suggests that the topic is entering a stage of development. As a result, different research directions might be undertaken: exploring new related topics, examining in greater depth thus far less studied areas, or even aiming to address "traditional issues" through new frameworks. Exploring new international collaboration might also prove useful in an effort to widen the scope of inquiry.

### 4.2. Countries and languages of publications

Since many journals publish solely in English, the majority of the articles (96.35%) were published in that language. There are also some articles in French, Spanish, Slovak, Czech, German, Portuguese, and Russian.

Despite having article contributions from 70 countries, over half of the authors are from the US, the UK, Australia, China, and Canada, and come from a wide array of institutions. Fig. 3 shows the nationalities of the authors and how close they are to the others with whom they cooperated. The closer they are, the more they cooperated. It reveals geographical and cultural clusters around the US, the UK, several Asian or European countries, as well as the countries that provide the focus for the origin of their studies.

In our view, the high concentration of articles in terms of countries has two consequences. First, it helps to provide more in-depth research subjects, and second, it opens up a window of opportunity to involve new countries in collaboration; in other words, to engage other authors and institution partnerships to work in these matters.

### 4.3. Journal productivity

The articles were published in 209 journals, although only 37 of them accounted for over 63%. Table 1 shows a list of these journals, the

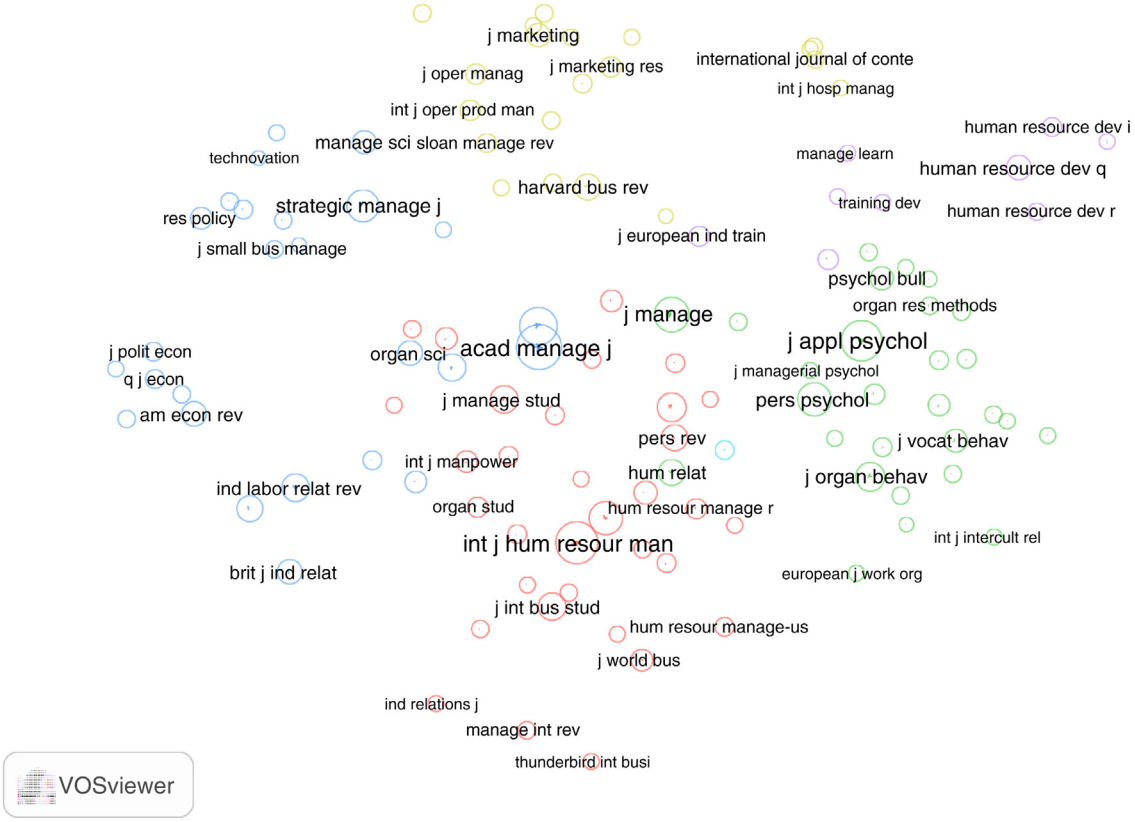


**Fig. 4.** Journals co-occurrence map.
Note: The size of the nodes (journals) indicates the relative number of citations. The distance between the nodes (journals) represents the relative strength in the relationship between them. We limited the visualization to 117 journals that accounted for 50 citations at least.

