

MANAGEMENT, SHARING AND DISSEMINATION OF RESEARCH RESULTS AT THE KOMAG INSTITUTE

Małgorzata MALEC^{1*}, Lilianna STAŃCZAK²

¹ KOMAG Institute of Mining Technology, Gliwice; mmalec@komag.eu, ORCID: 0000-0002-6373-4568

² KOMAG Institute of Mining Technology, Gliwice; lstanczak@komag.eu, ORCID: 0000-0002-5154-7693

* Correspondence author

Purpose: The article presents the authors' multi-year experience in the domain of management sharing and transfer of knowledge inside a research organization as well as outside it to scientific and industrial partners dealing with an implementation of innovative technical and technological solutions.

Findings: Conventional forms of sharing knowledge still seem to be effective Example. Seminars, conferences and in disciplinary meetings of shareholders embalming brainstorming and a development of scientific and research projects.

Originality/value: The survey results concerning this subject matter reflect different forms of disseminating knowledge also with use of internet and the social media.

Conventional forms of sharing knowledge still seem to be effective Example. Seminars, conferences and in disciplinary meetings of shareholders embalming brainstorming and a development of scientific and research projects.

The scope of work described in the article concerns the phenomena events processes between creators and research results and their users from the industry.

In this case knowledge sharing and transfer words both ways.

Keywords: knowledge sharing, management research results, transfer of innovative solutions, dissemination of knowledge resources.

Category of the paper: Case study, Viewpoint.

1. Introduction

The term of knowledge sharing was popularized in the literature of economic and management sciences in the nineties of the last century together with a development of a concept and then of the research area named as knowledge management and also knowledge and information management. It is an interdisciplinary and multidisciplinary research area concerning human capital, intellectual capital, HR management as well as IT systems and tools

enabling knowledge gathering, storage, search, sharing and dissemination of knowledge and information resources.

Knowledge sharing is a phenomenon taking place through interactions among employees using different communication channels.

It is a component of managing knowledge, team work, quality, learning etc. It promotes changes and a development of organizational competences.

The COVID-19 pandemic formed challenges to economic mobility and corporate expansion. It had a negative impact on knowledge innovation, so to re-establish the flow of internal knowledge, organizations are compelled to refine their knowledge management strategy and amplify employees' motivation and eagerness to share and transfer information.

Strategic leadership styles: transformational, transactional and charismatic affect employee performance along with mediation effect of knowledge sharing. The success of knowledge sharing within an organization begins with individual cooperation. The moderating role of social media usage should be taken into consideration. The proactive personalities of employees positively influence knowledge sharing.

Knowledge management and sharing are indispensable in each organization. Both employees and outside partners must have an access to efficient and clear interface, being the knowledge base.

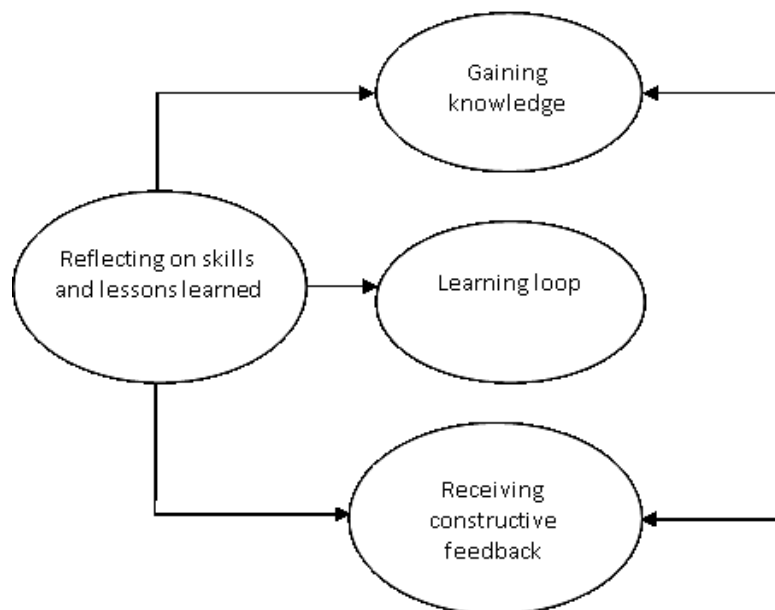


Figure 1. Data base as a tool for knowledge sharing.

Source: own.

The data base is a tool enabling knowledge sharing and dissemination as well as a construction of collaborative networks. A software for project management, on-line trainings, chat platforms for business as well as standard procedures promote an improvement of communication strategies. As it can be seen in Fig. 1 there is a learning loop encompassing gaining knowledge and receiving constructive feedback enabling a reflection on skills and lessons learned.

The article objectives consist in a presentation of research problems, identified by the authors, resulting from a use of different forms, methods and procedures for sharing and dissemination of knowledge as well as a successful management of knowledge resources based on the experience gained at the KOMAG Institute. So far the problem of sharing knowledge has been investigated at universities and industrial enterprises, but not in research institutes such as KOMAG.

The authors' scientific contribution concerns an identification of research problems, their systematization, detailed description and an elaboration of guidelines facilitating a process of efficient knowledge sharing and dissemination as well as their successful management. It should be highlighted that all these activities are oriented onto stakeholders of commercialization processes representing industrial enterprises. The scope of work, described in the article, concerns the phenomena, events and processes between creators of research results and their users from the industry. In this case, as it has already been mentioned, sharing and dissemination of knowledge works both ways which will be discussed explicitly in next chapters of this article.

