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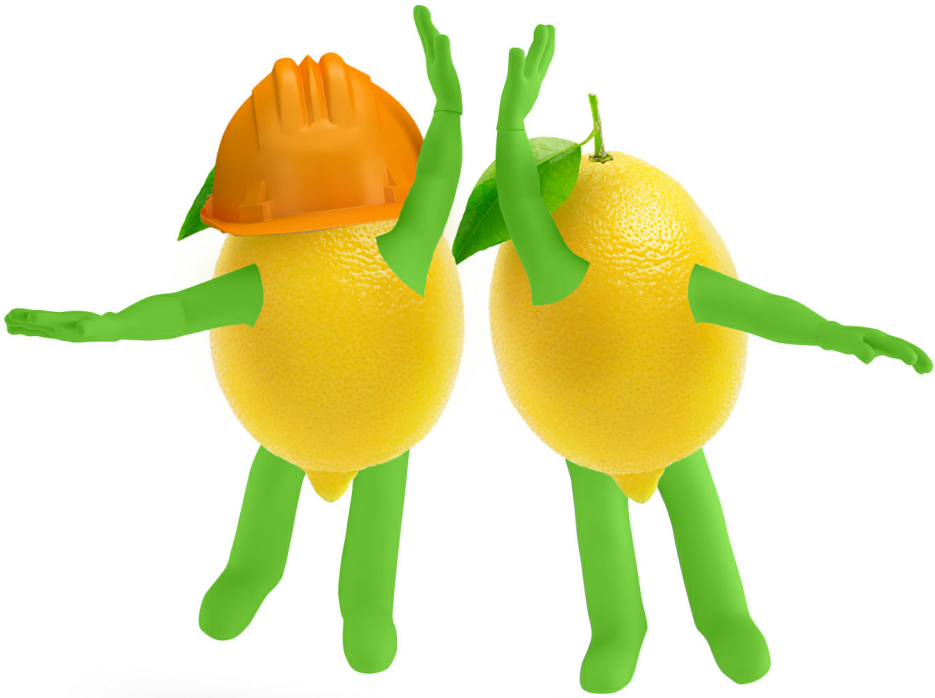

FACTORS DETERMINING EFFECTIVE COOPERATION OF COMPANIES WITH SCIENTIFIC-RESEARCH UNITS

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FACTORS DETERMINING THE EFFECTIVE COOPERATION OF THE SCIENTIFIC AND RESEARCH UNITS

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Summary

The aim of this article is to present and analyse the factors that affect the success of the cooperation between science and business. The inspiration to write this article were the results of research conducted during the years 2015–2016 by a team of Academy of Management in Warsaw. These studies describe the problem of low level of innovativeness of the Polish economy. The goal of these researches was to identify barriers of innovation resulting from the wrong policy of the state, activities of enterprises and activities undertaken by research institutions.
In this article, only the results of studies that concerned issues of cooperation between science and business are discussed. Then, in the course of further deliberations the difficulties in the communication and building relationship between business and science will be clarified.
Theses:

- The low level of innovativeness of Polish economy steam from the low level of cooperation between enterprises and research institutions
- A key reason for the low level of cooperation between science and business is the inability to build relationships and establish communication between the two communities

The summary presents suggested solutions that could support both communities in establishing and developing cooperation.

