

THE USE OF INTERNET AND SOCIAL MEDIA AS MARKETING TOOLS IN COMMERCIALIZATION OF RESEARCH RESULTS

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Purpose: The article presents the survey results, concerning commercialization processes conducted in scientific and research organizations in the scope of research and development projects' results of innovative character, with the use of Internet and social media as marketing tools.

Design/methodology/approach: The questionnaires were distributed among universities, research institutes and institutes of the Polish Academy of Sciences. Special attention was paid to the most commonly used commercialization methods such as sales of the R&D results, granting a license for R&D results and making a contribution in a form of R&D results. The Authors were particularly interested in the type of collaboration oriented onto a commercialization of research results such as 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 as well as opinions, expert opinions and reports.

Findings: The research results, presented in the article, also reflect different forms of disseminating the R&D offer with use of the Internet and the social media such as the website of the institute, branch website portals, social media e.g. Facebook, X portal (former Twitter), multi-media website pages e.g. YouTube, Flickr, Picasa, SlideShare.

Originality/value: The article assesses the factors that play a decisive role in the processes of successful commercialization of R&D research results in a research institute.

Keywords: research results, commercialization, Internet, social media, marketing tool.

Category of the paper: Research paper.

1. Introduction

The article aims at a presentation of a research problem, identified by the Authors, consisting in an investigation of using the Internet and social media as marketing tools in commercialization processes of R&D projects results. The scientific problem, under consideration, fits in the scope of “Engineering of Innovations”, understood as a technical dimension of implementing innovative solutions in the economy (Malec, Stanczak, 2020).

The Authors’ scientific contribution concerns an identification of a research problem, a preparation of the questionnaires concerning determinants of collaboration between an industrial enterprise with research organizations such as universities, research institutes and institutes of the Polish Academy of Sciences and a preparation of the questionnaire related to a commercialization level diagnosis in research institutes. It also includes a detailed analysis of the survey results and an elaboration of guidelines and recommendations for stakeholders of commercialization processes. The research work, described in the article, is oriented onto phenomena, events and processes between creators of research results, i.e. a research institutes and their users representing industrial enterprises.

Currently social media become one of the most important tools of the Internet marketing. The websites of social media such as Facebook and X platform (former Twitter) are an element of everyday life. The crucial role of social media consists in building relationships. It should be borne in mind that marketing activities include a process in which organizations create customers’ interest in product or services. It is an integrated process enabling organizations to build relationships with their customers, generating profits for themselves and for their customers. These relationships are based on mutual trust and understanding. Marketing in the social media is based on a creation of real relationships online with the final recipient or in the other words with the user enabling him/her to get to know the research institute, to like it and to trust the partner to the extent encouraging an interest in a collaboration. There is a big difference between traditional marketing activities, which transfer the information to indefinite recipients. It is concentrated on the company/institute and not on a customer/recipient and it should be highlighted that in this case the communication is unidirectional. On the contrary the marketing activities in the social media include interactions, they concentrate on the recipient and it is important to realize that two-directional dialogue is moderated by the recipients (Bullock, Agbaimoni, 2014).

2. Literature review

“Social media marketing” is based on using social platforms, blogs, VR and other spaces for a realization of not only promotional, image and sales targets, but also related to the customer’s support and servicing. It should be highlighted that an approach to the social media changed in recent years and the present stage of their development is a serious managerial challenge. There are some indicators enabling an efficiency measurement of marketing activities in the social media (Mazurek, 2016).

The potential of social media as regards marketing activities is extensively described in the literature. In particular it concerns the changes in relationships between the organization and the customer (Kitzman et al., 2011), levelling of information asymmetry between the players active on the market (Kaplan, 2012), a change of the customer’s role in the contemporary world (Barker et al., 2013), a creation of the brand success in the Internet (Mazurek, 2012). A phase of the popularity, of the potential identification of the activity possibilities is displaced by a phase of maturity. The social media marketing interferes dynamically in current processes, activities and the way of thinking about marketing, organization and customer. An identification of the social media potential in marketing activities determines a necessity of separating at least three perspectives:

- an operational perspective - a promotion of the brand, a creation of image, current customer’s service, maintaining contacts with recipients,
- a tactical perspective - a transformation of the social media user into a customer,
- a strategic perspective - an innovative perception of the market relationships between an organization and a customer.

