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The impact of Covid- 19 on employees' performance and turnover using DEA model

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Abstract

Purpose – This paper highlights the impact of the COVID-19 pandemic on the performance of employees and the changes that have taken place in their traditional way of working. The crisis due to Covid-19 and its consequences have shaped the daily lives of employees for almost two years. There have been many impacts of Covid-19 on employees: quarantine or even the disruption of their usual working methods, illustrated by the implementation of generalized remote working for all those whose activity allowed it.

Design/methodology/approach – A model related to the data envelopment analysis (DEA) approach is developed to explain the impact of staff turnover on organizational performance and to help managers adopt the appropriate human resources strategies during the crisis. This research will allow managers to better understand the phenomenon of workforce turnover on their organizational performance. In addition, this research is likely to help them adopt the right human resources strategies that could, under certain circumstances, influence the impact of turnover on the performance of the company in the desired way.

Findings – Several human resources practices, such as the recruitment and selection of employees, performance management as well as employee training, would not have been as impacted if companies had mechanisms to deal with these complex cases, in particular by the implementation of innovative human resources management practices, this implies that the preparation and management of periods of distress are not well carried out with regard to the management of human capital.

Research limitations/implications – Further investigations in other kinds of industries may offer additional insight into the findings of this study.

Practical implications – This paper provides valuable insights to HR managers to develop HR practices during crisis.

Social implications – Our finding indicates that certain factors may increase people's vulnerability to the financial stress related to COVID-19. We find support that the social distribution of economic vulnerability is magnified in regions with pre-existing social disparities, creating new forms of disparity.

Originality/value – This research has proven how the health crisis has impacted several human resource management practices. The majority of these repercussions cannot be controlled by companies, but in a time of distress like this, it is a good time for the HR function to prove its crucial and strategic role within the company. Companies are in principle affected in different ways by the pandemic, it depends on the nature of the activity, the field in which they operate, the skills of the top hierarchy to deal with crises, and from planning to crisis management.

Keywords: Covid19, Turnover, Performance, Human resources management, DEA, Competitiveness

1. Introduction

The role of human resource management (HRM) has greatly evolved in recent decades (Obedgiu, V. (2017)). Also, the economy has moved from agrarian to manufacturing, then to service-oriented, whereas we are now in an information economy, so the knowledge of the employees has become critical, which changes from all the more the role of HRM (Ambe, P., Cappelli, P., & Yakubovich, V. (2019)). Thus, given the challenges of growth,

competitiveness, and globalization, as well as the omnipresence of rapid changes, particularly in information technologies, HRM must henceforth go beyond administrative expertise and is increasingly strategic (Papa, A., Dezi, L., Gregori, G. L., Mueller, J., & Miglietta, N. (2018)). In view of all these changes, the concept of strategic human resource management (HSRM) emerged in the literature and in business practice in the late 1970s/early 1980s, emphasizing the inescapable link between the different HRM practices and organizational performance (Anwar, G., & Abdullah, N. N. (2021)). Thus, organizations are increasingly moving away from traditional thinking that HR is a cost to be reduced, in favor of a much more strategic perspective. Consequently, HR professionals must not only transform what they do, but also the way they are perceived, and their focus must be aligned with the strategic choices of the organization they support as well as the phase of the life cycle organization in which it finds itself. As such, it has been demonstrated that there is indeed a link between the strategic roles of the HR department and organizational performance, which further demonstrates that the role of HR must be transformed (Chênevert et al., 2011).

Since the beginning of the Covid-19 crisis, companies have had to constantly adapt their organization to continue their activity. That's why they provided solutions and advice to adapt the workstation of their employees. The adaptation of the workstation cannot be reduced to a bottle of hydroalcoholic solution on the desks. It is not always easy to accompany an employee remotely or to put in place specific measures to adapt workstations.

Remote working was imposed for a large number of employees. Many of them are not used to working from home... This, therefore, requires some adjustments. A dedicated space to be able to leave their workplace in the evening, to have a separation, even symbolic, between the professional space and the private space. As an employer, you need to encourage your employees to settle in as best they can so that they feel in a work environment. Give them also the means to use teleworking: provide a computer, a mobile phone, some elements of supply, access to platforms, specific software.

