

« CONCEPTION D'UN DISPOSITIF EVOLUTIF DE MISE EN ŒUVRE D'UN SYSTEME DE MANAGEMENT HYGIENE- SANTÉ AU NIVEAU DES ENTREPRISES MALGACHES »

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ABSTRACT

Currently, companies need an effective tool to implement its management system; companies adopt several concepts and have to master more than one management system to manage the areas of hygiene and health. An integrated management system model is therefore needed in the context of business development in these areas. The aim is therefore to design a scalable system to ensure and facilitate the effectiveness of a management system in companies. The problem in question is: How should hygiene and health management systems be implemented to ensure greater efficiency and efficiency? Indeed, companies face difficulties in setting up several standards and management systems in parallel, while similarities are eventually found between these standards. To overcome this problem, this research aims to design and implement a new system integrating hygiene and health in a single management system. The Integrated Management system is part of the perspective of developing new ways to promote businesses in general. Indeed, this system is a documented set of measures and provisions to implement policies expressed at the highest level of a company. It aims to continuously improve the hygiene and health of the workforce at work, which are the main drivers of productivity.

Keywords: Device - System - Hygiene- Health- Management

INTRODUCTION

The globalization of the economy, the evolution of consumption styles, and the power of information technology are imposing new managerial logics. Such evolutions pose serious problems of adaptation, but at the same time offer development opportunities to be seized. The main reasons for the existence of companies are no longer limited to the search for profit, as recently the social and environmental achievement guarantees the image of any company. Thus, companies include in their strategies the practice of a management system oriented towards these areas.

The challenge is to meet the requirements and rules that define the procedures for attesting compliance that products must meet in order to be able to circulate on the market by declaring themselves in compliance with a standard or a label.

Hygiene at work is an important issue for the company, whether in terms of image with partners or employee well-being. The challenges of the hygiene management system are numerous and call for transversal knowledge that concerns the entire company. The company implements all the conditions that enable it to respect the physical and mental integrity of its

employees and to limit the consequences of an occupational disease on the individual. This has an impact on the atmosphere within the company and on the performance of each individual. Without neglecting the impact on the company's image.

Health is a state of complete physical, mental and social well-being, and does not consist solely of the absence of disease or infirmity¹. Moreover, health is the result of a constant interaction between the individual and his or her environment and therefore represents the physical, psychological and social capacity of people to act in their environment and to carry out the roles they intend to assume in a way that is acceptable to themselves and to the groups to which they belong². Taking occupational health into account will become a must in the management of a company. It is at this point that the foundations of the occupational health management system will take shape. The health of the workers represents important stakes, for psychological, social, economic and legal reasons. The new challenge consists in integrating the health of the workers as a real strategic priority of the company, and thus to set up a global, voluntarist and dynamic policy of risk prevention, to integrate the health at work in the global management of the company.

Management is a relatively recent discipline which is confused with the management of an organization or a company. Its purpose is to plan, organize, direct and control an organization so that it achieves its objectives³. Integrated management has become a key success factor for companies, not only because it is a strategic axis at the organizational level, but also because it is a way for companies to obtain a competitive advantage, because the emergence of this type of approach is not essentially due to the awareness of organizations, but rather to the will of customers. So to meet their requirements, organizations have developed responsible actions that are increasingly oriented towards CSR (Corporate Social Responsibility) commitments.

Hygiene and health have long been separate sectors in the management systems of companies. But nowadays, a merger of these two areas into a single management system is possible despite their specificities, the management of both have similarities in terms of prevention and control systems. Thus, a management system allowing to manage both areas is in line with the perspective opened by the development of new ways of promoting companies in general. The major challenge of implementing an integrated system is to place companies in a process of progress in terms of effectiveness and efficiency, allowing the satisfaction of all interested parties. An integrated management system allows to guarantee the needs, expectations and requirements of all interested parties, through the improvement of the results of the company's activities, including product quality.

However, the implementation of an integrated management system requires a lot of skill, time and dedication. Not only does the resistance to change of the actors require patience, meticulous and arduous work, but also apprehensions, resulting from the routine activities they have endured for years, slow down the progress of the implementation; thus, few Malagasy companies are able to comply with the required criteria.

These situations require research into an evolving system for implementing a health and hygiene management system.

The major stake of the implementation of the integrated management system is to place the organizations in a step of improvement, allowing the satisfaction of all the stakeholders and the improvement of its global performances.

Thus, the problematic in question is the following: How should Health and Safety Management Systems be implemented to ensure better effectiveness and efficiency?

The objective is therefore to design an evolving integrated management system to ensure and facilitate the management of the health and hygiene domains.

The steps of the MEVA method⁴ are meticulously followed in the design of the models. First, the system is to be presented as an integrated health and hygiene management model which is supposed to improve the efficiency of the management of both areas. This hypothesis will then be verified by experimentation on companies.

The challenge of integrated management is to lead the organization in a process of progress and performance, by avoiding redundancies, and by conducting a general policy for the prevention and control of risks, but also by reducing the costs of implementation and monitoring of the various management systems, and finally to be beneficial for all interested parties.

The experimentation consists in testing the device designed for companies whose health and hygiene areas remain omnipresent within their activities, to collect results to analyze them and to deduce whether the initial hypothesis will be validated or not. The experimentation started three years before the data collection. The study is conducted in the natural environment of the observed phenomenon, in which case it will be a field experiment.