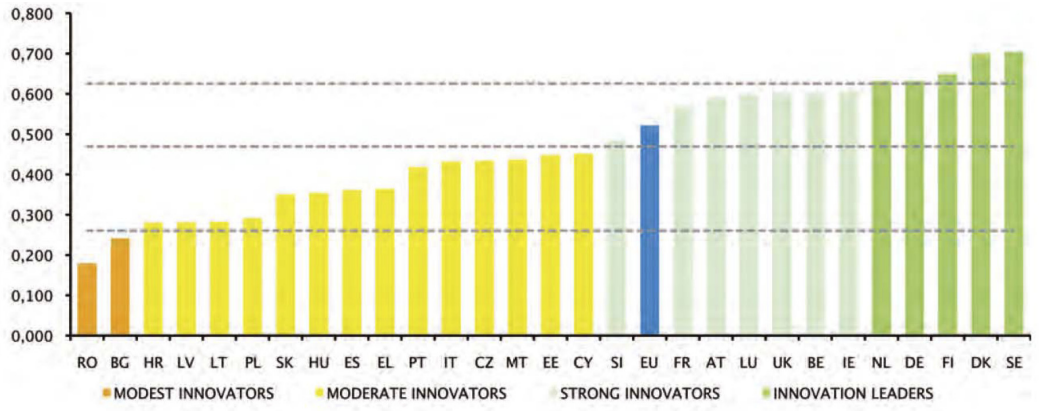
Keywords: communication, relationships, barriers, cultural differences, misunderstanding

Indicator of the innovativeness of EU countries

One of the most important factors behind the development of the economy and building the competitiveness of companies is innovativeness. This issue has gained huge popularity both in the business environment and the scientific environment. The indicator of innovativeness is one of the most important indicators for the assessment of a country's level of economic development.

There are many indicators of an economy's innovativeness. The crucial, most synthetic indicator illustrating the level of innovativeness is Composite Indicator of Innovativeness (CII). 25 factors are used to calculate the indicator.

Picture 1. **The level of innovativeness of European Union countries**



Source: Report, European Innovation Scoreboard 2016, http://ec.europa.eu/DocsRoom/documents/17822

Members of the European Union covered by the research were divided into 4 groups: leaders, strong innovators, average innovators and weak innovators.

- The first group are leaders, whose innovativeness indicators are more than 20% higher than the average for the European Union. Among them there are: Denmark, Finland, Germany, Holland and Sweden,
- The second group consists of strong innovators and contains countries

whose CII indicator ranges between 90% and 120% of the EU average. Among them there are: Austria, Belgium, France, Ireland, Luxembourg, Slovenia and Great Britain,
- The third, biggest group consists of average innovators. Among them there are 14 countries with an innovativeness indicator ranging from 50% to 90% of the average for Europe. Poland belongs to this group,
- The last group consists of weak innovators, whose indicators don't exceed 50% of the EU average. This group includes two countries: Romania and Bulgaria.

Poland's sixth place from the bottom should be food for thought. Poland is ahead of just Romania, Bulgaria, Croatia, Latvia and Lithuania. In case of Poland most indicators forming the general Synthetic Innovativeness Indicator are well below the average for the European Union. EU reports emphasize in particular, among others:

- Very weak links between business and research institutions,
- Low indicators of publications developed in public-private partnership and
- Low indicators of publications developed in international partnerships,
- Low level of implementation of patents[1]

Research on the barriers for innovativeness conducted by a scientific team of Warsaw Management University

This situation, which is unfavourable for Poland, was the source of motivation for the scientific team of Warsaw Management University under the leadership of professor Stanisław Sudoł and professor Krystyna Poznańska to conduct broad research. The intention of the research was the will to explain the reasons for low level of innovativeness of Polish economy and proposing solutions that could improve the state of affairs. The research was conducted from 2015 to 2016 and was financed by the National Science Centre (NCN) and was titled "Conditions for boosting the dynamics of technological innovativeness in Polish industrial companies". The main goal of the research was the identification of factors hampering and facilitating

starting research, looking for innovations and implementing these innovations. The subjects of the research were companies, scientific-research units and the sphere of state politics.

Research method

Apart from theoretical studies, or the analysis of scientific literature and economic publications, for the purpose of achieving the goals of the research three empirical research methods were applied:

- delphic method on a group of experts,
- questionnaire surveys on a group of industrial companies,
- interviews in scientific and research units.

The key research method was the delphic method. What this method involved is that the group of experts answered the same questions, asked in surveys and questionnaires, three times. After filling out the questionnaires each time, the research team would send the prepared results to experts, who could learn the views of other participants of the research. Each of the experts, while filling out the questionnaire another time had the opportunity to verify his earlier opinions. Experts were free to decide, whether they wanted to leave their earlier opinions unchanged or whether they wanted to change them. The experts learned the prepared results twice, after the end of the first and the second round of the survey. The answers given in the third round served as the basis for the preparation of the final report.