2. Literature review

Nowadays, in the literature from the scope of management it is highlighted that knowledge is a special and most important asset of an organization. It is perceived as a source of more – than-average economic benefits (Goh, Hooper, 2009) as well as of economic rent (Stańczyk, Hugiet, 2011). Due to knowledge an organization gains an ability of solving problems (Krupski, Niemczyk, Stańczyk-Hugiet, 2009). As a strategic resource it should be subjected to an identification, measurement, gaining, development, usage and protection. In particular knowledge gains a strategic meaning when it is used (Yang, 2007). Unused knowledge has no value, and out-of-date inadequate knowledge, has a negative value (Krupski, Niemczyk, Stańczyk-Hugiet, 2009). Knowledge sharing ensures gaining a permanent market supremacy (van den Hoof, de Ridder, 2004), innovativeness (Liao, 2006), improvement of individual and organizational production rates (Quigley et al., 2007; Verburg, Andriessen, 2011) as well as possibilities of introducing changes and adaptations to the requirements of environment (Sharratt, Usoro, 2003).

In the literature beside the term 'knowledge sharing' there are other terms such as 'transfer', 'exchange', 'dissemination', 'transmission', 'flow' or 'diffusion'. These terms have different meanings. Knowledge sharing is a multi-directional activity, consisting in an exchange of knowledge in the direction which is not always determined explicitly. Knowledge transfer is a unidirectional activity having its objective. It encompasses passing knowledge, which is to find a determined application (King, 2006).

From the point of view of management sciences, the basis of knowledge sharing includes a collective activity consisting in an exchange of knowledge in the framework of teams, organizational centres and organizations (King, 2006). An empirical verification of impact factors as regards efficient knowledge sharing by scientific workers of universities is presented in (Kozuch, Lenart-Gansiniec, 2016). Knowledge sharing, as an essential competence, is connected with team work, communication and continuous learning of an organization (Słocińska, 2016). In the analysis of the knowledge subject-matter and of its management four basic conceptual categories should be distinguished. They are: data, information, knowledge and metaknowledge understood as wisdom. Two first categories can be treated as resources, but knowledge and metaknowledge should be analyzed in a multi-faceted way.

The data interpreted in a given context are called information, whereas the data used in a determined area of human activity gain the term 'knowledge' (Probst, Raub, Romhardt, 2004). Wisdom manifests itself through self-awareness of possessed knowledge or its lack. An essential role is played by a continuous search of new knowledge and also calling into question the truth and complexity of possessed knowledge (Fazlagic, 2004). Knowledge sharing is one of the factors enabling a construction of a research organization as learning and smart (Leja, 2013). The empirical results of the studies on knowledge and information sharing in the context of scholarly communication in Poland are presented in (Świgoń, 2016).

Knowledge can also occur in a hidden form which is not written down-tacit form unlike an explicit form which is written down (Li et al., 2014). In the available literature it is highlighted that knowledge sharing process is an important component of management strategies and that it determines knowledge development in organizations. However, it is indispensable to select proper knowledge sharing forms and to create stimulating conditions considering knowledge sender and knowledge receiver (Rudawska, 2013).

Analyzing a process of knowledge sharing other terms such as knowledge transfer, exchange of knowledge, dissemination can be found (Devenport, Prusak, 2000). W.R. King suggests that transfer of knowledge should be distinguished from knowledge sharing because transfer is a unidirectional activity, whereas knowledge sharing is a multidirectional activity (King, 2006). The research work, conducted so far in the scope of knowledge sharing, has concentrated mainly on stimulating or blocking factors of this process and also on an identification and categorization of activities within it (Von Krogh, 2011). The literature review should also include knowledge management (Durst, Foli, Edvardsson, 2024). The impact of generating and exchanging technical knowledge within France-England Channel region project and the mutual benefits it had on the research institutes, industrial partners and collaborative network established from the project was presented in (El Souri, Gao, 2022). It is interesting to know that the global hydrogen technological innovation system is explored by analyzing the three knowledge and technology transfer channels of publications, patents and standards (Ashari, Blind, Koch, 2023).

Within the rapid development of artificial intelligence and enterprise digital transformation, the standardization organization, storage and management of semantic knowledge in computers have become the current research focus (Yuan et al., 2025). It is worth examining determinants of openness at the project level, focusing on research, development and innovation projects within mature industries in Norway (Justvik, Aas, Smiljic, 2024). Knowledge sharing is commonly expected to enable exploration of different facilitators supporting this process. Theoretical and managerial implications and suggestions for future research within the field are described in (Katana, Glaa, Mirata, 2024). The influence of knowledge management processes on employees' knowledge sharing and transfer behaviours, viewed through the lens of the social exchange theory, is described in (Yao-Ping Peng). An informative perspective to quantify pairwise contributions during the knowledge sharing stage, meanwhile utilizing an exclusive Lasso to identify characteristics of tasks, plays an important role (Chang et al., 2024). R. Kusa, M. Suder, J. Duda (2024) focus on the points where knowledge, information and entrepreneurial management meet, with special attention paid to the relationship between information management and knowledge management as well as their mediating role in shaping firm performance. It should be borne in mind that strategic leadership styles affect employee performance through knowledge and information sharing (Yas et al., 2023). The success of knowledge sharing within an organization begins with individual cooperation. Some research work concerns the relationship between proactive personality and knowledge sharing in the organization (Jangsiriwattana, Duangkummerd, 2023). Public institutions should be attentive to people with more time of service because they may have difficulties with technological advances, reorganization of processes and adaptation to new ways of sharing knowledge (Alves et al., 2024). There are several difficulties and mechanisms for adopting a process of capturing and transferring tacit knowledge between projects (Correa, Silva, Scafuto, 2023). Some issues, concerning knowledge sharing and transfer, as management system objectives, are presented in (Malec, Stańczak, Ricketts, 2023) and in (Zajac, 2020). Based on the literature review it can be concluded that research work on knowledge management, sharing and dissemination in research institutes, has not been in depth investigated yet, so the authors decided to study these issues as a part of their research project.

