

Strategic Human Resource Management: Importance of Tangible Analysis of Indicators



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Abstract Human Resources Management has proven to be a relevant area in modern management companies, and its strategic positioning in certain may reveal the potential that it may have in its success and performance. Part of this factor is related to the transition of the human resources department in the organizational paradigm, from a cost perspective necessary for the smooth running of the organization, to an investment perspective where managers feel comfortable investing without expecting results in the short term but expecting potential surplus value in the future. This significant change allows the emergence of new strategic approaches and can facilitate the approach of the HR department with other departments, in what refers to the techniques used and the symbiosis between all parts of the organization. This work addressed the concepts of human resources indicators analysed in a strategic aspect with *HR Analytics*, that appears as an attempt to measure something that in its nature is subjective: human capital. This study aims to address the concepts and its applicability in organizations. For this purpose, the studied population consisted of five case studies of technological companies, the data collection was done through semi-structured interviews and their analysis was accomplished through a content analysis. The main results indicate that there is an awareness of technological companies for what *HR Analytics* represents and what is in its genesis, with all companies showing to be aware of the trend, identifying their added value. However, it appears that most of the analysis is positioned at a descriptive level, not promoting advanced analytics from a predictive or prescriptive point of view. It is also possible to state that there is a discrepancy in what refers to the type of metrics analysed and the structure that processes them, being a phenomenon originated by several factors such as the size of the company, its business sector and the maturity of its analytical system.

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1 Introduction

Human Resources Management has proved to be an area of enormous importance in companies and its strategic positioning in certain organizations reveals the potential that it can have in their success and performance. Part of this factor is related to the transition of the human resources department in the context of the organizational paradigm, from a perspective of the cost necessary for the proper functioning of the organization, to an investment perspective where managers feel comfortable investing without expectation of results in the immediately, with the prospect of potential generation of added value in the future. This paradigm shift allows the emergence of new strategic approaches and can facilitate the approach of the HR department with other departments, which refers to the techniques used and the symbiosis between all parts of the organization.

In an increasingly globalized and competitive labour market, it is essential for organizations to capture and develop the best human capital at their disposal. If, in the second half of the twentieth century, individuals with long contributory careers were observed only in the same company and in the same function, today there is a greater rotation of job positions and the younger generations, namely the Millennials, are more demanding in terms of assessment what the employer has to offer.

In addition, there is yet another phenomenon, accelerated by the technological revolution, which is characterized by a growing emergence of new functions and extinction of others. At a European Union conference in Brussels in April 2019, entitled “The Future of Work: Today. Tomorrow. For All” this topic was addressed in greater detail, mainly its impacts on society and our working life as we know it today. This conference highlighted the need for long-term investment, an inclusive digital economy, new labour market policies and above all that no one should be left behind, and that there should be a big focus on upskilling. It is true that the labour market is changing drastically and that there is an extinction of jobs and the creation of new roles, which had never existed, such as, for example, software programmer, data engineer, data scientist, computer programmer applications, UX/UI Designers, social media managers, digital marketing, among others. In the opposite direction, one sees jobs that have already become or are in the process of becoming obsolete due to technology, such as travel agents, a few manufacturing-related jobs in the secondary sector, cashiers, warehouse workers, fast-food chains, and several others. However, we cannot claim that this is a replacement, as in fact the jobs created are quite different from the jobs that are disappearing. It is unlikely that a travel agent, printer, lumberjack, or telemarketing agent will be able to transition smoothly into a career in software programming, at least not in the short term, without a requalification process that at best can take several months, at best. Thus, we can

state that this unique market is characterized by the fact that a large part of the competitive pressure on human resources is placed on the employer, who lives in a constant search for the best talent and the attempt to retain it in the face of competition enticement.

This article explores the concepts of human resource indicators, analysed in a strategic aspect with HR Analytics, being an attempt to measure something that in its nature is subjective: human capital. This study aims to address the concepts and their applicability in organizations. For this purpose, the studied population consisted of five case studies of technological companies, where data collection was carried out through semi-structured interviews and their analysis proceeded through a content analysis.

2 Literature Review

The term “Strategy” originates from Greek language and has its emphasis on the military art, meaning the art of leading a troop, referring to a leader or a general. Thus, the verb “stratego” meant “to plan for the destruction of the enemy through an efficient use of resources” (Bracker, 1980). This concern with Strategy, despite having primarily manifested itself in the military context, is now seen in the business domain. When applied to the field of Management, the rationalist model of Linstead et al. (2009) states that Strategic Management is based on the premise that managers can access all the relevant information needed to plan long-term decisions about the organization and have the ability to implement those decisions. In this sense, it is a process of planning. This concept offers individuals in the decision-making position a guide that supports their decisions related to managing the organization. This process is not static, so it is constantly changing and developing due to changing external factors as well as changing paradigms that indicate the best reliability of the organizational path.

With regard to Strategic Management, it is possible to indicate that there are several approaches to the planning and execution of strategic management, however, according to Gamble et al. (2015) they generally comprise five levels:

- **Contextualization of the company:** establishing a guide through the articulation between the organization’s vision, mission and values. This point is important to understand how the organization perceives itself and how it wants to be perceived by the external environment.
- **Goal setting:** all individuals within the organization should have a common goal in mind. As an integral part of the long-term plan, goals allow all departments in the company to work towards achieving them collectively.
- **Creating a strategy:** Through the establishment of goals, a strategy is created that allows the previously defined goals to be fulfilled. This strategy should be easy to understand detailed and communicated to all departments in the company.

Leadership plays an important role in ensuring that everyone is working to achieve the goals set and to fulfil the strategy.

