



ARTIGOS

WILL ROBOTS HAVE THE CAPACITY TO REPLACE MANKIND? SURVEY FROM PORTUGAL

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ABSTRACT

This work aims analyze if citizens believe that Artificial Intelligence (AI) may have the ability to replace humans in society. The question has become very important and sensible in the public domain, particularly since 4.0 technology was created and digitalization was implemented. A literature review on the topic was conducted and five sub areas of interest were defined, related to, and namely robots and AI in Human Resources, Human Resource Management, Human Resource Development, Organizations and Society. Due to the innovative characteristic of the study, a questionnaire was developed, composed of 30 questions and a 5 points Likert scale. The study was implemented in Portugal. An exploratory factorial analysis was performed and 5 new factors were defined. The paper presents the results for the 5 initial questions and the five new factors. It was found that people accept that robots will have a massive influence in society but quite crucially, they will never succeed have emotions or feelings – and these are very interesting results. The studies' main limitation is the small sample size, and we would like to see it replicated worldwide, particularly because we found a valid scale of 5 items.

Keywords: Artificial Intelligence, Robots, Human Resources, Human Resource Management, Human Resource Development.

RESUMO

Este trabalho tem como objetivo analisar se os cidadãos acreditam que a Inteligência Artificial (IA) pode ter a capacidade de substituir os seres humanos na sociedade. A questão se tornou muito importante e sensível no domínio público, principalmente desde que a tecnologia 4.0 foi criada e a digitalização foi implementada. Foi realizada uma revisão da literatura sobre o tema e foram definidas cinco subáreas de interesse, relacionadas a robôs e IA em Recursos Humanos, Gestão de Recursos Humanos, Desenvolvimento de Recursos Humanos, Organizações e Sociedade. Devido à característica inovadora do estudo, foi desenvolvido um questionário composto por 30 questões e uma escala de Likert de 5 pontos. O estudo foi implementado em Portugal. Foi realizada análise fatorial exploratória e foram definidos 5 novos fatores. O artigo apresenta os resultados para as 5 questões iniciais e os cinco novos fatores. Verificou-se que as pessoas aceitam que os robôs terão uma influência maciça na sociedade, mas, de maneira crucial, eles nunca conseguirão ter emoções ou sentimentos - e esses são resultados muito interessantes. A principal limitação dos estudos é o tamanho pequeno da amostra e gostaríamos de vê-lo replicado em todo o mundo, principalmente porque encontramos uma escala válida de 5 itens.

Keywords: Inteligência Artificial, Robôs, Recursos Humanos, Gestão de Recursos Humanos, Desenvolvimento de Recursos Humanos.

INTRODUCTION

The idea that artificially intelligent creatures created by humans may exist is not from now. Mary Shelley's *Frankenstein* was written 200 years ago and is considered to be a masterpiece on the topic (Shelley, 2007). Nowadays, with the third industrial revolution, robots become to be more common, and the question of their application is not anymore a question of science fiction.

Therefore, in today's society some very basic questions are posed over the introduction of robots, such as the following: Will robots ever replace humans? Can robots have the ability to produce more and better than Mankind? Do robots have the artificial intelligence to develop themselves and be better than Mankind? Will Human Resources have the capacity to integrate and adapt the capabilities of the robots together with the collaborators? How much and how fast will robots change societies and organizations? All these specific question led us to concentrate on a specific question – Can robots surpass humans? This question was already addressed by authors like Bostrom, 2017.

Therefore, in this paper, we summarize a Master Thesis done in a Portuguese University in the academic year in 2018-9. The thesis had as research question the one we just mentioned below.

In order to address this research question we first made a literature review on the paper (summarized in section 2), then we created and applied a questionnaire (section 3), which we analyzed with results (section 4), and discussed (section 5); the conclusions are presented in section 6.

LITERATURE REVIEW

In this section we present ideas found in the literature about five questions on the relation between robots and humans, namely: robots and Human Resources, robots and Human Resource Management, robots and Human Resource Development, robots and organizations and robots and society at large. The five analysis will be presented in succession, from 2.1 to 2.5. In the end (2.6) detailed research proposals will be defined, clarifying the initial research question stated in the Introduction.

