

Received : October 2023 Accepted: March 2024

DOI: <https://doi.org/10.53555/ks.v12i4.2958>

Human Talent Management in Higher Education Institutions Challenges and Strategies in the 4.0 Era

Isabel Cristina Rincón Rodríguez¹, Jorge E. Chaparro Medina², Edwin German Ortiz Ortiz³, Yesenia Ibeth Plata Acosta⁴, Monica Zarta Botero⁵ and Cruz García Lirios⁶

Summary

The article identifies the main challenges faced by the Human Talent Management areas of Higher Education Institutions due to the integration of industry 4.0 technologies, as well as the main strategies that these areas should implement to adequately address timely and efficient the needs of the institutions. To develop this research, a qualitative methodology was applied with the use of a literary component based on the analysis of documents published in scientific databases, which made it possible to identify different characteristics that the human talent of educational institutions must have. higher, defining the four most recurrent, thus becoming the main challenges to be managed by these areas. Additionally, a field exploration was carried out through semi-structured interviews with Human Talent Management experts from the Educational Sector that allowed us to propose a set of transformation strategies to be implemented by these areas, with a view to providing solutions to the challenges posed by the industry 4.0. Through the use of Atlas ti, the findings obtained in the interviews with the experts were analyzed, confirming the theoretical elements identified in the documentary analysis, determining the main challenges for these areas: the ethics of care and good living, the collaborative team management, technological and digital skills, and data science. Finally, the strategies to be applied were defined based on what was mentioned by the experts.

Keywords: Higher Education, Industry 4.0, Human Resources, Industrial Revolution.

Abstract

This article seeks to identify the main challenges faced by the Human Talent Management areas of Higher Education Institutions due to the integration of industry 4.0 technologies, as well as the main strategies that these areas could implement to meet in a timely and efficient manner the needs of the institutions. For the development of this research, a qualitative methodology was applied with the use of a literary component based on the analysis of documents published in scientific databases, which allowed identifying the different characteristics or skills that human talent must have. In this way, the four most common ones in higher education institutions, which are considered relevant both at an administrative and teaching level, were selected, thus becoming the main challenges to be managed by the areas of human talent management. Additionally, a field exploration was carried out through semi-structured interviews with Human Talent Management experts from Higher Education Institutions, which allowed proposing a set of transformation or adaptation strategies that must be implemented by these areas, with a view to solving the challenges posed by industry 4.0. Through the

¹ Research Professor, University of Santander UDES. Phd. in Administration. Orcid: <https://orcid.org/0000-0002-7348-2341>

² Research Professor, Research and Development. Doctoral Student in Administration, Orcid: <https://orcid.org/0000-0002-0916-8702>

³ Research Professor, University Foundation of the Andean Area. Master in innovation, Orcid: <https://orcid.org/0000-0003-2865-6602>

⁴ Research Professor, University Foundation of the Andean Area. Master in innovation, Orcid: <https://orcid.org/0000-0001-5490-6762>

⁵ Research Professor, University Foundation of the Andean Area. Master in innovation, Orcid: <https://orcid.org/0000-0002-6630-1151>

⁶ Research Professor, Autonomous Mexico State University. Phd in Political Complexity, Orcid: <https://orcid.org/0000-0002-9364-6796>

use of the Atlas it software, the findings obtained in the interviews with the experts in human management were analyzed. With this we were able to determine that the four main challenges for these areas are the ethics of care and good living, management of collaborative teams, technological and digital skills, and data science. Finally, the strategies to be applied were defined based on what was proposed by the experts.

Keywords: *Higher Education, Industry 4.0, Industrial Revolution, Human Resources, Industrial Revolution*

Introduction

We are currently in industry 4.0, which will have a great impact on humanity, as stated by the president of the World Economic Forum Schwab (2016), “the fourth industrial revolution will be in every detail as powerful, impactful and historically important as the previous three.” (p. 14). However, according to what was expressed by Rodríguez et al., (2021), a significant gap is evident in the medium and short term in Industry 4.0, from the public and private sectors of the countries, so the design and development of public policies that contribute transversally in the digital age. These global changes have a structural impact on organizations, which must adapt to new facts and realities. According to Mora and Guerrero (2020), the main areas in which companies will have to readjust and restructure their management are: I4.0 projects, operational, strategic, human talent, energy and sustainability.

