

## Applying a sustainable model for behaviour prevention during and post COVID-19 crisis

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### Abstract

Faced with a health pandemic, companies producing goods and/or services must continue their activities to ensure sustainability. They must organize accordingly by putting in place an organization, and working means and hygiene in the company remains the most effective means of preventing risks. In this context, this article proposes the implementation of a behaviour hygiene and prevention model during the COVID-19 and post-COVID-19 periods. Indeed, preserving human potential in the workplace is a fundamental performance lever to boost the economy, and the company must take appropriate preventive measures. The adopted approach is based on the 5S method, in which the main objective is continuous improvement of the company's activities, thus offering an adequate solution to reduce risks in terms of health and safety. Besides the economic aspect, the proposed sustainable model is also part of the pedagogical perspective for educating the population over time.

## 1. INTRODUCTION

Like all countries of the world, Algeria is facing the COVID-19 pandemic, with a financial but, above all, human impact. This health crisis has affected all companies producing goods and/or services and, consequently, their employees because the infection risk can be high in confined work environments such as production workshops (Donthu & Gustafsson, 2020). Indeed, during the last year, Algerian companies lost almost half of their turnover (Institut National de Santé Publique, 2021). The COVID-19 pandemic has worsened Algeria's economic outlook for 2020. According to the national statistics office, industrial production in the public sector fell by 6.7% in the 1st quarter of 2020.

In this pandemic period, prevention plays a fundamental role in occupational health. Conversely, the absence of preventive measures generates an increase in contamination cases. Thus, in Algeria, this observation was established in the summer of 2021 when all the indicators relating to the pandemic were increasing (Institut National de Santé Publique, 2021). The company must identify organizational conditions considering the environment to put preventive measures for managing risks related to COVID-19 (Spinazzè et al., 2020). It is essential to preserve the health and safety of all employees.

In Algeria, Law No.88-07 of 26 January 1988 relating to occupational health, safety, and medicine underlines the character of certain socially inspired principles such as the rights

of safety at work and occupational health. Indeed, workers' health is an essential condition and working conditions significantly impact health equity by providing social status, opportunities for personal development and protection against physical and psychosocial risks (World Health Organization, 2018).

The company must have a health and safety management system to control risks associated with COVID-19 and prevent the contamination of workers. This system must be based on good hygiene and cleaning practices in the work environment, which guarantees the health and safety of employees (Duryan et al., 2020; Gultom et al., 2021). Therefore, the Algerian company must strengthen preventive measures, preserve jobs, and ensure sustainability.

In this context, we recommend implementing the 5S tool from Lean Manufacturing. The 5S method consists of maintaining an organized, transparent and efficient workspace, creating a dynamics of change by visible results on cleanliness, environment, internal atmosphere, the brand image of the firm, quality but also safety. Its main objective consists of shifting mentalities and to start a continuous improvement strategy (Azzemou & Nouredine, 2018). This can be seen as a preventive measure against COVID-19 to reduce its spread in workplaces and thereby protect the health and safety of workers. This work aims to propose a hygienic prevention approach based on the 5S tool to allow national companies to put in place actions to manage the risks associated with COVID-19.

In the second section, we present concepts of occupational health and safety prevention as well as health and safety regulations in Algeria. Next, the sustainable model based on the 5S method is proposed, and the fourth section is dedicated to the methodology implementation.

## 2. THEORETICAL FRAMEWORK

All companies producing goods and/or services must invest in safety and health in the workplace to prevent all risks that workers may face. Prevention is the set of anticipated actions intended to control the risks of work accidents or occupational diseases (Ammam, 2018; Xue et al., 2021). It improves working conditions through technical (protective equipment), organizational and human solutions (rethinking the organization), informing and training taking into account company specificities (size, resources, organization, geographical location, among other factors) (Gaillard, 2016; Keraka, 2020).

In the context of COVID-19, a company must implement an approach that is part of a health and safety management process where all the company's players must work, communicate and dialogue with each other. This is to ensure the safety of workers while preventing the increase in contamination. COVID-19 being a transmissible virus, can cause health complications in a large number of workers and can generate significant absenteeism (Verikios, 2020; Al-Hashimi & Al-Sayed, 2022). This is a new professional risk to be taken into account by the company, which must adapt and implement agreed measures to succeed in the process effectively.