The problem of developing an approach to increase the motivation of employees of the company’s marketing department to promote products to partners and consumers in the virtual space by using marketing tools of information interaction is presented in (Raiko et al., 2023). It is important to realize that marketing of the R&D projects’ results differs from other business-to-business (B2B) marketing processes due to its uniqueness and complexity of offers. Toukola et al. (2023) presented interesting information about the use of digital tools. They conducted a two-phase qualitative study analyzing digital tools applied in the project results marketing process, offering insights into the tools that suppliers can use in each step of the R&D results marketing process.

It is worth comparing modern tools used in marketing communication and to determine their position in relation to the traditional tools (Tarapata, 2022). The results of the research prove that an important future of marketing communication includes an integration of promotional instruments and activities. It should be mentioned that tools based on new technologies are gaining popularity, but they are not eliminating the traditional ones. Some barriers in commercialization processes of R&D projects’ results are presented in

(Stanczak, 2020) and in (Malec, Stanczak, Ricketts, 2023). In the result of the literature review and analyses, conducted by the Authors, key features of the Internet and social media marketing are presented.

3. Key features of Internet and social media marketing and advantages of using it

3.1. Key features of Internet and social media marketing

Key features of Internet and social media marketing include:

- a creation of contents which stimulate their further popularizing,
- a credibility of the message due to a transfer of the announcement promotion of third parties,
- a transfer of control over the message,
- a discussion and a dialogue as the basis resulting from an engagement of other users and participants,
- an efficiency of activities is not based on a simple function of time and expenses,
- a basis of relationships does not result from transactions but from mutual trust.

Successful implementation of innovative solutions, developed at scientific and research institute, among others due to an application of the social media, determine overall changes in the system of conducting marketing activities, in the way of thinking about customers and methods of reaching marketing targets. It should be borne in mind that the social media marketing is one of the fastest growing fields of marketing, determining many important changes in contemporary views on marketing activities, customers and market relationships. Social media are a very efficient and important promotional support which will be confirmed by the survey results described in a further part of this article. They contribute to a co-creation of innovative solutions, a positive brand image creation and efficient as well as reliable after-sales services. It is worth highlighting that they foster communication and coordination skills in a very efficient way. The social media marketing is also an example of a deterministic influence of information technologies on potential changes in marketing activities - their concept and realization. The dynamic perspective of social media marketing enables to conclude that the early stage of its usage, focused on supporting promotional activities, changes from tactical to strategic usage. Social media marketing is perceived as an important source of a competitive advantage and value creation (Mazurek, 2016). Some advantages of viral marketing should be mentioned (Szewczyk, 2015). It is a kind of activities oriented onto a generation of an advertisement which will disseminate spontaneously. This phenomenon develops quickly in the YouTube service. As the real time market is based on an immediate

reaction to the occurring events, it is forecast that in future this kind of marketing will become more and more popular and it will become the key communication channel among organizations.

According to surveys conducted by the Mzinga and Babson Executive Education, it can be seen that in the USA 86% enterprises actively uses social media marketing (Kowalski, 2011). It is also important to bear in mind that enterprises which are not active in the social media can be perceived as conservative ones, not taking advantage of modern tools and even not very professional (Podlaski, 2011). A non-invasiveness of the way to reach a customer or consumer plays a significant role. In the case of Facebook a contact with an Internet user takes place through the website, from which the information is sent after a clear confirmation of the interest in its obtaining, i.e. after its subscribing. Many Internet users express an opinion that social media services give marketing activities the second youth.

3.2. Advantages of using Internet and social media marketing

The Harvard Business Analytics Services conducted a survey of 2100 organizations, discovering that 79% of them use channels in the social media (Bullock et al., 2014). In their opinion advantages of using social media are as follows:

- a bigger awareness of the organization existence,
- bigger traffic on the website,
- more positive opinions about the brand,
- a possibility of monitoring opinions and discussions concerning the organization,
- a possibility of developing focused marketing activities,
- a better understanding of the brand perception by customers,
- a bigger knowledge about target markets,
- an identification of positive and negative comments,
- a development of a new activity,
- an identification of new chances for products or services,
- a possibility of measuring a frequency of discussions about the brand,
- an early warning against potential problems with products or services.