Due to the above, professions in general must be rethought and their competencies adjusted to the new realities, as indicated by García (2019), who expresses that the transformation of the nature of jobs due to advances in technology has led to that it is necessary to intervene in human capital so that workers acquire the skills required by the labor market. Bearing in mind that the fourth industrial revolution requires the “development of specific hard or cognitive skills, which vary according to each sector or activity, but also other soft or socio-emotional skills, necessary to produce knowledge throughout life” (Basco et al., 2020).

Taking into account the new profiles, skills and knowledge that professionals must develop to meet the needs of organizations, it is essential that HEIs also adapt to train professionals who meet the expectations of the work environment, "who manage to solve problems ethically." , with critical thinking and analysis of the consequences of their decisions, strengthening its disciplinary pillars to involve different perspectives that can complement the proposed solutions by working in an interdisciplinary way” (Castellanos et al., 2020). Likewise, digital development, characterized by technological acceleration, the availability of knowledge and access to information, means that higher education institutions must rethink training and training methodologies for the development of attitudes and competencies, this is supported in accordance with Sandia and Montilva (2020), who specify the new educational approach from a predominant learning in citizen education, promoting the competencies that are basic and necessary in digital aspects and civic skills.

Given the situation discussed above, the fundamental role assumed by the Human Talent areas of the HEIs is considered relevant, as support to the directives of the institutions so that human talent adapts and aligns with institutional policies, assuming the commitment to “preparation in processes of creating profiles, selection and permanence of personnel and, in addition, studies around change management, which prepare people in new lines of management and work for the adoption of competencies.” (H, VM, & MP, 2020).

At this point, the two big questions that give rise to this research arise: firstly, what are the

main challenges that the Human Talent areas of HEIs must face within the framework of Industry 4.0? and, secondly, what strategies should they implement to face the identified challenges?

Theoretical Framework

The penetration of the fourth industrial revolution is reflected in the conclusions presented by authors such as Basco et al., (2020) who mention that around 60% of the population has adopted digital platform technologies, mobile services and cloud computing. , where in addition, given the growth projections of new technologies, it is expected that these will be a fundamental part of this revolution, mainly through the use of key tools such as: artificial intelligence, big data, cybersecurity, simulation of virtual environments and robotization .

With respect to the technology-human relationship, the new information technologies developed today can generate changes comparable to those that have occurred in previous technological revolutions, where these have substantially impacted the labor market, mainly in aspects such as efficiency and indispensability of people, so that, human capital being the most valuable asset of companies, it deserves special handling, dedication and appropriate management, so that it does not end up abruptly displaced, but rather receives the relevance it deserves, by integrating it to the transformation process, recognizing that the latter will not be achieved with the continuous use of traditional strategies and without updating personnel skills.

Thus, for authors such as Arroyo and Hermoso (2019), the 4.0 revolution from technology increasingly plays a role in the management of human capital, given that it allows the simplification of processes, data processing and reporting. This is confirmed by the human resources manager of IBM Colombia, Muraska (2020, cited in H. et al., (2020) when she states that “technology comes to contribute, automate manual work and so that people can learn new skills.” (p. 7), which brings with it great challenges for organizations in terms of training, training and education of collaborators.

These training processes are fundamental for the transition demanded by the new 4.0 era, as mentioned Echeverría and Martínez(2018),who affirm that “education is the most powerful weapon that can be used to respond to the unavoidable need to update and improve skills throughout the lives of a greater number of people, and thus confront a VUCA environment” (p. 1) For this reason, author such as Martínez (2019) states that “Updating and reviewing the direction of education does not mean reducing it, impoverishing it, but rather the ability to harmonize with this moment in history without canceling its identity” (p. 7), this, supported by the strategic alignment of the human capital management of the institutions.

Although the above allows us to understand the relevance of human talent management so that HEIs can compete in environments governed mainly through the mastery of new technologies, it is also important to know which aspects are priority to align human talent with current trends in digital matters. Thus, based on a theoretical review, at least five skills have been identified on which the human talent of Higher Education Institutions should focus.

The first of them is what Murphy et al.(2019),have been called, through evidence, as a concern for a large number of corporate leaders worldwide, that is, the ethical use of technology, which has manifested itself mainly in those organizations that present high growth, which also , allows us to begin to dimension the importance that these issues have for organizations, specifically in the face of technological expansion and the vulnerability of the information that is managed

as an effect of it.

