http://dx.doi.org/10.23925/2179-3565.2021v12i2p67-74

RISUS - Journal on Innovation and Sustainability
volume 12, número 2 - 2021
ISSN: 2179-3565
Editor Científico: Arnoldo José de Hoyos Guevara
Editor Assistente: Rosa Rizzi
Avaliação: Melhores práticas editoriais da ANPAD

DIGITAL TRANSFORMATION AT THE RECRUITMENT AND SELECTION PROCESS: A STUDY OF SEMANTIC ANALYSIS

Transformação digital no processo de recrutamento e seleção: um estudo de análise semântica

Renata Martins Correa[1], Flávia Frate[2],
[1]Cruzeiro do Sul University of São Paulo, Brazil
[2]Mackenzie Presbyterian University of São Paulo, Brazil
E-mail: renatacorreaprof@gmail.com, flaviafrate@icloud.com

ABSTRACT

An era of exponential technological changes marks the current century. The convergence of different processes has changed the way that companies use technology. Thus, the objective of this study is to reveal how companies can achieve digital transformation at the recruitment and selection process through semantic data analysis. The methodological procedures were elaborated in a descriptive exploratory research, through the qualitative method, which consisted of the literature review and documentary analysis. As a result, it was found that technology, by using artificial intelligence, can assist in the analysis of the candidates' responses. Therefore, if a person uses more the pronoun “we”, it may indicate that the person is more sociable, according to the analyzed case. In this way, it is concluded that technology can corroborate for a more assertive hiring in the management of Human Resources, and then increase efficiency in recruitment and selection activities. Therefore, the future of work will be marked by advanced technologies.

Keywords: Digital transformation; Recruitment and selection; Semantic data analysis.

ACEITO EM: 24/08/2020
PUBLICADO: 31/05/2021

RISUS - Journal on Innovation and Sustainability
volume 12, número 2 - 2021
ISSN: 2179-3565
Editor Científico: Arnoldo José de Hoyos Guevara
Editor Assistente: Rosa Rizzi
Avaliação: Melhores práticas editoriais da ANPAD

TRANSFORMAÇÃO DIGITAL NO PROCESSO DE RECRUTAMENTO E SELEÇÃO: UM ESTUDO DE ANÁLISE SEMÂNTICA

Digital transformation at the recruitment and selection process: a study of semantic analysis

Renata Martins Correa[1], Flávia Frate[2],
[1]Cruzeiro do Sul University of São Paulo, Brazil
[2]Mackenzie Presbyterian University of São Paulo, Brazil
E-mail: renatacorreaprof@gmail.com, flaviafrate@icloud.com

RESUMO

Uma era de mudanças tecnológicas exponenciais marca o século atual. A convergência de diferentes processos mudou a forma como as empresas usam a tecnologia. Assim, o objetivo deste estudo é revelar como as empresas podem alcançar a transformação digital no processo de recrutamento e seleção por meio da análise semântica de dados. Os procedimentos metodológicos foram elaborados em uma pesquisa exploratória descritiva, por meio do método qualitativo, que consistiu na revisão da literatura e análise documental. Como resultado, constatou-se que a tecnologia, ao utilizar inteligência artificial, pode auxiliar na análise das respostas dos candidatos. Portanto, se uma pessoa usa mais o pronome "nós", pode indicar que é mais sociável, conforme o caso analisado. Desta forma, conclui-se que a tecnologia pode corroborar para uma contratação mais assertiva na gestão de Recursos Humanos, e assim aumentar a eficiência nas atividades de recrutamento e seleção. Portanto, o futuro do trabalho será marcado por tecnologias avançadas.

Palavras-chave: Transformação digital; Recrutamento e seleção; Análise de dados semânticos.

INTRODUCTION

Companies immersed in the framework of digital technologies, such as Google and Amazon, have been presenting an exponential growth – not only because they are technology companies, but also due to the fact they present purpose in their essence.