An implementation of the 5 W strategy facilitates commercialization processes. The 5 W strategy requires answers to five questions: WHY? WHO? WHERE? WHAT? WHEN?

WHY? – The answer to this question enables to raise the status of the organization, get a better knowledge about customers' needs, identify new markets.

WHO? – The answer to this question gives precise information about the target recipient, with whom it is possible to enter into interactions. It also informs about the recipients' characteristics, it reflects their way of thinking and preferences.

WHERE? – The answer to this question helps to understand which social media suit the marketing targets best.

WHAT? – The answer to this question specifies the message of the organization and transfers information in a clear way.

WHEN? – The answer to this questions gives information about online reactions and it is recommended to use the calendar software for up-dating information when it cannot be done personally.

The presented advantages are mainly of cognitive value, but they highlight the significance and importance of social media in the marketing activities of organizations. It should be borne in mind that an implementation of the 5W strategy contributes to a successful realization of marketing activities.

4. Contents of questionnaires used in the process of survey research

4.1. Questionnaire concerning collaboration determinants of enterprise with scientific and research organizations (universities, research institutes, institutes of the Polish Academy of Sciences).

Enterprises were divided into four categories in relation to their size: a microenterprise, a small enterprise, a medium-size enterprise and a single person enterprise. The surveyed legal persons were asked about the period of their market activity: no longer than two years, more than two years, but not longer than 10 years, more than 10 years but not longer than 20 years, more than 20 years. 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 also asked about a collaboration with scientific and research institutions, trying to investigate the reasons which caused no interest in such a collaboration. They included lack of a collaboration need, lack of an enterprise interest in innovative activities, a use of ready-made technological solutions, lack of financial means for a collaboration with research organizations, lack of experience in collaboration with research organizations, no information about offers of research organizations, lack of contacts with research organizations, maladjustment of offers of research organizations to needs of enterprises, lack of or inefficient marketing activity of research organizations, long-lasting administrative procedures in research organizations, complexity of administrative procedures in research organizations, difficulties in communication with representatives of research organizations, tendency to theorize

excessively by representatives of research organizations, downplaying of implementation problems by representatives of research organizations, patronization of the business party, use of research results as the basis of their own scientific career by representatives of research organizations. One of the questions concerned a type of collaboration, i.e. an implementation of a new product, an introduction of a change in an existing product, an elaboration of a new process, a modification of an existing process, a new market entry. It was important to find out which legal form of collaboration was chosen by an enterprise: a contract for sales of research and development project results, a license for using the results of research and development work, a spin-off company, a spin-out company. Apart from other items such as financing of collaboration, intellectual property rights or general level of satisfaction, the Authors intended to investigate the importance of the following factors, having a crucial impact on the decision about collaboration with a research organization: knowledge and competences, innovativeness, experience, market recognition, an adaptation of the offer to the enterprise needs, price, quality, advertisements, reaction speed, accordance in the scope of intellectual rights, complexity of administrative procedures, and operation of a department taking care of a customer, an interest in customer's needs, an ease in making contacts, a trouble-free communication, a flexibility in negotiations. The questionnaire was ended with the question about a frequency of using Internet and social media such as the website, Internet branch portals, social media (Facebook, former Twitter), multimedia websites (e.g. Youtube, Flickr, Picasa, SlideShare).

4.2 Questionnaire concerning the condition diagnosis in research institutes

The questionnaire started with the information about the revenue volume (up PLN 10 million, PLN 10 to 25 million, PLN 25 to 50 million, over PLN 50 million), the revenue volume from the commercialization R&D project results in the institute (up to PLN 5 million, PLN 5 to 15 million, PLN 15 to 25 million, over PLN 25 million), the most common commercialization method (sales of R&D project results, license, making a contribution in a form of R&D results to the company), the percentage of R&D project results subject to commercialization (up to 25%, 26-50%, 51-75%, 76-100%). Then it was important to find out which collaborative options were realized with industrial partners: a development of a new product, a modification of an existing product, a modification of an existing process, a new market entry, a participation in a creation of economic programmes, opinions, expert opinions and reports as well as diagnoses, accredited laboratory tests, a certification of products or management systems. It was important to investigate financing of commercialization processes such as financial means of an industrial partner exclusively, financial means of the industrial partner and the institute, domestic research projects, European research projects, international research projects.

