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EVALUATION OF THE MARKETING COMMUNICATION OF SCIENTIFIC UNITS IN THE CONTEXT OF COOPERATION WITH THE SECTOR OF SMALL AND MEDIUM ENTERPRISES IN LODZ REGION

EVALUATION OF THE MARKETING COMMUNICATION OF SCIENTIFIC UNITS IN THE CONTEXT OF COOPERATION WITH THE SECTOR OF SMALL AND MEDIUM ENTERPRISES IN LODZ REGION

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Summary

An essential role in the constant overcoming of barriers as well as in the development of cooperation on the line "science-business" is played by proper marketing communication carried out by scientific units, being the party initiating the commercialization processes. The aim of the article is to evaluate selected aspects of marketing communication carried out by scientific units during cooperation with small and medium enterprises (SMEs) representing the smart specializations of the Lodz region. The article discusses the results of research carried out in the second and third quarter of 2018, based on the method of indirect communication with respondents, using a questionnaire among the representatives of companies belonging to the smart specializations of the Lodz region. The research results prove that scientific units do not use the available spectrum of marketing communication tools in cooperation with companies and do not use the language of market benefits in the description of knowledge being the subject of commercialization. The majority of respondents are convinced that the level of use of online communication tools by scientific units is low and medium, which automatically transfers into lowering its perception as innovative partners. On the other hand, in the opinion of the surveyed companies, the use of the possibilities created by the Internet Web 2.0 era by scientific units in marketing communication, can positively affect their image in the business environment.

Keywords: marketing communication, cooperation, scientific unit, on-line communication, marketing message, R&D

Introduction

Cooperation of scientific entities and business environment is a very desirable and necessary phenomenon for the development of knowledge-based economy. As Sojkin and Michalak (2016) emphasise, in the era of globalisation, professionalisation and internationalisation of the economy, there is a need to transform the role of universities into an entity dynamically influencing market and manufacturing processes. Apart from natural preparation of personnel for the economy, the role of the university is to conduct R+D works together with enterprises or on their behalf. Practically every research and development activity (with the exception of basic research) is oriented towards the application of its results in practice, which means that it should take into account the market and business context. The level of knowledge of external conditions is directly proportional to the level of advancement of R+D works (Koszałka, 2016). In practice, this means that conducting work at an increasingly higher TRL[1] level requires more and more market and business knowledge, which is unambiguously related to the way and degree of integration of marketing communication. Therefore, from the marketing point of view, the offer of scientific entities for enterprises is a product which is subject to similar laws as other products on the B2B market. Due to the regulations concerning the functioning of scientific institutions (parameterization system, evaluation criteria or financing system) and the purpose of their activity, scientific entities cannot be treated, in a direct way, as commercial enterprises. Therefore, the aspect of marketing communication refers only to activities related to the process of knowledge commercialisation, i.e. science-business relations (Milczarek, 2017). Here, similarly as in market enterprises, the marketing message is the main determinant of success in the sales area (in this case, the commercialisation of knowledge). The scale of knowledge commercialisation in scientific entities, in turn, directly influences the level of innovativeness of the region and the country. This level is the higher the more the results of development works and industrial research correspond to the real needs of entrepreneurs (Borscht, 2016). According to the theory of the triple helix proposed by

Leydesdorff and Etzkowitz (2001), scientists in their relations with industry are expected to be active in the area of developing innovative solutions whose practical application will give them competitive advantages.

Unfortunately, in practice, according to research carried out (Warsaw Enterprise Institute, 2016; European Commission, 2007), the main barriers to cooperation between entrepreneurs and representatives of the world of science are of a communicative nature. They belong to them:

- negative image of science and scientists who, in the opinion of entrepreneurs, do not understand the questions posed to them in the context of business objectives, i.e. the market success of the implemented solution,
- perceiving activities resulting from cooperation with scientists as not significant for running a business (generating revenues and profit),
- convincing entrepreneurs of the asymmetry in the transfer of benefits,
- negative experiences of business in contact with science.