Maintaining and improving organizational performance remains a significant challenge for organizations today. To meet this challenge, the strategic approach to human resources management offers organizations to invest in work practices that mobilize, motivate, train, and involve employees, which would contribute to their retention (Al-Hajri, S. A. (2020)). However, the question remains: what are the real consequences of workforce turnover on the organizational performance of companies? In the scientific literature, several researchers

believe that workforce turnover is detrimental to organizations because of the direct and indirect costs associated with employee departures (Shaw, 2011).

Nonetheless, for other researchers, the effects of workforce turnover may be beneficial for organizations due, among other things, to the departure of underperforming employees and the arrival of new blood. Conflicting responses from the literature suggest that the relationship between workforce turnover on organizational performance is complex and that several factors are likely to explain (Shaw, 2011). The literature suggests that the way HRM is performed in the organization will influence the relationship between turnover and organizational performance (Wynen, J., Van Dooren, W., Mattijs, J., & Deschamps, C. (2019)).

Measuring efficiency has always been a problem for companies that have struggled to improve their productivity and efficiency. In his article, Farrell asserted that the main reason for the failure in solving the problem was the unwarranted combination of multiple inputs in any satisfactory measure of efficiency.

In this paper, each company is considered a decision-making unit (DMU). Each DMU has inputs and outputs. In this model, the inputs are the employee number, the turnover rate, and the percentage of employees working from home and remotely. The outputs of the DEA model are the factors that reflect performance like profit margin evolution and company performance according to the information provided. Data on these parameters are collected through questionnaires in the agri-food industry. The results show that this pandemic has hit companies and completely modified the way employees used to work. Working conditions and organizational commitment are the main factors that influence employee effectiveness and performance.

2. Conceptual Backgrounds

In the literature, certain human resources management (HRM) practices have been systematically cited as being able to induce loyalty-building attitudes or behaviors such as organizational involvement or turnover intentions (Guzeller, C. O., & Celiker, N. (2019)). The links between these variables find a theoretical basis in the theory of social exchange. This theory considers that, for example, in a company-individual relationship, the individual adopts attitudes or behaviors depending on the quality of the exchange (whether material or

immaterial: signs of approval, recognition, prestige), according to norms of reciprocity (Homes, 1958; Gouldner, 1960).

In the same way, the conceptual frameworks of Lawler (1986, 1992) and Bailey (Appelbaum et al., 2000) on the management of human resources, suggest that the companies which support and invest the most in their employees can expect attitudes and favorable behavior on their part (Paré and Tremblay, 2007). According to these conceptual frameworks, the resource management practices implemented in an organization, in terms of power-sharing (empowerment), skills development, recognition, and justice in organizational rewards, would be perceived by employees as a signal of support. that the company is ready to offer them, which would create attitudes and behaviors favoring organizational involvement, performance, or employee retention (Paré and Tremblay, 2007).

In the particular case of IT companies, HRM practices have repercussions of vital importance, among others, in software productivity, organizational involvement, or turnover (Paré and Tremblay, 2007).

About the influence of human resource management practices on organizational involvement, empirical research has until recently been little interested in studying this link (Meyer and Smith, 2000), and even less in a test of the influence of human resources practices on the involvement of IT personnel (Tremblay et al., 2000; Paré et al., 2001; Tu et al., 2001).

Considering the HRM practices suggested in the conceptual frameworks of Lawler and Bailey indicated above, the results of Tremblay et al., (2000) show that organizational involvement can be reinforced when recognition practices are put in place in organizations. Some studies have shown the existence of a positive relationship between compensation practices and organizational involvement (Paré and Tremblay, 2007). The results of the study suggest that employees whose expectations for advancement have been met will have a propensity to develop greater involvement with the organization than those whose expectations for advancement haven't been met are more limited. These practices signal to employees that the organization considers human resources as a source of competitive advantage, and that it seeks to establish a long-term relationship with them (Paré et al., 2001). Pare et al. (2001), Tremblay et al. (2000), as well as Paré and Tremblay (2007), found a strong positive relationship between the skills development practices implemented in the organization and affective organizational involvement. Finally, in the literature, there seems to be a relatively consistent relationship between information and communication practices and organizational involvement (Paré and Tremblay, 2007).

