E-LEARNING AS A SYSTEM FOR DISSEMINATING KNOWLEDGE ABOUT SUSTAINABILITY DEVELOPMENT MANAGEMENT IN A CHEMICAL ENTERPRISE

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Purpose: The aim of the article is to show e-learning as a system for disseminating knowledge about managing the sustainable development of chemical organizations.

Design/methodology/approach: A qualitative methodology was selected, which enables the study of the importance of an e-learning platform in managing knowledge about sustainable development in a chemical enterprise.

Findings: Literature studies allowed to development of the concept of an e-learning platform, the components of which are the processes of searching, discounting, and protecting knowledge about sustainable development, necessary for effective management in a chemical company.

Originality/value: Disseminating knowledge about sustainable development among employees of a chemical company is of practical importance. This article aims to fill a research gap in the field of acquiring, discounting, and protecting knowledge using an e-learning platform.

Keywords: E-learning, knowledge management, sustainability development, a chemical enterprise.

Category of the paper: Research paper.

1. Introduction

Contemporary organizations, especially chemical enterprises, face new challenges resulting primarily from the rapid development of information technology and the dissemination of the concept of knowledge management. Knowledge and its management are the key factors for the success of enterprises operating on the market today. One of the main characteristics of good management from the point of view of building unique competitive advantages is the company's ability to learn and transfer knowledge, especially in the area of sustainable development of the

organization. Nowadays, knowledge is becoming - on a micro-scale - a priority production factor and - on a macro scale - a determinant of technical progress. Sustainable development, although defined in various ways, can generally be understood as a relatively permanent process, based on stable and diverse foundations, bringing benefits not only to the organization itself and its creators or owners but also to the broadly understood environment. Sustainable development of organizations is a method of management in which economic, environmental, and social issues related to their functioning are taken into account simultaneously and equally.

The chemical industry, as one of the first branches of the national economy, started to implement the assumptions of conducting activities based on the search for solid attitudes of "sustainable development", leading to achieving profits while maintaining justice, a sense of security, and durability of ecological functions. Sustainability has been widely recognized as a core function of any chemical company. The products of the chemical industry are an inseparable part of social development, the approach of producers, both in terms of responsibility for the products themselves and for the production process, is changing towards increasing responsibility for employees and the natural environment.

Introducing modern programs and projects regarding environmental management in a chemical company and implementing clean and safe technologies requires launching the processes of searching for knowledge and its discounting in the process of communicating and educating employees.

Managing such development requires not only efficiency and accuracy in fulfilling the manager's functions and tasks but above all comprehensive observation of reality, analysis of processes taking place in every area of the organization's functioning, and creative use of resources and creating new concepts and trends for the organization's development. One of the tools enabling creative management of the organization's resources is e-learning.

The aim of the article is to show e-learning as a system for disseminating knowledge about managing the sustainable development of an organization.

2. E-learning as an instrument for disseminating knowledge in the organization

The dynamically changing reality poses new challenges to modern organizations. Globalization of markets, knowledge-based economy, information society, and increase in the level of competitiveness - these are the key factors determining the preservation and functioning of communities, businesses, and customers. The dissemination of new ICT technologies causes changes not only in the functioning of enterprises, but also in organizational structures, causing a new division of tasks, responsibilities, and competencies, and thus - proves the important role of education in the organization's strategy. There is no universal definition of e-learning.

Generally, they can be characterized as a controlled method of transferring knowledge (usually remotely), based on electronic media. E-learning is generally classified in three ways (Goyal et al., 2021):

- partial classroom learning - with this type of learning, the traditional classroom environment is provided to students as an infrastructure tool, and the rest is remote learning,
- distance learning - is a method of full distance learning with limitations of spatial and time units,
- smart distance learning anytime, anywhere (smart distance learning) - is the concept of teaching and learning methodology within this classification is further divided into different categories such as asynchronous and synchronous learning, blended learning, distance learning or Classroom 2.0, and intelligent learning.