The authors of the report summarize the research with a thesis that the reluctance of Polish entrepreneurs to undertake joint actions with scientists results mainly from a negative perception of Polish science and a belief in its low level of applicability and detachment from business reality. What is interesting, negative opinions on science were given to a greater extent by entrepreneurs who did not have any experience in cooperation with scientific entities. This fact reveals even more clearly the errors of marketing communication conducted by scientific entities, which as a supply side are obliged to positively activate the market through, among others, the use of communication instruments and tools characteristic for the B2B segment. Only in this way can they achieve an increase in the degree of commercialisation of knowledge, while at the same time breaking the current mental barriers on the part of enterprises (Kulczycki, 2017). This positive activation of the external environment is a factor that leads to a two-way flow of constructive information (features of immanent marketing communication), i.e. a comparison of the needs of enterprises with the

capabilities of scientific entities. Feedback, which, as we know, is the recipient's reaction to the message sent by the sender after its decoding, will then begin to serve as a source of valuable information from the external environment, and not just as an opinion generator as is the case today. The process of filling in the information gap, which according to Matusiak and Guliński (2010) has a long-term and complicated origin, will take place. Its causes should be sought primarily in the traditions and values represented by universities, the goals set, the career model and evaluation of a researcher, as well as in market priorities, business culture, constant uncertainty and the time horizon for decision making in economic entities.

Literature on the national and international level quite well defines both the motives for cooperation between the parties (e.g. Bjerregaard, 2009; Breen&Hing, 2002; Santarek and others, 2008) and the main obstacles in establishing cooperation (e.g. Feldy, 2014; Hakansson, 2014; Kuna-Marshalek and others, 2013; Mikosik, 2017; Urmański, 2016). Therefore, it seems interesting to evaluate the marketing communication conducted by scientific entities in the context of cooperation with enterprises focused on development through belonging to regional smart specialisations.

The aim of the article is to evaluate selected aspects of marketing communication conducted by research units in cooperation with SMEs representing intelligent specializations of the Łódź Province.

Key factors of marketing communication of scientific entities in the context of cooperation with enterprises

One of the key factors of effective communication between science and business entities is the way in which they encode the message addressed to the environment. Due to cultural differences between the two environments (science and business), the coding of the message must take into account the elements characteristic for the perception of enterprises, such as competitiveness, profit or the

highest quality (Kleiber, 2004; Marszałek, 2010; Różański, 2013). Therefore, the basic idea of the message should be presented in the construction of the communication, i.e. the benefits to be received by the recipient. In this case, the promotional constance must flexibly combine the substantive experience of the research unit with the innovative perception of business reality. Unfortunately, the tendency of scientists to frequently use metalanguage, i.e. concepts with a high degree of synthesis, is not conducive to decoding the message in an intended way (Mikosik, 2017). The structure of the marketing message and the way it is encoded are therefore of fundamental importance in relations between the world of science and business, and the growing specialisation of R&D work will further increase this significance (Hakansson, 2014).

Due to the nature of cooperation between research institutions and enterprises, the most frequently used channels of communication are personal channels, i.e. direct communication between research workers and entrepreneurs. This type of communication, due to its individualized character and real-time feedback, determines the process of knowledge commercialization. After a direct meeting with a scientist, an entrepreneur makes decisions on further cooperation, which is connected with a financial investment on his part. This is why it is so important to stress the market benefits that the enterprise will gain when deciding to purchase technology or knowledge in a research unit. Felda's research (2014) shows that direct contact between a scientist and an entrepreneur on average increases the possibility of cooperation between both institutions by more than nine times.

