ANALYSIS OF THE TRENDS IN THE IMPLEMENTATION OF KNOWLEDGE MANAGEMENT SYSTEMS IN IT COMPANIES IN REPUBLIC OF NORTH MACEDONIA

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Abstract

In recent years there is an increasing need for "high" technology skills on a global level, that are critical for the success of many businesses. Acquiring highly qualified employees, as well as recognition and appropriate management of personal and organizational knowledge increases the business productivity. Poor knowledge sharing practices can damage businesses multiple times. This paper provides a comprehensive analysis of knowledge management in national and international IT companies in North Macedonia. The focus of the paper is on what companies do today, how they manage the knowledge of their employees and through which techniques or ways they could improve knowledge management to work more efficiently, more productively, achieve a competitive advantage in the market as well as launch quality products and services.

Keywords: Knowledge management, IT companies, Improvement techniques.

INTRODUCTION

Today, knowledge is one of the most important assets for business, especially within knowledge industries. Knowledge industries are dependent on knowledge and technology to generate revenue. The organizations that will truly excel in the future will be the ones that discover how to tap people's commitment and capacity to learn at all levels in an organization (Senge 2006). One of the key knowledge industries is the IT industry - where the company's success has a key dependency on the knowledge in order to produce and deliver good products. There are many challenges for these industries such as engaging employees with strong technical knowledge; possession of an extensive set of technical skills for timely and quality completion of project tasks; keeping up with new technologies and the latest trends to stay competitive requires continuous learning; investing time in new employees in order to prepare with the necessary knowledge; preserving knowledge when a

key expert leaves the company; spreading knowledge beyond the boundaries of project teams, in order to avoid teams re-learning the same things over and over again.

Knowledge Management (KM), as the process of defining, structuring, retaining and sharing knowledge of employees within an organization, can address these challenges. Knowledge Management reduces operational costs, increases employee responsiveness and satisfaction, increases quality, improves decision making and more - when knowledge is stored in a knowledge base, and that is easily accessible, and employees will not have to waste time searching across emails, chats and interrupting coworkers to get answers to repetitive questions. Knowledge management also helps to enhance talent management which basically deals with attracting, developing and retaining the key talent of an organization (Mahendher, et al. 2021). This concept of talent management has been a great value addition, employee retention and employee engagement (Abusweilem and Abualous 2019).According to Liebowitz, knowledge management is the process of creating value from organizational intangible capital" (Liebowitz 2005).

First step in the process of knowledge management is **discovering and capturing knowledge.** Based on the identification, the key knowledge that is needed by the teams and the organization as a whole, it is necessary to be captured in the process where the holders of the knowledge share their knowledge as well as the creation of new knowledge. After creating a knowledge base as a second step in the knowledge management process, the knowledge base is promoted across the company and stored knowledge is being shared and used by the company's employees. The use of the knowledge base brings many benefits, reducing development time on the one hand and increasing product quality, creativity, experimentation and innovation on the other hand.

Various information technologies and techniques can facilitate and support knowledge management activity and processes. Different information technologies and techniques applied in knowledge management give different effects in separate processes(Blazheska-Tabakovska and Manevska 2015).

The focus of the paper is knowledge management in the IT sector, opportunity and challenges and how the KM impact organizations at all. After the introductory part, the paper presents the impact of knowledge management on organization performance. Next section presents research methodology. Section Three gives an overview of KM practices in many IT companies national and international with offices in North Macedonia. Lastly, a conclusion will elaborate on the needs of novel approaches in IT companies in the knowledge age and outline future research directions.

IMPACT OF KNOWLEDGE MANAGEMENT ON ORGANIZATION PERFORMANTS

Peter Drucker was the first to talk about the importance of increasing the productivity of knowledge workers as the greatest managerial challenge of the 21st century, comparing it to the need to increase the productivity of manual workers in the 20th century(Drucker 1969).]. Ramos et al., highlight the use of knowledge management techniques to optimize business performance to generate competitive advantages for small and medium-sized enterprises (Ramos Cordeiro, et al. 2024).The organizations consider that the biggest benefit of the program of knowledge management is increasing the effectiveness and improving the quality of products(Blazeska-Tabakovska and Manevska 2012).

There are many research studies that found a significant impact of KM in the IT sector. The studies found that organizations that encourage KM are greatly rewarded in terms of performance by the employees (Mishra, Kumar and Bhardwaj 2021). Knowledge Management is considered as an essential tool to improve the competency among employees

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in IT companies. More devotion to accepting contemporary training is necessary to recognize and remove the weaknesses and improve employees' knowledge, skill, attitude, and cooperation (Mishra, Kumar and Bhardwaj 2021). Managers and executives who operate with this mindset should consider as high priority tasks those activities related to HRM (Human Resources Management) and KM, as they have a direct connection with the market offering and thus ultimately with the business performance (Schuler, Jackson and Tarique 2011). Knowledge Management provides the organization with best practices, cross-functional ideas and increases opportunities for innovation(Padhya, Satpathyb and Patnaikc 2021). Consequently, companies should rely not only on the knowledge of their people but they should also implement KM systems and tools to retain that knowledge, so that future employees can capitalize on it for new exploitation(Gope, Elia and Passiante 2018).