### 2.1 Hygiene and safety in the workplace

According to the International Labor Office (ILO) definition, occupational hygiene is the science and art of detecting, evaluating and controlling the nuisances and factors of the professional environment that can affect the health and well-being of workers and members of the community. Hygiene in the workplace is therefore concerned with the professional environment. Its objective is to protect and promote the health of workers. Occupational health is today a major issue in public health but also in managing human resources in organizations (Barel & Frémeaux, 2012; Branicki et al., 2022). Employee safety improves well-being at work while improving the company's economic performance. It is a significant concern for businesses (Jubert, 2019). It is about working in a secure environment, which requires synergy from all employees regardless of their position. Employee safety is an essential dimension of social responsibility for the company (Mourey & Curaso, 2019). In fact, the company must act pragmatically and responsibly to protect its employees by putting in place the necessary means to control

all risks. Personal protective equipment is one of the means required for the safety of employees. Of course, safety rules are mandatory and are the responsibility of business owners.

The threat of the COVID-19 pandemic highlights the fundamental need to respect strict rules of hygiene in the workplace, hence the critical role of prevention (Sellami, 2020). Indeed, a number of contaminations linked to COVID-19 can be avoided if basic hygiene measures are taken within the company. In addition, the COVID-19 health crisis requires the company to protect its employees in accordance with regulations and to change the organizational culture.

## **2.2 Regulatory framework for health and safety in Algeria**

In Algeria, the prevention system is based on a set of means: legislative and regulatory, technical (health and safety services, occupational health services), prevention of occupational risks, and levels of consultation (Health and Safety Commission, National Council for Occupational Health, Safety and Medicine), Committee of participation, control (Labor Inspectorate), instruments (internal regulations of employers' organizations). Occupational health is an important concept, and many laws and decrees have been drawn up, particularly those relating to occupational health, safety and medicine.

The right to protection, safety and hygiene at work is guaranteed by Law No. 85-05 of 16 February 1985 on the protection and promotion of health. Algeria continues to work for the compliance of its national legislation with various international labor standards in accordance with the decent work concept. It has a legal and regulatory arsenal in the area of health and safety at work, proving the awareness existence.

The organization of prevention is set out in Law 88-07 on occupational health, safety and medicine with its corresponding articles 23-27. This law highlights the principles of the individual and/or collective protection system and introduces: "that the protection of workers' health consists in promoting and maintaining the highest degree of their physical and mental well-being in all professions, intending to raise the level of their capacity for work and creation". In articles 3 and 4, Law No.88-07 states that the employing body is required to ensure the health and safety of workers (article 3) and stipulates that the premises assigned to work, the work sites and their environment, must be kept in a constant state of cleanliness and present conditions of hygiene and healthiness necessary for the health of workers (article 4). Under these conditions, the working environment must meet collective comfort and hygiene (cubic capacity, ventilation, ventilation, heating and protection) and individual (changing rooms, sinks, showers, toilets and special clothes). The prevention and protection of employees exposed to occupational risks, whatever their nature and origins, is a major issue in the preventive public health strategy and a challenge for national companies.

## **3. PROPOSED SUSTAINABLE MODEL**

In view of the pandemic situation, the company must adopt temporary and exceptional measures to reduce the presence of workers (Wong, 2020). The principal aim is to improve the working environment, maximize space use, and protect employees. To guarantee a serene working environment for employees, we offer a hygienic prevention model inspired by the 5S method as an organizational measure in production and service firms. The major challenge in applying 5S is to prevent health risks in the company and protect employees' health and safety.

### **3.1 5S support method**

The 5S are the Japanese initials of the five basic operations to streamline tasks: Seiri (sort), Seiton (put in order), Seiso (clean up), Seiketsu (standardize) and Shitsuke (discipline). The 5S tool improves working conditions by ensuring workplace organization, cleanliness and safety (Omogbai & Salonitis, 2017; Rajesh & Kanagalakshmi, 2022). The main objective of this tool is the continuous improvement of the company's activities. It is accompanied by specific objectives associated with each operation defined by the 5S (Sharma, 2020).

The 5S method was initiated more than 50 years ago in TOYOTA factories. It stems from five operations that constitute it for an organization's productivity and quality by placing operators at the heart of the action. It is defined as a pragmatic action, simple to implement but requires tenacity on the part of managers. The five operations are adapting to meet the objective of improving safety operationally. They reduce the risk of accidents and control physical flows (Singh et al., 2021).