Secondly, the strategy of care and good living, which, as González (2019) indicates, care must focus on the needs of each individual and the responsibility towards them, which must subsequently transcend the care of others as social entities. This is why, from human capital management, the well-being of the collaborator must be focused on individually and as a group, without losing focus on the ethical environment as a larger system. An example as part of care is evidenced by Esquirol (2015, cited in Echeverría and Martínez (2018)), who states that the permanent connection with technology and social networks deprives the most precious asset that human beings possess, such as It is the time to rest, engage in conversations and reflect.

Thirdly, the management of collaborative teams is another of the skills to be developed by the human talent areas, given that, according to research such as that developed by Borrero and Alcalá (2020), professionals currently have a great challenge. facing the new digital era, because this phenomenon affects people's initiative and ability to generate innovative proposals that allow for better organizational results, which is why the adoption of agile and collaborative work methodologies becomes relevant. that allow unifying comprehensive processes and technologies, managing new knowledge to promote new teamwork skills through multidisciplinary and comprehensive interaction.

In accordance with the above, Zambon et al., (2019, cited in Amaya, (2019)), also consider that “the Industry 4.0 approach allows the creation of an environment in which all elements come together continuously. and effortlessly, also highlighting that all devices and their functionalities constantly communicate with each other”, which allows achieving a high level of coordination between the various components of the work teams. In this way, it is possible to increase the ability to coordinate activities, which is essential for the development of continuous improvement in organizational areas where it is required.

Another of the challenges or skills to be developed, on which greater attention is paid, refers to technological and digital skills, which are considered fundamental for the development of the human capital of Higher Education Institutions, given that this allows them to face the demands of the 4.0 era, mainly because currently, after the arrival of Covid-19, there is greater force in the inclusion of virtual and remote education modalities which, according to Aya et al., (2020) It requires HEIs to recruit teachers with greater preparation to teach, guide and accompany students in their work, in the use of digital teaching tools and the development of skills in information and communication technologies.

The above not only refers to the use of digital tools, but also to aspects of teaching, which, as Rambay and De la Cruz (2021) state, the competencies that must be developed by teachers are focused on pedagogical methodologies. based on ICT, planning and learning expertise with ICT, which requires not only digital skills but also the application of these to the aspects of pedagogy.

Likewise, according to Burgos (2016, cited in Aya, Mejía and Romero (2020)) “teaching in virtual environments implies the appropriation of the effective use of digital mediations as a starting point, assuming a facilitating and energizing role that manages to guide the student.” (p. 159); To achieve this, research and continuous updating are needed, so that in this way it is possible to meet the requirements of the virtual educational environment and generate learning guidelines and models based on ICT.

The fifth skill identified refers to data science, which becomes relevant given that every day,

information takes on greater importance in the development and evolution of society, which positions it as a key factor for economic growth and well-being, as a consequence of its usefulness, since where there is an increase in activities associated with digital tools, there is also greater data traffic, which in turn demands the development of human capital and its intellectual level (González et al. , 2020).

The above highlights the need for HEI collaborators to have skills in data sciences, mainly when considering what is being debated in the world on topics such as privacy, where González (2019) points out that it is important to make use of data. and privately managed information to enhance the market, data analytics and programming that, integrated with the sciences of human behavior, allow defining fundamental aspects for the management of human capital from the different areas of human talent, since people We have the capacity to produce data in a permanent and timely manner, which is stored and can be processed for the development of organizational management that is more adjusted to reality. The latter is also supported by big data which, according to Aguado (2018, cited by Amaya (2019)), has generated a shocking change in the way things are done in organizations, which mainly affects the way in which They make decisions based on achieving the organizational mission in the most efficient way possible.

Methodology

The research developed to identify the main challenges faced by the Human Talent Management areas of Higher Education Institutions and their main strategies to address their needs in a timely and efficient manner, has a qualitative approach, which according to Hernández (2018), “its purpose is to explore the way in which certain individuals perceive and experience the phenomena that surround them, delving into their points of view, interpretations and meanings” (p. 390).

