



**UNIVERSITAT
JAUME·I**

PEOPLE ANALYTICS IMPLEMENTATION IN THE HUMAN RESOURCES DEPARTMENT

Author: Consuelo Lázaro Lázaro

Tutor: Alma María Rodríguez Sánchez

BUSINESS ADMINISTRATION DEGREE
AE1049 – FINAL DEGREE PROJECT
CURSO 2021-22

TABLE OF CONTENTS

<u>A. LIST OF TABLES</u>	<u>4</u>
<u>B. LIST OF FIGURES</u>	<u>4</u>
1. INTRODUCTION	5
2. THEORETICAL FRAMEWORK	7
2.1. Human Resources Analytics concepts	7
2.2. Big Data in Human Resources	11
2.2.1. Keys to Big Data	11
2.3. People Analytics in Human Resource	14
2.3.1. Implementing People Analytics	16
2.4. Human Resources practices with People Analytics	19
2.4.1. Companies' examples	22
3. METHODOLOGY	24
3.1. Sample	26
3.2. Procedure	27
3.3. Questions analyzed	28
4. RESULTS	29
5. CONCLUSION	31
6. LIMITATIONS AND FUTURE LINES OF RESEARCH	34
6.1. Limitations	34
6.2. Future lines of research	34
7. BIOGRAPHICAL REFERENCE	35
8. ANNEX	41

A. LIST OF TABLES

Table 1. Key characteristics of big data.....12

Table 2. Characteristics of relational analysis.....16

Table 3. Computer tools.....19

Table 4. Investigation variables.....29

B. LIST OF FIGURES

Figure 1. Benefits of using the HRA.....9

Figure 2. Seven V's of Big Data.....14

Figure 3. Strategic process.....18

Figure 4. Areas of implementation for People Analytics.....21

Figure 5. Spending on business innovation by sector.....25

Figure 6. Turnover in innovative companies by sector.....26

Figure 7. Map of innovation in Europe.....27

1. INTRODUCTION

The purpose of this research paper is to discuss the term People Analytics, how it has been gaining importance for companies, more specifically in the HR department, how it is implemented and in which HR processes it is facilitating its use.

Going deeper into the subject, we will analyze the challenges faced by companies in implementing People Analytics, answer why many Spanish companies have not yet implemented it, find out if there are problems in the processes or if it is being done well and find out the results of the talent management of those companies that have implemented it.

Today's environment is fast changing and technology is constantly evolving, companies are adapting to digitalization. Digitalization and innovation go hand in hand, as new ideas and discoveries have to emerge in order to obtain new knowledge and results. The fourth industrial revolution has changed the way we work and has positioned people as the most precious asset of companies. In order to improve employee productivity, company results and strategic objectives, talent management must be efficient, and today, thanks to People Analytics, it is possible (Barnes, Panelo, & Vazquez, 2019) (Guerra & Ortiz, 2020).

The introduction of People Analytics in companies has been a big change, offering a number of benefits such as reduced monetary and time costs; improved talent retention, wellbeing and satisfaction; reduced biased hiring and demotivation; improved organizational values and stronger culture; in addition to analyzing personal data, it offers an effective analysis of social interactions; it increases the efficiency of decision-making; more time is spent on important and value-adding tasks; it improves people management based on real data; and it allows for tracking decisions made and checking whether or not they are working, thus correcting deviations (Cardoso R. T., 2021) (Cardoso A. P., 2021).

Thus, the application of People Analytics in companies is very productive for both business performance and human talent. But there is a false perception that only large companies can implement this practice. Well, regardless of the size of a company, both large and small companies can implement People Analytics models that are adapted to their conditions, as it is possible to obtain simple tools and techniques. The important thing and the key to this practice is to correctly define and organize the objectives to be followed and achieved, in order to favour the decision-making process of the organizations (Equipos&Talentos, 2020) (Davenport, Harris, & Shapiro, 2010).

Leading companies are aware of the role that people play in their businesses. This is why Google, Cisco Systems, Advanced Micro Devices and Electronic Arts are innovative companies that have already integrated analytics services into their organization and their human resources departments. But what about Spanish companies? They often face obstacles the first is investment, as there is no investment in innovation in the human resources department, managers need to be aware that if they do not invest in people, they will not make a profit. A second obstacle is the lack of competence, knowledge, experts and scientists are needed.

There are no studies that explain what kind of organizations are implementing technology in their business, why some find it easier and others do not. The main objective of this research is to identify and delve deeper into the problems and obstacles beyond those that can be deduced at first glance, such as, as mentioned above, investment.

2. THEORETICAL FRAMEWORK

2.1. Human Resources Analytics concepts

Human Resources Analytics is "an integrated methodology and process for providing evidence, through data analysis, that is used to improve the quality of people decisions with the goal of improving performance at the individual, group or organizational level" (García, 2018).

It aims to support companies in improving their performance in the management and development of people, in line with the organization's objectives. In short, it helps to make decisions regarding the management of people.

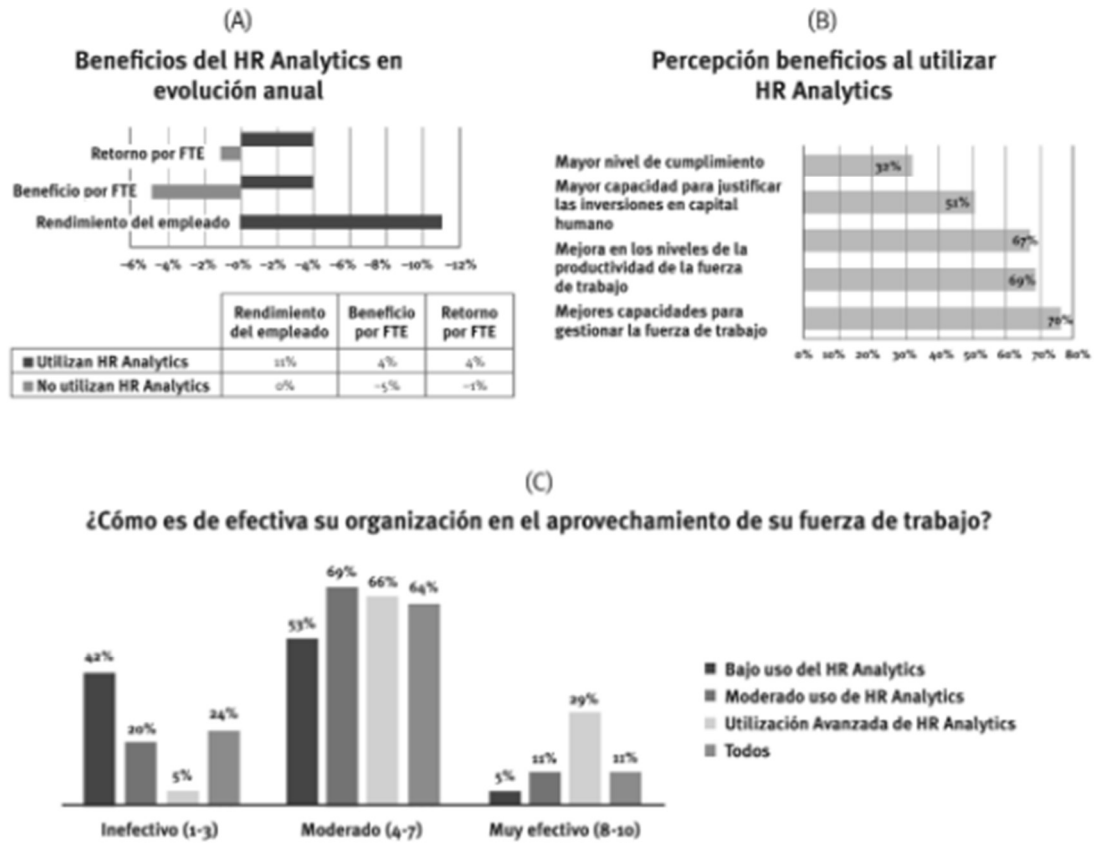
"HR Analytics is about drawing good conclusions from data. It includes statistics and research design and goes beyond the ability to identify problems and collect information about them" (Boudreau, 2008).

"Fact-based decision making uses objective data and analysis of that data as a fundamental guide for decision making. The goal of this approach is to find the most objective answer through a process of analysis uninfluenced by bias" (Davenport, Harris, & Morrison, 2010).