- The first action (get rid of the unnecessary) is to sort out a workstation. Even though it sounds simple, this action can significantly impact overall productivity. The commitment of all the actors of the organization is essential.
- The second action (tidying up) consists of delimiting designated and identifiable spaces specific to each object.
- The third action (cleaning) is essential for the well-being of workers in the short and long term. It is essentially about hygiene and keeping the working environment. It is a task that requires a lot of time and is often described as thankless. But it is the basis of quality production.
- The fourth action (standardizing) consists of implementing written and/or visual procedures to support workers in executing a new mode of operation. It is essential to frame the process to ensure its success.
- The fifth action (sustainability) consists of making the method last over time by involving all the organization's actors. Then, it is necessary to set up regular control of the standards to value the individual implication.

### 3.2 The proposed methodology

The proposed methodology is based on a model (Figure 1) integrating the 5S, thus allowing the company to act pragmatically and responsibly to stow, clean and disinfect its rooms.

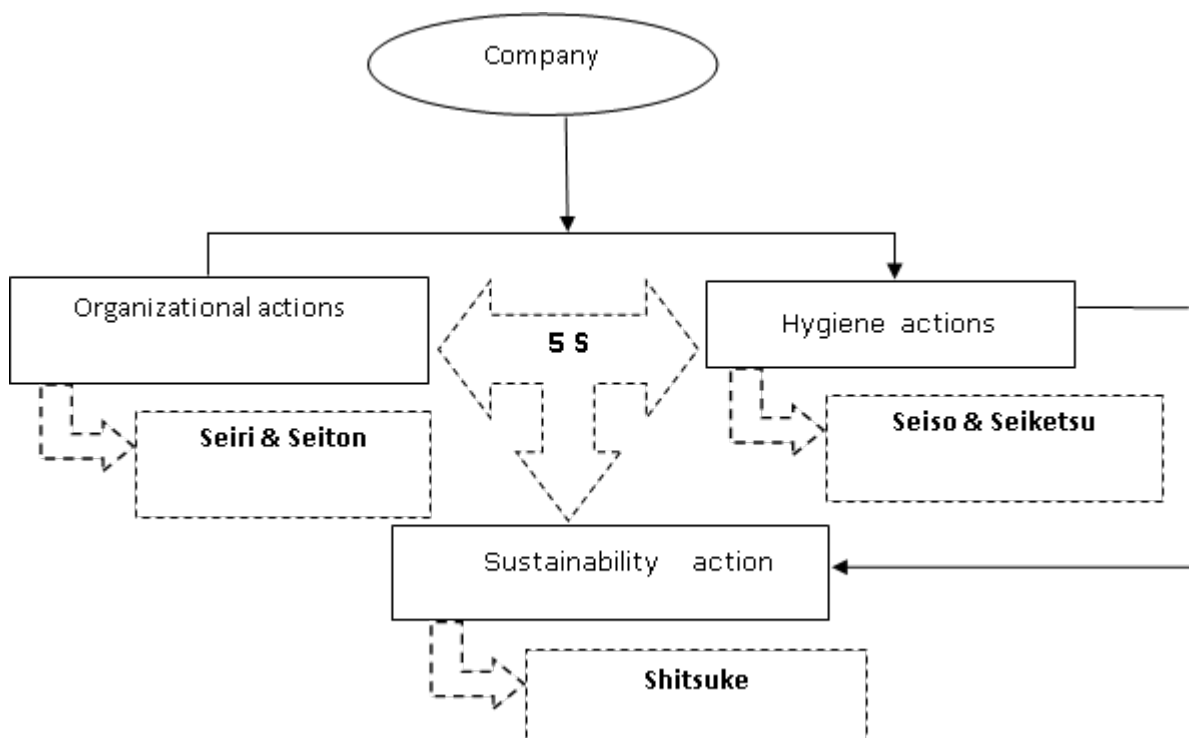


Figure 1. Sustainable prevention model

## 4. METHODOLOGY IMPLEMENTATION AND IMPACT

In the context of hygiene and prevention, the adopted approach consists in associating with the actions of an organization, hygiene and sustainability one or more operations falling under the 5S method. These actions are applied both to production/service enterprises and educational structures.

### 4.1 Organizational actions

Organization in the firm is an essential element, and in this context, implementation of the two actions Seiri and Seiton will allow the company to achieve its first objective, which is to have an organized space, by ridding the workspace of everything that is not useful and optimizing the workspace organization.

