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PERFORMANCE INDICATORS IN OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS: A SYSTEMATIC LITERATURE REVIEW

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ABSTRACT

Work accidents, injuries, and illnesses are serious problems in organizations. Rates show that, despite efforts to contain these events, accidents still happen in industries, with all the implied costs for companies. ISO 45001:2018 appears on the international scene with the main goal of preventing occupational risks and those related to health within organizations, betting on continuous improvement through the standardization of an Occupational Health and Safety Management System (OSHMS). These systems are linked to results that generate positive effects when introduced in an organization, impacting both safety and productivity. This systematic review aimed to define the indicators and results related to the implementation of OSHMS through OHSAS 18001 and ISO 45001, seeking to point out the indicators related to OSHMS, categorize such indicators, and compare which OSHMS operates better. This is a systematic literature review that uses the PRISMA protocol (Gul, M., 2018), thus defining a flow with four phases for the search of the selected studies from their identification, selection, and eligibility to inclusion. In this search, inclusion and exclusion criteria were applied to 344 articles, leaving 28 studies that made up the present review. Because it is a relatively new standard, there were few articles reviewed that evaluated the indicators from ISO 45001. From the review, it was possible to see that the indicators to monitor the performance of the OSHMS must be aligned with the company's practices, and it was also seen that the results from the implementation of an OSHMS will be linked to how much the company is involved with the system. This work is essential to understand how management systems in health and safety at work should be monitored through metrics that are often already established by corporations.

Keywords: ISO45001:2018; Occupational Health and Safety Management Systems; Indicators.

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1. INTRODUCTION

Occupational accidents, injuries, and illnesses are still serious problems in organizations and the rates show that despite efforts to contain these events, accidents still occur in industries, with all the costs that this can imply for companies (Fernández-Muñiz, B., Montes-Peón, J.M., Vázquez-Ordás, C.J., 2017). Among the work-related diseases, those that affect the musculoskeletal tissue are the most prevalent in general, and this is the main reason for absenteeism in companies. It is also known that programs aimed at workers' health and safety can positively impact this scenario, for example (Yazdani, A., Wells, R., 2018). Pinheiro (2019) points out in his study that the International Labor Organization ties to the Occupational Health and Safety Management Systems (OSHMS) positive effects when introduced in an organization, impacting both safety and productivity. Thus the effectiveness and efficiency of OSHMS become a challenge to corporations that seek to organize their processes in search for better results (Pinheiro, A.S.G., 2019).

As defined by Sousa (2010), an OSHMS, in summary, should provide a "set of tools to improve the efficiency of the management of Occupational Safety and Health (OSHMS) risks related to all activities of the organization" (Oliveira, H.L.S., Meza, L.A., Lima, G.B.A., Quelhas, O.L.G., 2018). The same author also points out that aspects related to the definition of the operational structure, the establishment of planning activities, the definition of responsibilities and necessary resources, the establishment of practices and procedures, as well as the guarantee of the identification of hazards and their evaluation and control, all these items must be considered. Thus, the relationship between productivity and performance, in terms of Occupational Safety and Health (OSH), needs to be understood as a strategic issue for the creation of new ways to improve economic competitiveness (Venel, C.D.C., Miranda, J.O., Duarte, J.A.L., 2018).

However, as in any other management system, there are margins for obtaining positive and negative results. Considering this possibility, the indicators take on a leading role within corporations for positioning on the maintenance of programs aimed at OSH, for example. It will be from the indicators that managers can view the performance of the elements that are measured, which provides the company with objective information for optimal decision making (Perdicoúlis, A., Glasson, J., 2011). Therefore, one can attribute to the indicators the possibility of facilitating the planning or management functions of the OSHMS, such as the construction of policies and greater assertiveness in the proposed measures (Galvão, T.F., Pansani, Andrade T.de.S., Harrad D., 2015).

In view of the above, it is necessary to understand the best indicators to monitor the evolution of the OSHMS. Therefore, this systematic review aimed to define the indicators and results related to the implementation of OSHMS through OHSAS 18001 and ISO 45001, seeking to point out the indicators related to OSHMS, categorize such indicators, and compare which OSHMS operates better.

