Exploring organizational change in the age of digital transformation and its impact on talent management: trends and challenges

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Abstract

Purpose – This article aims to examine whether the organizational changes brought about by digital transformation (DT) -such as a new organizational culture, new leadership and new business models- influence talent management, with the latter being seen as one of the major challenges facing companies in their process of digital transformation.

Design/methodology/approach —Using a quantitative methodology, a survey was applied to 314 companies in order to analyze the results of their talent management in the DT process. DT is not only digitalization as demonstrated in this study. Talent management is the key piece that can facilitate or block achieving high levels of digital maturity.

Findings – The study finds that the changes brought about by DT impact talent attraction, talent retention, and talent management in general, and also shows that digital transformation does not depend on digitalization, but rather that talent management is the key to either helping or preventing high levels of digital maturity being achieved.

Originality – The originality of this work lies in examining the influence of the changes that DT entails in talent management.

Keywords digital transformation, talent management, talent attraction, talent retention, transformational leadership

Paper type Research paper

Introduction

Businesses today find themselves in a new digital era called Industry 4.0. In this context, it is unclear whether business leaders have the necessary preparation to properly handle the new situation (Wang *et al.*, 2016), which leads us to consider leadership as a key factor in DT. While traditional talent management systems can provide a solid foundation, it is important to adapt and complement them with more agile and digitally-focused approaches. This may involve adopting new technologies, revising policies and processes, and a more focused approach to digital skills development and innovation (Sow and Aborbie, 2018).

"To achieve the successful implementation of digitization, organizations must invest in staff training, empower employees, change organizational culture, and hire leaders who actively support digitization" (Ancarani and Di Mauro, 2018, p. 7). Leaders are responsible for setting a clear vision and strategy for digital transformation. This involves understanding how technology can drive growth, improve efficiency and create value for the business (Strese *et al.*, 2016). Digital transformation is not just about adopting new tools and technologies, but also about changing the mindset and culture of the organization (Pellant, 2011).

New organizational capacities are required to ensure the success of the DT process (George *et al.*, 2016). Leaders first need to understand the complex implications that digitalization will have for their company and their employees (Quintana, 2015). DT requires organizations to make strategic changes to improve not only the individual skills of their employees but also the coordination of people, processes, and technologies. (Desmet *et al.*, 2015; Dörner and Meffert 2015). The changes that organizations may make as a result of the emergence of new technologies must therefore be complemented

by changes in organizational structures, management approaches, organizational behaviors, and operating cultures (Wade and Marchant, 2014; Kohnke, 2017).

The relationship between Industry 4.0 and talent management is fundamental in the current context of DT. Industry 4.0 refers to the integration of advanced technologies, such as artificial intelligence or the Internet of Things (IoT). This technological revolution is changing the way industrial operations are performed and, as a result, is transforming talent needs in organizations (Sparrow and Makram, 2015; Segarra *et al.*, 2020).

After reviewing the literature, we found numerous studies that explore talent management (Scullion *et al.*, 2010; Dries, 2013; Thunnissen, 2016; Whysall *et al.*, 2019; Claus, 2020). One stream of research advocates incorporating the effects of the organizational context on human resources by offering contingent alternatives, both in practice and research (Thunnissen, 2016). A second stream states that talent management adds value to strategic human resources (HR) management (Dries, 2013; Szierbowski-Seibel and Kabst, 2017; Beraha *et al.*, 2018). At the same time, there are many definitions of talent management that refer to key concepts such as the attraction, retention or development of talent (Scullion *et al.*, 2010; Thunnissen, 2016).

This paper aims to examine what effect the external and internal context of DT has on talent management in organizations (Gallardo-Gallardo *et al.*, 2019). The factors which are changing in organizations include: organizational culture (Bendak *et al.*, 2020), business models (Matt *et al.*, 2015; Bashir and Farooq, 2019), digital leadership (Promsri, 2019), and new HR strategies for talent management in the digital age (Chalutz, 2019).

The need to explore DT and talent management stems from the fact that –in the different lines of research on talent– a higher level of analysis which looks at the impact of the organization's external and internal context seems necessary (Thunnissen *et al.*, 2013). The digital context is triggering enormous efforts to adapt to the new situation at

a time when there seems to be a shortage of talent to meet current demand (Chambers *et al.*, 1998; Dalayga *et al.*, 2017).

Tarique and Schuler (2010) find exogenous factors that account for a shortage of talent (globalization, demographics, and the gap between supply and demand) as well as other endogenous factors (international strategic alliances, required skills, and regiocentrism). Intellectual capital or talent is becoming an increasingly key factor in organizations' strategic success. Digitalization, labor shortages, growth through acquisitions, demographic changes and globalization are just some of the trends that have made talent the top organizational priority (Kiron and Spindel, 2019).

