Technological Tools, KM and Innovation in SMEs

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Abstract: Knowledge management has emerged over the past decade as one of the key issues at the heart of modern organisations. Knowledge management as a process that supports an organisation in finding, selecting, organising and disseminating relevant information and expertise, essential for activities such as problem solving, learning, strategic planning and decision making. Knowledge management is an emergent system of organisational design and operational principles, processes, organisational structures, applications and technologies that help knowledge workers increase their creativity and ability to deliver commercial value. The issue of knowledge management is primarily considered in the context of large organisations. In contrast, relatively little attention has been paid in the literature to the specifics of knowledge management in small and medium-sized enterprises. The focus of researchers attention on large enterprises is partly due to the fact that the larger the enterprise, the greater the challenges regarding key knowledge management processes, including, for example, knowledge dissemination. Awareness of the organisation’s knowledge is higher in SMEs than in large organisations. Due to their size, SMEs do not have the same problems in communicating and disseminating knowledge within the organisation as large enterprises, so formal knowledge dissemination activities and processes are less frequently implemented. In addition, formal approaches to knowledge management use IT systems, which are costly and mostly designed for large organisations. Financial barriers and the different needs of SMEs therefore mean that formal knowledge management may not be fully implemented in SMEs. Therefore, it becomes important to examine the use of technological tools in knowledge management and their impact on the innovativeness of a company from the SMEs. The main research objective of the article is to analyse the use of technological tools for knowledge management in companies operating in the Polish SME market and their impact on innovation. Specific research objectives included assessing the level of ICT use in SMEs, identifying the level of employment of ICT specialists by SMEs, identifying the use of websites, social media and cloud computing by SMEs, identifying technological tools supporting knowledge management in SMEs, assessing the impact of technological knowledge management tools on innovation in SMEs. The research was conducted in 2022 using the CATI method among 600 randomly selected SMEs operating on the Polish market. The majority of SMEs do not employ employees with specialised digital competences. Such people are employed by less than 8% of small and 30% of medium-sized companies. The situation is completely different in large companies - almost 3/4 of them employ ICT specialists. Employers have a problem recruiting digitally competent employees. For this reason, outsourcing IT services is becoming increasingly popular, especially among small and medium-sized companies. Companies that use technological knowledge management tools are more innovative.

Keywords: Knowledge management KM, SME, Technological tools KM, Innovation

1. Introduction to Concept Of Innovation, Types of Innovation in the Era Of Industry 4.0 - Literature Research

In today's highly competitive manufacturing environment, companies are faced with the challenge of dealing with large amounts of data, the speed of making the right decisions or the flexibility of production processes (Griffin, Ebert, 2013). Especially the aspect of production flexibility is an important element here, as nowadays, the nature of production is shaped by paradigm shifts from mass production to on-demand, customer-oriented production (Gerwin, 1997). Such activities result in a shorter product life cycle, an increased product range, as well as a change of processes to those with high efficiency and a change of equipment and machinery to more flexible ones. The development of the technological process results in an increase in complexity in all areas of a company's activities. This leads to an increased demand for innovation in terms of new materials and technologies, innovative production processes as well as new business models as well as new business models. In order to meet the expected complexity of modern production systems, a new concept based on knowledge, technology and tools was created, simulating, optimising and monitoring existing production systems. The concept of Industry 4.0 first appeared in 2011 in Germany (Lee, 2013). It was assumed then that in the area of Industry 4.0, a company's production system would consist of an information system and numerically controlled machines that would operate autonomously and exhibit elements of artificial intelligence. However, it turned out that due to the specificity of production systems in different industries, the term Industry 4.0 cannot be generalised in principle (Lasi, Fettke, Kemper, Feld, Hoffmann, 2014). This means that the scope of the definition of Industry 4.0 must be considered individually, depending on the needs of the company in question. The concept of Industry 4.0 covers areas that include numerous technologies and related paradigms. In the literature, the concept of innovation is not unambiguous, there are many definitions of innovation (Weryński, Dońińska - Weryńska, Tokar, 2014). Innovation is perceived as products and phenomena or
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processes of technical, organisational, social or psychological nature. The best known and classic definition of innovation was introduced by J. Schumpeter, who considered it an innovation (Schumpeter, 2017):

- the introduction of new products or the improvement of existing products,
- introduction of new or improved manufacturing methods,
- creating a new market,
- the use of a new form of sale or purchase,
- use of new raw materials or semi-finished products,
- introducing new process organization.