2. METHODOLOGY

Systematic literature reviews are recognized as a formal, organized, and controlled process for evaluating and synthesizing studies in various areas of knowledge. The methods used to construct this one are presented below.

Study design

The protocol established follows PRISMA recommendations (Gul, M., 2018). Thus, a flow with four phases was defined for the search of the selected studies from their Identification, Selection, and Eligibility until Inclusion, according to **Figure 1**:

Therefore, as inclusion criteria, the following were established:

- Be published within the last 10 years;
- Have keywords in the title and/or abstract;
- Cite evaluated indicators;
- Be peer-reviewed.

In this sense, we excluded duplicate studies, those whose topic dealt with integrated management systems (associated with ISOs 9001 and 14001), and literature of the systematic review and/or systematic mapping type.

Research Strategy

The databases selected for the present research were Scopus, Bireme, and CAPES Journals where the following search strategies were used:

- Scopus: ((“ohsas 18001” OR “iso 45001”) AND performance);
- Bireme:(tw:(tw:((tw:(“ohsas18001”OR”ISO45001”)) AND performance)));
- CAPES Periodicals: ((“iso 45001” OR “ohsas 18000”) AND performance).

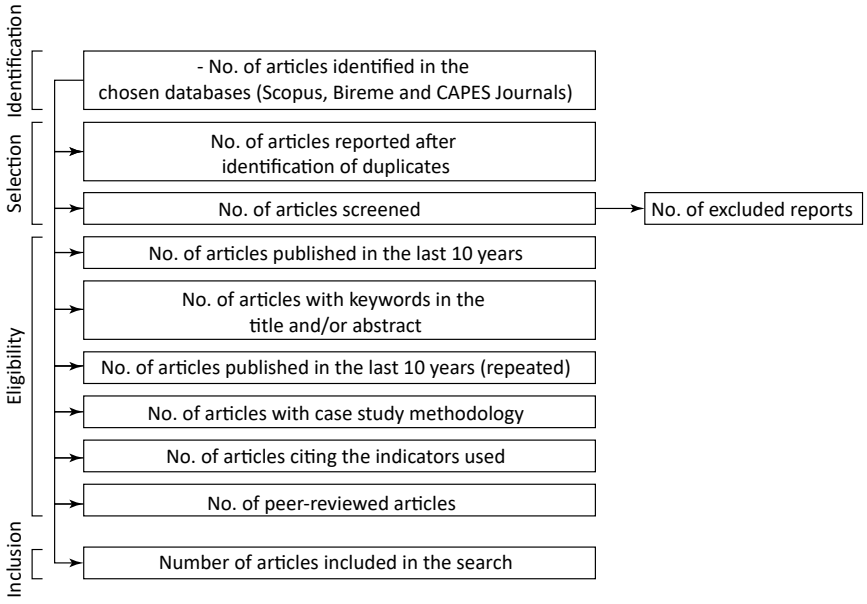

Figure 1. Article Selection Flowchart

Data Management

After applying the search string, 228 studies were found in the CAPES periodicals database, 102 in Scopus, and 14 in Bireme, initially totaling 344 studies.

After applying the inclusion and exclusion criteria, 28 articles remained, thus composing the present systematic literature review.

3. RESULTS AND DISCUSSION

The purpose of risk factor assessment within occupational health and safety is to ensure the protection and safety of occupationally exposed individuals (Gul, M., Ak, M.F., 2018). It also aims to minimize the possible losses and damages resulting from factors related to the process, workplace, and workers' activities, and to contribute to greater business productivity and competitiveness (Alves, J.L.L., Junior, L.C.M., 2013). Alves and Junior (2013) state that the elements available in relation to Occupational Safety and Health (OSH) confirm how necessary it is for organizations to implement a management system applied to this topic. Moreover, according to these authors, companies need to progress with respect to the safety management system, not only those that have a strong safety culture and want to achieve excellence, but also those that do not have a strong culture (Heras-Saizarbitoria, I., Boiral, O., Arana, G., Allur, E., 2019). In this context, the term OSH culture emerges as a determining factor for the developed programs to achieve satisfactory results, this being one of the prime factors of the OSHMS.