Nevertheless, the choice has been targeted at companies transporting petroleum products that already have management systems and encounter difficulties in managing the fields. Indeed, the particularities of the activities of these companies oblige them to master the fields. Beyond these criteria, the choice was conditioned by the willingness and agreement of the companies on the study protocol and ultimately their availability at the time of the study.

¹ Selon la constitution de l'Organisation Mondiale de la Santé (OMS)

² **Hervé Anctil**, « La santé et ses déterminants : mieux comprendre pour mieux agir », [Québec] : Ministère de la santé et des services sociaux, Direction des communications, La Direction des communications du ministère de la Santé et des Services sociaux, 2012

³ www.petite-entreprise.net/P-1583-136-G1-management-definition.html consulté le 28/07/17

⁴ Modélisation- Expérimentation- Validation- Application

The evaluation of the evolutionary system of implementation of the management systems relates to the level of implementation of the system (Launching, planning, management of resources, implementation and control and follow-up with the intermediate control of each stage) and of their integration in practice. The analysis of the organizational conditions of implementation of the management systems is based on an analysis of the structure, the means, the method of project management (policy, planning, communication, participation, evaluation ...). A survey by opinion poll near a sample of employees of companies transporting petroleum products is then scheduled to assess the effectiveness of the system implemented. The questionnaire is based on evaluation criteria built from the reference frames of the two areas that make up the system.

An experimentation by a scientific method which consists in using statistical calculations: the correlation method to confirm the validity of the hypothesis and to obtain quantitative data allowing to refine it. The qualitative data obtained by experimentation will be analyzed by a software recognized by its effectiveness which is the "Sphinx" in order to validate the hypothesis. Indeed, the Sphinx software allows the design of a questionnaire, the capture and analysis of the responses and the exploration of the recorded data. The software integrates more advanced multidimensional analysis techniques (factorial analysis, typology, etc.) and can analyze any file containing numbers and/or text, regardless of its origin. Also, the software allows to process open-ended questions, non-directed interviews or any other text regardless of its origin.

CONCEPTUAL AND METHODOLOGICAL FRAMEWORK OF THE STUDY

Several management systems have emerged in recent years, allowing companies to manage the various areas that guarantee their performance and brand image, but the objective of this research is to focus on the areas of health and hygiene and the standards and management systems related to them.

For a company, a management system is a policy that mobilizes all its members on a permanent basis in order to manage and improve the efficiency of its operations in the face of changes in its environment. Total efficiency is part of a continuous improvement approach, it concerns all the services or all the processes of the organization. Continuous improvement is a concept inspired by the DEMING wheel⁵. It means that the management system must constantly improve.

In fact, in the implementation of a management system, the company gathers the provisions relating to the actions to be carried out in front of the risks and opportunities, the identification of the dangers and the evaluation of the risks and opportunities, the determination of the legal requirements and other requirements, the objectives and the planning of the actions to reach them. For this planning phase, and in particular for the definition of objectives, the standard requires consideration of the overall issues and expectations of its workers and other interested parties and determines the "risks and opportunities" that may arise from hazards, risks, and legal and other requirements. This approach allows the policy and objectives to be more closely aligned with the company's overall strategy.

The company must also provide the resources necessary for the operation of the management system, the competence and awareness of the personnel, communication and documented information.

Operational control and emergency preparedness and response must also be considered.

The company must establish processes to manage change that affects performance, such as new products, changes in the workforce or working conditions, and changes in knowledge about hazards and risks.

For monitoring and measurement, the organization should determine what needs to be monitored and measured, including the effectiveness and efficiency of operational and other prevention measures. And finally, for continuous improvement of the company's overall performance, it must formalize corrective actions to reduce the gaps between set and achieved objectives.

The management system is therefore defined here as the set of processes by which an organization manages the correlated or interacting elements of its activities in order to achieve its objectives. These objectives can be aimed at different results to be achieved, particularly with regard to hygiene and health. The management system is generally based on reference documents. These are reference documents on which an organization relies to set up the procedures. These references can be internal like company standards or external like ISO standards. The ISO standards (International Organization for Standardization) are international references that allow to know if an organization respects a set of processes.

Hygiene is a set of measures intended to prevent infections and the appearance of infectious diseases. It is essentially based on three actions: cleaning and disinfection; disinfection; conservation. Industrial hygiene or occupational hygiene is the anticipation, identification, evaluation and control of health risks in the workplace: its ultimate goal is to protect the health and well-being of workers. Hygiene is a public health issue, access to a clean and healthy environment being a primary condition for sustainable development.

⁵ La roue de DEMING se décompose en quatre phases :

- Plan : Préparer, planifier. Cela correspond à la stratégie.
- Do : Développer, réaliser, mettre en œuvre. Cela correspond à l'exécution des tâches.
- Check : Contrôler. Cela correspond à la vérification.
- Act : Agir, ajuster. C'est que l'on met en place une action pour ajuster.

The objectives of the hygiene management system (HMS) are firstly, to assume the best responsibility of the organization related to hygiene, then to define the structures to be implemented to manage hygiene in accordance with the regulations and standards in force and finally to manage the resources essential to the control of hygiene. In addition, the system aims to continuously improve the organization's brand image.