Organizational strategies –derived from DT– affect large areas of companies and even reach beyond their borders, affecting products, business processes, sales channels and supply chains (Barco, 2016). One of the main gaps being investigated in an effort to explain why not all companies achieve success in their DT is their talent management (Kane, 2019). "More than anything else, DT requires talent. In fact, bringing together the right team of technology, data and process people who can work together, with a strong leader who can drive change" (Davenport and Redman, 2020, p. 1).

This paper aims to explore the correlation between organizational changes –typical of companies' DT– and human resources policies aimed at talent management (Frankiewicz and Chamorro-Premuzic, 2020).

The 4.0 Revolution entails a series of challenges for companies in all sectors and includes digital transformation and changes in the required skills (Baena, 2017; Bestratén, 2018). DT and automation change the labor landscape, which means that companies need workers with technical and digital skills, as well as adaptability and continuous learning skills in order not to fail in the DT process (Blanco, 2017).

The 4.0 Revolution offers a number of exciting opportunities, but also significant challenges for companies, and requires combining strategic vision and adaptability as well as a focus on innovation in order to excel in this new digital business environment (Hecklau *et al.*, 2016).

As a theoretical background that investigates the process of digital transformation and talent management within the dynamics of the internal changes currently occurring in organizations, we point to some key studies. First, we find studies that analyze how the competitive advantages derived from digitalization are maximized and that entail a process of change in organizations (Abedrapo, 2014; Arntz *et al.*, 2016; Susskind *et al.*, 2016; Torrecilla, 2019). In addition, we find research that highlights the organizational changes appropriate to DT: new business models, changes in organizational culture and leadership (Kagermann *et al.*, 2011; Jansen, 2017; Kinzel, 2017; Palazzeschi *et al.*, 2018; Martin *et al.*, 2018).

Theoretical framework

Based on the criteria of Tranfield, Denyer and Smart (2003), reference articles have been included for the systematic review of the literature:

1. Clear definition of the research problem; 2. Systematic search strategy selection of keywords; 3. Inclusion and exclusion criteria: relevance of the study, type of methodology used, time period, and other relevant factors. Impact level of the journal and year of publication in at least 90% of the selected articles; 5. Validity of results and risk of bias; 6. Summary of the findings; 7. Conclusions and recommendations.

DT entails substantial changes in the business model –including talent management. There is an increasing consensus in the scientific field concerning the fact that DT implies

a holistic change that affects all of the organization's forces and agents, based on technology (Tabrizi *et al.*, 2019).

DT is essential for organizations to adapt and prosper in the new digital context of business (Slotnisky, 2016; Moreno, 2018). Cabezas and De la Peña (2015) consider DT to be a transition that companies must undertake in order to join the digital world, satisfy customer demands, and compete in a global market as well as improve operational efficiency.

Context is key to explaining the value of talent (Gallardo-Gallardo *et al.*, 2013; Gallardo-Gallardo *et al.*, 2019), and individuals may perform better or worse depending on their immediate environment, leadership, and the team they work for (Quintana, 2015). We draw on the review carried out by Gallardo-Gallardo, Dries and González-Cruz (2013) and consider the concept of talent as a moderating variable, given that there seems to be no general consensus concerning the concept thereof.

We therefore believe that DT is an organizational effort aimed at adapting to this new context. Talent can act as a moderating variable in the relationship between digital transformation and changes in organizational culture, business model and transformational leadership by influencing the capacity for adaptation, innovation, leadership and digital competencies within an organization (Thunnissen, 2016; Whysall *et al.*, 2019).

Digital Transformation as a process of business innovation and change

In today's technological environment, numerous studies show a growing interest in the impact of innovation on business performance (Raute *et al.*, 2019). The human factor is considered key to promoting and developing knowledge networks (Reagans and Zuckerman, 2001; Becerra and Sánchez, 2011). Various studies have evidenced what

contribution people make to the process of business innovation, since people's knowledge enables the use of both new and existing skills (Camelo *et al.*, 2000; Li *et al.*, 2006).

In addition, DT includes changes in business models, the developments that businesses require, and social changes. Transformation is disruptive and affects not only customer relationships but also internal processes and value propositions (Morakanyane *et al.*, 2020). Organizations that are less digitally mature (Chanias and Hess, 2016) tend to focus on individual technologies and to develop strategies through an operational approach, whereas more mature organizations develop digital strategies with the intention of transforming the business as a whole.

Innovation management can be defined as the creation and implementation of a new state-of-the-art management practice, process, structure or technology aimed at organizational goals (Birkinshaw *et al.*, 2008). As competition intensifies and the pace of technological change accelerates, firms must renew themselves. The challenge is not only to offer new products and services but also to change management within organizations (Teece, 2007).

Digital Transformation in the enterprise

DT strategies go beyond the process and include changes and implications for products, services and business models in general (Matt *et al.*, 2015). As with the alignment between business strategies and ICT strategies, it is essential to secure a perfect fit between DT strategies, ICT strategies and all the other organizational and functional strategies. Research has addressed this issue and has sought to merge and consolidate ICT strategies and business strategies into a comprehensive "digital business strategy" (Bharadwaj *et al.*, 2013).