3. Process of knowledge sharing, dissemination and management at the KOMAG Institute

3.1. General information about the KOMAG Institute

The KOMAG history of technical and technological activity dates back to 1950. During a nearly 75-year period it underwent numerous organizational and restructuring changes, but it has always been a bridge between science and industry as regards mechanical and mechatronic systems for the mining industry, environmental protection and work safety. At present it plays a significant role in the domestic and international scientific area, having at its disposal the state-of-the-art research and testing infrastructure enabling a realization of projects of interdisciplinary character. These projects are oriented onto smart solutions in the following branches of industry: mechanization, mechatronics, power engineering and ICT, operated in different branches of economy, including health protection, occupational safety, ergonomics and circular economy. Accredited testing laboratories continue to broaden their scope of activity to meet partners' requirements. KOMAG is a Notified Body within the Machinery, ATEX and Safety of Toys Directives. Its development model meets the requirements of the present market conditions according to the principles of the fourth industrial revolution. Knowledge, experience and innovativeness of solutions are confirmed by numerous patent letters, certificates and awards gained both in Poland and abroad. At present the research and development projects, realized at the KOMAG Institute concern a generation, transmission and storage of energy and hydrogen, a revitalization of post-industrial areas, including post-mining areas, biodiversity, electromobility, cybersecurity, renewable sources of energy as well as an integration of control, automation, monitoring and sensory systems.

3.2. Figures – second level numbering

The organizational structure of the KOMAG Institute encourages for an exchange of knowledge and for a collaboration within the framework of the whole Institute. A self-organization and a decentralization of the management system improve a process of knowledge sharing, enabling a creation of teams and a direct collaboration among employees. The Organizational Chart is presented in Fig. 2. It reflects in detail the knowledge management system at the KOMAG Institute.

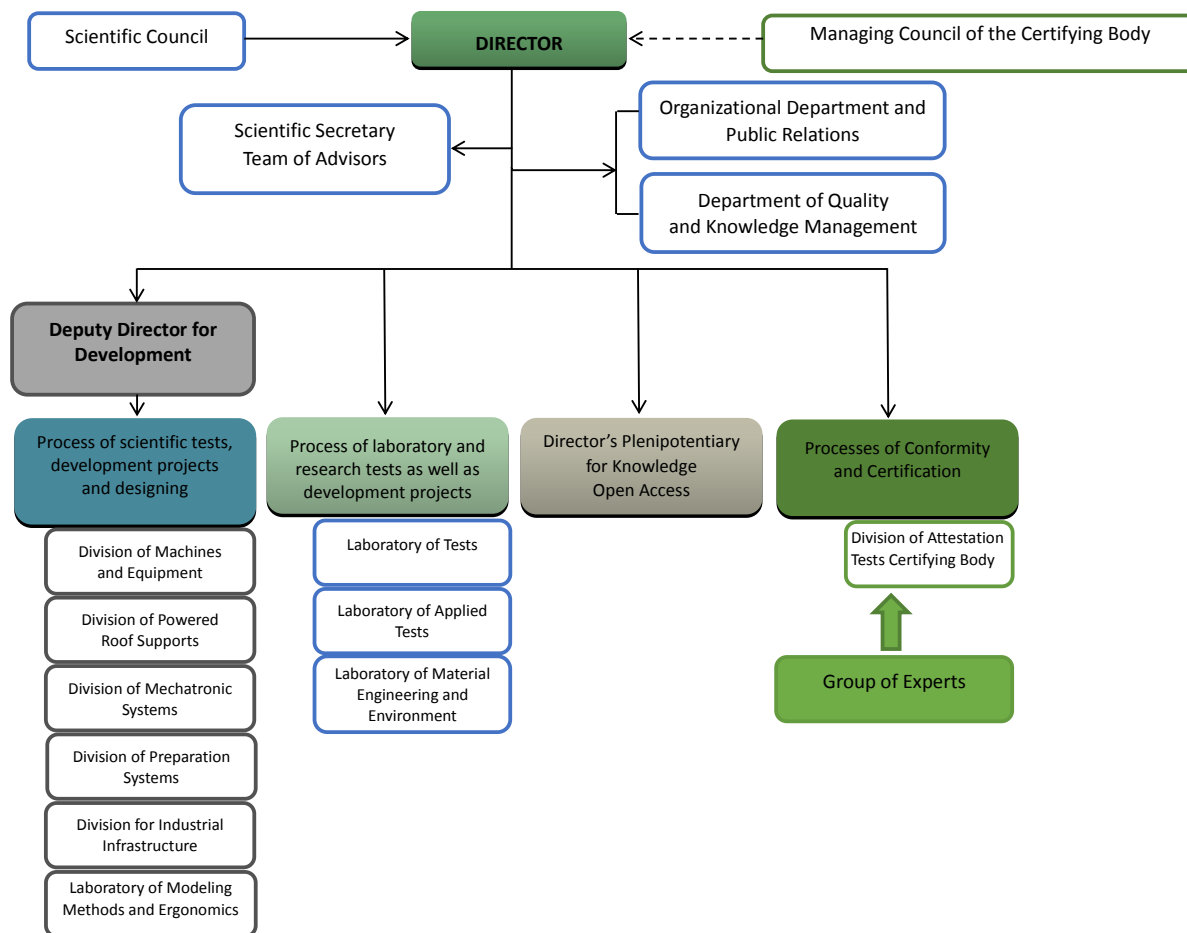


Figure 2. KOMAG Institute Organizational Chart.

