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The Contribution of Knowledge Management to Human Resource Development: a Systematic and Integrative Literature Review

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Abstract

Knowledge management (KM) and human resource management (HRM) are closely related, since they both manage knowledge-based intangible assets that create and maintain a competitive advantage. In this research, we aim to show how KM contributes to human resource development (HRD) by systematically reviewing the empirical literature of the last 20 years (2000 to 2019). The results show that six KM processes contribute to seven dimensions of HRD to different degrees. KM contributes mostly to individual and professional HRD. The two most relevant KM processes in this relation are the creation and sharing of knowledge. The findings indicate an underuse of KM in technological, organizational, and social HRDs that should alert managers. The contribution of this study regards the identification of these seven dimensions of HRD and the effects that KM processes have on them. This contribution provides theoretical guidance on the relation between KM processes and HRD dimensions that leads to managerial implications for organizations.

Keywords Knowledge management · Knowledge management processes · Human resource development · Human resource development dimensions · Literature review

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Introduction

Knowledge management (KM) and human resource management (HRM) have some aspects in common; they both generate fundamental intangible assets (Rivera & Rivera, 2016) for an organization at a strategic level that strongly contribute to the creation and maintenance of a sustained competitive advantage (Andreeva & Kianto, 2011; Scurtu & Neamtu, 2015). The development of employees' skills is the responsibility of human resources that must moderate several shortages, such as knowledge gaps (Hurd, 2005). HRM practices such as training and development influence KM processes and pre-knowledge management behaviors (Jimenez-Jimenez & Sanz-Valle, 2013), like the motivation to share knowledge (Gagné et al., 2019).

The literature shows the relevancy of turning tacit knowledge into explicit knowledge and integrating it with conceptual knowledge and practical experience to support human resource development (HRD) (Slotte et al., 2004). Thus, there is a nexus between HRM and HRD (attracting and recruiting, motivating and retaining, and deploying) and KM (Horwitz et al., 2003), yet there is no study that addresses how KM contributes to HRD. Therefore, we want to fill that gap by exploring a conjoint review of both literatures. Thus, this research's aim is to analyze the body of empirical literature (Post et al., 2020) that reports on this phenomenon at the organizational level in order to gather evidence to show that KM contributes to HRD. This way we will be able to answer our research question: how does KM contribute to HRD in organizational contexts? We answer this question through the analysis of the scientific empirical literature that was published between 2000 and 2019 on the two topics. With this research we aim to solve the scientific problem of uncovering the different ways that KM process contribute to HRD.

By developing a literature review, we aim to gather evidence for the theory that KM contributes to HRD (Hardy & Clegg, 1997). Additionally, we offer a taxonomy that shows that the dimensions of HRD receive contributions from KM processes. Therefore, the goal of this study is not simply to uncover the contribution of KM to HRD, but to identify its significance and consequences by gaining a new understanding of the body of literature in question (Post et al., 2020). According to Webster and Watson (2002), analyzing other studies summarizes the components of a body of literature and offers guidance that shapes future studies.

Following Webster and Watson (2002), the aim of our study is to motivate future research to pursue the involved topics. In the study, we explain the review's contributions, describe the key concepts, delineate the boundaries of the research, review the relevant literature, develop a framework to guide future research, bridge the theoretical explanations and past empirical findings, and present conclusions for researchers and managers. Thus, we provide an exemplary and creative review article.

The reminder of the study is as follows: First, from a theoretical point of view, we frame the topics addressed in the study: KM and its processes, HRD and its dimensions, and the rationale that relates KM to HRD. Next, we explain the methodological options and procedures and follow them with data collection, analysis, and discussion. Finally, we present the study's conclusions and limitations as well as suggestions for future research.

Knowledge Management

Knowledge results from social interactions between individuals and organizations. It is a dynamic human process that is strongly related to the beliefs of individuals; hence, its origin and application relate to the human mind. Knowledge in the workplace can be understood as the ability of individuals and organizations to act and effectively contribute to the creation of valuable resources and assets (Scurtu & Neamtu, 2015). Knowledge is the central engine of economic and social growth that determines the evolution and longevity of an organization's success (Buckley & Carter, 2000; Stewart et al., 2000). KM is a relatively new scientific discipline (Scurtu & Neamtu, 2015; Serenko & Bontis, 2013). On the one hand, organizations launch KM initiatives in order to consolidate and exploit their knowledge assets to better compete in a dynamic and global business environment. On the other hand, researchers seek to better understand the nature of KM; its methods, technologies, processes, and results (Holsapple & Wu, 2008; Serenko & Bontis, 2013). As a result, KM is a critical field of study that is multidisciplinary in nature for both the academic community and for organizations. It serves to modernize business practices and to increase productivity, internal processes, and product quality as well as improve services (Holsapple & Wu, 2008; Serenko & Bontis, 2013).

KM involves a set of processes for the creation, dissemination, and leverage of knowledge that is assumed to be aligned with organizational objectives and to contribute to their achievement (Carrión et al., 2004; Curado et al., 2011; Xavier et al., 2012). Organizations that deal with knowledge-based businesses and services face a dilemma. On the one hand, they need to be open and receptive to external relations and effectively manage the exchange of knowledge between suppliers and customers. On the other hand, they need to protect the development and capitalization of their internal cognitive assets that in turn, constitute their main competitive resources (Bolisani et al., 2013). KM is supported by three elements: processes, technology, and people (Carrión et al., 2004; Curado et al., 2011; Edwards, 2008). Processes involve the creation, acquisition, sharing, storage, use, and the protection of knowledge (Huizing & Bouman, 2002; Navimipour & Charband, 2016; Rodgers et al., 2017; Serenko & Bontis, 2013). Technology refers to the software and hardware needed to support the processes mentioned above. People refer to employees, the organizational culture, and the establishment of individuals' roles and attitudes (Carrión et al., 2004; Curado et al., 2011). The relation among the three elements can be described in this way: people use technology, technology supports people, people help in the design and operation of the processes, the processes define the role and knowledge required by the people, people determine technological needs, and technology makes some processes possible (Curado et al., 2011; Edwards, 2008).