Therefore, the obtaining and analysis of the information was done through two fundamental moments; The first moment corresponds to a documentary type component, from an analytical review of the literature that allowed us to understand the problem in detail. This analytical and descriptive review of the literature is a phase prior to data processing that “consists of preparing and analyzing historical data to identify patterns and trends” (Intelligent, 2019), which is why this methodology was considered the most suitable for identifying the most recurring challenges for the areas of Human Talent Management in relation to industry 4.0.

The second moment was developed through field research, through semi-structured interviews with experts in areas of Human Management of Higher Education Institutions to obtain data related to the topic. According to Pomposo (2015), this type of interview generates a space for flexibility in terms of information and development with the interviewee, in this way it was possible to obtain data that helped validate the information analyzed and propose some strategies that can implement these areas of facing the new challenges of industry 4.0. There was a sample of five (5) experts who have more than 20 years of experience in the area of Human Talent Management in Higher Education Institutions, who are located in the city of Bogotá, Colombia, as described below. :

Expert 1. Journalist and Social Communicator from the Universidad de la Sabana, Master in university management from the Universidad de los Andes and Doctor in Philosophy, PhD in Higher Education from the Universidad Benito Juárez García. He is currently the director of the Observatory of the Colombian University, he has more than 30 years of professional experience in issues of management, visibility, training, direction, teaching and planning in HEIs, with

performance in academic peer issues with nearly 70 HEIs in Colombia. Additionally, he is the creator of the dDies-Development of Directors of Higher Education Institutions program and was a consultant at the Latin American Leadership Institute for 20 years.

Expert 2. Industrial Engineer from the Catholic University of Colombia and Specialist in Labor Legislation and Social Security from the Sergio Arboleda University. He is currently a Manager at Contexto Consultores SAS, he has more than 30 years of professional experience in Human Development with a focus on the design of policies, strategies and process architecture, human capital administration and salaries. During his professional career he has been Director of Human Talent at the National University Health Corporation of Colombia, Head of Human Talent Administration at the Universidad del Rosario. Additionally, he has 15 years of experience in teaching at Higher Education Institutions.

Expert 3. Business Administrator from the Universidad de los Andes and Manager of Uniandinos projects. 10 years ago he founded Business life Colombia, from where he works on sustainable projects and consulting on management issues, training, information analysis, salary studies and planning at IES. He has more than ten years of experience in Higher Education Institutions through project management, consulting, headhunting, culture, happiness, organizational climate, among others.

Expert 4. Business Administrator at the Externado University. He is currently a Human Management consultant for Higher Education Institutions, he has more than 45 years of experience in Human Management in leadership issues, management development, the first years were consulting, being Director of Human Management at the livestock bank, today BBVA, at Phillips and Nestlé. For more than 30 years he has been linked to education and consulting, so that, for 18 years, he was a university professor on topics of human management, leadership, ethics and social responsibility and sustainable development.

Expert 5. Psychologist from the Catholic University of Colombia with Specialization in Human Resources Management from the Externado University of Colombia, with her training and experience she has acquired expertise in the design and management of human talent processes and policies. She is currently Director of Human Resources at the Gimnasio Colombo Británico - Bilingüe Internacional with more than 25 years of experience leading Human Management processes and positions such as Head of Selection, Occupational Health and Wellbeing at the Universidad del Rosario and Head of the Human Talent Unit from the University of San Buenaventura.

The semi-structured interview format is made up of two components, such that in the first section questions are formulated to characterize the professional profile of the experts, and the second section has ten questions focused on the challenges of the human talent area. in higher education institutions, strategies and recommendations to face industry 4.0. Inductive analysis was used to analyze the data, which, according to Herrera (2018), seeks to previously establish categories that are built from theoretical references. The data was processed in the Atlas ti tool, with two categories and four subcategories.

Analysis of Results

Next, the results obtained during the literary review and field exploration processes are presented and a comparison is developed against the contributions made by other authors previously on this topic. Thus, to identify the main challenges faced by the areas of Human

Talent Management of Higher Education Institutions in the face of the 4.0 revolution, the four main concepts that are repeatedly mentioned in the literature consulted were selected. and which, as seen in Figure 1, correspond to: ethics of care and good living, management of collaborative teams, technological and digital skills and data science.