Traditional companies need to be reinvented to keep up with the digital information age. New entrants or agile and innovative companies are emerging, such as startups, in which business models are repeatable and scalable. As startups have been innovating through co-creation or collaboration between people, it is not likely that there will be an independent nucleus from digital environment.

Professor Sunil Gupta (2019) from Harvard University states: "I studied countless digital transformation in companies and learned that leaders who achieve transformative results immerse in the digital environment. That is, they do not treat digital strategy as separate from their overall strategy. Instead, they lead with the mindset from digital environment first, and make sure that their digital strategy reaches all aspects of the company".

For Gupta (2019), almost all large companies make mistakes when launching independent digital units or have units in Silicon Valley hoping that young entrepreneurs will stimulate innovation in the company. In this perspective, Hinings (2018) understands the effects of digital transformation through the combination of several digital innovations, values and beliefs that changes or complements existing rules in organizations.

Therefore, it is necessary to transform the organizational culture and mindset, for the Digital Transformation happens. So, the digital strategy becomes an integral part of the overall business strategy. Gupta (2019) also indicates that "when the excitement about the digital environment spreads through the company, new initiatives start to emerge everywhere, leading to proliferation". In addition to the usage of the intellectual capital from the internal public or employees, Gupta (2019) recommends an open innovation or crowdsourcing, that will bring skills and ideas from users and specialists that are outside the companies, contributing with brand new ideas to achieve innovation.

In the same way, Henry Chesbrough (2006) brings a reflection on the new approaches that seek for more flexibility in the generation of technological innovations. The open innovation model assumes that companies must use external sources of ideas, in order to add value perceived by the user and increase their competitiveness in the generation of new technologies.

Similarly, Lowik et al. (2016) call this type of practice in organizations as "open innovation", and for that to happen, individuals who create knowledge innovation are required.

Human participation is fundamental in the process of corporate innovation, and combined with other resources or in line with the usage of technological artifacts, the performance for the competitive advantage is potentially greater. There are many technologies today, such as augmented and virtual reality, internet of things, 3D printing, among others, that make up the new era of industry 4.0.

Therefore, this study aims to study artificial intelligence and describe how the Human Resources area can use this technology to obtain more efficiency in recruiting candidates through a semantic data analysis.

1 THE DIGITAL TRANSFORMATION

With the significant changes revealed by the digital environment, managers have been required to reflect on the central essence of their company to achieve digital transformation. It is necessary to think about different ways to achieve innovation in which all people involved reveal their maximum potential for solving problems.

Technological changes require rethinking the business model to create value or experience for the user. In this perspective, Rogers (2016 apud Warner et al. 2019) argues that "the digital transformation is not fundamentally about technology, but about strategy", which means that managers must find ways to identify new business models.

According to Liu et al. (2011 apud Warner et al. 2019), the digital transformation is "like an organizational transformation that integrates digital technologies and business processes in a digital economy".

Similarly, Singh and Hess (2017 apud Warner et al. 2019), suggest that the term digital transformation of an organization goes far beyond functional thinking, and holistically considers that the "range of actions" must be taken to explore opportunities or avoid threats arising from digital technologies.

Therefore, the success of organizations is determined by innovations across the board, meaning that it permeates all areas of the company in a holistically manner.

For Schumpeter (1964, p. 76) "it is a rule that the entrepreneur initiates the economic changes", generating a "circular flow" of new needs with the consumer, replacing old products and services for new ones. Thus, since the middle of the 20th century, business literature has been based on organizations that have been surviving through innovations and promoting competitive advantage (Flatten et al., 2011).

In 1988, Bourgeois and Eisenhardt (1988) analyzed the survival of organizations in high-speed changing contexts or organizations inserted in environments of extreme change. It was seen that, just as organizations must make efforts to maintain themselves due to the impacts of innovations, the labor market or human resources also follow these constant changes, reflecting on their practices.