The group of experts consisted of 18 people working in science and in practice, associated with the issues of innovativeness in the economy. They were chosen by the research team of Warsaw Management University on the basis of such criteria as held scientific and professional titles, knowledge of the subject of innovativeness, diversity of institutions and research units they work for.

The second direction of research was a survey on a group of companies. In this case the surveys were conducted by the Public Opinion Research Centre (CBOS) on a group of 100 industrial companies. The surveyed were representatives of the managements of these centres.

The third subject of research were scientific-research units. In this case the research was conducted by the scientific team of Warsaw Management University.

The most important conclusions from the research

Taking into consideration the very broad scope of issues discussed in the report, it would be hard to present all mentioned barriers and recommendations in this article. As the goal of this article is to discuss factors resulting from cooperation of science and business, below only those associated with this goal will be discussed.

In the sphere of state policies experts highlighted above all the problem of financing — associated mainly with insufficient spending on research-development activity.

They also pointed to the problem of incorrect content-related assessment and selection of the research projects submitted by the National Science Centre and National Centre for Research and Development. Until recently it was scientific units themselves that would make decisions on the subject of applied research conducted by them, taking into consideration their financial capacity. In 2015 the system of financing applied research changed. Now the normal practice is that consortia consisting of companies and scientific units start and conduct applied research. Under the framework of the operational programme "Intelligent development", National Centre for Research and Development in Warsaw and National Science Centre in Kraków grant financial assets to chosen ventures by means of contests. This rule is supposed to encourage research units to conduct research, which has a potential to be implemented in industrial practice. The fact that companies cooperate with scientific units raises the likelihood of implementation of an innovation[2].

However, among experts there are doubts, whether this model of cooperation of industry and science will be successful. The problem is the issue of very strong differences and cultural characteristics of the two environments and thus different understanding of goals and rules in the two environments. The researchers point out clearly that "scientists working in scientific units and employees of industrial companies belong to

social groups of different culture. Between them there are no links and mutual understanding, which hampers agreement and cooperation between them."[3] A. Marszałek comes to similar conclusions and claims that "one of the most common problems with establishing cooperation between science and business is the lack of actions associated with coordination, which is reflected by different perception of a problem."[4] Also E. Kulczycki thinks that the fundamental problem in cooperation between the two environments are problems with communication.[5] Experts have clearly shown that these differences are so significant, that such cooperation cannot succeed without the participation of intermediaries between the two sides, called here "innovation brokers".

The research conducted in scientific units shows that only a small part of solutions developed in scientific units are implemented. At the same time the situation is slightly better at institutes representing engineering-technical sciences. As the surveyed respondents emphasized, what influences the level of cooperation with companies is above all the fact, whether these units are able to offer companies services which are sought after in the economy.

Nevertheless, the surveyed respondents very often mentioned the lack of interest in their offer among companies, due to poor adaptation of their offer to the expectations of the market. This has been confirmed by research conducted among small and medium companies in Mazowieckie voivodeship. The fact that these services don't respond to the scope of companies' activity was mentioned as one of the main reasons for this state of affairs[6].

This situation has been additionally complicated by the fact that what hampers scientific employees' engagement in the development and implementation of innovative projects is the existing system of assessment and promotion of scientific employees. In this assessment the publications of a scientist play a more important role than his achievements in the implementation of new projects. There is often a conflict between devoting time to one kind of activity and the other. The development and implementation of innovations is much more work-consuming and riskier than publishing.

The surveyed also highlighted the need for a flexible approach to the issue of didactic burdens of scientific employees. If conducting research requires from scientists devoting a significant amount of time to this work, or travelling, they should have less didactic work. In some extreme cases

the possibility of eliminating the duty of conducting classes for employees conducting research should be taken into consideration. This is of particular significance during work aimed at obtaining scientific titles.