Occupational health is an interdisciplinary approach, involving employees and employers, with the aim of creating a healthy workplace, including the fight against harassment at work and wage discrimination⁶ according to the state of health. An Occupational Health Management System (OHMS) aims to take into account the improvement of employee health in a global manner shared by all the company's stakeholders. It is a methodology for managing occupational health performance based on prevention policies, procedures and action plans, involving each level of responsibility.

Corporate health management consists of putting in place structures and processes to protect and improve the health of employees. The purpose of health management is to promote the overall health of employees. Not only to prevent the risk of illness of employees but also to ensure their daily well-being.

Health and hygiene in the workplace are important issues for the company, for psychological, social, economic and legal reasons. Integrating their management into the overall management becomes a real strategic priority for the company. It is a question of implementing a global, proactive and dynamic risk prevention policy.

Modeling of a hygiene and health management (SMHSA)

ISO management system standards provide a model for organizations to follow in achieving their goals and objectives. They help develop a culture within the organization based on an automatic cycle of self-assessment, correction and continuous improvement of operations and processes through employee awareness, commitment and leadership.

The Integrated Health and Safety Management System (SMHSA) is based on two internationally recognized standards: ISO 22000: Food Safety Management System (SMSDA) and ISO 45000: Occupational Health and Safety Management System (SMSESUT).

The ISO 22000 standard aims to create and maintain a hygiene management system in an organization. It is based on the concept of food safety implemented by NASA astronauts. Hygiene and food safety became an imperative requirement par excellence. Therefore, in October 2005, the committee "food products", within the ISO, published the ISO 22000 standard that defines the requirements of a management system for food safety (SMSA)⁷. According to the ISO 22000 standard, the company must have mandatory documents apart from the hygiene policy, flow charts, procedures and records. It must also define other free documents which will be necessary for the good functioning of its management system.

The ISO 45001 standard is a set of international standards for occupational health and safety management systems. It was developed by a committee of experts in the field of occupational health and safety, and follows the same structure as other management system standards such as ISO 14001 and ISO 9001. It also takes into account previous international standards developed in this field such as OHSAS 18001, the ILO-OSH guidelines of the International Labour Organization, various national standards and international labour standards and ILO conventions. This makes it one of the most valuable health and safety management systems to date. Achieving ISO 45001 certification demonstrates that the company operates a best practice occupational health and safety management system, reducing the likelihood of accidents and violations of legislation, as well as improving the overall performance of the organization.

ISO standards establish requirements or guidelines to help organizations manage their policies and processes to achieve specific objectives. The standards are developed to be applicable to all economic sectors, different types and sizes of organizations, and diverse geographical, cultural and social conditions.

The similarities between the standards as well as the similarities in the management systems concerning these areas lead to the grouping of the areas into integrated management systems. The main common points are first of all the approach PDCA⁸, secondly, the need for leadership and commitment from the management to lead the prevention project, the planning and development of preventions, the implementation of control and safeguard barriers and finally the control and improvement of the preventions carried out.

The implementation of integrated management systems; allows to manage in common the objectives, the policy, the corrective and preventive actions, the management review, the internal audits, the training and the documentary control of some standards; by taking into account the compatibilities between these standards.

Both systems have common points that can be assembled in a single management system but the concept is designed with the ambition of respecting hygiene and health in a single structure while taking into account the inherent specificities of the Hygiene and Health Management System.

The objective of the hygiene management system (SMH) is first, to assume the responsibility of the organization related to hygiene, then to define the structures to be implemented to manage hygiene in accordance with the regulations and standards in force and finally to manage the resources essential to the control of hygiene. An Occupational Health

⁶ Ben Halima M.A., Rococo E. « Discrimination salariale selon l'état de santé en France » Document de travail no 55. 2013/03

⁷ www.iso.org

⁸ Planifier- Dérouler-Comparer-Agir

Management System (SMSa) is to take into account the improvement of the health of the personnel, in a global way and shared by all the actors of the company.

The Hygiene and Health Management System is a system that links both the management of hygiene and health risks, and the input data are the initial state of hygiene of the personnel, the health risks in the infrastructures and workstations, as well as the occupational diseases. The Health and Hygiene Management System is led by a manager appointed by the management and presented to all staff. The support function concerns the management of personnel in the workplace, managing their involvement in the system, their training and their qualifications. This function provides the necessary resources related to infrastructure and facilities in terms of hygiene and health to achieve the set objectives. The operational function contributes to the development, implementation and enforcement of control and safeguard barriers for occupational health and disease risks. The output of this system is the final state of cleanliness of personnel, infrastructure and facilities, as well as the actions taken to prevent occupational disease risks.

The foundations of experimentation

The experimentation will consist in setting up a system based on integrated management system reference systems. In fact, the integrated health and safety management system (SMHSA) is modeled after a managerial approach:

Launching, which concerns the setting of objectives as well as the different planning of actions to be undertaken

- o The management of the resources concerns the evaluation and fixing of the necessary resources

- o Implementation, which consists of the actual setting up of the planned actions

- o Control and monitoring allows for a complete verification that the system in place is in conformity with what was planned and to rectify any shortcomings.