Research of human resources management under certain circumstances on the relationship between staff turnover and performance has given rise to two perspectives, the one-dimensional perspective, and the multidimensional perspective. In this study, we take the multidimensional perspective. The choice of this perspective is justified by the convergence of its results. The multidimensional perspective has seen the development of three different models. A quick overview of these different models is done, before presenting some main empirical results.

2.1 Theoretical models

It emerges from the literature, three different models, which Delery and Doty (1996) have designated by the name “universalist”, “contingent” and “configurational”. The universalist model wants the most recognized HRM practices to have a positive effect every time they are applied (Fabi et al, 2004). Authors who subscribe to this approach consider recourse to the universalist paradigm as a determining factor in the search for practices that maximize the efficiency of the firm. According to Allan-Soltan et al, (2003), in the universalist conception, the research is hypothetico-deductive in nature and consists, based on evidence and observations, of subsequently proceeding to their generalization or "universalization". The universalist perspective brings together all the work that seeks to identify and validate "best HRM practices". This universalist model represents the one on which the majority of empirical studies have relied to date. However, some authors reproach it for its somewhat simplistic character. Barba-Aragón, M. I., & Jiménez-Jiménez, D. (2020)), for example, argue that there is no magic bullet for best practices to explain, other than to put in place an HRM system designed to support the business. in achieving its operational and strategic objectives. Alserhan, H., & Shbail, M. (2020) argue that any individual HRM practice is easily imitated and therefore can only provide a competitive advantage for a short period until a competitor can imitate him.

The contingency model offers nuance to the universalist approach (Fabi, et al 2004), and suggests that HRM practices, to be effective, must be aligned with other organizational contingency factors and particularly with the strategy. Empirical studies conducted based on this approach, therefore, seek to establish how individual HRM practices can interact with corporate strategy to improve performance. (Fabi et al, 2004). Several studies have therefore questioned the universal influence of HRM practices (Blom, R., Kruijen, P. M., Van der Heijden, B. I., & Van Thiel, S. (2020)).

The configurational model, on the other hand, focuses on highlighting sets of practices rather than individual practices. As a criticism of these two models, some authors stress that HRM systems must be intimately linked to the nature and specificity of each company. In this sense, it can be very difficult, even utopian, to want to define generic sets or configurations that may be suitable for a particular type of strategy. Purcell (1999) suggests moreover that we abandon the contingency and configuration approaches and instead develop an approach that would be interested only in the variable "adjustment to change", HRM practices then constituting as many means likely to facilitate such a process of adjustment.

It is essential that the HR department learns to comply with a tumultuous world and that the HR procedures which result from a context of confusion do not cause any prejudice to the employees so that they manage to continue their productivity and carry out their mission of the most efficient way (Simões, 2013). In a critical period, a company may be forced to sacrifice high-level collaborators, either by dismissing them or pushing them out of the company as a result of the distressed situation in which they find themselves (Vardarlier, 2016). This can harm the results of a company in terms of qualitative and quantitative productivity because of the loss of the qualified profiles that it enjoyed. According to the research results of Vasa (2010), the acquisition of employees in times of distress is a real headache because of the complexity for companies to find future employees. On the other hand, companies can benefit from the advantage of having a greater number of seasoned job seekers because of the presence of technically unemployed workers in the labor market, where the bosses are also located in the labor market. a better situation to discuss remuneration by the increased availability of human resources.

The health crisis being a particular mode of crisis, the mechanisms to confront it must also be distinct from other modes of crisis, consequently, companies often have recourse to periodic training measures for their employees to strengthen their skills and their skills. get their missions done efficiently (Rodriguez and Walters, 2018). However, the traditional face-to-face training system is not recommended in the context of this pandemic, to protect employees from contamination by the virus. Companies are forced to convert to online training, which can be inaccessible for many organizations. There is also reasoning that online training plans may not be as effective as traditional face-to-face training plans (Rana, Rajiv, & Lal, 2014). Companies that cannot adopt online training modes are more willing to limit the volume of training activities or forgo training their employees. Individual and organizational results are one of the biggest concerns of any business. Companies develop and implement