This organizational change is considered a gradual transformation process that will have an impact on the organization by carrying out the following actions:

- Delete any items from the workshop that are no longer needed and decide what to do with them.
- Store and classify items like raw materials, semi-finished products or tools used permanently to limit physical movements. We can also sort and place work items according to their use frequency. The aim is to make it easy to locate and access them.

#### 4.1.1. Application on production enterprise

As an example of a production enterprise, we consider a local SME, a company producing leather goods generating many scraps and boxes after the cutting stage. In general, these wastes are stored in an anarchic manner.

The principle of organizational actions removes unnecessary scraps and stores only necessary elements for recycling (Figure 2, left). Likewise, the organizational actions of the model allow sorting and classifying of raw materials through a partitioning (Figure 2, right) of these elements.



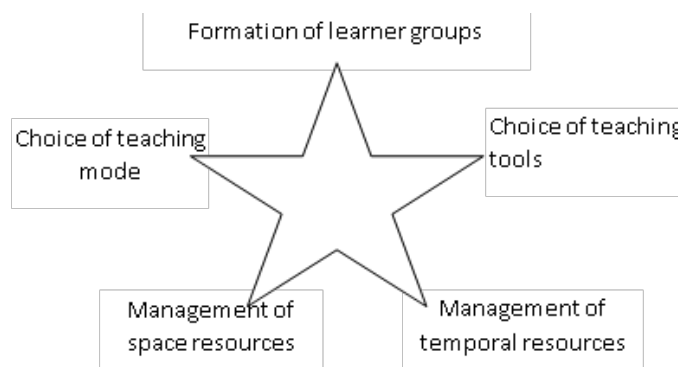
**Figure 2.** Organizational actions in enterprise - Seiton action (left) and Seiri action (right)

#### 4.1.2. Application on educational structure

By considering educational structures as companies, we propose to apply organizational actions (Figure 3) to this particular environment. Indeed, places of education (schools, high schools and universities) are conducive to the COVID-19 spread. Thus, at the beginning of the school year, the division of a classroom into sub-groups requires a rearrangement of the timetable and space to limit learners' movement.

Similarly, in addition to the division of already existing groups, new organizational measures have appeared at the Algerian university, such as face-to-face teaching in waves, and distance learning through videos and E-learning platforms. These

propositions require a new vision in order to classify courses according to face-to-face or distance approach, and to sort and adopt teaching tools via the Internet.



**Figure 3.** Organizational actions in educational environment

## 4.2 Hygiene actions

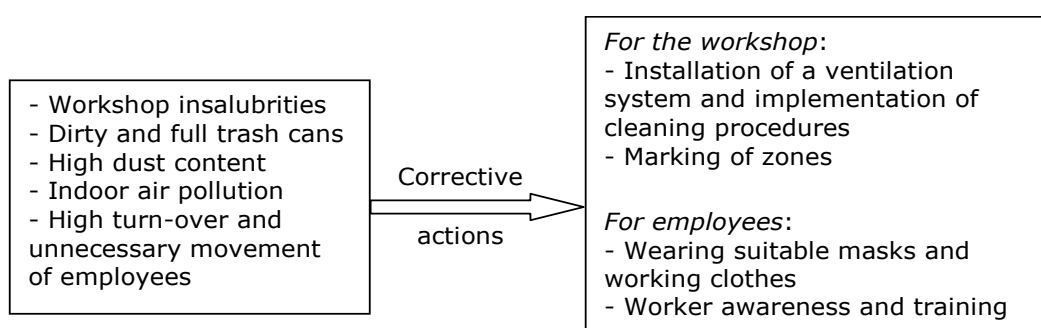
Cleanliness is a strategic element in the firm because it is a form of stress management. Indeed, a healthy hygiene environment provides safety to employees of the company. To guarantee them a serene working environment, the application of the two actions, Seiso and Seiketsu, will make it possible to make the inventory cleaner, do what is necessary to reduce dirt and ensure that the mess no longer appears. It is also about standardizing the application of the first two actions all around.

Implementation of prevention and hygiene actions involves deploying cleaning actions and maintaining them. This process will improve safety and protect the physical and moral health of employees by carrying out the following actions:

- Put hygienic means at the level of the tools to disinfect them before each use to prevent contamination and protect employees. The company can prepare a kit for each employee, including personal protective equipment (mask, gloves and glasses). The hydro-alcoholic gel must be available continuously. The firm can also install a cleaning area and a thermal camera.
- Promote a standard of workspace organization by marking the ground of the directions of movement in the company. Establishing responsible behavior of employees will consist of respecting the safety distance between them, wearing a mask, using hydro-alcoholic gel and hand washing.