In **Chart 1**, we present the authors, objectives, and year of publication of the studies that comprised the present review. It is noted the heterogeneity of the research objectives; however, the theme OSHMS transits in the center of the discussions.

Occupational Health and Safety Management Systems (OHSMS) when implemented in an organized manner, seek to prevent injury and illness among workers and provide safe and healthy workplaces (Górny, A., 2018).

OHSAS 18001 is a British standard focused on OSHMS that was internationally accepted (BSI. IB de N., 2017). However, in order to unify the particular information of each nation, the International Organization for Standardization (ISO) published in March 2018 the ISO 45001:2018 standard, which appears on the international scene with the main objective of preventing occupational risk factors and those related to health within organizations, betting on continuous improvement (ISO 45001:2018). It stands out in relation to its predecessor, OHSAS 18001, the claim to have a more accessible language for the service sector and to identify risks and non-risks, rethinking their definition and revising the concept of workplace and worker. In addition, it is an international standard (Yahya, R., Utami Handayani, N., Purwanggono, B., 2018).

Considering the recent publication of the international standard replacing the British one, the first observation is that it is not possible to determine which OSHMS operates more efficiently. **Chart 2** below shows that of the 26 papers reviewed, only two deal with aspects of ISO 45001, while the other 24 use OHSAS 18001 in their studies.

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Chart 1. List of authors, research objectives and year of publication

AUTHOR	STUDY OBJECTIVE	YEAR	Ref
Heras-Saizarbitoria *et al*.	Analyze the implication of OHSAS 18001 certification in the reduction of occupational accident rates.	2019	12
Anna Skład	Examine the impact of individual processes in the Occupational Health and Safety Management System on the effectiveness of this System.	2019	13
Adam Górny	Analyze the effects and applications of the ISO 45001 standard to model the manufacturing environment.	2018	14
Abolfazl Ghahramania, Simo Salminenb	Evaluate the effectiveness of OHSAS 18001 in improving safety performance indicators of occupational injury rate conditions, safety climate, occupational health, and safety.	2018	15
Hong Chee Chonga, T. Ramayaha,b, Chandrakantan Subramaniamc	Assess the impact of internal control on occupational safety performance.	2018	16
Esteban Lafuente, Jesús Abad	Investigate how the characteristics of operational processes-systematic and project-based-affect the impact of adopting safety management systems on different performance metrics.	2017	17
Abolfazl Ghahramani; Heikki Summala	Investigate the effect of OHSAS 18001 as a globally accepted OHSMS on the rate of occupational accidents in Iran.	2017	18
Dejana Dejanović; Milenko Heleta	Review Serbia's occupational health, safety legislations, and the requirements that airports need to fulfill for the Occupational Health and Safety at Work certification series and propose preventive measures for employee health and safety.	2016	19
Iraj Mohammadfam *et al*.	To evaluate the performance of Occupational Health and safety at work in some Iranian companies with OHSAS 18001 certification.	2017	20
Martha Isabel Riaño-Casallas, Eduardo Hoyos Navarrete, Ivonne Valero Pacheco	Analyze the impact on occupational accidents with the implementation of an occupational health and safety management system under OHSAS 18001.	2016	21
Metin Bayram; Mustafa C. Ünğan; Kadir Ardıç	Assess the relationship between accident costs, prevention and OHS performance, and employee satisfaction.	2016	22
Iraj Mohammadfam *et al*.	Evaluate the performance of Iran companies certified in OHSAS 18001.	2016	23
Umut Hulusi Inan, Sait Gül, Hafize Yilmaz	Build a Multiple Attribution Decision Making (MADM) model to determine and compare the OSHMS performance of companies.	2016	24
Abolfazl Ghahramani	Compare OHS performance in OHSAS 18001 certified and non-certified companies.	2016	25
Abolfazl Ghahramani	Identify potential areas for improvement based on the experience and perception of managers who worked in companies that are adopting OHSAS 18001 in Iran.	2016	26
G. Hrenov *et al*.	Analyze safety level in 11 companies in Estonia.	2016	27
Õnnela Paas, Karin Reinhold e Piia Tint	Investigate the safety performance in the Estonian manufacturing industry and explore the benefits of OHSAS 18001.	2015	28
Sunku Venkata Siva Rajaprasad, Pasupulati, Venkata Chalapathi	The study proposes the underlying theoretical framework to identify factors and help the management of Indian construction organizations to understand the interaction between the factors influencing the implementation of OHSAS 18001.	2015	29
Chris K.Y. Lo *et al*.	Examine the impact of OHSAS 18001 on operational performance through three theoretical lenses: Institutional Theory, Normal Accident Theory, and High Reliability Theory, and investigate how complexity and coupling moderate the relationship between OHSAS 18001 and operational performance.	2015	30
Õnnela Paas *et al*.	Analyze the OHSMS in 16 Estonian manufacturing companies (eight OHSAS 18001 certified and eight non-certified).	2015	31
Õnnela Paas, Karin Reinhold e Piia Tint	Assess, through safety audit, the extent to which OHSAS18001 contributes to actual and formal safety elements in manufacturing companies.	2015	32