Knowledge management can enhance human capital in the organization, including knowledge acquisition, creation, identification, sharing, and practice. In order to facilitate knowledge sharing the organization should have conducive knowledge culture (Padhya, Satpathyb and Patnaikc 2021). The companies with more effective acquisition, sharing, and utilization of knowledge about the market can better understand market dynamism and create innovative products to satisfy customer and market demands (Lee and Tsai 2005). The obtained knowledge can efficiently assist companies in capturing changing customer preferences and product technologies.

Companies should rely not only on the knowledge of their people but they should also implement KM systems and tools to retain that knowledge, so that future employees can capitalize on it for new exploitation. The organizational learning capability affects product innovation performance (Alegre and Chiva 2008).

Knowledge transfer is one of the most difficult things companies do, and it is imperative for effective collaboration and teaming. Articulating a piece of information contained only in employees minds and translating it so someone else can internalize it is a remarkably complex task. In all company processes the transfer of knowledge is essential.

According to Nico Appel, co-founder of pagespeed.io, "Ensuring training and task assignments are closely linked, and also build on an employees' previous experience" is key to building a competent, effective team.

When employees have a clear understanding of what is expected from them, can see how they fit into the team and vision, and are given the tools and training to deliver; they feel secure. This feeling starts with onboarding and connection-making.

The knowledge management tools come in various types, each designed to serve different purposes as: Document management systems enable easy storage, organization, and retrieval of crucial files and documents; Collaboration platforms facilitate seamless teamwork and knowledge sharing among employees; Content management systems provide a central repository for creating, editing, and distributing digital content; Decision support systems help with data analysis and problem-solving; Social networking tools promote informal knowledge sharing and relationship building. Knowledge management tools can take many forms, from dedicated knowledge sharing tools to general-purpose solutions. The market has a lot of good knowledge management tools available such as Google Drive. Some of the most common examples of knowledge management tools are: Document Management Systems, Knowledge bases, Wikis, Intranet platforms, and Collaboration tools. Also closely connected with knowledge management are Guru, Confluence, Jira, Trello, Stack Overflow for Teams, Zoho Desk, Document360, GitHub, Microsoft 365 (Office 365) and Slack.

Implementing the right knowledge management tools, who assess company goals, can significantly enhance a company's productivity and overall performance.

RESEARCH BACKGROUND

According to fast technology development, IT companies must be flexible, nimble and fully streamlined, or they risk losing faith with their competition. So, most IT businesses design processes and train the workforce to be as agile as possible. One of the biggest problems in IT company is communication that slows down progress and throws projects out of whack rails and those breakdowns can be costly[1].

The best way for IT companies to manage this is to develop a knowledge management strategy. A successful knowledge management strategy provides the organization's planned and documented approach to centralizing the company's knowledge. It includes adopting a platform for knowledge engagement that provides a single, customizable search space for knowledge insights of the software organization.

Knowledge sharing within an organization, as the transfer of information, expertise and best practices, from one employee to another makes a big impact on the organization and it is important to be encouraged. Knowledge sharing is only effective when all employees are aware of and take part in the process. The companies may use different methods to encourage knowledge sharing among employees as formalize knowledge-sharing processes (implementing official processes, procedures, and policies that outline the what, why, and how), weekly team meetings, one-on-one meeting, mentorship, promote a learning culture: Trainings and workshops (cultivate an environment that encourages and rewards employees for learning) and team building.

Effective communication channels, formal and informal, are important for navigating and the smooth flow of knowledge(de Kok, Bellefroid and Helms 2013). Formal channels, such as reports, presentations, and documented processes, provide a structured foundation of knowledge. The best formal channel is knowledge sharing platforms that help make all important information and documentation easily accessible. Informal channels, like team meetings, brainstorming sessions, and even virtual coffee chats, add a dynamic and interactive element to knowledge sharing. The informal channels can be used for real-time problem-solving, clarification, and the exchange of different opinions. A well-defined organizational directory that outlines areas of expertise and encourages open communication is invaluable for knowledge sharing. This map empowers employees to connect with the right colleagues, tap into specialized knowledge, and collaborate more effectively (Wachstock 2024).

Another way that helps organizations and teams be more productive and obtain improved business outcomes, is employee training and development. Employee training and development can help employees become better at their jobs and overcome performance gaps that are based on lack of knowledge or skills. The benefits of such programs include: addressing weaknesses, improving the performance of employees, and boosting the company profile, reputation, and innovation. Several common training approaches have proven highly effective. Several common training approaches that have proven highly effective are lectures and computer-based training, instructor-led learning, on-the-Job training, video training, coaching etc.