As far as success factors are concerned, the following aspects were taken into consideration: knowledge and competences, innovativeness, experience, market recognition, reliability, an adaptation of the offer to the enterprise needs, price, quality, advertisements, reaction speed,

accordance in the scope of intellectual rights, complexity of administrative procedures, an operation of a department taking care of a customer, an interest in customer's needs, and ease in making contacts, a trouble-free communication, a flexibility in negotiations.

As in the case of industrial partners, representatives of scientific and research organization were asked for an efficiency assessment of the Internet and social media (e.g. Facebook, former Twitter), multimedia websites (e.g. Youtube, Flickr, Picasa, SlideShare). Three final questions concerned a collection and analysis of information about customers, a basis of key customers enabling a quick identification of their needs as well as barriers which impede marketing activities in a research institute such as lack of financial means, lack of qualified personnel, lack of the state-of-the-art marketing tools, blindness of the management and employees to marketing activities as well as a mismatch of actions to the needs of industrial partners. The obtained survey results enabled to compare opinions of industrial partners and research institutes as regards the use of the Internet and social media as marketing tools in commercialization of R&D results.

5. Contents of questionnaires used in the process of survey research

As it has already been mentioned 100 questionnaires were distributed among all research institutes and 390 questionnaires were sent to industrial partners. Unfortunately only 23 questionnaire were returned from the institutes and 65 questionnaires - from industrial partners. However, considering the circumstances, it was possible to draw conclusions of general character, reflecting specific trends and specific barriers to commercialization processes. Fig. 1 shows the percentage of R&D project results which were commercialized.

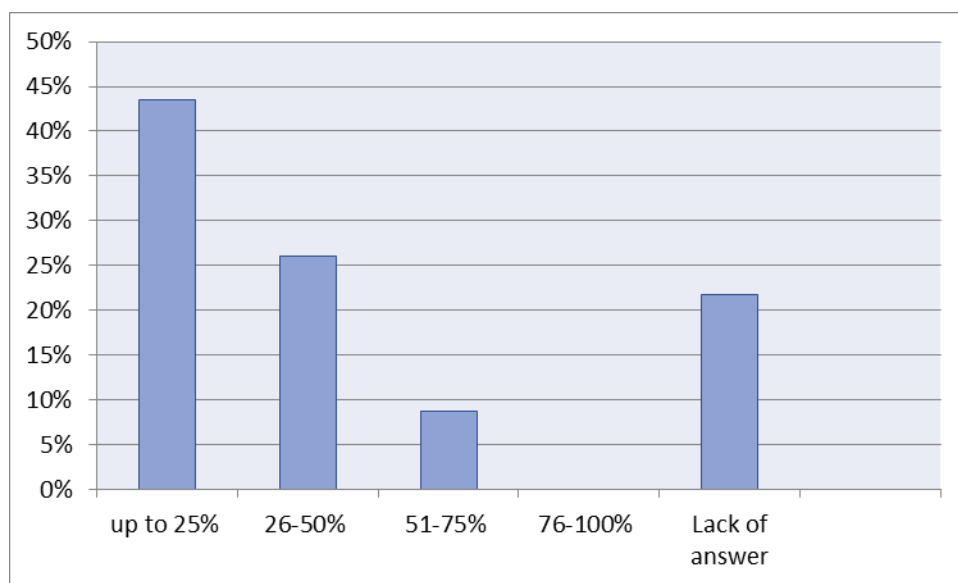


Figure 1. The percentage of R&D project results subject to commercialization.

It can be seen that 44% of the institutes commercialize up to 25% of R&D results, 26% of them from 26 to 50% and only 9% of them commercialize from 51 to 75%. No institutes commercialize more than 76% of their research results. It may be interesting to investigate an impact of different stakeholders on the subject matter of R&D projects planned to be commercialized – Fig. 2.