It seems clear that digital transformation does not merely involve digitization but that it also implies changes in terms of how to redefine the value proposition or significantly change the way people work (Meffert and Swaminathan, 2017). DT is usually measured by the Digital Maturity Index, which assesses the company within its DT process. This Digital Maturity Index is based on different indicators that measure the degree or stage of the digital *change* process achieved by a company (Lorenzo, 2016).

Today, the process of DT entails creating new business models and the possibility of exploiting new market opportunities. In turn, this DT entails an important investment in the development of digital skills and that must be aligned with the business strategy. Development of these capacities must occur in an integral manner in all dimensions of the organization: strategy, people and culture, structure and management systems, business process, and technology (Lorenzo, 2016).

Indicators of Organizational Change in Digital Transformation

In this section, we review the indicators of organizational changes that DT entails. In the previous section, we looked at how DT is measured by the Digital Maturity Index. Now we consider the indicators used by different studies to measure the transformation process.

From the perspective of resource theory, companies are influenced by contextual contingencies when developing a dynamic and proactive corporate strategy aimed at managing the interrelationship between business and the natural environment (Aragón-Correa and Sharma, 2003). Companies in ever-shifting contexts need to anticipate and to react to changes (Makkonen et al., 2014). Prominent amongst the strategic resources that favor innovation processes are transformational leadership (Contreras and Barbosa,

2012), human capital (Lawson and Samson, 2001), or culture (Naranjo-Valencia and Calderón-Hernández, 2015).

Among the elements needed to successfully develop the DT process are: identifying the future direction of the business, leaders able to direct the transformation, determining the organization's competitive position in the digital age, and identifying areas where the organization can succeed with this effort and so achieve its goals effectively. DT requires significant human, financial and technological capital, which must be coordinated in order to facilitate successful outcomes (Sow and Aborbie, 2018). In our research model, we use the following indicators to assess companies' degree of digital maturity: new business models, innovation culture, and transformational leadership.

New business models in the digital age. The digital age is bringing profound changes to organizations. New business models (Catlin *et al.*, 2015) are often start-ups that later reach a more consolidated level as companies, or that can even be acquired by large corporations who seek new ways of entering the market. The potential benefits of digitalization are manifold and include increased sales or productivity, innovations in value creation, new ways of interacting with customers, and so on.

Different studies have examined the process of transforming companies into digital businesses (Fitzgerald *et al.*, 2013). Companies experience significant organizational changes as they gradually build up their digital capacity in an effort to improve customer engagement, internal operations or employee engagement These new business models in the digital era allow for improvements in efficiency and changes in internal decision-making processes. They also involve restructuring the current workforce, with significant reductions in certain business areas.

Innovation culture. Companies immersed in DT are aware that today's new environment requires an effort to adapt their organizational culture to the digital age. In this sense, having common values for DT focused on innovation is deemed key.

Sánchez and Alonso (2003) define organizational culture as a set of assumptions, values and norms whose meanings are collectively shared in a determined social unit (team) and at a specific moment. Organizational culture is a critical success factor for attracting, engaging, developing, and retaining talent.

If we therefore consider DT as a profound and global change that companies undergo –rather than seeing it as just another evolutionary step– organizational culture should be a priority in the process, as it serves to give identity to its members and to generate a strong commitment from the organization's members (Vey *et al.*, 2017).

Leadership in DT. Organizations need people who can make the right and effective decisions, with leadership being a key skill. New leaders are those who show innovative guidelines and who encourage their team members to act independently and to carry out the necessary transformations in their organizations (Becerra and Sánchez, 2011). As part of the digital maturity process in organizations, leaders are needed in order to facilitate change. Hearsum (2015) proposes the following leader skills: adaptability, collaboration, innovation, user-centered, self-awareness, systemic intelligence, and the ability to differentiate between technological and cultural digitalization.

In this line, transformational leadership seems to be the leadership that is needed for the digital change process. Because of its influence on culture, it is also a suitable model for transforming a traditional organizational culture into an innovative one. This is due to transformational leaders' ability to influence their followers and to foster the desired values in the organization (Bass and Avolio, 2003).

While the process of DT affects all companies, the challenge it poses to company leaders and how these can be addressed can make a difference in the speed of transformation. Numerous studies relate leadership and digitalization (Khan, 2016; Sow and Aborbie, 2018; Schwarzmüller *et al.*, 2018; Bartsch *et al.*, 2020) although studies into leadership have found in transformational leadership a number of leadership practices that are performed in complex and changing organizations (Khan, 2016; Alos-Simo *et al.*, 2017; Klein, 2020).

The organization's leaders are those who decide to drive the DT process (Phillips and Wright, 2009; Alos-Simo *et al.*, 2017). This is because implementing digital capacities is a strategic decision. The company's top management must decide to initiate the digital change process and subsequently achieve its effective implementation through employee commitment (Alos-Simo *et al.*, 2017).