- **Applying the strategy:** As the term itself indicates, it is about making sure that the strategy is implemented as planned. This point implies the distribution of resources, developing the decision-making process and human resource management. It is important that management oversees the efforts of all departments to comply the outlined plan, however, it is equally important to make sure that everyone has assured resources so that they can focus on the common goal.
- **Strategy Assessment:** It is fundamental for the organization to carry out periodic assessments to understand the most problematic areas, measure the levels of success and check if the performance targets are being met. Establishing short-term goals is important to understand the path being followed, assess it and, if necessary, correct it. One of the tools used at this point is the SWOT analysis (Strengths, Weaknesses, Opportunities and Threats) to analyse what changes are needed and where. Another tool used is the financial analysis that is applied before, during and after the execution plan.

Kaufman (2001) states that researchers' interest in strategic management since the 1980s has had a profound impact on the development of HRM, as research has emphasized that employees within an organization are not a homogeneous group, but a resource whose quantity and quality of output can be manipulated. In this context, Strategic Human Resource Management (HRM) emerges, defined by Dessler (2013) as the act of formulating and executing human resource policies and practices with the aim of influencing the competencies and behaviours of its employees in the direction the organization needs to achieve its strategic goals. Thus, information is needed to support the establishment of goals, the creation of a strategy and its subsequent application, and making measurable something that is naturally intangible, as in the case of human capital, is a priority for analysing information clearly and with a practical purpose.

With the emergence of integrated management systems in the cloud and powerful Big Data tools, Human Resource Management is experiencing a paradigmatic change, and it is in this sense that People Analytics appears. Large companies are starting to invest in integrated information management programmes that can combine planning, talent management or operational improvement, moving from a group of technical experts to a strategic management task that can respond positively to all company stakeholders. In short, it is about analysing large amounts of information and using it for the purpose of value creation or strategic positioning, something that was already applied in other areas of the company such as financial or commercial and that has now become comprehensive to people management as well. (Collins et al., 2017).

2.1 *Human Resources as a Structural Cost or as a Source of Value Creation?*

Given the historical nature of the function on an administrative support basis to the business, the Human Resources department was, for several decades, seen as a necessary cost for the smooth running of the organization. Nevertheless, and paraphrasing Peter Drucker, “what cannot be measured, cannot be managed”, and the need arises to create impact and performance evaluation metrics to analyse in what sense the HR department is generating value to the organization, putting into perspective the structural cost adjacent to the department with the possible benefit it generates.

Therefore, Fitz-Enz (2010) states that no organization can continue its activity competitively based on indicators that are not quantifiable, developing research in order to introduce metrics in this area of the company, not only in order to evaluate the performance of the department itself, since this type of metrics already exist for several years, but with the aim of producing strategic value for the organization itself.

Deepening this theme of costs, Fitz-Enz and Mattox (2014) argue that, like any other activity in a company, there is a cost to attract, recruit, develop and retain talent in a cycle of human capital development, not only financial but also immaterial (time, resources, among others), as well as team-building activities, employer branding or even the storage of data for each employee. Later, if we intend to obtain information from this data and with this activity produce some approaches to actions to be taken in the organization, we will also have a cost, not only of the operation itself but also of the knowledge needed to do it. The question is: *How can we get a return on investment? How do we manage to transform the cost of the present into the benefit of the future?*

In fact, in any organization and in any area, managers seek return on their investment. Fitz-Enz and Mattox (2014) state that it is difficult to measure the return being generated on the investment, as the action triggered by HR can produce results in other areas of the company, and if there is not an integrated view of all the departments, the causality analysis becomes more complex. However, the authors are clear when they state that several investments made in this area do not have the desired return, and in large part the reason is the inefficiency of the operation.

In line with this perspective, Ashton et al. (2004) had already argued that to have a transition from the view of the department as a cost, it is necessary to look for other ways to create value for the organization, with greater accountability of the department in defining the objectives and the path to be followed because HR is a key part in designing the company's strategy. For this to happen, the authors indicate that there must be a framework between the company's final strategy and the HR department's objectives, and its organizational practices such as evaluation metrics must meet the business objectives, developing the organizational culture in the intended strategic sense, with technology being the facilitating agent in all these processes.

2.2 *Measuring Human Capital to Optimize Decision-Making*

According to a study developed by Fitz-Enz (2010), most companies do not have their HR department and its adjacent metrics linked to the business strategy, and only a fraction of them report their activity on a regular basis to top management. That said, one of the main reasons given for this phenomenon is because this type of reporting does not have a direct influence on the type of strategies adopted by the organization, nor does it promote a cause–effect relationship between the verified results and the resulting actions to be taken of those results.

Gibbons et al. (2009) had already analysed this issue, stating that despite all the metrics adjacent to the HR department and human capital management, decision-making was for a long time based on “instinct”, rather than in facts. Despite this, they point out that new technologies make it possible to trace patterns of relationship between the intangibility of human capital and the tangibility of the business, starting a path that may place the area in a strategic pillar of any organization. The authors thus explore the concept of evidence-based human resources management, that is, evidence-based human resources management, which will serve as a support for HR Analytics to make its contribution to organizations in which the wealth of its human capital is essential.

Regarding specific measures, it is possible to state that they are context-dependent and that they vary over time according to the organization’s needs. Baron (2011) indicates that there are four main areas where it is necessary to compile human capital assessment measures: (1) how talent is attracted, recruited and retained over time; (2) how talent is developed and used; (3) how talent is rewarded and motivated; (4) how knowledge and performance are managed in the organization. According to these four areas, the author goes deeper into some analysis possibilities. According to the author, it is necessary, first, to collect data for analysis, and then we can draw a human capital assessment model based on these measures, as explained in the following Table 1.

Based on this framework, the author indicates that the results of the framework are intrinsically linked to the value of human capital in an organization and that, depending on the organizational needs, it may be subject to transformations over time, to fit in with the business needs.