Knowledge management strategy is most important for the onboarding process. Onboarding training as a process of supporting new employees provides them with the resources and knowledge they need to become productive in the role quickly, such as understanding their responsibilities, getting to know the company culture, how to use the company's resources, learning about the products of the company and much more. In the onboarding process, they connect with individuals in a team setting and watch team members

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[1]SHRM https://www.shrm.org/credentials/certification/exam-preparation/shrm-learning-system

talk to each other and communicate with each other. Personal connection is also an enormous benefit when new employees try to learn who to ask for what. When employees have a clear understanding of what is expected from them, can see how they fit into the team and vision, and are given the tools and training to deliver; they feel secure. This feeling starts with onboarding and connection-making. According to Lee and Tsai, the ability to learn is most important, the best way to onboard is actually to integrate continuous learning throughout the entire organization(Edmondson 2012).

Despite the benefits, organizations confront barriers in knowledge management processes. Knowledge management presents a number of challenges such as lack of time, hard accessible knowledge, unsupportive technology, out-of-date knowledge, resistance to organizational change, employee shortage, lack of knowledge sharing culture, knowledge silos etc.

The organization that practises knowledge management to achieve better efficiency needs to conduct a knowledge management assessment. The knowledge management assessment is a simple audit of every knowledge-related component in the organization with a primary focus on impact. The assessment discovers gaps in processes, team structure, or technology. Before starting to measure the impact, it is needed to do some research into the epistemology of the organization regarding its knowledge, knowledge processes, and knowledge productivity. The assessment method chosen will further depend on the perspective of knowledge management(Hulsebosch, Turpin and Wagenaar 2009).

In today's fast-paced business world, organizations are constantly seeking new ways and tools to enhance efficiency and improve knowledge management productivity.

RESEARCH METHODOLOGY

Research methodology is adopted to achieve our research objectives. This entails researching knowledge management experiences in 31 different IT companies, national and international, with different organizational settings to assess the current state of practice and expand the discourse in this area. An exploratory approach is well suited to our research objectives based on several reasons: to better understand the nature of organizational processes thereby providing an understanding of knowledge management practices across organizations; to directly examine and better understand their KM experiences, visions, practices and real challenges to manage the employee's knowledge; and to identify the KM tools in use.

The research involves multiple sources of evidence that converge on the same set of facts or findings. The survey with open-ended questions was combined with structured interviews in some organizations to confirm that the information presented in the survey was factual and representative of our discussions. Key decision makers within the organizations were interviewed to gain insights into their approaches to knowledge management, and the challenges. Notes were carefully taken, and evidence was preserved to support our research findings.

Data analyses

With survey was covered well-established companies in North Macedonia, national or international with offices in the country. Most of the company covered with research was with 1-10 employees (13) and with employees 11-50 (8). With 51-200 employees was 6 companies, with 201-500 was 3 companies and only 1 company had over 500 employees (Figure 1).
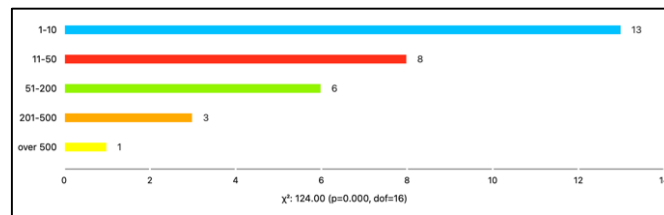
Figure1.Cart of company size (according to number od employees)

Knowledge management as explicit and systematic management of processes enabling vital individual and collective knowledge resources is crucial to be identified, created, stored, shared, and used from employees and customers. Most companies covered by research (16) don't follow precisely defined knowledge management procedures in daily operations and knowledge sharing happens in informal ways. The use of KM practices in some companies (8) depends on project tasks. Only 4 companies have embedded KM in workflows and 3 companies have defined the procedure which is following. The integration of knowledge management in daily operations is not closely related to the size of the company (Figure 2).
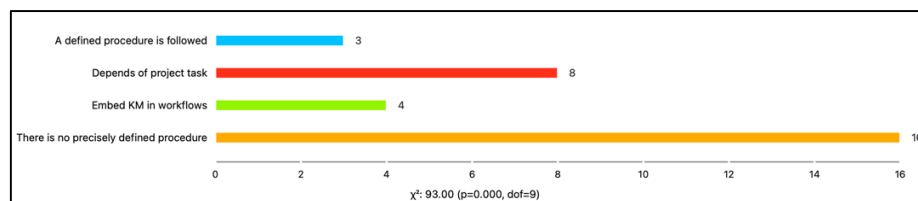
Figure 2a. Knowledge management practices
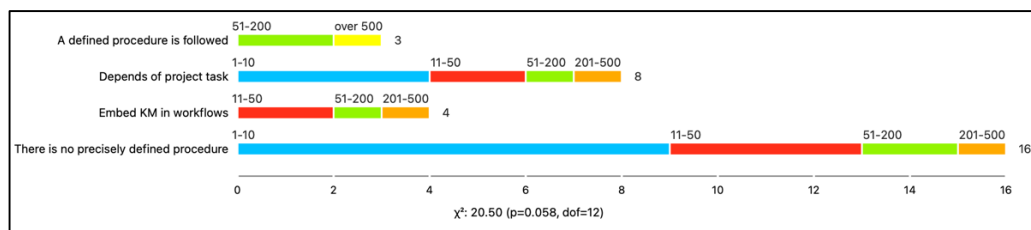
Figure 2b. Knowledge management practices: according to the company size