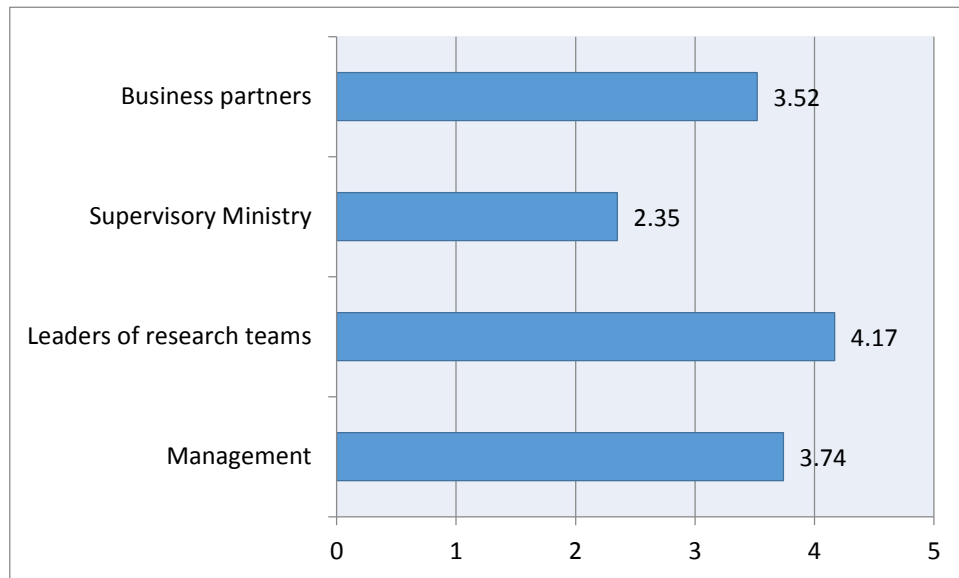


Figure 2. An impact of stakeholders on the subject-matter of R&D projects.

It should be highlighted that leaders of research teams had the biggest impact on the subject-matter of R&D projects – median 4.17, whereas the institute management – 3.74 and business partners – 3.52. The role of business partners is extremely important in this case.

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. 3).