ARTIFICIAL INTELLIGENCE (AI) IN HUMAN RESOURCES (HR)

Probably, the best way to face and study this topic is being aware that Artificial Intelligence is powerful and misunderstood (Lee, 2019). When talking about the use of AI in HR, reality is seen as data that are processed by algorithms, allowing them to be able to make decisions. If we embrace such automation, it is possible to change the day to day processes as well as the way in which management of Human Resources is done. Robots can also be used in the strategy of making important decisions and in the organization of workers, to study existing labor policies, to make changes that improve the quality of work and to automate some tasks that were exclusive to a worker. With AI, the HR strategy can be modified, and the decisions taken are made with more assertive meaning and better adapted to the qualities of each professional, having a great impact both on the work of the employee and on the results obtained. The more extensive the information is about individual skills and competences, the greater and more realistic the track record of each individual within his / her life in the company will be.

With the use of AI in companies, the manager can quickly have access to valuable information, such as communications, skills, technical work, billing and others, that facilitate the work of those who run the

trajectory of a company. According to Crews, in the paper written by Nagele-Piazza (2018), by introducing robots into companies, it is possible to improve wage policies by more easily controlling the various wage levels and professional categories, applying the laws in force in company agreements and eliminating possible errors that exist on the pay grids. According to Parker, it is also possible, as in the Nagele-Piazza (2018) article, to create within the company, Chatbots that allow employees better access to all relevant information in labor relations, facilitating communication between the various departments. In fact, according to Thomas Davenport and Julia Kirby in the paper written by Finneran (2015), technology does not replace but enhances human labour. Thus, it seems possible to reconcile both realities and take advantage of it, achieving better results and worker satisfaction. The exchange of and use of these technological means must always be accompanied by some prudence, as the use of robots may not be well accepted by employees and may have impacts that cause major changes at all levels within the company.

ARTIFICIAL INTELLIGENCE (AI) IN HUMAN RESOURCE MANAGEMENT (HRM)

Ever since the study of intelligence and human reasoning was a concern of scientists

and philosophers, there have been advances made to get to know about this subject which is important to compare and to help in what is now a civilizational advancement with the introduction of AI in the various sectors of activity and in particular in Human Resource Management (HRM). Entrepreneurs are the first stakeholders to promote the introduction of AI in HRM, which will promote major changes in various areas such as recruitment, assessment, training, management and integration.

There is a general consensus that appropriate HRM must involve effective policies and practices that guarantee a good contribution of all the employees in the fulfillment of a company's strategic objectives (Baird, 1988). The performance of the company depends on a set of initiatives and policies implemented by Human Resources, empirical evidences that justify this basic assertion (Harker, 2000). Paradoxically, the studies that established the relationship between Human Resources Management policies and the achievement of company objectives, gave little importance to the difference between the policies and practices that originate in more traditional or technical knowledge and those that originate from specific policies of strategic management of Human Resources.

In recent years, compensation systems have been involved in conjunction with Human Resources Management policies. It allows identifying factors such as flexible working, improving the quality of work, training and others. Utilization of the companies AI allows adjustments, not only of working hours, but also for employees to have a better lifestyle. Human capital, along with the robots, of a company can be a decisive factor in gaining a competitive advantage (Williams, Ashill, & Naumann, 2015).

ARTIFICIAL INTELLIGENCE IN THE DEVELOPMENT OF HUMAN RESOURCES

Can AI come to steal our jobs? It is a question that is posed today and that puts us on the alert regarding all developments in this matter. Considering that work is constantly reshaped by technological progress (Djankov & Saliola, 2018), both workers and organizations must learn to adjust. Maybe we should not talk about "stealing" jobs, but about "adapting", so that both realities coexist. A recent study by Lee (2019) states that not every job will be replaced by AI. In fact, some of them are not at risk at all. According to the historian Yuval Harari (2017), we must devote more of our time to studying and monitoring all the technological advances that AI is having, so that for some years we will not be surprised by the state of

integration and interaction between the machines with AI and Humans, which can go beyond the limits of what is ethical and acceptable in society. Only effective early regulation by humans can prevent machines from regenerating themselves and jeopardizing the development of Humanized societies.

Scientist Stephen Hawking (2018) went further and thought that AI will determine the end of the human race. It seems unlikely that this will happen, but this AI technology, is increasingly present in companies and our daily lives, by integrating this intelligence into robots, Iphone, Windows, Facebook and many other tools we use in our daily activities. There are many fully automated call centers, and we will soon see other sectors of activity go the same way toward partial or even total automation. Human Resources is one of the sectors where AI will bring about major changes and its integration will perform the small routine tasks that will allow employees to perform other tasks with greater added value.