If leadership processes seek to modify employee behavior, then it is the leaders who are responsible for shaping cultures (Strese *et al.*, 2016), for creating and transmitting values so that these cultures evolve and adopt the change (Kotter and Heskett, 1992) required to lead the implementation of DT (Alos-Simo *et al.*, 2017). Transformational leaders make strategic decisions and shape change, with transformational leadership giving rise to increased organizational effectiveness (Hassan *et al.*, 2010) and affective employee commitment to the company.

HR Management in DT

In recent years, many companies appear to be experiencing a talent shortage problem (Kiron and Spindel, 2019). In turn, in the case of the digital age, this problem is exacerbated by the need to add digital skills, be they literacy, instrumental or managerial skills. In the current digital age, the role played by HR departments in companies must

change in order for them to lead DT. Today, these departments must be able to transform data into valuable knowledge (Bondarouk and Brewster, 2016; Berber *et al.*, 2018) and it is these human resources departments who should be responsible for implementing the talent management strategy (attracting and retaining talent). This is particularly relevant in innovative companies, which have been able to progress at the same time as digitalization, improving their processes, redesigning their business models and readapting their culture to the current digital environment. New technologies facilitate the decentralization of talent management –redefining the role of human resources and involving it more in the business (Kane, 2019; Frankiewicz and Chamorro-Premuzic, 2020).

Companies' DT has led them to reflect on the new role played by human resources departments (Bondarouk and Ruel, 2009); in other words, whether they should continue as before or whether they should take over the management and development of talent. For decades, human resources departments have been responsible for maximizing the efficiency of the company's staff through recruitment, selection, training, remuneration, and development policies. Digital disruption has substantially transformed this situation (Lepak and Snell, 1998), and we must therefore ask ourselves: What is the contribution of DT to talent management? How important is it to gain competitive advantage through talent in DT?

Based on the review of the theoretical and empirical background, we propose the following hypotheses:

> ***H1.*** Organizational changes (new business models, organizational culture, and leadership) resulting from DT have an impact on talent management.

INSERT HERE FIGURE 1

Market analyses show that most employers are struggling to find the talent needed to meet their needs (Cavana *et al.*, 2007 Strack *et al.*, 2008). The new business environment requires leaders with a different style and talent who can take advantage of the new advantages offered by the digital environment (Kanter, 2001).

Talent attraction strategies, such as employer branding, allow potential employees to discover new career opportunities (Davenport and Patil, 2012). In turn, companies can incorporate big data and HR analytics into their business within digital disruption (Colombo and Grilli, 2010; Delgado-Verde *et al.*, 2016; Siepel *et al.*, 2017), which will allow them to track the employee's whole lifecycle before they are hired.

H2. Organizational changes (new business models, organizational culture, and leadership) resulting from DT have an impact on talent attraction.

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Talent management focused on retaining and developing talent has a positive impact on key employee aspects, job satisfaction, motivation, commitment and confidence in leaders. Some authors identify talent with superior performance (Harvey *et al.*, 2002).

Companies have had serious difficulties in attracting and retaining talent for years (Dries, 2013). The first direct benefit of implementing engagement and retention policies would therefore be not having high turnover that negatively impacts organizational performance, in addition to the direct replacement costs this involves.

Gibbons (2006) identifies some aspects that improve employee engagement, such as: leaders with confidence and concern for their employees, degree of employee participation and autonomy, aligning individual performance with that of the company, pride in belonging, or opportunities for professional growth, among others.

The digital age is changing the way an organization recruits, selects and develops skills for a new generation of employees. Currently, in order to improve organizational performance, HR offers digital solutions for the company and employees, solutions that generate engagement and new experiences for employees (Mihalcea, 2017), both in terms of improving common HR practices and of updating employer branding strategy. This strategy can reduce the turnover rate or improve employee contributions to the company. First, there needs to be a clear understanding of the relationship between an organization and its employees (Miles and Mangold, 2004).

H3. Organizational changes (new business models, organizational culture, and leadership) resulting from DT have an impact on talent retention.

INSERT HERE FIGURE 3

Methodology

Population and sample

This study looks at Spanish companies engaged in carrying out the process of DT. In the study on DT in Spain conducted in 2021 by the Spanish Chamber of Commerce, 35% of companies were at an advanced stage of implementation with a specific DT strategy, and 50% were at an intermediate level. As of 1 January 2021, the Central Business Directory (DIRCE) states there are 3,366,570 active companies in Spain. Of these, we select those

at the mid-upper level of their DT process. We obtained a sample of 314 companies (table 1) that are representative of the 630,600 companies with levels of digital maturity of between 3-5, according to the Digital Readiness Assessment Maturity Index "DREAMY" (Digital Readiness Assessment Maturity model), where 1 is the minimum, and 5 the maximum (De Carolis *et al.*, 2017).

Data were collected through a hand-delivered survey. This tool was answered by human resources department directors.

INSERT HERE TABLE 1

Prior to delivering the questionnaire, we selected the different items based on published studies on the model variables. We used both statistically validated scales and scales constructed from published studies. From the different variables identified in the literature review, an initial version of the questionnaire with a total of 105 items was developed.