Experimentation consists of testing the system designed for companies that manage the two areas, collecting results to analyze them and deduce whether the initial hypothesis is validated or not. The experimentation will focus on the implementation of a management system, assuming that the SMHSA model allows the improvement of the hygiene and health of the company's personnel. The study has a comprehensive aim; it follows an inductive approach, i.e. based on facts emerging from the field. Thus, the experiment was carried out on a sample of fourteen companies operating in the hydrocarbon transport sector in Madagascar. The choice of this sector of activity is dictated by a certain number of criteria favorable to the research. Indeed, this sector is marked by high exposure to occupational risks and accidents, and the companies working in this sector are subject to quality and standards constraints RSE⁹.

The evaluation of the effectiveness of the SMHSA system will be done by a survey in the form of an opinion poll among the employees of these companies based on the analysis of the following variables:

- The method of implementation of the device on which the effectiveness of the integrated management system depends. The launch of the system, the management of resources, the implementation and the control and monitoring are the processes that are supposed to condition the effectiveness of the system.

- The level of improvement in the areas explains the effectiveness of the system.

- The effectiveness of the experimented system is the key variable of the research model, the one we want to explain and which is supposed to depend on other variables.

RESULTS

Device implementation process

The following data describes the companies' processes for the main stages of the implementation of the system. As a reminder, these companies already have management systems for the areas of hygiene and health, but the experimentation consists of proposing more effective systems based on existing standards. Thus, several principles must be respected for each step of the implementation process so that the alignment of the systems is done adequately. The following results discuss the employees' opinions on the respect of these principles.

The launch phase of the device

This process requires a start-up approach consisting of the setting of objectives, the mobilization of stakeholders and, above all, the development of the various action plans. The development of processes, procedures, work instructions, records and awareness as well as the determination of the information system are also part of this step. The coordinator is in charge of proposing the different plans and procedures which will then be validated by the management after being approved by the committee members. For the sake of transparency, the staff must also be informed about these systems.

Before proceeding to the in-depth analysis of the opinions of the respondents on the implementation process, it is desirable to appreciate the trends of the answers at the level of the study sample, which are established on a rating of 1 (Never) to 5

⁹ Responsabilité sociale de l'entreprise

(Always) by the average and the standard deviation, indicator of appreciation of the average by its value. The lower the value of the standard deviation, the greater the concentration of responses around the mean.

In view of the results¹⁰, we can state that the opinions on the statements made concerning the launch of the system are fairly homogeneous, since the standard deviations are all less than 1 and the employees surveyed generally tend to agree or, more precisely, to accept the approach or compliance with the standards required for the launch of the system.

Resource management

Like any other project, the implementation of a management system requires the management of several resources, namely human, financial and material resources. The management of resources concerns not only the elaboration of the competency profile and the training plan for the personnel, but also the management of the budget and the determination of the infrastructure and equipment.

In order to verify the standards of this structure, we have used in this study 20 items, more precisely 5 items of each respectively to evaluate the roles of the coordinator on the management of resources, the agreement of the Committee on the prescriptions of the coordinator, the validation of the management of resources by the Management and the explanation of the management of resources to the staff.

Evaluated on a scale of 1, where employees declare that they have "NEVER" seen or noticed the structure, to 4, where employees declare that they have "ALWAYS" seen or noticed the structure, the results on the general tendency of the opinions of the employees in the sample on the management of resources in the facility presented in the table below are characterized in two groups

In the first group, there is a refusal to acknowledge the role of the coordinator in the management of resources and the presentation of this role to the staff, with the exception of the development of processes, procedures and work instructions, as evidenced by an average score below 3. The values of the standard deviations below the mean reflect the homogeneity of the answers provided by the employees of the study sample. The second association of response trends where the averages exceed 3 from the results table below establishes the confirmation of the structure's finding regarding the Committee's agreement and the Management's validation of the coordinator's missions on the management of resources or, more precisely, the elaboration of processes, procedures and work instructions performed by the coordinator.

Table 2: Overall trends in the views of employees in the study sample on resource management in the scheme

Items study for resource management	Mean	Standard deviation
Is the competency profile and staff training plan developed by the coordinator?	2,99	1,025
Is the budget developed by the coordinator?	2,12	,560
Is the infrastructure and equipment determined by the coordinator?	2,87	1,083
Are the processes, procedures, work instructions, records and awareness developed by the coordinator?	3,30	,783
Is the information system determined by the coordinator?	2,93	,584
Are the competency profile and training plan for staff approved by the committee?	3,35	,700
Is the budget approved by the committee?	3,34	,704
Is the infrastructure and equipment approved by the committee?	3,27	,825
Are the processes, procedures, work instructions, records and awareness approved by the committee?	3,22	,896
Is the information system approved by the committee?	3,33	,783
Are the staff competency profile and training plan validated by management?	3,28	,802
Is the budget validated by management?	3,69	,829
Is the infrastructure and equipment validated by management?	3,25	,813
Are processes, procedures, work instructions, records and awareness validated by management?	3,73	,756
Is the information system validated by management?	3,31	,784
Are the competency profile and training plan presented and understood by staff?	2,10	1,025
Is the budget presented and understood by the staff?	2,52	1,421
Is the infrastructure and equipment presented and understood by the staff?	2,93	1,020
Are the processes, procedures, work instructions, records and awareness presented and understood by staff?	3,29	,811

¹⁰ Annexe1

Is the information system presented and understood by staff?	2,89	1,048
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Source: Author, 2020

The implementation of the device

The management system takes into account the actors, materials and activities within a company. It is then a coordinated system and especially piloted by a committee. The latter gives itself the means to reach its objectives while putting it in relation to the reality of the company. Therefore, the management system must always correspond to the reality of the company's organization and not be a simple theoretical system. For this, it is necessary that the quality management system is implemented according to the operation of the company.