On the question what knowledge management tools the company currently uses there are different answers such as: Confluence, Trello, GitHub, Jira, Zoho Desk, Google Workspace, Slack and Microsoft 365. Confluence is used by companies of different sizes. Most companies (5) use Google Workspace and Trello. Also, some companies (4) use GitHub and Slack. 3 companies use Zoho Desk and 2 companies use Jira and 2 companies Microsoft 365. It is important to emphasize that most of the companies highlighted use no one tools for knowledge creation and sharing.
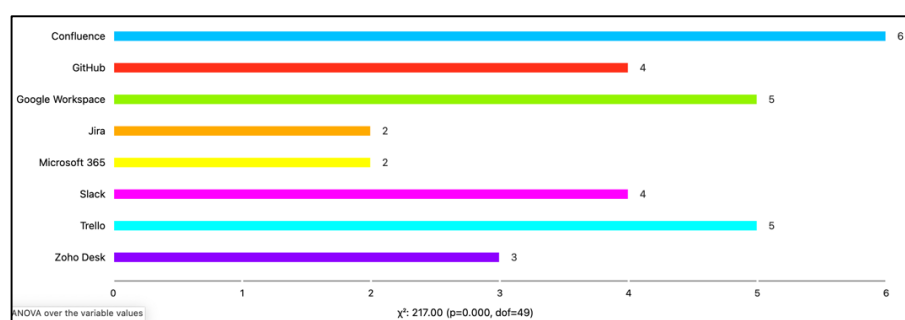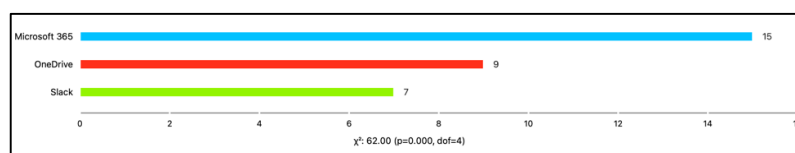

Figure3a. Application of knowledge management tools in company
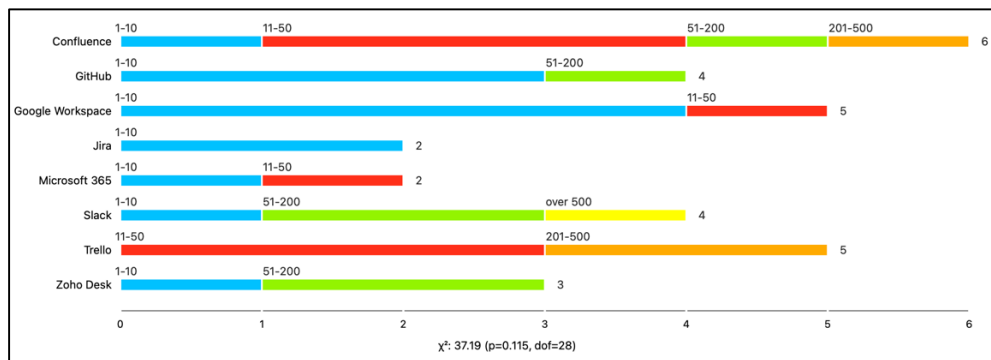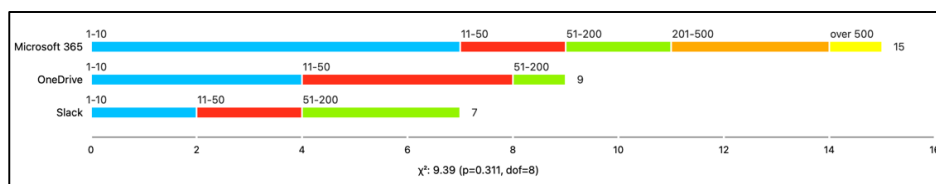
Figure 3b. Application of knowledge management tools in company: according to the company size

For content creation and sharing among employees the company declared that it uses Microsoft 365, OneDrive and Slack. The choice of the tool is not influenced by the size of the company.


