

The Role of Knowledge Management for Industrial Safety Compliance

SHIH-MING PIⁱ, GHASSAN AL-ZU'BIⁱⁱ

The paper investigates the role of knowledge management in safety compliance in the industrial sector. The article reveals that problems with safety compliance have a negative impact on the enterprises' activity. It is emphasized that knowledge management, which has recently become a novel tendency in business, has a strong influence on the managerial activities of the enterprise. Different approaches to defining the concept of knowledge management are identified. The creation of knowledge management was supported by many political, social, economic and technological factors, including a broader spread of information technologies systems in companies, communication opportunities in computer networks, the segmentation and specialization of skills, the mobility of the workforce and intellectual assets as well as competitive problems in the business environment.

The article represents and analyzes most common and popular definitions of this concept. Safety compliance has a positive impact on the economic and non-economic activities of the enterprise. A systemic management approach to workplace safety and health in industries has been implemented for many years already. It was figured out that there is close relations between knowledge management and safety compliance. To be more specific the problems with safety compliance have a negative impact on the enterprises' activity, so safety compliance should become the priority of the enterprises' management. The article demonstrates what actions are needed for safety compliance applications and how they are connected with knowledge management steps. It was revealed that positive impact of security measures (renewable employment, stable development of the enterprise, better ecological performance) are connected with enhanced financial and non-financial results of the enterprises' activity and, as a result, with knowledge management.

Keywords: knowledge management, safety compliance, sustainable development, safety, knowledge application, industry, safety training.

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Introduction. According to the reports of the International Labour Organization, a common worker loses 7.4 days per year owing to industrial trauma or sicknesses caused by unsatisfactory workplace conditions [2]. Therefore, problems with safety compliance have a negative impact on the enterprises' activity. Numerous accident and injury reports in a variety of different (especially, in large-scale) industries have indicated the value of safety promotion. Researches state that the safety compliance measures (for example, decent work conditions, protective equipment if needed, training sessions, etc.) are significantly important, drawing extra attention to the problems with the existing legislative framework and industrial standards. It is also strongly important that enterprises take into account all past industrial incidents in order to keep workers up-to-date and deprive them of future challenging

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situations. Employees' behavior is well-known to be critical for safety in workplaces, especially in industrial ones. The present researches have identified how substantial safety compliance on the well-being of the workforce (sustainable jobs), renewable employment creation, and sustainable business organizations is.

Safety promotion is impossible without certain significant steps for its achievement. In recent years, more researches consider knowledge management as an important tool for safety compliance [11]. Primarily, effective knowledge management involves fast information sharing among employees. Surely, there are other, more advanced ways to improve safety compliance in the context of knowledge management, including training sessions, team-building seminars, decision-making lectures, etc. All these measures indicate the importance of knowledge management implication for security compliance in industry.

Problem statement. Many scientists have studied different approaches to managing safety compliance and the impact of safety compliance on the economic and non-economic productivity of the enterprise, including J. Ferreira, K. Mueller, A. Papa, R. Cerchione, W. Barley, J. Treem, A. Kianto, P. Heisig and others. However, there is a lack of researches concerning the role of knowledge management and its influence on safety compliance in the industry.

The purpose of the research is to investigate the role of knowledge management in safety compliance in the industrial enterprises.

The results of the research. According to K. North and G. Kumta, the novel economy is focused on awareness, which contributes in order to become more productive, to ensure the survival and growth of capital [9]. Awareness has a significant role in the information society, whereas the role of information becomes more important. Enterprises understand that information is an influential tool and must be handled with prudence. In order to remain successful, companies need to leverage expertise to become creative. Creativity and being well-prepared for transformations are the key elements of the economic prosperity of any society.

More than 20 years ago, a novel tendency in the managerial sphere appeared. The concept was created in the advisory community. It resulted through two causes that combined: understanding the value of an information and knowledge institution and the urgency of the internet as a resource for information-sharing and knowledge-sharing and almost instantly realizing the potential of the Internet, especially for far scattered enterprises. The evolution of this concept happened in three basic ways. The first one was highlighting emerging technologies with various advances in technological process. The second way was growing awareness among the managers about the importance of using knowledge when producing commodities. Improved understanding contributes to the adoption and usage of knowledge management tools.

Knowledge management is a new direction of strategic management, which allows satisfying certain targets. Its primary objective was to improve business results, expand competitiveness and increase the level of innovation in an era of globalization. These objectives can be achieved by a variety of tools and methods [1]. The use of knowledge management gives a variety of advantages to the enterprises. For example, companies get a chance to organize a safer and more convenient workplaces, where it is possible to observe higher level of cooperation among employees and employers. Besides, knowledge management allows to adopt different important decisions quickly.