### 4.2.1. Application on production/service enterprise

In the same enterprise producing leather goods, hygiene actions are applied through corrective actions (Figure 4) for each identified operation that caused problems for working employees, as:



**Figure 4.** Hygiene actions in production enterprise

Conversely, during this COVID-19 pandemic, we have observed an effort to apply these hygiene actions in service production companies such as pharmacies, shops and public administrations. For example, following a specific study on pharmacies (Hamadouche,

2020), good hand hygiene is available to all staff, room disinfection takes place frequently with a particular process for money and a marking on the ground physical distancing between customers.

#### 4.2.2. Application on educational structure

Similarly, in knowledge production enterprises like universities, this aspect has been taken care of by the establishment of disinfection zones (Figure 5, left); ground markings (Figure 5, right) ensure the direction of student traffic.



**Figure 5.** Hygiene actions in university – Seiso action (left) and Seiketsu action (right)

### 4.3 Sustainability action

The final action is to maintain the improvement. It is about fostering self-discipline and encouraging effort. Shitsuke is only effective if developed rules in the first four actions are engaged. Care must be taken to ensure that the methodology is rigorously applied according to standards. To do so, training and information for all workers are essential.

This last action is crucial for improving the life quality at work as well as that of labor productivity. Implementation of training and information actions in addition to organizational measures means the end of the improvement process and its sustainability, which will be based on the following actions:

- Formalize and disseminate good practices
- Display the barrier and distance measures in the company.

In order to fight against the pandemic, in companies producing goods and/or services, the fundamental action of sustainability (Figure 6) must be maintained through preventive operations against COVID-19 through the display of placards reminding all the measures barriers.

### 4.4 Impact of Sustainable model

The proposed model application has obtained interesting observations and results with the 5S support:

- On production/service enterprises

Despite reluctance to implement the 5S method in the studied company due to staff's lack of motivation and involvement, this method has shown its effectiveness in improving productivity. Indeed, the implementation of the methodology gives an improvement of the functional and organizational processes and the wasteful elimination of non-added value tasks. Thus, after the identification of problems and implementation of 5S with appropriate corrective actions, the flow index increases from 54.58% to 73.7% for added value operations; it decreases from 45.42% to 26.3% for non-added value tasks in the company. Moreover, installing a ventilation system and wearing appropriate masks and work clothes improved the environmental quality for workers (Azzemou & Nouredine, 2021).



Figure 6. Shitsuke action

- On educational structure

Universities have been closed in virtually every country around the world in an attempt to limit the COVID-19 spread. Innovative and responsive solutions have therefore been provided. In Algeria, face-to-face classes have been suspended, and new strategies have been implemented through the actions of the proposed methodology, in particular, E-learning. However, this teaching mode has found difficulties in being realized due to the lack of equipment, preparation and experience of teachers. But we noted that many efforts had been made to implement organizational actions as well as hygiene and sustainable actions.

So, in order to guarantee safe and healthy workplaces, the university has provided students and teachers with hygiene supplies (masks and gel) as well as awareness campaigns and training in preventive measures (Kerras & Salhi, 2021).

## 5. CONCLUSIONS

In the COVID-19 context, the company must, on the one hand, ensure the sustainability of its activities which are already severely impacted by the pandemic, and on the other hand, guarantee the health and safety of employees. Despite economic and social upheavals that threaten millions of people's livelihoods and long-term well-being, the company must decide on measures adapted to the work continuity. Thus, the employer must ensure that all employees of the company comply with hygiene instructions so as not to endanger their lives and their families.

In this perspective, this paper has proposed modelling these measures using the 5S tool from Lean Manufacturing. The objective of the adopted model is to offer a hygiene framework to prevent risks; its implementation allowed identified actions of the organization, cleanliness and safety of the workplace. By relying on the 5S tool, a well-known method of continuous improvement, good health safety practices are recognized and specified. This is a very useful way to slow the spread of COVID-19, particularly by applying the first three measures. Companies must take other additional hygiene measures to guard against the COVID-19 virus. On the one hand, installation of collective protection equipment, obligation to wear personal protective equipment, compliance with physical distancing rules and implementation of adequately equipped sinks. On the other hand, as the organization is an essential element in companies and



to fight against the pandemic, a new organization can be considered leading to further devices such as teleworking.