It should be noted that these types of strategies are based on Key Performance Indicators (KPIS), and that they depend on data collection. In this scenario, the way data is collected and the use given to it, may be a contributing factor to the creation of value within the organization. Fitz-Enz and Mattox (2014) list four levels of action that can be applied to analyse information regarding this issue. In a first phase, describe, later explain, followed by predicting and optimizing. This process starts with simple metrics and reports, later evolving to more complex analytical models, with the potential to create value as much greater as the evolution and complexity of the process.

Table 1 Impact of the value of human capital on organizational performance (Adapted from Baron, 2011)

Area	Evaluation factors
Acquisition and retention	Good profiles are successfully attracted
	The contracted resources meet the organization’s standards
	The organization does not lack intellectual capital in its teams
	The organization demonstrates strategic planning on talent, including succession planning
	The organization can retain capabilities vital to the operation of its business
Development	Individuals demonstrate agility in dealing with different circumstances
	Human resources demonstrate acquisition of new knowledge and their application
Motivation and reward	Rewards are linked to the organization’s success
	The organization manages to make the relationship between commitment, engagement and effort
Performance	The organization perceives the relationship between high employee engagement and business factors, such as customer retention
	The organization’s ability to innovate

2.3 HR Analytics as a Strategic Partner of the Organization

According to Lawler and Levenson (2004), in most cases the human resources department did not seem to be making much progress in terms of becoming a strategic partner of organizations and this is often because not having the metrics and analytical models that are present in other areas such as finance and marketing, for example.

Despite this, the authors state that HR Analytics is changing this paradigm as it helps to clarify and quantify the impact of human resources practices on organizational performance and, in this sense, has the potential to create value throughout the structure, being able to influence strategies and business decisions. Thus, the authors state that for the human resources department to become a true strategic partner, it needs to present data and adjacent analysis to demonstrate that human capital management affects organizational performance and are not just a necessary cost for the smooth running of the organization. In this sense, the application of data analysis tools and statistical techniques that have the potential to identify patterns between human resource practices and indicators such as customer satisfaction or other business metrics, make HR Analytics increasingly an important strategic partner for the organization (Lawler & Levenson, 2004). The first type of metric we can take as a starting point is the effectiveness of human resources in administrative tasks. For example, average hiring time, headcount ratios and administrative cost per employee (Lawler & Levenson, 2004). The second type of metric relates to role efficiency.

Efficiency means that human resources practices and policies produce the desired effects on the target(s) they are aimed at.

Later, Lawler and Bordeau (2009) analysed in what concrete sense human resources become a strategic partner of the organizations and identified some strategic activities within the organizations that are positively related to the role of the human resources department in the strategy of the organizations and that could be an indicator of the evolution of the importance of this department in the strategic role of the company: (1) Identify or suggest new strategic options; (2) Decide on the best strategy to use; (3) Planning the implementation of the strategy; (4) Outline the organizational structure for implementing the strategy; (5) Identify new business opportunities; (6) Plan new merger, acquisition or divestment strategies (Lawler & Bordeau, 2009, p. 6).

It is important to highlight Castellano (2014), who states that although HR Analytics is often seen as a replacement for subjective human interpretation, it is more about a balance between quantitative information and naturally qualitative human judgment, not just about collect the information, but know how to use it based on techniques and procedures that meet the organization's strategy. Following the human importance in the discipline, Davenport et al. (2010) state that special attention should be given to the human side of human resources, and this analytical aspect cannot serve the purpose of dehumanizing employees, nor should they be treated solely and exclusively as resources.

3 Methodology

According to the Literature Review, there are some starting questions that become relevant in this problematic, making it essential to define them. The object of study, as mentioned, will be the technological companies in Portugal. Thus, based on the literature review and the problem under analysis, the following research questions were formulated to proceed with the analysis of the study objective and its contraposition with the literature analysed:

1. Is there an awareness among technology companies of what HR Analytics represents?
2. Is there a need in these types of companies for a tangible analysis of indicators within human resources departments?
3. What are the most relevant metrics for the department and the business?
4. Does this type of practice represent a competitive advantage for companies and assist the organization in meeting its business objectives?

For the purpose of the study, the companies were selected through a convenience sample. The first selection criterion was the Information Technology activity sector. The second selection criterion is related to the region, with the organizations having offices in the North of Portugal (not necessarily the headquarters, it could be a branch office). Thirdly, it was the public knowledge of some human resources practices

within organizations that are seen as industry benchmarks, with the chosen organizations appearing in several rankings of best companies to work for in Portugal. Finally, there are organizations that have practice with an analytical component regarding the functioning of human resources, with the objective being to analyse their level of maturity and in what sense this type of actions bring value to the business on a daily basis.

The business areas of organizations, although included in the Information Technology sector, are quite distinct. In the sample, it is possible to observe several areas of activity, from digital marketing, to consulting, telecommunications, retail, e-commerce or software houses. Despite the diversity of performance of each of the organizations, there is a point of contact that makes them similar: their human capital. Both are composed, in their majority, of collaborators in the technological area, from software engineers, systems, databases, digital business specialists, among others. As this is a highly competitive area in terms of human resources, where the demand for a qualified workforce often exceeds the supply, it is expected that human resource management practices and methodologies will be more developed compared to other more traditional industries, because there is a constant effort for organizations to be attractive to individuals in the sector. To maintain the privacy of the data under analysis, all companies will be kept anonymous during the investigation.

As previously mentioned, data collection was carried out through semi-structured interviews, which were later transcribed to maximize the information provided by the interlocutors and avoid losses. The analysis of the collected data was through content analysis, which allows a detailed and systematic study of the information, whose purpose is to discover and interpret its meaning.

Regarding the characterization of the interlocutors, of the five interviewees, four are female, with only one male. A large part of the interviewees already has vast experience in the sector (more than ten years), with only one of the interviewees having less than five years of activity. All of them hold management positions in the human resources area and assume responsibility for managing teams.

