STATE REGULATION OF THE DEVELOPMENT OF EDUCATIONAL AND SCIENTIFIC PROCESS IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

The issue of state regulation of the development of the educational and scientific process is considered, the relevance of which is indisputable in the context of strengthening neoliberal approaches to higher education and research. This encourages state institutions of higher education to search for the most acceptable educational model that would promote the training of future professionals for all sectors of the economy and public life, as well as comprehensively combine intellectual, knowledge, technology, traditional, innovative components, taking into account national and global trends. The aim is to study the relationship between models of state regulation of educational and research activities and innovative development of the country in the context of the global and European dimension. Calculated main indicators of activity of higher education institutions of the country, which is characterized by the state-paternalistic model of education, their dynamics are given, interrelations between factors of innovative development are investigated, and the degree of their influence is defined. Innovative rankings of countries with different educational models, in which the best positions are expected for the countries with socio-corporate model of education and low projected level of innovation rating for the state-paternalistic model. The practical value of the research results lies in supplementing the theory of neoliberalism and its impact on the development of educational and scientific process. The empirical results of the present research can be used by governments of developing countries, which are in the process of integrating neoliberalism into the practice of state regulation of higher educational institutions.

Keywords: State Regulation; Educational and Scientific Process; Educational Models; Innovations; Innovative Rating.

INTRODUCTION

Modern transformational processes, which have covered the educational environment not only of individual countries, but also the world market of educational services, put forward new requirements for higher education as a factor that is decisive in the formation of the state and its place in the international arena. Globalization and the creation of a single information space encourage public institutions of higher education to search for the most acceptable educational

model that would promote the training of future professionals for all sectors of the economy and social life, as well as comprehensively combine intellectual, knowledge, technology, traditional, innovative components with taking into account national characteristics and trends. The main purpose of state regulation of the educational and scientific sphere is to ensure the appropriate level of organizational processes and responsibilities of higher education institutions; ensuring quality end results of educational and scientific activities that manifests itself innovative component; guaranteeing quality training in accordance with the needs of the state. The scientific problem is formed by the tendencies of strengthening neoliberal approaches to educational and scientific activity and determining the role of the state in these processes. The purpose of the research is to study the relationship between models of state regulation of educational and scientific activities and innovative development of the country.

LITERATURE REVIEW

The information base of our research consists of works in which modern tendencies of development of educational and scientific processes and formation of educational and scientific policy are investigated. Some scholars, in particular, Marginson (2017) define the result of educational and scientific activities as a mixed or private-public good, in his work the author clarifies the nature of public and private goods and identifies four types of the state regulation of the education. In almost the same direction, we highlight the study by Štremfel (2015), which examines the issues of European education management and determines their overall impact on the development of the Slovenian educational space. The same category includes the works of Leicht et al. (2018), which identify general issues and trends in education in the context of sustainable development. Researches by Choi (2019) investigate indicators of university autonomy in the context of stakeholder interests; Karnitis and Karnitis (2017) on sustainable growth of EU economies, which provides a description and modeling of their development. Wojniak and Majorek (2018) identify the main milestones of the Polish education system under the 2017 reform, as well as describe its goals, assumptions and contradictions. In our study are very important the scientific results of Pūraitė et al. (2017), which investigate the impact of public funding on the autonomy of higher education institutions and its relationship with the economic activities of universities.

According to Stevenson (2006) research in education can be conducted in the following areas: development of analytical models and tools that can be interpreted; educational policy analysis; critique of specific policies. It is argued that policy development should take place at different levels almost simultaneously. Reynolds et al. (2014) argue that research on educational processes should focus on teachers, inter-level transactions, efficiency as a way of measuring results, and the social component that focuses on educating vulnerable populations. Verger (2014) considers the issue of globalization in education from the standpoint of institutionalism, rationalism and constructivism.