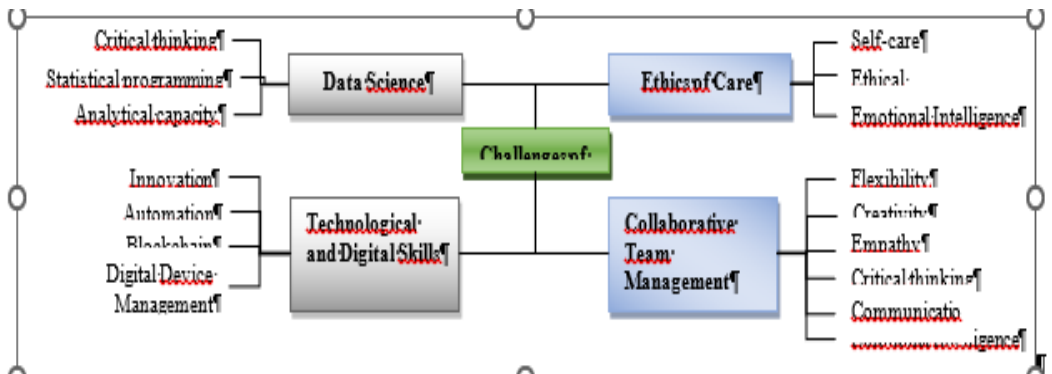


Figure 1: Challenges of 4.0 in the Areas of Human Talent Management.

Likewise, for each of these challenges, the elements that are considered key to its development were identified and are also presented in Figure 1. These elements are: for the ethics of care and good living, self-care, ethical criteria and emotional intelligence; Regarding the management of collaborative teams, the skills of flexibility, creativity, empathy, critical thinking, communication and in common with the previous challenge, emotional intelligence were identified; for technological and digital skills, aspects such as the management of digital devices, blockchain, automation and innovation were identified; Finally, in data science, there is critical thinking, statistical programming and analytical skills.

The above allows us to clearly see the need for the human talent department of higher education institutions to prepare both in technical and human aspects, to face the new reality that, as mentioned by Floridi (2015, cited by Castellanos et al., (2020)) “When the environment changes, the individual must transform and thus preserve humanity, using the resources available to understand the new environment in which they live and survive in it” (p. 248).

On the other hand, with respect to the field research, to categorize the contributions of the experts, a classification was carried out supported by the Atlas TI software, from which the categories presented in Figure 2 were obtained, whose responses confirmed that in their For the most part, experts focus their ideas first, around Human Talent Management challenges, such as the development of collaborative teams, secondly, the ethics of care and good living in employees, and thirdly, technological skills and digital and finally, the efficient use and management of information.

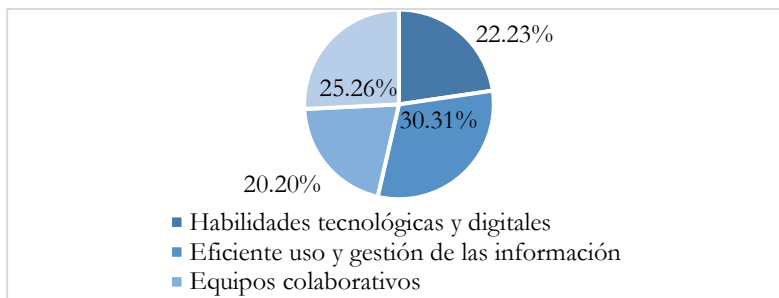


Figure 2: Categorization of the Skills of the 4.0 Revolution, Calculation with the Atlas Ti Tool.

The result allows us to see that despite the clear importance of the development of collaborative teams, with a total of 30 mentions that are equivalent to 31%, the proportions between the four categories are very similar, since the ethics of care and good living in employees and technological and digital skills have 26% and 23% respectively, while the efficient use of information management, which has the lowest percentage, has 20%, remaining very close to the others. three categories.

The importance reflected in the percentage obtained by collaborative work supports what was expressed by Master and Restrepo (2017), who affirm that the absence of general skills is one of the limitations when it comes to obtaining personnel for different positions, which is why, these have become increasingly important in the development of human talent, even more so with the arrival of the fourth industrial revolution and within which teamwork is considered one of the main skills for different positions in an organization.