Source: own.

The Organizational Chart shows three main processes conducted at the KOMAG Institute, i.e. processes of scientific tests, development projects and designing, processes of laboratory and research tests as well as development projects and processes of conformity and certification. The Development and Quality and Knowledge Management and the Director's Plenipotentiary for Knowledge Open Assess are responsible for a realization of the objectives concerning the processes described above. A successful and efficient operation of all the researchers is guaranteed by the Quality Systems compulsory at the Institute, according to ISO 9001, ISO/IEC 17025, ISO/IEC 17065. As a dissemination and sharing of knowledge is a complicated and differentiated process, the authors decided to show it on the model developed by them.

3.3. KOMAG model of knowledge sharing and dissemination of research results

Based on multi-year professional experience, the authors developed their own model of knowledge sharing and transfer processes shown in Fig. 3.

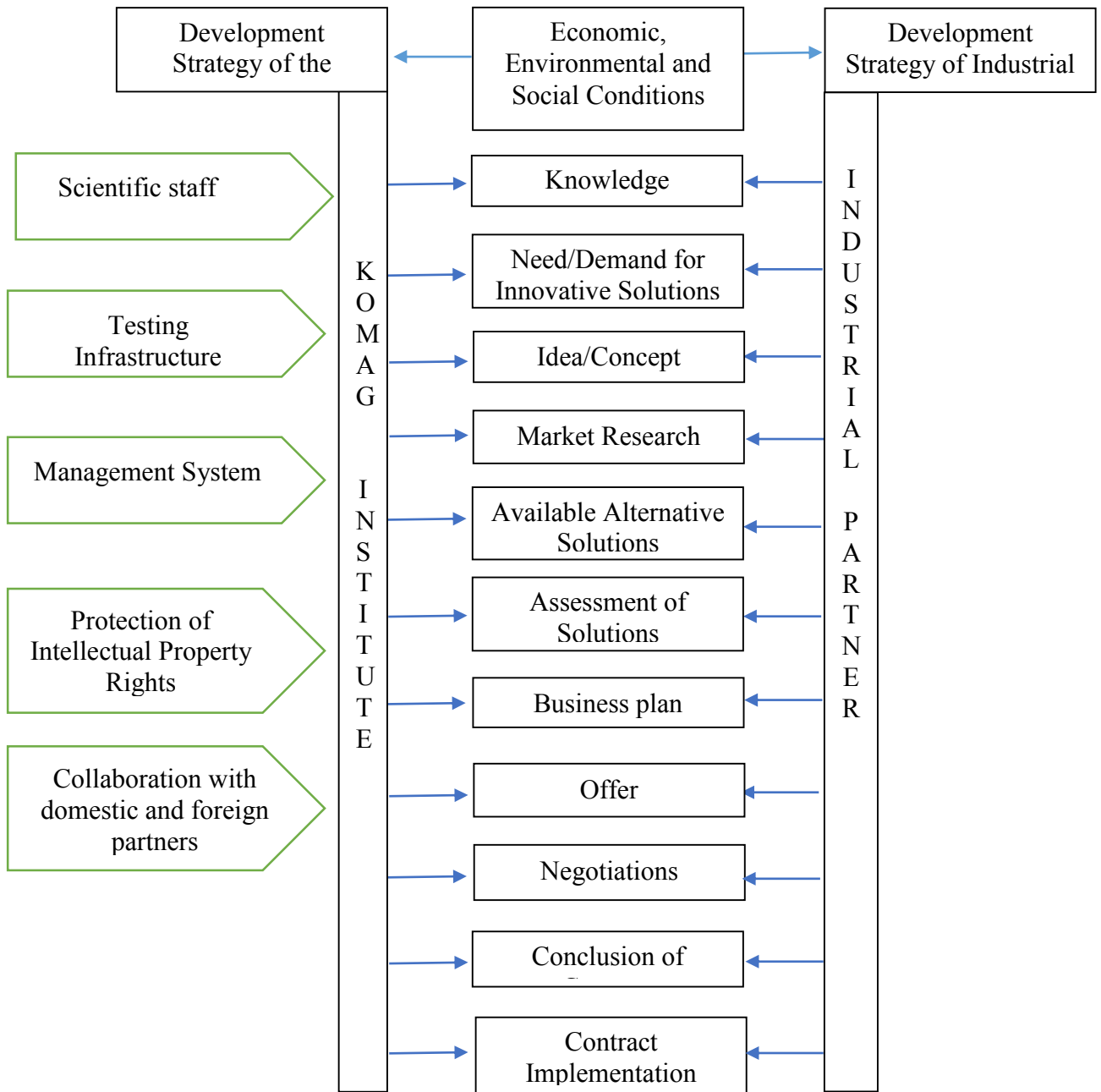


Figure 3. Model of knowledge sharing and dissemination of research results.

Source: own.