Regarding the characterization of the companies, it is important to mention that although they all have an office in the northern region of the country, only two have their headquarters in Porto, with two of them having their headquarters in Lisbon and one having its headquarters in London and the Portuguese branch located in Porto.

In terms of size, we have to highlight two large companies (Company 1 and Company 4), two medium-sized companies (Company 3 and Company 5) and a small company (Company 2). With the selection of this sample, we sought to have a broad spectrum of analysis, characterized by companies of different sizes, with different human resources practices and operating in different sectors of activity. The following Table 2 summarizes the selected sample.

All interviewees have at least a bachelor's degree and two of them have master's degrees and specializations, the speaker from Company 2 in the area of People Management and the speaker from Company 4 in the area of Business Analytics and Big Data.

Table 2 Sample characterization

Company	Interlocutor's position	Interlocutor's gender	Interlocutor's uptime	Interlocutor's academic qualifications	Company's sector of activity	Headquarters' location	Company size
Company 1	Unit manager	Female	3 years	Degree (Criminology)	Information systems consulting	Lisbon	~500 employees
Company 2	HR manager	Female	5 years	Master's degree (Psychology), postgraduation in people management	Information technology for digital marketing	Porto	~50 employees
Company 3	HR manager	Female	14 years	Degree (Human Resources)	Retail information technology	London	~150 employees
Company 4	People analytics project leader	Male	10 years	Master's degree (Business Management), specialization in business analytics	Telecommunications	Lisbon	>2500 employees
Company 5	HR manager	Female	15 years	Degree (Human Resources)	Software house	Porto	~80 employees

4 Analysis and Discussion of Results

Based on the study objectives that are defined, firstly, by exploring the study of KPIS analysis in human resources in companies in this sector and, secondly, by understanding whether there is an implemented HR Analytics strategy, exploring its level of maturity and knowing its specificities, some key themes were categorized to allow the analysis and discussion of results:

- Use of KPIS in Human Resources;
- Applicability of KPIS and Reports Made;
- Definition and Relevance of HR Analytics;
- Decision-Making in Human Resources;
- Contextualization of the Information Technology Sector.

4.1 Use of KPIS in Human Resources

The use of Indicators is important in HR Analytics as it serves as a foundation for the development of analytical models that can provide answers to business problems, not only from a HR perspective but also in a holistic view of the entire organization. On this topic, Fitz-Enz (2010) states that quantifiable indicators are important not only to evaluate the performance of the department itself but also to produce strategic value for the entire organization.

As you can see, of the five companies that were interviewed, four perform KPIS analysis and compile them into reports for analysis. As mentioned by the interlocutor of C2, the *“human resources processes with regard to indicators are not clearly structured”*, and *“the management of resources depends on the needs of the moment”*. This factor was justified by the company’s interlocutor based on its small size and low turnover rate for the sector, so the ad hoc analysis is efficient in its case.

About the others, the importance of analysing indicators in Human Resources was highlighted, especially with regard to issues such as recruitment and turnover. This factor is particularly reinforced by C1, which, this factor is particularly reinforced by C1, which, as a consultancy operating in the technology area and whose business volume is based on Outsourcing skilled labour in information systems, has in its human capital its source of business and that recognizes as essential to have the recruitment and retention areas totally under control. As mentioned by the interlocutor, *“(...) we are a company that works with several clients in the consultancy area and, therefore, unlike most companies, we do not sell any product, we “rent” knowledge. This knowledge comes from our human resources, consultants, and therefore it is essential for us to keep track (...)”*.

Also, C3 and C5, software houses that develop products and provide technical and functional consulting on the products they sell, place special emphasis on these two factors, and C3 has in place a quarterly SWOT analysis with several indicators, which include the indicators mentioned above. Performance evaluation is also a

factor mentioned by this company as being important because it promotes the career development of its employees, which in turn can maximize their retention.

With regard to C4, it is possible to state that there is an analytical model with maturity in force and that allows KPIS analysis at different scales, being adaptable to teams, projects, and different areas. According to the interlocutor, the “(...) *importance of these is defined by the business objectives, on the one hand, and the characteristics of the workforce, on the other hand (...)*”, giving a concrete example: “(...) *in a call-centre company, some of the main metrics will be related to the exit of employees and their replacement cost, given the turnover rate of the sector (...)*”.

4.2 Applicability of KPIS and Reports Made

The concern of the respective companies with recruitment, retention and career development plans for their employees is evident. In an area where the shortage of qualified human resources is a reality all over Europe, companies are faced every day with the competitiveness of the market not only in their area of expertise but also for their own human resources.

Regarding other factors mentioned, it is worth noting the answer of Company 1, which refers to the number of interviews conducted as an analysis factor in the organization, stating that regarding the reports, “(...) *on the one hand, the recruitment productivity of human resources, for example, how many interviews you do per week, how many interviews are necessary to make a hiring (...)* and on the other hand, *we have the monitoring and retention reports of employees.*”. In this sense, we can identify two levels of analysis: on the one hand, the analysis of indicators that refer to the employee, but, on the other hand, the analysis of indicators confined exclusively to HR productivity. Considering the sector in which this company operates (outsourcing in the technology area) it is natural that this is an extremely relevant topic, as recruiting and retaining is its core business.

Company 3 also presents a systematic structure for the analysis of these indicators, where the interlocutor stated that “(...) *we have KPIS that is part of our ISO-9001, it is one of the points we take into account and they focus on Turnover, satisfaction survey, as well as the training area (...)*”, referring also to a “(...) *quarterly SWOT analysis with the assessment of risks, opportunities, strengths and weaknesses associated with each area (...)*” and a “(...) *annual performance evaluation with quarterly feedback (...)*”.