Knowledge Creation and Acquisition

Knowledge creation (KC) refers to the organizational ability to develop new and useful ideas and solutions related to various aspects of organizational activity,

from products to technological processes and to management practices (Andreeva & Kianto, 2011; Ichijo, 2002; Nonaka & Takeuchi, 1995). KC regards the act of making the knowledge created by individuals accessible by amplifying it in social contexts and selectively connecting it with the pre-existing knowledge in the organization (Nonaka & von Krogh, 2009). An organization can produce knowledge, for example, in different ways through internal research and development processes or through external sources like benchmarking by using networks, imitation practices, and outsourcing (Lyles, 2014; Zaim, 2006). Therefore, human resource practices are key factors in organizational KC (Collins, 2000). KC can occur deliberately and consciously by following specific methods and pursuing concrete objectives. However, it can also arise from "enlightened moments" in which new ways of thinking or a new idea are added to existing knowledge (Brix, 2014; Kao et al., 2011). When individuals become aware that knowledge has been created or improved, they may code it and develop it. Such practice makes knowledge less uncertain and more structured (von Krogh et al., 2012; O'Connor and Rice 2013; Brix, 2017). KC is promoted by the employee's skills, attitudes, and intellectual agility (Wee & Chua, 2013). Although knowledge creation and acquisition processes may seem to refer to the same phenomenon, the processes of creating and acquiring knowledge have different specificities. Knowledge acquisition (KA) is the process by which organizations obtain knowledge. KA may use external sources of knowledge, follow ways of proceeding in the context of the market, or address customer problems (Monteiro, 2016). In other words, KA refers to the appropriation of knowledge available outside the organization from customers, suppliers, and competitors (Andreeva & Kianto, 2011). Therefore, this process is often positively related to organizational results like innovation (Andreeva & Kianto, 2011; Monteiro, 2016).

Knowledge Storage

Knowledge storage (KST) refers to practices of archiving and structuring data and information (Donate & Sánchez de Pablo, 2015). KST conserves knowledge, selectively, in properly indexed and interconnected repositories that allow organizations to accumulate valuable knowledge assets over time (Ranjbarfard et al., 2014). Knowledge needs to be stored and documented; otherwise, the organization remains in constant danger of losing it (Andreeva & Kianto, 2011). The stock of stored organizational knowledge builds an organizational memory that is captured in written documents, electronic databases, coding systems, organizational processes, or in the minds of individuals (Andreeva & Kianto, 2011). Organizations may lose their innovation capability, creativity, and competitive advantage if knowledge is not easily accessible through an adequate type of storage (Andreeva & Kianto, 2011).

Knowledge Sharing

Knowledge sharing (KS) is the transfer and distribution of stored knowledge among individuals, groups, and organizations in different ways (Wang & Ko, 2012; Navimipour

& Charband, 2016). KS is a strategically important process for organizations, since it allows people to access the knowledge necessary to improve performance (Wang & Ko, 2012). Knowledge can be shared through structured means, for example, documents and formal or informal interpersonal interactions (Wang & Ko, 2012). KS involves the exchange of knowledge between individuals that allows the recipient to apply or reformulate the knowledge in a new context. The success of KS depends on the values, interests, and motivations of employees. Environments with high levels of trust, social interaction, proximity, and frequency of communication stimulate KS and the flow of intangible and cognitive resources (Wee & Chua, 2013). At the core of the KS lays the perception that knowledge must move continuously through the group or organization. Such drive generates interactions between individuals that allow the accumulation, reuse, and recombination of knowledge that generates potential individual and organizational benefits (Wang & Ko, 2012).

Knowledge Use

Knowledge use (KU) is the application of knowledge in a concrete action (Wee & Chua, 2013). This KM process places knowledge within operational contexts in a meaningful way (Oluikpe, 2015). The KU is influenced by the absorptive capacity of employees and is facilitated by their familiarity with the context. The purpose of KU is to promote the use of practices from past experiences and projects to reduce or eliminate duplication and similar errors (Wee & Chua, 2013). KU involves integrating the new knowledge into business processes and thus making it accessible to all individuals in the organization (Qasrawi et al., 2017). The productive KU translates into growing valuable and intangible assets that lead to an increase in performance (Rivera & Rivera, 2016).

Knowledge Protection

Knowledge protection (KP) is the possible approaches, methods, or tools used not only to protect the intangible assets from KU, but also to protect knowledge itself. This protection may involve formal (like copyrights, patents, or industrial property rights), semi-formal (like confidentiality contracts), or informal options (like restricted access to info, fast innovation cycles, or loyalty building among personnel) (Bolisani et al., 2013; Päällysaho & Kuusisto, 2011). The methods of KP are considered successful if they allow the organization to obtain an economic return on the investment made in the production of knowledge through research and development activities. KP strategies vary widely depending on the ability of organizations to apply them (de Faria & Sofka, 2010) and, therefore, this can be a difficult process (Elliott et al., 2016). As an example, in the case of legal protection methods, they may be less attractive to small organizations, since these are lengthy processes and require specific resources (e.g., specialized advice by lawyers) (de Faria & Sofka, 2010). With regard to less formal processes, KP can also depend on the specifics of the organization since knowledge resides in the minds of individuals,

and this characteristic in of itself can be a barrier to the effective implementation of KP (Elliott et al., 2016).

Human Resource Development

There are numerous definitions of HRD that, on the one hand, demonstrate the youth of this academic field and, on the other hand, the effort to establish a clearer view of the concept. Depending on the definition, the purpose and product of development can be different. In other words, it can refer to a development (e.g., individual or organizational), or it can refer to a behavioral change (e.g., achievement of certain organizational objectives or performance improvement). HRD follows training and development and reflects an alignment at the organizational and strategic levels (Han et al., 2017). In order to obtain an understanding that is as holistic as possible, HRD regards any process that is planned, systematic, or even unstructured within a timeframe and that has the potential to develop knowledge, specialization, productivity, or satisfaction that are related to the individual's work to obtain gains at the personal, group, organizational, community, national, or humanity level (Han et al., 2017; McLean & McLean, 2001).

HRD meets several purposes: (i) addressing change processes; (ii) facilitating learning, skills, and abilities related to the work of employees according to the specificities of each organization (Dirani, 2012; Richman, 2015; Stewart & Sambrook, 2012); (iii) improving individual behaviors; (iv) optimizing the production and use of labor forces; (v) disseminating knowledge through the development of people; and (vi) globally improving organizational performance (Alhalboosi, 2018). Therefore, all intentional activities that support behavioral changes and learning opportunities are HRD practices (Richman, 2015; Stewart & Sambrook, 2012).

HRD is associated with HRM and, therefore, we establish the common and distinct specificities of the two concepts, since they are usually confused by academics and communities in practice (Richman, 2015). HRM and HRD use learning processes to suppress practical knowledge needs in the organizational context (Richman, 2015). HRD involves organizational development, career development, and personnel development (Alhalboosi, 2018), and addresses issues at the personal level (employability, diversity, and allocation of resources according to different needs); learning at the organizational level (adequacy between existing and necessary skills, programs and curricula, learning strategies, and availability of trainers and infrastructures); managing organizational performance (maintaining and improving service quality, defining standards, information management systems, and other management practices); and working conditions at the organizational level (recruitment and selection, job description and workload, promotions and career mobility, and incentives and payment systems).

Consequently, HRD is the connecting tie among several management functions and contributes in an integrative way to numerous forms of development. By improving the employees' capabilities, knowledge, and skills, HRD increases the individual's productivity; such improvements have a direct effect on economic and

social development. Developing human resources in an integrated and holistic way means designing actions with defined purposes to expand the level of competencies, maximize opportunities, and consequently benefit society as a whole (Singh, 2016).