Currently, the development of the business management concept has led to the creation and modification of new definitions of the term innovation. The Organisation for Economic Cooperation and Development defines innovation as the implementation of a new or significantly improved product or process, a new marketing method or a new organisational method into company practice (Oslo Manual, 2005). Innovation is treated as something new or significantly improved in some area (Yusuf, 2009). Currently, innovation is also defined as the process of creative use and transformation of knowledge, belonging to the organization or obtained from outside, as a new product, service or process (Cavagnoli, 2011). In companies, innovation becomes an interesting tool that can provide competitive advantage, enables development and gives independence, which can result in the expected success and financial benefits (Wielgórka, Trzepizur, 2015).

The systematisation of innovation concepts can be done according to different criteria. Innovations can be divided into: product, process, organisational and marketing (Hąbek, Wolniak, 2014). This method of division is also used by the Oslo OECD. Product innovation is the introduction to the market of a product or service that is new or significantly improved in terms of its characteristics or applications. These include significant improvements in technical specifications, components and materials, embedded software, ease of use, or other functional characteristics. Process innovation occurs within a process and is the implementation of a new or significantly improved production or delivery method. These are significant changes in technology, equipment or software. Their purpose may also be to reduce production costs. Marketing innovation is the implementation of a new marketing method, involving significant changes in product design or construction, or in packaging, distribution, promotion or pricing strategy. The objective of a marketing innovation is to better satisfy customer needs, open new markets or reposition the company's product on the market to increase sales. Such innovations include changes in product design. An organisational innovation is the implementation of a new organisational method in the principles adopted by the enterprise, in the organisation of the workplace or in its relations with the environment. The purpose of such innovations may be to achieve better results by reducing administrative or transaction costs or to increase the level of job satisfaction. Such innovations also include gaining access to non-traded assets or reducing supply costs. These are routine activities and procedures that regulate the operation of a company (Oslo Manual, 2005). Innovations can also be divided into tangible and intangible. Tangible innovations are products, devices, works of art, books, etc., while intangible innovations are ideas, concepts, new methods or theories, etc., expressed in words or symbols or images (Sżatkowski, 2001). Innovations can also be divided due to the marketing approach. One can continue one's consumption behaviour, and minor changes only concern the benefits offered by new products appearing on the market (Karcz, 2007). Innovations can also be divided, according to the scope of the effects they cause, into strategic and tactical innovations. Strategic ones concern innovative undertakings of a long-term character. Coupled innovations are the most frequent, as the complexity of technology, technological progress and high costs of R & D force the creators to cooperate and work together with various institutions (Janasz, Kozioł-Nadolna, 2011). An interesting division of innovation is presented by D. Smith, who takes into account such criteria as: the impact of innovation on the system and the type of knowledge used. From this point of view incremental innovation, modular innovation, system architecture innovation and radical innovation are distinguished (Smith, 2006). Incremental innovation is a change that improves components in the system but does not change its structure. Radical innovation, is new elements in the system and their new configuration. Radical innovation in the strategic sense would have to be considered in action strategies and organizational processes (Therrien, Doloreux, Chamberlin, 2011). In classical economics, innovations are divided according to the criterion of the substitution effect of labour by capital. The above-mentioned divisions of innovation are difficult to distinguish unambiguously, one innovation may be classified in many types. For example, a technological innovation may at the same time be in another group as a breakthrough, tied, creative, or pro-environmental. Due to such an extensive classification of innovations, a certain scheme can be presented, which takes into account the general division of innovations, as well as the participation of the company in its creation.