Nowadays we already think of complex equipment for companies, with certain cognitive abilities, doing tasks faster than man, and even being able to do more accurate analysis (Moniz, 2018). It is thought

that the simplest tasks will be the first to be extinguished. It is believed that with the study done on the future of work, there are some professions that are at risk of disappearing such as; marketing operators, cash operators, cooks, waiters and accountants. (Frey & Osborne, 2017)

The fact that there is an increase in productivity by the machines can lead to greater salary differences among employees, since it is increasingly necessary for specialized individuals with specific skills in one area to monitor several individuals in their respective areas.

ARTIFICIAL INTELLIGENCE SEEN IN THE ORGANIZATION

AI has evolved to such an extent that today it is widely used in many industries such as robotics being an essential tool in automobile assembly lines and other production sectors, as well as in service-related sectors. This current involvement of robots in the life of humans, specifically the performance of their daily tasks, is not new. Perhaps the only news that is happening is the robots' reason for existence compared to what was expected in the past. A study by Wilkes et al. (1998) states that robots are expected, by definition, to provide services to human users. Today, it seems that we are

a bit further moving from “provide services” to “assist” or “replace”, as stated by Wang (2016). There has been a constant evolution of robots, companies believe in the added value of introducing machines with AI, robots, which will be a source of development and adding value to all sectors of activity.

AI can be associated with activities that contribute to achieving the goals of companies. Organizations are made up of individuals who have the ability to learn and have a relevant role in the company, who, with the introduction of AI, have their work redirected towards solving more specific and complex problems while robots handle simpler tasks that can be easily solved with the automation of robots. The emergence of AI has allowed us to develop new tools than can identify inappropriate work behavior.

To create technology with AI, which can perceive and correct human behaviors that are less ethical and morally unacceptable, is undoubtedly a great technological advance that can influence and change this type of behavior that is unacceptable in the workplace, specifically sexual harassment. This technological tool, with AI, can be fundamental, in conjunction with HR employees, to eliminate condemnable

behaviors that undermine industrial relations in companies.

Humans have limited capabilities to understand and track all developments in the activity of virtual organizations, AI gives virtual organizations the ability to mitigate the limitations of human beings, being able to monitor and control much of the available resources without loss of costly human time. Virtual organizations are the first industrial application of AI, used in the knowledge and development of robotics.

ARTIFICIAL INTELLIGENCE SEEN IN SOCIETY

The use of AI can help in various human activities, which are now part of our daily lives. There is an extraordinary volume data produced and available on computers. AI can provide great aid in the treatment and processing of these data, and this interaction may have benefits for both Human kind and machines.

AI can impact the many daily activities of humans, such as health, environment, space, and many other areas where it is possible to work with AI. There are great potentialities of intervention between Human kind and robots, which together can open space for major investigations, which may in the future solve many of the problems of Human kind. It

is possible to think that in the future there is a probability that a doctor will have access to information on cases and treatments of a particular disease, from other patients around the world with similar diseases, to assist in the diagnosis and cure of the disease.

AI is evolving at a speed that Human kind did not anticipate. According to Zovko (2018), it is expected that between the years 2030 and 2045 artificial intelligence will significantly surpass human intelligence. Even if we do not believe this is a scenario for which we must be prepared. It is as if a smart, calculating brain, having infinite ability to find patterns and anticipate scenarios that will help fight serious illnesses, have smart cities, and increase the production of many factories. The great fear that torments man is that AI will become the best friend of many people, which may further increase the existing socialization problems of people today.

Nowadays AI already exists in the houses, cars and many other things that are part of our life. There is an infinite innovative cycle in some popular scientific areas. The use of AI is not, and will never reach a total consensus of being a positive thing, but also there are those who reasonably raise some doubts, particularly related to issues of

ethics and morality (Bostrom, 2017). Underlying this lack of consensus is perhaps the fact that over time, workers' beliefs about robots became more complex and pessimistic (Argote et al., 1983). There is a concern with the existence of dangerous intelligent systems, in which anxiety increases with some of the various studies and discussions that are made on this topic.