Kouassi (2018) examines educational trends in terms of government spending and economic growth; serves critical analysis of theoretical and empirical literature on the relationship between government spending and economic growth. The study argues that liberal theories contribute to the mechanisms of self-regulation of markets, but, at the same time, reveal the conditions for state intervention in the economy. Abery et al. (2017) are investigating the

movement to inclusive education, taking into account the experience of the United States and project these trends in Central and Eastern Europe.

In developing countries, the basic problems of neoliberal integration are corruption and low institutional inertia in the introduction of new management technologies (Akimova et al., 2020; Aleinikova et al., 2020; Khytrova et al., 2020).The education system is becoming increasingly stratified; inequality is being increased due to the heterogeneity of educational resources and the quality of services.

Paying tribute to the authors and their scientific achievements, we believe that some conclusions and provisions need to be adapted, concretized and further scientific support, in particular, in determining the end result of educational and scientific activities (the level of innovative development and its relationship with the education model). The problem is the fact that countries that have significant intellectual resources, high levels of higher education coverage, and, according to these indicators, may be countries with a high level of development, are beyond the innovation rating, which creates certain paradoxes and distortions.

METHODOLOGY

The study used general and special methods (forecasting and correlation). General scientific: monographic method in order to systematize the existing theoretical approaches to the problem state regulation development of the educational and scientific process; analysis and synthesis- in determining the innovation rating countries in the global and European dimension; in the study of indicators of educational and scientific activities of Ukrainian higher education institutions in the dynamics; dialectical (in the study connections and factors of innovative development); abstract-logical method, in the formation of scientific assumptions, as well as generalizations, conclusions and research proposals. Special research methods were used to identify correlations between factors of innovative development; forecasting methods were used in order to identify the future state of the innovative ranking of countries with different models of education. The information base of the study is data State Statistics Service of Ukraine, which relate to quantitative indicators of higher education institutions; data from the European Commission on Innovative Development; World Bank statistics, which determine the ranking of countries.

A qualitative analysis of the educational systems of the USA, Germany, Japan, EU, Russia and Ukraine has been used to develop a classification of modern educational models of the development of the educational and scientific process, which make it possible to compare the practice of neoliberal state regulation. The classification outlined reflects the different levels of neoliberalism in the practice of state regulation and makes it possible to compare countries in terms of innovation according to the type of educational model. When calculating the complex indicator of innovation, the World Bank indicators for 2010-2019 for EU, Ukraine, Germany, Russia, the USA and Japan have been used, namely: the number of doctoral graduates; Higher Education; international joint publications; citations of publications; expenditures on research in the public sector; costs of research work in business; innovative products / processes; marketing innovations; innovative cooperation; public-private joint publications; private co-financing of state investigations and developments; applications for patents; applications for the use of trademarks; design of software applications; export of medium and high-tech products; export of

knowledge-intensive services (The European Innovation Scoreboard report and annexes, and the indicators' data base).