programs to ensure that employees deploy their strengths to achieve individual and organizational goals through performance management. When a successful performance management system is adopted, it helps to enhance and improve the performance of individuals and the company against predetermined policies and economic goals (Kumar, 2019), Armstrong (2009) described performance management as a methodical device to strengthen the performance of the organization by improving the performance of individuals and groups. According to Armstrong (2009) Performance management is similar to the role of a sports coach, which considers the skills, motivation, and experiences of each employee, but also the internal and external context of their environment. He seeks to motivate him and bring him to the best of his abilities, his performance, and not to judge him solely on his results. Evading performance checks in times of crisis can seem to be advantageous for employees because in principle, employees hate to be evaluated. However, Wilken (2020) argues that forgoing evaluations during a crisis could cause managers to lose critical information about the organization's performance at a time when managers are expected to make sensible decisions about the organization. Referral, however, could lead to misdirection and an increased rate of unpleasant turnover when highly qualified employees do not receive the recognition and benefits, they deserve. It should be noted that the crisis can have negative effects on the performance of employees due to the stress it is likely to generate (Halkos & Bousinakis, 2016), this means that performance management during this period must be more dynamic. and more personalized to preserve and strengthen individual and organizational performance. Usually, managing a crisis is very expensive, especially when it happens by chance. The crisis can cause financial hardship for the company, including the benefits to which employees are entitled.

2.2 The empirical results

Studies embracing the multidimensional approach are certainly less numerous, but their results converge. We are largely inspired by the census carried out by Allouche et al 2004. We can divide these studies into two: studies qualified as “universalist” and so-called “configurational” studies. the intensity of use of a particular system of HRM practices and assume that a specific set of HRM practices always produces better results (Allouche et al, 2004.). The authors stress that the identification of these practices is based on observation of the HRM practices of companies deemed "excellent". They cite the study by Huselid (1995) who, based on 13 HRM practices, distinguished between practices acting on employee

motivation from those relating to skills and organizational structure. The two indexes thus created allowed the author to classify companies into three categories: non-users of "high-performance" HRM practices, moderate users, and intensive users. The author concludes that the two indexes "employee motivations" and "skills and organizational structure" have a positive influence on economic performance (in terms of productivity and sales per employee) and financial performance (measured by the Q from Tobin). The authors tell us that about organizational performance, Delaney and Huselid (1996) adopted a methodology with many similarities to the one just described and lead to a positive relationship between the simultaneous implementation of certain HRM practices. The so-called "configurational" studies differ from the universalist perspective in the sense that it is guided by a holistic principle leading to the construction of typologies of ideal types of HRM systems (Allouche, et al 2004) and is based on the hypothesis of equi finality of the parts of the system. Here The consistency of HRM practices with different elements of the organization, and in particular the strategy, is sought. Note that the systems of practices can be made up of very different practices and vary according to the authors. For the sake of harmonization, Dyer and Reeves (1995) grouped the different systems into three groups. The first group of systems, of a traditional type, is essentially characterized by work organization, low employee participation, and a low rate of training. The second, of the "innovative" type, is opposed to traditional systems and is defined by flexible work organization, high employee participation, and intensive training. As for the third group of systems, of mixed type, it is situated between the two preceding ones. The results of this work lead to relatively homogeneous conclusions (Allouche 2004): the system of human resources management practices, of an innovative type, based on employee engagement, appears to be positively linked to the performance of the company. Shrouf, H., Al-Qudah, S., Khawaldeh, K., Obeidat, A., & Rawashdeh, A. (2020) have shown a positive relationship between HRM systems based on engagement and performance measured by a productivity indicator and a quality indicator. They have established a link between HRM practices based on engagement, productivity, and financial performance. In summary, the authors conclude that in terms of sales performance, the studies can be fairly easily compared since this is generally measured by an indicator of net sales per employee or actual sales. On the other hand, regarding production performance, the exercise seems difficult because productivity indicators can take very specific forms depending on the activity sector.

