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**FINANCING OF THE SCIENTIFIC
AND RESEARCH ACTIVITY OF A
UNIVERSITY IN THE PERSPECTIVE
OF THE CHANGEABLE CRITERIA OF
A KNOWLEDGE BASED ECONOMY
AND INTERNATIONAL ASPECTS**

ABSTRACT. The activity of universities in the area of research and didactics plays an essential part which has an influence on the economic area of the state's functioning through an implementation of new programmes which put an obligation on research and development entities to seek additional sources of financing. It is definitely a good sign but it might be that such activities, which are not backed up with any other activities, will have a cannibalistic impact on some scientific areas and those universities which operate in their field, or they may cause a regionalization of funds allotted on new conditions. Those processes that occur in the economy must relate to a wider framework of reference, which is durable in the respect of future legal determinants over a certain period of time. Only once such an assumption has been accepted, it will be possible to define a certain model of financing or manage finances on the level of higher education. It is also important whether we refer directly to a university or take into account the determinants concerning financing of higher education. The criterion and the methodology of the determination of goals changes fundamentally at this point. In the first scope, we will deal with the definition of the goal on the grounds of the financial conditions of the institution which implements the curriculum; the objectives are established on the grounds of the compulsory curricula, requirements to pursue scientific and research activities, but also they are based on the recommendations defined in the directives and strategies, which constitute an essential element of an adaptation to the joint conditions on the international level, or a level connected e.g. with an implementation of the successive steps of the competitiveness and innovation of the European economy.

JEL Classification: I23, P2**Keywords:** funds, development, university, company, research.

Introduction

The notion of a knowledge based economy itself indicates the direction connected with financing of activities which concern economic objectives realized with the support of science and not the other way round. It can be seen on an example of the development of universities and scientific and economic sector entities whether there are any possibilities of abuses, which may occur in the scope of areas imposed by the financial framework of the activities and directions pursued on the national and European levels. The issues concerning financing of higher education in Poland are characterised by a number of the common directions of transformations which have been in progress over the past years. When analyzing exclusively such cognitive aspects, a fundamental question might be asked, e.g. what legal recommendations and directives define the effectiveness of the didactic as well as research and development activities that are being realized by higher universities? Should the Polish criteria be used at present, or is it rather the norms adapted for the European standards that need to be used? The answer is basically simple. One should adhere to the valid regulations of law and, to the highest extent possible, also participate in those scientific and economic transformations that are connected with the implementation of rules based on directives. Universities are particularly expected to implement the objectives contained in the Lisbon Strategy. The curricula and methods to run didactic classes are being adapted to the requirements and expectations of the theory of the knowledge based economy¹. The result of the reduction of funds allocated for the financing of science is that the necessity of a diversification of the sources of financing is more and more frequently indicated as the method to solve financial problems or to define the methods to cover prime costs.

Strategies and criteria to establish the purposes of the functioning of universities with reference to an increase of the value of the scientific and research as well as didactic activity

If we consider only the aspect of financing or budgeting of a certain activity, which is for example the research and development activity of a university, the groups of those costs need to be distinguished which are allotted for the realization of objectives in accordance with the goals and objectives accepted. Among these, a part of the funds is allotted to the realization of strategic scientific research and development work managed by research and development centres. Those funds which are allotted to the implementation of research projects, development projects and targeted projects that are financed by the appropriate Minister for Higher Education constitute another group of costs.

The operations of a university in an academic environment are financed on the grounds of the accepted financing models from the EU funds. Financing algorithms are used to facilitate the conditions for funds to be reliably committed². These algorithms are based on such coefficients which demonstrate the effectiveness, efficiency and attraction of the pursued educational and research programmes. An index based on the results obtained by students in their studies constitutes one of such factors. It is applied in many EU states. A commissioned task, for the realization of which a specific quantity of funds is allotted, is yet another index applied in twelve European states. The current ability to settle the university's liabilities towards the didactic personnel, suppliers or contractors is conditioned by the performance or non-performance of the said task. In the aspect of financing, it is *alter alia* the number of students that constitutes an important element. In some states, analytical methods for the

¹ J. Figel, Higher Education Governance in Europe. Policies, structures, funding and academic staff, ISBN 978-92-79-08524-6, Komisja Europejska 2009, p. 3.