Company 4 presents a symbiosis between top management and HR in what refers to the implemented action plan, stating that “(...) *within the scope of the strategic plan, a set of HR strategic levers is defined, which translate into an HR action plan, with the most relevant human capital initiatives for the company (...)*”.

When it comes to the type of action inherent to the development and analysis of these reports, the answers are quite enlightening: all companies intend to implement continuous improvements to their processes. As stated by Company 3, “(...) *if the KPI is not being achieved as we want, an action strategy must be developed together*

with the team leader to improve the indicator (...)”, and Company 4 goes deeper into this issue, stating that *“(...) it is the follow-up, and the respective reflection on the results, that allows the generation of insights on which to base actionable recommendations for improvement and/or experimentation (...)*”. With regard to companies 1 and 5, both mentioned that these reports intend to trigger an implicit action and improvements in processes, but the response was not accompanied by examples.

Regarding the responsibility for these actions, Companies 1, 3 and 5 expressed a joint responsibility between HR and the first line managers of each team. It turns out that although the process would be triggered in the first instance and with primary responsibility by the HR manager, this process would ultimately be shared with the first-line manager, who has the most contact with the employee. As mentioned by the interlocutor of Company 3, *“(...) HR Manager is responsible for the KPIS and responsible for the action process resulting from its analysis, and in many situations the objective is to work together with the team-leaders.*

Regarding Company 4, given the more mature structure in the analytical aspect in HR, it is said that the *“(...) activity is the responsibility of the people analytics team, in HR, who work on the recommendations with a multidisciplinary team (...)*”, with an entirely dedicated team to do the analysis and recommendation based on the analytical models developed.

• Definition and Relevance of HR Analytics

Analysing the level of HR Analytics implementation in these organizations, we can see that the results are in line with what has been observed so far. All companies, with the exception of C2, have some type of analytics system that supports decision-making, although a large portion of them are at the first level, where they cement points such as decision and workforce optimization, and gathering information about possible decisions and their outcomes (Fitz-Enz & Mattox, 2014).

In this sense, the interlocutor of C1 refers that it is something that is in progress, *“(...) even in the sense of evaluating our productivity over time (...)*”, something that is in line with the previous answers from this company, which reveals an analysis more focused on the department itself than on the entire organization in a holistic way. C3 mentions that it is carried out *“(...) a KPIS analysis and as a result of this analysis we take actions (...)*”, something that fully meets a descriptive analysis. In the same line of implementation follows C5, which states that *“(...) we have implemented KPIS analysis (...)*”. In a different paradigm is C4, which states that the *“(...) company began designing an HR analytics ecosystem in 2015, which has allowed analytics to evolve from descriptive to predictive and prescriptive (...)*”.

Regarding the type of added value created within the organization because of the implementation, C1 refers to the importance of market competitiveness, stating that *“(...) we became competitive in the market and managed to be sustainable over time (...)*”, a natural concern of those in the business for their ability to recruit and retain talent. C2, despite not having implemented it, recognizes a potential for added value when we add this analysis to a larger organization, saying that there could be *“(...) potential to create added value in an organization, especially in a larger organization*

and where KPIS analysis is central to the company's success (...)". C3 also claims that it is something that promotes the development of the organization's culture and performance, as it allows *"(...) we understand the requirements, how the functions are developed, the career development of our employees, ultimately leading to the retention of our talents, something very important in this area (...)"*. C4 states that naturally the *"(...) impact that HR Analytics can have on the organization is directly correlated with the analytical maturity of HR analytics practices (...)"* and that *"(...) the various stages of maturity, and the respective analytical capacity, always bring value, as long as it is involved in an analytical process of generating methodical insights and based on the right questions, in view of the "problems" to be solved. (...)"*, stating that there are problems for all types of analyses, from the simplest to the most complex. In turn, C5's answer goes in the direction of C3, stating that this process *"(...) allows to implement continuous improvement plans and maintain process control (...)"*.

4.3 Decision-Making in Human Resources

There is a pattern regarding the symbiosis between the HR department and top management. All interlocutors share information with top management, to promote the continuous improvement described in previous topics, although in some cases it is not clear what the degree of influence in decision-making after the transmission of information is. C1 states that the information shared goes towards recruitment and selection, going in line with the previous topics. C2, C3 and C5 go in the same direction, stating that there is sharing of information with the aim of promoting organizational performance. C5 states that they are communicated *"(...) factors and patterns that indicate an increase in the turnover rate, in order to keep it as low as possible, collect periodic and integrated feedback to see if there is something that may not be meeting expectations (...)"*.

With regard to C4, this sharing of information is also mentioned by the interlocutor, and he mentioned three examples of information that can be transmitted to top management, considering its increasing degree of complexity. The interlocutor starts by mentioning that *"(...) in a scenario of increasing turnover, with impact on the business, it is possible, if based on pattern analysis to identify the potential causes, to design metrics that allow to evaluate the evolution of meritocratic practices in the organization and related to the evolution of departures (...)"* this scenario being confined to a descriptive analysis. On the other hand, *"(...) at a more advanced stage, it is possible, through advanced analytics and machine learning, to build models that identify the risk level of voluntary departure per employee (...)"*, this being a predictive analytics scenario. Finally, analytical models based on recommendation systems are highlighted, where the interlocutor refers *"(...) causal inference analysis that assess the impact of retention actions taken in the past, so that recommendations are more accurate (...)"* this being a predictive analytics scenario.