In the meantime, the current system of financing state-owned universities, which involves subsidies from the Treasury of State correlated mainly with the number of students, doesn't favour hiring scientific employees who don't perform any didactic duties. The current system of financing of state-owned universities requires changes urgently. The level of subsidies from the budget shouldn't depend only on the number of students. What should also be taken into consideration is the scope, level and efficiency of scientific research.

Another factor hampering the development of innovativeness in scientific units and thus also cooperation between science and business are low salaries of scientific employees and the lack of relations between the level of salaries and scientific effects, especially creating innovative solutions. The situation hasn't changed much in the whole period since World War II. These circumstances cannot have a negative impact on the level of science in Poland and indirectly, on the economic and social development and more broadly, the civilizational development of Poland.

The surveyed also highlighted the problems with development and implementation of innovations resulting from the lack of young and ambitious scientific employees. In other words, there is a need to rejuvenate scientific employees. One of the arguments is faster adaptation of young people to market conditions, learning the rules of commercialization of innovative solutions and communication with companies. The conducted interviews show that interest in cooperation, transfer of knowledge and technology to the economy is greater in the scientific units, where the average age of the management is lower.

Summing up, among the key barriers for cooperation of science and business there are:

- low spending of the state on research and development activity
- scientific units' inability to adapt their offer to the needs of the market
- flawed system of motivating and promoting scientific employees rewarding for the number of publications and not the quality of implementations

- lack of a flexible system of employing scientists leading to a situation where every scientific employee has to perform didactic duties
- low salaries in the sphere of science
- low share of young people among scientific employees
- inability to implement innovative solutions on the market
- inability to build relations and communicate with representatives of business

The above-mentioned factors hampering the development of innovativeness and cooperation between science and business bear the traits of systemic relations. Such factors as the level of salaries, motivation to understand the needs of the market, adapting your offer to the expectations of the entrepreneurs, looking for the possibility of commercializing ideas, or the will to build relations between science and business are connected by cause and effect relations.

Deliberations on the justification for raising the salaries of scientific employees, or changing the rules of rewarding them is certainly needed, but according to the author such deliberations can be treated mainly as wishful thinking. The crucial issues, which can be determined by the representatives of the world of science are:

- Mastering the skills of building relations and communication with the representatives of business
- Learning to adapt the offer to the needs of companies
- Learning the rules of implementing innovations in the economy

The first skill seems to be most important, as it determines the success of the other two. Mastering the skill of building relations and communication with business is a necessary condition (threshold factor) for understanding what the market demands from scientific employees and understanding how to commercialize inventions. Moreover, building joint ventures with business is also a way to solve the financial problems of both scientific units and scientific employees themselves. For this reason, further part of this article will be devoted to the diagnosis of reasons and looking for difficulties in communication between the scientific community and the business community.

The organizational culture of scientific units and its influence on the emergence of problems with communication with business

Organizational culture is a "historically formed system of values, norms, attitudes and models of behaviour, which are the simulators of the behaviour of members of an organization and influence the formation of its relationships with the environment. This culture refers to both the internal life of an organization and harmonious coexistence with the environment, where it operates."[7] Among the basic manifestations of culture there are: symbols, way of communicating, rituals, values and myths, organizational taboo.[8]

For the purpose of explaining the influence of organizational culture on the manner of communication of the scientific environment with the world of business, specific factors will be emphasized. Next, these factors will be presented from the perspective of organizational culture of a company and from the perspective of scientific-research units, which is supposed to show the differences existing between them.

Among key factors shaping the organizational culture of scientific units there are:

- Symbols
- Key values
- Interpersonal relationships and communication
- Organizational structure and structure of authority
- Approach to regulations and rules
- Approach to deadlines and targets.
- The desired level of synthesis of thinking and the used language
- Approach to control and criticism
- The significance of the area of analysis and implementation

Symbols

The most important symbol shaping the binding norms in the scientific environment are scientific titles and degrees. In a very strong way they shape the organizational structure, rules of communication, or the decision-making processes. The scientific environment is so strongly attached to titles, that even in informal communication between scientific employees using titles to

address interlocutors is the binding norm. It comes as no surprise for scientific employees, when people of similar age with the same scientific title working together for many years, address each other as "doctor".