**Figure 4a. Tools for content creation and sharing in company**

Figure 4b. Tools for content creation and sharing in company: according to the company size

Most of the companies covered by the research for collaboration and document sharing use Google Workspace (14). The biggest companies (with 51 employees and more), according to many different platforms and two (2) companies with 51-200 employees use SharePoint. Also, for collaboration and document sharing companies use GitHub (7).
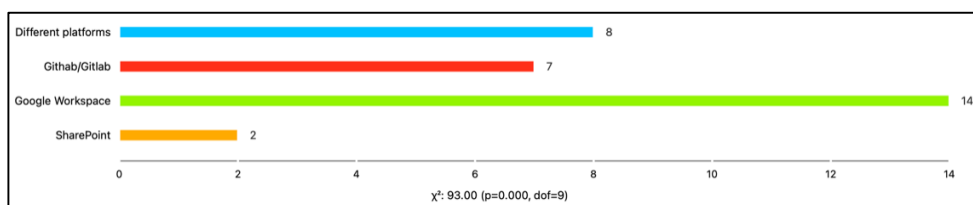
**Figure 5a. Platforms for collaboration and document sharing used by companies**
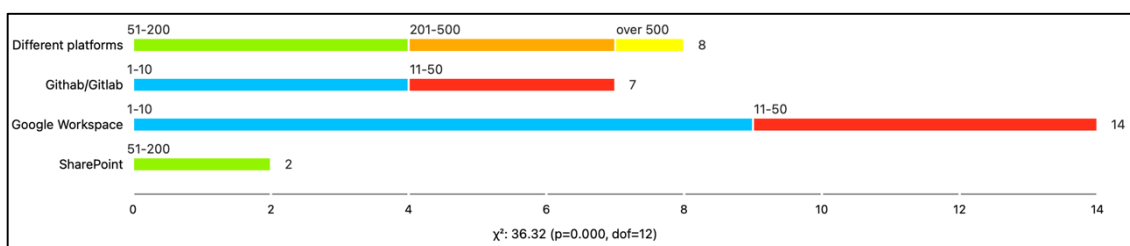
Figure 5b. Platforms for collaboration and document sharing used by companies: according to the company size

The companies use different methods to encourage knowledge sharing among employees. The most popular way of encouraging knowledge sharing among employees in smaller

company is team building and one-on-one meeting or weekly team meetings. The biger company use formalize knowledge-sharing processes and use training and workshops. Promoting learning culture: training and workshops are the most used (9) method at all.
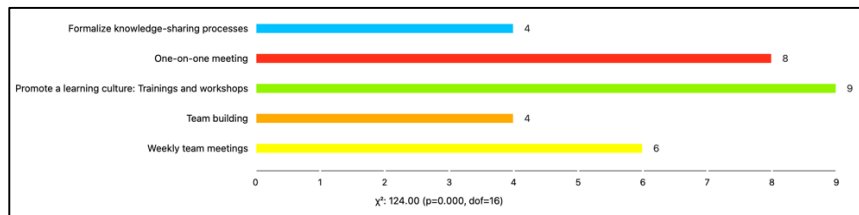

Figure 6a. Ways to encourage knowledge sharing
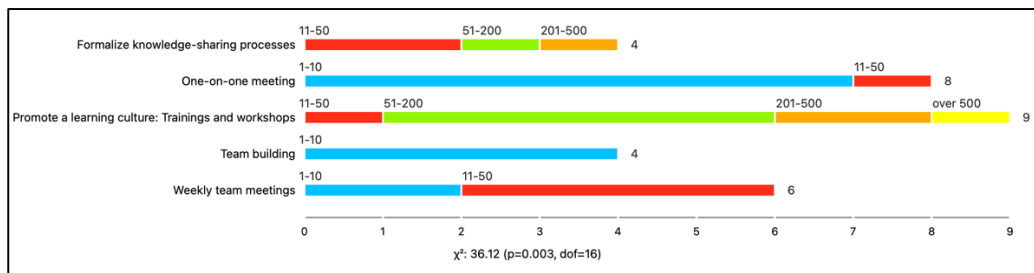
Figure 6b. Ways to encourage knowledge sharing: according to the company size

Nowadays, employees have a wide array of information and communication technologies to choose, as knowledge sharing channels. Determining rational choices of channels is important for companies. For knowledge sharing, the bigger companies use internal communication channels and also use Wiki and meetings. Companies with smaller numbers of employees do not have official channels and/or platforms or use Wiki and meetings (Figure 7).
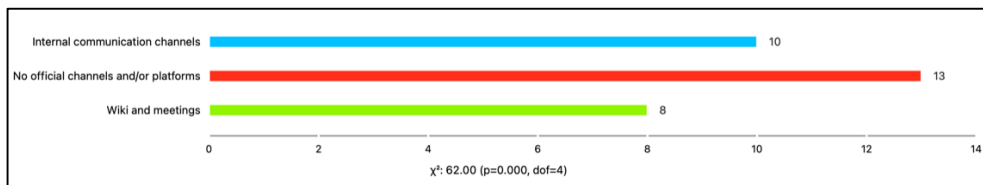