The model reflects a process, conducted at the KOMAG Institute to share and disseminate knowledge to industrial partners. It can be seen that a need or demand for implementing an innovative solution can result from the development strategy of the KOMAG Institute, from the development strategy of an industrial partner or from economic, environmental or social conditions. Knowledge resources are both at the Institute as well as at the industrial partners', so the idea/concept can be submitted by either of them or both of them. The same concerns market research, available alternative solutions, assessment of solutions and business plan. Then an offer is prepared by the Institute and negotiations start. The two last steps include a conclusion of contract and its implementation. Such an approach to the process of dissemination and sharing of knowledge is possible at the KOMAG Institute due to the scientific staff and researchers of high qualifications and the state-of-the-art testing infrastructure. The knowledge management system and well-developed protection of intellectual property rights are extremely important in this case. A collaboration with domestic and foreign partners from academia and widely understood industry is a source of information and challenges, stimulating a continuous development and progress of the Institute. While analyzing this diagram it can be seen how complex this process is and although the Institute plays the leading role, it should be highlighted that the activity of an industrial partner in the individual steps can have a crucial impact on the final success. The development model reflects a simplified, but clear image of real-life processes. This model is limited to a presentation of the factors whose impact on the process is significant from the point of view of conducted analysis, so it takes into consideration only the selected factors. It is a sort of an integrated model which indicates that its individual elements are based on a certain scope of knowledge, creating a frame structure. It is oriented onto an elaboration of information and guidelines of utilitarian character. A systematization of activities within the process of knowledge sharing, a classification of barriers to these processes and an identification of results plays a crucial role. Generally speaking, the main objective of this process consists in an increase of innovativeness, a quality improvement and safety increase leading to a successful commercialization of research results.

In practice at the KOMAG Institute three phenomena occur in the process, i.e. knowledge sharing consisting in an exchange of knowledge among the employees of the Institute, knowledge transfer oriented onto its transmission to industrial or scientific partners in a form of technical and technological solutions as well as knowledge dissemination enabling an access to knowledge for all the employees. All these activities cause a diffusion of knowledge. The subject-matter of knowledge sharing has a multi-aspect character, because it identifies factors which have an impact on efficiency of this process. It is indispensable to take into consideration knowledge sharing behaviour and knowledge acquisition behaviour.

Knowledge sharing is perceived to be an essential competence. It is also a personal, organizational and social development factor. The significance of Internet and other tools enabling to generate and store huge amounts of information has already been mentioned and will be presented in a further part of this chapter. The essence of knowledge sharing in the Institute is a two-side process, in which a knowledge exchange and a creation of new knowledge take place. This process is indispensable for transforming individual knowledge into organizational knowledge. On the individual level there are motivation and behavioural factors of knowledge sharing, whereas on the organizational level structural, cultural, communication, technological and managerial factors can be named. The organizational culture also promotes knowledge sharing. An issue of trust and intellectual openness is very important, because it encourages team work, unites teams and contributes to a generation of new ideas. An encouragement for critical thinking and for in-depth analyses of tasks, for creativity taking into consideration a possibility of making a mistake, within the risk under control, plays a significant role in the whole process. In relation to the organizational culture a significance of communication should be discussed. Dialogues and efficient flows of information support, in particular, the knowledge sharing system. The employees should be trained in the domain of communication and knowledge sharing skills. A use of complex IT solutions facilitates a knowledge codification and an open access to knowledge. Managerial skills and factors should be taken into consideration. Not only motivational activities, in particular financial incentives encouraging researchers for sharing knowledge, but also non-financial motivators in a form of a verbal praise, are important.

A responsibility of the managerial staff in the scope of creating the atmosphere promoting knowledge and experience sharing, a creation of mutual trust conditions, eliminating a fear of unfair competition, appropriation of ideas, lack of openness or apparent openness, envy, picking up ideas, malice and disapproval have a crucial impact on successful and efficient knowledge sharing, dissemination and management. However, it should be borne in mind that dominating competition leads to conflicts and hostility. On one hand an efficiency of knowledge sharing depends on the researchers' approach, their engagement in a realization of the KOMAG's strategic objectives, personal satisfaction, benefits resulting from knowledge exchange, communication skills but on the other one it depends on the management style, including motivation, encouragement, a generation of the trust atmosphere, openness as well as conditions which promote processes of knowledge sharing and transfer.

4. Survey results concerning knowledge sharing by scientific and research institutes and their industrial partners

The authors investigated interdisciplinary issues concerning widely understood processes of knowledge management, dissemination and sharing oriented onto a commercialization of innovative project results. Special attention was paid to a development of a new product, a modification of an existing product, an elaboration of a new process, a modification of an existing process, entering a new market, a participation in a creation of economic programmes and expert opinions. Different forms of sharing knowledge with the use of Internet and social media, such as the website of the Institute, branch web-site portals, social media e.g. Facebook, X portal (former Twitter), multimedia website pages e.g. YouTube, Flickr, Picasa, SlideShare were analyzed. Social media enable interactions, they concentrate on the recipient who moderates a two-directional dialogue (Bullock, Agbaimani, 2012). The questionnaire contained knowledge sharing determinants among scientific and research organizations (universities, research institutes, institutes of the Polish Academy of Sciences and industrial enterprises divided into four categories in relation to their size: microenterprise, a small enterprise, a medium-size enterprise and a single person enterprise. Then the surveyed persons were to mark their scope of activity: metal and machine industry, services, trade and transport, fuels, power engineering, extraction of raw materials, industrial production, agriculture and fishing, safety, construction, engineering and technical services, IT services, development of software, installation and maintenance of IT systems, customer support services, warehousing and storage. The area of the market activity was also identified: regional, domestic, European Union countries, world. The authors were particularly interested in an efficiency of knowledge sharing as a factor of successful knowledge transfer in the commercialization aspect of research results. It turned out that the following factors had crucial impact on a decision about a collaboration with a research organization: good knowledge about competences, innovativeness, experience, market recognition, an adaptation of the offer to the enterprise needs, price, quality, advertisements, reaction speed and a trouble-free communication enabling knowledge sharing.