In the business environment titles don't play such a significant role. Apart from official situations, or hierarchical relationships between the manager and the subordinate professional titles are not used on a daily basis in talks. Very often the norm is informal address and using people's first names on all levels of organizational hierarchy, also between young and older people.

From a broader perspective, restrictive and formal norms of communication between people are a typical feature of the scientific environment. This environment is much less eager to change from formal to informal manner of communication and the change takes much more time. In case of business the limits of this freedom have been shifted much further.

These differences may have a major impact on building the relations between the world of business and science. The tendency of the representatives of companies to reduce the distance from the representatives of the world of science too fast may be perceived as impoliteness, rudeness, which may discourage from the continuation of a relationship.

Key goals

The main goal of an entrepreneur is profit, which is usually achieved thanks to sales. Even if other factors such as passion, or the need for self-realization, are important for an entrepreneur, profit has to be an immanent part of the decision-making process in every area of activity, e.g. concerning the choice of strategy, methods of production, or directions of marketing activities. At the same time, a professional making decisions is always positioned in a particular context of factors restricting his activity, such as held resources, finances, skills and even the values respected by his employees. The main criterion for the assessment of the accuracy of his decision is whether his solutions have been implemented and whether they helped achieve the goal for which they were prepared.

For a scientific employee the key challenge is his professional development. A scientist develops by looking for laws and rules governing the area of knowledge he deals with. The practical dimension of this learning is a secondary issue and in some cases it is not taken into

consideration at all. Here own preferences, goals and passion are crucial. A scientist strives to discover truth, to create science according to the assumed rules and while doing it he often skips the rules of commercialization. At the same time external limitations are much less significant for him in the process of creating this science. Very often, a scientific employee creating a new concept presents a perfect model, which doesn't take into consideration the needs of the market, need for financing, qualifications of the personnel, or compliance with legal provisions.

In the assessment of scientific works the main criterion is the compliance of a publication with the rules of science. The review of a publication focuses on such criteria as whether the goal and hypothesis have been properly formulated, or whether research was conducted according to the rules of conducting research, whether a publication contains convincing body of evidence and whether it contains innovative discoveries. Scientific employees are actually encouraged to formulate bold, or even unrealistic hypotheses, which can be either confirmed, or rejected in course of further research. For scientists a publication which rejects a formulated hypothesis has the same cognitive value as a publication which confirms a hypothesis. This is the nature of science. Typical and tested solutions don't belong to the area preferred by science, which clearly distinguishes the preferences of this environment from the preferences of the representatives of business. Professionals could also find it hard to understand a situation in which, after many months of research the effect is the rejection of the originally adopted hypothesis. According to the norms of business practice, such situation would be treated as a failure.

Supplier-client relations

A scientific employee hardly ever meets people who are the counterparts of clients in business. Not even students at private universities are the clients of scientists. Students are clients till the moment they sign a contract with a university and start studying. After this event they become the participants of a situation that could be called the "lecturer's market". Didactic employees determine the rules and students can only comply with them unconditionally. Even appearing at conferences, or holding talks with book publishers don't have a character typical of the relationship between the

supplier and the recipient. A speaker, or a book author are not obliged to adapt to (apart from some minimum requirements) the expectations of their recipient and don't have to accept a compromise not favourable for them.

At the same time, for an employee of the business sector changing own assumptions and plans under the influence of clients' expectations is a common thing. Also, a situation in which the client assumes a demanding attitude and the manner of conduct is not entirely honest is not uncommon. The representatives of business learn from experience how to deal with such situations, treating them as an element of daily life. Due to this, when they order the implementation of a project from other entities, they themselves assume the possibility of changing their preferences and expectations already after the conclusion of a contract. The representatives of science may not be prepared for such situations.