Marketing communication both in enterprises that want to increase their market value and in scientific entities whose task is to conduct R+D works, serves as a link with the external (internal) environment. Due to the two-way flow of information, marketing communication is a system thanks to which organisations can also obtain information, which distinguishes it from promotion. As a system, i.e. a set of interconnected elements, marketing communication is effective only when there is absolute consistency of

the message with the coding system, the type of recipient and the context in which the message is transmitted. Feedback, as the recipient's reaction to the sender's intentions, is a kind of verification of the correctness of information encoding, as well as the permeability of the applied transmission channels. In the case of enterprises, a measurable indicator of a properly constructed communication architecture is the purchasing reaction of customers, an increase in the level of brand recognition or the number of positive ratings in social media. In relation to scientific entities, however, it will increase the interest of the business environment in the conducted R&D works, as well as increase the scope of its orientation regarding the research capabilities of a given entity. Due to the nature of the offer of scientific entities and the specific nature of its addressee (usually a private entity from the SME segment), the best results are achieved by communication in personal channels, which is additionally most expected by the business environment (Urmański, 2016). Personal channels of marketing communication are characteristic of the B2B market, where the message is highly specialised and the details need to be specified in detail.

Testing methodology

Basic empirical research, preceded by pilot studies, was carried out at the turn of May and August 2018. The method of indirect communication with the respondents using a questionnaire was used during the research. The research was conducted among representatives of micro, small and medium enterprises belonging to intelligent specialisations of the Łódź Province.

The survey was conducted in accordance with the scope described in Table 1.

Table 1. Scope of research

Material scope	Marketing communication process
Entity scope	Companies belonging to regional specialisations in Łódź
Spatial scope	Łódź Province
Source of information	Original: materials from our own empirical research
Research method	Method of indirect communication with respondents using a questionnaire
Time range	05.2018-08.2018.

Source: Own elaboration.

The questionnaire was drawn up in Word as well as using an interface at https://www.interankiety.pl/ and a link activating its completion was sent together with a cover letter to the respondents. Due to the high risk of antispam rejection, mailing by means of a questionnaire portal was abandoned. If the respondent asked for a survey in a noninternet form, the questionnaire was sent in a Word document format.

In the study, a targeted, layered selection of the sample was used. The questionnaire was sent to 10% of the population (Tab.2). The selection of enterprises in particular layers was random. The basis on which the division into layers was made was the CDIG and CRN (KRS) registers.

Table 2. Smart specialisation enterprises in Łódz Province

Specialisation	Micro	Small	Medium	Total	Number of questionnaires sent
Modern Textile and Fashion Industry (including Design)	8 793	923	155	9 871	981
Innovative Agriculture and Agricultural and Food Processing	5 548	624	134	6 306	631
Energy (including OZE)	584	42	31	657	67
Medicine, Pharmacy, Cosmetics	13 039	345	104	13 488	1 350
Advanced Building Materials	3 591	307	77	3 975	398
IT and Telecommunications	4 614	101	10	4 725	473
Total	36 169	2 342	511	39 022	3 900

Source: Own calculations based on the CDIG and CRN (KRS) registers.

135 completed questionnaires were received, representing 3.46% of all sent questionnaires. This result, with a population of 39.022 subjects and a confidence level of 95%, gives a maximum statistical error rate of 8%.

The survey involved 135 companies among which there were:

- 32 entities representing modern textile and fashion industry (including design),
- 10 entities from the area of innovative agriculture and agri-food processing,
- 13 entities representing the energy sector (including EE,OZE),
- 16 entities from the medical, pharmaceutical and cosmetics sectors
- 23 entities representing the advanced building materials sector,
- 41 entities from the area of IT and telecommunications.

84 surveyed entities declared that they represent micro, 41 small and 10 medium-sized enterprises. Among the surveyed group there were dominating entities operating on the market for more than 10 years. The size and age structure of enterprises reflects the SME segment (not only the smart enterprise sector) in the Łódź region, which is dominated by entities employing up to 9 employees, present on the market for over a decade.