Knowledge Management and Human Resource Development

KM is a critical field of study that affects both the academic community and organizations. For organizations, this process facilitates the modernization of internal processes and improvements in the quality of products and services (Holsapple & Wu, 2008; Serenko & Bontis, 2013). Svetlik and Costea (2007) associate KM with HRM and argue that the most challenging problem for understanding and advancing KM is giving priority to human factors. Individuals are the core concern of HRM and HRD (Richman, 2015). HRD in particular may use KM practices and processes to benefit performance related issues (Parise, 2007). The relation between KM and HRD reflects reciprocity and complementarity to the extent that HRD practices generate knowledge, especially when teams of multiple skills are involved, and KM, through its processes, provides the HRD with support for the human interaction necessary for development (Figueiredo & Cardoso, 2012).

The concepts of knowledge and skills are closely associated (Kimble et al., 2016). Knowledge about how tasks should be performed is often framed in the organization's routines, social norms, and culture. Competences are the practical result of both individual and collective knowledge. Competencies represent knowledge, skills, and behaviors that can be used to predict future performance (Kimble et al., 2016). Rabeh et al. (2013) state that competences are related to specific domains of knowledge. Thanurjan and Seneviratne (2009) categorize the sources of knowledge as those internal and those external to the organization. Thus, the development of competencies is a source of internal knowledge.

Core competencies are intermediate types of organizational knowledge. Organizational competencies include the application of knowledge in the form of specific operating capabilities. In addition, competencies constitute a type of corporate know-how in which these skills represent the application of knowledge; organizational skills allow the creation of extraordinarily valuable products and services that, consequently, result in a competitive advantage (Edgar & Lockwood, 2007). The relation between KM and core competencies gives support to the idea that KM is the primary force behind all competencies and capabilities. KM strategies and structures influence the acquisition of core competencies through KM processes (Shaabani et al., 2012). Wong and Aspinwall (2005) create a list of 11 factors critical for the success of KM initiatives to show that training and development and HRM occupy the sixth and seventh places, respectively. These placements are evidence of the positive relation between the KM processes and HRD. Migdadi (2009) concludes that HRD is one of the most common indicators of KM results in SMEs. According to Yahya and Goh (2002), KM is an evolved form of HRM, and in turn HRD is responsible for building learning and knowledge organizations. Similarly, Migdadi (2009) considers HRM to be a critical success factor in the implementation of KM initiatives that lead to HRD.

Jeung et al. (2011) identify how HRD contributes to the knowledge bases of the social sciences by identifying three themes central to HRD: training transfer and evaluation, organizational learning, and creating and sharing knowledge. Training transfer and evaluation are organizational issues that involve internal systems. Organizational learning encompasses learning about the organization's culture, modeling behaviors, and characteristics as well as facilitating the learning processes. Finally, creating and sharing knowledge take place among workers. This study shows how HRD is closely related to the processes of creating and sharing knowledge through its interaction with other disciplines.

Method

A literature review is an essential aspect of academic research (Xiao & Watson, 2017). This type of review is particularly useful for integrating studies on emerging themes (Jabbour, 2013). The advancement of knowledge must be built on previous work (Xiao & Watson, 2017). Through a relevant literature review, the breadth and depth of the work on a topic can be explored and understood, and gaps can be identified (Xiao & Watson, 2017). The literature review also allows for the evaluation of the validity and quality of the work or, on the contrary, to reveal weaknesses, inconsistencies, and contradictions (Paré et al., 2015; Xiao & Watson, 2017). Like empirical investigations, a literature review must be valid and reliable (Xiao & Watson, 2017).

In this study, we develop a systematic literature review on two topics: KM and HRD. Following Snyder (2019), our purpose is to synthesize and compare evidence on the literature combining both topics; our research question is specific and address the two topics; we adopt a systematic search strategy; we chose empirical papers as a characteristic for sample inclusion; we present a quantitative analysis and evaluation of the literature, although we complemented it with a qualitative content analysis, and finally, we contribute with evidence on showing the relevancy of the relationship among the two topics and answer our research question.

In order to guarantee methodological transparency in the research process (Denyer & Tranfield, 2009), we provide a comprehensive, state-of-the-art review of the contribution of KM processes to HRD. This review is theoretically driven and builds its contribution through a synthesis of the covered literature (Torraco, 2016). We perform a systematic review to provide stronger results. A systematic literature review contributes to achieving credible interpretations of the data (Gioia et al., 2012; Harrison & Rouse, 2014) and to generating a convincing new theoretical contribution (Gioia & Pitre, 1990). It involves the collection, treatment, and quantitative analysis of the literature (Verbeek et al., 2002), and thus, it identifies what has been done in a specific scientific domain (Petticrew & Roberts, 2006), such as the contribution of KM processes to HRD.

We follow a three-step method to conduct our review (Tranfield et al., 2003). First, we planned the review. We focused on studies that had been published on the combined topics. We then developed the rationale for and structure of the review

that was followed by creating a protocol for a comprehensive method in which we listed the sequential procedures and defined the control moments.

Second, we conducted the review. We followed the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines (Moher et al., 2009) by (a) identifying papers in databases for the pre-established time horizon by using meaningful keywords; (b) screening of the identified papers to ensure they were empirical, scientific, and peer-reviewed studies that flowed from all the pre-defined filters in the initial search; (c) screening the papers to guarantee eligibility with respect to the pre-established criteria of addressing both topics (KM and HRD); and (d) including the selected papers after going through the previous three steps and excluding those that did not comply entirely with the domain and limits of the study. Third, we disseminated our findings.

Data Collection, Analysis, and Discussion

We carried out an analysis of the literature produced between the years 2000 and 2019 on the aforementioned themes. We used the bibliographic database Online Knowledge Library (B-ON) because it brings together a wide range of publishers of international scientific journals and due to its ease of access and use. Data collection was done in December 2019. In order to obtain the articles necessary for the investigation, we used seven combinations of keywords that are appropriate for our objective: knowledge management and human resource development, knowledge creation and human resource development, knowledge acquisition and human resource development, knowledge sharing and human resource development, knowledge storage and human resource development, knowledge use and human resource development, and knowledge protection and human resource development. These were matched to the subjects available in the database.

Filters were used to restrict the areas of knowledge to Social and Human Sciences and Economics. We only considered articles whose full texts were available in the Library's collection and were peer reviewed papers written in English. Furthermore, they had to have been published between 2000 and 2019. Next, we used the advanced search service to select only empirical articles and case studies. Following the PRISMA guidelines (Moher et al., 2009), we excluded the papers that did not comply entirely with the domain and limits of the study. Thus, we eliminated theoretical articles, articles that were not written in English, repeated articles, and articles whose theme did not fall within the scope of this study. Our preliminary sample contained 234 articles.