SPECIFIC RESEARCH PROPOSITIONS

After making the literature review, we found out that the initial broad research question about robots versus mankind, as exposed in the title of the paper and in the introduction, should be detailed in five specific research propositions, namely the following:

Proposition 1: Robots influence mankind's way of working, allowing robots to collaborate with human resources without ever replacing them (Bostrom, 2017)

Proposition 2: The interconnection between robots and HRM brings more skills and knowledge, in order to require the best technicians for the organizations (Luger, 2004)

Proposition 3: With the introduction of robots in the development of HR, it will be possible for them to develop the simplest

tasks, and can man do the most complex tasks (Hamlin & Stewart, 1998)

Proposition 4: Organizations see robots as machines that can develop organizations, bring new technologies and that can evolve, also bringing new knowledge and techniques to Mankind (Wakka, 2018)

Proposition 5: Robots are a positive thing for the evolution of society, supporting what the development of companies, mankind and technology (Oliveira, 2018)

These five specific research propositions are the core of the empirical part of the paper. They resulted in a questionnaire, which was implemented (see 3) and analysed (see 4). The results will be discussed in section 5 and conclusions presented in section 6.

METHODOLOGIES

QUESTIONNAIRE

A questionnaire (see Annex 1) was created, composed of 30 items, six for each one of the research propositions defined above. Each item was analyzed with a 5-point Likert scale from Do not agree (1) to Totally agree (5), in which the respondents expressed their level of disagreement or agreement respectively with the problems raised in the survey.

DATA COLLECTION

The questionnaire was put in Google, and disseminated with Facebook and LinkedIn, and we obtained about 120 answers. Furthermore, the questions were distributed to another 30 people by mail and 30 more on paper, and thus we obtained a sample of 180 respondents, obtaining concrete answers on this theme.

RESULTS

SAMPLE CHARACTERISTICS

The 180 persons for which we obtained results were mainly women (60 percent), with a bachelor's degree (40 percent) or secondary studies (30 percent). The average age was 46 years, with the extreme ages being between 18 and 88 years old.

EXPLORATORY FACTOR ANALYSIS

Given that the scales on each one of the propositions we used were new, and untested, we decided to make an exploratory analysis of the information collected.

In consequence some items were eliminated, namely items 1, 4, 10, 14, 18, 19, 21, 22, 23 and 30, because they presented a low factorial weight (<0.50) or because there was saturation in items by more than one factor.

We obtained a new and final structure of factors, composed by 5 factors. After analysis of the items of each factor, the following designations were attributed:

a) Factor 1 was named *“Impact on the increase of knowledge”*, being composed by the items:

11. Artificial Intelligence is capable of making important scientific discoveries, and even if we are not able to understand the process, this is considered science.

27. Robots, like humans, may have emotions and affections that may be important in more complex situations.

28. Robots will have capabilities that allow you to solve more complex problems, creative ability, critical sense and a lot of individual initiative.

29. Artificial Intelligence allows one to know the constant needs of the clients, being that such needs are in constant change.

b) Factor 2 was named *“effects of robotization in society”* resulting from the following items:

5. Robots will be a source of business development and added value to all

sectors of business activity and may be of added value to companies.

15. The insertion of Artificial Intelligence, is considered as important, for the labour industry, in the next 10 years.

20. Societies can be intelligent and autonomous enough, taking advantage of what Artificial Intelligence is.

25. Artificial intelligence is increasingly present in companies and in everything man uses.

26. Robotics allows Human Resources Management to be transformed into each company, and there may be a need to have Artificial Intelligence in the company.

c) Factor 3 relates to the *“impact of the introduction of robots in Human Resources”*, with the following items:

2. The introduction of Artificial Intelligence will influence how you will manage the Human Resources of a company.

3. Artificial Intelligence can be used in the strategy of making important decisions and organizing workers.

6. If Artificial Intelligence thinks faster than mankind and can predict which questions are to be answered, it will be able to answer the questions posed.

7. This introduction of IA will modify the various tasks to be performed by Human Resources, being automated by robotics.

8. With automation in Human Resources there are changes in the way of working and areas that can be more developed.

d) The penultimate factor is the “*Impact on human work*”, with the following items:

13. Can Artificial Intelligence challenge existing jobs?

24. It is possible for men to feel insecure and threatened by cybernetic risks.

e) Finally the last factor 5 is called “*effect of the interaction between man and robots*”, the related items being:

9. Humans are always necessary to be able to regulate the presence of the Artificial Intelligence in the company.

12. Bringing companies together with Artificial Intelligence allows you to adjust not only working hours but also allows employees to have a better lifestyle.