Enterprises were divided into 5 groups (A–E). Cooperation with the research unit currently being implemented (group A) was declared by 11 enterprises, which constitutes 8.1% of the surveyed population. The same values are represented by group B, i.e. enterprises which in the last 3 years have cooperated with scientific institutions in the Łódź region. Group C includes economic entities that have made unsuccessful attempts at cooperation. This group consists of 13 enterprises and constitutes 9.6% of the total number of respondents. 33 of the surveyed entities (group D) have never established partnership relations with a scientific institution, but they declare such an intention in the next 3 years. Therefore, these are potential and, more importantly, cooperation-oriented entrepreneurs whose share in the surveyed group amounted to 24.4%. On the other hand, group E included 67 enterprises, i.e. 49.6% of respondents who did not

cooperate with scientific institutions and do not intend to do so in the future.

To sum up, it can be stated that the surveyed enterprises represented different stages of cooperation with scientific entities (group A, B and C), as well as different attitudes towards cooperation in the future (group D and E). The surveyed group included a cross-section of companies belonging to Łódź, intelligent specialisations in terms of size and years of functioning on the market. Differentiation was also observed in the type of business activity and the type of customer served.

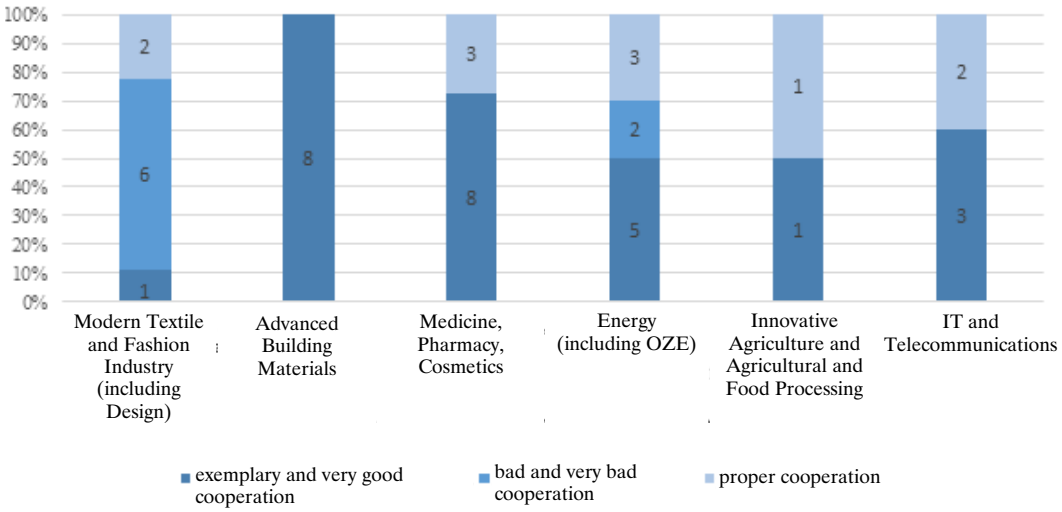
Selected research results are presented below.

Results of empirical studies

The evaluation of cooperation among enterprises with which scientific institutions have conducted or are currently conducting joint projects has been positive. In the case of each group of scientific entities, the majority of the evaluations were good and very good. The highest percentage of positive marks in relation to all the opinions issued was recorded by scientific institutes and artistic entities (75% of positive marks). The highest ratings for cooperation with scientific institutions in the region were given by entrepreneurs from construction specialisation, in which 100% of respondents issued model and very good notes. On the other hand, the group most dissatisfied with the marriage with science turned out to be entities operating in the area of the traditional Łódź industrial sector, i.e. textiles (Fig. 1).

Statistical analysis, that was made, allowed to identify the correlation between the type of research unit and the assessment made by enterprises belonging to the group of intelligent regional specialisations. In the case of assessments obtained by scientific entities, it turned out that the relationship with the type of entity is not statistically significant ($chi^2 = 8.029$; $p > 0.05$). On the other hand, a statistically significant correlation between the scores awarded and the enterprises' belonging to a given regional specialization ($chi^2 = 28.398$; $p < 0.05$).