As in the case of industrial partners, representatives of scientific and research organizations were asked for an efficiency assessment of the Internet and social media as tools of knowledge sharing and communication channels.

From the scientific point of view, it was worth investigating the frequency of using different sources by enterprises while searching information about offers of scientific organizations (Fig. 4.)

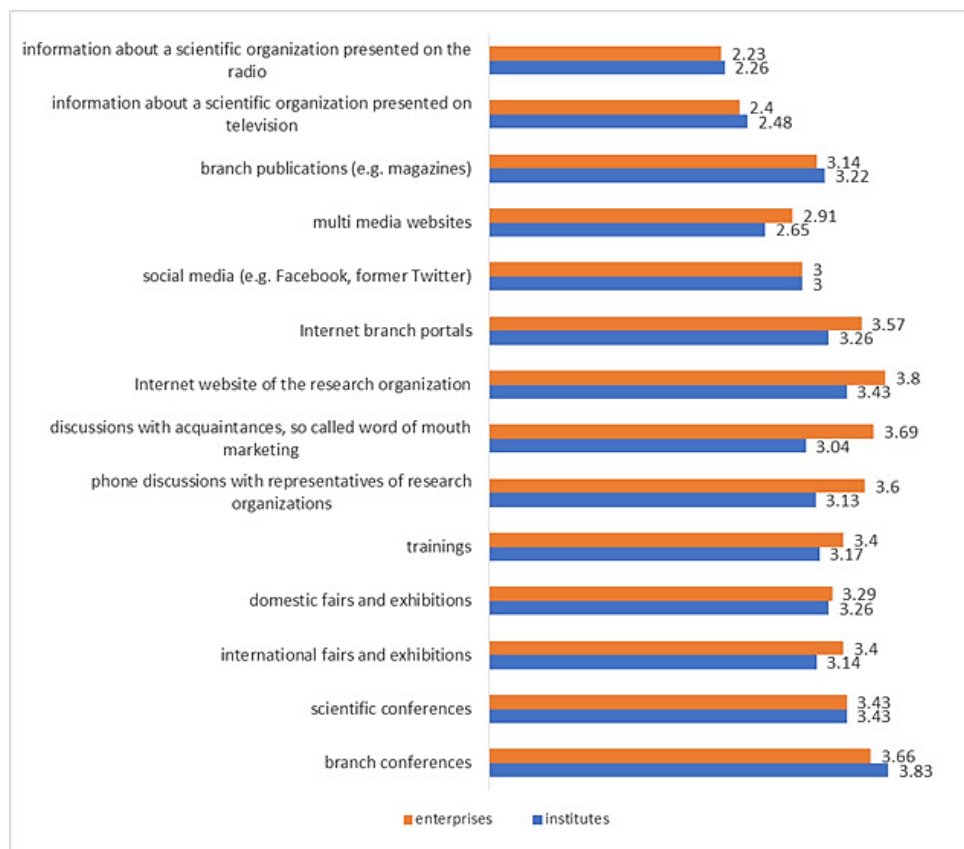


Figure 4. Frequency of using different sources of information by enterprises while searching information about offers of scientific organizations.

Source: Malec, Stańczak, Drózdź-Szeplińska, 2024.

It is worth highlighting that the enterprises used mainly the Internet websites of research organizations as the source of knowledge, but they also indicated a use of a so-called word of mouth activities and branch conferences.

In Fig. 5 it can be seen that in the year 2023 different sources of knowledge sharing and transfer were used by representatives of enterprises. Phone information seemed to be assessed as very good (59%), then the website (34%) and conferences (21%). It is surprising to find out that 66% of respondents did not use social media, 59% did not use trainings, 70% did not use KOMAG publications, 56% did not take advantage of conferences and symposia and 52% - of fairs and exhibitions. It is also worth assessing a use of different marketing tools in the year 2023 (Fig. 5)