The concept of HR Analytics is capturing the attention of both organizations and society due to a question of opportunity, as data on people's behaviour can be obtained thanks to the development of new technology that facilitates access to it, and transformed into knowledge and prospective intelligence. "This technological development has been successfully applied in sectors as diverse as banking, health, energy, marketing and consumption, sentiment and opinion analysis in conversations on social networks, and even in the sports and political area" (Aguado, 2015). In addition, another issue is the need, as people are the competitive advantage of organizations, so it is important to know data on human capital and to know how to analyze it.

Figure 1. Benefits of using the HRA

BENEFICIOS EN LA UTILIZACIÓN DEL HRA



Source: (Aguado García, 2018)

People Analytics is a research system used to study the people who make up an organization, using extracted data and performing an intelligent analysis to obtain objective, valid and reliable conclusions.

Not only does it provide data about the present, but it is also possible to make preventive decisions by analyzing the data and making predictions about the state of the company in the future.

The main objective of People Analytics is to help executives and managers to better manage the people in a company, make better decisions and boost well-being. To do this, it is first necessary to identify the variables that the company wants to know and analyze.

"HRA is a methodology and an integrated process to provide evidence, through data analysis, that is used to improve the quality of people decisions with the objective of

improving performance at the individual, group and/or organizational level. It is therefore about helping organizations to improve their performance by aligning the management and development of people with business objectives" (Dalinger, 2019).

"Fact-based decisions use objective data and data analysis as a fundamental guide to decision making" (Carreño Rodríguez, Salgado Ocampo, & Suárez Bolaños, 2020).

"People Analytics is the systematic identification and quantification of the people who drive business results" (Bondarouk, 2016).

In Analytics, analysis is divided into three levels (Guevara Céspedes, 2020):

- Descriptive analytics, the main focus of this analysis is on obtaining and understanding the relationships of current and historical data.
- Predictive analytics, predictions about the future are made through statistical techniques, models and the extraction of current and historical data.
- Prescriptive analysis, at this level complex data is analyzed to predict outcomes, aid decision making and show possible consequences.

People Analytics is based on two concepts: Big Data and Business Intelligence.

Big Data is a database used for massive data analysis. This concept applies to all information that cannot be collected, processed or analyzed through traditional software tools.

"Big data is a term that describes large volumes of high velocity, complex and variable data that require advanced techniques and technologies to enable the capture, storage, distribution, management, and analysis of the information" (Commission, 2012).

"The big data revolution is about doing things by analyzing huge amounts of information that are simply not possible with smaller volumes" (Álvarez, 2021).

The size of the data to be considered Big Data is not yet defined, currently experts consider the data set to range from 30-50 Terabytes to several Petabytes.

It helps companies harness data and use it to identify new opportunities, identify problems, move faster and more efficiently. It reduces costs and above all helps to improve decision making (Powerdata, s.f.).

Data can be collected from a variety of sources such as websites, search engine information; social networks such as Instagram or Facebook; CRM systems; Machine to

Machine, technologies that allow you to connect to other devices; online shop transactions; or call logs.

There is a classification of data into structured data, which are those traditionally used in data processing. Unstructured data are those which have their original form, as they were collected and without undergoing any type of storage or analysis. And semi-structured, which follow a structure but are not sufficiently regular as in the case of structured data (Delrieux, Barry, Stickar, Mazzanti, & E., 2015).

To conclude this concept, it is necessary to know that Big Data is based on magnitudes called the "Vs", which complement its definition. It used to be based on three "Vs" namely variety, volume and velocity, but nowadays, it is made up of seven "Vs", which include value, variability, veracity and visualization, in addition to the previous three.

"Big data is high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making" (Gartner IT Glossary, nd, 2022).

Business Intelligence is a process made up of tools and processes that allow information to be filtered so that it is useful, of high quality and adds value to decision-making, transforming it into knowledge.

The data received in this process are those generated by Big Data, and it is at this stage that they become meaningful.

"BI is an interactive process for exploring and analyzing structured information about an area (usually stored in a data warehouse), to discover trends or patterns, from which to derive insights and draw conclusions. The Business Intelligence process includes communicating findings and effecting change. Areas include customers, suppliers, products, services and competitors" (Dresner, 2007).

According to a survey conducted at a Gartner Symposium conference: "Business Intelligence is the ability to provide data/information in a functional process (or application) to enable a specific fact to be shown and which in that context can lead to an action" (Dresner, 2007).

The process is based on extracting the necessary data from various platforms: "Operational Systems (OS), Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Structured Query Language (SQL)" (Merchán, 2019). Once the data is extracted, it is transformed into a format in which it can be analyzed

and stored. It is stored in sub-sections, so that company departments can easily find and select it.

2.2. Big Data in Human Resources

After analyzing the concepts of Big Data and People Analytics, it can be stated that they are different concepts, although it is common to use them as synonyms. Big Data is the set of massive data, but People Analytics does not refer to the amount of data, but to the process of analyzing it, focusing on the management of human capital, the orientation of talent management.

It is true that Big Data has contributed to the advancement of People Analytics, offering a large amount and variety of data to analyze in an innovative and simple way. Time and resources are optimized by focusing only on valuable information that is useful for both day-to-day activities and complex processes.

One advantage of Big Data is predictive analytics, as it is a tool for predicting future results, making decisions that reduce business risk and improve operational efficiency. Big Data tools provide several sources of information to obtain data, thus reducing costs in using different sources that sometimes provide data that are irrelevant. It also makes it possible to increase revenue, thanks to the generation of data on the company's products and services and to make decisions about obtaining greater productivity (Barnes, Panelo, & Vazquez, 2019).

2.2.1. Keys to Big Data

Big Data is based on a series of key characteristics that complement the definition and are considered a competitive advantage, which is why it is a useful and differentiating concept for all those companies that decide to implement it (innova, 2019).

Table 1. Key characteristics of big data

Intelligence	Related to knowledge management, it is about going beyond descriptive analysis and focusing on predictive and explanatory analysis, and although these analyses are complex, they help to better
--------------	--

	understand all the data that can be obtained in order to make efficient and accurate decisions.
Methods and techniques	The set of mathematical tools and techniques that are used to facilitate the collection, extraction and analysis of data, which are not available to everyone.
7 Vs	<p>Volume, the sheer size of the data that can be stored in a company is infinite. The greater the volume of data, the more difficult it is to use big data.</p> <p>Speed, the rate at which it is possible to search for and obtain information in real time, as quickly as possible. It is necessary to store and process data as quickly as possible so that they do not lose value.</p> <p>Veracity, the degree of reliability of the data obtained, which will have an impact on the quality and validity of the data, so it is important to check its veracity.</p> <p>Variety, the amount of diverse data that can be obtained from different sources. You can find data with numbers and text, as well as videos and images.</p> <p>Value, the data that is obtained and is useful for analysis and drawing conclusions.</p> <p>Variability, a large volume of data can be obtained, which can change and vary depending on time.</p> <p>Visualization, the way in which data is displayed and represented through, for example, graphs or spreadsheets (RedacciónAPD, 2019) (Cabrera Sánchez & Villarejo Ramos, 2018).</p>

Source: Own elaboration¹

¹ (Aguado García, HR Analytics: Teoría y práctica para una analítica de recursos humanos, 2018)

Figure 2. Seven V's of Big Data



Source: (ResearchGate, 2018)²

Data, if processed correctly, is a company's most valuable asset. With it, it is possible to find out consumer tastes, preferences, needs, satisfaction with products and services, and it is also possible to create advertising campaigns for greater profitability. In addition, a large amount of information can be obtained from the Human Resources area, which is why, thanks to technology, more and more companies are implementing the Big Data phenomenon in this department, with the aim of making efficient and value-generating decisions (Granja, Katzky, Seferian, Mariconda, & Occhiuzzi, 2016).

"Analytics in human resources is a communication tool that provides information from different sources with the objective of identifying the conditions in the area that will govern decision-making and the possible solution of current and future problems. In this way, it seeks to move away from the old HR system, adding value with accounting and data management" (Fitz Enz, 2010).

Big Data leaves aside old HR methods such as intuition and subjective data, and aims to use this tool to achieve effective and efficient results. Based on objective results it will be possible to integrate the HR department into strategic decision making as other departments are used to (Hernández-Leal, Duque-Méndez, & Moreno-Cadavid, 2017).

² [The 7 V's of Big Data | Download Scientific Diagram \(researchgate.net\)](#)

"Most of the information in Human Resources is dirty. Files are filled with incorrect, duplicate, outdated and inconsistent information. And you will be faced with the major challenge of defining what various pieces of that data mean (this is called building the data dictionary)" (Bersin, 2012). By this definition that the author provides, People Analytics is included, a tool that complements Big Data and with which it will be possible to define the data that are important, since the objectives to be achieved are defined in advance.