Figure 1. Evaluation of cooperation with scientific entities by enterprises from Łódź regional specialisations



Source: Own calculations.

Among the respondents belonging to groups A and B there were 7 entrepreneurs who cooperated with more than one employee of the research unit and were unable to determine which contacts were the most frequent. In the remaining 15 cases, respondents indicated only one person who dominated in cooperation with the research institution. The highest number of indications, as a person with whom entrepreneurs most often had contact in a scientific institution, was given to a scientist (prof., PhD habilitatus.,PhD), and the lowest number to the Centre for Technology Transfer (CTT) of a scientific institution. None of the assessments of the work of persons employed in scientific institutions was negative, and definitely good and very good marks prevailed.

Summarizing the assessment of cooperation with research institutions made by respondents from groups A and B, one can notice that enterprises belonging to Łódź regional specialisations cooperate with more than one research institution, which means that they are

looking for interdisciplinary solutions that can help them run their businesses in various areas. The most popular among business entities are the scientific entities being a part of the Technical University of Łódź, which may prove the need for product and process innovation in the industrial area. The highest level of science-business contacts is assessed by construction companies and at the same time the vast majority of them declare their future cooperation. The most disappointed by the cooperation with science are entities belonging to the textile specialisation, which may be related to the declining character of this sector in its present shape in the region.[2]

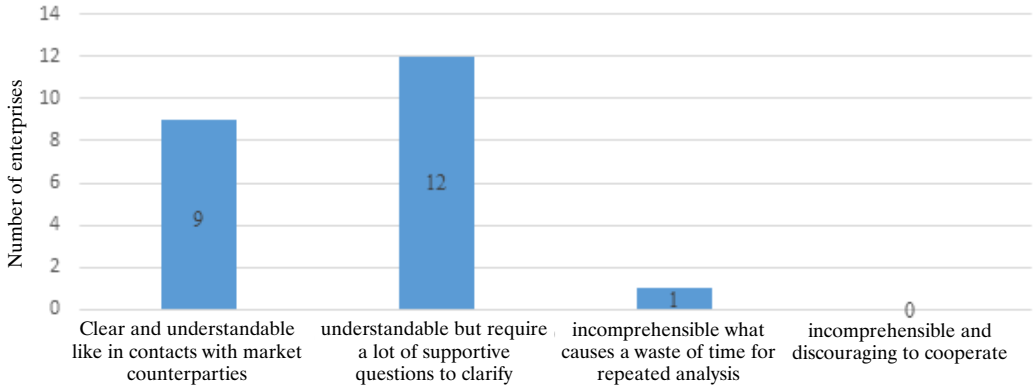
Scientific entities as entities are rated much worse than scientists and administrative staff working in them. The results in this respect confirm the level of trust in scientists and scientific entities presented in Urmański's research (2016).

The research also gave an answer to the question which of the sources of information about the offer of scientific entities (the subject of later cooperation) was the main one from which entrepreneurs drew. The analysis of the respondents' answers clearly shows that it was the conversation at a scientific conference, symposium or trade fair that gave an impulse for later cooperation. This type of communication was indicated by 16 out of 22 respondents. The second place was taken by business contractors (22.7%), and the third place, with a share of 4.5%, was taken by the website of the research unit. The remaining variants (advertising materials, social media, newsletter, "open door", advertisement in the mass media) did not receive any indication.

In terms of understanding the information provided by research units, the opinions of respondents were divided (Fig. 2).

Despite the necessity of asking auxiliary questions by entrepreneurs, the vast majority of the message was considered understandable. Only one of the respondents considered the language of the scientists communicating with it as requiring repeated analysis, i.e. additional time needed for proper decoding of the message. In this case, there was a lack of statistical significance between regional specialisations and the evaluation of information coding by scientific entities ($chi^2 = 6.223$; $p > 0.05$).