The collected articles were numbered from the oldest to the most recent and organized by author, journal, industry, organizational size, geographical location, content analysis, and other pertinent observations. Each of the articles was read in full. We reduced our initial sample due to misclassifications in the database: 65 were not empirical articles, 12 were not written in English, 76 were repeat versions, and 34 did not fit the themes under study. Thus, 47 analyzable articles (see Appendix) were included in the study, and they showed a growing trend in publication as presented in Fig. 1.

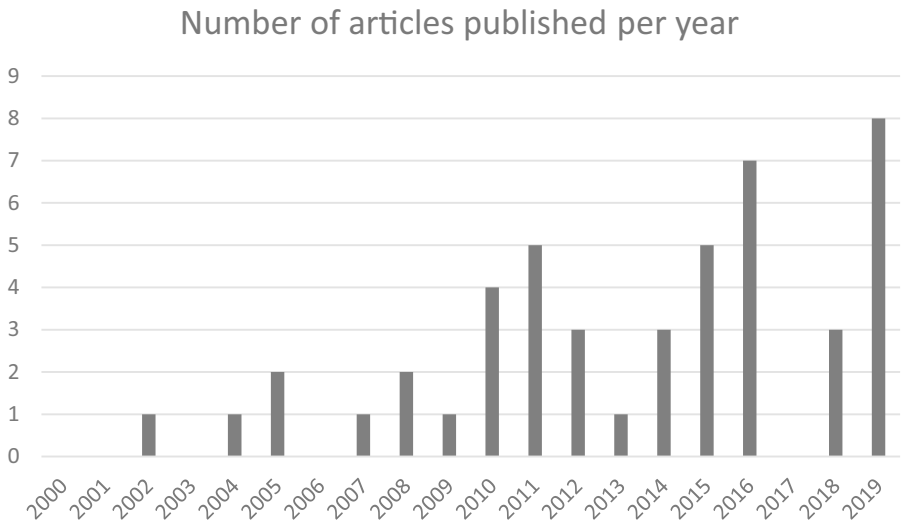

Fig. 1 Distribution of articles over the period in analysis

The most representative journals among the classified articles were *Economics & Management*, *Economic Science*, and *Amfiteatru Economic*, considering each of these journals had three articles. They were followed by *Sustainability*, *Health Policy Planning*, *Journal of Cleaner Production*, *European Planning Studies*, *Economic Science Series*, and *International Journal of Production Economics* that had two articles each in the database. The remainder only had one article. With regard

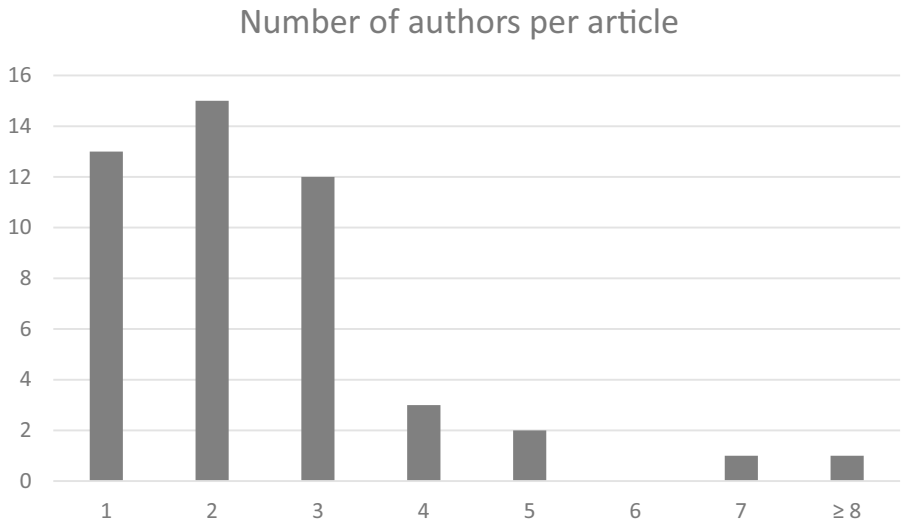

Fig. 2 Distribution of articles according to the number of authors

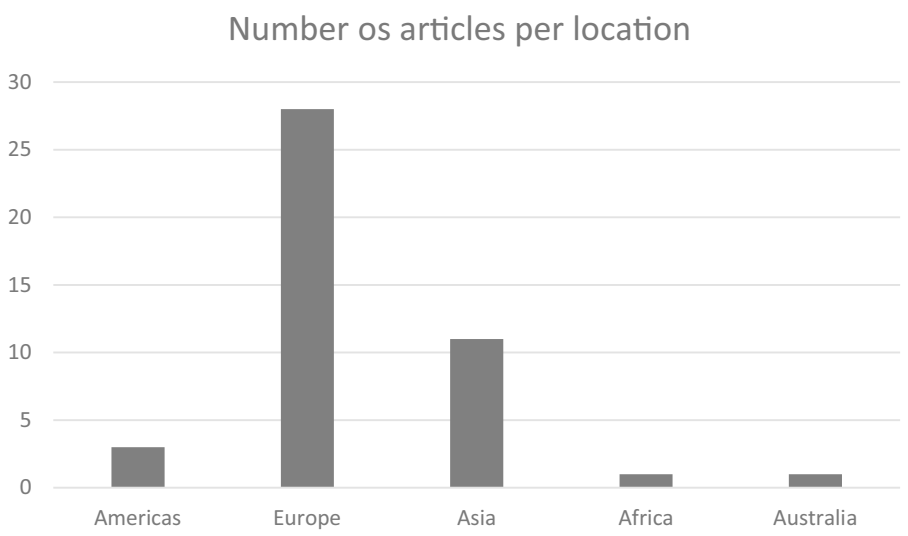

Fig. 3 Distribution of articles according to the location where their studies were conducted

to the number of authors per article, the articles were predominantly written by two authors, as can be seen in Fig. 2. This evidence is in line with the results obtained in the study carried out by Curado et al. (2011) who investigated patterns of authorship and content in the KM literature. Our results reflect a similar pattern and indicate the need for interaction among researchers in order to produce relevant results and, consequently, the maturation of the KM research field itself.

Regarding the size of the organizations, there were no conclusive results since more than 79% of the articles (37 articles) did not specify their size (see Appendix). In terms of the geographical location of the studies (Fig. 3), Europe is the continent with the highest number: 28 articles. Eleven out of these 28 studies were carried out in Romania. This number may be due to the Sectoral Operational Program Human Resource Development (SOPHRD) by the Ministry of Labor of the Romanian government that promoted economic development from 2007 to 2013. The priority of this program was to invest in education and development to support the growth and development of a knowledge-based society.