One of the reasons for these changes, in addition to technological issues, is the constant change in the behavior of generations (Dalessandro, 2018). In this way, the necessity to use innovative Recruitment and Selection methods arises (Shree & Singh, 2019).

Organizations that wish to remain competitive in the market must have employees who meet this expectation, perform activities with mature and non-repetitive routines and focus on the development and implementation of new ideas, approaches or procedures (Shioh e Susanto, 2011).

Gupta (2019) also proposes that companies take the opportunity of technology to reduce costs and increase the efficiency of operations.

In this innovative environment, organizations that aspire to stand out must reconcile technological innovation with psychological profiles compatible with this scenario.

2 TECHNOLOGY INNOVATION AT THE RECRUITMENT AND SELECTION PROCESS

For a better organizational developing in recruitment and selection qualified and competent professionals are necessary. But this task requires time and energy from managers.

Attracting talents with profiles that suit this scenario attending companies' expectations is one of the greatest and perhaps the most important challenge for organizations (Kollitz, 2019).

Therefore, technologies can be used for a better selection of candidates in order to compose the workforce (Martinez-Gil, 2014). In the same way of thinking, Dalessandro (2018) says that the use of digital technologies is the future for traditional recruitment and selection.

The individual insertion with the profile that mostly matches the company's position is the success and survival corollary in the innovative environment. Thus, the usage of technology for choosing and hiring new employees is extremely important, understood as a solution that has been deployed in the activities of human resources and, more specifically, at the recruitment and selection department (Martinez-Gil, 2004).

In fact, Dalessandro (2018) concludes that reaching future generations in traditional recruitment will be difficult, since they not only live in this environment full of innovation, but also seek opportunities online.

In this study Dalessandro (2018) also mentions that corporations that use digital technologies for recruiting candidates can reach young people from the millennial generation more effectively, because they are strongly connected with the experiences of digital media.

In this context, Shree and Singh (2019) studied the gamification method for recruitment and selection, which is the usage of game design techniques, mechanics and game thinking to identify internal and external candidates for the organization.

Initiatives using automated solutions make this step in the process more efficient. Globalization has provided viable access to information through the internet, so people in different locations are able to access open job

opportunities at companies. This means that the volume of curriculums and analyses to be carried out becomes potentially greater. In this way, Artificial Intelligence technology can assist with this process.

3 ARTIFICIAL INTELLIGENCE

Artificial intelligence is intelligence demonstrated by virtual assistants, like human intelligence that algorithmically designed crosses data to perform functions that require intelligence when performed by people.

This technology can improve existing products and services, enable the automation of tasks, and increase efficiency and productivity.

The future will be possibly constituted by the combination of software, data and artificial intelligence. As a result, sectors such as health, financial services, manufacturing and retail must undergo significant transformations, bringing benefits to consumers (Taulli, 2019).

Artificial intelligence has been becoming one of the most powerful strategic tools in today's organizations and in any business area: HR, Marketing, Finance, Logistics, Insurance, and others. Everything indicates that artificial intelligence will shape the future more strongly than any other innovation in this century.

Machine learning is a current application of artificial intelligence based on the idea of designing machines with access to data and let them learn for themselves.

Thus, the selection process of candidates with profiles matching the organization objectives become more extensive and costly, as it may involve a more qualified labor. This is the reason why technological innovation through artificial intelligence can be highly efficient in the recruitment and selection process.

4 SEMANTIC ANALYSIS AT THE RECRUITMENT AND SELECTION PROCESS

One example of technological innovation that supports recruitment and selection activities is the "e-Recruitment" or electronic recruitment, as called by Martinez-Gil (2014). With this technology, the social networks and/or applications with artificial intelligence can partially replace human action in the recruitment and selection process.

Such intelligent technique has grown significantly in recent years and there are several types of analysis with these resources. One example of it is the linguistic analysis or semantic analysis, the topic being studied in this paper. (Martinez-Gil, 2014).