The creation of knowledge management was supported by many political, social, economic and technological factors, including a broader spread of information technologies

systems in companies, communication opportunities in computer networks, the segmentation and specialization of skills, the mobility of the workforce and intellectual assets as well as competitive problems in the business environment.

Many scientists divide the concept of knowledge into two groups – tacit and explicit knowledge. Tacit knowledge is connected with personal experience and concern different personal aspects of knowledge perception, whereas explicit knowledge is a kind of knowledge, what may be pretty simply spreaded among employees. These kinds of knowledge are used in the enterprises for better planning of different activities connected with knowledge management. There are many ways how the knowledge management can be implemented in the common workplace. Tutorials, special training, courses (including, online ones) and lectures are basic forms of knowledge management tools.

Many approaches in defining the concept «knowledge management» exist. Most of them concern the wide variety of functions connected with the work with information and knowledge. In Table 1 most common definitions are represented.

Table 1

Definitions of the concept «knowledge management»
(adapted from [3], [4], [6], [7], [8], [10])

References	Definition
Dayan, R., Heisig, P., & Matos, F. (2017)	The consistent way of working with information, its processing, and evaluation in the enterprise
Gaviria-Marin, M., Merigó, J. M., & Baier-Fuentes, H. (2019)	The way of adjusting knowledge we have to solve diverse business challenges and figure out novel solutions by analyzing existing examples in this knowledge
Hussinki, H., Ritala, P., Vanhala, M., & Kianto, A. (2017)	A variety of individuals' actions, communications, sharing of knowledge (and information, primarily) in conjunction with expertise
Hwang, Y., Lin, H., & Shin, D. (2018)	The way of development, exchange, application of knowledge (and experiences)
Kianto, A., Vanhala, M., & Heilmann, P. (2016)	The complex process of knowledge development and its exchange in an enterprise
Rosenthal-Sabroux & Grundstein (2018)	A way of processing information that set up and work with awareness, works out different sources of information and provide the effectiveness of knowledge used in the long-run period

It is important to emphasize that all the definitions are united by the idea of knowledge management as a way of sharing not just information as a primary unit of knowledge, but also experience and expertise. It is also important to understand the difference between concepts of knowledge and information. Information is a variety of different facts, which, according to the context, have different meanings. Knowledge is a processed information with the emphasize on understanding and good perception. For example, R. Dayan, P. Heisig, and F. Matos figured out that both processing and evaluation are important when analyzing new information. A. Kianto, M. Vanhala and P. Heilmann emphasized that awareness is the basic part of different knowledge management approaches. They also consider knowledge

management as a tool for achievement different goals in different time periods. Y. Hwang, H. Lin, D. Shin gives an understanding that sharing both experience and expertise are as important as traditional knowledge and information. Other scientists gave a sense that knowledge management is either a result or process, which are directed on the achievement of certain targets.

Regardless of advances in knowledge management, a systemic management approach to workplace safety and health in industries has been implemented in many developed countries (including the USA, the United Kingdom, France, etc.) since 1989. Generally, the history of safety compliance started in the United States of America at the beginning of the 1970s, when a special bill on industrial safety compliance was adopted. After the adoption of this bill, different industrial standards about the safety of workers (first of all, the bill concerned people, who were employed in the large-scale industry) set up. This implementation has included developing mutual requirements that provide criteria for the safety compliance management system. The goal is not only to develop core business processes (including marketing strategies development, creation of product design, manufacturing, promotion, sales), but also to extend these concepts to finding new approaches to keep companies successful and optimize their creative characteristics.

Effective knowledge management for learning purposes is critical in a safety context and therefore to prevent mistakes. In different organizational environments where similar high-risk activities are conducted in many locations, the relationship between information sharing among employees and safety compliance may be especially significant. Different analysis studies have shown that the culture of protection was established in the area of management of HR and was reinforced by the influence of intellectual capital and ideas on the information in the context of the socio-technological paradigm of network operation.

Knowledge management is considered to have various significant steps for its implementation. The connections between knowledge management and safety compliance are demonstrated in Figure 1.

From Figure 1 it becomes obvious that safety compliance involves certain actions in safety training. These actions can have a direct or indirect impact on safety compliance. These include practices and skills; constant exchange of information; prevention of dangerous situations (for example, orientation on certain actions in the context of risk-management and providing an adequate reaction to dangerous situations), employees' involvement; actions, which are directed on the transformation of the employees' behavior; continuous improvement.