RESULTS AND DISCUSSION

In general, we can distinguish two opposing approaches to the regulation of higher education: strict state regulation and a liberal approach, using which four different educational models can be classified (Figure 1).
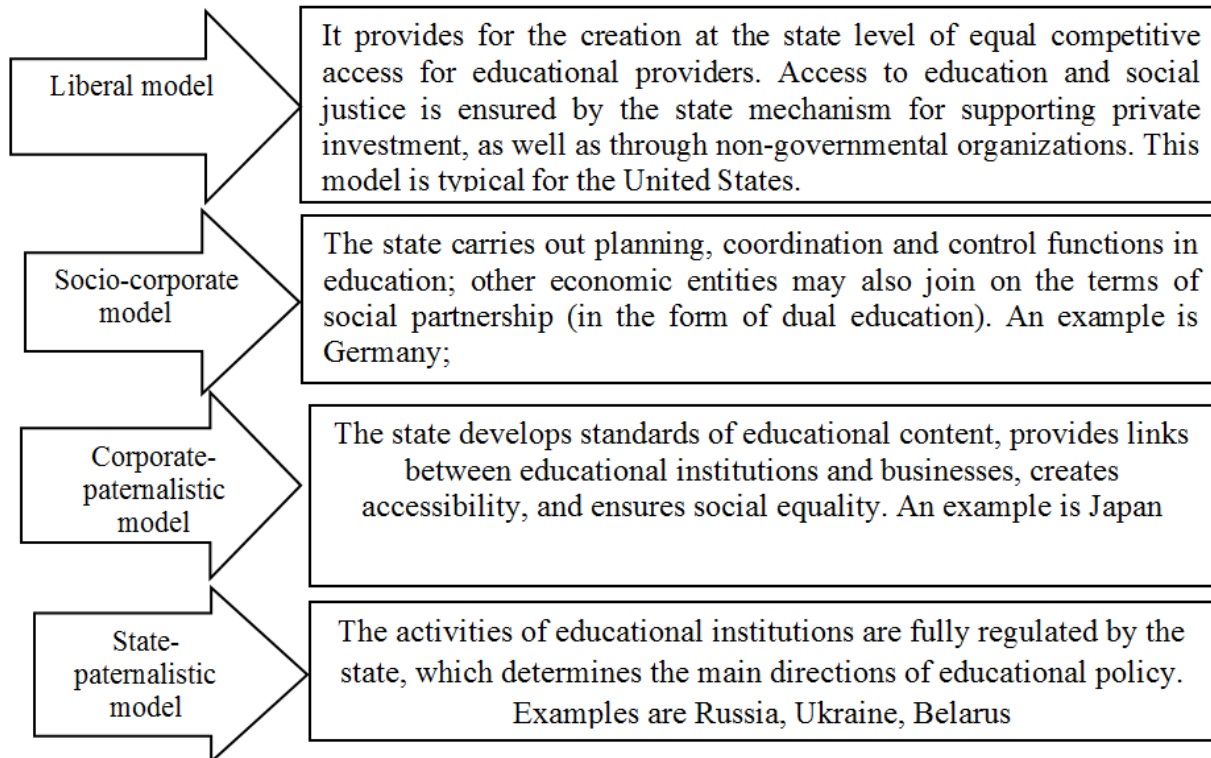

FIGURE 1

CLASSIFICATION OF MODERN EDUCATIONAL MODELS BY FUNCTIONS OF THE STATE (SOURCE: NATIONAL EDUCATION SYSTEMS)

In order to assess the effectiveness of the state's influence on educational and scientific processes, we present Indicators innovation individual countries of the world according to the type of educational model (Table 1).

When calculating the complex indicator of innovation, the following indicators were taken into account: the number of doctoral graduates; higher education; international joint publications; citations of publications; expenditures on research in the public sector; costs of research work in business; innovative products/processes; marketing innovations; innovative cooperation; public-private joint publications; private co-financing of state research and development; patent applications; applications for the use of trademarks; application design;

export of medium and high-tech products; export of knowledge-intensive services. Results show the high innovation of countries in which the socio-corporate and corporate-paternalistic models of education predominate. Slightly lower than the average European level of innovation in the United States, where a liberal educational model is implemented. Ukraine and Russia are represented by the state-paternalistic model, which, according to the provided statistical information, does not contribute to the growth of innovation activity of the countries.

TABLE 1										
COMPREHENSIVE INDICATOR OF INNOVATION (RATING) OF COUNTRIES WITH DIFFERENT EDUCATIONAL MODELS										
Countries	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
The average for the EU countries	100	100	99	101	99	100	103	104	109	112
Ukraine	33	33	32	31	32	31	29	29	27	27
Germany	127	129	129	129	124	124	123	126	127	130
Russia	48	49	42	46	42	48	48	46	48	48
USA	101	104	105	92	94	92	92	90	91	99
Japan	105	105	106	106	107	107	111	106	109	105

Source: author's calculation based on Eurostat (2020); The European Innovation Scoreboard report, Hiba (2020); Institutions of higher education (2020)

Consider the dynamics main performance indicators of higher education institutions and research institutions of Ukraine (Table 2).