**Table 2**
Most prolific authors.
Note: The Left list is ranked by h-index and the right list is ranked by citations.

| Author | h-Index | Citation sum within h-core | No. citations | No. articles | Author | h-index | Citation sum within h-core | No. citations | No. articles |
|---|---|---|---|---|---|---|---|---|---|
| Aguinis H | 5 | 108 | 118 | 7 | MacDuffie JP | 3 | 1227 | 1227 | 3 |
| Bacon N | 4 | 80 | 80 | 4 | Ichniowski C | 2 | 1008 | 1008 | 2 |
| Chambel MJ | 4 | 54 | 54 | 4 | Shaw K | 2 | 1008 | 1008 | 2 |
| McPhail R | 4 | 51 | 51 | 4 | Prennushi G | 1 | 870 | 870 | 1 |
| MacDuffie JP | 3 | 1227 | 1227 | 3 | Delaney JT | 1 | 798 | 798 | 1 |
| Budhwar PS | 3 | 135 | 135 | 3 | Huselid MA | 1 | 798 | 798 | 1 |
| Klaas BS | 3 | 114 | 114 | 3 | Osterman P | 1 | 675 | 675 | 2 |
| Karatepe OM | 3 | 107 | 107 | 3 | Luthans F | 2 | 384 | 384 | 2 |
| Burke MJ | 3 | 97 | 97 | 3 | Lee DMS | 1 | 224 | 224 | 1 |
| Bjorkman I | 3 | 93 | 93 | 3 | Trauth EM | 1 | 224 | 224 | 1 |
| Warner M | 3 | 60 | 60 | 3 | Farwell D | 1 | 224 | 224 | 1 |
| Tabassi AA | 3 | 53 | 53 | 4 | Laursen K | 1 | 211 | 211 | 1 |
| Boselie P | 3 | 50 | 50 | 3 | Foss NJ | 1 | 211 | 211 | 1 |
| D'Netto B | 3 | 35 | 35 | 3 | Sarkis J | 1 | 185 | 185 | 1 |
| Kulkarni M | 3 | 28 | 30 | 4 | Adenso-Diaz B | 1 | 185 | 185 | 1 |
| Mabey C | 3 | 29 | 29 | 3 | Gonzalez-Torre P | 1 | 185 | 185 | 1 |
| Kumpikaite V | 3 | 28 | 28 | 3 | Scullion H | 2 | 180 | 180 | 2 |
| Shen J | 3 | 21 | 22 | 4 | Tzafrir SS | 2 | 178 | 178 | 2 |
| Cai ZY | 3 | 17 | 17 | 3 | Morley MJ | 1 | 178 | 178 | 1 |
| Fisher R | 3 | 17 | 17 | 3 | Collings DG | 1 | 178 | 178 | 1 |
| Singh S | 3 | 15 | 15 | 4 | Daily BF | 2 | 173 | 173 | 2 |
| Ichniowski C | 2 | 1008 | 1008 | 2 | Simmering MJ | 1 | 170 | 170 | 1 |
| Shaw K | 2 | 1008 | 1008 | 2 | Colquitt JA | 1 | 170 | 170 | 1 |
| Luthans F | 2 | 384 | 384 | 2 | Huang SC | 1 | 148 | 148 | 1 |
| Scullion H | 2 | 180 | 180 | 2 | Michie J | 2 | 142 | 142 | 2 |

number of articles they published, the percentage they represent, the Hirsch-index (Hirsch, 2005) we calculated, and the citations they received from their studies.