Figure 7a. Communication channels for knowledge sharing
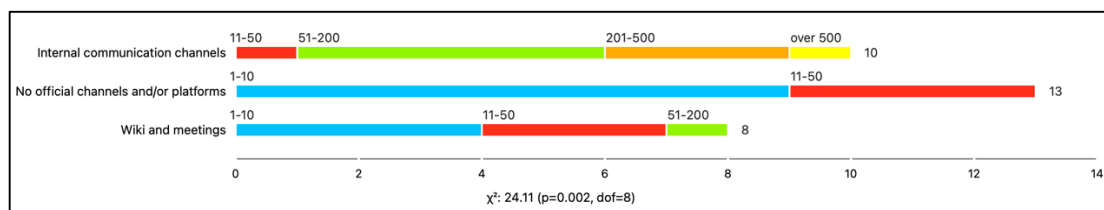

Figure 7b. Communication channels for knowledge sharing: according to the company size

The employee training and skill development has an impact on direct and indirect business outcomes, from productivity, revenue, workforce turnover, and more. Most companies with more than 51 employees, for the employee training and skill development, use academia and other forms of training or follow professional development plans. Online training platforms, visiting professional events, peer learning, Learning Management Systems, Youtube and personalized learning (customized training programs that help maximize the impact of learning by focusing on specific areas that each employee needs to improve or develop) are used in companies with less than 51 employees.
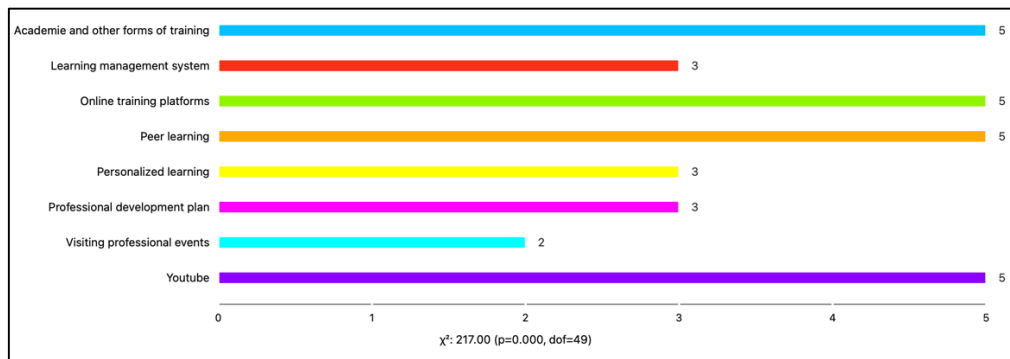
Figure 8a. Ways of employee training and skill development
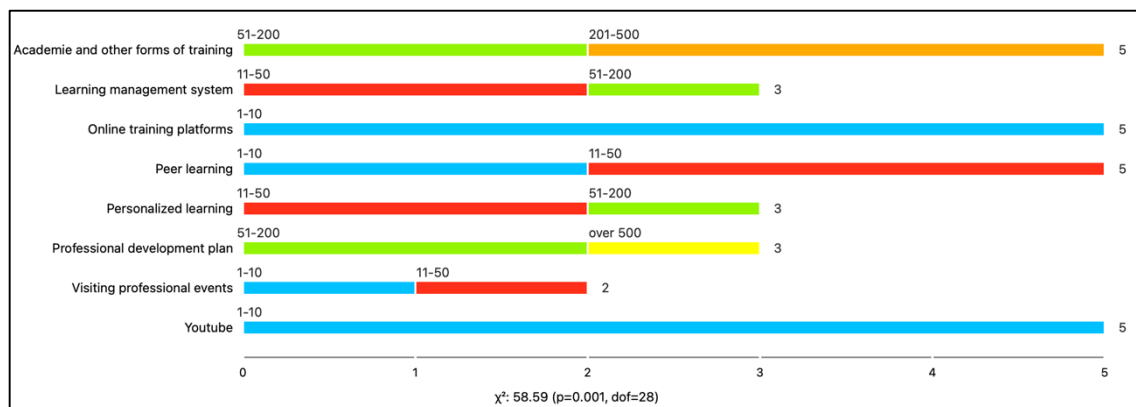
**Figure 8b. Ways of employee training and skill development: according to the company size**