2. Technological Tools KM in SME Enterprises

There is an accumulation of knowledge within the organisation, which is often not used by the organisation. This is due to the fact that knowledge is dispersed - individual organisational units create barriers to the free flow of knowledge; moreover, knowledge sharing is not always adequately supported by incentive systems and responsibilities (Bolisani, Scarso, Biolo, 2014). The authors point out that in practice there is a large discrepancy between the knowledge held and the ability to apply it (Zack, McKeen, Singh, 2019; Pfeffer, Sutton 2022). The reason for this is the lack of proven models and procedures that can serve organisations as a set of structured activities for implementation. The micro, small and medium-sized enterprise (SME) sector plays an important role in all economies around the world (Barroso, Ferreira, Meidute-Kavaliauskiene, Banaitiene, Falcao, Rosa, 2019). In Poland, there are 2.4 million non-financial enterprises, defined as active enterprises, of which 99.8% are enterprises included in the SME group (according to data for 2021 of the Polish Central Statistical Office (GUS). In recent years, entrepreneurship in Poland has been characterised by three distinct trends. Firstly, over the last few years it can be seen that the entrepreneurship of Poles is not waning. The number of enterprises is growing dynamically. Secondly, the quality of Polish entrepreneurship is improving. Polish companies as a group are contributing more and more to social welfare. The data show that they produce an increasing proportion of Polish GDP. The average company is growing steadily in economic terms. Its productivity, as measured by revenue, added value and production, is increasing. Trends also point to an improvement in the structure of companies from the point of view of legal forms. The share of companies as legal entities is increasing and that of physical persons is decreasing. Thirdly, the openness of entrepreneurs and their orientation towards growth is increasing. Companies, although still too seldom, are internationalising more and more - the proportion of exporters and the average value of exports are systematically increasing, as well as the use of the advantages of an online presence. Polish companies are also investing more and more and developing and implementing innovations, although the scale of development activities is still not high.

In the most general manner, knowledge management (Pritchard, 2010) is defined as a management method, the basic aim of which is the unconventional development of competitive advantage (Glabiszewski, Sudolska, 2009) by contemporary operating enterprises, including non-profit organisations (Perechuda, 2005). The great supporters of the knowledge management concept are T.H. Davenport and S.C. Völpel, who pointed out, however, that knowledge management primarily plays an important role in improving methods of creating new knowledge, and then in its proper dissemination and use (Davenport, Völpe, 2001). Another definition of knowledge management is proposed by P. Murray and A. Myers, who presented it as a sum of processes enabling the creation, dissemination and use of knowledge, in order to achieve the goals set by the organisation (Strojny, 2000). Knowledge management was also characterised by D.J. Skyrme, who described it as a precise and systematic management of knowledge resources and the related processes of creating, collecting, disseminating and using knowledge to ensure the organisation's proper functioning (Skyrme, 1999). Providing the right conditions to support the implementation of such a system into an organisation depends largely on a number of factors, among which the following stand out: adequate resources, the right management system and organisational structure (Liczańska-Kopcewicz, 2017), appropriate organisational culture and communication, and a properly designed organisational strategy. However, knowledge management is still a young concept and not widely used by organisations (Dayan, Heisig, Matos, 2017). For this reason, knowledge is still a resource that, when properly used, can contribute to a given company's competitive advantage in the market (Centobelli, Cerchione, Esposito, 2017).

Implementing knowledge management in an organisation is not an easy task, which is influenced by the fact that the issue involves IT processes, human resources, possible modifications to organisational culture and, depending on the business profile, other elements relevant to the organisation. In most cases, the literature on knowledge management does not devote much space to issues related to implementation, and the implementation of a knowledge management system in SMEs hardly (Barroso, Sanguino Bañegil, 2013; Chawan, Vasudevan, 2013; Clercq, Thongpapanl, Dimov, 2014; Wong, 2005). Knowledge in small and medium-sized enterprises cannot be created according to the same procedures as in large organisations, which results from the small potential in terms of human resources, capital, technology and development. The knowledge management system should prevent the loss of knowledge possessed by the organisation, but should also create knowledge within the existing resources. This system must be an attempt at a holistic approach to organisational phenomena and processes. The management of an organisation must independently create a knowledge management system in its organisation, adapted to the specifics of the enterprise and its human and financial capabilities (Cheng, Kuan, 2014). An attempt to comprehensively implement knowledge management in an SME must, taking into account the scale, cover such areas as the IT system, organisational
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culture and employee management. The functioning of modern SME organisations requires constant adaptation of management methods and development strategies to new business conditions. This is particularly important in the process of digital transformation, which has been making significant transformations in the area of the economy for some years now. This also applies to the issue of knowledge management in business organisations, which can be considered in the area of organisational structures, business processes, personnel, organisational culture, but also in the area of ICT supporting this management. This means that under conditions of extreme competitiveness as part of the digital transformation, the management methods used so far, which are aimed often aimed solely at ensuring stability and predictability, with help comes advanced ICT solutions for knowledge management (Preuss, Cordoba-Pachon ,2009), understood as systematic and knowledge, understood as a systematic and organised use of its resources to improve the functioning of the organisation, realised within the framework of the process orientation by (Unold, 2015):

- knowledge location and acquisition,
- collecting knowledge and processing it,
- its enrichment and sharing.