On the other hand, in the analysis of the semi-structured interviews with the experts with the atlas ti tool, as shown in figure 3, it was identified that, to manage collaborative teams, one of the strategies within the development of leaders is to give collective recognitions, which lead to establishing productivity indicators from coexistence. This is aligned with what was presented by Master and Restrepo (2017), and what was expressed by the World Economic Forum (2016), who express that, additionally, teams must be managed from collective satisfaction by identifying elements of attitude, aptitude and judgment, and have the ability to identify innate leaders who influence teams.

For the challenge of ethics of care and good living, experts postulate three elements to work on, the first is the organizational climate, which focuses on identifying opportunities for well-being and quality of life and managing people from diversity and from be; The second is to define an organizational culture that seeks alignment of the employee with it, developing leaders to prioritize people and manage teams from trust and not from control; The third is the development of skills that allow a balance of personal and work life, thus giving relevance to what was expressed by González (2019), who expresses that people's well-being is not only based on autonomy and justice, but also in care as an essential element to lead a good quality of life.

Regarding the challenges related to technological and digital skills, the strategies identified revolve around integrating technology into the service, investing in technology and training employees in order to optimize response times. This is related to what has been said about collaborative teams, where authors such as Master and Restrepo (2017) categorically affirm that the relationship of each person, company and country with the digital ecosystem will determine its sustainability and its ability to progress., which is consistent with what was expressed by the experts. Finally, for the efficient use and management of information in the areas of Human Talent, associated with data science, leaders must have access to information for their self-management, generate periodic diagnoses for decision making and seek potentialization. of internal processes, always from a focus on productivity aligned with the strategy.