Please note that the total number of articles shown in Fig. 3 exceeds the total number of articles in this study, since there are some articles where the addressed phenomena were studied in more than one continent. Regarding the number of articles by industry, the three most representative sectors were, respectively: services (11 articles); education, training, and development, (10 articles); and manufacturing (5 articles.) Again, the number of articles in Table 1 exceeds the total number of articles in this study due to the existence of articles that involve more than one industry.

Service organizations are considered to be knowledge organizations, while there are business areas that are more or less knowledge intensive (Zieba, 2013). Our results agree with the conclusions reported by the OECD in 2003 (OECD, 2003) about KM practices in ministries, departments, and other agencies of the central government in

Table 1 Number of articles according to the industry addressed the study

Industry	Number of articles
Services	11
Education and training	10
Manufacture	5
High-tech industries	4
Public administration	3
Nonavailable info	3
Healthcare	3
Biotechnology	2
Energy	2
Agricultural industry	2
Tourism	2
Construction	1
Finance	1
Automobile industry	1
Environmental protection industries	1
Retail	1
Telecommunications	1
Information and communication technologies	1

the OECD member states. The OECD report stresses that KM is increasingly important for the services industry for both public and private organizations. Simultaneously, this type of organization faces new challenges created by the specificities of a knowledge-based economy. Our analysis shows that the most used KM processes in the services sector are KC and KU. These findings are consistent with Hipp's (1999) contribution over 20 years ago in which knowledge-intensive service organizations are intermediaries between those who create knowledge and those who use it.

Education and training involve a systematic approach that presupposes the development and improvement of capacities, skills, and knowledge to improve the overall effectiveness of the organization. In addition, this is an activity often associated with HRM whose KM processes are constantly explored through learning tasks (Fletcher et al., 2016). Education and training provide formal professional activities or other initiatives that allow organizations to prepare and develop their employees (Dirani, 2012). These practices are considered successful when the acquired knowledge is effectively transferred, usually through KS (Dirani, 2012; Rahman et al., 2013). KC and KS are the most referenced KM processes in this industry and are clearly related to learning and converting the associated knowledge into valuable assets for individuals, teams, and the organization (Dirani, 2012).

Manufacturing companies have gradually recognized the importance of KM practices and the need to align them with organizational strategy (Mageswari & Sivasubramanian, 2012). Articles that report on this industry present KS as the most applied process. Such evidence is consistent with Tao et al. (2017) who report that in the previous 20 years,

the manufacturing industry has invested in socialization processes that prioritize KS, corporate collaboration, and the active participation of operators to generate value. Furthermore, when considering all industries, KP is the least mentioned KM process in the articles. This paradoxical result may be due to the paradigm shift referred to above, or on the other hand, to the specificities of the business or the type of goods produced.

Most articles on the KM contribution to HRD do not address a single KM process; on the contrary, they address several processes at once. However, the most used process that contributes to HRD is KC. This result is similar to the conclusions by Jeung et al. (2011) who report that KC is highly related to HRD. Furthermore, a content analysis of the articles on the contribution of KM processes to HRD indicates different dimensions of HRD. Similar to Akbari et al. (2015), we suggest that HRD involves several dimensions. Our results point to the existence of seven dimensions (Table 2) that cover internal and external beneficiaries of HRD: professional, individual, organizational, economic, environmental, social, and technological. While Akbari et al. (2015) propose only five: professional, personal, organizational, socio-cultural, and educational. However, their HRD approach focused on internal stakeholders.

According to Table 2, the reviewed articles show that the KM processes contribute predominantly to individual and professional development. Consequently, we conclude that the benefits of KM are underutilized at the organizational as well as the economic, social, environmental, and technological levels. Similarly, Bhojaraju (2005) states that most of the time, knowledge resides within organizations in an unclear and "out of sight" way and therefore is undervalued and underused. Although organizations are aware of the challenges of implementing KM processes, they do not know how to face them and end up harming their use of knowledge assets (Bhojaraju, 2005). The lack of knowledge on the part of organizations on how to overcome these barriers makes the goals of KM difficult to achieve, negatively affects organizational performance, and can discourage the latter from investing in knowledge-based practices (Chatterjee, 2014). If organizations themselves are underutilizing the potential of KM, it seems natural that other dimensions of social life do not recognize its benefits. Thus, although there is theoretical awareness of the need for KM, its effective implementation is still below its potential.

Discussion and Conclusions

KM processes and HRD have a reciprocal relation. In other words, HR is the only critical resource capable of supporting KM processes, and it is KM itself, through the supply and exploitation of its processes, that allows HR managers to understand the fundamentals and needs of its initiatives and activities, in particular, HRD (Figueiredo & Cardoso, 2012; Parise, 2007; Svetlik & Costea, 2007). The analyses of the articles led to the segmentation of HRD into seven dimensions: individual, professional, organizational, economic, social, environmental, and technological developments.

Professional development (PD) is designed to provide the employees with the necessary skills and techniques, or to improve the existing ones, for the full performance of their professional work. This dimension of HRD involves the planned reinforcement of personal strengths and talents that places them in the service of a given profession.

Table 2 Articles addressing each HRD dimension

HRD dimension	Article's ID	Number of articles
Professional	2, 3, 5, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 18, 20, 21, 22, 23, 24, 25, 26, 29, 30, 31, 32, 34, 35, 37, 38, 39, 42, 43, 47	33
Individual	1, 2, 3, 5, 6, 7, 10, 11, 12, 13, 14, 15, 16, 20, 21, 22, 23, 24, 29, 30, 31, 32, 33, 34, 36, 37, 38, 39, 40, 41, 43, 47	32
Organizational	1, 2, 3, 4, 6, 9, 11, 12, 14, 16, 17, 20, 22, 23, 25, 28, 29, 30, 31, 32, 36, 37, 39, 42	24
Economic	4, 8, 12, 13, 16, 19, 27, 33, 34, 36, 37, 40, 41, 42, 44, 46, 47	17
Environmental	13, 29, 37, 41, 43, 44, 45, 46	8
Social	13, 19, 27, 29, 37, 44, 46	7
Technological	4, 8	2

This interest in developing the individual as a professional aims to achieve later goals in terms of productivity and organizational performance (Smith & Kritsonis, 2006). In this study, 33 articles (70%) mention PD and find that this dimension is influenced the most by the KM processes. As an example, article number 3 presents research aimed at determining the necessary skills of recently recruited employees in public recreational parks. The development of such skills is the responsibility of HRD. HRD is aligned with the vision, mission, and policies of the organization, while eliminating knowledge and skills gaps (Hurd, 2005). In this article, the author mentions that the employee's competencies determine how successful he or she can be in the exercise of the job that in of itself, requires the use of KM processes. In this context, the KM process that most contributes to this dimension of development is clearly knowledge creation (in 22% of the articles that mention PD). This evidence may be related to the definition of PD itself, since it requires the constant creation and renewal of the skills needed for work (Gümüsay & Bohné, 2018).