In this regard, such acts will take place through a number of processes and the use of information technologies, what means collecting experiences and disseminating information [5]. These steps allow providing employees' safety, which is the most important in the context of safety compliance. The health of workers itself leads to the economic and non-economic growth of companies, the security of employers, renewable employment, and the enhanced economic and non-economic effects of companies.

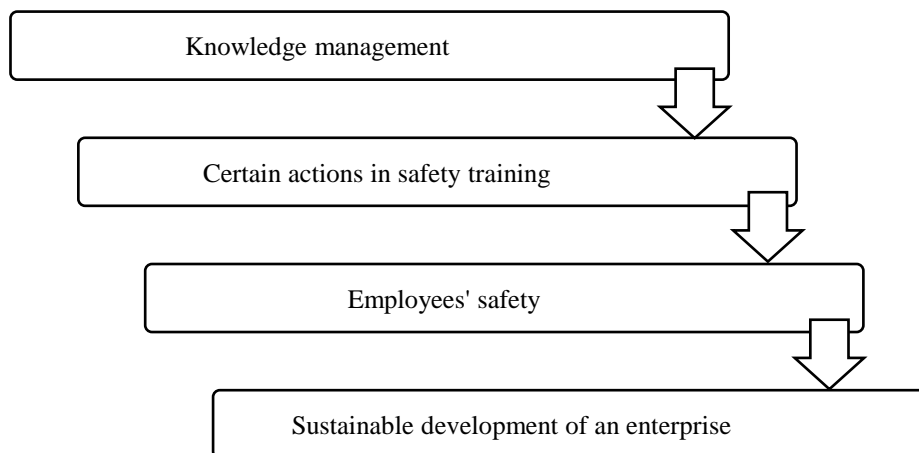


Figure 1. Connections between knowledge management and safety compliance

The interactions between knowledge management and safety training actions must be understood. In particular, efficient management of knowledge ensures compliance with safety through the quick exchange of information among employees. Table 2 demonstrates what actions are needed for safety compliance applications and how they are connected with knowledge management steps.

Table 2

Knowledge management steps and knowledge application

<i>Knowledge management steps</i>	<i>Knowledge application (for safety compliance implementation)</i>
Practices and skills development	Setting out the guidelines for certain competencies. Adoption of training courses. Development of preparatory materials
Information exchange	Organization of feedback connection within one enterprise. Setting up the certain tools (for example, online ones) for communication
Prevention of dangerous situations	Creation and certification of certain industrial standards. Adoption of documentation for risk evaluation. Certain rules and limits development
Performance measurement and evaluation	Setting up the system of monitoring. Providing analytics for existing data
Investigation of work-related accidents	Arrangement of transparent internal and external investigative measures
Actions, which are directed on the transformation of the employees' behavior	Carrying out certain actions for correction and prevention of similar cases in future. Analysis of the effectiveness of preventive and transformative action

Safety compliance has also a reversed interaction with knowledge management. Positive impact of security measures (renewable employment, stable development of the enterprise,

better ecological performance) are connected with enhanced financial and non-financial results of the enterprises' activity. In their turn, financial and non-financial assets of the firm have an important role in providing effective knowledge management.

Conclusions. In this research, the role of knowledge management in safety compliance in industrial enterprises has been investigated. It was revealed that problems with safety compliance have a negative impact on the enterprises' activity, so safety compliance should become the priority of the enterprises' management. Knowledge management is a new direction of strategic management, which allows satisfying certain targets, including improved business results, stronger competitiveness and higher level of innovation in an era of globalization. Many scientists divide the concept of knowledge into two groups – tacit and explicit knowledge. Tacit knowledge is connected with personal experience and concern different personal aspects of knowledge perception, whereas explicit knowledge is a kind of knowledge, what may be pretty simply spreaded among employees. It was researched that many approaches in defining the concept «knowledge management» exist. The most popular ones were represented and analyzed. It was emphasized that all the definitions are united by the idea of knowledge management as a way of sharing not just information as a primary unit of knowledge, but also experience and expertise.

It was detected that a systemic management approach to workplace safety and health in industries has been implemented in many developed countries for many years. Generally, the history of safety compliance started in the United States of America at the beginning of the 1970s, when a special bill on industrial safety compliance was adopted. The relationship between knowledge management and safety compliance is significant. Safety compliance involves certain actions in safety training. These actions can have a direct or indirect impact on safety compliance. These include practices and skills; constant exchange of information; prevention of dangerous situations (for example, orientation on certain actions in the context of risk-management and providing an adequate reaction to dangerous situations), etc.