Study Variables

Independent variable. The independent variable of our model is digital maturity. This is a key variable in our research, since knowledge about the paths taken by different organizations provides a deeper understanding of this phenomenon (Tilson *et al.*, 2010). While a digital strategy consolidates and aligns the ICT and business strategy, a DT strategy specifically contains the vision, planning and implementation of the organizational change process (Matt *et al.*, 2015). We measure the digital maturity variable (model-independent variable) through the three most commonly used indicators of DT in research: business models, organizational culture, and leadership.

Measuring new business models. The emergence of new connectivity devices, data analytics tools for decision making, and multi-channel customer relationships all demand major and profound organizational changes (Díaz-Espinal, 2014). All of these lead managers to appraise the activities carried out by a company in order to generate value for customers and shareholders. If companies wish to digitalize their business, they should start by defining how employees participate in the change, with human resources being the key to change in digitalization (Genzorova *et al.*, 2019).

In this research, we look at whether there are changes in business models, depending on the evolution of the digitalization process, and whether there are also changes in attracting and retaining talent. In our study, we use the measurement employed by López and Sandulli (2007) and the model proposed by Osterwalder (2004).

Measuring organizational culture. Organizational culture can be used to develop talent management, as it is an important factor in project and program success. Focusing solely on the selection and implementation of digital technologies does not seem to be the most appropriate path to success (Anderson *et al.*, 2014). The best way to respond to digital disruption is by changing company culture, and by making it more agile, risk-tolerant and experimental (Beraha *et al.*, 2018).

Within the DT process, there are three keys to achieving success: managing digital disruption, reflecting on leadership style, and talent (Kane, 2019). Companies may have leadership development plans and the best talent management initiatives, but if they are not backed up by practices, standards and values, then these plans and programs will have little impact (Van Zyl *et al.*, 2017).

Pellant (2011) perceived culture as the way people behave, and different studies have positively related organizational culture to employee retention (Tetteh and Brenyah, 2016; Madueke and Emerole, 2017). Similarly, some studies have linked organizational

culture to talent attraction (Wood *et al.*, 2019; Acikgoz, 2019). In our study, we employ the item scale on culture, used by Fernández-Jardón *et al.* (2016).

Measurement of leadership style. One of a leader's main roles is to make people in the organization fit into the team –all the more so when the intended change is as profound as that required by DT. Today, digital and smart businesses demand a new structure, with multidisciplinary teams that possess the skills to take on the transformation. Specifically, leadership is seen as an aptitude to lead the organization towards success through relevant and effective decision making, transforming conflicts into new opportunities (Becerra and Sánchez, 2011). Leaders must show the capacity to lead the processes of change in DT, showing innovative organizational and managerial capacities, strategies to adapt to changing situations and a vision which –when shared with all the actors involved– leads them to act on their own initiative (Becerra and Sánchez, 2011). In addition, senior management support is essential throughout the transformation process. Transformative leadership skills are key to dealing with employees who resist change (Matt *et al.*, 2015).

Different studies relate transformational leadership to DT (Khan, 2016; Sow, 2018; Baharuden *et al.*, 2019). Similarly, different studies have linked transformational leadership to talent management (Matt *et al.*, 2015). In our study, we use the transformational and transactional leadership model employed by Avolio and Bass (2004).

Dependent variables. Traditionally, talent management has studied HR practices aimed at attracting and retaining talent. Bearing this in mind, we have chosen three dependent variables: talent management, talent attraction, and talent retention. Talent management is measured by a scale of HR practices. In our research questions, we ask whether DT independently influences the attraction or retention (commitment) of talent –which is why we split them into two different variables.

Measurement of talent attraction. One of the main handicaps when addressing the issue of attracting talent lies in the concept itself and in its definition (Meyers *et al.*, 2013). Another of the most popular ideas in recent years is that talent is attracted and not recruited (Weiss and Mackay, 2009).

This knowledge makes it possible to anticipate what recruitment efforts must be made and the resources that need to be used in order to organize activities in the field of human resources (Ericsson *et al.*, 2007). Recruitment, on the other hand, involves attracting people in a timely manner, in sufficient numbers and with the right skills, and convincing them to join the company.

Currently, the process has evolved from a model focused on the job offer to a model more based on employer reputation, which can be defined as the values that stakeholders attribute to the company in line with their perceptions. This potential of attraction –which depends on stakeholders' perception of the company– can be added to the firm's ability to retain or attract talent, and various studies have indeed related talent attraction strategies to DT (Barrales-Molina *et al.*, 2014; Gilch and Sieweke, 2020).

The Talent Attraction scale is extracted from the studies of Meyers, Van Woerkon, and Dries (2013), Ericsson, Prietula and Cokely (2007), Weiss and Mackay (2009), Ross (2003), Juhdi, Pa'wan and Kaur (2013), and Garr, Atamanik and Mallon (2015). At the same time, we added a specific employer branding scale based on the studies by Hillebrandt and Bjorn (2013) and Eckhardt et al. (2014).