Both e-learning and blended learning evolve from a new idea to a widespread, practical, and rational way of education. Blended learning training is defined as a combination of traditional and electronic training (blended learning), subject to various forms of education depending on the specificity of the subject (training content). Modern e-learning is conducted online or off-line in the internal network of the training institution (intranet) or via an external network (Internet), and recently also via mobile telephony (m-learning, mobile learning), often with the use of additional resources on information carriers (CD-ROM, DVD, etc.). In other words, e-learning and blended learning are "a modern way of transferring knowledge, controlling the learning process and obtaining feedback on assimilation.

The rapid development of the Internet and the progressing computerization of society enabled the creation and dissemination of the so-called e-learning platforms, i.e. software sets enabling online classes and remote service of trainees. E-learning platforms are extensive applications that facilitate the creation, conduct, and administration of educational courses. These are de facto integrated sets of tools to achieve more specific related goals with teaching, in particular course management and course resources. In principle, there is no consensus as to what specific functions an e-learning platform must perform. IT companies offering the purchase and implementation of solutions in the field of e-learning platforms literally define the e-learning platform as the so-called smart wardrobe, equipped with many clever shelves and drawers in which you can arrange various things. Some have encrypted locks and only those in the know have access to these places. Most importantly, however, every access to this secret "closet" is logged. Opening each drawer by users leaves a virtual "track" (*Co to jest platforma e-learningowa…*, 2023).

From the point of view of effective organization management, the e-learning platform should be considered as a component of knowledge management consistent with the sustainable development strategy adopted in the organization.

The concept of sustainable development implemented by organizations in the knowledge environment is part of the model of holistic knowledge management (SET KM Model), based on three pillars: (1) the organization's strategy, i.e. the strategic organizational concept of awareness, knowledge, and learning; (2) an environment for creating, sharing and using knowledge, depending on the organization and its partners, and objective factors; (3) knowledge tools conducive to effective management processes, including knowledge diffusion. The concept of sustainable development becomes particularly important in the era of knowledge society and economy because knowledge is the driving force for the universal development of individuals, organizations, and the entire economy. Knowledge is an intangible asset that plays a key role in the success or failure of any organization (Ooi, 2014, pp. 5167-5179). Organizations treat it as an instrument that enables them to compete effectively in the market (Mothe et al., 2027, pp.1-21).

A.M. Dereń, et al. (2022, pp. 1-16) proposed the concept of an e-learning platform dedicated to an industrial organization operating in conditions of sustainable development. The adopted concept is based on five coherent elements: a system of knowledge exchange in the field of sustainable development, a database of development problems, a database of development products, a recruitment system, a motivation system, and a database of employee experience. This concept not only provides broadly understood employee development but can also be a system for presenting, testing, and reporting knowledge. The recommended e-learning platform not only enables the management of talents and employee experience but is also a communication tool enabling the exchange of knowledge. The process of knowledge exchange is related to its acquisition, discounting, and protection.

3. A system of acquiring, discounting, and protecting knowledge in a chemical enterprise

Nowadays, knowledge, information, and data are the key strategic resources of every business organization. It is assumed that knowledge is confirmed belief. It is about beliefs and expectations. It is a function of a particular attitude, perspective, or intention, and it is about actions. It is context-dependent and relative (Lipczyński, 2014, p. 48). On the other hand, information captured as streams of messages is an instrument for discovering and building knowledge (Nonaka and Takeuchi, 2000a, pp. 80-81). Information transforms into knowledge when, in the process of interpretation, it gives context and is "anchored" in beliefs and human involvement (Nonaka et al., 2000b, p. 7). Data, on the other hand, are individual facts, statistics, or information, often digital.