The onboarding process prepares the new employees with a clear understanding of their responsibilities and how their role contributes to their team's and company's objectives. All companies with over 50 employees have established onboarding procedures and manage knowledge transfer during employee onboarding. The companies under 51 employees haven't exactly defined the program or used some of the following: Send a welcome kit, use short targeted training, share the necessary online materials or introduce new hires to the team.
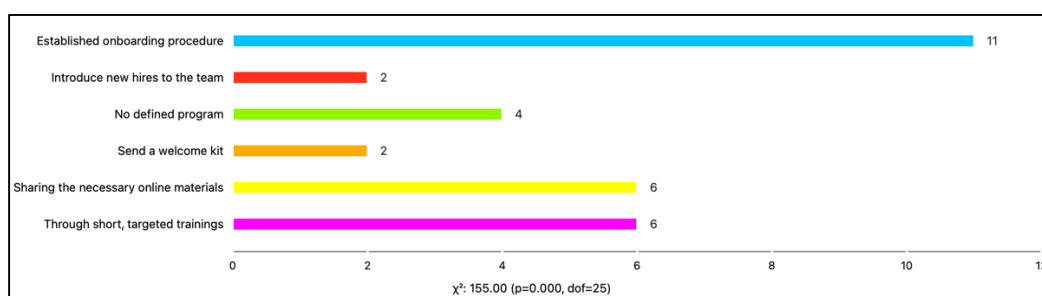
**Figure 9a. Knowledge transfer during employee onboarding**
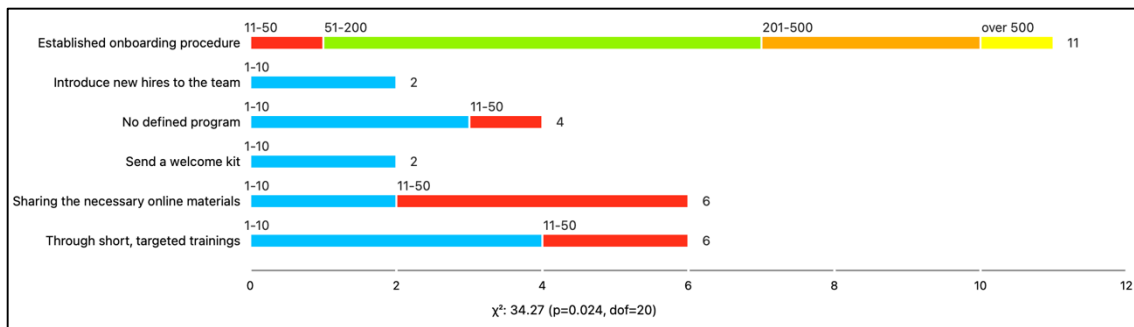
Figure 9b. Knowledge transfer during employee onboarding: according to the company size

About the challenges with effective knowledge management the companies were faced with Lack of time (9), Lack of human resources (5), Resistance to change (4), Limited employee engagement (5), Lack of organization shearing culture (5) and Data Security Concerns (3).
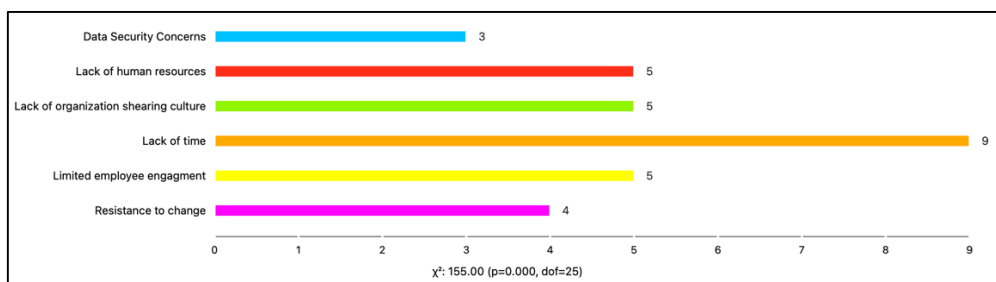

**Figure 10a. Challenges with effective knowledge management**
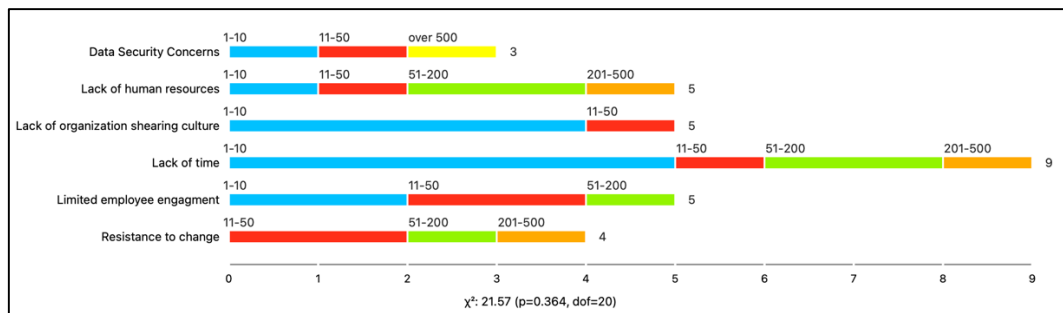
Figure 10b. Challenges with effective knowledge management: according to the company size