16. The integration of Artificial Intelligence may create more jobs than it will destroy, arguing that its use is an opportunity to automate repetitive and low value added tasks.

17. There must be collaboration between humans and the robots so that together they can achieve the objectives of the company.

INTERNAL CONSISTENCY

The final values for Cronbach’s alpha for each one of the five factors derived from the explanatory factorial analysis, are shown in the following Table 1. The numbers in bold indicate the factor to which each item belongs. Each item had at least an alpha value of 0.5.

Table 1: Factorial Weight of the remaining items

Perg.= Question	Factor				
	1	2	3	4	5
Perg._28	,835	,296	,195	,133	,076
Perg._27	,649	,394	,228	,084	,148
Perg._29	,644	,513	,467	,055	,260
Perg._11	,593	,359	,371	,068	,151
Perg._26	,496	,754	,540	,193	,249
Perg._15	,348	,702	,459	-,041	,449
Perg._25	,343	,693	,417	,536	,351
Perg._20	,322	,662	,339	,251	,415
Perg._5	,261	,613	,430	,006	,445
Perg._7	,265	,478	,805	,219	,260
Perg._2	,279	,399	,648	,169	,261
Perg._8	,208	,551	,621	,155	,359
Perg._3	,399	,598	,600	,005	,219
Perg._6	,488	,444	,530	,117	,181
Perg._24	,151	,229	,207	,763	,117
Perg._13	,148	,209	,233	,712	,065
Perg._17	,243	,454	,364	,157	,674
Perg._16	,293	,373	,265	-,264	,563
Perg._9	-,101	,198	,105	,208	,546
Perg._12	,349	,495	,331	-,024	,538

Source: Author's own elaboration

STATISTICAL ANALYSIS OF THE FACTORS

In the following Table 2, we expose several important figures that characterize the 5 factors previously defined, such as the average, the standard deviation, the coefficient of variation, the Cronbach's alpha and the correlation coefficients. Regarding the average values, we find that the

affirmations about the impact on the increase of knowledge have an average of about 3 (2.69). Therefore, it seems that the individuals who answered were undecided about whether the Increased knowledge for both people and robots could be important for their development and business. Regarding the other factors, the average of the answers was about 4, which indicates

that respondents strongly believe that robots can be inserted in society, and can interact with humans, that their introduction in companies can be impacting, and may

influence the work environment in the way humans work, being able to help in the accomplishment of tasks, getting humankind and the robots to interact with each other.

Table 2: Main statistical data on the 5 factors

Factor	<u>Average</u>	<u>Standard deviation</u>	Coefficient of variation (SD/Av)	1	2	3	4	5
1. Impact on increased knowledge	2,69	0,89	0.33	$\alpha = 0,754$				
2. Effects of robotization on society	3,53	0,74	0.21	0,458**	$\alpha = 0,807$			
3. Impact of introducing robots into Human Resources	3,56	0,71	0.20	0,471**	0,619**	$\alpha = 0,769$		
4. Impact on human work	4,13	0,93	0.23	0,196**	0,277**	0,266**	$\alpha = 0,724$	
5. Effect of interaction between man and robots	3,59	0,74	0.21	0,295**	0,523**	0,381**	0,085	$\alpha = 0,648$

Source: Author's own elaboration

** - significant at less than 5 percent

The values presented for the standard deviation, able us to perceive the existence of possible values that are out of what is the pattern of given answer - and in our case, the low values of the SD for the five factors, are indicative that the respondents beliefs do not differ much for each factor. The joint

consideration of the average with the standard deviation produces the coefficient of variation (CoV), also presented, and the values are low, with 0.2 for four of the factors and 0.3 for the other one. This reinforces the idea obtained when analyzing the averages, and mainly about the last four

factors, and particularly about factors 2, 3 and 4 – high average and low CoV.

Regarding the correlations, all the factors appear to have significant relations with the others with one exception, which is the relation between factor 4 and factor 5. This means that for nine of the correlations a linear association exists, but for the mentioned exception only a non-linear relation exists.