2.3. People Analytics in Human Resource

The key to business success is human capital, and although companies continue to focus on results and improving productivity through incentives, the mentality is changing. It must be understood that the most valuable thing in a company is its people, who are the ones who will lead entrepreneurs to achieve their goals and make profits. That is why it is so important to spend time getting to know employees, caring for them and keeping them, for which a powerful tool is currently the use of People Analytics, with which it is possible to study people and make decisions (rrhhdigital, 2021).

Since 2007, some authors have identified and defined the emotional behaviour of workers in companies. "It is a question of emotional capitalism: affection becomes central to economic behaviour and emotional life follows economic logic" (Illouz, 2007). "Performance appraisals will focus on manual skills and the management of personality and emotions. Thus, capital will seek to capture for its benefit cognitive, aesthetic and affective skills of workers" (Hanlon, 2017).

To increase people's performance and productivity, psychology plays a very important role. "It is necessary that work is adapted to meet motivational, emotional, affective and social needs" (Cabanas & Sánchez González, 2016). On the part of human capital, it is necessary for them to be well trained and to acquire new skills and cognitive abilities, such as creativity, perception or anticipation of certain situations, also knowledge comes to the fore, and is the characteristic that gives a company a competitive advantage.

At first, the HR department only collected a limited amount of data on staff, but the idea of managing and analyzing it for the new purposes caused a great deal of bewilderment among employees. It is true that nowadays, very few companies make good use of this new concept and take full advantage of it, but there are many advantages to be gained from it, such as boosting organizational performance (Jaramillo Toledo, Rincón Rodríguez, Sánchez Jaimes, & Sierra Meneses, 2021).

Data have been collected on people's attributes, of which there are two types: the first are traits, such as gender, ethnicity or work experience; the second is status, such as age, distance to the job, seniority or the value of bonuses. But it is necessary to go beyond the analysis of attributes, companies need to carry out a relational analysis, to understand the relationships between people and how they communicate with each other, as it is through this analysis that the performance of workers can be explained (Leonardi & Contractor, 2018).

To constitute relational analysis, six characteristics are taken into account:

Table 2. Characteristics of relational analysis

Ideation	How idea generators broker ideas with different groups of people to create a new product or to provide solutions to problems. A study by sociologist Ronald Burt presents the idea that people who are not constrained create the most useful and novel ideas.
Influence	In addition to having a good idea, influence is essential to be able to carry out the project. The most influential people are not top managers or people who have many friends, but those who have strong connections with the rest of their colleagues. Influence is measured through a person's connections and connections of connections.
Efficiency	Being the most qualified person in a company does not mean that his or her work is efficient, so it is important to measure the person's knowledge and ability to make use of available resources.
Innovation	Teams are needed to develop innovation, disagreements arise so that different points of view emerge, and from the creation, innovative ideas are born. But it is not easy, because funding and a number of support people are needed for new ideas to have an impact and be developed. Attribute analysis, mentioned above, is sometimes used to create working teams, which are made up of people with very different attributes, as it has been proven that different points of view help in the creation of ideas.
Silos	These are unavoidable, and occur in large companies that have areas of specialization, in which it is necessary to work together and in total coordination. Relationships both internal and external to the group begin and isolation occurs. It usually happens according to people's affinity,

	or different opinions. The solution to the isolation of the different areas is to appoint a person from each area to have a meeting from time to time, so that all the areas can benefit from the information that was collected individually.
Vulnerability	Excessive dependence of one company on others for information and knowledge can be very negative. There must be connections and relationships between the two, but always have other options so as not to remain vulnerable.

Source: Own elaboration. ³

Once these characteristics are clear, action must be taken to make the relational analysis useful, and decisions must be made on how things should be done to make the most of these characteristics. Organize meetings at a certain time, have influential people on staff or create connections with different contacts to obtain information.

It sounds simple, but the reality is different, and few companies apply this practice because they are not able to identify predictive performance patterns, due to a lack of expert staff to carry out these analyses. As well as the lack of information systems to capture the necessary data, due to the high costs. But as Luis Lombardero stresses, "the time has come to move from intuition to rationality and data in HR decision making. The assumptions companies make when managing their workforce can be quite damaging if they are wrong. Up-to-date data and monitoring of significant workforce trends is necessary to create insights that allow the business to be run much more efficiently. These concepts, therefore, refer to the strategic use of analytical tools and methodologies applied to macro data, which are already used by other areas of the company, to gain a better understanding of their employees and collaborators" (Equipos&Talentos, 2020).

2.3.1. Implementing People Analytics

People Analytics is a lot of work for a company, but a study, conducted by the Institute of Knowledge Engineering (January 2020), reveals that 78% of large Spanish companies

³ (Leonardi & Contractor, 2018)

agree that implementing People Analytics in HR is important now and looking to the future. (Núñez, 2021)

Figure 3. Strategic process



Source: (Sisternas, 2022) ⁴

A series of phases must be followed to achieve the implementation of People Analytics. The implementation of People Analytics is proposed in companies because clear objectives are defined, with the aim of improving different aspects of a company. Firstly, both external and internal company information must be collected and analyzed, with the aim of reducing the size of the information, making it valuable, detailed and summarize what is most important. The next step is to identify the metrics, which are parameters that must be defined to measure the concepts to be improved. Finally, the analysis phase, in which all the information obtained is analyzed in order to reach a series of conclusions and be able to make coherent decisions (Arteaga Páez, J. S., 2016).

In this process, it is important to establish from the outset the objectives and the questions to be followed so that the data to be obtained are meaningful. These are usually objectives related to the improvement of HR practices, such as the selection process, the creation of career plans, the distribution of compensation or the prognosis of absenteeism.

⁴ <https://www.sesamehr.es/guias/people-analytics-hr-analytics-guia-analizar-datos-recursos-humanos/#Tipos de People Analytics>

Two new roles are needed, the first is the data scientist, who is in charge of the IT side of data capture, storage and management. He or she must have strong skills and knowledge in technology, as his or her role also consists of creating and validating statistical models, in order to obtain efficient results. The other essential actor in this process is the Human Resources specialist, an expert in people, who must know and establish the objectives, so that once the required information has been obtained, he/she knows how to use it correctly and control that they are being met.

The two actors must work in coordination, just like the rest of the areas of a company, as a large amount of data will be collected from different places. The expert system is established, which will respond to the objectives that have been set, and with which knowledge will be obtained by analyzing. Finally, the agreed models are implemented (Soria, Martínez, & Gamero, 2018).

To measure the different activities carried out by a company, it is necessary to include tools that allow us to implement People Analytics, such as:

Table 3. Computer tools

Power bi	Data analysis tool developed by Microsoft, which allows the use of different tables, graphs, reports, visual content... simple enough to be interpreted by any user. It is based on Business Intelligence services in the cloud. It offers storage and preparation of data in customized visualizations. One of the advantages of this tool is its speed, simplicity, autonomy and the precision with which it works with data (Ferrari & Russo, 2016) (Sotaquirá Alaya, 2017) (Meseguer Barrionuevo, 2016).
Python	Programming language tool that supports object-oriented, functional and imperative programming. It allows for ease of extension, variable name resolution. Its function is to enter a series of commands and instructions for the program to obtain results and evaluate them instantly.
Tableau	This tool is used to analyze and visualize data, and to solve problems that may arise with it. It is useful in organizations for decision-making. The data is relevant, reliable, clear and combinable (Platzi, s.f.).
R tool	Software composed of packages, in which you create a code to be able to analyze statistical data and graphs and to be able to draw conclusions to make decisions. It is a program that is easy to use and interpret, uses

	advanced techniques and allows you to create web applications and workflows in order to obtain reports (Rocafull, Qué es R Software, 2018).
Excel	Spreadsheet developed by Microsoft. It is currently the most widely used spreadsheet in the world. This tool allows you to work with text or numerical data, organizing them in rows and columns or using mathematical formulas. There are infinite uses that can be given to it, from simply making informative lists, to having a series of data that through formulas have reached conclusions and are supported with tables and graphs (ExcelParaTodos, s.f.).
Machine Learning	Artificial intelligence, allowing machines to adapt to new situations and create analytical models. Without this intelligence it would be impossible to reach the speed at which data is processed, and it allows the management of the volume of data with which we get to work. The main characteristic is that it adapts to the needs of people and can achieve greater productivity in companies, generate growth and, with it, customer satisfaction (Hewlett Packard Enterprise, s.f.).