A look at how approaches to the research topic have evolved may help us to understand these figures. As in other disciplines, the oldest and most topic-focused journals rank at the top. This is the case with *International Journal of Human Resource Management*, with 130 articles, *Human Resource Management*, with 61 articles, *Personnel Review*, with 49

**Table 3**
Most cited articles.

| Article | Cites |
|---|---|
| Huselid, 1995 | 143 |
| Barney, 1991 | 96 |
| Macduffie, 1995 | 90 |
| Delery & Doty, 1996 | 86 |
| Arthur, 1994 | 72 |
| Delaney & Huselid, 1996 | 71 |
| Becker & Gerhart, 1996 | 64 |
| Pfeffer, 1994 | 58 |
| Podsakoff Pm, 2003 | 57 |
| Ichniowski et al., 1997 | 56 |
| Youndt Ma, 1996 | 50 |
| Wright et al., 2001 | 46 |
| Osterman P, 1994 | 41 |
| Batt R, 2002 | 40 |
| Baron Rm, 1986 | 39 |
| LepakDp, 1999 | 39 |
| Becker & Huselid, 1998 | 36 |
| Guest D. E., 1997 | 36 |
| Fornell C, 1981 | 36 |
| Wright P. M., 1994 | 35 |
| Huselid et al., 1997 | 35 |
| Appelbaum et al., 2000 | 35 |
| Wright Pm, 1992 | 34 |
| Eisenhardt, 1989 | 34 |
| Blau P. M., 1964 | 33 |
| LadoAa, 1994 | 33 |
| Schuler R. S., 1987 | 32 |
| Hofstede G., 1980 | 32 |
| Snell Sa, 1992 | 31 |
| Podsakoff Pm, 1986 | 30 |
| Bowen De, 2004 | 30 |
| Becker, 1964 | 29 |
| Guthrie Jp, 2001 | 29 |
| Koch & McGrath, 1996 | 29 |
| BartelAp, 1994 | 28 |
| Miles Re, 1984 | 28 |
| Anderson JC, 1988 | 28 |
| Arthur J.B. 1992 | 28 |
| Pfeffer J, 1998 | 26 |
| Wright Pm, 1998 | 26 |
| Jackson & Schuler, 1995 | 25 |
| Aiken L. S., 1991 | 25 |
| Nonaka I., 1995 | 25 |

articles, or *International Journal of Manpower*, with 44 articles published. The h-index indicator strengthens the ranking position of these journals. Since they constitutively embrace diverse points of view, other journals provide different perspectives in the arena. This is the case with articles published in journals such as *Management Decision* or *Personnel Psychology*.

Accordingly, the classification of articles shows how, beyond the "Business & Economics" type, almost one in five (183 articles) were tagged with "Psychology." Developed topics allow a core group of journals that mainly focus on the principal field (e.g. business, management, human resources) to be combined, together with another group that approach the topic from a different perspective.

The map in Fig. 4 helps to visualize these findings on journals and their categorization. Co-citation analysis for journals was performed, enabling us to draw a map so as to understand closeness and the relationship among them, and to pinpoint where the articles that structure the knowledge on this topic are located. Given the high number of publications and citations, management journals are mainly located at the center of the map. Journals from different fields, such as psychology, are related to this core group, and specific journals pivot around them. Closeness indicates how they are co-cited; that is, how articles highlight relevant silos of knowledge for their studies. This allows us to visualize the core of sources that explore the topic in greater depth and serves as a point of reference for multiple viewpoints.

### 4.4. Authors' productivity

There are 1922 single authors in the sample of articles analyzed. Table 2 shows who the most prolific were. In order to classify and understand their importance, we ranked them based on their h-index for each author (list on the left) as well as the total number of citations (right-hand list). We used both ranks since they give different perspectives of their contributions and may indicate collaboration in their production.

When considering relevance in terms of the h-index, leading the ranking were authors such as Aguinis, Bacon, Champel, McPhail or MacDuffie. Studies by Aguinis, deeply rooted in the area of psychology, explore topics such as organizational performance improvement through human capital development, the outcomes of people's training and development within organizations and society, or associated performance management or team leadership. Bacon deals with the topic of training in SMEs, team-working, and employee relations. Chambel's studies focus on temporary workers, whereas McPhail addresses several matters such as job quality or job satisfaction, mainly in labor-intensive industries.

The articles published by MacDuffie rank high in both classifications, evidencing the relevance of his research. His investigation of HR systems, where training plays a key role in practice, is a key reference. Ichniowski, Shaw, and Prennushi collaborated in articles studying the relationship between HRM and firm performance and productivity.