Implementing the system according to the required standards does not only mean elaborating the monitoring plan but also the assessment of the actions carried out, the construction of a dashboard of the results of the actions carried out and the intervention plans in case of emergency.

The evaluation of the implementation of the system in this thesis is based on the required standards mentioned above. We have defined 15 measurement items, of which we first assess the reliability of the items, secondly the trends in the responses of the employees in our study sample, and thirdly we justify the possibility of dividing them into four axes which relate respectively to the effective roles of the coordinator in the implementation, the agreement of the Committee and the validation of the management of the main tasks of the project and the explanations to the employees of the prescriptions on the implementation of the device.

According to the results of the table below on the trends of the opinions of the employees of the companies regarding the implementation of the scheme. The Cronbach's Alpha value of 0.921, which is very close to 1, ensures the reliability of the evaluation items for the implementation of the project.

Table 3: Reliability statistics for implementation assessment items

Cronbach's Alpha	Cronbach's Alpha based on standardized items	Number of elements
,921	,916	15

Source: Author, 2020

The description of the respondents' opinions on the implementation of the project makes it possible to establish overall that the standards required in this system are often perceived by the employees since the average scores of their opinions exceed 3 reflecting the positive finding.

Table 4: Descriptive statistics of employees' opinions on the implementation of the scheme

ITEMS	Mean	Standard deviation	Analyse N
Is the monitoring plan developed by the coordinator?	3,35	,727	400
Has the coordinator prepared a report on the actions carried out?	3,27	,836	400
Is the results dashboard developed by the coordinator?	3,30	,775	400
Is the compilation of contingency plans developed by the coordinator?	3,34	,733	400
Is the monitoring plan approved by the committee?	3,32	,768	400
Is the summary of completed actions approved by the committee?	3,33	,743	400
Are the results presented to the committee?	3,32	,761	400
Are contingency plans approved by the committee?	3,04	,550	400
Is the monitoring plan validated by management?	3,34	,765	400
Is the review of completed actions validated by management?	3,26	,846	400
Are the results reported to management?	3,67	,857	400
Are emergency response plans validated by management?	3,34	,753	400
Is the monitoring plan presented and understood by the staff?	3,16	,610	400
Is the results of the actions taken presented and understood by the staff?	3,02	,665	400
Are staff informed of the results?	3,25	,830	400
Are emergency response plans presented and understood by staff?	3,52	,782	400

Source: Author, 2020

Control and monitoring

Control and follow-up are integral parts of the audit. Internal and external audits are to be carried out in order to verify in depth the practical problems that have occurred during the implementation and operation of the organization. A compilation of the rules of control of the control devices, lists of corrective actions is also necessary.

It is also in this phase that the system of encouraging the personnel to report anomalies or the possibility of improvement, the system of evaluation of the corrective actions as well as the plan of corrective maintenance to the control of the risks is elaborated.

With regard to control and monitoring, we used a measurement tool based on 28 whose purpose is to verify whether the standards required in the control and monitoring of a project are used¹¹.

The trend in the opinions of the employees in our study sample on the control and monitoring system in the implementation strategy of the system, as shown in the table above, is in favor of following the required standards. Indeed, the average scores associated with the different items are mostly above 3, which underlies the experiences of the application of the standards of control and monitoring by the employees, with the exception of most of the items that justify the commitment of the employees in the system where the associated scores are close to 3 and express that the strategy of control and monitoring on the system are rather rarely presented and explained to the staff of the company. All the employees' opinions are homogeneous if we refer to the values of the standard deviations which are all lower than the average scores.

Improvements in the two areas

In any company or organization, management is not only a matter of procedure. It is above all a state of mind.

The following results then explain the changes observed in both areas during the experiment. These changes should be symbolized by the continuous progress.

Improved hygiene management

Occupational health management is not just about anticipating, identifying, assessing and controlling occupational hazards that could affect the health and well-being of workers. It also takes into account the possible impact of these risks on neighbouring communities and on the environment in general¹². In order to focus our evaluation, we focused our measurement scales on the standards required for the evaluation of hygiene, namely, waste treatment, disinfection, hygiene prevention and disease prevention systems.

Apart from the item on hygiene prevention, which indicated a situation of non-improvement, the impact of hygiene management was immediately judged as positive by the employees of the companies

Table 6: Average score for items assessing the impact of the system on hygiene management

Items impact assessment	Mean	Standard deviation
In your opinion, has the waste treatment system been improved since the implementation of the new system?	3,33	,463
In your opinion, has the disinfection system been improved since the application of the new system?	3,32	,512
In your opinion, has the hygiene prevention system been improved since the implementation of the new system?	2,12	,468
In your opinion, has the disease prevention system been improved since the application of the new system?	3,32	,349

Source: Author, 2020

As a result, we can say that the device manages to bring a state of improvement for the 3 standards required out of 4 in the evaluation of the hygiene management.