Source: Own elaboration

As has been proven, implementing People Analytics is not a simple task, and it must be accompanied by tools that complement its operation. That is, in order for people analytics to be effective and help improve a company's results, different applications that help work with statistics, mathematics and predictive models are necessary (hcmfront, 2020).

2.4. Human Resources practices with People Analytics

Once the whole process involved in People Analytics has been analyzed, its usefulness will be explained. How it is used and how it will help in the different practices carried out in the Human Resources department.

In recent years, the perception of the HR department has been changing, as it used to support the operational management, but nowadays it is also focused on the strategic management of the organization. This has changed due to the technological revolution and the globalization of countries' economies, which has changed the way companies think. The focus has shifted to human talent and knowledge and how to manage it efficiently decision-making based on data (rrhhdigital, 2021) (Carreño Rodríguez, Salgado Ocampo, & Suárez Bolaños, 2020).

Today, and still evolving and improving, People Analytics provides valuable information for the different HR practices and facilitates decision-making in each of them. It is used to measure activities performed, productivity, efficiency, motivation, engagement and satisfaction. It is also used to detect the talent of people, recruit, select and evaluate their performance. It shows collective data on people, the behaviours and relationships they have with each other (Adriana, 2020).

Figure 4. Areas of implementation for People Analytics



Source: (Sisternas, 2022) ⁵

Recruitment and selection, selecting people through mathematical models. In this process, a statistical model is created with the profile of the ideal candidate, which can best approximate the culture of the company, and thanks to the filtering of historical data, similar CVs are compared and examined to identify the profile that best suits the company. This information usually refers to education, knowledge, projects, experience, expectations, motivations, etc. (Gómez García, 2019).

A useful HR activity for this process could be gamified assessments, which are psychometric tests that provide real-time feedback on the candidate's experience in order to improve it. Every decision the candidate makes and their behaviour is analyzed through algorithms to get results and check whether they are suitable for the job or not. It takes into account whether they hesitate before making a choice or how they solve

⁵ <https://www.sesamehr.es/guias/people-analytics-hr-analytics-guia-analizar-datos-recursos-humanos/#Tipos de People Analytics>

problems, thus obtaining results about creativity, persistence, learning ability, problem-solving skills, social intelligence, personality, leadership ability and innovative spirit (Maldonado Terán & Samaniego Jimenez, 2013).

Another practice would be digital interviews, which are interviews in which technology is used for the conversation between interviewer and interviewee. By analyzing the algorithms, results are obtained from facial expression, tone of voice, emotions and the language used. This practice saves time and speeds up the recruitment process.

Gamification has become fashionable, video games are used to uncover skills in candidates that are otherwise unidentifiable and are often used in the interview phase. This method increases merit-based recruitment. The games that are chosen are previously studied so that they give the results needed to draw conclusions about the candidates' personality and skills (Bodie, Cherry, McCormick, & Tang, 2016).

Development and training, it is important to decide which type of training for employees is the most appropriate, as it will improve their performance and add value to the company. For future training decisions it is very useful to evaluate people after training and to get results about which ones have been the most productive. It is also important through the data of workers in terms of competencies, skills and productivity for career development, as it identifies workers with the option of changing jobs; internal entrepreneurship; forming work teams; or empowering workers.

Evaluation, surveys, forms or interviews are used, carried out by specialized professionals with employees to find out their satisfaction, commitment and motivation. Satisfaction is paramount to the success of the company. It is also important to recognize signs of demotivation or even intentions to leave the job, so that preventive actions can be taken to retain people.

There are different practices that help evaluators, such as data mining, with this tool the digital footprints of candidates are analyzed to find out their behaviour on the web, and have results on skills, personality and interests of each one.

Sentiment analysis is also possible, using cognitive technology to analyze words, in the tone in which they are pronounced, to understand the needs of the candidates.

Another practice would be the analysis of the "content of content", whereby the underlying emotional content is identified from the content that is uploaded to social networks. In this way, information is obtained from candidates about how they will behave in the face of any event or decision.

Remuneration, using surveys, the answers are analyzed and through a mathematical model, to find out the impact that salary modifications would have, and thus analyze their satisfaction and well-being. Salary scales are created according to the profile and position of each worker, thus making them equitable. Staff costs are also calculated directly in the event of staff changes or new projects.

Nowadays, an essential aptitude that is sought in people is emotional intelligence, and it is analyzed through the intelligence test, with which it is possible to find out the capacities that a person has when it comes to managing their emotions and establishing relationships with the rest of their colleagues. It is a practice that can be used in recruitment, training and development or even in evaluation. The aim is to obtain a score on the emotional quotient, measured on a scale, through various assessments (Fitz-Enz, 2010).

2.4.1. Companies' examples

Dow Chemicals, which started as a small chemical company, is now considered an innovator in its sector. And Union Carbide Corporation (UCC), also a chemical company and one of the oldest in the United States, merged. Faced with the large number of reports they had to integrate, 35,000 to be exact, they decided to use data mining, with which, using ad hoc technology, they managed to find out about different chemicals, companies and people, and to register more than 100,000 new chemicals. The result was a saving of 3 million dollars, a 50% reduction in time spent and also a 10% reduction in the number of data errors (Pino-Díaz, 2019).

Google, a technology company and the most powerful search engine on the internet, is considered a success story in terms of implementing gamification as a resource in personnel selection. This is the case of Google+, where they have created innovative games to achieve social circles, encourage competitiveness and know how to manage relationships between people. Two programmes also stand out, the first is the "Oxygen Project", which defines the basic characteristics that company managers should have; and the "Aristotle Project", with which they analyze the results obtained from working in a team and draw conclusions as to whether workers participate, efficiency, who leads, whether there are conflicts... (Bosch, Riumalló, & Morgado, 2021).

Zappos is an online shoe retailer with twenty years of experience, and places special importance on emotional intelligence, training its employees by spreading happiness. If the bosses transmit happiness, the workers will work twice as hard and happily, and this

will be transmitted to the customers, who will also be happy to buy quality products. This company also monitors the progress and development of each of its employees through competence evaluations. They have developed a social network in which all staff have access to and discuss issues of competence and social fit, in order to get in touch with the whole company (Myklogica, 2014).

Workday Inc. is a provider of on-demand human capital and financial management software. It is considered a world leader in providing solutions to the HR department thanks to its innovation in artificial intelligence. They have managed to create a recruitment model, which predictively identifies candidates who are likely to leave the company. In this way, they can analyze the problem, talk to the candidates and try to prevent them from leaving the company (Chamizo, 2021).

Another software company, Hirevue, uses video recruitment, so it is possible to analyze facial expressions, tone of voice and words (Chamizo, 2021).

In the case of Facebook, they use customer and employee data to understand their needs and preferences, which candidates are suitable, engaged and supportive of diversity.

Arcos Dorados, a restaurant chain company to which, for example, McDonald's belongs. They use People Analytics to identify problems with voluntary employee turnover, and it also allows them to create a model to reduce turnover risks (Granja, Katzky, Seferian, Mariconda, & Occhiuzzi, 2016).

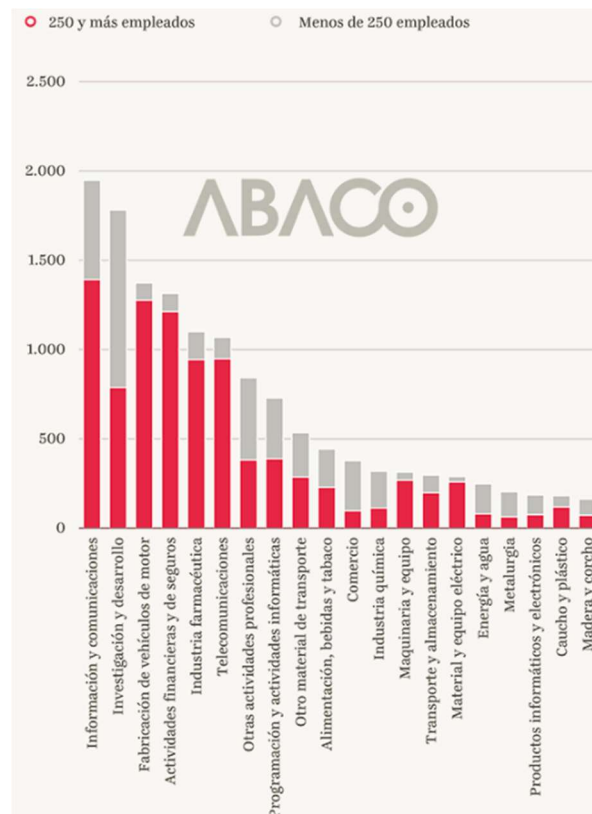
3. METHODOLOGY

Analyzing the concepts of analytics, the methodology, its processes and its applications, it is clear that there are a series of characteristics that are key to a company's decision to apply People Analytics. These can be communication, investment, information, preferences, influence, etc. By means of a survey, all these variables will be investigated.