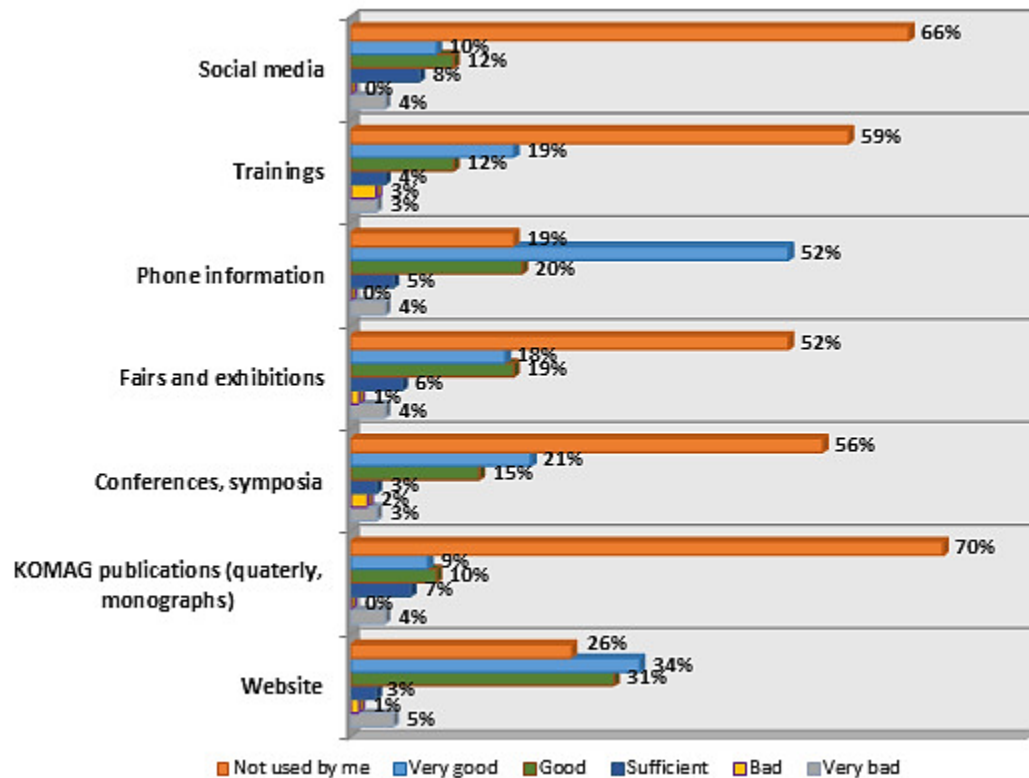


Figure 5. Assessment of different marketing tools in the year 2023.

Source: Malec, Stańczak, Dróżdż-Szeflińska, 2024.

The respondents assessed trainings as bad and very bad – 6% in total, conferences – 5% and website – 6%, so corrective measures should be taken as soon as possible.

The survey results enabled to analyze KOMAG processes against the background of other research institutes which will definitely promote more efficient knowledge sharing and transfer sources. Bearing that in mind, studies on knowledge sharing and dissemination of research results should be continued as there is still a possibility of improvement.

5. Conclusions

Based on the literature review and the results of their own scientific investigations the authors presented a research problem consisting in an analysis of knowledge management, sharing and transfer between research institutes, in particular the KOMAG Institute of Mining Technology, and industrial partners.

- The article is primarily of cognitive values, emphasizing the importance of knowledge sharing in communication process of research results of innovative character.
- The obtained survey results enabled to compare opinions of industrial partners versus scientific and research institutes, but special attention was paid to the systems used at the KOMAG Institute. It should be highlighted that these results can be used for building better and more reliable relationships between research organizations and industrial enterprises. These relations should be based on mutual interests, trust and understanding and they should promote a two-directional dialogue moderated by recipients.
- Based on multi-year professional experience the authors developed their own model of knowledge sharing and dissemination processes which reflected the most crucial components such as a development strategy of the KOMAG Institute, economic, environmental and social conditions and also a development strategy of industrial partner. Five impact factors were taken into consideration: qualifications of scientific staff, testing infrastructure, management system, protection of an intellectual property rights as well as a collaboration with domestic and foreign partners. All these factors form an in-input from the part of the KOMAG Institute.
- The model can be used as a sort of guidelines of utilitarian character because a systematization of activities within the process of knowledge management, sharing and transfer, a classification barriers to these processes and an identification of results play a crucial role in a commercialization of research results.
- In practice, at the KOMAG Institute three phenomena occur in the process of knowledge management, sharing and transfer, i.e.: knowledge sharing consisting in an exchange of knowledge among employees of the Institute, knowledge transfer oriented onto its transmission to industrial or scientific partners as well as knowledge dissemination. All these activities cause a diffusion of knowledge.

Bearing in mind the survey results, obtained by the authors, it was possible to analyze knowledge sharing processes at the KOMAG Institute against the background of other research institutes. It turned out that some processes should be modified to make them more efficient and reliable.

As knowledge sharing process is an important component of management strategies and determines knowledge development in organizations, so it is indispensable to select properly and correctly knowledge sharing forms and to create stimulating conditions as regards knowledge sender and knowledge receiver.

References

1. Alves, J.N., Cogo, M.P., Klein, L.L., Pereira, B.A.D. (2024). Knowledge management drivers and its results: a quantitative study in a public higher education institution. *Business Process Management Journal*, 30(3), 770-798.
2. Ashari, P.A., Blind, K., Koch, C. (2023). Knowledge and technology transfer via publications, patents, standards: Exploring the hydrogen technological innovation system. *Technological Forecasting and Social Change*, 187, 122201.
3. Bullock, L., Agbaimoni, O. (2012). *Marketing w mediach społecznościowych – dlaczego i jak firmy muszą z niego korzystać?* Prace Instytutu Lotnictwa.
4. Chang, X., Zhou, M., Wang, X., Yang, Y., Yang, P. (2024). Informative relationship multi-task learning: Exploring pairwise contribution across tasks' sharing knowledge. *Knowledge-Based Systems*, 301, 112187.
5. Correa, R.D., Silva, L.F.D., Scafuto, I.C. (2023). Mechanisms for capturing and transferring tacit knowledge between projects. *International Journal of Knowledge Management Studies*, 14(1), 50-73.
6. Devenport, T.H., Prusak, L. (2000). *Working Knowledge. How organizations manager what they know.* Boston, Massachusetts: Harvard Business School Press.
7. Durst, S., Foli, S., Edvardsson, I.R. (2024). A systematic literature review on knowledge management in SMEs: current trends and future directions. *Management Review*, 74, 263-288.
8. El Souri, M., Gao, J. (2022). Impact of Knowledge Exchange in Cross Regional Interdisciplinary Collaboration Within a Robotic Development Project. In: *Advances in Manufacturing Technology*, XXXV (pp. 107-112). IOS Press.
9. Fazlagić, A. (2004). Gospodarka oparta na wiedzy – nowy kontekst dla ZZL. *Zarządzanie Zasobami Ludzkimi*, no. 6.
10. Goh, C.H., Hooper, V. (2009). Knowledge and Information sharing in a closed information environment. *Journal of Knowledge Management*, 13(2).
11. Hoof van den, B., Ridder de, J.A. (2004). Knowledge sharing in context: the influence of organizational commitment, communication climate and CMC use on knowledge sharing. *Journal of Knowledge Management*, 8.
12. Jangsiriwattana, T., Duangkumnerd, V. (2023). Enhancing knowledge sharing in organizations through the proactive personality of employees. *Polish Journal of Management Studies*, 28.
13. Justvik, G.J., Aas, T.H., Smiljic, S. (2024). Understanding the Openness of Research, Development and Innovation Projects: Evidence from Mature Industry Firms in Norway. *IEEE Transactions on Engineering Management*.