2.3 Organizational performance

Organizational performance can be defined in numerous ways, due to it being a multidimensional concept. Hendry (2012) asserts that because performance can be defined in multiple ways, it cannot be measured utilizing only one measurement tool. Nonetheless, numerous researchers have attempted to establish the meaning of performance. According to Karamat (2013), organizational performance has been defined as transforming inputs into outputs to achieve specific results. Musmuliana (2012:14) further defines organizational performance as a “process to enhance both the effectiveness of an organization and the wellbeing of its member through planned interventions”.

Even though organizational performance can be conceptualized in several ways depending on the stakeholders. Cocca & Alberti (2010) suggest that there are areas that should be focused on when looking into performance, such as; innovativeness, quality, efficiency, effectiveness, finances, performance and productivity. All these elements shall be discussed further later. Tariq, Ramzan & Riaz (2013) point out that measuring organizational performance is essential because it measures the value that personnel bring to the organization. The researcher concludes that organizational performance is a vital measure of organizational success.

If the turnover makes the yoyo, it is first of all because the quarantine has been conducive to many questions. During the covid crisis, employees looked at the ads and even said they were open to opportunities.

The turnover rate is an indicator present in a large majority of HR reports, its analysis and interpretation should be carried out with caution. It is important to know that the ideal turnover rate does not exist. Some sectors by nature have a high turnover rate, without this necessarily reflecting a problem or a bad social climate within the company. This is the case, for example, of sectors that are subject to seasonal work such as agriculture, catering, or tourism. On the other hand, IT and digital are sectors in which skills are changing rapidly. They then naturally demonstrate a high turnover rate. IT professionals are often approached by competitors and it is not unusual to change jobs frequently.

Finally, it is important to consider arrivals and departures in the company. Thus, a company whose growth is fast and exponential can have a very high turnover rate even though very few employees have left!

2.4 Turnover

Employee turnover is the rotation of workers around the labor market; between firms, jobs, and occupations; and between the states of employment and unemployment Abassi et al. (2000).

Generally estimated as a percentage, turnover is calculated from the ratio between the number of employees recruited and those who left the company during a well-defined period (very often an annual period), as well as the total number of people present in the company at the beginning of this period. The turnover percentage varies between 0 and 100%. 0% means that there was no movement of departure or recruitment during the targeted period while conversely 100% reflects a complete renewal of the workforce in all positions, either for a departure or for recruitment.

A low turnover within a company reveals a healthy social situation, while a high percentage of observed turnover will highlight a social malaise to be resolved. In addition, turnover has a significant cost for companies (Hogan, 1992; Wasmuth and Davis, 1993; Barrows, 1990) which must provide a substantial budget to offset the costs related to the various departures (voluntary departure indemnities, resignation, etc.) as well as those necessary for new hires (training, internship, etc.).

Several factors can explain the causes of high turnover. Indeed, poor working conditions, the social climate, stress at work, etc. can prevent a company from retaining its employees, who for their part are ready to abandon their position when faced with the slightest opportunity that presents itself. Poor management of human resources (lack of promotion, unclear prospects for development, a better offer from competitors, etc.) are all elements that can demotivate employees and generate significant turnover within a company.

If a certain level of turnover is normal and even desirable to promote innovation thanks to the contribution of other profiles, it should not however be too high. It is generally considered best to stay below 15% turnover.

Companies must therefore quickly take measure of the phenomenon. They need to put in place the necessary responses to renew the commitment and motivation of their employees.

3. METHODS

3.1 Method and modeling

Our sample of companies is made up of several units belonging to 10 companies from the food and beverage industry, located in the same region. Of the 155 participants, 102 (66%) were men and 53 (34%) were women. Regarding the type of companies to which the participants belong, 56% belong to private organizations and 44% to public companies. In the context of this research, the intrinsic characteristics of employee performance in times of health crisis (number of employees, the company turnover, percentage of employees working at the office and remotely the profit margin, and the company performance during this period....) therefore, appear to be uncontrolled factors, as do regional trends. In addition, to monitor the influence of legal status on business performance, the sample consists only of integrated departments. The choice of explanatory variables for the modeling must reflect the characteristics of the performance criteria of the employees as well as the constraints they face.