Figure 2. **Assessment of information coding by scientific entities in the opinion of respondents**



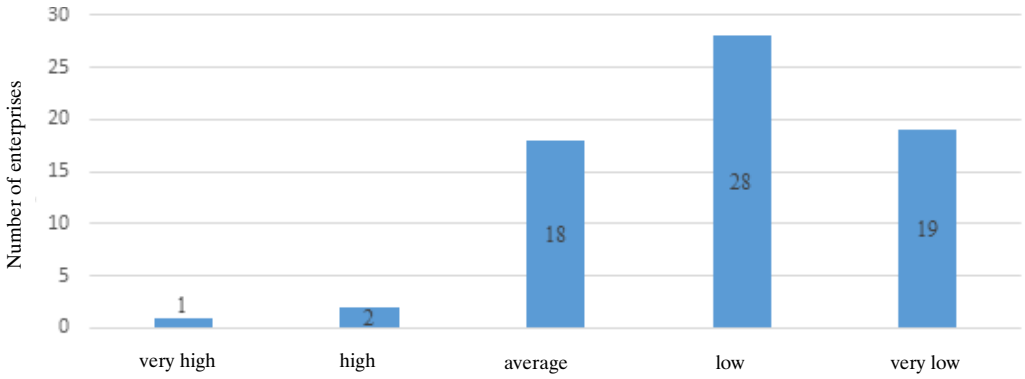
Source: Own calculations.

Interpersonal communication is therefore the key to increasing the number of successful commercialisations of knowledge. Its main element, i.e. feedback, undoubtedly makes it easier for both parties to understand the message and thus their mutual intentions. The results of the survey clearly showed that the largest group of respondents understood the message after asking additional questions, which would not be possible (in real time) in another model of marketing communication.

The results of the research showed unequivocally that the degree to which scientific entities use the whole spectrum of marketing communication tools is unsatisfactory (Fig. 3).

Among the respondents from groups A–D, i.e. entities which had contact or intend to establish cooperation in the future, only 3 entrepreneurs defined this level as high and very high. 18 entrepreneurs stated that this level is medium, which means that scientific institutions still have a lot to do in this respect. The largest group of entities, which constitutes 69.1% of respondents, described the level of using marketing communication tools by scientific entities as low and very low. It is noteworthy that there was an exceptional consensus among the respondents, regardless of their belonging to a given regional specialisation.

Figure 3. Degree of use of marketing communication tools by scientific entities in the opinion of respondents



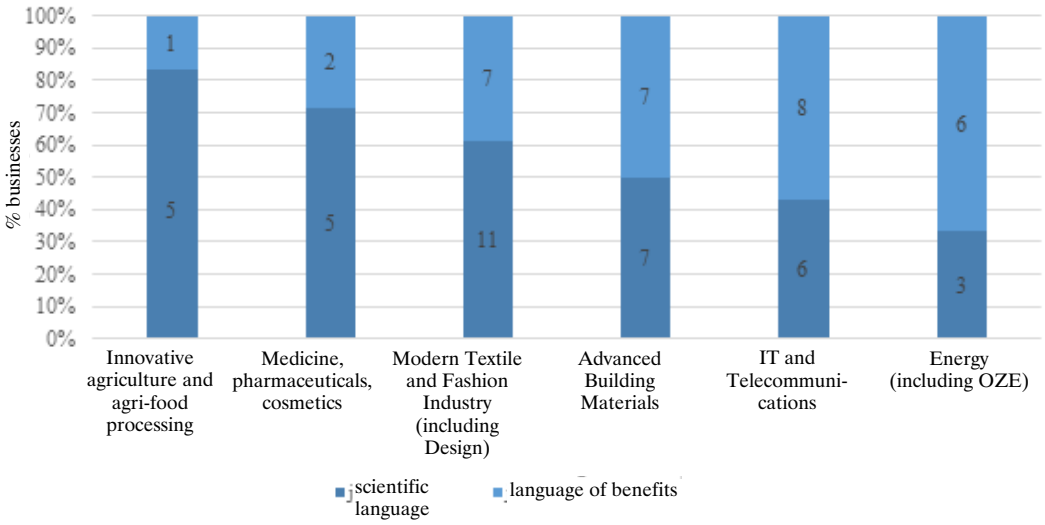
Source: Own calculations.