Studies have shown that large companies, mostly in the technology sector, are the ones that have implemented People Analytics. It also coincides that all the companies analyzed above are American.

According to the data obtained from the Abaco observatory, expenditure on innovation by sector shows that the largest expenditure is made by large companies, those with more than 250 workers. In the primary sector, their investment is almost invisible. It is in sectors such as technology, pharmaceuticals and communications that the greatest expenditure on innovation is made.

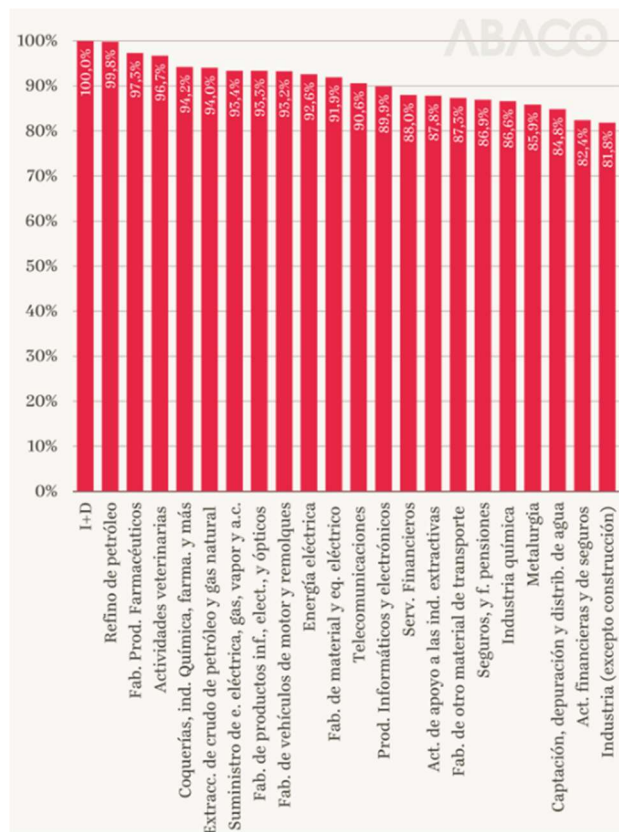
Figure 5. Spending on business innovation by sector



Source: Abaco⁶

It is also justified that the fact of investing in innovation for the company, in the medium to long term, turns into profits. The turnover of innovative companies is doubled in those sectors mentioned above that have spent the most, reaching 100% in R&D or pharmaceuticals.

Figure 6. Turnover in innovative companies by sector



Source: (Abaco, 2011) ⁷

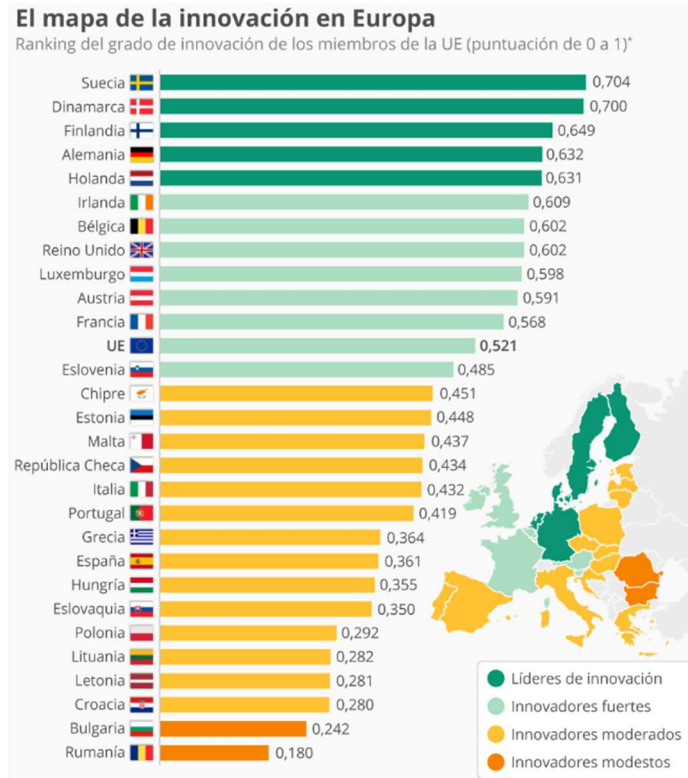
A simple comparison of European countries shows that Spain is a moderate innovator, it is a small part of its budget allocated to innovation. Although it is also true that in recent years, within this third group, its position has been increasing. Studies indicate that this

⁶ <https://www.sesamehr.es/guias/people-analytics-hr-analytics-guia-analizar-datos-recursos-humanos/#Tipos de People Analytics>

⁷ [Innovación empresarial por sectores - ABACO \(observatorioabaco.es\)](http://Innovación empresarial por sectores - ABACO (observatorioabaco.es))

is due to the high number of inhabitants with higher education or doctorates in the field of digitalization and environmental sustainability (Europapress, 2021).

Figure 7. Map of innovation in Europe



Source: European Commission

Why is all this happening? The purpose of this research is to find out why Spanish companies are not on the lists of innovative companies. We want to find out the reasons why they have not yet implemented People Analytics, as it is a new, innovative concept that favours the improvement of company results.

3.1. Sample

Responses were obtained from a total of n = 9 companies, which in this research will be anonymous, at the request of some of them and in accordance with Organic Law 15/1999 on the Protection of Personal Data (BOE-A-1999-23750).

It is possible to specify that they are all companies originating from the Valencian Community and dedicated to the ceramic sector, the transport sector and the technological sector. They are all small and medium-sized companies, most of them

have 10 workers, another one has 50, and the largest company in the whole sample has 97 workers.

3.2. Procedure

To find out what problems companies are facing, a form has been created in Google Forms, with questions about the knowledge of People Analytics, possible difficulties within the company or the way companies are managed, in short, to identify critical factors.

It consists of simple questions, which are those that only allow the respondent to choose one option out of several that are presented, and Likert scale questions, those in which the respondent answers the degree of agreement or disagreement in which he/she agrees or disagrees according to the question asked. It has been divided into two parts, the first part is for companies that do not yet have People Analytics in their company, with a total of 13 questions; the second part is for companies that do have People Analytics, with a total of 8 questions (ANNEX 1).

A series of variables have been defined with which the questions have been completed, and thanks to the answers, various conclusions will be drawn.

Table 4. Investigation variables

The importance of technology
The influence of the department of Human Resources
The ease of collecting information
Teamwork
Experienced staff with skills and abilities
Employees are the success of the company
Resistance to change
Uncertainty in the use of personal data
Preventive measures for security

Involvement of managers
The importance of investing
High costs
Loss of time
Being more informed

Source: Own elaboration

3.3. Questions analyzed

The following analysis is descriptive in nature, and a series of data will be collected on the basis of the variables defined above. With this analysis it is possible to find out the behaviour and actions carried out by people or organizations. But it is not possible to draw quantitative results, in terms of calculation of means, variances or variances.

The variables are extracted from text articles where it is explained that there are no studies on People Analytics but there are hypotheses that these characteristics are ultimately the cause of the implementation of this tool in some companies and not in others (Green, D., 2017) (Lipovetsky, 2017) (Rodriguez, Perona, & Martínez, 2018).

Various studies have found that a large number of experts are still unfamiliar with the term People Analytics, although they attach importance to the use of data for the management of people's talent, but they use simple tools such as Excel to manage this data, which is the most commonly used tool, and do not intend to look for other alternatives, as the skills and capacities they possess are basic (Carreño Rodríguez, Salgado Ocampo, & Suárez Bolaños, 2020).

Most of the data obtained on this subject come from interviews with employees who give their own experience of these new technologies, how they work in their companies and how they manage them. But there is a need for research that affirms all these views (Marçal Vázquez, 2017).