TABLE 2											
THE MAIN INDICATORS OF HIGHER EDUCATION AND RESEARCH INSTITUTIONS OF UKRAINE											
Indexes	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**Deviation 2019 from 2010 (±)**
Number of free economic zones, units	349	345	334	325	277	288	287	289	282	281	-68
Number of persons in the Free Economic Zone, thousand people	2130	1955	1825	1724	1438	1375	1369	1330	1322	1266	-863.7
Number of graduate	34653	34192	33640	31482	27622	28487	25963	24786	22829	25245	-9399

students											
Number of doctoral students	1561	1631	1814	1831	1759	1821	1792	1646	1145	1113	-448
Expenditures for research work,UAH billion	9.0	9.6	10.6	11.2	10.3	12.2	11.5	13.4	16.8	17.2	8.2
Volume of sold innovative products, UAH billion	33.7	42.4	36.2	36.0	25.7	23.0	21.2	19.7	24.9	34.3	0.6
The ratio of costs to the volume of innovative products,%	27	23	29	31	40	53	54	68	67	50	23
Expenditures on science, mln.	8.0	8.2	8.8	6.0	5.3	5.0	5.3	6.9	8.3	9.8	1.8

Source: State Statistics Service of Ukraine (2020); Institutions of higher education (2020).

In Ukraine decreasing is observed in indicators the number of institutions of higher education, the number of students, graduate students, and doctoral students. Analytical data indicate a slight increase in spending on science. Despite this, Ukrainian science remains at 0.2% of GDP, which contradicts the legislation, which sets the amount of expenditures in this area at 1.7% of GDP. In order to identify the links and the impact of factors on the volume of innovative products of Ukraine, in the EXEL environment we calculate the correlation coefficients, taking the following analyzed variables: the cost of innovation, state budget expenditures on science and number of graduate students. The results of correlation analysis show that between the volume of innovations and research costs show a weak inverse relationship (correlation coefficient -0.3); between the indicator of budget expenditures on science there is an average relationship, a correlation coefficient of 0.6; The highest correlation exists between the number of graduate students and the volume of innovations (coefficient 0.74). There is an average relationship (expenditure of 0.4) between expenditures on science and expenditures on research. There is a stable inverse relationship between the number of graduate students and the cost of research work (coefficient -0.8), as well as the lack of correlation between the number of graduate students and spending on science (coefficient 0.1) (Figure 2).

These calculations lead to the conclusion that a significant factor influencing the volume of innovation in the country in our study is the number of scientists and budget expenditures on science. For the forecast estimation of innovative prospects of development of the countries which belong to various educational models we will use data of Table 1 and in the STATISTIKA 8.0 environment, built a graph of the forecasted function and calculated the forecast indicators of the level of innovation of countries.

It should be noted that the highest approximation coefficient has a forecast for the United States (0.6) and Ukraine (0.9), which indicates a high probability of the forecast situation. The described model shows high chances of growth of the innovation rating for Germany, which by 2024 should be 141 (against 130 in the reporting year 2019) and for the United States (116 against 99 in 2019). A decrease in the indicator is expected for Ukraine (state-paternalistic