It should be pointed out that a high ranking in this category merely reflects the effort put into the subject matter, and might not necessarily be related to the relevance it has earned in the literature. This point is explored in greater detail later on via cited references.

### 4.5. References analysis

In addition to an analysis of authors, a study of the references they used in their papers helps to draw the discipline's intellectual map. There are 49,683 references from 36,745 unique articles in our sample. The top referenced citations are ranked in Table 3.

The most cited study (Huselid, 1995) was referred to in 143 articles. It evaluates the links between high performance work practices and firm results. It also states that these practices have a statistically significant impact on the volume of sales, employee productivity, and financial performance, both in the short and long term. Huselid claims that increased training leads to sustained growth in productivity. Papers by Barney, MacDuffie, Delery, and Arthur follow the above-mentioned article in the ranking. Barney (1991) is a key reference since he is a key contributor to the development of the resource-based view, a theory that focuses on the firm's internal resources and capabilities. Barney asserts that resources which are scarce, valuable, hard to imitate, and hard to replace are the ones that provide sustained competitive advantages which lead to long-term company income. A detailed definition of resources and their characteristics were described in the mentioned article. Macduffie (1995) uses empirical research to evidence that applying a combination of high performance work practices such as recruiting, employment security, variable compensation, training, promotion, and quality systems implementation, positively influences company performance. Similarly, Delery and Doty (1996) show a positive relationship between employee in-company training and obtained returns, measured by ROA and ROE. The study also demonstrates that an increase in training is linked to better employee behavior indicators. Arthur (1994) conducted research that provides evidence of the positive impact of training on employee loyalty to the company, and his study shows that training diminishes employee turnover.

It is worth noting that the top ranked citations were published many years ago. In fact, only four of the top 35 were published after 2000, with most of them having been written during the "building stage" defined in our analysis. Accordingly, recent articles tend to suffer from a lack of citations, although if they explore new areas and receive