Individual development (ID) seeks to create, improve, or increase specific and intrinsic skills to a given individual. ID generates competencies that are the result of the employee's effort and are strongly influenced by his or her experiences, education, and social environment (Gümüsay & Bohné, 2018). ID is present in all aspects of HRD and levels: work, social, personal, or cultural level (Akbari et al., 2015). In this study 32 articles (68%) mention ID as a component of HRD. As an example, the authors of article number 40 argue that it is critical to recognize the context in which each individual operates (Oort and Bosma, 2013). Additionally, they demonstrate that the individual level is the most relevant for resource exploitation processes and that individuals should be the focus of the analysis when it comes to issues related to development, because they are the ones who carry out economic activities capable of generating value. Therefore, the KM process that most contributes to this dimension of HRD is KS (in 24% of articles mentioning ID). Moreover, article number 5 highlights KS as one of the KM processes that contributes the most to ID based on human "face-to-face" contact that helps employees to share tacit knowledge (Mládková, 2007). The author stresses that this tool can be used to fill intellectual and emotional needs and that when used by HR professionals, allows for the development of skills and competencies necessary for the exercise of a given job function. For this reason, article number 5 also supports professional development.

Organizational development (OD) regards the process of collection, diagnosis, action, planning, and intervention in the entire organizational system with the objective of aligning the strategies for structures, processes, cultures, and people (Osland et al., 2015). OD promotes self-renewal, change, and improvement in a given organization. In this study, 24 articles (51%) mention OD. The KM process that contributes the most to OD is knowledge creation (in 25% of articles mentioning OD). KC often appears within the scope of OD and is associated with innovation. As an example, article number 40 argues that the ability to create efficient knowledge determines economic and organizational sustainability. There is a positive relation between KC practices (e.g., research and development) and organizational performance, in particular with regard to innovation (Hu et al., 2005). Furthermore, article number 22 shows that business organizations cannot achieve sustained competitive advantage if KM is not framed in their global strategy. According to the reported study, in order to

achieve OD and, consequently, sustained competitive advantage, a firm must focus on KS through multidisciplinary work teams, and KC through the creation of innovative concepts and new products. The authors also add that OD is the responsibility of all elements of the hierarchical structure (Scurtu & Neamtu, 2015). As a result, we have evidence that supports the idea that OD is associated with KC and KS.

Economic development (EcoD) concerns the process of transformation by which economic actors, such as nations, organizations, or even workers, move from activities of lesser value to activities of greater integrated and added value. Therefore, EcoD deals not only with the ability to make processes, products, functions, and production chains more efficient and effective, but also makes people more capable and competent (Wicaksono et al., 2019). It is also through EcoD that the production and distribution of goods and resources are expected to become more aware and responsible in order to turn emerging economies into advanced economies. In this study, 17 articles (36%) mention that EcoD is associated with HRD. The KM process that contributes the most to this dimension of HRD is KC (in 26% of articles mentioning EcoD).

Environmental development (EnvD) is a process that considers all the components of the Earth (air, water, soils, fauna, and flora) and acknowledges the needs of present and future generations by fully understanding the specifics of the environment and protecting it in a socially responsible way. EnvD is within the scope of HRD and KM due to the articulation it requires between several disciplines, namely, natural sciences, social sciences, engineering, and management, to face environmental challenges (Sauvé et al., 2016). In this study, only eight articles (17%) mention that EnvD is associated with HRD. The KM process that contributes the most to EncD is KA (in 29% of articles mentioning EnvD). Illustrative examples are article number 41 that proposes that the accumulation and application of knowledge is fundamental for the sustainability of natural resources (Bobylev et al., 2015) and article number 13 that establishes the relevancy of training for environmental protection (Nadrag & Mitran, 2011).

Social development (SD) relates to the constant improvement in the quality of life, that is, social well-being, work and health conditions, as well as access to development opportunities. SD involves increasing support to families and communities (Wicaksono et al., 2019). In this study, SD is associated with HRD in only seven articles (15%). For example, article number 19 finds that SD is connected to KS and fund management in the EU, specifically within the scope of the SOPHRD in Romania (Bud & Nistor, 2015). One of the five priority issues of the program concerns the development and more efficient use of human capital. The authors conclude that KS in the context of EU-funded projects is essential to achieve sustainable development and to increase productivity, innovation, and competitiveness to create new jobs and to provide support for social progress. The study concludes that creating and sharing knowledge optimize and make efficient the use of European funds that in turn results in social cohesion. The KM process that contributes the most to SD is KS (in 27% of articles mentioning SD).

Technological development (TD) regards the constant research and investigation that integrate scientific, technical, economic, and commercial aspects to achieve specific organizational or business objectives. TD has played a central role in transforming the economy and society and affects both the structures and strategies of organizations. Putting TD into practice requires transformation, training, and knowledge maintenance (Gölpek, 2015). In this study, only three articles (6%) link TD occurs to

HRD. It is surprising that such a low percentage of articles mention TD since technology is a pillar of KM (Edwards, 2008). As an example, article number 8 establishes that nuclear technology is the product of the integration of several knowledge sources coming from intensive research, development, and experience activities (Choi et al., 2009). On the other hand, Ling et al. (2008) argue that although it has a significant effect on the creation of sustained competitive advantage, it is not the technology that makes KM work. Additionally, an excess of technology can overload employees and hinder processes, which is in line with Yahya and Goh's conclusions (2002) on the need for a more appropriate view of technologies, so that they are correctly positioned in favor of KM. In other words, the creation of motivation and a favorable environment for the exploitation of KM processes is also necessary, since it determines the real use of technology. Without this environment, technological development is compromised. There are only three KM processes associated with TD: KC, KS, and KU. There are just two articles that address the three KM processes involved with TD.

Consistent with Argote et al. (2003), KC and KS are the most frequent KM processes associated with HRD. On the other hand, KP has little relevance within the scope of all HRD dimensions. The various dimensions of HRD should not be addressed individually, but rather in articulation that reaches the full potential of HRD. Breaking down HRD into several dimensions allows for the structuring and better understanding of the multiple aspects associated with the phenomenon. The prioritizing of each dimension of HRD and the KM processes depends on the industry, location, and the objectives of each organization (Canals, 2014; Swarnalatha & Tephillah, 2014). Figure 4 displays the percentage of articles that are associated with the different HRD dimensions and the listed KM processes.

Conclusions, Limitations, and Future Work

Our study adds to the literature on the contribution of KM processes to HRD. The results show that different KM processes contribute to several dimensions of HRD at different levels. KM contributes mostly to professional and individual dimensions of HRD. The two most relevant KM processes in this relation are KC and KS. Our findings show KM is underused in favor of technological, environmental, and social HRD.