Control and criticism

In business the first and most important "tool" of control and feedback is the client. The client usually, in the process of purchase, expresses his dissatisfaction with the quality of delivered service, or product vocally and expects improvement, if he is not satisfied. The process of improving a service in the interaction with a client, often associated with the necessity of listening to his groundless remarks is a daily practice in business.

In scientific circles the issue of assessing the quality of work is actually a taboo subject. Even the reviews of publications concern technical issues associated with the quality of the prepared publication, rather than its applicational value. Factual criticism of both scientific and didactic work is an uncommon thing in the scientific environment.

Porter's theory of 5 forces and his competitive strategy was one of the most heavily criticised theories of management in the world. It was criticised by both the representatives of science and business. Critics claimed that in many aspects Porter's theory doesn't comply with the rules of the market, that it contains mistakes in thinking and assessment of the economic reality. In Poland open criticism of a book of one scientist by another scientist would lead to personal reactions and would become a subject of disputes for many years. This kind of criticism is virtually non-existent in Poland.

Rules of communication and solving problems

Business is about relationships. Running a company a manager is forced to build daily relations with people — clients and employees. These relationships are subject to particular rules. Business employees through regular participation in meetings, negotiations, gatherings, problem solving with the participation of other people learn particular models of behaviour, discussing particular subjects, understanding of the used concepts, methods of holding talks. There is one common feature of all these behaviours. They are supposed to lead to a defined business goal, that is, concluding a trade contract, convincing others to carry out particular tasks, identifying facts, gathering information, or solving a problem. The key factor here is the efficiency of achieving goals. Digressions, free comments, subjects not linked to the main goal of a meeting are usually regarded as undesirable things in business.

At the same time the work of a researcher is an independent work. Professional relations with other scientific employees are mainly personal in character. Working on solutions to problems together is rather uncommon and usually it concerns the issue of assigning teaching duties, or other problems of similar complexity. On the other hand, some departments organize scientific meetings. However, such meetings usually resemble debates more than anything else. At such meetings the participants present their opinion concerning a discussed problem, where it is not necessary for the group to reach an agreement on the discussed issue. Such meetings are more about the exchange of opinions and presenting own points of view, than working out common solutions. In these talks the goal is looking for truth, highlighting mistakes in thinking or non-compliance with existing theories. Usually the digressions of particular participants of a meeting on collateral subjects are not regarded as improper. In fact, they often become a source of additional inspirations.

One of key activities of the representatives of business is negotiating. One of the features of negotiating is using strategies to achieve the goal of talks: managing facts, presenting the situation from a perspective favourable for yourself, hiding inconvenient information, or using arguments which are supposed to influence emotions. The goal of negotiations is convincing the other side to accept your arguments,

sometimes even against the rules of logic. Persuasion is an efficient and acceptable tool in this environment.

At the same time negotiation strategies in the scientific environment are not as common as in business. The scientific community relies more on factual argumentation supported by facts, or experts' opinions. Attempts to use manipulation techniques are regarded with suspicion. There is also greater honesty in presenting the good and bad sides of the discussed factors. For example, during a conference organized by the representatives of business, which was attended by the author, both scientific employees and representatives of business gave their presentations. The purpose of all presentations was presenting your products hoping that in the future you would sign contracts with companies' representatives present in the room. It was possible to notice a substantial difference between the presentations of scientific employees and employees from the business sector. Representatives of the science sector not only paid more attention to the methodical organization of their presentation, but were also more honest, that is, they presented the weaknesses of their solutions and admitted to the mistakes they had made. In the business sector the common conviction is that you shouldn't talk about the weak points.

Organizational structure and structure of authority

Organizational structure is a "set of functional and hierarchical relations existing between positions, departments and organizational units of a higher level"[9]. Structure of authority means the set of relationships in the area of real influence that particular members of an organization have on the decision-making process. As the held authority (strength of influence) depends on many factors, the significance of particular members in an organization is always slightly different from their positioning in the formal structure.

In companies the structure of authority is to a much greater extent close to the organizational structure than in scientific units. Strong attachment to the importance of respect, scientific titles and personal relationships in the organizational culture of the scientific community strongly implicates the influence of these factors on the real decision-making capacity.