The knowledge management system consists of the following elements:

- knowledge management strategy - indicating priorities for action, defining the role of knowledge management in the process of achieving the organisation's strategic objectives,
- people and organisational culture - the willingness of employees to share knowledge, supported by organisational culture,
- business processes - the process orientation of the organisation to effectively collect, share and retrieve knowledge,
- information and communication technologies - these provide users with information and communication technologies - these provide users with effective collection, processing and sharing of data (transformed into information and further into knowledge).

In practical terms, this means the need for modern ICT solutions for knowledge management, enabling the support of business processes as part of gaining and strengthening competitive capabilities. During evolution of the information society towards a knowledge society it boils down to treating modern enterprises as intelligent organisations intelligent. An intelligent organisation is one that bases its operating philosophy on the management of knowledge (Waltz, 2003). The term became widespread in the 1990s. due to the development of ICT, the dynamically changing economic environment and increased market competitiveness. An intelligent organisation is an organisation learning organisation, which has the ability to create, acquire, organise and share knowledge, use it to improve the efficiency of its operations and sharing it, using it to improve operational effectiveness and increase competitiveness in the global market. The idea of such an organisation is based on a systemic approach to the organisation, i.e. treating it as a complex organism based on existing structures and implemented processes with particular emphasis on the role of knowledge. Attributes of smart organisations include (Beckford, 2016), (Grösser, Zeier, 2012), (Schwaninger, 2010):

- speed and flexibility of action,
- the ability to observe the environment,
- the ability to diagnose market signals early and respond to changes in the environment,
- the ability to quickly implement new knowledge-based solutions and thereby achieve the economic benefits.

Network technology - understood as a set of network connections, mechanisms responsible for the coordination of all processes related to data exchange. This technology consists of two layers: a first hardware layer realised through. The first layer is hardware, implemented by servers, network connections and a number of tools related to synchronisation of the network synchronisation, and the second layer represented by software designed to implement the above-mentioned activities. Web technology - understood as a technology combining database technology. Web technology is implemented through websites and any mechanisms related to the representation of data on websites. The Websites present data, information, knowledge from various sources, often accumulated in many databases and files, sources, which are often combined in multiple databases and files. By means of web technology on websites equipped with the appropriate applications the web technology provides tools to share information and knowledge. Web technology provides tools for a range of knowledge management processes, such as: knowledge sharing.
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between experts, discussion forums experts, discussion forums, corporate portals and many others. However, it is important to remember that the foundations of web technology most perceived by users are database technology and network technology.

Each of the aforementioned technologies enables the implementation of multiple knowledge management functionalities. Many times, knowledge management tools are based on all three technologies.

3. Research on technological tools KM and innovation in SME enterprises

A comprehensive survey based on an interview questionnaire, categorised as quantitative research, was conducted in 2022 and the data obtained were analysed using statistical methods. The aim of the survey was, inter alia, to analyse the use of technological tools of knowledge management and their impact on innovation in the sector of micro, small and medium-sized enterprises in Poland. The study addressed, inter alia, the following issues:

- the level of ICT use in SMEs,
- identification of the level of employment of ICT specialists by SMEs,
- identification of the use of websites, social media and cloud computing by SMEs,
- identification of technological tools to support knowledge management in SMEs,
- assess the impact of technological knowledge management tools on innovation in SMEs.

Interviews were conducted with owners, co-owners and persons responsible for management in the segment of SME companies in Poland, from various industries. 600 randomly selected companies from the SME sector operating in the Polish market, which 40% were micro-entreprises employing up to 9 people, 30% small entrepreneurs employing up to 49 people, and 30% medium-sized entrepreneurs employing up to 249 people.