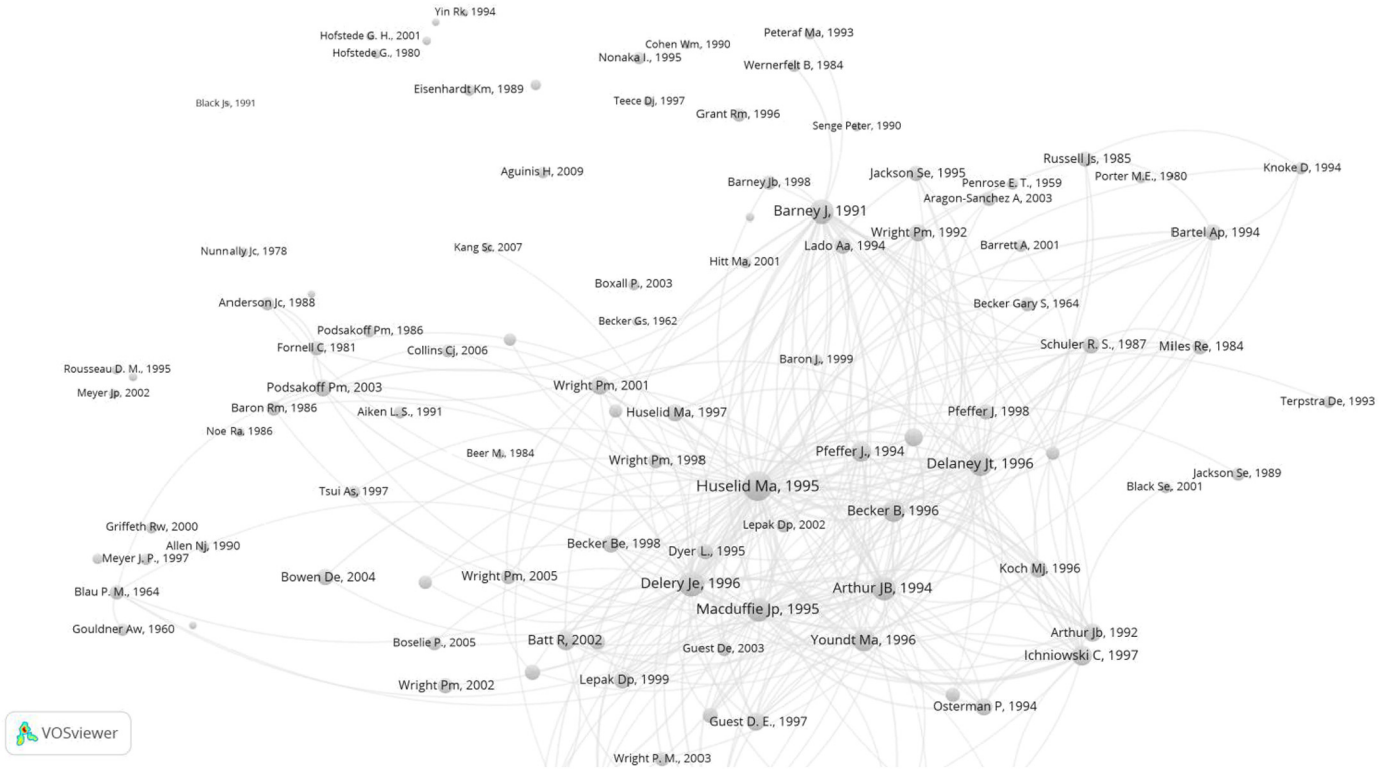


**Fig. 5.** Co-citation. Map of cited references.

frequent citations, it might be a sign they are beginning to be considered relevant contributions. Such is the case with Aguinis & Kraiger, (2009).

As regards co-citation analysis for the cited references, we analyzed articles cited at least 20 times (66) in order to pinpoint the core foundation that provides the intellectual structure supporting research on the topic. A co-citation map for references (Fig. 5) helps visualize the results.

We performed principal component analysis to study the network of co-cited references in Fig. 5. Results show how three factors explain over 96% of variance, enabling us to consider them as the axes that shape the focus of the literature. For this purpose, we took into account studies with higher loadings in each of the components.

The first component includes studies from Barney, Jackson, Gerhart, Dyer, Becker, Koch, and Combs. Their articles seek to provide a grounding for the relationship between human resources and performance, based on generating competitive advantage. There is, therefore, a framework for analyzing competitive strategy (Porter, 1980), where human resources are a key factor in generating competitive advantages (Barney & Wright, 1998). Based on this, and occasionally determined by external factors (Jackson & Schuler, 1995), human resource strategies may be designed to obtain firms' results (Dyer & Reeves, 1995), through practices (Koch & McGrath, 1996) or by offering a link between human resources and their outcomes (Becker & Gerhart, 1996; Ulrich, 1997). In this context, human resources and performance relationship can be measured (Combs, Liu, Hall, & Ketchen, 2006; Eisenhardt, 1989; Gerhart, Wright, McMahan, & Snell, 2000). This factor also contains a review of the research on this rationale as well as managerial implications (Becker & Huselid, 1998).

The second component relates training to outcomes and to antecedents or the underlying rationales that support it. Formal and informal training is studied in the context of manufacturing industries in the US as a key element vis-à-vis enhancing workforce skills and, as a result, plant performance (Appelbaum, Bailey, Berg, Kalleberg, & Bailey, 2000). The study by Aguinis and Krager reviews the literature on training and development from a multidisciplinary perspective (Aguinis & Kraiger, 2009). Training motivation meta-analysis provides the basis for research that examines elements which affect training or its results in terms of performance (Colquitt, LePine, & Noe, 2000). Many studies support methods for carrying out research that is applied to organizational behavior (Nunnally, 1978), the need to generate human capital (Becker, 1964), and how investing in human capital may have a positive impact positive on productivity (Black & Lynch, 1996, 2001), where management decisions such as a buy-out can help these practices (Bruining, Boselie, Wright, & Bacon, 2005).

The third component frames the relationship between HR practices and their outcomes in the strategic context, under the resource dependence theory. Human capital in general, and training in particular, are presented as a source of competitive advantage (Barney, 1991) and play a key role in the strategic management of human resources (Wright, Dunford, & Snell, 2001). Although the literature points to a positive effect of HR practices, certain authors advocate taking a close look at causal relationships (Wright, Gardner, Moynihan, & Allen, 2005).