Improved health management

The following results relate to the relationship between management and occupational health in order to evaluate the impact of the system according to the required standards, which refer to the system of job visits, insurance, psychological support and illness management, in health management.

The level of impact observed by the companies' employees regarding health management is quite convincing. The respondents stated that they have noticed all the improvement situations.

Table 7: Average score for items assessing the impact of the system on health management

Items impact assessment	Mean	Standard deviation
In your opinion, has the pre-service visit system been improved since the implementation of the new system?	3,18	,458
In your opinion, has the insurance system been improved since the implementation of the new system?	3,31	,478

¹¹ Annexe 2

¹² B.Goelzer, « Encyclopedie de sécurité et de santé au travail » ED J.L. BIT, Genève,2000

In your opinion, has the psychological support system been improved since the implementation of the new system?	3,11	,542
In your opinion, has the management of illnesses been improved since the application of the new system?	3,35	,762

Source: Author, 2020

In sum, we can say that the device has amply brought a state of improvement through the management of the health of the employees of the companies.

IMPACT OF THE IMPLEMENTATION OF THE SMHSA MODEL ON THE IMPROVEMENT OF THE MANAGEMENT OF HYGIENE AND HEALTH OF THE PERSONNEL OF COMPANIES.

Occupational hygiene is defined as the science of managing measurable exposure risks. Of course, it also takes into account other workplace hazards and organizational and psychosocial factors. If occupational hygiene focuses on the work environment, the field of occupational health focuses on people at work, with the objective not only of preventing occupational diseases, but also of maintaining and promoting the highest degree of physical, mental and social well-being of workers in all occupations, taking into account their physiological and psychological abilities.

The question here is first to see if the improvement in hygiene management is due to the compliance with the processes of launching the new system, resource management, implementation and control and monitoring of the system. The p-value of 0.000, which is lower than the risk of error of 0.05 presented in the ANOVA table, confirms significantly by the value of the coefficient of determination R^2 that this improvement in hygiene management reflects the overall conduct of these 4 phases according to the imposed standards.

It follows from this result that 81.7% of the variation in the perceived improvement in hygiene management is explained by the variation in the implementation of the device through the 4 phases according to the imposed standards.

Table 8: Summary of the hygiene improvement models and the 4 phases of implementation

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics				
					Variation of R-two	Variation of	ddl1	ddl2	Sig. Variation of F
1	,904 ^a	,817	,813	,21771	,817	217,067	4	195	,000

a. Predictors: (Constant), monitoring, resource management, implementation, score launch

Source: Author, 2020

This improvement effect on the results of the hygiene management is confirmed by the ANOVA if we look at the p-value of 0.000 lower than 0.05.

Moreover, the analysis of the partial contribution of each predictor variable by the p-value or sig. of the T-tests of nullity of the coefficients evoke by the table of the coefficients of the model below that only the values of the p-values are lower than 0,05 for the scores of launching and the scores of follow-up, they are respectively equal to 0,002 and 0,001.

Thus, we can affirm that the states of improvement resulting from the management of hygiene through the implementation of the device are mainly due to the management of the launch and the control and follow-up.

Referring to the values of the Beta coefficients, we can say that the control and monitoring of the system brings more effect because 55.9% of the variation of the improvement are due to the control and monitoring against 40.3% by the management of the launch of the system. The effects of the management of resources and the implementation of the system are not significant on the scopes of the hygiene management.

Table 9: Coefficients of the improvement model on hygiene management by the 4 phases of the system

Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Standard deviation	Bêta		
1	(Constant)	,306	,147		2,076	,039
	launch	,483	,151	,403	3,206	,002
	Resource management	-,018	,088	-,021	-,203	,840
	Implementation	-,030	,107	-,031	-,281	,779
	Monitoring	,488	,151	,559	3,228	,001

a. Dependent variable: improvement of hygiene management

Source: Author, 2020

At the same time, through the same analytical approach, we present below the effect of the 4 phases of implementation of the system established according to the imposed standards on health management.

The summary table of the model which presents the value of R^2 allows us to establish significantly (p-value or sig. less than 0.05) that 76.2% of the improvement state of the health management is due to these 4 phases of docking of the device.

Table 10: Summary of health management models across the 4 phases

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics				
					Variation of R-two	Variation of	ddl1	ddl2	Sig. Variation of F
1	,873 ^a	,762	,757	,23007	,762	156,326	4	195	,000

a. Predictors: (Constant), Control and Monitoring, Resource Management, Implementation, Score Launch

Source: Author, 2020

The analysis of variance or ANOVA performed in parallel authenticates this predilection effect of health management improvement by the predictors generated by the 4 phases of the project because the sig. is lower than the 0.05 risk of error.

Table 11: ANOVA of the health management model across the 4 docking phases

Model		Sum of squares	ddl	Medium square	F	Sig.
1	Regression	33,100	4	8,275	156,326	,000
	Residuals	10,322	195	,053		
	Total	43,422	199			

a. Dependent variable: improvement in health management

Source: Author, 2020

By analyzing the table below which produces the values of the different coefficients of the regression model of health management by the launch, the management of resources, the implementation and the control and monitoring which govern the stages of implementation of the device, we can notice in the last column that the values of the p-value or sig resulting from the T-test of nullity of these coefficients which studies the significance of the contributions of each phase that only the effects of the launch and the management of resources are considered relevant on the improvement of the management of health the values of the p-values are lower than 0,05.