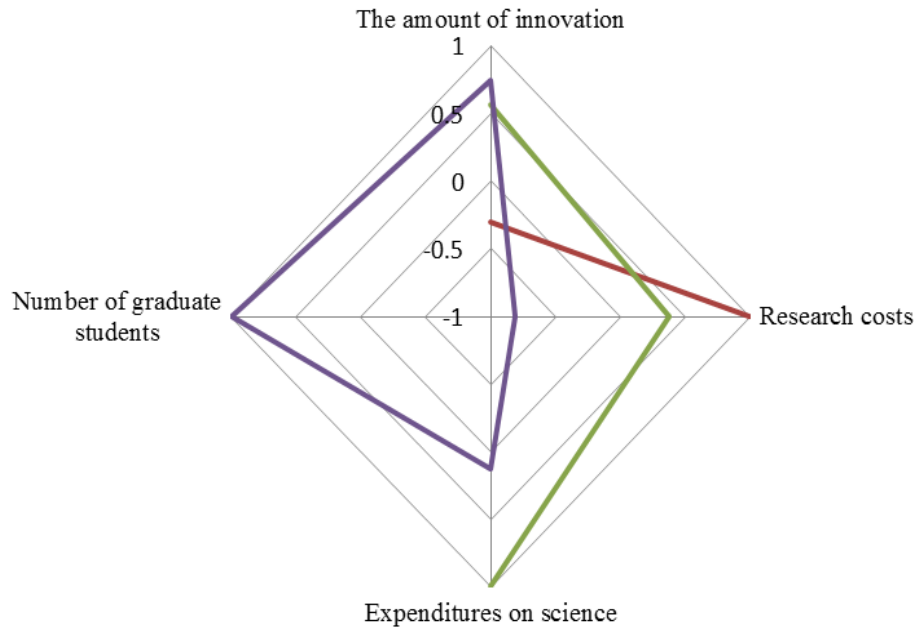model) and Japan, which is represented by the corporate-paternalistic model of education (Figure 3).