This approach, which is still little used in Algeria, will be interesting to implement to reduce the number of physical contacts of employees. However, where telecommuting is not possible, the company must rethink its organization by redesigning its workspace. Indeed, the sustainable socio-economic development of national enterprises depends on improving the quality of life at work. It is also the opportunity to set up new teaching mechanisms, such as E-learning, and this aspect is starting to be generalized.

And finally, it is necessary to put in place training and information actions which remain a fundamental preventive lever for the preservation and protection of worker health. In this context, Algeria promulgated Executive Decree No. 20-69 of 21 March 2020 on measures to prevent and combat the spread of COVID-19. National companies have started to set up a health, safety and environment charter to guarantee healthy and safe working conditions. Thus, occupational health services are required to relay as a priority and actively instructions, hygiene rules as well as prevention messages from the health department of each Wilaya (territorial authorities) to employers and workers in companies and administrations. This will help establish a culture of prevention in enterprises producing goods and/or services. In this context, the methodology actions have been implemented in a production company and university. In the first case, we obtained tangible results despite the workers' lack of motivation and involvement. In the second case, new teaching methods have emerged, and a Covid-19 screening center was recently created at this university.

Furthermore, the proposed model can be the basis of a sustainable pedagogical approach to the population's education in terms of hygiene and prevention. This has already started with several awareness campaigns on preventive measures. However, for effective implementation of the 5S actions of the methodology, the challenge is the involvement of all workers in companies and the involvement of learners and teachers in education. To achieve this and to have a broader field of study, we plan a sustainable model for other companies. From this perspective, an extension of the 5S method with the safety action could be considered for companies with a high-security risk. On the other hand, following the sustainable model applied to universities, we want to deepen the impact of new teaching mechanisms on educational results.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## REFERENCES

- Al-Hashimi, M., & Al-Sayed, H. (2022). Perception and Impact of Coronavirus (COVID-19) on People's and Lifestyle: E-learning, People, Well-Being, Quality of Life, Protective Measures and Government. In *Technologies, Artificial Intelligence and the Future of Learning Post-COVID-19* (pp. 635-656). Springer, Cham.
- Ammam, R. (2018). The impact of the system of benefits and social services on job satisfaction in Algerian institutions. *Strategy and Development Review*, 8(15), 125-142. <https://www.asjp.cerist.dz/en/downArticlepdf/276/8/2/54656>
- Azzemou, R. & Nouredine, M. (2018). Continuous improvement for the firm's competitiveness: implementation of a new management model. *Management Science Letters*, 8(1), 19-32. <https://doi.org/10.5267/j.msl.2017.11.003>
- Azzemou, R. & Nouredine, M. (2021). Adding Value by Handling of Logistics: Study Case in Algeria. *International Journal of Academic Accounting, Finance & Management Research*, 5(6), 23-29. <http://ijeais.org/wp-content/uploads/2021/6/IJAAMR210602.pdf>
- Barel, Y. & Frémeaux, S. (2012). Le rôle des médecins du travail dans les actions de prévention primaire. *@GRH*, 2(2), 69-88. <https://doi.org/10.3917/grh.122.0069>
- Branicki, L., Kalfa, S., & Brammer, S. (2022). Surviving Covid-19: The Role of Human Resource Managers in Shaping Organizational Responses to Societal Paradox. *British Journal of Management*, 33(1), 410-434. <https://doi.org/10.1111/1467-8551.12570>