### 4.6. Topics on human resources training

The authors of the research papers in our sample used 3562 different keywords to classify their studies. Fig. 6 shows the 210 terms referred to as keywords at least nine times. The size of the nodes in the map is used to reflect the weight of each word. The closeness of words, as well as lines, indicates the strength of their relationship.

The first two keywords in the rank and in the co-occurrence data give the expected results, since they were among the selection criteria. The link to human capital and performance appears highly ranked, taken as such, as well as under words like “development.” The role played by development, knowledge management or job satisfaction as relevant study topics also proves relevant. It should be pointed out that this is consistent with the intellectual framework found, the most relevant authors, and the cited references on HR practices. As regards the

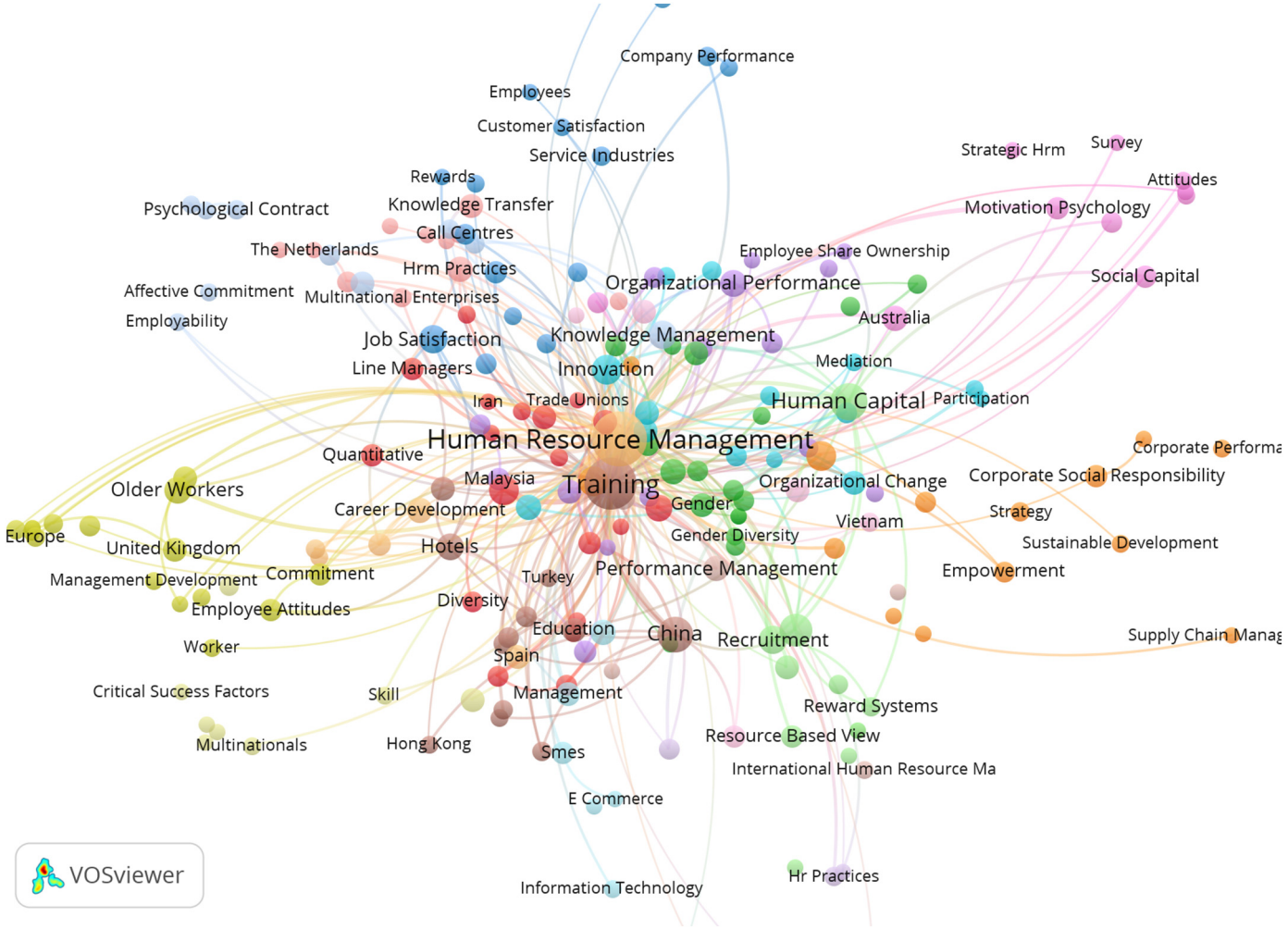


**Fig. 6.** Co-occurrence of keywords - map.

country of origin of many authors, other countries that are significant, after the US, are China, Spain, and Australia. With regard to industries, keywords from all of the articles show that the specific literature focuses on labor-intensive companies.