Jesús Abad, Esteban Lafuent, Jordi Vilajosana	Examine the connection between OHSAS 18001 adoption and company performance.	2013	33
Di Fan; Chris K.Y. Lo	Investigate the impacts of voluntary occupational health and OHSAS 18001 certification on fashion and textiles on the financial performance of companies	2012	34
Lise Granerud, Robson So Rocha	Examine how certified occupational and health management systems hinder or support learning in the areas of Health and Safety.	2011	35
Beatriz Fernández-Muñiz, José Manuel Montes-Peón, Camilo José Vázquez-Ordás	Analyze the safety climate in organizations with the OHSAS 18001 standard, identify its dimensions and propose a structural equation model that will help determine the antecedents and consequences of employee safety behavior.	2011	36
M.N. Vinodkumar, M. Bhasi	Investigate the influence of certification in OHSAS on the relationship between safety management and safety performance in hazardous chemical industry with major accidents.	2010	37

Source: The authors (2020)

Chart 2. Relationship between Authors and the OSHMS used in their research

AUTHOR	NORM
Abolfazl Ghahramani	OHSAS 18001
Abolfazl Ghahramani	OHSAS 18001
Abolfazl Ghahramani; Heikki Summala	OHSAS 18001
Abolfazl Ghahramania, Simo Salminenb	OHSAS 18001
Adam Górny	ISO45001
Anna Skład	ISO 45001
Beatriz Fernández-Muñiz, José Manuel Montes-Peón, Camilo J. Vázquez-Ordás.	OHSAS 18001
Chris K.Y. Lo *et al.*	OHSAS 18001
Dejana Dejanović; Milenko Heleta	OHSAS 18001
Di Fan; Chris K.Y. Lo	OHSAS 18001
Esteban Lafuente, Jesús Abad	OHSAS 18001
G. Hrenov *et al.*	OHSAS 18001
Heras-Saizarbitoria *et al.*	OHSAS 18001
Hong Chee Chonga, T. Ramayaha,b, Chandrakantan Subramaniamc	OHSAS 18001
Iraj Mohammadfam *et al.*	OHSAS 18001
Iraj Mohammadfam *et al.*	OHSAS 18001
Jesús Abad, Esteban Lafuent, Jordi Vilajosana	OHSAS 18001
Lise Granerud, Robson So Rocha	OHSAS 18001
M.N. Vinodkumar, M. Bhasi	OHSAS 18001
Martha Isabel Riaño-Casallas, Eduardo Hoyos Navarrete, Ivonne Valero Pacheco	OHSAS 18001
Metin Bayram; Mustafa C. Üngan; Kadir Ardıç	OHSAS 18001
Õnnela Paas *et al.*	OHSAS 18001
Õnnela Paas, Karin Reinhold e Piia Tint	OHSAS 18001
Õnnela Paas, Karin Reinhold e Piia Tint	OHSAS 18001
Sunku Venkata Siva Rajaprasad, Pasupulati, Venkata Chalapathi	OHSAS 18001
Umut Hulusi Inan, Sait Gül, Hafize Yilmaz	OHSAS 18001