All the change involved in implementing People Analytics entails a change in corporate culture, the way of thinking, the way of being more productive, the way of treating employees, new training, including flexibility and incentives. It is not enough to invest in a new project and for everything to continue working in the same way, it requires a global change in the whole of the organization (Torrijos Zurita, Rosado Millán, & Lacasa Díaz, 2020).

4. RESULTS

As mentioned above, two survey options were considered, depending on whether the company has already implemented People Analytics or not. No company surveyed has implemented People Analytics, so we are going to focus and analyze the reasons why Spanish companies do not implement it.

66.7% of companies are aware of the importance of technology, while the remaining 33.3% are not. The current environment is very dynamic, undergoing constant changes, and therefore, for a company to be competitive and remain in the market in this situation, it is important to incorporate new technologies in companies, capable of offering valuable information or helping with production processes, in order to increase productivity (Pita, G. E. C., 2018).

22.2% say that it is easy to gather information from the other departments in their company. 44.4% find it fairly easy, but 33.3% think it is more complicated in their company. Interaction and communication between departments to obtain information is crucial for the functioning of an organization, as all information from any department is valuable and sharing it often facilitates the work of others or the emergence of new ideas.

88.9% of respondents put teamwork into practice. Today, it has been proven that bringing employees together to work as a team leads to cost reductions, the emergence of new ideas, employee efficiency and motivation. Despite the advantages, there are still 11.1% who still opt for individual work.

44.4% of companies agree that the HR department has very little influence within the organization. In only 22.2% of cases do they have a lot of influence and another 22.2% say that they have neither a lot nor a little influence. The Human Resources department is in charge of selecting, training, developing and managing the human capital of organizations; people are the most important capital a company has to obtain profits.

77.8% consider their employees to be essential to the success of their company. Giving importance to employees, supporting them, creating a good working environment, having communication, motivating them or even rewarding them for doing a good job leads to improved results in terms of objectives and competitiveness.

66.7% of companies confirm that managers are involved in the well-being of their employees. The remaining 33.3% think that they are also involved, but to a lesser extent. Managers are in charge of transmitting trust, employees need transparency in management, communication and care, in order to obtain positive results.

100% of respondents agree that they have never considered implementing People Analytics.

66.7% of the companies claim to have Human Resources staff with skills and abilities in this tool, but 33.3% do not. In order to implement People Analytics it is necessary to have expert staff in this field, and the fact that the staff is internal is a great advantage compared to other companies, as the cost of staff represents a high percentage of the investment needed in this project.

The opinion on whether there is resistance to change on the part of any member of the company is very disparate, with 33.3% saying that there is a lot, 22.2% saying that there is a lot and 44.5% saying that there is very little. The negative attitudes that people may have when faced with uncertain changes or changes that are outside their comfort zone are a serious problem for people, and even more so for the results of companies, but it is possible to mitigate this through communication.

66.6% of respondents think that People Analytics is important enough to invest in it. Investing in a new project for companies requires extensive study and decision making, but as long as the benefits of investing in it outweigh the negatives, it is wise to gamble.

88.9% of companies say that high costs are not the reason why they do not invest. Only 11.1% do for that reason. Projects involving investment in new technology often have high costs, which is why small and medium-sized enterprises cannot even think about investing.

22.2% of companies consider this project to be a waste of time, but the remaining 77.8% say it is not.

Finally, 66.7% of companies confirm that they would consider implementing this tool if they were better informed. 33.3% would not even consider it.

5. CONCLUSION

Throughout this research work, the People Analytics concept has been analyzed in order to answer the question of why Spanish companies do not implement this concept in their working methods. As we have seen, it is a very current concept and there are still hardly any studies carried out on it. For this reason, it has been necessary to carry out a survey in order to draw conclusions. The main objective is to clarify the problems or challenges that companies face when implementing People Analytics.

Firstly, a theoretical review of the concepts that encompass People Analytics, such as HR Analytics, Big Data or Business Intelligence, all of which are methodologies and processes through which both internal and external company data are analyzed. They are used to help the management of organizations, to improve their performance, staff development and management decision-making.

Through People Analytics it has been affirmed that people are the most valuable assets that organizations have, and that through relational analysis, analyzing characteristics such as attributes, efficiency or vulnerability, it is possible to increase the performance of workers, through performance prediction patterns, which must be studied and then applied in communication with the worker. The aim is to improve communication, the relationship and treatment with workers so that they improve their performance.

For the implementation of this tool it has become clear that the objectives must first be well defined, that data scientists and HR specialists, all of them subject matter experts, are needed, and that it is necessary to include certain tools such as databases, Excel or Power bi. It is not a simple project, therefore, the combination and complementation of all these factors is necessary.

This tool adds value to the company if it is used correctly in the Human Resources department. It is possible to select the perfect candidate in the recruitment and selection process with a statistical model that analyses their skills, knowledge, creativity... The data is analyzed and evaluations are carried out after the training to be able to check their learning and make decisions regarding their development career. For the evaluation of workers, it is a useful tool to know their motivation, level of satisfaction, behaviour in the face of any unforeseen event... And finally, through mathematical models, it is possible to know the reaction and opinion of the employees with regard to changes in remuneration. These analyses are essential for making decisions about which candidate to select, which type of training is the most appropriate, to know the opinion of the employees, and to choose the right remuneration for them, in order to have satisfied employees who increase the performance of the company.

With the examples seen of companies that have implemented People Analytics, it is clear that thanks to the different practices put in place it is possible to reduce costs, time and the number of errors in the data, as the technology works automatically, it is already programmed to make the process of data collection and classification more efficient. In terms of improvements in personnel, it is possible to analyze facial expressions and the tone of voice of candidates for recruitment in the case of online interviews. Also, thanks to gamification, social relations between people are improved and people learn to manage them, and in the case of the development of social networks within a company, communication and relations are also fostered, in short, contact with the entire company. As for emotional intelligence, it helps to transmit the spirit of working with happiness, so that workers improve the quality of their work.

The results obtained in the survey affirm that companies are aware of the importance of technology for, in general terms, improving productivity and that People Analytics is also important enough to invest in this tool, the problem is that, as we have seen above, Spanish companies do not invest in it. Most of them think that the high costs of this tool are not a reason not to invest in it, nor that it is a waste of time. Therefore, let's look at the important points in organizations to see what is happening.

They have never considered implementing People Analytics mainly because of a lack of information.

It is necessary to explain the thinking of the managers of the old companies. The main function of companies was to trade and make money, the only purpose was to be the driving force of the economy, to produce in order to make profits. Later, new technology began to be introduced, and the aim was to make profits in order to invest in technology that would speed up production processes. But nowadays, the business environment has become complex and unstable due to globalization, the importance and the role that people play in these "new organizations", as well as their environmental responsibility. Well, society has been evolving and giving importance to problems that previously were not even noticed, the problem is that business thinking has not changed, we want to make managers aware of all these new challenges, as it has been proven in many cases of large companies, but in the case of Spanish companies, they continue to focus on the thought of producing to obtain profits, and forget that to produce and obtain profits, it is necessary to take care of the environment, such as, for example, people.

All of this is closely linked and has consequences for the management of companies. In the survey, a very high percentage of respondents said that it is not easy to collect information between departments. All the information in a company is important in all

departments, being able to share it facilitates communication and avoid possible problems, but the fact that in many companies this is still failing means that the implementation of People Analytics is still a long way off, as this tool manages to merge all the company's information in a single place so that any member of the company has it at their scopes.

Lack of information also leads to resistance to change on the part of the members of the organization, being uninformed leads to uncertainty, fear and delirium in people, which is why, even if the idea of implementing People Analytics in a company arises, it would not be successful, many would think of it as a threat rather than a support for the improvement of the company.

It is true that the vision of employees has begun to change, as they are considered in most cases as essential to the success of the company, they are given importance, there is communication, they are motivated, for example, with the involvement of the bosses in their welfare, transmitting trust and transparency. This is the first step, but People Analytics would facilitate this work, more accurately analyze the opinions and behaviours of employees, in order to have one hundred percent certain answers, and have a guide of what to do to keep staff satisfied.

Finally, focusing on the Human Resources department, it is true that they have expert staff with skills and abilities in this tool, therefore, it is a great advantage and would save a lot of money in costs when it comes to implementing it. The problem is the influence that the department has within a company, which is minimal, which means that when it comes to making a proposal, it will not have support or will not be given the importance it requires.