² J. Figiel, Finansowanie ... op. cit., s 8.

adjustment of the quantity of financing are also applied apart from this index, according to the effectiveness of education, which is expressed through the results of education.

Among the basic scopes of financing of university activities, the following are to be distinguished:

- a) *Financing of development projects* involving one's own projects in the thematic area involving the ministerial initiatives as defined by the applicant. Such a proposal may be submitted by a scientific entity or a scientific and industrial consortium which possesses its legal and financial determinants and a specific scope of responsibilities. Financing of such projects involves applied research and development work.
- b) *Financing of research projects*, which involves one's own designing activity including postdoctoral projects with the subject matter as defined by the applicant and promoter's projects aimed at a preparation of PhD theses. Subsidies are allotted to research projects on the grounds of the competition of the proposals submitted.
- c) *Financing of special projects* which involves projects that possess the nature and the subject matter as defined by the applicant and which are directly submitted by entrepreneurs or any other entities which possess the ability and needs to implement them.
- d) *Financing of those investments which serve needs of scientific research or development work involves the costs of the following:*
 - building investments,
 - purchase and adaptation of building facilities,
 - participation in investment undertakings that are realized on the grounds of international contracts,
 - production of scientific and research apparatus included in fixed assets, purchase of such apparatus and also purchase of intangible and legal assets,
 - expansion and restructuring of the IT infrastructure of science,
 - special investments that are co-financed from structural funds.
- e) *Financing of scientific cooperation with foreign states*
 - involving international projects that are realized within the framework of the European Union programmes or any other international programmes,
 - concerning the payment of contributions to international institutions or organizations under the international contracts concluded.

Subsidizing of scientific as well as scientific and research activity but first of all the statutory didactic activity by the Ministry, appears to be a less effective method of the commissioning of budgetary funds. Within the framework of the forms of financing from the public funds, this mainly consists in transferring of block subsidies³. Various types of expenses are financed in this way, whereas plans are approved at the government level by public authorities. This kind of financing is subject to monitoring. There is also a requirement to submit annual reports, to publish results or to create databases and information case studies.

In the majority of the European states, subsidies are allotted to specific research programmes or to projects. This constitutes an element of a more effective practice of financing. The effects of the implementation of projects financed from European funds clearly demonstrate the effectiveness of the accepted mechanisms based on such rules. Initially, the process of understanding the mechanisms and realizing the distinct advantage over the common methods of financing was quite difficult concerning implementations in Poland. At present, it seems that the techniques and methodologies as well as the legitimacy itself to apply such a framework of project management are justified and even required. The European projects and programmes realized by the majority West European states have relied for many

³ J. Figiel, *Finansowanie ... op. cit.*, p. 8.

years on the designing methodology concerning the realization of research and development programmes. It becomes evident what has so far been a certain process consisting in the performance of a certain current activity in some unchanged conditions, with a specific potential and use of resources, can be considered in a design framework. Even if the nature and the scope of activities realized apparently does not change, the method changes of the determination of objectives, their scope and details. It is also possible to introduce certain elements of project management known as the Project Management Cycle. Apart from the approach connected with the application of the logical matrix for the determination of objectives, one may observe dependences which occur during the performance of each design cycle. What is interesting, projects can be examined with reference to certain aspects, which may for example be the aspect of an increase of values or an increase of the productivity and effectiveness of education. The quality and numerical values of the possessed scientific and didactic personnel are also taken into consideration at the determination of the thresholds of the functioning of a university and, in this way, also the financing level of its operations. Therefore, in some countries special competition procedures are applied concerning the recruitment of employees. Widely used categorization is applied with respect to education, scientific achievements and other aspects which may concern the scope and the quality of cooperation to be realized in the future.