In our research, we created four items that evaluate talent attraction by dividing it into four factors:

1- Type of talent needed for the company. 2- Talent attraction strategy. 3- Talent development. 4- Talent retention.

We also used the PRH-33 scale (Boada-Grau and Gil-Ripol, 2011) –which measures HR practices– to evaluate talent management. In addition, we used items that refer directly to the employer brand and which were taken from the study by Hillebrandt and Bjorn (2013), and an item on the use of e-recruitment taken from the study by Eckhardt *et al.* (2014).

Measuring Talent Management. A geographically diverse workforce –together with a growing number of younger workers, flexible working hours and remote workers– are just some of the characteristics of the workforce in the digital age that make it different from the recent past (Prerna, 2015). Together with changes in the workforce comes the challenge of managing talent, which is the most important asset any organization possesses.

In order to correlate HR practices and talent management with DT, the PRH-33 scale was selected (Boada-Grau and Gil-Ripol, 2011). This scale consists of two sub-factors:

1)- Development: professional growth of people within the organization, focusing on aspects such as: teamwork, leadership, reconciliation, change, and innovation.

2)- Formalization: use of processes, procedures and tools, with reference to documentary aspects, the definition of plans and the use of management models.

A review of the HR Practices Scale PRH-33 (Boada-Grau and Gil-Ripoll, 2011) shows the 15 most cited HR practices in the scientific literature to be: (1) values and culture, (2) job description and analysis, (3) internal communication, (4) training and development, (5) performance and performance assessment, (6) personnel selection, (7) salary compensation, (8) incoming and disengagement processes, (9) workforce planning, (10)

climate and motivation, teamwork, (12) change management, (13) leadership style, (14) industrial relations, and (15) career plans.

In this research, 28 items from the scale of 33 were used in order to reduce the excess number of questions and so use the most appropriate ones for this research related to talent management. As a reference, we take talent management to involve attraction, commitment and retention activities in order to achieve more competitive advantages and better organizational results (Anwar *et al.*, 2014). We thus eliminated from the original scale the items that refer to occupational risks or the relationship with unions, so as to focus the scale on talent management. In addition, eight items were introduced to strengthen the evaluation of HR practices vis-à-vis attracting and retaining talent.

Measuring Talent Retention. As regards talent retention, one extra item was created – following the work of Garr, Atamanik and Mallon (2015).

Results

Testing the hypotheses put forward in our analysis model is performed with the statistical tool of partial least squares path modelling (PLS-PM). This is a structural equations model that performs multivariate data analysis (Hair *et al.*, 2017). With PLS, we performed estimates of simultaneous equations with multiple regressions between the dependent and independent variables on the one hand and the observed and latent variables on the other (Henseler and Fassott, 2010). The aim is to validate the model by seeking to maximize the level of variance explained (measured with the coefficient of determination R^2, obtaining the structural validity). In addition, in order to evaluate this structural validity, the significance level of the standardized regression coefficients or path coefficients and the sizes of the effects (f^2 and q^2) are measured.

First, we analyze construct validity and obtain the divergent validity (table 2).

INSERT HERE TABLE 2

The magnitude of the path coefficients is observed as standardized values in a range +1 to -1; the higher the value, the greater the relationship between the constructs, and the closer it is to 0, the lower the convergence to the construct. If the result of a path value is contrary to the sign postulated in the hypothesis, the hypothesis will be rejected. The results obtained show significant and moderate relationships (table 3).

INSERT HERE TABLE 3

We then examine the validity of the analysis model (goodness of fit of the model) by means of the coefficient of determination. Falk and Miller (1992) consider that an R^2 should have a minimum value of 0.10; Chin (1998) considers 0.67, 0.33 and 0.10 (substantial, moderate, and weak); while Hair *et al.* (2017) recommend 0.75, 0.50, 0.25 (substantial, moderate, and weak). Hair *et al.* (2017) argue that PLS-SEM has several advantages over other SEM techniques. The basic algorithm of PLS follows a two-step approach. The first concerns the iterative estimation of latent variable scores. The second relates to the final estimation of weights, loads and path coefficients by estimating ordinary least squares (multiple and simple) and principal component analysis (Henseler *et al.*, 2016).

The results obtained (table 4) are moderate, although all factors are above 0.20. In this analysis, we found the R^2 for talent attraction and talent management to be substantial, talent retention to be moderate, and DT to be weak. All are above 0.20, which validates the equation by explaining the variance by at least 20%.

INSERT HERE TABLE 4

Discriminant Validity: As regards discriminant validity to evaluate correlations between dependent variables, the authors recommend taking as a reference a composite validity greater than 0.7 (Hair et al, 1999; Malhotra, 2004). As for the value of the extracted variance, all values are above 0.5, which indicates that the factors are valid at the convergent level.

The classical criterion used is that of Fornell and Larcker (1981), who recommend that the square root of the average variance extracted (AVE) be greater than the correlations that present a construct with the rest of the constructs. When the square root is higher in all cases, it is assumed that the model is valid in a discriminant way.