In short, Spanish business culture is still focused on making profits, and does not think about development and innovation, although it is true that they do focus on the welfare of their employees, but only some of them do. The idea of implementing People Analytics in Spanish companies is still far away. For this to happen it is important to encourage innovation, to have training in all companies to learn how to be more creative, creativity and imagination are related to innovation. Diversity, cooperation, teamwork and flexibility are also important. Another point would be organizational resilience, as it helps in adverse situations to return to the normal state of the company, this would bring confidence, cohesion and efficiency among employees. It can be concluded that the key to success is the learning and training of all the staff of a company, from managers to employees, once this is clear, Spanish companies could develop all their activities and obtain very positive results.

6. LIMITATIONS AND FUTURE LINES OF RESEARCH

6.1. Limitations

The information collected for the theoretical framework has been extensive in terms of journals, articles and academic papers on definitions and theory, but when searching for research papers, studies, analyses or surveys on the concept of People Analytics, the information has been more limited, as it is a very current term which has not yet been sufficiently researched.

With regard to the survey, it was difficult to find a large sample of companies, only 9 could be counted and all of them did not have People Analytics, as Spain is characterized as a country of medium and small companies, which do not usually have a Human Resources department.

Also, as the survey was anonymous, it was not possible to separate the companies by sector and analyze in detail the obstacles or problems that each sector encountered in implementing People Analytics, and for this reason, the conclusions were very general.

6.2. Future lines of research

As a result of this research, it should be noted that this type of technological tools work with data, and this data is information that is obtained from people, more specifically from workers. All this information is analyzed and used to make decisions on HR practices to improve employee satisfaction and performance. But to what extent are employees willing to consent to their personal data being used in this way? Where would be the limit and who sets the limit on the use of such data? Study data protection regulations to know what data is used, where it is stored, who will have access to it.

Where is the ethical debate if we talk about the term wearables? In the workplace, some people do not agree to their personal data being used, but outside of work all kinds of electronic devices are valid. Such as watches, mobile phones, glasses, headphones, etc., which measure body temperature, sleep time, heart rate, automatically connect to household appliances, as well as much more information that can be extracted and that users are not aware of. Or, on the contrary, the possibility to connect all these devices to work and increase productivity (Iberdrola, 2022).

7. BIOGRAPHICAL REFERENCE

Abaco. (2011). *Innovación empresarial por sectores*. Obtenido de http://www.observatorioabaco.es/post_observatorio/innovacion-empresarial-por-sectores-3

Abaco. (2015). *Gasto en innovación empresarial por sectores*.

Adriana, M. (2020). *Qué es people analytics y por qué es tendencia en Recursos Humanos*. Obtenido de <https://empresas.infoempleo.com/hrtrends/people-analytics>

Aguado García, D. (2018). *HR Analytics: Teoría y práctica para una analítica de recursos humanos*.

Aguado García, D. (2018). *HR Analytics: Teoría y práctica para una analítica de recursos humanos*.

Aguado, H. &. (2015). *HR Analytics: Teoría y práctica para una analítica de recursos humanos*. En D. A. García.

Álvarez, I. (2016). *¿Qué es el Big Data?* *Forbes*.

Arteaga Páez, J. S. (2016). *Diseño e implementación piloto de people analytics en la Empresa Antofagasta Minerals SA*.

Ávarez, I. (2021). *¿Qué es el Big Data?* *Forbes España*.

Barnes, F., Pabelo, R., & Vazquez, M. (2019). *Beneficios de la utilización de People Analytics en la Gestión del Capital Humano: Reclutamiento y desarrollo de carrera profesional*.

Bersin. (2012). *Big Data y Analytics, nuevas tendencias en Recursos Humanos*. En C. B. Granja, M. Y. Katzky, C. L. Mariconda, C. B. Seferian, & A. Occhiuzzi.

Bodie, M. T., Cherry, M. A., McCormick, M. L., & Tang, J. (2016). *The Law and Policy of People Analytics*.

Bondarouk, H. &. (2016). *People Analytics: ¿Qué es?, Guía paso a paso y Ejemplos*. Obtenido de <https://www.felicidadeneltrabajo.es/ideas-para-empresarios/hr-people-analytics-que-es-guia-ejemplos/>

Bosch, M., Riumalló, M. P., & Morgado, M. (2021). *People Analytics. Usando los datos*.

- Boudreau, C. &. (2008). HR Analytics: Teoría y práctica para una analítica de recursos humanos. En D. A. García.
- Cabanas, & Sánchez González. (2016). Big Data y people analytics: intimidad y emociones en la gestión de los recursos humanos. En D. F. Szelechter, & M. B. Zangaro.
- Cabrera Sánchez, J. P., & Villarejo Ramos, Á. F. (2018). *Factores que afectan a la adopción de big data como instrumento de marketing en empresas españolas.*
- Cardoso, A. P. (2021). *El enfoque RRHH 4.0: ¿Está cambiando finalmente la función de recursos humanos?*
- Cardoso, R. T. (2021). People Analytics. La importancia de la analítica de datos en la gestión de RRHH. *Escuela de negocios y dirección*. Obtenido de <https://www.escueladenegociosydireccion.com/revista/business/rr-hh/people-analytics-la-importancia-de-la-analitica-de-datos-en-la-gestion-de-recursos-humanos/>
- Carreño Rodríguez, M. C., Salgado Ocampo, V., & Suárez Bolaños, L. F. (2020). *PEOPLE ANALYTICS: ¿UNA NECESIDAD PARA LA GESTIÓN DEL TALENTO?*
- Chamizo, H. (2021). *Así está cambiando el uso de la inteligencia artificial la gestión de recursos humanos en empresas como Amazon, Workday o Hirueve.*
- Commission, T. F. (2012).
- Dalinger, A. (2019). *Nivel de análisis de datos duros para la toma de decisiones en Recursos Humanos.*
- Davenport, Harris, & Morrison. (2010). HR Analytics: Teoría y práctica para una analítica de recursos humanos. En D. A. García.
- Davenport, T. H., Harris, J., & Shapiro, J. (2010). Competing on talent analytics. *Harvard business review*, 52-58.
- Delrieux, C., Barry, D., Stickar, R., Mazzanti, R., & E., C. (2015). *Clasificación de Información en BigData mediante la utilización de Técnicas de Inteligencia Artificial y Análisis de Redes Sociales.*
- digital, R. (2021). People Analytics: qué es y por dónde empezar.
- Dresner, H. (2007). Business Intelligence: Competir con Información. En J. L. Cano.

- Equipos&Talentos. (2020). El poder del People Analytics en la gestión de personas, ahora más que nunca.
- Equipos&Talentos. (2020). La inversión, la competencia y los datos, las principales barreras del People Analytics.
- Europapress. (2021). *España se mantiene en el grupo de países de nivel "moderado" de innovación*. Obtenido de <https://www.europapress.es/ciencia/noticia-espana-mantiene-grupo-paises-ue-nivel-moderado-innovacion-20210621140646.html>
- ExcelParaTodos. (s.f.). *¿Qué es Excel, para qué sirve y cómo funciona?* Obtenido de <https://excelparatodos.com/que-es-excel/>
- Ferrari, A., & Russo, M. (2016). *Introducing Microsoft Power Bi*.
- Fitz Enz. (2010). Big Data y Analytics, nuevas tendencias en Recursos Humanos. En C. B. Granja, M. Y. Katzky, C. L. Mariconda, C. B. Seferian, & A. Occhiuzzi.
- Fitz-Enz, J. (2010). *HR Analytics: Predicting the economic value of your company's human capital investments*.
- García, D. A. (2018). *HR Analytics: Teoría y práctica para una analítica de recursos humanos*.
- Gartner IT Glossary, nd. (2022). *IT Glossary. Big Data*. Obtenido de <https://www.gartner.com/en/information-technology/glossary/big-data>
- Gómez García, F. (2019). *La importancia del e-recruitment en la moderna gestión de recursos humanos*.
- Granja, C. B., Katzky, M. Y., Seferian, C. B., Mariconda, C. L., & Occhiuzzi, A. (2016). *Big Data y Analytics, nuevas tendencias en Recursos Humanos*.
- Green, D. (2017). *The best practices to excel at people analytics. Journal of Organizational Effectiveness: People and Performance*.
- Guerra, R., & Ortiz, G. (2020). *Industry 4.0 and its relationship with Human Resources management*.
- Guevara Céspedes, C. E. (2020). *Implementación de People Analytics y plan estratégico para reducir el alto nivel de rotación de personal en la empresa del rubro fast food*.
- Hanlon. (2017). Big data y people analytics: intimidad y emociones en la gestión de los recursos humanos. En D. F. Szlechter, & M. B. Zangaro.