Finally, regarding the alpha of Cronbach four of the five factors present a value higher than the threshold of acceptance of 0.7, and the last one is close to it, which indicates that the five factors are valid for the study that is being carried out.

ANALYSIS OF THE ANSWERS TO THE VARIOUS RESEARCH PROPOSITIONS

The answers obtained in the questionnaire regarding the five research propositions are summarized in Table 3 below.

Table 3: Answers to the questionnaire, summary

<u>Propositions</u>	<u>Minimum</u>	<u>Maximum</u>	<u>Average</u>	<u>Mode</u>	<u>Median</u>	<u>Standard Deviation</u>	<u>SD /Average</u>	<u>Associated questions</u>
<u>Human Resources</u>	1	5	3,83	4	4	0,75	0.2	3,8,13,18,23 e 28
<u>Human Resource Management</u>	1	5	3,5	4	4	1,22	0.35	2,7,12,17,22 e 27
<u>Development of human resources</u>	1	5	4	4	4	0,89	0.22	4,8,14,19,24 e 29
<u>Organizations</u>	1	5	3,83	4	4	0,75	0.2	5,10,15,20,25 e 30
<u>Society</u>	1	5	3,2	3	3	0.41	0.13	1,6,11,16,21 e 26

Source: Author’s own elaboration

Some differences exist in the average and the standard deviation between the groups of initial propositions: higher average of for HRD and lower average for society of 3.2, and higher standard deviation of 1.2 for HRM and lower value for society of 0.41. This results in a much higher coefficient of variation for

HRM than for the other groups of questions and even a smaller ones for the society oriented questions. Differences also happen a little for the mode and median, and namely the questions about society, that have a lower value – 3 instead of 4.

Finally it was very interesting to notice that of all the 30 initial questions one had results very different from all the others, and that one was question 27, regarding emotions and feelings – which had a mode of 1 and an average of 2.15.

DISCUSSION

This study has two significant limitations, one in content and the other in dimension. The first limitation is that we addressed the beliefs of people on the research question. There are possible alternatives – like to address limited groups (ie managers, scientists, politicians and administrators), or to try to do some forecast based on trends. A second significant limitation of this study is that the sample was only of 180 elements. The two limitations are due to the fact that the study was done in the scope of a Master thesis, with limited time of one year.

That limitation call for further studies using larger samples or diferent perspectives, as indicated in the conclusions.

However, in spite of those limitations we were able to achieve some results that are useful. Namely the following:

1. In terms of the scientific debate we defined five constructs, 1. Impact on

increased knowledge; 2. Effects of robotization on society; 3. Impact of introducing robots into Human Resources; 4. Impact on human work; 5. Effect of interaction between man and robots, for which there is validity on answering the research question. This is an important result because we found the five constructs and validated them. The result has a practical impact – because validated scales can be used by other scholars. The result also has an impact on knowledge – because now we know a scale on the impact of robots in society and also we got to know that using this scale citizens believe that the impact of robots in society is strong in the four last constructs less in the impact of knowledge. We also found out that the citizens do not believe that robots will ever have emotions and feelings; this idea is very interesting and has scientific interest because it seems that the wisdom of the people is very strong regarding this specific point.

2. In terms of practical implications, we found out that people believe strongly that robots will have impacts in society, human resources, human work and the relation between mankind and robots; the impact of robots in knowledge is felt to be less important; but rather significantly the impact is to be limited by the fact that people

do not believe emotions and feeling will be possible. Therefore this study confirms the importance of robots in the world but limits that influence to soulless operations.

3. What has just been written means that the results of this study have a big policy meaning – that is, the consequence of the ordinary people’s feeling is that it will be impossible to replace humans in the command of the world society. Robots are seen as very useful and powerful but in terms of complexity they will not achieve nothing like the human brain. Therefore, the idea of robots in power is science fiction.

These results, and the methodology make the Master Thesis in which this paper is based, a very innovative piece of work.

CONCLUSION

The topic of creating artificial intelligence has been in human minds for a long time (at least since Mary Shelley wrote Frankenstein in the 19th century) and in social terms it is related to the relation between humans and machines, leading to frictions starting at least with Ned Ludd also in the 19th century. In very recent years, robotization has become a widespread topic in the media worldwide, and the question of the relation between humans and robots has received

immense consideration. In scientific terms however, the question is still very new, and as stated in section 2, we found not many studies to address the issue. Therefore we created a questionnaire around five topics, and used that questionnaire on a sample of 180 persons in Portugal.