With regard to the second question of this topic, it has been sought to understand how HR decision-making is structured in each of these companies. In this question, some differences were observed regarding the way in which each of them works. C1 mentions that there are “(...) *every week KPIS review meetings, where we define action points for the immediate (...)*”, having an agile mode of action with immediate response, revealing once again the need to implement actions quickly and flexibly. C2 mentions that “(...) *decision making depends on the need of the moment. (...)*” which is also in line with what has been observed so far, with processes structured in an agile manner, not having a previously defined strategic plan exclusively for HR, with decisions being taken according to immediate needs. C3 mentions that it is carried out “(...) *a quarterly SWOT analysis with the assessment of risks, opportunities, strengths and weaknesses associated with each area (...)*” and also “(...) *entrance and exit interviews, satisfaction survey, quarterly IvsI, annual performance evaluation with quarterly feedback (...)*”, having a solid process for decision-making, based on various events that take place over time. C5 states that “(...) *the process is circular and constantly changing, with the ultimate goal of improving the employee’s experience (...)*”, also revealing flexibility and little rigidity in the processes, going against what was observed on C1 and C2.

In turn, C4, which is based on its consolidated and mature analytical model, has a well-defined process for decision-making, which starts with a “(...) *reflection on the most pertinent business issues, which involves clarifying the problem/situation and how it should be addressed (...)*”, then there is the “(...) *hypothesis construction (...)*” that is followed by the “(...) *data collection and determine the quality of the data, and clean up if necessary (...)*”. Afterwards, it takes place the “(...) *the analyses that test the hypotheses and provide the basis for generating insights (...)*”, that follow up on “(...) *actionable recommendations (...)*”. There is an interesting point mentioned by the interlocutor, which is based on HR’s ability to present and argue in order to form a convincing narrative, the ability to story-telling. The interlocutor states that “(...) *It’s especially important to ensure that we influence the decision, so it’s critical to communicate insights and recommendations in a convincing, visually strong, compelling narrative, supported by data. (...)*”. Finally, there is a duty to “(...) *ensure the implementation and monitoring of the recommended actions, evaluating the success of the project based on a set of metrics that return value to the organization (...)*”.

4.4 Contextualization of the Information Technology Sector

With regard to the question of comparing the information technology sector with other sectors, the answers are, for the most part, in the same direction. C1 states that there is greater sophistication in HR practices, and it is unavoidable that competitiveness in the sector brings more demands for HR. The interlocutor says that it is normal that “(...) *human resources management in this sector is more subject to innovation due to market competitiveness (...)*” and adds that “(...) *It is important*

that companies remain competitive, have employer branding strategies and career plans for their employees (...)". The answer from C2's interlocutor also goes in this direction, stating that it is a sector more conducive to innovation and flexibility at work. Thus, the interlocutor claims that *"(...) this sector is more favourable to innovation than any other (...)"*, being that *"(...) the technological area is unique in terms of organizational practices and culture (...)"* and that *"(...) the work environment is flexible and different from other more primary industries (...)"*. This point raised by C2's interlocutor regarding "primary industries" is interesting, as C3's interlocutor has worked for several years in the secondary sector (civil construction) and precisely raises this issue, stating that it is a more complex sector, with greater competitiveness and that makes more demands for HR. He also added that the fact that it is an area in constant mutation and evolution, requires that HR is in continuous learning. The interlocutor claims that *"(...) the type of profile in the technology area is more complex, even in the recruitment area (...)"* and that this *"(...) is a constantly changing area and it is essential that we are constantly learning (...)"*. Unfortunately, we were unable to get the answer from C4's interlocutor regarding this issue since it was at the end and had to be abbreviated with some parts of the interview as the interlocutor had a meeting right away. Finally, regarding C5, the opinion is in line with most of the answers given, mainly in line with C1, stating that it is an area where there is greater evolution as the market is more competitive. The interlocutor claims that the *"(...) The technological sector is quite evolved in terms of its practices compared to other sectors (...)"*.

Regarding the question that analysis the objectivity of HR and whether the quantitative factor is having an increase in importance relative to the qualitative one, here the answers are unanimous, with the exception of C4. All refer that the human factor is essential, despite recognizing that the KPIS can provide some assistance in terms of decision-making. In this matter, it is worth highlighting the response from C3 that states that *"(...) the human and qualitative factor is always the most important, we are talking about people and not machines that are predictable (...)"*, adding that *"(...) however, quantitatively we were able to measure and optimize some processes that are related to employees (...)"*. Unlike this stream, C4's interlocutor states that KPIS are essential in decision-making. The interlocutor even said, during the interview that, *"(...) what we cannot measure, we cannot manage (...)"* and that the indicators will allow *"(...) read with much greater reliability, in a holistic and integrated manner, the impact of human capital management practices on the organization's performance (...)"*. This factor can be verified given that, as noted, this is the only company that has a complex and mature analytical model, performing descriptive, predictive and even prescriptive analysis, according to the pyramid for value creation in HR Analytics by Fitz-Enz and Mattox (2014). All the other interlocutors of the other companies carry out descriptive analysis and for this reason it is possible that they do not place as much confidence and importance in these models as the interlocutor of C4.

5 Conclusions

This study was developed to analyse the quantitative and analytical aspects of human resources in the technological sector in Portugal and to understand their degree of maturity, practical applicability and generation of added value for their organizations. This is an exploratory descriptive study in which semi-structured interviews were used as a technique for collecting data from some companies in the area of information technologies. The transcription of the interviews and their subsequent categorization and coding facilitated the analysis and standardization of data, and for this purpose content analysis was used as a data analysis technique.

It is important, first, to resume the objectives of the same to clarify the results obtained:

- Check if there is an awareness of technological companies for what HR Analytics/People Analytics represents and its relationship with HR indicators;
- Check the importance given to these practices in relation to the Strategic Management of Human Resources;
- Check whether there is a need in these types of companies for a tangible analysis of indicators within HR departments;
- Check if there is a symbiosis between the analysis of human resources indicators and the organization as a whole;
- Which metrics are most relevant to the department and the business;
- Check whether this type of practice represents a competitive advantage for companies and helps the organization to fulfil its business goals;
- Get the interlocutor's view on what the future trends will be.