Semantic analysis is a technological process in which the words are interpreted by similarity, making a semantic analysis of the responses. Martinez-Gil (2014) says that artificial intelligence assigns scores to both parts that are interested: the job position and the candidate, based on the similarity of their meaning. In the case studied in this paper, the company that uses this intelligence reports that the technology is capable to perform a semantic analysis of the responses. "We take a deep observation and try to understand if the person uses long or short sentences, types and quantity of pronouns, and negative or positive words for example. If the person is using more 'me' than 'us' and how it indicates a more sociable pattern.''

This type of system does not compete or replace all management procedures in the recruitment and selection section, but it helps the development of processes, as the technology is accurate and assertive in the analysis of algorithms.

We are also able to affirm that traditional processes may not consider adequate semantic relations, so this is a positive point about using this technology. Also, it is important to say that the isolated usage of this resource is not recommended, as it should always be used as a complement to the traditional analysis processes. Analyze different candidates' profiles that configure the best option for the company and the position opened may require a lot of time and cost.

Artificial Intelligence technology provides intelligence for candidate analysis. Thus, it can be used as a pre-selector to reduce the volume of curriculums, simplify the selection process and maximize efficiency in a quick and intelligent manner.

4.1 A Case in Brazil

As an example of the combination between semantic analysis and artificial intelligence, we have a Chinese human resources technology company, that analyzes the candidates' responses to the job position through artificial intelligence. The name of the company will not be revealed in order to keep confidentiality.

The algorithms process the candidate's information and list keywords to accurately identify the person's profile. “We try to put the curriculum at a different point in the process, where it is most useful. And we want to make possible some kind of ‘interview on a large scale’, creating the chance for everyone to be evaluated by a tool that relates the answers to the best performance for the job position”, explains Rutger Laman Trip, director of Seedlink, company that owns the software. Candidates must answer open-ended questions and the virtual assistant interprets the language used by the person.

“Our technology makes a semantic analysis of the answers. We take a deep observation and try to understand if the person uses long or short sentences, types and quantity of pronouns, and negative or positive words for example. If the person is using more ‘me’ than ‘us’ and how it indicates a more sociable pattern. This is the tip of the iceberg of the correlations that the program is able to make,” he said. “We look at the competence by the language that is being used by the candidates, and not their background, age, skin color or field of study”, comments the director. The virtual assistant or artificial intelligence makes a four-level-deeper interpretation. (EXAME, 2020)[1].

FINAL CONSIDERATIONS

The 21st century is marked by technologies that started to change the world, causing individual transformations and breaks in business paradigms. In this study, it was revealed how companies can achieve digital transformation at a process of recruiting and selecting candidates for the job positions through semantic data analysis.

Artificial Intelligence or virtual assistant interprets and correlates candidates' keywords by similarity, making a semantic analysis of the responses and, in the end, indicates the candidate's profile.

We analyzed a case of a company in China that uses this intelligence. Thus, if the person uses long or short sentences, many pronouns, more negative or positive words, and more ‘me’ or ‘we’, it is possible to detect if the person is more or less sociable.

The usage of technology at the selection process of candidates is a solution that has been deployed in human resources activities. When the company hires the employees in a correct manner, the retaining of talent happens, and superior results are achieved.

Thus, it is concluded that technology, through Artificial Intelligence, can assist in the analysis of candidates' responses and corroborates for more assertive hiring in Human Resources management. And in this way, offers some job position that resonates with the candidate.

In addition, the study addressed the concept of co-creation and open innovation, in which companies can reinvent themselves by the usage of intellectual capital from employees or external public, achieving innovation quickly.

And finally, it was verified in the World Economic Forum[2] studies a report showing that the future of work will have significant changes and will be marked by advanced technologies, such as: augmented and virtual reality, internet of things, 3D printing, nanotechnology, biotechnology, Big Data, drones, droids, bitcoin or digital currency and Artificial Intelligence, which was the object of study in this paper.