14. Katana, K., Głaa, B., Mirata, M. (2024). *Facilitator roles for knowledge sharing in industrial symbiosis networks during emergence*. Business Strategy and the Environment.
15. King W.R. (2006). Knowledge sharing, Encyclopedia of knowledge management. London: Herslen.
16. King, W.R. (2006). The critical role of information processing in creating an effective knowledge organization. *Journal of Database Management (JDM)*, 17(1), 1-15.
17. Koźuch, B., Lenart-Gausiniec, R. (2016). Uwarunkowania skutecznego dzielenia się wiedzą na uczelni. *Zarządzanie Publiczne*, 4(36), 303-320.
18. Krupski, R., Niemczyk, J., Stańczyk-Hugiet, E. (2009). *Koncepcje strategii organizacji*. Warszawa: Polskie Towarzystwo Ekonomiczne.
19. Kusa, R., Suder, M., Duda, J. (2024). Role of entrepreneurial orientation, information management, and knowledge management in improving firm performance. *International Journal of Information Management*, 78, 102802.
20. Leja, K. (2013). *Uczelnie jako generator wiedzy. Misja i służebność uniwersytetu w XXI wieku. Praca zbiorowa*. Warszawa: Oficyna Wydawnicza Politechniki Warszawskiej.
21. Li, X., Roberts, J., Yan, Y., Tan, H. (2014). Knowledge sharing in China – UK higher education alliances. *International Business Review*, 23, 343-355.
22. Liao, L.F. (2006). A learning organization perspective on knowledge sharing behaviour and firm innovation. *Human Systems Management*, 25.
23. Malec, M., Stańczak, L., Drózdź-Szeplińska, M. (2024). The use of Internet and social media as marketing tools in commercialization of research results. *Scientific Papers of Silesia University of Technology Organization and Management Services*, No. 196.
24. Malec, M., Stańczak, L., Ricketts, B. (2023). Just transition of post-mining areas-technical, economic, environmental and social aspects. *Min. Mach.*, vol. 41, iss. 1.
25. Probst, G., Raub, S., Romhardt, K. (2004). *Zarządzanie wiedzą w organizacji*. Kraków: Oficyna Ekonomiczna.
26. Quigley, N.R., Tesluk, P.E., Locke, E.A., Bartol, K.M. (2007). A Multilevel Investigation of the Motivational Mechanisms Underlying Knowledge Sharing and Performance. *Organization Science*, 18.
27. Rudawska, A. (2013). Dzielenie się wiedzą w organizacjach–istota, bariery i efekty. *Organization and Management*, 157.
28. Sharratt, M., Usoro, A. (2003). Understanding Knowledge – Sharing in Online Communities of Practice. *Electronic Journal on Knowledge Management*, 1.
29. Słocińska A. (2016). Dzielenie się wiedzą jako istotna kompetencja. *Studia Ekonomiczne. Zeszyty Naukowe Uniwersytetu Ekonomicznego w Katowicach*, No. 258. ISSN 2083-8611.
30. Stańczyk-Hugiet, E. (2011). W poszukiwaniu renty. *Przegląd Organizacji*, 9.
31. Świgoń, M. *Personal Knowledge and Information Management (PKIM) behaviour–in the light of the comparative studies among Polish and German students*.

32. Verbung, R.M., Andriessen, E.J.H (2011). A Typology of Knowledge Sharing Networks in Practice. *Knowledge and Process Management*, 18.
33. Von Krogh, G. (2011). *Knowledge sharing in Organizations: The role of communities. Handbook of Organizational Learning and Knowledge Management*. New York: John Wiley and sons.
34. Yang, J. (2007). The Impact of Knowledge sharing on Organizational Learning and Effectiveness. *Journal of Knowledge Management*, 11(2).
35. Yao-Ping Peng, M. (2024). Breaking down barriers: exploring the impact of social capital on knowledge sharing and transfer in the workplace. *Humanities and Social Sciences Communications*, 11(1).
36. Yas, H., Alkaabi, A., ALBaloushi, N.A., Al Adeedi, A., Streimikiene, D. (2023). The impact of strategic leadership practices and knowledge sharing on employee's performance. *Polish Journal of Management Studies*, 27.
37. Yuan, J., Zhai, K., Li, H., Yuan, M. (2025). Research on the construction and mapping model of knowledge organization system driven by standards. *Computer Standards & Interfaces*, 92, 103905.
38. Zając, R. (2020). Strategy and Objectives in the Management System. Implementation of the Balanced Scorecard in a Research Institute. *Min. Mach.*, No. 3, pp. 64-72, DOI:10.32056/KOMAG2020.3.7