The interactions between knowledge management and safety training actions were understood. It was revealed that positive impact of security measures (renewable employment, stable development of the enterprise, better ecological performance) are connected with enhanced financial and non-financial results of the enterprises' activity and, as a result, with knowledge management. Knowledge management creates a lot of opportunities for safety compliance of the enterprises, so it is important to continue researching in order to find out more about its advantages.

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Ши-Мин Пи, Гассан Аль-Зуби.

Роль управления знаниями для обеспечения промышленной безопасности

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В статье исследуется роль управления знаниями в обеспечении безопасности в промышленном секторе. В статье раскрывается, что проблемы с соблюдением норм безопасности оказывают негативное влияние на деятельность предприятий. Подчеркивается, что управление знаниями, которое в последнее время стало новой тенденцией в бизнесе, оказывает сильное влияние на управленческую деятельность предприятия. Определены различные подходы к определению концепции управления знаниями. Создание системы управления знаниями поддерживалось многими политическими, социальными, экономическими и технологическими факторами, включая более широкое распространение систем информационных технологий в компаниях, возможности коммуникации в компьютерных сетях, сегментацию и специализацию навыков, мобильность рабочей силы и интеллектуальные активы, а также проблемы конкуренции в деловой сфере. В статье представлены и проанализированы наиболее распространенные и популярные определения этого понятия. Соблюдение правил безопасности положительно сказывается на экономической и неэкономической деятельности предприятия. Системный подход к управлению безопасностью и здоровьем на рабочих местах в промышленности применяется уже много лет. Было выяснено, что существует тесная связь между управлением знаниями и соблюдением требований безопасности. Точнее говоря, проблемы с соблюдением правил безопасности оказывают негативное влияние на деятельность предприятий, поэтому соблюдение правил техники безопасности должно стать приоритетом руководства предприятий. В статье показано, какие действия необходимы для обеспечения безопасности и как они связаны с этапами управления знаниями. В работе выявлено, что положительное влияние мер безопасности

(возобновляемая занятость, стабильное развитие предприятия, улучшение экологических показателей) связаны с улучшением финансовых и нефинансовых результатов деятельности предприятий и, как следствие, с управлением знаниями.

Ключевые слова: управление знаниями, соблюдение требований безопасности, устойчивое развитие, безопасность, применение знаний, промышленность, обучение технике безопасности.

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Роль управління знаннями для забезпечення промислової безпеки

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У статті досліджується роль управління знаннями в забезпеченні безпеки в промисловому секторі. У статті з'ясовується, що проблеми з дотриманням норм безпеки чинять негативний вплив на діяльність підприємств. Підкреслюється, що управління знаннями, яке останнім часом стало новою тенденцією в бізнесі, чинить сильний вплив на управлінську діяльність підприємства. Визначено різні підходи до визначення концепції управління знаннями. Створення системи управління знаннями підтримувалося багатьма політичними, соціальними, економічними та технологічними факторами, включаючи більш широке поширення систем інформаційних технологій у компаніях, можливості спілкування в комп'ютерних мережах, сегментацію та спеціалізацію навичок, мобільність робочої сили та інтелектуальних активів, а також проблеми конкуренції в діловому середовищі. У статті представлені та проаналізовані найбільш поширені і популярні визначення цього поняття. Дотримання правил безпеки позитивно позначається на економічній і неекономічній діяльності підприємства. Системний підхід до управління безпекою та здоров'ям на робочих місцях в промисловості застосовується вже багато років. Більш конкретно, проблеми з дотриманням безпеки негативно впливають на діяльність підприємств, тому дотримання безпеки повинно стати пріоритетом управління підприємствами. У статті було з'ясовано, що існує тісний зв'язок між управлінням знаннями і дотриманням вимог безпеки. У статті показано, які дії необхідні для забезпечення безпеки і як вони пов'язані з етапами управління знаннями. У роботі було виявлено, що позитивний вплив заходів безпеки (відновлювана зайнятість, стабільний розвиток підприємства, кращі екологічні показники) пов'язаний з посиленням фінансових та нефінансових результатів діяльності підприємств і, як результат, з управлінням знаннями.

Ключові слова: управління знаннями, дотримання вимог безпеки, сталий розвиток, безпека, застосування знань, промисловість, навчання техніці безпеки.

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Tables: 2; *Figure:* 1; *References:* 11

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