In the past several years, the use of EU funds has acquired a wide significance, which is in particular defined with the rules of the National Framework of Reference for the years of 2007-2013. Within the framework of designing activity, universities have the possibility to use funds from the Operational Programme of Infrastructure and Environment, Innovative Economy or Human Capital. Funds obtained within the framework of the Regional Operational Programmes and the Seventh Framework Programme constitute yet another possibility to ensure sources of financing for universities. The possibility to obtain funds for research, investments and the development of international cooperation is offered in particular by the last programme mentioned above, which possesses an international aspect.

Activity connected with obtaining of private sources in the aspect of securing an independence of activities and an increased competitiveness on the market of universities

A business activity which consists in obtaining funds for the realization of the university's objectives constitutes a business activity with the aim of covering the current costs of the entity's operation. Funds are permitted here that come from deeds of gift, charges concerning provision of services or those which are connected with membership undertakings or undertakings concerning partnership cooperation. Some states introduce tax reliefs for universities, partners or individual grantors. In the perspective of charity and social activities, it may not constitute a very essential source of financing, but there are also other possibilities concerning an implementation of mechanisms to obtain funds from such sources. What is important here is the attractiveness of a university as a centre which possesses a scientific and human potential, which attracts sponsors, companies and organizations. They can realize their own purposes connected with the basic and sideline activities by participating in the university's initiatives or their own initiatives⁴. In some European states, creation of university partnerships is permitted, which support the university in the financial aspect through the activities they pursue, and at the same time they ensure a development of the infrastructure and offer possibilities to participate in economic undertakings.

⁴ J. Figiel, *Finansowanie ... op. cit.*, p. 9.

The Minister establishes the amount of financial funds for science in the financial plan concerning the part of the state's budget that is allocated to science. However, not more than 10% of these funds is assigned to research itself. Obviously enough, this value is certainly several times smaller than the one which scientific institutions have at their disposal in West European states; in spite of this situation, increasing amounts of financial funds have been allotted there in the recent period. The correct functioning of universities constitutes an essential issue for many European governments and the European Commission. This in particular concerns competition, which constitutes one of the key factors for the economic development in the era of innovation, technological development and other aspects which increase the quality of the economy and living standards. Therefore, an increase of funds allotted to the financing of research programmes in companies with the use of public funds is of a great significance⁵. The basic idea for this mechanism is to indicate to the industry those benefits which are the result of the realization of an innovative activity, the development of new technologies as well as any other activities which are based on scientific research. The overriding goal is to increase the economic competitiveness connected with the observable problem concerning an excessive development of other world economies.

Development of competitiveness on the international arena and its impact on financing of research and development activities

The competitive struggle began with the competition with the United States. The crisis in the years 2008-2009 resulted in a shift the competitive priorities. At present, it is China that is almost the largest economic superpower, and in the coming future it will be the largest economic superpower. It was the driving force for overcoming of the crisis. This state constitutes an unusual economic potential, which at present creates its own technological solutions. China started from relying on technologies from other countries and underwent a number of transformations connected with the scale on which activities are pursued. The government of China accepted a strategy which consists in slow and careful building of the status of a superpower. In spite of the adversities connected with a slowdown in the economy, China is realizing its successive goals and further successes on the international arena. Therefore, the European Commission has established new goals with the aim of introducing, apart from competition, rules of a joint exchange of experiences and partnership in activities.

Research activities constitute one of the most important types of work which are decisive of the university's potential within the framework of its functioning in the economic environment. The level of the adaptive capability of technologies and research results which are required by the economy to increase its position and innovation rises together with the development of competitiveness. As a result of research for the needs of economy and the joint purpose of their implementation, it is essential to establish cooperation with companies, those non-government organizations which operate in the scientific and research area, or research and development centres and institutions. The scope of the activity performed, its structure and type with reference to the technological directions and transformations on the industrial scale are decisive for the innovative potential of a university and its value added to the basic statutory activity. Obviously enough, funds are important that are allotted to investments of different types, which contribute to the development of the research and development offer. This is realized through the purchase of devices, scientific apparatus, materials that constitute the research basis and the purchase of analyses, expert opinions and

⁵ K. Santarek, J. Bagiński, A. Buczacki, D. Sobczak, A. Szerenos, Transfer technologii z uczelni do biznesu, tworzenie mechanizmów transferu technologii, Polska Agencja Rozwoju Przedsiębiorczości, Warszawa 2008, p. 86

technologies, which indirectly contributes to other scientific achievements and the realization of further research work.