Source: The authors (2020)

S&G Journal
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It is evident from the analysis of the articles that there is no standard for structuring indicators for OSHMS. Investing in OSHMS will impact indicators closely linked to health and safety as well as financial and organizational indicators. Heras-Saizarbitoria et al. (2019) discuss the positive impact of OHSAS 18001 on the sales performance of 44 certified companies in the United States of America in the fashion and textile sector and a negative impact on the return on assets of the companies. They also state that a positive, but not very significant, effect of OHSAS 18001 certification on the financial performance of 50 companies in the Czech Republic was found. Similarly, Fan and Lo (Fan, D., Lo, C.K.Y., 2012) highlighted that the adoption of OHSAS 18001 has a positive impact on the company's fashion and sales performance related to textiles (Heras-Saizarbitoria, I., Boiral, O., Arana, G., Allur, E., 2019).

Dejanović and Heleta (2016) also point out that airport activities, for example, are one of the most important from the point of view of risk definition, and are defined as having the main objectives aimed at improving performance in occupational health and safety and, thus, the focus of actions is on activities with greater exposure to risk factors. Vinodkumar and Bhasi (2010) attribute to OHSAS 18001 certification the possibility of reducing accidents and thus improving productivity, safety, and employee health. Bayram, Ungan, and Ardiç (2016), in turn, adopt as indicators accident frequency and severity rates, numbers of accidents involving death or loss of limbs, and tangible damage and losses, these directly linked to the financial aspects of corporations. Lo et al. (2015) outlined as evaluated indicators abnormal safety performance, sales growth, and labor productivity (profitability) (Dejanović, D., Heleta, M., 2016; Bayram, M., Ünğan, M.C., Ardıç, K., 2017; Vinodkumar, M.N, Bhasi M., 2011).

Fernández-Muñiz, Montes-Peón, and Vázquez-Ordás (2012), for their part, point out that acts of "unsafe employees" and "human error" play an important role in generating workplace accidents. Additionally, they argue that human factors are critical to the success of health and safety programs, making employee behavior a vital issue that must be included in risk assessment. In the study, the results show that management commitment and particularly communication influence the mentioned indicators. These factors should be encouraged to reduce risks and improve the performance of general indicators in organizations (Fernández-Muñiz, B., Montes-Peón, J.M., Vázquez-Ordás, C. J., 2012). In the same vein, Górny (2018) shows that ISO 45001 can contribute to improvements in the way working conditions are managed, with positive effects on the quality of production processes. He also states that success in achieving the intended effects depends vitally on ensuring the active involvement of workers and company representatives. Rajaprasad, Pasupulati, and Chalapath (2015) point out that management commitment wields great power and the most influential factor is a structured safety policy that clearly establishes top management's commitment to occupational safety and health (Górny, A., 2018; Dejanović, D., Heleta, M., 2016).

Moreover, Riaño-Casallas, Navarrete, and Pacheco (2016) analyzed accident data collected from four companies in the petrochemical sector three years before and after OHSAS certification. From a document review and interview with the head of occupational health and safety, the researchers observed the degree of evolution of the management system from six indicators: policy, hazard identification, objectives and programs, operational control, performance measurement, and accident investigation (Riaño-Casallas, M.I., Hoyos, N. E., Valero, P. I., 2016). Ghahramani (2016) outlined constructs along with some indicators within them: Organization and Administration (safety policy, safe activities, people management), Participation, Communication and Training (staff participation, safety communication and training), Environment (physical environment, psychological conditions, risk analysis procedures), and Follow-up (accidents and occupational diseases, work capability, and social assistance) (Ghahramani, A., 2016). Hong, Ramayah, and Subramaniam (2018), meanwhile, evaluated indicators related to management commitment to the OSH program, employee involvement, safety training provided, and government regulations aimed at health and safety in companies. In this study, the indicators were related to safety performance through the application of internal control, with the use of audits, for example (Hong, C.C., Ramayah, T., Subramaniam, C., 2018). Auditing also makes up the indicators evaluated by Inan, Gül, and Yalmaz (2016) (İnan, U.H., Gül, S., Yılmaz, H., 2017).