The structure of the survey was weighted to the structure of companies in Poland according to the region database operator (Central Statistical Office). The research sample prepared in this way enables the analysis of data at the level of the entire SME population in Poland. The survey has been carried out using the CATI (Computer Assisted Telephone Interview) method in 2022. It is one of the methods of collecting information in quantitative research. The CATI survey was conducted using a special program that assisted the person calling the respondent throughout the conversation. The interview questionnaire consisted of a core part (relevant questions) and a metric (classification questions). The main part of the questionnaire aimed to obtain information on knowledge management in SMEs. The questionnaire included information about the surveyed enterprises: number of employees, income, balance sheet total, legal form, type of activity according to PKD, period of operation, official position of the person completing the questionnaire. The surveyed companies gave answers to particular groups of factors according to the following scale 1 - unimportant factor, 2 - unimportant factor, 3 - moderately important factor, 4 - rather important factor, 5 - very important factor.

After receiving the results, the points were added up and the share in the total number of points possible was quantified (number of interviews received x 5).

![Figure 1: Computer Equipment, Internet Access in 2022 in SMEs?](image)

Computer equipment has a significant impact on the use of technological knowledge management tools. In the 2022 surveyed, the percentage of SME companies using computers remains high at 98% in the medium
enterprise sector, 95% in the small enterprise sector and 92% in the micro enterprise sector (figure 1). The highest level of internet access is found among medium-sized enterprises reaching 99% in mobile internet access, the lowest level was reached by micro enterprises 92% in internet access. The majority of micro, small and medium-sized enterprises do not employ staff with specialist digital skills. Such people are employed by less than 2% of micro, 8% of small and 30% of medium-sized companies. The situation is quite different in large companies - almost 3/4 of them employ ICT specialists. Employers are struggling to recruit digitally competent employees. For this reason, outsourcing IT services is becoming increasingly popular, especially among small and medium-sized companies. Business managers also recognise that it is more cost-effective to partner with one specialised and experienced external provider than to develop an in-house IT department. 88% of medium-sized companies had their own website, 64% of small companies had their own website and micro companies fared the worst at 16%. Most enterprises see their website as a marketing tool. Most often, the website is used to present the company’s products, catalogues, price lists of products or services (69% of all companies). Another popular function, especially among larger companies, is posting information about job vacancies. Company websites also make it possible, among other things, to place orders and check their status online. One of the least frequently used website features by companies is its personalisation for regular users.

More than a third (36%) of the companies surveyed in Poland used at least one social media, which is a result of both a greater awareness of the power of the media themselves and the hiring of communication and marketing specialists, as well as higher budgets for promoting their own offerings. Social networking sites are used in the majority of cases, with blogs and media sharing portals being used to a lesser extent.

Figure 2: Use of Social Media in Surveyed SMEs

Considering the size class, medium-sized companies were the most likely to use social media 68% (figure 2). Social media is increasingly becoming the main channel for maintaining customer relationships. Some companies are abandoning telephone contact in favour of email or social networks. The rise in popularity of the latter has meant that they are increasingly used by companies to promote products and brands. This allows them to create a group of loyal customers and effectively attract new ones. By communicating on social media, companies encourage customers to share ideas, gaining knowledge that is then used in the creation or development of products and services. Increasingly, social media are being used in the recruitment of employees. It is also successfully becoming a tool for improving communication within the company, enabling the exchange of knowledge, opinions and ideas among employees.

Cloud services make it possible, especially for micro and small entities, to take advantage of the latest technological solutions without having to invest large amounts in the purchase of software and IT infrastructure, providing flexibility and optimal support for their development. Among the benefits that a company can achieve by using cloud services, there is also a reduced need for office space and a reduction in the number of IT support staff in the company. According to the companies surveyed, 35% of medium-sized companies, 18% of small companies and 4% of micro companies used cloud computing services. The most common reason for companies not using cloud computing services was insufficient knowledge 46% of the total number of companies. The digitalisation of business is unequivocally associated with positive changes also in knowledge management. It significantly increases work efficiency, improves communication and group activities, and allows for better customer service. The change of working style from analogue to digital means greater agility and competitiveness of the company. In an era of total digitalisation of life, being inactive in the
Implementation of new technologies is, from a business point of view, an action doomed to failure in the long term. Digitalisation is currently the most effective tool for managing and implementing innovations. Poland can boast one of the most dynamically developing economies in the European Union. Unfortunately, a feature of the domestic market is the low level of digitisation. In terms of the Digital Economy and Society Index (DESI), Poland is ranked 24th among 28 Member States in 2022.