In agreement with the heads of the human resources department, it appears that the turnover and the profit margin evolution of companies best represent the performance of companies. We will therefore retain this variable as a key element of performance perception.

Given its strong operationality, we have chosen to focus on a particular technique: data envelopment analysis (DEA), particularly suited to an internal benchmarking problem at the level of individual analysis. We use multiple types of input and a double type of output DEA model appropriate for human resource management since it meets performance and employee turnover objectives.

By comparing the efficient decision-making units with each other, the use of the DEA method will make it possible to identify the most efficient operational procedures and human resources management policies to reproduce them to the entire sample. It will make it possible to provide a business diagnosis.

3.2 DEA Modelling

The DEA or Data Envelopment Analysis method is a method of evaluating the performance of organizational units called DMUs or Decision-Making Units. This method was introduced by Charnes et al. (Charnes et al., 1981) as a means of assessing the performance, or rather the efficiency, of a US federal school resource allocation program. The aim is to measure which

schools are the most efficient in terms of the use of resources. Efficiency is measured by the ratio between the resources used and the results obtained. Subsequently, this method was extended to many areas including the management of public hospitals, social services, branches of a banking network, etc.

The principle of the method is quite simple. It considers any system or decision-making unit as a kind of black box consuming resources (called inputs) and producing services (called outputs).

One of the uses of the method is to compare several organizational units or DMUs to determine the best ones. These will form a kind of efficiency frontier. All units below the border are deemed to have a margin of progression that can be easily calculated. The term data envelopment comes from this border which allows enveloping all possible cases of combinations of inputs and outputs. Having determined the margins of progress, decision-makers can then play on the inputs by reducing them while keeping the same level of service (outputs) or act on the outputs by increasing them while keeping the same level of inputs.

To illustrate the DEA method and its use, we will adopt a very simple example. Take the case of a company in the agri-food sector to assess employee performance and turnover during a pandemic. For reasons of simplicity, we consider multiple types of input (the number of employees, the company turnover, percentage of employees working at the office and remotely) and a double type of output (the profit margin and the company performance during this period).

3.2.1 The CCR Model

The first Data Envelopment Analysis (DEA) model was developed by Charnes, Cooper, and Rhodes (1978) under the assumption of a Constant Returns to Scale production technology, i.e., when an increase in the production resources results in a proportional increase in the output.

Considering $j = 1, 2, 3$, m Decision Making Units (DMUs) using $x_i \mid i = 1, 2, 3$, n inputs to produce $y_r \mid r = 1, 2, 3$, outputs and prices (multipliers) v_i and u_r associated with those inputs and outputs, we can also formalize the efficiency expression in (1) as the ratio of weighted outputs to weighted inputs:

$$Efficiency = \frac{\sum_{r=1}^s u_r y_{jr}}{\sum_{i=1}^n v_i x_{ji}} \quad (2)$$

In Charnes et al. (1978) DEA methodology the multipliers and a measure for the technical efficiency of a specific DMU can be estimated by solving the fractional programming problem:

$$\max \frac{\sum_{r=1}^s u_r y_{or}}{\sum_{i=1}^n v_i x_{oi}} \mid \sum_{r=1}^s u_r y_{jr} - \sum_{i=1}^n v_i x_{ji} \leq 0 \quad (3)$$

For all j, r and i , and strict positive and u_r . This problem is denominated the CCR constant return to scale input-oriented model, which by duality is equivalent to solving the following linear programming:

$$\min(\theta) \mid \sum_{j=1}^m z_j x_{ji} \leq \theta x_{oi}; \sum_{j=1}^m z_j y_{jr} \geq y_{or}; \sum_{j=1}^m z_j = 1; z_j \geq 0 \quad (4)$$

Similarly, the model adapted for the definition of input and output slacks:

$$\min(\theta - \sum_{r=1}^s s_r^+ + \sum_{i=1}^n s_i^-) \mid \sum_{j=1}^m z_j x_{ji} + s_i^- = \theta x_{oi}; \sum_{j=1}^m z_j y_{jr} - s_r^+ = y_{or}; z_j, s_i^-, s_r^+ \geq 0 \quad (5)$$

For all j, r , and i . As a result, we have an efficiency score θ which varies from 0 to 1 designating the efficiency for each decision-making unit. We can obtain the marginal contribution of each input and output in the multiplier model of (3), the peers of efficiency and respective weights in the primal (or envelopment) form of (4), and also the potential for improvements and slacks.