Figure 1 shows the system of acquiring, discounting, and protecting knowledge in the organization as the key components of the e-learning platform for the exchange of knowledge in the organization. The purpose of this exchange is to increase the productivity of knowledge.
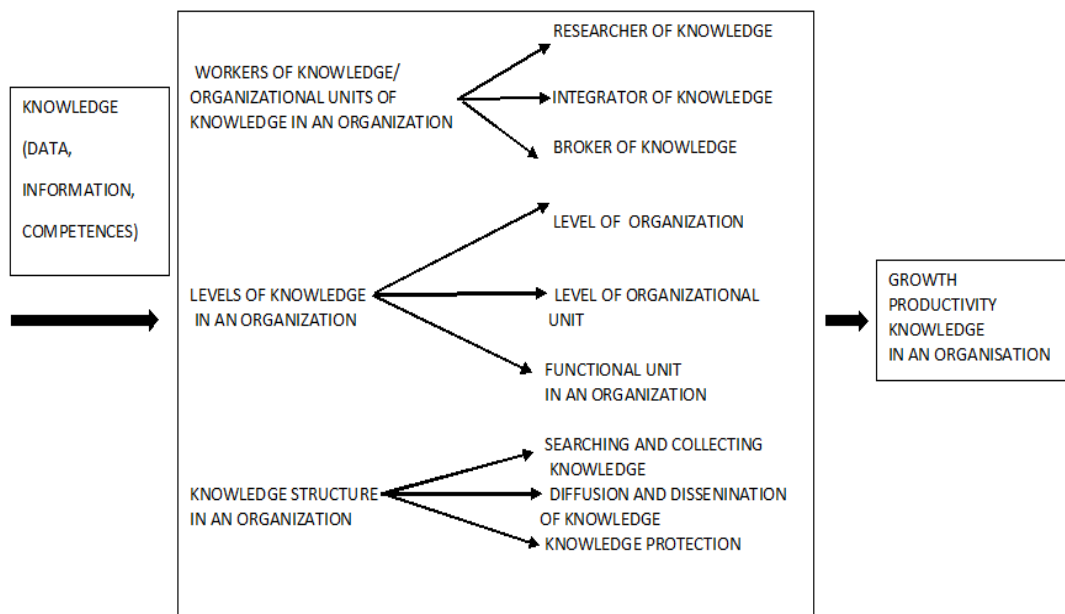

Figure 1. Acquiring, discounting, and protecting knowledge in a chemical enterprise.
Source: own study.

Knowledge productivity is the ratio of the effects to the expenditure incurred to obtain knowledge. In order to evaluate inputs, the indicator of the current state of resources and the costs of modifying knowledge resources should be determined. G. Probst et al. (2002) define the state of resources as employee skills, key competencies, connections with the knowledge environment, quality, and a number of competence centers and patents.

The exchange of knowledge is preceded by its acquisition. It is a process of knowledge flow from the organization's environment to its interior, as well as a process during which employees acquire knowledge from internal sources, i.e. from their co-workers, from documentation and databases, available books and magazines, and the media.

For this purpose, it is necessary to distinguish the levels of knowledge management in the organization (as a whole), in its organizational units, and in the performed functions, e.g. production, marketing, and innovation.

As part of the knowledge acquisition process, a number of sub-processes can be distinguished, such as knowledge discovery, knowledge generation, knowledge acquisition, identification of the necessary knowledge and knowledge gaps, identification of knowledge users, knowledge localization - identification of internal and external sources of knowledge and ways of obtaining it, evaluation of knowledge, knowledge assimilation - integration of external knowledge with internal knowledge, knowledge mapping, structuring and organizing knowledge (Wyrozębski, 2014, pp. 42-53).

Acquisition of knowledge can also take place by extracting it from competitors' products or processes conducted by them, for example by benchmarking. In addition, the acquisition of knowledge is also carried out through participation in training, conferences, and symposiums, as well as in an informal way during contact with other people. Social media are also an important source of knowledge, especially in terms of information on potential opportunities and threats.

Acquisition of knowledge also takes place through the purchase of advice and studies from consulting companies, especially in a situation where own human resources do not promise rapid development. However, the knowledge acquired in this way is not unique. This is the nature of knowledge created in an organization.

An active approach to knowledge acquisition involves searching the internal and external environment. This is about filtering and evaluating potential opportunities from outside the enterprise, including related and emerging technologies, new markets, and services, including those that can be exploited by combining them with existing employee competencies. Recognizing an opportunity in practice means a process of painstaking penetration of the environment carried out on several levels. It can be an operational-level initiative where marketing and technology managers learn about developments in their fields; it can also be a top-down initiative where subsidiary managers or professional equity funds are advised to monitor and invest in potential opportunities (Tidd, Bessant, 2011, p. 737).