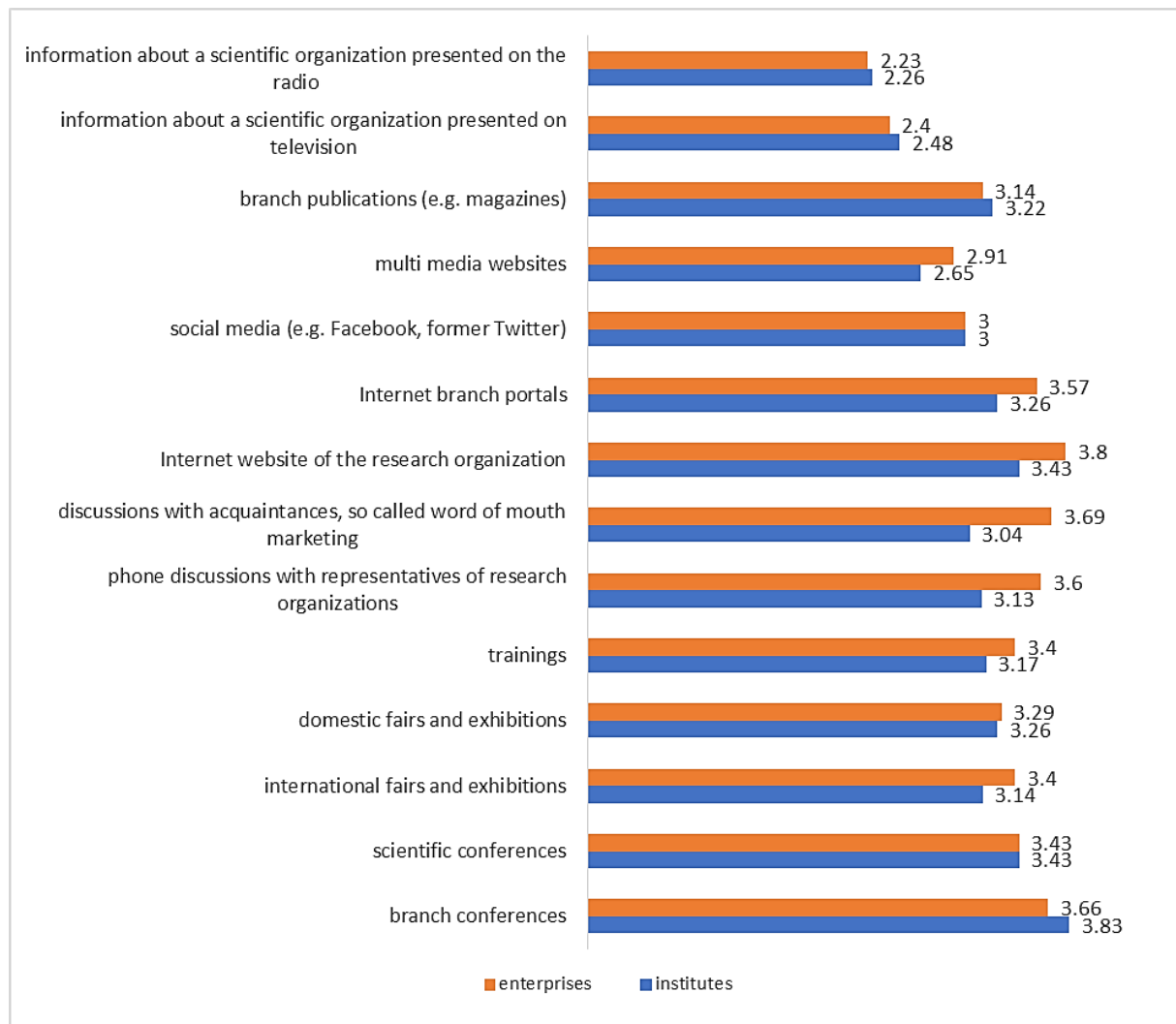


Figure 3. Frequency of using the following sources by enterprises while searching information about offers of scientific organizations.

It is worth highlighting that the enterprises used the Internet website of the research organizations as the source of information, then they indicated a use of a so called word of mouth marketing and branch conferences.

The analysis and comparison of survey results also included two time intervals, i.e. the year 2022 and the year 2023. In the year 2022 there were 69 indications and in the year 2023 – 99 indications which reflect 43% increase in efficiency of using different marketing tools. Fig. 4. presents 69 indications in the year 2022 and Fig. 5 – 99 indications in the year 2023.