We find evidence to support the central assumption of this study that KM contributes to HRD. We were able to propose a new theoretical approach to HRD and present seven HRD dimensions that show the multiple aspects of the phenomenon. Additionally, we addressed six KM processes and associated them to seven dimensions of HRD, which illustrate the complex contribution of KM to HRD. This contribution provides theoretical guidance on the relation between KM processes and HRD dimensions.

Our study identifies the fragilities in the use of KM processes. KM mostly contributes to individual and professional HRD. However, this dimension of HRD resides in the minds of individuals, and at any time they may abandon the organization and take valuable knowledge assets with them (Bhojaraju, 2005; Chatterjee, 2014). Additionally, at a time when sustainability issues are so highly valued, KM processes should not have such a low contribution to environmental HRD. Therefore, managers should encourage employees to share

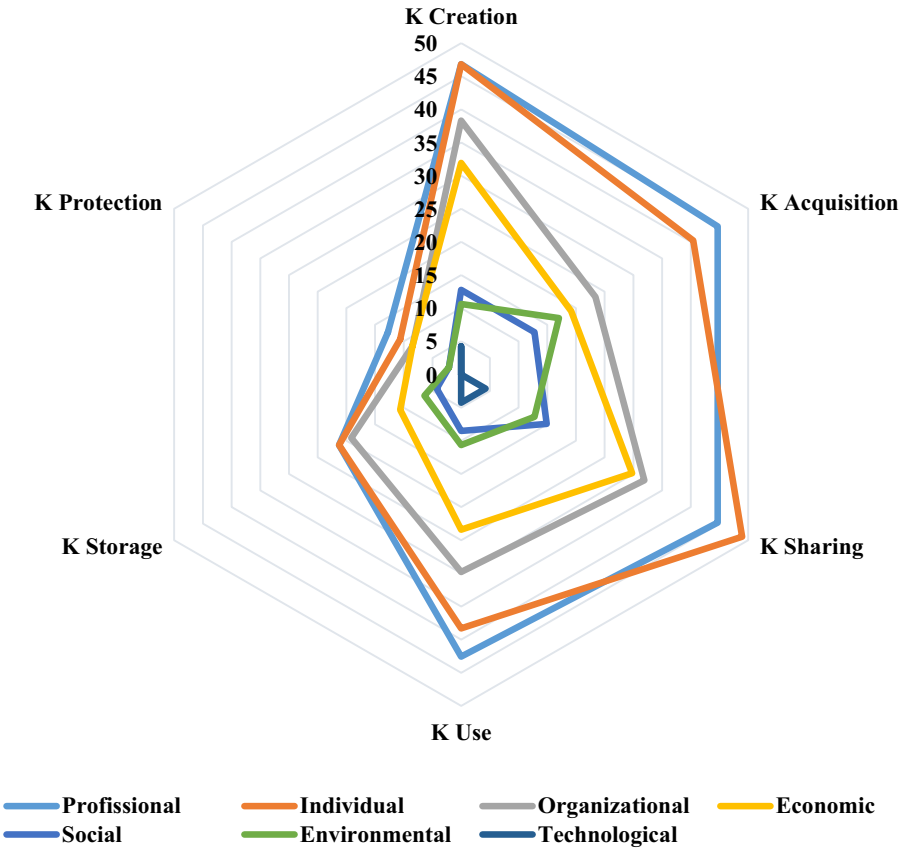

Fig. 4 Percentage of articles with KM processes contributing to HRD dimensions

information and ideas so that there is a constant inflow of knowledge (Wang et al., 2012) to contribute more clearly to the different HRD dimensions identified in the literature.

This review respects the requirement to advance both theory and debate (Gatrell & Breslin, 2017). The present investigation emerged from the assumption in the literature (Post et al., 2020) that HRD and KM are areas of multidisciplinary activity that overlap (Svetlik & Costea, 2007). Based on this inference, we focused on how KM contributes to different HRD dimensions. We advanced theory by supporting an original approach to HRD. We gathered evidence in support of HRD having seven dimensions: individual, professional, organizational, social, economic, environmental, and technological. Such results show a broader perspective of HRD as introduced by Singh (2016). HRD expands the qualification of professionals, and it gives a holistic perspective that includes individual, organizational, economic, social, technological, and even environmental aspects (Bobylev et al., 2015; Han et al., 2017; McLean & McLean, 2001; Singh, 2016). Richman (2015) introduced this comprehensive approach when arguing that political, social, and environmental influences determine the focus of HRD. We believe our results further contribute to establishing an enlarged HRD framework that involves multiple dimensions.

This research generates debate since it shows that KM contributes to the different dimensions of HRD. Although such a contribution is in line with previous works (e.g., Migdadi, 2009), we use a systematic literature review that covers 20 years to uncover the different KM processes that are associated with the different dimensions of HRD. We also consider the relation among subcategories of both phenomena. In order to achieve a successful HRD beyond knowing which KM processes are important to each dimension of HRD, it is necessary to recognize the way in which each KM process is preformed (Brajer-Marczak, 2016). Yet, there are paradoxical results that constitute motives for further research. For example, we agree with Loureiro et al. (2018) who warn about the gap in the existing bibliographic production on KP and the fragmented way in which it is addressed (Fig. 4 displays a clear gap). Specifically, when considering technological HRD, we find no evidence of its association with KP.

One of the conclusions of this study relates to the underutilization of KM, especially at the organizational level of HRD. Again, our results are consistent with earlier studies (e.g., Bhojaraju, 2005) and indicate that organizations do not know how to face the challenges imposed by KM and, as a consequence, this lack of knowledge compromises organizational development. According to our analysis, more than a decade later, this problem still exists; KM should involve a holistic and multidisciplinary approach to managing processes.

The managerial implications that emerge from our findings are that HR managers and KM managers should develop a close relationship that would benefit both functional areas. Our study shows KM managers that they can contribute to HRD dimensions, namely with the support from KC and KS. Additionally, this study points to a lesser use of KM in support of technological, organizational, and social HRD; thus, KM managers could focus on enlarging such contributions. Considering the three pillars of KM—technology, processes, and people (Curado et al., 2011)—managers could explore them to directly contribute to technological, organizational, and social HRD, respectively

HRM managers should be aware that HRD involves seven dimensions according to our results. Moreover, HRM managers should give more emphasis to the underdeveloped social, organizational, and technological dimensions of HRD. Additionally, such effort would contribute to the support of the three pillars of KM, respectively people, processes, and technology (Curado et al., 2011).

Our aim is that our recommendations are useful for both academics and practitioners. The researchers may follow our suggestions and fill the remaining gaps in the literature. This work presents some limitations that emerge from the filters chosen to guide the literature review: keywords, the B-ON database, the period. The typology of the KM processes that we followed in the study may also have conditioned the research. Future longitudinal studies may help to understand whether there are any sequential or causal relations between the various dimensions of HRD identified here. Furthermore, confirmatory research that uses quantitative methods, namely hypothesis testing, would be of great interest. Such studies could test the relations between the KM processes and each dimension of HRD. Finally, after this study it would be exciting to replicate the research by considering the contribution of other disciplines to HRD.