In the case of evaluation of the language used by scientific entities in relation to the description of the offer addressed to enterprises, the respondents were divided (Fig. 4). 37 out of 68 entities answering this question found the description of the offer to be scientific, which does not include practical market benefits for enterprises. The opposite opinion was expressed by 31 entrepreneurs who perceived the benefits of cooperation in the communications of scientific institutions. The specialisations that dominated in this group were the IT and energy sectors. Perhaps it is related to the specificity of both specialisations, in which innovative market solutions (expressed in values commonly known in the industry) are noticed without additional explanations. Statistical analysis showed a lack of statistical significance between regional specialisation and the assessment of the language used (chi^2 = = 5.641; $p > 0.05$).

The results of the study unequivocally revealed the weaknesses of scientific institutions in operating in a hypermedia computer environment, in the context of marketing communication with business entities. The perception by commercial entities of the degree of using the possibilities offered by the Internet in scientific institutions places it at a low and very low level. Only 16.7% of all ratings indicate this degree as high and very high, 38.2% of

respondents assessed the degree of using elements of on-line communication by scientific entities as medium, and as much as 45.1% as low or very low. This is definitely not enough in the era of Web.2.0. Even if in reality this level is much higher, it does not change the fact that the reception of activities of scientific entities in this area is negative. In this case, there was no statistical correlation between regional specialization and the evaluation of the degree of using elements of marketing communication by scientific entities (chi^2 = = 12.503; $p > 0.05$).

Figure 4. **Assessment of the language used by scientific units to present the offer for enterprises in the opinion of respondents**

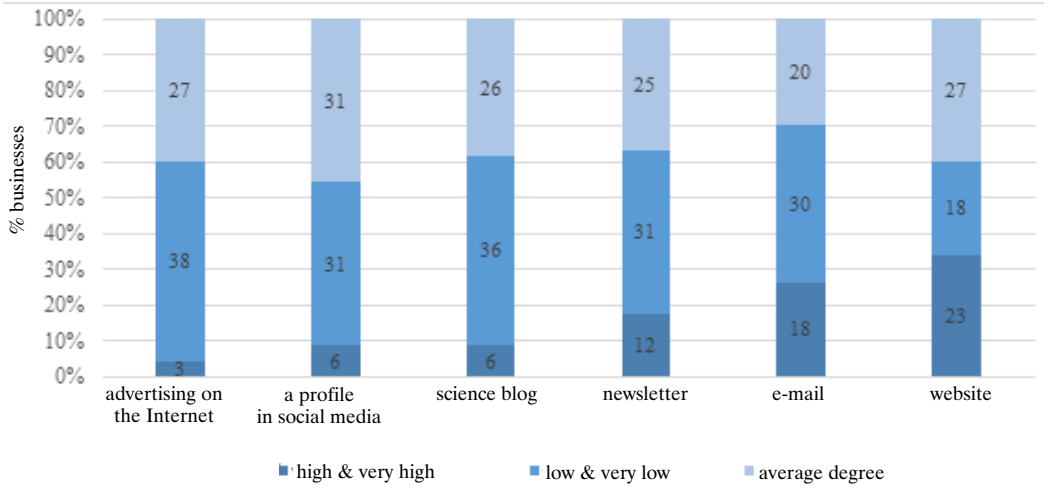


Source: Own calculations.