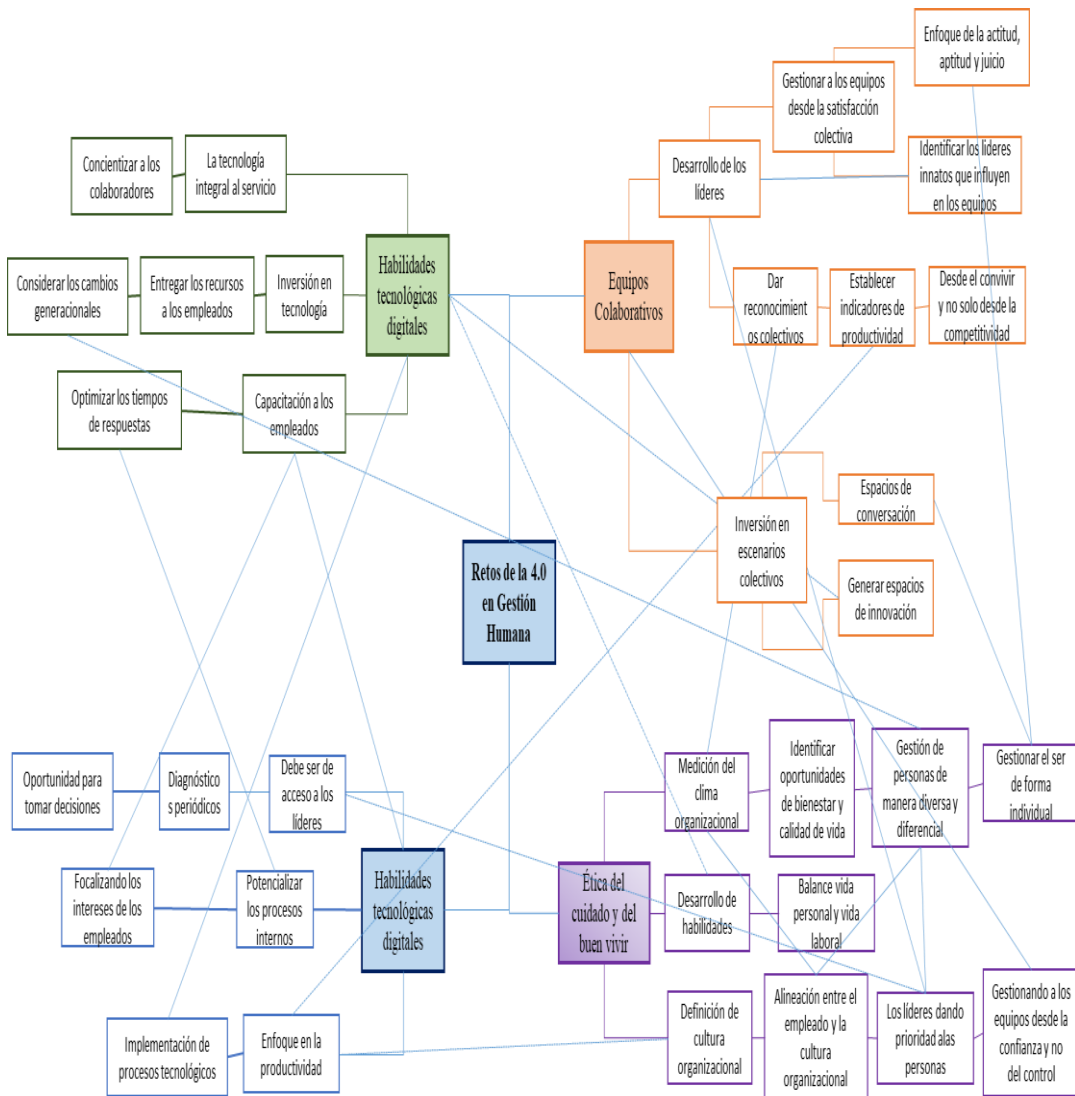


Figure 3: Analysis of Interview with Experts. Application with Atlas Ti Tool.

Conclusions

Industry 4.0 has generated great challenges for the areas of Human Talent Management, which must overcome various challenges, mainly in relation to four fundamental axes such as the ethics of care and good living, the management of collaborative teams, the skills technological and digital and data science. Although the literature considers these topics as the main challenges for the areas of human talent, the interviews carried out with the experts allowed us to identify that currently the priorities within the challenges of Industry 4.0 should be focused on, first of all, working on the collaborative team development; secondly, the ethics of care; thirdly, technological skills and finally, fourthly, the use of data. The above, focused on the development of the being, giving priority to soft skills and followed by hard skills supported by the use of information for internal management.

The research also concludes that experts propose strategies to develop skills in employees, mainly in leaders, to make decisions, develop people from being and diversity, encourage creativity and collaborative work. Likewise, the use of technological tools that allow results in the medium and long term, focused on productivity and the balance of the employee's personal and work life, is key.

The 4.0 revolution has generated great changes and these must be assumed with responsibility and priority by parts of the Higher Education Institutions, generating that their Human Talent Management areas are committed to the new demands of the environment, so that they can be up to date. up to the new trends and are not faced with obsolescence generated by the lack of attention of the management on the issues concerning the integration of digital tools in the development of educational activities.

Without a doubt, the area of Human Talent Management in higher education institutions plays a fundamental role in the face of the implications of the 4.0 era, since it serves as a transforming axis of human capital through the use of strategies for the improvement of “being” from the different aspects that constitute it, giving priority to the human in the field of ethics and integrality. With the analyzes carried out, it is clear that the challenges faced are not only at the level of academic training, but also, and perhaps much more relevant, is the importance of the attitudinal and relationship strengths that the capital must have. human to achieve adequate performance in the new global environment where it operates, characterized by permanent dynamism, uncertainty, competitiveness, among others.

References

- Amaya Aragon, R. (2019). The industrial revolution 4.0: transformations in organizations and human management in the period 2015 - 2019. Bogotá: Universidad Piloto de Colombia.
- Arroyo Monreal, M., and Hermoso Traba, R. (2019). Current needs in talent management: 4.0 solutions. Zaragoza University, Spain. At: <https://core.ac.uk/download/pdf/290000833.pdf>
- Aya Vejarano, CE, Mejía Vásquez, JC, and Romero Oliveros, A. (2020). Challenges in teaching practices and teacher professional development in the 21st century, the Andean case. In JJ Briceño Martínez, MP Castellanos Saavedra, & JL Valencia Molano, Current Challenges of Higher Education Analysis and perspectives in the face of a changing world (pp. 155-173). Bogotá: Area University Foundation.
- Basco, A.I., De Azevedo, B., Harraca, M., and Kersner, S. (2020). Latin America in motion Competencies and skills in the Fourth Industrial Revolution. Inter-American Development Bank. doi:<https://doi.org/http://dx.doi.org/10.18235/0002132>
- Borrero Puentes, N., and Alcalá Zarate, LF (2020). Virtual team management model in the execution of collaborative academic projects. CEA Magazine, 6(12). doi:<https://doi.org/10.22430/24223182.1609>
- Castellanos Saavedra, MP, Briceño Martínez, JJ, & Valencia Molano, JL (2020). Current Challenges of Higher Education Analysis and perspectives in the face of a changing world. Bogotá: University Foundation of the Andean Area.
- Echeverría Samanes, B., & Martínez Clares, P. (2018). Revolution 4.0, Skills, Education and Guidance. Digital Journal of Research in University Teaching (RIDU), 12(2). doi:<http://dx.doi.org/10.19083/ridu.2018.831>
- García Aretío, L. (2019). Need for digital education in a digital world. Ibero-American Journal of Distance Education, 22. doi:<https://doi.org/https://www.redalyc.org/articulo.oa?id=331460297001>
- González López, P. (2019). Ethics of care and education. University of the Balearic Islands.