What's more, the very perception of the organizational structure is different in the scientific community and in business. Above all, in science it is necessary to clearly separate the administrative division from the scientific-

didactic division. In the administrative division there are e.g.; departments of marketing, IT, planning or dean's offices. Here the organizational structure and binding rules are similar to the rules and structure in companies. In hierarchical structure the director is positioned above the manager and the manager supervises the employees. At the same time in the division of scientific-didactic employees, what plays a much more important role than formal position is the respect resulting from scientific titles, age, broadly understood opinion in the community, or the number of presentations and publications. Formal rules of hierarchical subordination are replaced here by the customary norms observed by the community. This situation leads to the creation of hierarchical constructs, which are not typical of the business environment. It is a normal situation in the scientific community, when a dean, who is normally the superior of the head of a department, is at the same time a member of the department managed by this person and thus his subordinate. The situation gets even more complicated when the dean is a doctor and the head of a department is a professor.

In business such a situation would probably lead to a management crisis. In the world of science it is a norm, deeply rooted in the tradition of the community and it doesn't surprise anyone and doesn't cause extraordinary problems. At the same time, it teaches scientific employees to adopt a relative view of the significance of formal hierarchy. In the business environment such departures from the formal hierarchy are rather uncommon. This lack of understanding of the significance of factors influencing the set of personal relationships in the world of science may lead to many misunderstandings among the representatives of the world of business.

The approach to regulations and rules

In business even legal regulations are treated as obstacles on the way to achieving goals. If a legal regulation makes it impossible for an entrepreneur to achieve his goal, he looks for ways to bypass the regulation in the first place. It is only when he doesn't find a way to bypass a law that he subjects his activities to the law. Thus, it is obvious that an entrepreneur won't take into consideration the provisions of rulebooks and unwritten norms, if these rules make his operations harder.

At the same time in the scientific environment sometimes even breaking the common norms associated with social behaviours may be hard to accept. All kinds of norms and in particular written rules are treated here as actually existing and invariable factors, which have to be taken into consideration in the decision-making process.

In the business environment such approach of the representatives of science to rules may be treated as a superfluous self-limitation of the efficiency of operation. In the world of science the inclination of business to bypass rules may be perceived as actions breaching the rules of ethics.

Approach to deadlines and goals

The two communities have a different understanding of deadlines set during the negotiation of terms. The concept of "kwadrans akademicki" (translator's comment: in Poland students wait for their lecturer up to 15 minutes, if he or she is late, hence "academic quarter", or "kwadrans akademicki" in Polish), has spread from the language of the academic community to the general Polish language. In the scientific community there is greater flexibility in the area of observing deadlines. In many cases delays in delivering documents to a university's administrative departments reaching up to a week, or a few weeks, are acceptable, e.g. the deadline for submitting protocols to dean's offices, or submitting articles for review.

The situation is similar in case of holding on to the defined targets. In the scientific environment there is quite a broad margin of freedom in this respect. Both during lectures and during presentations at conferences, or in publications, every subject can be discussed in different ways and from different points of view. This diversity is actually a value that a scientist contributes to science. In course of work on a scientific concept, or writing a book, a scientific employee often changes the goal and hypotheses, taking into consideration the information and conclusions obtained during the research process.

At the same time, in the business environment both deadlines and frameworks of conducted tasks are more precisely defined and are treated as invariable and immovable. In certain situations, when the client is obliged by deadlines defined by legal regulations, there is absolutely no possibility of moving deadlines.

Differences in the perception of rules concerning the compliance with deadlines and contract terms may be a source of misunderstandings between the representatives of the two communities.

Levels of thinking and used language

Science prefers using metalanguage, that is, terms characterized by a high level of synthesis. "Turbulent environment", or "stochastic data" are examples of concepts commonly used in science, which don't exist in the language of business. However, even such terms as "innovativeness", or "competitiveness" are used much less frequently in business than in science, very often they are differently understood.