Of all the assessable elements of online communication, advertising on the Internet, social media profile and science blog received the lowest level of use (Fig. 5). The comparison shows that respondents surfing on websites or social media rarely encounter information from research institutions (in various forms), as it is the case with commercial entities. In turn, the newsletter, e-mail and website received slightly higher ratings, but still below the average, as elements of online communication used by research institutions. The

degree to which all Internet communication instruments are used, without exception, in the assessment of business entities is insufficient in relation to the possibilities offered by scientific institutions. It is therefore a clear signal sent to scientific entities that are interested in cooperation with business, as well as an element shaping their image among entrepreneurs.

Figure 5. **Degree of use of individual elements of on-line communication by scientific units in the opinion of respondents**



Source: Own calculations.

76% of the respondents believe that the use of a range of modern Internet communication tools by scientific entities has a positive impact on their image in the business environment. Only 6% of respondents believe that using marketing communication tools in the Internet environment is now a standard and does not create premises for innovation.

The results of the research confirmed that scientific entities do not use the available spectrum of marketing communication tools in cooperation with enterprises. Similarly, scientific entities do not use the language of market benefits in the description of knowledge that is

subject to commercialisation. It was also stated that the use of the opportunities created by the Internet era Web 2.0 in marketing communication by scientific entities has a positive impact on their image in the business environment. The results of the research have shown that the use of forms of communication available in the hypermedia computer environment by scientific entities contributes to the creation of the image of an innovative business partner.

Summary

In Poland, alliances between science and business are inevitable, as is the case in countries with the highest level of IDP[3]. The economic reality forces both groups to overcome their mutual prejudices and bring about a lasting agreement based on trust, but also on market principles.

Summarizing the evaluation of cooperation with research institutions, which was made by respondents from groups A–D, i.e. entrepreneurs who are at different stages of cooperation with research institutions, it can be stated that:

- Almost 70% of the respondents believe that scientific entities do not sufficiently use the range of marketing communication tools in the context of cooperation with business.
- Almost 85% of respondents are convinced that the level of use of online communication tools by scientific entities is low and medium, which automatically translates into lower perception of them as innovative business partners according to 76% of respondents.
- Only for 45% of enterprises the language used by research units to describe their commercialization offer is understandable and shows potential market benefits from its implementation. This result means that more than half of the respondents have problems with perceiving the profits flowing for them in the presentation of the offer. In the case of entrepreneurs, investing capital (time, money, human and material resources) in an undertaking in which they do

not see measurable benefits (profit, increasing market share, increasing brand recognition, etc.) is very rare. The mere fact of not recognising market potential in knowledge intended for commercialisation does not mean that it does not exist. Often scientists, focused on broadening knowledge, simply do not expose it or are not able to do it in a market way, characteristic for B2B market.

The correct (in accordance with the rules of the institutional market) use of marketing communication tools determines the successful cooperation of scientific entities and enterprises. As it has been repeatedly pointed out, the creator of the message between science and business should be a scientific institution that has intellectual potential, as well as tools for market interaction. It is the scientific entities that should bear the burden of selecting appropriate communication tools, communication channels and forms of communication, and they must have the ability to read information flowing through feedback in order to modify future communications addressed to the business sphere. Consequently, it is necessary to change the attitude of both environments and break down barriers in mutual relations, resulting in an increase in the number of joint implementation projects.

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[1] TRL (Technology Readiness Level) determines the technological readiness, i.e. the stage of development of a given solution. The methodology assumes 9 levels of technological readiness. Stages II–VI are considered industrial research and Stages VII–IX are considered development works. Stage I of TRL is the level of basic research.

[2] The region is dominated by clothing sewing plants, clothing knitwear manufacturers and trading companies, and there is no strong representation in the segment of innovative technical fabrics, which are the future of the industry in the EU. Enterprises with the dominant PKD (Polish Classification of Activities) from Division 13 (textiles production) and 14 (clothing production) according to Eurostat technology classification belong to the low-technology group.

[3] The Summary Innovation Index (SII) determines the level of innovativeness of EU countries (25 other partial indicators are used to calculate it).

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