- González López, P. (2019). Ethics of care and education. University of the Balearic Islands. In: https://dspace.uib.es/xmlui/bitstream/handle/11201/150839/tfm_2018-19_MV12_pgl888_2161.pdf?sequence=1&isAllowed=y
- González, F. (2019). Big data, algorithms and politics: social sciences in the era of digital networks. *Moebius Strip*, 267–280. doi:<https://doi.org/https://dx.doi.org/10.4067/s0717-554x2019000200267>
- González, Y., Manzano, O., and Jiménez, L. (2020). Qualification of human talent in the face of organization 4.0 and its innovations. *Spaces*, 1–19. doi:<https://doi.org/https://doi.org/10.48082/espacios-a20v41n49p18>
- H, A., VM, E., & MP, MA (2020). Challenges of human talent management in industry 4.0.
- Hernández Sampieri, R. (2018). Research methodology: quantitative, qualitative and mixed routes. Mexico City: McGraw Hill.
- Herrera, C. (2018). Qualitative research and thematic content analysis. *General Magazine of Information and Documentation*, 119.
- Intelligent. (2019). What is business analytics? Obtained from Big Data and Artificial Intelligence At: <https://itelligent.es/es/que-es-analitica-empresarial/>
- Martínez Ruiz, X. (2019). Presentation Industry 4.0 and digital pedagogies: aporias and implications for higher education. *Educational Innovation*, 19(79), 7-12.
- Master, BM, and Restrepo de Mitchell, I. (2017). Strategy for one. Bogotá - Colombia: National Association of Businessmen of Colombia –ANDI.
- Mora-Sánchez, D., and Guerrero-Marín, L. (2020). Industry 4.0: the challenge on the route towards digital organizationsb. *Management Studies: International Journal of Administration*, 186–209. doi:<https://doi.org/http://dx.doi.org/10.32719/25506641.2020.8.7>
- Murphy, T., Garg, S., Sniderman, B., & Buckley, N. (2019). In: <https://www2.deloitte.com/co/es/pages/technology/articles/uso-etico-de-la-tecnologia-en-la4ta-revolucion-industrial.html>.
- Pomposo Yanes, ML (2015). Analysis of needs and proposal for online evaluation of oral competence in English in the world. National University of Distance Education. At: <https://n9.cl/k52w>
- Rambay Tobar, MG, & De la Cruz Lozado, J. (2021). Development of digital skills in university teachers in. *In Crescendo*, 11(4),. In: <https://revistas.uladech.edu.pe/index.php/increscendo/article/view/2331>
- Rodríguez Alegre, LR, Trujillo Valdiviezo, G., Egusquiza Rodríguez, MJ, & López Padilla, RD (2021). Industrial Revolution 4.0: The digital divide in Latin America. *Koinonía Interdisciplinary Refereed Journal*, 6(11), 147–162. At: <https://www.redalyc.org/articulo.oa?id=576868768011>
- Sandia Saldivia, B., & Montilva Calderón, J. (2020). Digital technologies in service-learning for citizen education. *IRIED. Ibero-American Journal of Distance Education*, 23(1), 129–148. At: <https://www.redalyc.org/articulo.oa?id=331462375007>
- Schwab, K. (2016). The fourth industrial revolution. Barcelona: Editorial Debate.
- World Economic Forum. (2016). The Human Capital Report. At: http://www3.weforum.org/docs/HCR2016_Main_Report.pdf