- Donthu, N., & Gustafsson, A. (2020). Effects of COVID-19 on business and research. *Journal of business research*, 117, 284. <https://doi.org/10.1016/j.jbusres.2020.06.008>
- Duryan, M., Smyth, H., Roberts, A., Rowlinson, S., & Sherratt, F. (2020). Knowledge transfer for occupational health and safety: Cultivating health and safety learning culture in construction firms. *Accident Analysis & Prevention*, 139, 105496. <https://doi.org/10.1016/j.aap.2020.105496>
- Gaillard, I. (2016). Très Petites Entreprises: les compétences organisationnelles, base de la santé au travail. *La revue des conditions de travail*, (5), 46-56. [https://www.researchgate.net/publication/318921048\\_Tres\\_Petites\\_Entreprises\\_les\\_competes\\_organisationnelles\\_base\\_de\\_la\\_sante\\_au\\_travail](https://www.researchgate.net/publication/318921048_Tres_Petites_Entreprises_les_competes_organisationnelles_base_de_la_sante_au_travail)
- Gultom, S., Baharuddin, D. A., Amal, B. K., & Purba, A. S. (2021). Implementation Of Occupational Safety And Health (K3) For Students In Facing Pandemic. *NVEO-NATURAL VOLATILES & ESSENTIAL OILS Journal*| NVEO, 2633-2648.
- Hamadouche, M. (2020). Means of preventing the risk of exposure to SARS-Cov-2: Survey of pharmacists in a city in eastern Algeria. *Archives des Maladies Professionnelles et de l'Environnement* 81(4), 341-347. <https://doi.org/10.1016/j.admp.2020.06.005>
- Institut National de Santé Publique. (2021). Pandémie de Covid-19, Algérie. Situation épidémiologique du 5 Juillet 2021. *Bulletin épidémiologique*, N°225, Algérie.
- Jubert, L. (2019). L'organisation du travail et la prévention des risques professionnels (Doctoral dissertation, Université de Nanterre-Paris X).
- Keraka, C. N. (2020). Safety Management System and Employee Performance in Textile Manufacturing Companies in Selected Counties in Kenya (Doctoral dissertation, JKUAT-COHRED).
- Kerras, N., & Salhi, S. E. (2021). University Education in Algeria during the Covid-19 Pandemic: Limitations and Challenges. *Arab World English Journal*, Vol. 12(3). <https://dx.doi.org/10.24093/awej/vol12no3.2>
- Mourey, M. & Curaso, N. (2019). Révolutionner la santé et la sécurité au travail. La nouvelle approche pour une gestion collective des risques dans l'entreprise. Diateino Eds.
- Omogbai, O., & Saloni, K. (2017). The implementation of 5S lean tool using system dynamics approach. *Procedia Cirp*, 60, 380-385. <https://doi.org/10.1016/j.procir.2017.01.057>
- Rajesh, N., & Kanagalakshmi, L. (2022). Workplace Communication during the Pandemic situation. *Journal of Contemporary Issues in Business and Government* Vol, 28(01).
- Sellami, S. C. (2020). La Responsabilité Sociétale des Organisations à l'épreuve du COVID-19. *International Journal of Innovation and Applied Studies*, 29(3), 685-696. <http://www.ijias.issr-journals.org/abstract.php?article=IJIAS-20-146-05>
- Sharma, R., Sharma, S., & Sharma, M. (2020). 5S Housekeeping Lean Technique by Using System Dynamics Method. In *Proceedings of International Conference in Mechanical and Energy Technology* (pp. 209-217). Springer, Singapore. [https://doi.org/10.1007/978-981-15-2647-3\\_19](https://doi.org/10.1007/978-981-15-2647-3_19)
- Singh, C., Singh, D., & Khamba, J. S. (2021). Exploring an alignment of lean practices on the health and safety of workers in manufacturing industries. *Materials Today: Proceedings*, 47, 6696-6700. <https://doi.org/10.1016/j.matpr.2021.05.116>
- Spinazzè, A., Cattaneo, A., & Cavallo, D. M. (2020). COVID-19 outbreak in Italy: protecting worker health and the response of the Italian Industrial Hygienists Association. *Annals of work exposures and health*, 64(6), 559-564. <https://doi.org/10.1093/annweh/wxaa044>
- Verikios, G. (2020). The dynamic effects of infectious disease outbreaks: the case of pandemic influenza and human coronavirus. *Socio-economic planning sciences*, 71, 100898. <https://doi.org/10.1016/j.seps.2020.100898>
- Wong, A., Ho, S., Olusanya, O., Antonini, M. V., & Lyness, D. (2020). The use of social media and online communications in times of pandemic COVID-19. *Journal of the Intensive Care Society*, 1751143720966280. <https://doi.org/10.1177/1751143720966280>
- World Health Organization. (2018). Global action plan on physical activity 2018-2030: more active people for a healthier world. World Health Organization. <https://apps.who.int/iris/handle/10665/272722>
- Xue, M., Al-Turjman, F., & Saravanan, V. (2021). A Labor Safety Performance and Involvement of Workers in Accident Reduction and Prevention. *Aggression and Violent Behavior*, 101560. <https://doi.org/10.1016/j.avb.2021.101560>