Within the framework of technological tools supporting knowledge management, the surveyed companies indicated, among others, the following tools: Knowledge Bases, Business Intelligence, Case Based Reasoning, Content Management System, Data Mining, E-learning, E-Room, Executive Dashboard, Experience Data Bases, Extranet, FAQ, Discussion Forum, Data Warehouses, Indexing, Intranet, Web Directories, Mind Mapping, Electronic Mail, Corporate Portal, Employee Profiles, Project Snapshots, Ranking, Expert Systems, Document Management Systems (DMS), Videoconferencing, Search Engines.

Figure 3: The 6 Most Frequently Used Technological Tools of KM

The analysis carried out on the basis of the research demonstrates the wide variety of technological tools for knowledge management. The surveyed companies identified dozens of technological tools. The most frequently used included email 99% in the medium-sized enterprise group, search engines 96% in the medium-sized enterprise group, knowledge bases 88% in the medium-sized enterprise group. The pandemic period has meant that companies are increasingly using videoconferencing to communicate information. It is worth noting that technological tools support all organisational tools and activities, especially in territorially dispersed organisations. In fact, it is impossible to organise a conference without using e-mail or a document management system. The analysis of the research shows that technological knowledge management tools also significantly support the organisation’s business processes. Knowledge management tools support business processes such as:

- support of analytical evaluation processes,
- support of decision-making processes,
- acquisition, processing of analysed data (information, knowledge) from multiple sources.

This support is manifested in the provision of technological tools for knowledge management at different levels of sophistication. These tools provide, among other things, communication, coordination, logistics, management of organisational knowledge management processes, as well as efficient operational work and support for organisational knowledge management tools.

The next aspect of the research analysed is the impact of technological tools supporting knowledge management on innovation in enterprises. Following a tabular description of the classified tools, an analysis of the impact of the studied tools on innovation in enterprises was carried out based on the results of the interviews of the surveyed enterprises. The technological knowledge management tools most influencing the level of innovation (technological and in terms of organisational culture) of the surveyed SME enterprises were found to be: Good Practice Database, Knowledge Bases, E-learning, Discussion Forum, Groupware, Intranet,
Email, Corporate Portal, Employee Profiles, Expert Systems, Document Management Systems, Videoconferencing. The research conducted indicates that the tools most supportive of innovation were found to be those most frequently used in the day-to-day operational work of companies. In addition, the tools most supportive of innovation mainly in the area of organisational culture were found to be those used for communication within companies, i.e. those that build virtual communities, which was also influenced by the COVID pandemic. These tools contribute to transforming the specificity of work by creating virtual contacts between employees and are as important as face-to-face contacts.

4. Conclusion

Concluding the considerations presented so far, on the basis of the analysis carried out, it can be stated that the use of technological tools of knowledge management in enterprises of the SME sector currently plays a very important role. It facilitates and streamlines organisational processes, supports business processes, shapes organisational culture by changing the principles, forms, habits of cooperation and communication. The advantage of using modern technologies is the improvement of work efficiency and time savings resulting from, among other things, faster exchange of information placed in the cloud, information acquisition, improvement of the level of innovation. Digital solutions are also helpful in building customer relationships, enabling feedback on the quality of service or purchasing preferences. A great potential lies in the sector of small and medium-sized enterprises, which, lacking the possibility to employ qualified ICT employees and implement modern solutions, are threatened by digital exclusion, therefore, it is necessary to build awareness of the use of technological tools of knowledge management and their influence on the innovativeness of enterprises of the SME sector. However, building this awareness is a long, complex process and requires time for the enterprise. In the first phase of implementation, technological tools for knowledge management are most often perceived as mere technical applications, software, the implementation of which causes a lot of trouble, and only after a long period of use do they bring benefits, improvements in the way the enterprise operates. This is due to a number of factors, including ad hoc implementation of IT systems without a well-thought-out long-term strategy, lack of understanding of the change process associated with the use of knowledge management tools, communication errors accompanying the implementation and change processes, etc. However, in spite of the many difficulties, it is worth implementing technological tools to support knowledge management, as the benefits of the implementation process are very broad, they comprehensively improve the operation of SME enterprises, and many of these tools influence their innovativeness, which is very important in the times of Industry 4.0.

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