Owing to the influence of legal determinants and recommendations yet first of all the methods to increase competitiveness, an opportunity was observed to raise the competitiveness of the economy on the international arena through an involvement of companies in scientific and research activities. The practices concerning the research activity which had already been functioning and had been realized by companies, demonstrated their unusual development and effectiveness in comparison with research work realized by universities. The same approach, which is connected with the nature of the functioning of a company being geared towards a profit, caused that the needs to increase the competitiveness in order to achieve a competitive advantage over other companies determine the business environment to implement innovations. Contrary to some theories, innovations involve the introduced solutions, improvements, technologies, both technical products and such products that are defined in other fields of science, whose implementation or application will be acceptable and useful in social, scientific and economic environments. However, it is an obvious fact that in some states including Poland, scientific work does not always have to possess a reference to practical economic or social applications. This frequently causes that the effectiveness of work and the value that is generated as a result decreases significantly. The work lengthens due to an insufficient specification of the objectives of the research to be conducted. This research frequently fails to address the fundamental problem but generates ideas and solutions without any specific practical reference. This additionally decreases the legitimacy of research and, as a result, changes the relation of the effect to the profit as compared with the activity of companies even concerning the scale of research conducted.

An access to research apparatus and laboratories constitutes one of those elements which predominate over companies concerning the range of transmitting activities pursued by universities. Universities do not possess an adequate approach to the realization of research to ensure additional sources of financing and to shorten the time and costs of its performance. The possibilities of the use of European funds for research and development appeared after Poland's accession to the European Union and also shortly before the accession. Taking into consideration experiences and problems connected with the implementation of the effects of research and development work as well as the availability of the research infrastructure, a decision was made to combine scientific environments and economic environments. The commonly known synergistic effect was to ensure an increase of the competitiveness of companies, whereas through co-financing of research for the scientific environment, it was to provide additional sources of financing for universities.

Conclusions

The Polish higher education was bound to encounter attempts of a standardization of requirements concerning education and running of research and development activity once it had gone through the first stage of implementation in the European Union structures. On the one hand, it was necessary to change the way of thinking being limited by the curricular framework imposed by the common standards; on the other hand, it appeared necessary to position the university as a participant of scientific and economic transitions in the area of the university's own activities. In this process, a great role may be attributed to the funds which are pumped into the areas of the functioning of companies as well as the scientific and research sector. The subjectivity and the processes which have been occurring for a dozen or so years, are of a huge significance here as the centre of gravity is changing: it moves in an evolutionary manner funds from the current and new sources of financing to those activities which concern the cooperation of the scientific environment with the economy .

In the recent period, a special role has been attributed to the cooperation realized in the international environment, which entails the development of the didactic personnel, extends the access to research, yet also achieves its effect in the substance related to a practical application of research results. Owing to this, research takes on an attractive form for the industry, and through the implementation of the activity within the framework of the didactic activities conducted, research enhances the effect of innovation for the future activities of graduates and the experiences of future researchers. The commercialization of knowledge and abilities connected with the use of subsidies from the European Union is, and will be, an extremely important aspect which guarantees to a university a position in the scientific and economic environment - in the era of the development of competitiveness, with the quality of research work and implementation being ensured and which provide additional sources of financing. In a long run, even those elements of cooperation which are financially immeasurable, frequently bring about such results which increase the value of a university as well as of the research results. What needs to be taken into consideration is the value which constitutes a certain financial, non-cash and non-financial quantity, which may be defined or assessed. This value allows one to conduct the projected scope of improving the quality of education and research in a well-thought-out manner.

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