The acquired knowledge should be discounted, i.e. its value must be used in the organization. This requires the codification of knowledge, i.e. giving it an appropriate organizational form, and facilitating access to it by employees who need it at a given moment. Codification of knowledge in its entirety is not always possible. Hence the need to create the so-called corporate guides or knowledge maps. They allow you to divide all your knowledge into three categories:

- basic (core) knowledge, necessary for the functioning of the company "here and now",
- advanced knowledge, allowing to create of competitive advantage in the market,
- innovative knowledge, allowing to distance competitors (Kłusek-Wojciszke, Łosiewicz, 2009, p. 145).

The e-learning platform enables effective discounting of knowledge by:

- converting data and information into knowledge, e.g. by identifying patterns,
- transforming texts into knowledge by means of syntheses, comparisons, and analyses,
- preserving individual knowledge into group knowledge, i.e. passing it on to employees,
- involving employees in knowledge, e.g. in the form of seminars, workshops, and training,
- connecting employees with other employees by creating professional and specialized thematic groups,
- integration of knowledge with knowledge by identifying and interacting with different fields of knowledge, e.g. in joint projects.

Knowledge discounting takes place with the active participation of knowledge researchers, knowledge brokers, and knowledge integrators. They form a group that bonds learning on an individual and corporate level. The functioning of this group facilitates the sharing and transfer of knowledge in the enterprise.

For the processes of transferring and discounting knowledge in an enterprise, its protection is of great importance. Knowledge is a strategic resource of every organization and a basic element of business processes.

The criteria for evaluating knowledge as a protected value, in its general stock, depend, among others, on factors such as:

- level of novelty,
- creative contribution,
- scientific, implementation, and market attractiveness, completeness,
- susceptibility to development,
- inspiring development,
- the ability to keep secrets,
- the cost of production or purchase,
- economic and non-economic benefits possible to obtain temporary and in the future,
- expected period of use,
- competitiveness in relation to existing knowledge, both protected and unprotected (Kotarba, 2006, p. 226).

The catalog of features indicated above is not complete, but it is a reference point for assessing the value of knowledge possessed by the company and implementing appropriate safeguards. Organizational knowledge protection should include the following areas:

- controls on the acquisition, production, and processing of information and knowledge,
- secure distribution of the resources in question,
- monitoring the "ways" of information and knowledge in the structure of a given organization,
- - staff training in security procedures (Materska, 2005, p. 17).

In the opinion of G. Probst et al. (2002) the protection of knowledge is to protect organization against the loss of this valuable resource and its unauthorized use experiences and information by competitors. Increasing awareness in the field of protection knowledge requires launching the process of its identification, building a strategic architecture and programming the company's goals, defining growth parameters and priorities development of new activities, developing a clear way of allocating resources supplying knowledge creation processes (Sołek, 2012, p. 93).

4. Conclusion

The concept of sustainable development is particularly important in the era of knowledge society and economy, because knowledge is a factor in the development of individuals, organizations and the entire economy. The concept of sustainable development implemented by companies in the chemical industry is part of the knowledge management model, based on the acquisition, discounting and protection of knowledge. A practical tool for implementing this knowledge management model is the e-learning platform recommended by the authors. Building and implementing an e-learning platform is a change that needs to be properly communicated and carried out in the organization. It is a process that should be preceded by a detailed strategic analysis in several key areas: business needs resulting from the emergence of the problem, its solution, analysis of recipients and stakeholders or partners (PESTEL analysis) and available resources. The e-learning platform is an innovative method of knowledge sharing and a stimulator of human resources development in the company, adapted to the individual capabilities of a given employee. Effective implementation of the skills development strategy in the organization requires the use of a modern e-learning platform that offers a sufficiently wide range of functionalities. The platform will largely automate the repetitive tasks of HR departments, enable tracking of training progress made by employees of the organization and will identify possible gaps in knowledge and competences, both in the individual and team dimension.

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