The results of the application of the questionnaire are of two kinds:

1. First, using an exploratory factor analysis we defined five constructs for which there was convergence, namely, 1. Impact on increased knowledge; 2. Effects of robotization on society; 3. Impact of introducing robots into Human Resources; 4. Impact on human work; 5. Effect of interaction between man and robots. For all the factors, the coefficient of variation was small, and for the last four the average was high, so people agree on the impact of robots in the mentioned four situations.

2. Second, regarding the five group of questions about the initial propositions as initially defined, all the groups received strong support with the exception of society and all the groups had fair variation with the exception of human resource management (big diversity) and society (small diversity). Also, analyzing answers to question 27 we found people do not believe that machines

will ever have feelings or emotions. This is a very interesting finding because it diminishes the importance of robots in all the plausible future scenarios, and it reinforces the dominance of humans of planet Earth. People seriously believe that robots may be faster and stronger in some aspects, but they will never have souls, they will never know they will die, and therefore, they will always be inferior to mankind. This alone, considerably limits and defines the answer to the research questions included in the title of this paper, and also undermines and limits some thoughts massively included in the media about the future importance of robots in History.

For future studies we suggest that the same questionnaire would be applied to a larger sample, may be in several countries, having in mind that five constructs were defined in the exploratory factor analysis. We also know that different samples or different perspectives as indicated in the discussion section are possible.

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ANNEXE 1 - QUESTIONNAIRE

1. Artificial Intelligence will be compatible with the irrationalities of man.
2. The introduction of Artificial Intelligence will influence how you will manage the Human Resources of a company.
3. Artificial Intelligence can be used in the strategy of making important decisions and organizing workers.
4. There may be integration and interaction between the machines with Artificial Intelligence and the Humans, and should not exceed ethical factors.
5. Robots will be a source of development and add value to all sectors of activity, and may be of added value to companies.
6. If Artificial Intelligence thinks faster than mankind and can predict which questions are to be answered, it will be able to answer the questions posed.
7. This introduction will modify the various tasks to be performed by Human Resources, being automated by robotics.
8. With automation in Human Resources there are changes in the way of working and areas that can be more developed.
9. Mankind is always necessary to be able to regulate what is the presence of the Artificial Intelligence in the company.
10. With the introduction of Artificial Intelligence, mankind will be left with more complex tasks.
11. Artificial Intelligence is capable of making important scientific discoveries, and if we are not able to understand the process, this is considered science.
12. Bringing companies together with Artificial Intelligence allows you to adjust not only working hours but also allows employees to have a better lifestyle.
13. Can Artificial Intelligence jeopardize existing jobs?
14. The creation of technology with artificial intelligence allows us to perceive and correct human behaviour that is less ethical and morally unacceptable.
15. The insertion of Artificial Intelligence, is considered as important, for the labor industry, in the next 10 years.
16. The integration of Artificial Intelligence may create more jobs than it will destroy, arguing that its use is an opportunity to automate repetitive and low value added tasks.
17. There must be collaboration between mankind and the robots so that together they can achieve the objectives of the company.
18. Increasingly robots will be able to be closer to mankind, where the distinction between the two can be difficult in some tasks.
19. Artificial intelligence can produce false and implausible results for companies.

20. Societies can be intelligent and autonomous enough, taking advantage of what Artificial Intelligence is.
21. Robotics can be used to conduct interviews, obtain answers in real time and have a realistic selection, being decisive for the choice of true talents.
22. Artificial Intelligence can make mistakes in the various Human Resources processes.
23. Increasingly, robots will have cognitive skills that allow them to be faster in developing tasks, developing them faster and better than mankind.
24. It is possible for men to feel insecure and threatened by cybernetic risks.
25. Artificial intelligence is increasingly present in companies and in everything man uses.
26. Robotics allows Human Resources Management to be transformed into each company, and there may be a need to have Artificial Intelligence in the company.
27. Robots, like humans, may have emotions and feelings that may be important in more complex situations.
28. Robots will have capabilities that allow you to solve more complex problems, creative ability, critical sense and a lot of individual initiative.
29. Artificial Intelligence allows one to know the constant needs of the clients, being these in constant change.
30. Human Resources can never be replaced by robots in their entirety.

CONTATO

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