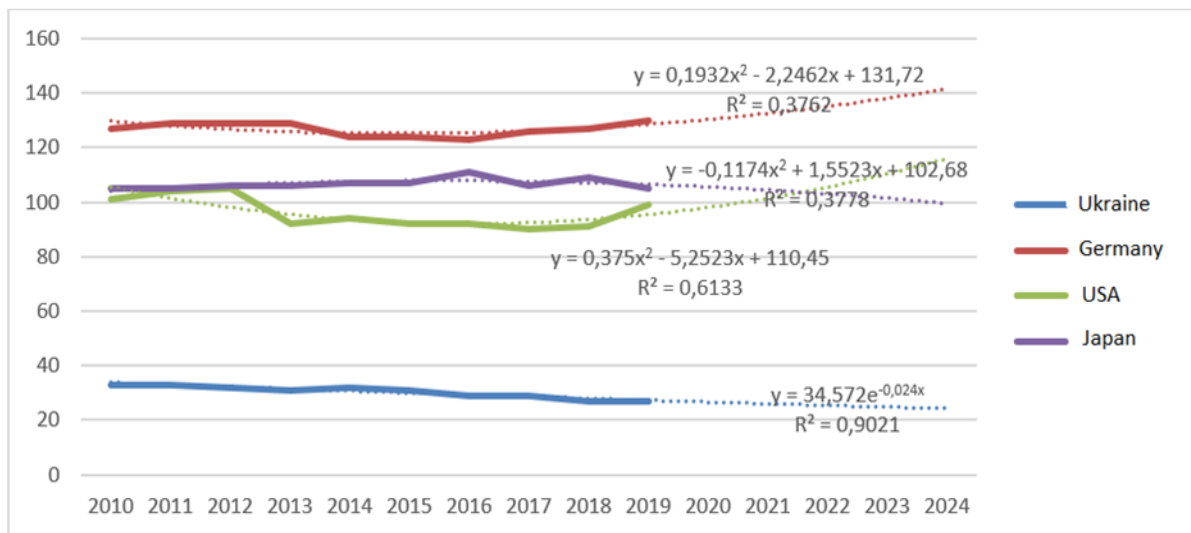

FIGURE 2

CORRELATION BETWEEN FACTORS

FIGURE 3

FORECAST OF INNOVATION OF COUNTRIES WITH DIFFERENT EDUCATIONAL MODELS

DISCUSSION

The globalization of higher education is a characteristic feature of educational trends worldwide. According to Knight (2003), this determines the need to prepare future professionals for professional activity in the global world and management of global processes. Education policy is based on four determinants: educational, social, economic, and institutional values. We support this position and believe that educational and scientific activities have a pronounced social function, which is manifested by the cumulative effect of production and innovation, dissemination and practical use of knowledge. The implementation and significant popularization of the concept of neoliberalism (Ball, 2012) worldwide has led to the globalization of educational processes in many countries. This has formed an appropriate environment, the main thesis of which is the belief in the benefits of the private sector or public-private partnership, which laid the foundation for the formation of the parameters of educational reforms in many countries.

The issue of liberalization of educational processes in educational institutions should be considered together with the strengthening of the deliberative foundations of the state, which are associated with a high degree of development of civil society. Bessette (1980), determines the right of civil society to discuss political decisions and gives it influence on the representative government, provided that full public awareness and awareness. But such a state can be achieved with a high level of democratization, motivation, and civic activism.

In many countries of the world the opinion about the advantages of the private sector is formed and the parameters of the corresponding educational reforms are laid down. Verger (2014) in his study argues that significant decentralization of education promotes privatization processes and notes that countries that have reached a high degree of decentralization education, especially developing ones, have significant problems with effective funding of the educational and scientific process, since local governments do not have sufficient capacity to do so. Individual countries (Ivanyshyn et al., 2019), solve such problems by providing educational subvention, but this leads to uneven distribution of funds, and, in accordance with the disparities of local regional development.

According to the conclusions Pūraitė et al. (2017), none of the applied models of higher education funding selected in Lithuania was able to ensure access to education, quality, and attract qualified teaching staff. The authors argue that without autonomy, universities cannot be innovative and respond effectively to social and economic change and meet the social and economic needs of a state that cannot meet students' expectations of a better quality of life. Based on the results of the study, can be stated that the most optimal model of state regulation of educational and scientific processes is the model used by many European countries and is defined as socio-corporate.

CONCLUSION

Modern science and education are at a difficult stage of economic, political, social and paradigmatic change. That educational model, which was formed during his father's years in countries with a totalitarian system, proved unable to meet modern challenges and form an innovative scientific environment, the center of which is intelligence, critical thinking and a constant desire to improve. For a long time, the educational environment was subjected to illogical reforms, experiments and changes that did not have a clear basis, ultimate goal and a

defined consistent implementation strategy. The analytical information presented in the study shows that the educational and scientific environment of countries with a state-paternalistic model of education is sufficiently represented by relevant institutions operating in this field, in addition, a fairly high proportion of citizens are involved in this sector, which in theory should form a powerful basis of scientific activity. However, a study of the innovation ranking of these countries on a global and European scale shows that they have the lowest rates among European countries. We tend to explain this situation temporarily by the imperfection of the educational model and the low level of involvement of financial resources in this area.

The present research complements the theory of neoliberalism in the context of self-regulation of the market of educational services. Institutions of higher education, like the practice of commercial firms, actively cover their own costs through the formation of research funds. This means that professional culture in a competitive environment is developing faster under the pressure of the external environment. Competition stimulates professionalism through constant innovation in the practice of university management in those countries where there is a mechanism to support private investment or social equality and access to education are provided (the USA, Japan). As a result, such models of education are effective in terms of innovative development of the country. State regulation based on the control and definition of educational policy is ineffective in the context of promoting innovative development of the country (Russia, Ukraine). In both cases, the quality of the educational and scientific process is radically different in favor of government regulation in the United States, Japan, Germany, where the neoliberal concept proves its effectiveness. Along with this, the present research proves that the social role and professional culture of universities have been transformed in the process of deregulation and commercialization of educational services. The limitations of the present research lie in the low ability of the prognostic model in order to reflect the effects of neoliberalism, to explain the future innovative development of countries with different models of the education system and the educational and scientific process.

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