According to the systematic analysis of the companies' current knowledge management capabilities, seven of the biggest companies (over 51 employees) practice regular reviews or assessments of knowledge management strategies. Eleven of the companies sometimes, during thirteen companies don't reviews or assessments knowledge management strategies
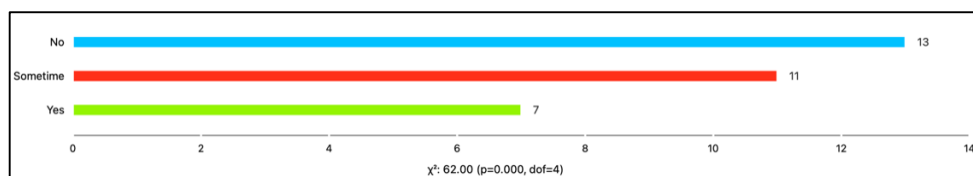

Figure 11a. Reviews or assessments practices about knowledge management strategies
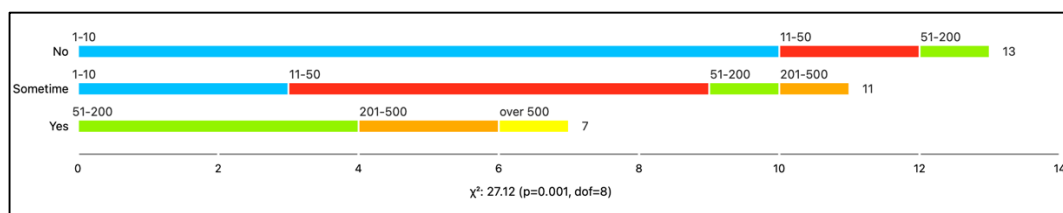
Figure 11b. Reviews or assessments practices about knowledge management strategies: according to the company size

For the future plans for investment in new knowledge management tools or systems doesn't matter of company size, 9 companies plan standard investment, 5 companies will invest for sure, and 4 will invest depending on the tool's potential. 14 companies consider that KM tools are not important for the company or that they already have all they need (Figure 12).
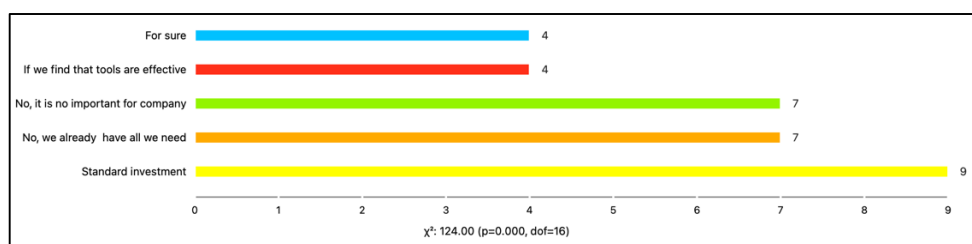
Figure 12a. Future plans for investment in new knowledge management tools
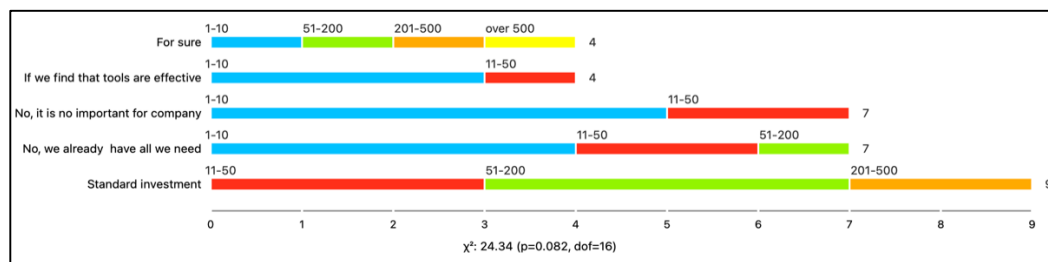
Figure 12b. Future plans for investment in new knowledge management tools: according to the company size

CONCLUSION

The conclusions reached after the realization and analysis of the research about the situation in companies related to the application of knowledge management are very different and overwhelming. Although we are talking about IT companies, the use of knowledge management tools is either very small/insignificant or not applied, and in most cases, it is applied only partially, with different tools without highlighting exactly why exactly that tool is used, and without thinking how to increase the application of KM in the future.

The analysis of the sample, which is not so large, but is comprehensive (companies of different sizes) shows that there is a wide space open for the incentive to use these tools, but that it first of all requires an awareness of what the benefit of using such tools will be for KM. Furthermore, it is necessary to indicate where these tools can be used.

In today's fast-paced business world, when IT companies are challenged to constantly seek new ways to streamline processes and improve efficiency and productivity. One of the key ways businesses can achieve these goals is definitely through well-established knowledge management practices. Also using appropriate knowledge management tools is crucial for organizations to effectively capture, store and share knowledge - both internally and externally. So, it is necessary for IT companies to improve their knowledge management

practices and awareness of the importance of knowledge management and knowledge management systems.

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