According to the article created by MIT News (2020)[3], in US, four types of industries are responsible for 70% of robots, which are automakers (38%), electronics (15%), plastic and chemical industries (10%) and metal

[1] https://exame.com/carreira/entrevista-antes-curriculo-depois-esta-empresa-quer-mudar-o-recrutamento
[2] https://www.weforum.org/agenda/2016/01/the-10-skills-you-need-to-thrive-in-the-fourth-industrial-revolution/
[3] http://news.mit.edu/2020/how-many-jobs-robots-replace-0504

manufacturers (7%). The advanced robotics in the USA replaces an average of 3.3 workers. This increase in the usage of robots in the workplace also reduced wages by about 0.4%, which has significant social implications. However, MIT News presents another study, now in France[4], in which it reveals that companies using robotics in industry tend to add more workers to their organization, and this is due to the result of automation that led to a growth and a better market share – so these companies became more productive and profitable. The study reveals that companies that do not invest in technology lose space to their competitors.

Thus, the Artificial Intelligence technology, which is the purpose of this study, by using semantic data analysis, revealed to be a considerable resource for digital transformation at the recruitment and selection process.

REFERENCES

BOURGEOIS, L. J.; EISENHARDT, K. Strategic decision processes in high velocity environments. [J] Management Science, 1988, 34, 7, 816-35.

CHESBROUGH W. H. Open Innovation. The new Imperative for Creating and Profiting from Technology. [B] Harvard Business School Press, 2006.

DALESSANDRO, C. Recruitment Tools for Reaching Millennials. [J] International Journal of Qualitative Methods, 2018, 17(1).

FLATTEN, T. C. et al. A measure of absorptive capacity: Scale development and validation. [J] European Management Journal, 2011 v. 29, n. 2, p. 98- 116.

GUPTA, S. Implantando Estratégia Digital. [B] São Paulo: M. Books do Brasil Editora Ltda, 2018.

HININGS, B.; GEGENGUBER, T.; GREENWOOD, Royston. Digital Innovation and Transformation: An institutional perspective. [J] Journal Elsevier, 2018, volume 28, pages 52-61.

LOWIK, S., KRAAIJENBRINK, J. and GROEN, A.J. The team absorptive capacity triad: a configurational study on individual, enabling, and motivating factors. [J] Journal of Knowledge Management, 2016, Vol. 20 No. 5, pp. 1083-1103.

KOLLITZ, R., RUHLE, S., SÜß, S. Recruitment practices under scrutiny: A latent-profile analysis of family firms' approaches to recruit non-family employees. [J] German Journal of Human Resource Management: Zeitschrift Für Personalforschung. 2019 *33*(3), 167–196.

MARTINEZ-GIL, J. An Overview of Knowledge Management Techniques for e-Recruitment. [J] Journal of Information & Knowledge Management, 2014, Vol. 13, No. 2.

SCHUMPETER, J. A. Theory of Economic Development: an investigation into profits, capital, credit, interest and the economic cycle. [B] Os Economistas Collection. São Paulo: Nova Cultural, 1997.

SHREE, S; SINGH, A. S. Exploring Gamification for Recruitment through Actor Network Theory. [J] South Asian Journal of Human Resources Management. 2019, *6*(2), 242–257.

SHIH, H; SUSANTO, E. Is innovative behavior really good for the firm? [J] International Journal of Conflict Management, 2011, 22(2), 111–130.

[4] https://news.mit.edu/2020/robots-help-firms-workers-struggle-0505

TAULLI, T. Introduction to Artificial Intelligence. [B] Brasil: Novatec, 2019.

WARNER, K. S. R; WAGER, M. Building dynamic capabilities for digital transformation. An ongoing process of strategic renewal. [J] Journal Elsevier, 2019, 52, pages 326-349.