3.2.2 Weight Restrictions and Value Judgements in DEA

Most of the methodological extensions of DEA have been application driven i.e., they have been a result of the application of the method to real-life problems (Allen et al. 1997). One such development is the use of weight restrictions and value judgments. The intention of incorporating value judgments is to incorporate prior views or information regarding the assessment of the efficiency of DMUs.

4. Results

The sample in this study is companies and their employees working in the food industry. Four questionnaires were given to several employees in these companies and the managers of the respective HR department. The design of the questionnaires was based on the stated methodology using a five-point Likert scale (1 as very low, 2 as low, 3 as moderate, 4 as high,

and 5 as very high). The modeling results provide us with an efficiency score, also called a resource use score, for each unit in the sample. The DEA calculates and optimizes a performance score for each unit in the initial database. It performs as many linear programs as there are performance criteria. The closer this score is to 100%, the better the company's performance, relative to other units in the initial sample. This part presents the DEA scores in CCR under the seven specifications which reflect an overall technical efficiency both financially and socially.

Synthetic presentation of all the results From DEAP software (Please see Table 1 Efficiency Summary for more information)

Table 1 Efficiency Summary

firm	te
COMP1	1.000
COMP2	0.810
COMP3	0.416
COMP4	0.736
COMP5	0.639
COMP6	0.372
COMP7	0.428
COMP8	0.490
COMP9	1.000
COMP10	1.000
*mean	0.689

Table 2 Summary of Input Slacks:

firm input:	EMPLOYEE	TURNOVER	REMOTE
OFFICE			
COMP1	0.000	0.000	0.000
COMP2	0.000	11.658	3.610
COMP3	7.144	0.000	10.861
COMP4	0.000	2.994	7.922
COMP5	0.000	3.435	13.435
COMP6	22.141	0.000	7.741
COMP7	0.000	7.745	17.393
COMP8	0.000	0.657	15.244
COMP9	0.000	0.000	0.000
COMP10	0.000	0.000	0.000
*mean	2.929	2.649	7.621
			0.830

In this study, we have noted that most of the companies, had an issue with their performance due to covid 19. Enterprises with effective DEA efficiency (COMP1, COMP9, COMP10) with a high turnover rate were forced to lay off some employees to adjust their business to the current situation. we have to mention that most of the people layout in these companies were part of the part-time or low-level management. (Please see : Table 3:Table 4 for more information)

Table 3 Summary of Peers:

firm peers:

COMP1	COMP1	
COMP2	COMP9	COMP1
COMP3	COMP9	COMP1
COMP4	COMP9	COMP1
COMP5	COMP10	
COMP6	COMP9	COMP1
COMP7	COMP9	COMP1
COMP8	COMP1	COMP10
COMP9	COMP9	
COMP10	COMP10	

Table 4 Summary of Peer Weight (in the same order as above)

FIRM PEER WEIGHTS:

COMP1	1.000	
COMP2	0.540	0.424
COMP3	0.620	0.271
COMP4	0.875	0.046
COMP5	0.783	
COMP6	0.840	0.083
COMP7	0.686	0.140
COMP8	0.345	0.503
COMP9	1.000	

The company decided to make production according to the demand. However, for enterprises whose efficiency has reached the optimal value of 0.6, employees realize that the working condition was at their best level which is why they have decided to move to another company or simply resign We have also noted that the decision that some companies have taken to let some of their employees work from home doesn't have any impact on the work performed. This crisis has Cleary had an impact on the turnover of all these companies as the analysis mentioned and from the information, we have collected from all the companies that participated in this interview.

5. Discussion

The overall objective of this study was to evaluate the efficiency of employees in times of crisis through the DEA approach. The health crisis has played the role of accelerating trends already underway. These transformations are characterized by the primacy given to people in working relationships with the more significant consideration, by the company, of issues of diversity and values such as empathy and benevolence. These values are particularly popular with the younger generations. Thanks to new technologies, gathering this information is easier than ever before. Talent acquisition software allows HR departments to gather information about candidates to measure performance and return on investment. This information can then be shared with the rest of the company. As a result, the firm will be better able to recruit and retain top talent while reducing operating costs.