The implementation of the system and the control and monitoring according to the results of the T-tests do not bring conclusive effects in this health management.

Table 12: Coefficients of the regression model of health management by the 4 docking phases of the device.

Model		Non-standardized coefficients		Standardized coefficients	t	Sig.
		B	Ecart standard	Bêta		
1	(Constant)	,334	,156		2,146	,033
	score_launch_1	,653	,159	,587	4,103	,000
	Resource management	,350	,093	,451	3,769	,000
	implementation	-,133	,113	-,148	-1,172	,242
	control_monitoring_1	-,001	,160	-,001	-,004	,996

Source: Author, 2020

The confirmation of our hypothesis comes from the regression analysis of the effectiveness judged on the management of hygiene and health through the effects of improvement states of hygiene management and health management by the 4 phases of implementation of the device.

Indeed, the indicators of the determination coefficient R^2 and the analysis of variance ANOVA¹³ establish significantly (p-values are all less than 0.05) that 75% of the variation in the effectiveness of hygiene and health management is explained by the variation in the states of improvement of hygiene management and health management.

Jointly, according to the table of coefficients of the predictive variables of the model of the effectiveness of the management of hygiene and health in particular the states of improvement of the management of hygiene and the

¹³ Annexe 4

management of health that these last ones contribute each significantly to the effectiveness of the joint management of hygiene and health. The associated p-values are all below the 5% risk of error.

Table 13: Summary of the hygiene and health management effectiveness model by the hygiene and health management improvement states from the 4 phases of implementation

Model	R	R-two	R-two adjusted	Standard error of the estimate	Edit statistics				
					Variation of R-two	Variation of	ddl1	ddl2	Sig. Variation of F
1	,500 ^a	,750	,742	,439	,750	31,933	2	192	,000

a. Predictors: (Constant), health management improvement, hygiene management improvement.

Source: Author, 2020

Table 14: Efficiency model coefficients of hygiene and health management by states of improvement of hygiene and health management from the 4 phases of implementation of the system

Model	Non-standardized coefficients		Standardized coefficients		t	Sig.
	B	Ecart standard	Bêta			
1 (Constant)	1,517	,214		7,097	,000	
improvement of hygiene management	,381	,107	,383	3,560	,000	
improvement of health management	,145	,115	,135	1,259	,000	

a. Dependent variable: 150 How effective do you think the health and safety management system is?

Source: Author, 2020

CONCLUSION

To conclude and summarize the results of the research, it is necessary to recall that the objective of this research is to implement an effective management system to help companies in the management of hygiene and health of their staff. This model proposes to manage simultaneously, in a single management system, hygiene and health, while taking into account the specificities of the standards that govern them. The implementation of this HHSa system is based on a managerial approach that is considered effective in improving the management of both areas. This approach is composed of the launch phase, the management of resources, the implementation of the system and finally the control and monitoring system of the actions undertaken. The effectiveness of the model is tested by experimentation in companies experiencing difficulties in the management of hygiene and health. The analysis of the results of the opinion polls among the employees of these companies concerning the improvements brought by the implementation of the system allowed to confirm the efficiency of the model. This system will necessarily evolve as companies' priorities change with changes in objectives, contractual or regulatory obligations, and relationships with external partners (suppliers or customers) and risk assessment. It must be reviewed regularly to take into account the evolution of these parameters.

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- ISO 21500: 2012 / "Guidelines for project management
- ISO 22000: 2018 / "Food safety management systems
- ISO 22301:2019 / "Business Continuity Management Systems
- ISO 22320: 2019 / "Security and resilience - Emergency management - Guidelines for incident management
- ISO 28000 2018 / "Safety management systems in supply chain management
- ISO 45001:2018 / "Occupational Health and Safety Management Systems