The work environment to which the individual is inserted influences employee behavior, in that, although the immediate cause of accidents often involves human error, organizational and management factors imply incidents in all sectors. This aspect makes one realize that effective OSH leadership and strong management commitment to OSH becomes a prerequisite for safe behavior among employees and better performance of worker protection programs (Fernández-Muñiz, B., Montes-Peón, J.M., Vázquez-Ordás, C. J. (2012).

Lafuente and Abad (2018) evaluated the indicators "safety problems," "risk encompassed by organizational tasks," "safety knowledge linked to the adoption of OHSAS 18001," "work accidents," "work environment conditions," and "operational and economic performance of OHSAS 18001 implementation." As a result, they state that organizations modify existing safety practices to mitigate workplace accidents and safety learning effects vary widely across industry sectors. They also point out that orga-

nizations whose current knowledge is largely codified and processes are highly systematic benefit from safety knowledge and experience, while the effects of OHSAS 18001 are diluted in organizations whose knowledge is high, but processes make it difficult to see the consequences of occupational accidents (Lafuente, E., Abad, J., 2018). In the same vein, Mohammadfam et al. (2017) point to "management commitment", "employee involvement in OSH activities", "employee training", "hazard communication", "safety instruction", "accident investigation", "OSH inspection", "incentives and rewards", "corrective actions", "management participation in OSH meetings", "correct documentation of OSH rules and procedures", and "OSH promotion policies and risk assessment" as indicators (Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian, A., 2017). Paas et al. (2015) evaluate indicators of personnel management, safety activities in practice, communication, physical work environment and psychological working conditions. The indicator "training" is evident in many studies, so this aspect should be present as it is a point presented by ISO 45001 in its application guidelines (Paas, Õnnela, Reinhold, K., Hartšenko, J., Tint, P., 2015). Hrenov et al. (2016) state that the larger the company, the better the possibilities for regular training of workers by those responsible for occupational health and safety. They make it clear that safety knowledge management can enhance activities, thus increasing safety performance in companies (Hrenov, G., Paas, Tint, P., Reinhold, K., 2016). In addition, Granerud and Rocha (2011) point out that certified OHS management does not obstruct learning and can support it in an advanced way, showing that certification is not tied to the stagnation of training events (Granerud, R.L., Rocha, R.S., 2011).

However, Ghahramani and Salminen (2019) show that an OHSAS 18001 certification is not a guarantee for achieving good safety performance. They affirm that the characteristics of a certified organization, such as implementing and maintaining the requirements of the OHSAS 18001 standard, are a decisive factor for its effectiveness in improving safety performance. In the study, a positive effect was found in reducing occupational diseases, improving the safety climate and OHS practices. The indicators studied were "safety performance linked to occupational injury rate," "safety climate and health practices," and "occupational safety (Ghahramani, A., Salminen, S., 2019). Ghahramani and Summala (2017), in assessing the indicators leading the scenario and impact of occupational injuries, also show that implementing OHSAS 18001 does not guarantee safety improvement (Ghahramani, A., Summala, H., 2017). Still in the field of low effectiveness of OSHMSs, Heras-Saizarbitoria et al. (2019) conclude that OHSAS 18001 certification is only loosely related to better occupational health and safety performance measures in terms of occupational injury rates. It further identifies a "certain propensity" for OHSAS 18001 certification to be found in economic sectors of activities with the worst OHS rates (Heras-Saizarbitoria, I., Boiral, O., Arana, G., Allur, E., 2019). However, it is worth noting that Sklad (2019) states in his study that safety performance increased significantly under the influence of improving the leadership process, showing that leadership has a positive impact on its effectiveness. However, there is divergence among the reviewed literatures under a macro analysis, without considering specific characteristics of the studies (setting, financial investment, human capital, period of analysis, past history, etc.) (Skład, A., 2019). Mohammadfam et al. (2017) further point out that implementing OHSMS is only the first step in structuring and managing health and safety in the workplace. For this to be consolidated it is necessary to increase the acceptance of employees and other beneficiaries; moreover, their performances must be evaluated using the appropriate indicators. Nevertheless, Fan and Lo (2012) state in their study that the adoption of OHSAS 18001 had no positive impact on the performance of the indicators related to the company's return on assets (Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian, A., 2017; Fan, D., Lo, C.K.Y., 2012).