A scientific employee is interested in models, concepts, scientific theories. A researcher deals with the analysis of general problems and looks for similarly general solutions to them. More specific and current, operational management problems are of lesser significance for science.

What is always crucial for a manager is the level of specificity of a certain peculiar problem which he wants to solve. This may be a problem of conflict between two departments, problems with carrying out a project by a particular deadline, stoppages in production, or low level of efficiency of marketing activities conducted during the last promotional campaign. Taking such problems into consideration, the management of a company expects particular suggestions and solutions, which would help eliminate, or at least reduce the scale of losses arising from the existence of a given problem.

However, this doesn't mean that in companies problems and solutions of a higher level of generality — general efficiency of work, the quality of strategic actions, innovativeness of actions in the company — are not discussed. However, these issues are discussed much less frequently, during occasional meetings, or trainings dedicated especially to this purpose. Such events take place once, or a few times a year.

This divergence of expectations can be seen clearly, when you look at the subjects of organized conferences. It is hard to expect that science would find a conference on managing clients' complaints, methods of sales, or marketing aimed at children interesting. On the other hand a conference on the paradigms in management sciences, or 21st century entrepreneurship wouldn't be interesting for business.

Analysis of situation and implementation

Scientific work is above all analytical work. At the same time manager's work is mostly about implementations. When a scientific employee notices

a problem, he asks himself the following questions: what are its causes, what may be its effects, what other factors influence a particular situation/problem. A scientific employee looks for links, relations, components, perspectives. He tries to capture an issue from a possibly broadest perspective, defining the category of phenomena, typologies, models. This liking for analysis can be seen clearly in the structures of textbooks. Characterizing the described phenomena up to 100% of chapters deal with the analysis of particular issues. Textbooks very rarely describe also the issue of implementing solutions. Meetings of scientific employee groups concerning problems usually focus entirely on the analyses of the discussed phenomenon and to a lesser extent on suggesting solutions.

At the same time, the focus in business is on implementations. Analyses of situations are conducted only to such an extent as is necessary to work out common and clear views. Almost the whole work of management teams is focused on developing the methods of implementing the determined solutions and overcoming the difficulties associated with the process.

Suggestions concerning possible solutions

For the purpose of integrating the scientific community and the business community, it is worth taking into consideration solutions which encourage, or even force building relationships between them. Among activities which may encourage the two communities to exchange opinions and learn from each other, there may be:

- Organizing joint conferences, seminars and workshops. The necessary condition for the success of such initiatives is adapting the subject and discussed problems to the level of understanding of the two communities. However, achieving this is very difficult due to major differences in expectations, which has been explained in the analyses above
- Thematic portals for the exchange of knowledge between science and business, like www.biznesinauka.eu, or www.sciencenetwork.eu The problem with the exchange of experiences and starting cooperation this way results from the fact that initiatives of this kind are aimed rather at technical communities and concern mainly cooperation in the area of development of technologies.

- Obligatory internships for young scientists in business. What could be an important activity for the purpose of integrating the scientific community with business are obligatory internships for young scientific employees. This solution would probably be heavily criticised by the scientific community and wouldn't necessarily be accepted by business. An issue that would have to be solved in case of such solutions is the matter of financing such internships.
- Innovation brokers. The role of intermediaries between business and science was discussed in the research of Warsaw Management University. The experts concluded that people acting as intermediaries in building relationships between the two communities could be very valuable. They would have to be people with experience both in business and science, who understand the culture of both environments and are able to build links between them.
- Financing joint projects. The issue of preferences in financing projects with state funds, for the initiatives between science and business, which take into consideration the participation of scientific centres in the commercialization of innovations, was also discussed during research conducted at Warsaw Management University. Here experts had varied opinions. Criticism concerned excessively big divergence of the organizational cultures and experiences of the two communities, which hampers efficient cooperation.
- Joint business initiatives e.g. organization of joint trainings, courses, postgraduate courses. This is comparably the easiest form of cooperation between business and science. The two communities don't have to prepare in a particular way to such cooperation. However, this solution may concern only a small part of scientific centres.

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