The f2 distribution is a continuous probability distribution. A value of 0.03 represents a low f effect, a value of 0.15 represents a medium effect, while 0.35 represents a high effect. All the effects of the "DT indicators" variable are high (table 5).

INSERT HERE TABLE 5

Since the distribution of PLS is unknown, conventional significance cannot be tested: in other words, since the sample is not normal, conventional parametric tests are not applied. The bootstrapping technique is used to assess the robustness of the indicator loadings and to determine whether the relationships between the variables are significant. From the distribution of the subsamples obtained, we obtain their standard error, which will be used to calculate Student's t, according to the known formula $t=b/Sb$. Table 6

shows that all factors have a t > 1.96 and P< 0.005. After processing the bootstrapping technique with 2,000 observations, the following results are presented.

INSERT HERE TABLE 6

The results obtained show that the organizational changes resulting from the DT process have an impact on talent management (hypothesis 1), talent attraction (hypothesis 2), and talent retention (hypothesis 3). The three hypotheses of our study model are therefore accepted.

Discussion and conclusions

Although there are more indicators, our research objective was to see whether through the three that were selected there was the same significant relationship with talent management as digital transformation measured with the digital maturity index. By using bootstrapping analysis, we can analyze not only the validity of the structural model but also assess the hypotheses that are statistically significant, through the Student's 't' values. The indirect effect of digital maturity positively influences the relationship of organizational changes of transformation on talent management. The hypothesis test confirms that this relationship exists and that it is significant.

Throughout this study, the relationship between DT and talent management has been highlighted. The digital age is changing the way organizations attract and retain employees who add value to the company (Kane *et al.*, 2017). In the current context, one of the biggest challenges facing companies is to attract and retain talented people. In the long term, talent management is a strategic element of the business model that generates innovation, consumer value, and financial benefits (Genzorova *et al*., 2019). The search

for young people who display great potential is therefore a key objective for organizations.

In the current context, technological advances are being harnessed to improve talent management. These developments are taking place against a background that forces companies to change their organizational culture towards a more innovative model. Senior and mid-level managers should adopt a leadership style that favors the transformation process (Vaccaro *et al.*, 2012).

This paper looks at whether new business models require changes in talent management. This notion has been tested and confirmed in our study, considering that talent is a key resource for developing new business models. We also explore the relationship between DT (business model, innovation culture, and leadership) and talent management. The hypotheses concerning the influence of DT on management practices, attracting and engaging talent have been tested and accepted. We can therefore say that DT influences and brings about changes in talent management practices (attracting and retaining talent).

Contribution to HR Management

We confirm the relationship between the changes and benefits that digital transformation entails and the need to manage talent differently from the way companies traditionally do so in the analogue environment (Wade and Marchant, 2014; Kohnke, 2017). The transition from transactional HR services to active business analytics begins by identifying the data needed to gain an insight into employees (Siepel *et al*., 2017).

The results of our research confirm that digital transformation is a process of organizational change that is innovative in nature. We confirm current scientific interest in terms of analyzing the repercussions of introducing innovation in business

management. By definition, business innovation involves a change in the way things are traditionally done (Hargrave and Van de Ven, 2006). Allowing human resources departments to analyze data easily can speed up decision making. Human resources managers must have a broad understanding of the contextual and complex interactions of employees within an organization.

Workforce profiles at all organizational levels should be known and monitored at all times so that efforts to maximize the return on human capital prove to be productive. This may be the link between DT and talent management. DT is an ongoing phenomenon that stretches beyond an organization's investment in technology or digitalization, as it involves profound changes in the conception of the business model, organizational culture, and the value chain of the company (Bondarouk and Brewster, 2016).

Although the main reason for implementing ICT within the human resources function has been to optimize procedures in this area, other positive effects have also emerged, such as cost reduction, improvements in the quality of the services provided, or increased productivity (Huselid, 2004). Digital transformation offers opportunities to improve efficiency, productivity and employee experience, but also presents challenges in terms of talent acquisition, skills development and organizational change management (Karacay, 2017; King and Vaimanb, 2019).

Limits of the research

This research does evidence certain limitations that advocate approaching the results with caution. Firstly, the instrument used in our study is a hand-delivered survey, which implies direct dependence on company willingness to complete the questionnaire. The results must therefore be limited to the sample of selected Spanish companies, which is why we invite this line of research to be continued in other markets. A second limitation

concerns the concepts of DT and talent. As a phenomenon that has changed the business context, DT is by no means a unified concept.

For this reason, we decided to approach its analysis through two factors. The first involves graduating the level of digital maturity achieved in the company and is measured by the digital maturity index. The second factor emerges through the organizational changes that DT entails, and is measured by three indicators (business models, innovation culture, and transformational leadership). The other concept used in our model is talent. In the review carried out on this term, we also find different approaches.