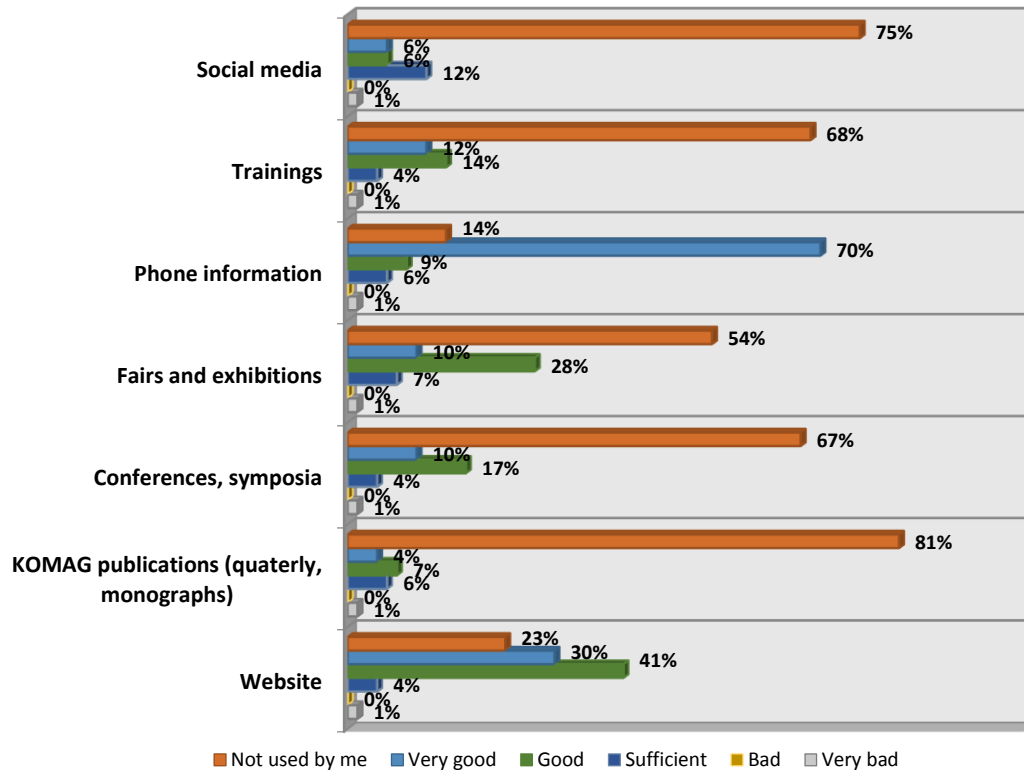


Figure 4. Use of different marketing tools in the year 2022 (69 indications).

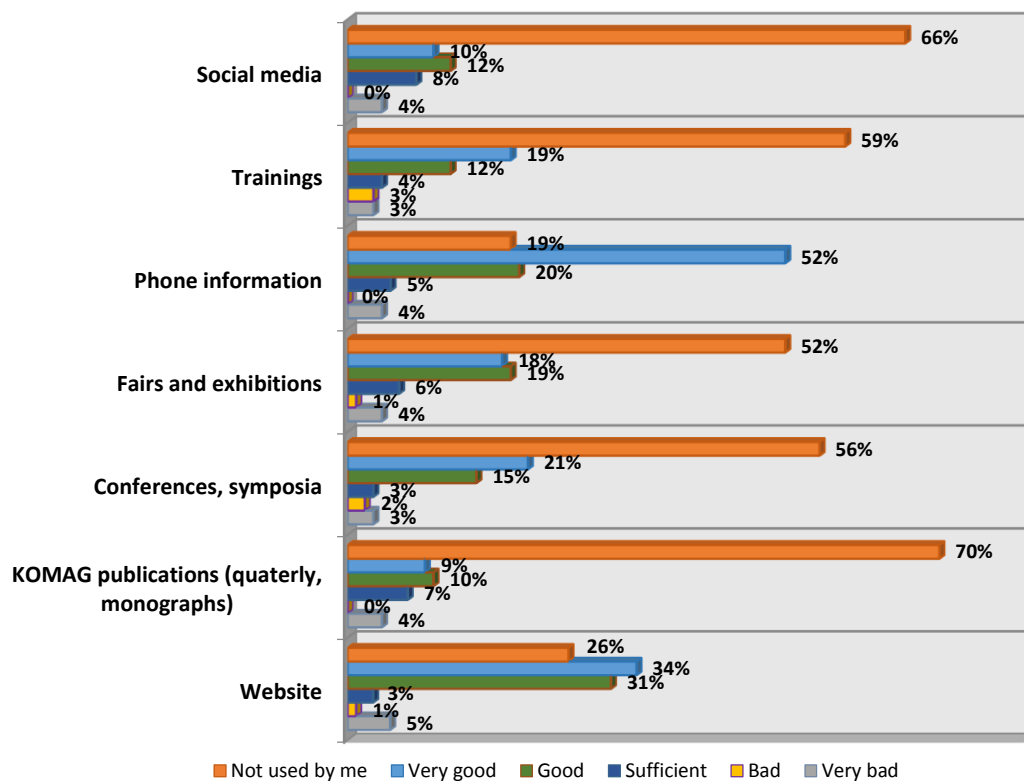


Figure 5. Use of different marketing tools in the year 2023 (99 indications).

It should be noticed that in the year 2022 1% of respondents assessed all the marketing tools, subject to the analysis, as very bad, whereas in the year 2023 the opinion “very bad” varied from 3 to 5%. The number 3% concerned trainings as well as conferences and symposia, but the number 5% concerned websites which needs taking corrective measures as soon as possible.