Paas, Reinhold, and Tint (2015) ponder that the OHSAS 18001 certificate does not automatically guarantee high safety activities in the company (Paas, Reinhold, K., Tint, P., 2015). However, following the OHSAS 18001 standard is an indication and incentive for systematic safety activity at all levels of the company and promotes a strong improvement process when put into use. In assessing the performance of Iranian companies certified by OHSAS 18001, Mohammadfam (2016) found that they have a better level of occupational health and safety. This underpins the argument that OHSMS plays an important strategic role in workplace health and safety (Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian, A., 2016). Abad, Lafuente, and Vilajosana (2013) tie improvements in work performance to the adoption of the OHSAS 18001 safety system; moreover, they show that OHSMSs are valuable investments with strategic implications because safety management expertise can become a key tool that can significantly improve safety and operational performance (Abad, J., Lafuente, E., Vilajosana, J., 2013). Granerud and Rocha (2011) point out that health and safety improvement practices depend mainly on the company's overall organizational process and do not arise automatically just by adhering to a standard (Granerud, R.L., Rocha, R.S., 2011).

S&G Journal
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SGSST performance indicators

Economic/Financial

Aspects related to the finances and economics of a corporation are the object of attention of managers, and this is nothing new. Decision making within companies largely considers the monetary impact it may have on the institutions. Strategies in all business spheres are instituted from the study of financial viability and its influence on the company's economy. When talking about investment in OSH and the implementation of an OSHMS, these aspects should be monitored through their own indicators, as pointed out by the indicators proposed by Heras-Saizarbitoria et al. (2019). Fan and Lo (2012) tracked OHSMS performance through indicators related to company sales and return on assets. Bayram, Ünğan, and Ardiç (2017) used indicators that tracked the financial impacts arising from workplace accidents, while Lafuente and Abad (2018) used indicators that related operational performance to economic (Heras-Saizarbitoria, I., Boiral, O., Arana, G., Allur, E., 2019; Lafuente, E., Abad, J., 2018; Bayram, M., Ünğan, M.C., Ardıç, K., 2017; Fan, D., Lo, C.K.Y.; 2012).

Production and Quality

Indicators on production are closely related to the economic-financial indicators of the institutions. However, production must be linked to quality requirements. Mindful of this, Górny (2018) measured the impacts of ISO45001:2018 in facilitating the manufacturing process by positively impacting their quality (Górny, A., 2018). Similarly, Fan and Lo (2012) tracked productivity and performance in the textile industry, and Riaño-Casallas, Navarrete, and Pacheco (2016) in the petrochemical (Riaño-Casallas, M.I., Hoyos, N. E., Valero, P. I., 2016; Fan, D., Lo, C.K.Y., 2012).

People Management

The indicators of an OSHMS related to people management cannot be based on outdated parameters focused only on monitoring absenteeism, for example. Today, companies have in their human capital their true wealth, and when it comes to OSHMS, the center of attention is on the workers. Therefore, a broad and deep understanding of the impact of an OSHMS on the processes involving human resources is essential. Paas, Reinhold, and Tint (2015) investigated general indicators of people management in the manufacturing industry (Paas, Reinhold, K., Tint, P., 2015). Ghahramani (2016) used indicators in his study that assessed people management within constructs that were composed of aspects of organization and management and related to workers' participation in OSHMS (Ghahramani, A., 2016). Similarly, Hong, Ramayah, and Subramaniam (2018), and Mohammadfam et al. (2017) verified indicators that pointed to workers' involvement in OSH performance as well as incentives and rewards that motivate them in joining programs. In contrast, Ghahramani and Salminen (2018) point to questions that assess the "safety climate" as indicators (Hong, C.C., Ramayah, T., Subramaniam, C., 2018; Ghahramani, A., Summala, H., 2017; Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian, A., 2017).