- hcmfront. (2020). *5 etapas claves para implementar People Analytics de forma exitosa*. Obtenido de <https://home.hcmfront.com/blog/-5-etapas-claves-para-implementar-people-analytics-de-forma-exitosa>
- Hernández-Leal, E. J., Duque-Méndez, N. D., & Moreno-Cadavid, J. (2017). *Big data: an exploration of research, technologies and application cases*.
- Hewlett Packard Enterprise. (s.f.). *What is Machine Learning?* Obtenido de https://www.hpe.com/es/es/what-is/machine-learning.html?jumpid=ps_ie6zycw2kp_aid-520061736&ef_id=EAAlaQobChMlv5nZwc2q9glVpJBoCR0MIwWXEAAAYASAAEglFMfD_BwE:G:s&s_kwid=AL!13472!3!569614956433!e!!g!!qu%C3%A9%20es%20el%20aprendizaje%20autom%C3%A1tico!148055713
- Iberdrola. (2022). *La tecnología "wearable", mucho más que un complemento*. Obtenido de <https://www.iberdrola.com/innovacion/tecnologia-wearable>
- Illouz. (2007). Big data y people analytics: intimidad y emociones en la gestión de los recursos humanos. En D. F. Szlechter, & M. B. Zangaro.
- innova, A. (2019). *¿Qué es Big Data? Las cuatro claves para entender por qué es útil*. Obtenido de <https://abancainnova.com/opinion/que-es-big-data-las-cuatro-claves-para-entender-por-que-es-util/>
- Jaramillo Toledo, J. C., Rincón Rodríguez, D. A., Sánchez Jaimes, J. M., & Sierra Meneses, J. M. (2021). *Beneficios de People Analytics en procesos de gestión de talento humano*.
- Leonardi, P., & Contractor, N. (2018). *Better People ANalytics*.
- Lipovetsky, S. (2017). *Factor Analysis by Limited Scales: Which Factors to Analyze?*
- Maldonado Terán, A. E., & Samaniego Jimenez, A. G. (2013). *Recursos Humanos: Importancia de las pruebas lúdicas en el proceso de selección del personal dentro de una empresa*.
- Marçal Vázquez, A. S. (2017). *¿Cuáles son los efectos de la digitalización de los RRHH en el desarrollo y retención del talento en las empresas?*
- Merchán, A. R. (2019). *Business Intelligence: Minería de datos aplicada en Recursos Humanos*.
- Meseguer Barrionuevo, B. (2016). *El business intelligence en las pymes. Herramienta power bi*.

- Myklogica. (2014). *Zappos: Innovación en RRHH y selección*. Obtenido de <https://www.myklogica.es/2014/05/innovacion-rrhh-seleccion-zappos-encajas-o-no-encajas-en-esta-compania/>
- Núñez, M. (Febrero de 2021). Obtenido de People Analytics y su impacto en el negocio: <https://empresas.blogthinkbig.com/people-analytics-impacto-negocio/>
- Núñez, M. (2021). *People analytics: su impacto en el negocio. El caso de Telefónica*. Obtenido de <https://empresas.blogthinkbig.com/people-analytics-impacto-negocio/>
- Organic Law 15/1999, o. 1. (1999). *Boletín Oficial del Estado, 298, de 14/12/1999*. Obtenido de <https://www.boe.es/eli/es/lo/1999/12/13/15/con>
- Pino-Díaz, J. (2019). *Text Mining para la toma de decisiones*.
- Pita, G. E. C. (2018). *Las TICs en las empresas: evolución de la tecnología y cambio estructural en las organizaciones*.
- Platzi. (s.f.). *Qué es y para qué sirve Tableau*. Obtenido de https://platzi.com/blog/que-es-tableau/?utm_source=google&utm_medium=paid&utm_campaign=14603491644&utm_adgroup=&utm_content=&gclid=EA1aIQobChMIu_Hr5cSq9gIVUNnVCh1YWwlnEAAYAiAAEgl14vD_BwE&gclidsrc=aw.ds
- Powerdata. (s.f.). *Big Data: ¿en qué consiste? Su importancia, desafíos y gobernabilidad*. Obtenido de <https://www.powerdata.es/big-data>
- RedacciónAPD. (2019). *Big Data: ¿Qué es y para que sirve?* Obtenido de <https://www.apd.es/big-data-que-es-y-para-que-sirve/>
- ResearchGate. (2018). *The 7 V's of Big Data*. Obtenido de https://www.researchgate.net/figure/The-7-Vs-of-Big-Data_fig1_328792007
- Rocafull, M. (2018). *Qué es R Software*. Obtenido de <https://www.maximaformacion.es/blog-dat/que-es-r-software/>
- Rocafull, M. (2018). *Qué es R software*. Obtenido de <https://www.maximaformacion.es/blog-dat/que-es-r-software/>
- Rodríguez, L. F., Perona, M., & Martínez, F. (2018). *La digitalización de la función de RRHH en España (I)*.

- Romero, M. (2019). *People Analytics: ¿Qué es?, Guía paso a paso y Ejemplos*. Obtenido de <https://www.felicidadeneltrabajo.es/ideas-para-empresarios/hr-people-analytics-que-es-guia-ejemplos/>
- rrhhdigital. (2021). *People Analytics: qué es y por dónde empezar*.
- Sisternas, P. (2022). *People Analytics. Guía para analizar los datos de RRHH*. Obtenido de Sesame: https://www.sesamehr.es/guias/people-analytics-hr-analytics-guia-analizar-datos-recursos-humanos/#Tipos_de_People_Analytics
- Soria, E., Martínez, S., & Gamero, M. (2018). *¿Cómo crear un equipo de proyecto de People Analytics?* Obtenido de Observatorio de recursos humanos y relaciones laborales, (140).
- Sotaquirá Alaya, W. J. (2017). *Power Bi como herramienta de Big Data & Business Analytics para Onelink Colombia* . Obtenido de (Doctoral dissertation, Universidad EAFIT).
- Torrijos Zurita, R., Rosado Millán, M., & Lacasa Díaz, P. (2020). *Digitization practices implemented in companies from human resources departments: critical analysis of the discourse*.
- Wharton School. (2021). White Paper Finalists | Wharton Analytics Conference 2021. Youtube. [White Paper Finalists | Wharton People Analytics Conference 2021 - YouTube](#)

8. ANNEX

ANNEX 1

Hello, my name is Consuelo Lázaro, I am a business administration student at the UJI. I am doing a researching for my final degree project with the intention of finding out why Spanish companies have not yet implemented People Analytics in their Human Resources departments and to know the problems they may face.

People Analytics is a research system that is used to study the people that make up an organization, using extracted data and carrying out an intelligent analysis to obtain objective, valid and reliable conclusions. The main objective of People Analytics is to help executives and managers to better manage the people in a company, make better decisions and boost well-being.

Thank you very much for your cooperation.

1. Has People Analytics been implemented in your company?	YES / NO
Next section if in question 1 you answer YES	
2. How much influence does the Human Resources department have in your company?	1 2 3 4 5
3. Do you have staff with skills and abilities on the subject?	YES / NO
4. Do you regard employees as essential to the success of your company?	1 2 3 4 5
5. How difficult was the decision to implement it in your company?	1 2 3 4 5
6. How much resistance to making this change have you encountered?	1 2 3 4 5
7. Is there uncertainty about the limits on the use of your employees' personal data?	1 2 3 4 5
8. Have any preventive measures had to be taken for the security of the programme?	YES / NO

Next section if in question 1 you answer NO	
1. Have you ever considered implementing People Analytics?	YES / NO
2. Are you aware of the importance of technology in business today?	YES / NO
3. How much influence does the HR department have in your company?	1 2 3 4 5
4. How easy is it in your company to collect information from other departments?	1 2 3 4 5
5. Is teamwork practised in your company?	1 2 3 4 5
6. Do you have staff with skills and abilities on the subject?	YES / NO
7. Do you regard employees as essential to the success of your company?	1 2 3 4 5
8. Is there resistance to change from any member of the company?	1 2 3 4 5
9. Are managers involved in the wellbeing of their workers?	1 2 3 4 5
10. How important do you consider People Analytics to be for you to invest in it?	1 2 3 4 5
11. Inability to invest due to high costs?	YES / NO
12. Do you think this project is a waste of time?	YES / NO
13. If you were more informed about the issue, would you consider implementing it?	YES / NO