ANNEXES**Annexe 1****Trends in Respondents' Responses to the Launch Facility**

VARIABLE	ITEMS	Mean	Standard deviation
Launch of device	Are staff invited to participate in device planning?	1,71	,780
	Is the meeting room set aside for all staff?	1,72	,829
	Is an attendance sheet available for each meeting?	2,10	,527
	Are minutes kept for each meeting?	2,45	,671
	Has a call for expressions of interest been made for committee members?	1,71	,762
	Is a profile required for the coordinator position?	3,31	,739
	Is the H3SQE policy written by the coordinator?	3,29	,753
	Is the H3SQE objective proposed by the coordinator?	2,84	,583
	Is the organizational chart developed by the coordinator?	3,27	,819
	Are the terms of reference set by the coordinator?	3,37	,697
	Is the information management system developed by the coordinator?	3,26	,834
	Is the H3SQE hazard list developed by the coordinator?	3,32	,754
	Are the risk assessment methods developed by the coordinator?	3,23	,876
	Are the prevention plans developed by the coordinator?	3,32	,754
	Is the calculation of the effectiveness and efficiency of the plan developed by the coordinator?	2,51	,665
	Is the selection of the coordinator approved by the committee?	3,26	,822
	Is the H3SQE policy approved by the committee?	3,34	,733
	Is the H3SQE objective approved by the committee?	3,33	,789
	Is the H3SQE organizational chart approved by the committee?	3,33	,758
	Are the terms of reference approved by the committee?	3,30	,777
	Is the information management system approved by the committee?	3,36	,750
	Is the H3SQE hazard list approved by the committee?	3,28	,820
	Are prevention plans approved by the committee?	3,31	,766
	Are the risk assessment methods approved by the committee?	3,28	,778
	Is the calculation of the plan's effectiveness and efficiency rate approved by the committee?	2,88	,572
	Are the committee members validated by management?	3,71	,727
	Is the selection of the coordinator validated by management?	3,28	,809
	Is the H3SQE policy validated by management?	3,35	,735
	Is the H3SQE objective validated by management?	3,80	,636
	Is the H3SQE organization chart validated by management?	3,28	,809
	Are the responsibilities validated by management?	2,86	,562
	Is the information management system validated by management?	3,23	,847
	Is the H3SQE hazard list validated by management?	3,27	,792
	Are the risk assessment methods validated by management?	3,31	,746
	Are the prevention plans validated by the management?	3,32	,781
	Is the calculation of the plan's effectiveness and efficiency rate validated by management?	3,68	,795
	Are the committee members introduced to the staff?	3,30	,749
	Is the coordinator introduced to the staff?	3,69	,780
	Is the H3SQE policy presented to staff?	2,93	1,042

Is the H3SQE objective presented and understood by staff?	3,25	,831
Is the H3SQE organizational chart presented to staff?	3,29	,804
Are the terms of reference read and approved by staff?	2,89	,608
Is the information management system presented and applied by staff?	2,92	,547
Is the H3SQE hazard list presented and understood by staff?	3,69	,773
Are risk assessment methods presented and understood by staff?	2,86	1,061
Are the prevention plans presented and understood by the personnel?	3,30	,794
Is the calculation of the effectiveness rate of the plan presented and understood by the personnel?	2,94	,541

Source: Author, 2020

Annexe 2

Statistics on the evaluation of the monitoring and control system

Items	Mean	Standard deviation	Items	Mean	Standard deviation
Is the internal audit program developed by the coordinator?	3,30	,819	Is the external audit program validated by management?	3,31	,823
Is the external audit program developed by the coordinator?	3,30	,794	Is the compilation of control device rules validated by management?	3,67	,804
Is the compilation of control device rules developed by the coordinator?	3,29	,766	Is the system for encouraging staff to report anomalies or opportunities for improvement validated by management?	3,29	,818
Is the system for encouraging staff to report discrepancies or the opportunity for improvement developed by the coordinator?	2,91	,578	Are corrective action lists validated by management?	3,28	,784
Is the compilation of corrective action lists developed by the coordinator?	3,26	,822	Is the evaluation of corrective actions validated by management?	3,24	,820
Is the evaluation of corrective actions developed by the coordinator?	3,33	,770	Is the corrective maintenance plan for risk control validated by management?	3,35	,727
Is the corrective maintenance plan for risk control developed by the coordinator?	3,31	,773	Is the internal audit program presented and understood by staff?	2,54	,672
Is the internal audit program approved by the committee?	3,31	,765	Is the external audit program presented and understood by the staff?	2,45	,678
Is the external audit program approved by the committee?	3,31	,753	Is the compilation of control rules for control devices presented and understood by staff?	3,32	,767
Is the compilation of control device rules approved by the committee?	3,27	,825	Is the system for encouraging staff to report discrepancies or opportunities for improvement presented and understood by staff?	3,24	,816

Is the system for encouraging staff to report discrepancies or opportunities for improvement approved by the committee?	3,33	,729	Are corrective action lists presented and understood by staff?	3,29	,785
Are corrective action lists approved by the committee?	3,31	,773	Is the evaluation of corrective actions presented and understood by personnel?	2,96	1,014
Is the evaluation of corrective actions approved by the committee?	3,34	,725	Is the corrective maintenance plan for risk control presented and understood by staff?	3,26	,858
Is the corrective maintenance plan for risk control approved by the committee?	3,31	,738	Is the external audit program validated by the management?	3,31	,823
Is the internal audit program approved by management?	3,35	,741	Is the compilation of control device rules validated by management?	3,67	,804

Source: Author, 2020

Annexe 3

Table: ANOVA on the impact of the 4 implementation phases on hygiene management

Modèle	Somme des carrés	ddl	Carré moyen	F	Sig.
1 Régression	41,156	4	10,289	217,067	,000
Résidus	9,243	195	,047		
Total	50,399	199			

a. Dependent variable: improvement of hygiene management

b. Predictors: (Constant), control_monitoring_1, resource_management, implementation, score_launch_1

Source: Author, 2020

Annexe 4

Tab : ANOVA model effectiveness of hygiene and health management by the states of improvement of hygiene management and health management from the 4 phases of implementation of the system

Modèle	Somme des carrés	ddl	Carré moyen	F	Sig.
1 Régression	12,319	2	6,160	31,933	,000 ^b
Résidus	37,035	192	,193		
Total	49,354	194			

a. Dependent variable: 150 How effective do you think the health and safety management system is?

b. Predictors: (Constant), health management improvement, hygiene management improvement.

Source: Author, 2020