Communication and Training

Activities that aim to communicate and train workers are linked to people management practices. However, in some studies, these points were accompanied with independent indications as in Paas, Reinhold, and Tint (2015), Ghahramani (2016), Mohammadfam et al. (2017), Hong, Ramayah, and Subramaniam (2018), and Lafuente and Abad (2018) (Hong, C.C., Ramayah, T., Subramaniam, C., 2018; Ghahramani, A., Summala, H., 2017; Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian, A., 2017; Paas, Reinhold, K., Tint, P., 2015).

Ambient

The work environment can offer various hazards to workers. The actions and processes of an OSHMS need to focus on the environmental factors of companies. Aligned to this, Paas, Reinhold, and Tint (2015), Ghahramani (2016), and Lafuente and Abad (2018) proposed the monitoring of environment-related indicators to understand the performance of OSHMS and OSH programs (Lafuente, E., Abad, J., 2018; Ghahramani, A., 2016; Paas, Reinhold, K., Tint, P., 2015).

Accidents

Every OHS program aims to extinguish accidents in the workplace. Therefore, monitoring the indicators related to accidents is essential to verify the performance of an OSHMS. Bayram, Ünğan, and Ardiç (2017), in addition to the frequency of accidents, proposed indicators that assess their severity. Riaño-Casallas, Navarrete, and Pacheco (2016) further ponder indicators that evaluate hazard identification; Lafuente and Abad (2018) add indicators on task risks and Mohammadfam et al. (2017) on accident investigation and records, as well as risk assessment. In addition, Ghahramani and Salminen (2018) tracked indicators that highlighted workers' injury rates (Ghahramani, A., Salminen, S., 2019; Lafuente, E., Abad, J., 2018; Mohammadfam, I., Kamalinia, M., Momeni, M., Golmohammadi, R., Hamidi, Y., Soltanian,

A., 2017; Bayram, M., Ünğan, M.C., Ardıç, K., 2017).

Politics

Policies surrounding OSH within a company are necessary for the development of this culture among workers and the success of an OSHMS. As such, Riaño-Casallas, Navarrete, and Pacheco (2016), Ghahramani (2016), and Mohammadfam et al. (2017) cite policy as performance indicators (Riaño-Casallas, M.I., Hoyos, N. E., Valero, P. I., 2016; Bayram, M., Ünğan, M.C., Ardıç, K., 2017; Ghahramani, A., 2016). Also, Hong, Ramayah, and Subramaniam (2018) evaluated indicators regarding management commitment to OHSMS, similarly to Mohammadfam et al. (2017) (Hong, C.C., Ramayah, T., Subramaniam, C., 2018; Riaño-Casallas, M.I., Hoyos, N. E., Valero, P. I., 2016).

Indicators that assessed the psychological conditions of workers were also cited (Paas, Õnnela, Reinhold, K., Hartšenko, J., Tint, P., 2015). It is also noteworthy to present the indicators related to the monitoring of OHS and OHSMS programs, as mentioned the study by Ghahramani (2016). İnan, Gül, and Yilmaz (2017) cite audit-related aspects as indicators, similarly to Hong, Ramayah, and Subramaniam (2018), who point to audit indicators aligned to government regulations, such as regulatory standards (Hong, C.C., Ramayah, T., Subramaniam, C., 2018; İnan, U.H., Gül, S., Yılmaz, H., 2017; Ghahramani, A., 2016).

4. CONCLUSION

From the review carried out, it was possible to see that the indicators to monitor the performance of the OSHMS should be aligned with the practices of the company in question and that these indicators can encompass economic and financial, production and quality, people management, communication, and training-related categories; as well as reflecting the environment, accidents, and the OSH policy. It was also possible to realize that the results from the implementation of an OSHMS will be linked to how much the company gets involved with the system. The OSHMS culture must be aligned among all organizational spheres and must be subject to continuous training. However, there is still no scientific evidence to support the statement of which OSHMS (OHSAS 18001 or ISO 45001) operates best in the business scenario.

For future works, it is suggested that research be encouraged that seeks to follow the performance of the new international standard in OSHMS and that works as a basis for its improvement based on scientific findings, supporting, through evidence, the actions taken by managers in OSH.

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