## 5. Conclusions

Through this study we show that human resources training is an established yet still challenging topic in business and management literature. Analysis of the articles published between 1975 and 2016 suggests there have been three stages in research on this topic: a seeding stage, covering the years from 1975 to 1993; a rapid growth period, between 1994 and 2006; and a development period from 2007 onward. This shape is common when research in a given topic or field is going through a development phase. As such, it provides sufficient grounding on which to construct new studies and, at the same time, affords researchers the opportunity to explore new topics or relationships and to even try out new frameworks. Once a certain topic reaches a stage that might be deemed settled, intellectual foundations provide a basis on which to build robust studies, targeting unexplored related topics.

We think that the concentration of the published studies around contributors based in the US has helped to delve more deeply into the topic, yet it has also pointed to possible directions for research through international cooperation. This kind of joint effort may enrich the results and open up new perspectives that are barely covered in just one focused geographic area.

Journals whose main topic is human resources account for the majority of the publications. Nevertheless, there are over 200 sources offering a wide range of perspectives. Publications from an array of disciplines, such as organizational behavior, psychology, strategy, or management in general, can therefore contribute, and can serve to provide a multidisciplinary approach to the subject matter in question.

In our study, we found that the most prolific authors approached the topic from different perspectives aligned with previous findings. Aguinis primarily offers a vision from the perspective of psychology, McPhail conducts research from the standpoint of human resources, Woods focuses on the hospitality field, De Saa-Perez on SME, and so on. Some authors published their studies in the hospitality field, which is consistent with the relevant presence of journals that focus particular attention on this area.

Analysis of the keywords used by the authors to identify their publications reveals strong links to human capital-related concepts, the constant aim of pursuing the relationship to performance, development, innovation, knowledge management, job satisfaction, and a lack of depth when studying most industries. These keywords accordingly reflect the findings on the main structuring of the cited references. This consistency suggests that research on the topic has been constructed along the right lines during the development process.

Articles by Huselid, Arthur, Barney, MacDuffie, Becker, Delaney, Write, Ichinoswki, Koch or Dyer build the core of the intellectual framework of human resources training over the observed period. Their studies help to establish a basis of cited references grounded on those approaches, exploring topics that range from the relation of human

resource management to performance or productivity, to the link to strategy, or the impact of industry on HR practices. The reference citations show that research on this topic is articulated around studies that highlight resource-based view approaches. Human capital also emerges as a relevant concept for grounding and relating studies. The results obtained when analyzing the components confirm these findings. Components show a clear interest in reflecting the link between human resources management and performance aimed at generating a competitive advantage. In this vein, training emerges as one of the key elements that may produce outcomes in terms of performance, and suggests that the contribution clearly fits into the positive effect of investing in human capital. The significant presence of references that provide an intellectual foundation based on the above-mentioned theory thus makes full sense.

This main stream in literature, approached from different angles such as the universalistic or contingency theories, has proved successful in explaining the positive relationship between human resources training and performance. Despite this, we found there to be much room for future development in other approaches, i.e. ethics or stakeholders, which are underrepresented in the development process of research into the topic.

### 5.1. Limitations and future research

Our study has certain limitations. Although we examined contributions for the whole study period, it may be helpful to perform the same type of analysis for each of the stages identified. This could provide a different perspective on the evolution of indicators and offer a different way to understand possible trends.

As regards the placement of cited references, it would be interesting to use accurate natural language programming, once it becomes available, in order to add meaningful results to these techniques.

Future research on human resources training could aim to fill some of the gaps we highlight. It would be interesting to gain further insights into a broader range of industries and to perform more analyses from an international perspective. Finally, we think that our contribution provides a resourceful foundation on which to develop meta-analyses on this topic.

## Declarations of interest

None.

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