Appendix

List of papers in the systematic literature review

Paper code	Year	Author(s)	Journal	Industry	Firm size	Study's location
1	2002	Kylaheiko, Sandstrom and Virkkunen	International Journal of Production Economics	Biotechnology and Information and communication technologies	NA	NA
2	2004	Mann, Pritchard and Rummery	Public Management Review	Healthcare	NA	UK (Europe)
3	2005	Hurd	Journal of Park and Recreation Administration	Services	NA	Midwestern USA (North America)
4	2005	Hu, Lin and Chang	Urban Studies	High-tech industries	NA	Hsinchu, Taiwan (Asia)
5	2007	Mládková	Economics and Management	Manufacture	NA	Czech Republic (Europe)
6	2008	Sekliuckienė	Economics and Management	Retail	NA	Lithuania (Europe)
7	2008	Kumpikaitė and Čiarnienė	Economics and Management	Manufacture Services	NA	Lithuania (Europe)
8	2009	Choi, Jun, Hwang, Starz, Mazour, Chang and Burkart	Energy Policy	Energy	Large	Korea (Asia)
9	2010	Goyal	International Transactions in Humanities and Social Sciences	Education and training	NA	Uttar Pradesh, India, (Asia)
10	2010	Abrudan, Hatos and Matei	Economic Science	Education and training	NA	Romania (Europe)
11	2011	Patalas-Maliszewsk and Hochmeister	Contemporary Economics	Services	SME	NA
12	2011	Popescu, Chivu, Ciocarlan-Chitucea and Popescu	Economic Science	Services	SME	Romania and Spain (Europe)
13	2011	Nadrag and Mitran	Economics, Management and Financial Markets	Education and training	NA	Romania (Europe)
14	2012	Königová, Urbancová and Fejfar	Journal of Competitiveness	Education and training	NA	Czech Republic (Europe)
15	2012	Carausan	Administratio	Public administration	Large	Romania (Europe)
16	2012	Burja	Economic Science Series	High-tech industries	NA	Romania (Europe)

Paper code	Year	Author(s)	Journal	Industry	Firm size	Study's location
17	2014	Delić and Smajlović	Ekonomski Vjesnki,	NA	NA	Bosnia Herzegovina (Europe)
18	2014	Oncioiu	Oeconomica	High-tech industries	SME	NA
19	2015	Bud and Nistor	Economic Science Series	Finance	NA	Romania (Europe)
20	2015	Rivera and Rivera	Innovar: Revista de Ciencias Administrativas y Socyales	Education and training	NA	Mexico (North America)
21	2015	Islam	ASA University Review	Manufacture	SME	Bangladesh (Asia)
22	2015	Scurtu and Neamtu	USV Annals of Economics and Public Administration	Services	Large	Japan (Asia)
23	2016	Pee and Kankanhalli	Government Information Quarterly	Education and training	NA	Singapore (Asia)
24	2016	Runhaar and Sanders	Educational Management Administration and Leadership	Education and training	NA	Netherlands (Europe)
25	2016	Shahzad, Bajwa, Ansted, Mamoon and Khaliq-ur-Rehman	Utilities Policy	Energy	NA	Pakistan (Asia)
26	2016	Gherghina and Andres	Seria Economie	Public administration	NA	Reşiţa, Romania (Europe)
27	2016	Bugnar, Mester and Fora	Economic Science	High-tech industries	NA	Fiji and New Zealand (Oceania); China, Vietnam, Singapore, Republic of Korea, Israel, Japan, Qatar (Asia); Costa Rica, Panama, Mexico, USA, Barbados (America); Belgium, Germany, Czech Republic, Finland, Austria, Luxembourg, Norway, Iceland, Sweden, Denmark, Netherlands (Europe)

Paper code	Year	Author(s)	Journal	Industry	Firm size	Study's location
28	2016	Kirovska, Josifovska and Kiselicki	Journal of Sustainable Development	Manufacture	SME and large	Republic of North Macedonia (Europe)
29	2019	Cabral and Dhar	Journal of Cleaner Production	Tourism	NA	Kerala, India (Asia)
30	2019	Parast and Golmohammadi	International Journal of Production Economics	Healthcare	NA	NA
31	2019	Ghafoor, Khan, Muneer and Haider	Journal of Independent Studies and Research—Management and Social Sciences and Economics	Telecommunications	NA	Lahore, Pakistan (Asia)
32	2019	Karolidis and Vouzas	Public Performance and Management Review	Public administration	NA	Greece (Europe)
33	2010	Istudor, Bogdanova, Manole, Ignat and Petrescu	Amfiteatru Economic	Agricultural industry	NA	Romania and Bulgaria (Europe)
34	2011	Capik and Drahokoupil	European Planning Studies	Services	NA	Poland, Czech Republic, Hungary and Slovakia (Europe)
35	2014	Blaga and Gabor	Amfiteatru Economic	Services	Medium	Romania (Europe)
36	2018	Zlatković	Economic Themes	NA	NA	Bosnia Herzegovina (Europe)
37	2019	Monavvarifard, Baradaran and Khosravipour	Journal of Cleaner Production	Education and training	NA	NA
38	2011	Sukserm and Takahashi	International Journal of Business and Society	Automobile industry	NA	Thailand (Asia)
39	2018	Doherty, Gilson and Shung-King	Health Policy Planning	Education and training	NA	South Africa (Africa)
40	2013	Oort and Bosma	Annals of Regional Science	Agricultural industry Manufacture and Services	NA	Belgium, Greece, Slovenia, Hungary, Spain, Finland, Ireland, France, Italy, Sweden, Germany, Netherlands, Norway, Switzerland (Europe)

Paper code	Year	Author(s)	Journal	Industry	Firm size	Study's location
41	2015	Bobylev, Kudryavtseva and Yakovleva	Ekonomika Regiona	Environmental protection industries	NA	Russia (Europe)
42	2016	Savarese, Orsi and Belussi	European Planning Studies	Services and Biotechnology	SME	Italy (Europe)
43	2018	Deaconu	Sustainability	Education and training	NA	Romania (Europe)
44	2019	Wamsler, Wickenberg, Hanson, Olsson, Stålhammar, Bjorn, Falck, Gerell, Oskarsson, Simonsson, Torffvit and Zelmerlow	Journal of Cleaner Production	Public administration	NA	Sweden (Europe)
45	2019	Zhang and Deng	International Journal of Digital Earth	NA	NA	China (Asia)
46	2019	Blanco-salas, Gutiérrez-Garcia and Labrador-Moreno	Sustainability	Agricultural industry and Tourism		Spain (Europe)
47	2010	Dinu, Marchevski, Dobrescu and Petrescu	Amfiteatru Economic	Services	NA	Romania and Bulgaria (Europe)

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