The results indicate that there really is an awareness of technology companies for what HR Analytics represents and what is in its genesis. All companies demonstrated that they are aware of the trend and realize the benefits it can bring to the organization. Most of the interviewed companies apply descriptive analysis of their human resources indicators, something that, according to the literature, is the first step towards the analytical integration of the department with the entire organization. In line with the authors Fitz-Enz and Mattox (2014), it appears that a large part of the analysis aim to assess the productivity of the department itself, rather than generating added value for the organization in a holistic way. This type of procedure is not recent, and as presented by Dulebohn and Johnson (2013), efficiency metrics such as cost per hire and yield rates, or human capital metrics such as costs and income per FTE, are analysed for several years from a SHRM point of view and allow you to assess the performance and productivity of each organization's HR. However, it is necessary to make an abstraction between this type of metrics and effectiveness metrics such as ratio analysis (such as average salary) and comparison with the competition, the progression of employees through development plans and in the last level the strategic impact metrics, which relate the various metrics, tools and methodologies applied in HR to the results of the entire organization. The difference between these four levels is clear: while the first ones are centred on the department itself, the last

two focus on the organization as a whole and even on the competition itself. With the exception of one company (C4), it appears that most of the companies interviewed are found more in the first two levels than in the last two. It is important to highlight in this topic the challenge from an organizational point of view of transforming a cost (internal investment) into a profit, even in the medium term, and given that the implementation of an analytical model of the character of C4 in an organization has costs for the structure, this is a difficulty this department goes through as it becomes difficult to measure the return on investment made, as an action triggered by HR can produce results in several other areas of the company, and without this holistic view, it becomes difficult to assess the causal relationship between the two (Fitz-Enz & Mattox, 2014).

Having made this premise, it is important to point out that, according to the analysis carried out, there is a path that is being traced despite the previous observation. According to the evolution of HR KPIS presented by Ulrich and Dulebohn (2015), we can divide them into three levels: in a first phase, the human resources practices, which seek to measure the department's professionals and their performance. In a second phase, the intermediate results, where the objective is to measure the results originated from human resources practices, such as the organization's culture and the development of talent and, finally, in a third phase, it seeks to measure the organization's results, measuring the results in an integrated way with other departments. Thus, the analysis carried out shows that most of the companies studied in a second phase are framed, in which a real concern with the career development of employees, the company culture and the "emotional" salary was observed, something that was quite manifested including by C3. Thus, it is possible to state that the sector's competition is bringing benefits to its workforce, as there is an increasing concern on the part of companies with the well-being of their employees, as mentioned by C3 "(...) *we are talking about an area with an above average remuneration, and many times people work not only for the money, but also for their well-being. (...) it's called emotional salary (...)*". Thus, it is possible to state that in most cases the first barrier was eliminated, which "closes" the HR department on itself, and that in most cases, especially in this area, HR is a true strategic partner of organizations, going against the evolution of Lawler's studies (2012).

With regard to the companies' need for the analysis of indicators, it was quite clear that, once a certain dimension is reached, indicators are important for the good functioning of the organization. It is even possible to clearly identify which are the most important indicators from a strategic point of view, according to the analysed sample, being centred on the talent itself, be it recruitment, retention or its development. This observation is perfectly normal based on the data presented and the continued shortage of labour, and was even more notorious at C1, in which its business involves recruiting, motivating, developing and retaining talent, which demonstrated a clear inclination towards this aspect, being the only one of the companies that demonstrated to have recruitment/retention objectives and metrics as a basis for performance analysis of the HR department itself.

Making a parallel with the competitive advantage obtained from the coherent analysis of indicators, it is also possible to say that companies recognize that there

is a competitive advantage created from their analysis, and a large part of them even claim that only in this way they manage to maintain competitive in this market. Only one of the companies (C2) did not identify a competitive advantage in its specific case but stated that it recognizes that it can bring added value in a larger company where large amounts of data are generated that can be transformed into information, which is not your case because it is a small start-up.

With regard to the importance given specifically to KPIS in an analytical aspect, the perception of it is diffuse. It is true that a large part of the companies interviewed in the sample apply descriptive analysis to assist in their decision-making, but it is uncertain what importance they attribute to these indicators when making the decision. When asked about this issue, most respondents clearly demonstrated that the human factor is essential in decision-making. This factor alone demonstrates that HR (of the companies included in the sample) is farther from moving towards becoming a more quantitative and data-based science, a path that the marketing area has been following for a long time. Nevertheless, it was interesting to observe the parallelism that C4's interlocutor drew from the People Analytics strategy applied in his organization with marketing, demonstrating that this type of practice exists with models matured in our country, with this organization having been distinguished by Gartner in 2018 due to the People Analytics project they have under development. This level of maturity allowed this company to develop three analytical modules in its HR department. On the one hand, workforce analytics, which is essentially based on workforce planning, HR Analytics that ensures full coverage of human capital management through more than 200 KPIS, and the People Analytics module, which seeks to be an evolution of last and carry out a recommendation and continuous improvement analysis on your HR Analytics indicators.

Regarding the symbiosis of HR with the other departments of the organization, it was observed that this is a reality, especially with first-line managers, team leaders or team leaders. It was found that all HR departments work closely with this middle management line to provide a faster, more agile and effective response. The companies even demonstrated that they have career development plans or performance appraisals that have shared responsibility between HR and team leaders. In the specific case of C1, a follow-up plan was listed with formal quarterly meetings to obtain feedback and implement improvements, in which they are interspersed between HR and team leaders. As for the symbiosis from a strategic point of view with top management, it was not clear the involvement of some HR departments in this situation. It was possible to verify that both C3 and specially C4, have strategic involvement with top management to share information and recommendations, but regarding the others, this is not something that can be assured.