Thirdly, the number of cases studied always implies taking the results with relative caution. In an effort to reduce this limitation, and by using the digital maturity index when selecting the sample of companies, we achieved more precise representativeness, control over the variables and greater predictiveness in relation to business performance.

Future lines of research

The conclusions of the study lead us to propose possible lines of future research, related to different approaches of our work. First, the concept of talent needs to be further developed, as it is key to identifying more clearly the differences between companies in terms of the level of digital maturity achieved. We recommend the conclusions on the distinction between the exclusive or inclusive talent model along the lines of Gallardo-Gallardo *et al.*, (2013).

Secondly, separating talent attraction from talent retention into different lines of research may help to find more specific talent management strategies. In our model, results for attraction and retention strategies proved to be similar, although it is possible to explore more specific aspects within the process of DT that affect each strategy differently and in an unequal manner. Results differ particularly when we analyze the

strength of the relationship between indicators of DT and the management, attraction, and retention of talent in terms of the concept of talent.

In this line, we refer to Capelli (2009), since the author suggests that companies often make the mistake of treating talent attraction and retention as a single continuous process, when in reality they are two separate activities that must be approached differently.

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TABLES

SECTOR OF YOUR ENTERPRISE		Frequency	Percentage	Valid percentage	Cumulative percentage
	<	102	32.4	32.4	32.4
	Construction	70	22.3	22.3	54.7
	Trade	35	11.1	11.1	65.8
	Other services	107	34.2	34.2	100.0
	Total	**314**	**100.0**	**100.0**	

Source: own elaboration.

Table 1.

Descriptive analysis of sample distribution

Reliability and construct validity	**Cronbach's Alpha**	**Spearman correlation**	**Composite reliability**	**Variance extracted**
Digital transformation indicators	0.744	0.761	0.853	0.659
Talent attraction	0.788	0.880	0.962	0.926
Talent management	0.927	0.928	0.965	0.932
Talent retention	0.692	0.726	0.748	0.525

Source: own elaboration

Table 2.

Reliability and construct validity analysis

Path coefficients	Digital transformation indicators	Talent attraction	Talent management	Talent retention
Digital transformation indicators		0.669	0.737	0.326
Talent attraction			0.648	

Source: own elaboration

Table 3.

Analysis of path coefficients

Discriminant Validity	DTIndicators	Digital maturity	Talent Attraction	Talent Management	Talent Retention
DTIndicators	**0.812**				
Digital Maturity	0,644	**0,759**			
Talent Attraction	0,779	0,758	**0,905**		
Talent Management	0,803	0,573	0,862	**0,965**	
Talent Retention	0,627	0,600	0,811	0,765	**0,809**

Source: own elaboration

Table 4.

Analysis of Discriminant Validity

Coefficient f^2	Digital transformation indicators			Talent attraction	Talent management	Talent retention
Digital transformation indicators				**0.739**	**0.738**	**0.188**

Source: own elaboration

Table 5.

Analysis of the f^2 distribution

Statistics T (Bootstrapping)	**Original sample**	**Sample mean**	**Standard deviation**	**Statistical T**	**P Values**
Dig. Transf. Indic.->Talent attraction	0.697	0.700	0.069	10.132	**0.000**
Dig. Transf. Indic.->Talent management	0.660	0.665	0.069	9.610	**0.000**
Dig. Transf. Indic.->Talent retention	0.281	0.309	0.147	1.987	**0.008**

Source: own elaboration

Table 6.

Statistical $t \geq 1.96$ P values ≤ 0.05 Sub samples: 2.000

FIGURES

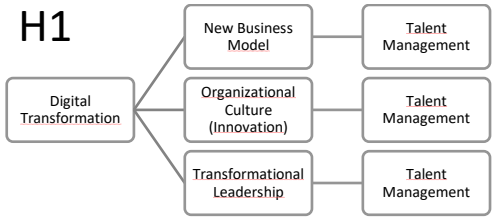

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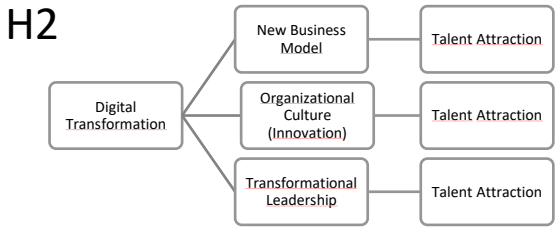
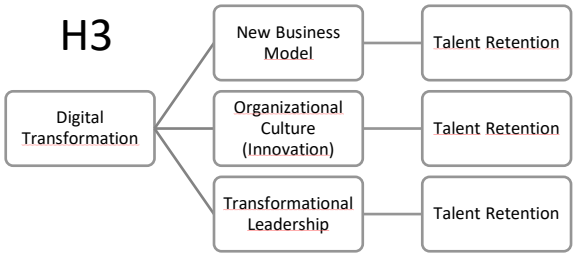
Figure 1. Hypothesis 1



Source: own elaboration.

Figure 2. Hypothesis 2



Source: own elaboration.

Figure 3. Hypothesis 3