6. Conclusions

The Authors presented a research problem consisting in an investigation of using the Internet and social media as marketing tools in commercialization processes of R&D projects’ results. They were oriented onto phenomena, events and processes between creators of research results, i.e. research institutes and their users representing industrial enterprises.

- The article is primarily of cognitive values, emphasizing the importance of modern technologies in the marketing activities of research organizations, but it also gives some guidelines which can be used in successful commercialization processes of R&D project results.
- Internet and social media are important marketing tools that stimulate the management of modern research institutions which intend to apply the latest solutions enabling to reach specific groups of stakeholders.
- The dynamic perspective of social media marketing enables to conclude that the early stage of its usage, focused on supporting promotional activities, changes from tactical to strategic usage.
- Social media marketing is perceived as an important source of competitive advantage and a value creation.
- The obtained survey results enabled to compare opinions of industrial partners versus scientific and research institutes.

The crucial role of Internet and social media as marketing tools in commercialization processes is reflected in the survey results obtained during the presented project. They are important for building relationships between research organizations and industrial enterprises which use different forms of research results. These relationships are based on mutual interest, trust and understanding. Traditional marketing activities transfer the information to indefinite recipients whereas the marketing activities in the social media concentrate on recipients, realizing a two-directional dialogue moderated by recipients.

References

1. Barker, M.S., Barker, D., Bormann, N.F., Neher, K.E., Zahay, D. (2013). *Social media marketing: A strategic approach*. Mason, OH: South-Western Cengage Learning, p. 330.
2. Bullock, L., Agbaimoni, O. (2012). Marketing w mediach społecznościowych – dlaczego i jak firmy muszą z niego korzystać? *Prace Instytutu Lotnictwa*.
3. Kaplan, A.M., Haenlein, M. (2012). Social media: back to the roots and back to the future. *Journal of systems and information technology*, 14(2), 101-104.
4. Kietzmann, J.H., Hermkens, K., McCarthy, I.P., Silvestre, B.S. (2011). Social media? Get serious! Understanding the functional building blocks of social media. *Business horizons*, 54(3), 241-251.
5. Kowalski, K. (2011). Tajniki skutecznej reklamy. *PC World*, no. 3.
6. Mącik, R., Mazurek, G., Dorota, M.Ä. (2012). Channel characteristics' influence on physical vs. virtual channel choice for information search and purchase—the case of polish young consumers. *International Journal of Cyber Society and Education*, 5(1), 35-54.
7. Malec, M., Stańczak, L., Ricketts, B. (2020). Integrated commercialization model of research and development project results. *Management systems in production engineering*, 28(4), 228-239.
8. Malec, M., Stańczak, L., Ricketts, B. (2023). Just transition of post mining areas—technical, economic, environmental and social aspects. *Mining Machines*, 41.
9. Mazurek, G. (2012). Virtualization of marketing. *Contemporary Management Research*, 8(3).
10. Mazurek, G. (2016). Ewolucja wykorzystania mediów społecznościowych w marketingu. *Nierówności społeczne a wzrost gospodarczy*, 45, 23-31.
11. Podlaski, A. (2011). *Marketing społecznościowy: tajniki skutecznej promocji w SOCIAL MEDIA*. Helion.
12. Raiko, D., Shypulina, Y., Vasylytsova, S., Oborina, A., Fedorenko, I. (2023). Development of a system of motivation for employees of the marketing department of the enterprise for product promotion using tools of informational interaction of virtual space. *Eastern-European Journal of Enterprise Technologies*, 123(13).
13. Stańczak, L. (2020). Innovative techniques and technologies for the mining industry—conclusions from the KOMTECH-IMTech 2020 Conference. *Mining Machines*, 4.
14. Szewczyk, A. (2015). Marketing internetowy w mediach społecznościowych. *Zeszyty Naukowe. Studia Informatica*. Uniwersytet Szczeciński.
15. Tarapata, J. (2022). Modern technological means used by modern companies in marketing communication. *Zeszyty Naukowe. Organizacja i Zarządzanie*, 159. Politechnika Śląska.
16. Toukola, S., Stähle, M., Mahlamäki, T. (2023). Renaissance of project marketing: Avenues for the utilisation of digital tools. *Project Leadership and Society*, 4, 100091.