Finally, regarding future trends in the sector, there is a growing concern with the well-being of employees, and the balance of professional life in a component of personal well-being, with a series of factors in development that aim to promote this objective, such as the exploration of new forms of work, greater flexibility in working conditions and greater automation and digitalization of processes. We are witnessing today, not for the best of reasons, an acceleration of this transformation, brought about by the pandemic crisis that has ravaged the world. Several companies such as

Facebook, Twitter, Shopify, Squarespace, Dropbox or Slack have already announced that flexible working, which includes telecommuting, will remain in place permanently, even after the pandemic is over. According to a study developed by Gartner, about eight out of ten companies revealed that they intend to allow teleworking, at least in a hybrid and occasional way, and 47% of them showed that they intend to allow their employees to have access to remote work whenever they want. This paradigm shift that we are experiencing makes the integration of our work life with personal life, the work–life balance, to have a drastic change that can actually change the world of work as we know it today (Gartner, 2020).

It is expected that this study has contributed to the creation of new perspectives and value generation regarding the implementation of HR Analytics and that it has provided a broad view of the concept, as well as the deepening of data-driven management in HR. As referenced in the literature review (Cravino, 2010; Fitz-Enz, 2010; Fitz-Enz & Mattox, 2014; Lawler, 2012; Lawler & Levenson, 2004), it appears that this is an area that is in its initial phase and that the implementation of an analytical model with contributions from various parts of the organization, especially information technologies, is something that is not an established standard today if we have the observed sample as a starting point, and only CE4 complies perfectly with these requirements.

Regarding the limitations based on the results obtained, it is possible to state from the outset that one of the limitations of the study is related to the low number of participations, and that, in fact, a sample of five companies is not sufficient to establish generalized conclusions about the sector. Based on the exploratory nature of the study, the objective was more focused on getting to know these realities as exhaustively as possible, rather than drawing generalized conclusions. It is also important to state that not all interlocutors had the same level of knowledge about the topic, which can also generate a discrepancy in terms of the quality of the information provided. Finally, it is essential to refer to the historical moment we are experiencing, caused by a pandemic, which brought structural challenges across the board in all sectors of our society and which, therefore, brought an added difficulty to this investigation.

Regarding future recommendations, it is possible to say that the research in HR Analytics is still limited and further development is needed, so the recommendations are not very diverse. One of the possibilities for the future would be to focus on organizations from other sectors in order to weave a comparative analysis between them. Another possible path to follow would be to carry out a more in-depth study of organizations that have advanced analytical models in place, such as C4, realizing how this strategy is structured and implemented in practice. Also in this sense, it would also be interesting to assess how the HR departments themselves are organized in order to have this very distinct practice within the department itself, seeking to know what the teams' skills, their multidisciplinary and complementarity.

References

- Ashton, C., Haffenden, M., & Lambert, A. (2004). The “fit for purpose” HR function. *Strategic HR Review*, 4(1), 32–35.
- Baron, A. (2011). Measuring human capital. *Strategic HR Review*, 10(2), 30–35.
- Bracker, J. (1980). Development of the strategic management concept. *Academy of Management Review*, 5(2), 219–224.
- Collins, L., Fineman, D. R., & Tsuchida, A. (2017). People analytics: Recalculating the route. *Deloitte Insights*. https://theleadershipedge.com/download/human_resources/People-analytics-Recalculating-the-route_Deloitte.pdf
- Cravino, L. M. (2010). Measuring what is important. In “*The New HR Analytics: Predicting the Economic Value of Your Company’s Human Capital Investments*” de Fitz-Enz. AMACOM.
- Davenport, T. H., Harris, J., & Shapiro, J. (2010). Competing talent analytics. *Harvard Business Review*, 88, 52–58.
- Dulebohn, J. H., & Johnson, R. D. (2013). Human resource metrics and decision support: A classification framework. *Human Resource Management Review*, 23(1), 71–83.
- Dessler, G. (2013). *Resource management* (13th ed.). Pearson.
- Fitz-Enz, J. (2010). *The new HR analytics: Predicting the economic value of your company’s human capital investments*. AMACOM.
- Fitz-Enz, J., & Mattox, J. R. (2014). *Predictive analytics for human resource management*. Wiley.
- Gamble, J. E., Peteraf, M. A., & Thompson, A. A. (2015). *Essentials of strategic management: The quest for competitive advantage*. McGraw-Hill Education.
- Gartner. (2020). *Gartner survey reveals 82% of company leaders plan to allow employees to work remotely some of the time*. Retrieved November 21, 2020, from <https://www.gartner.com/en/new-room/press-releases/2020-07-14-gartner-survey-reveals-82-percent-of-company-leaders-plan-to-allow-employees-to-work-remotely-some-of-the-time>
- Gibbons, J. M., Woock, C., & Board, C. (2009). *Evidence-based Human Resources: A Practitioner’s Guide*. The Conference Board.
- Kaufman, B. E. (2001). Human resources and industrial relations: Commonalities and differences. *Human Resource Management Review*, 11(4), 339–374.
- Lawler, E. (2012). *Effective human resource management: A global analysis*. Stanford University Press.
- Lawler, E., & Bordeau, J. W. (2009). Effective organizations—What makes HR a strategic partner? *Center for Effective Organizations*, 1(213), 0–23.
- Lawler, E., & Levenson, A. (2004). HR metrics and analytics: Use and impact. *Human Resource Planning Journal*, 27(4), 27–36.
- Linstead, S., Fulop, L., Lilley, S., & Banerjee, B. (2009). *Management and organization: A critical text*. Palgrave Macmillan.
- Ulrich, D., & Dulebohn, J. H. (2015). Are we there yet? What’s next for HR? *Human Resource Management Review*, 25(2), 188–204.