On average, for every job opening, a company receives 250 applications. Rather than having an HR team member spend time reviewing each application, the Big Data accumulated by talent acquisition software allows the company to instantly identify the right candidate. For example, certain keywords or talents listed in an application can be spotted by the software. If these skills have proven useful in previous hires, the software will look for them first. In addition, application or interview assessment data can help HR team members reach an agreement more quickly.

Analytical technologies also allow companies to find and recruit the right candidates sooner by accessing the sources from which top talent comes. Big Data and analytics technologies allow companies to improve the quality of their candidates while reducing costs. When used properly, data can also reduce turnover through robust hiring and achieve goals faster by hiring fewer employees. HR and Big Data can indeed optimize hiring.

Once HR departments have gathered the data needed to start identifying trends, the information can be used to predict future hiring needs. Some trends can be identified very early in the data collection process. For example, if data from a tech company's talent acquisition software shows that it takes an average of two months to finalize the recruitment of a developer, and a product roadmap suggests that the company will need such talent in three or four months, it is possible to plan recruitment in time. This way, companies will have a pool of candidates who have already been vetted and interviewed when it comes time to recruit.

Big Data helps companies to better manage their recruitment phases. For example, it is easier to calculate how many candidates need to be interviewed for open positions. This will ensure that the company has enough employees to proactively satisfy customers.

Employee turnover is a major expense for all companies. Every time an employee leaves the company, it is necessary to recruit, hire and train a new employee. This costs money, takes time, and consumes resources. Companies lose the investment they made in recruiting the departing employee, and the opportunity they would have had to recruit another instead.

To remedy this problem, HR departments can use Big Data to retain employees and avoid losses by gathering information about what keeps employees in the company, and why some choose to leave. To do this, it is necessary to regularly survey employees about their priorities. Some firms will most likely be surprised by the answers provided.

By conducting such surveys, employers can adjust their strategy to meet employees' needs and desires. For example, more development opportunities can be added or additional mentoring options can be offered. These surveys don't have to be a major project. It can be as simple as a questionnaire sent by email. By using big data to assess employee satisfaction, HR departments can leverage data about employee sentiment to improve the business and increase retention rates. Such information can also be used to identify employees most likely to leave the company and determine ways to retain them.

6. Conclusions

The year 2021 marks a turning point in the traditional functioning of companies. After months of working remotely and operating in small teams, employee expectations are no longer the same.

The health crisis has thus led to deep reflection for many employees. They now have a new vision of their work environment and the desired management methods... To the point of considering leaving their company if it does not adapt.

The study revealed that the most efficient employees have a relatively high organizational commitment and suitable physical working conditions. In contrast, there was no significant relationship between remote working and the amount of work as the inputs of the DEA model and its efficiency value.

However, the findings indicate the importance of physical working conditions and organizational commitment, it is recommended that companies focus on the ergonomic aspects of the organization and protect their employees.

Employees therefore currently expect greater autonomy in the organization of their schedule, a more personalized relationship with the company, and increased transparency on its objectives and strategy.

The study was also limited to ten companies and may not apply to other companies. This study was limited to an analysis of HRM factors and the impact on employees' efficiency in the agri-food sector.

Finally, it should be noted that recruitment problems in certain sectors such as hotels, restaurants, and hospitals will be even more acute during the phase of recovery.

Further investigations in other kinds of industries may offer additional insight into the findings of this study.

Status of data and materials	Statement
Datasets published in the literature	Datasets used for this study are included in: Paré, G. and Tremblay, M. (2007), “The influence of high-involvement human resources practices, procedural justice, organizational commitment, and citizenship behaviors on information technology professionals’ turnover intentions”, <i>Group & Organization Management</i> , Vol. 32 No. 3, pp. 326-357. doi:10.1177/1059601106286875.
Data available on request due to privacy/ethical restrictions	The data that support the data analysis and findings of this study are available on request.

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