CONCEPTUAL FOUNDATIONS OF TRANSITION TO THE NON-LINEAR MODELS OF HIGHER EDUCATION IN THE REGION¹

The subject matter of the analysis is the non-linear characteristics of the new model of higher education in relation to its resources and risk environment. The purpose of this article is to prove the need and the possibility of transition to the non-linear model of higher education in the region on the basis of theoretical positions and the results of the study of non-linear socio-economic processes. In this connection, the socio-economic factors of such transition are characterized; the objective necessity of its implementation in the context of the economic and social uncertainty of a particular region, which is Ural Federal District, is shown. A new type of relationship between universities and their social partners is considered. The need for the change of interactions between educational communities; reliance on the use of a new wide range of economic, social and spiritual resources; the constant search for new mechanisms, educational programs, relations with the external environment, management decisions are argued. Ural Federal District is shown as one of the most advanced regions of the Russian Federation not only in the sphere of the economy, social and cultural life, but also in the sphere of higher education. This circumstance is related to the constant, intensive search for innovative approaches to the modernization of higher education in the region, including the formation of its non-linear model. The presented situation forms the basis of the hypothesis that the non-linear model of higher education can ensure its competitiveness in the global educational space, to enhance its role in the society and specific regions of the country and to turn it to a locomotive of the socio-economic and socio-cultural development. The study is based on an interdisciplinary methodology, including the potential of theoretical sociology, sociology of education, economic sociology, management theory, regional economy. The findings of the research serve as the basis for improving the educational policy of the Ural Federal District.

Keywords: social and economic uncertainty, risks, challenges, vulnerabilities, non-linear economic processes, non-linear model of higher education, regional economy, the region’s system of higher education, social partnership in education, educational communities

Introduction

The Russian system of tertiary education is currently undergoing radical changes, aimed at strengthening its competitiveness in the global educational arena. However, this process is slow and extremely controversial. It does not go without let or hindrance, and is impeded by the confrontation with the Soviet-era traditions of higher education. Two key trends have become noticeable in recent years: on the one hand, the Russian higher education is integrating into the world academic space; on the other hand, the process of its regionalization is under way, namely, adapting educational systems and practices and carrying out research related to the characteristics and needs of the regions. Consequently, the need arises for a theoretical understanding of the higher education system that would take into account the interests of the Russian society, the region and the global interests in the development of tertiary education.

The increasing economic and socio-cultural dynamics of the Russian society, associated with its growing economic and social uncertainty (unclear prospects and multiple development scenarios) has necessitated the non-linear development of higher education. The objective need for this transition to a non-linear model meets the challenges of non-linear social time, with its increasing complexity, mobility, multiple vectors, its probabilistic character, and the diversity of

life behavioural strategies of different social communities. Yet, the concept of a non-linear model of higher education and the ways of shifting to such a model are uncertain, indefinite, lack a clear vision of its meaning and essence, which creates risks, vulnerability, and side effects, often latent, of this transition.

**Socio-economic preconditions for the transition to a non-linear Model of higher education in the region**

In a huge country like Russia, its centre cannot be the focal point for the higher education system development. The regions that make up the country, especially as large as federal districts, play an equally important role in the modernisation of the system and its non-linear development. Yet, these regions have not been given sufficient attention by researchers and education practitioners when establishing concepts and implementation mechanisms. They are invisible, unseen, and largely neglected as research and management practices objects. The proposed concept is being developed at the regional level for Ural Federal District (UFD) as the theoretical basis for the model and, after successful testing, may be recommended for other regions of the country.

The higher education system of UFD includes more than 70 universities in Sverdlovsk, Chelyabinsk, Tyumen, Kurgan regions, Khanty-Mansi and Yamalo-Nenets Autonomous Districts. It is represented by all major types of higher education institutions in Russia: federal university, research university, support universities that are being created, etc. They reflect almost all fields of study and specialities (technical, natural sciences, economics, humanities and social sciences).

Ural Federal District is one of the most advanced districts of the Russian Federation and comprises several federal subjects, highly developed in terms of their economy: Sverdlovsk, Chelyabinsk, and Tyumen regions, Khanty-Mansi and Yamalo-Nenets Autonomous Districts. The economic structure of these subjects includes all the major industry branches, which creates, directly or indirectly, an interest in the implementation of breakthrough projects in the field of education. The need for such projects is due to the instability of higher education development in UFD. According to Ural Federal University rector V.A. Koksharov, since the beginning of the 2000s, the operating conditions and the higher education system infrastructure in Ural Federal District have generally improved, "yet the overall evaluation of the development of the region’s higher education system is still not favourable" [1, p. 41].

The situation with higher education in the region is distinguished from Russia in general by slight fluctuations in its quantitative characteristics.

While the number of tertiary education institutions in Russia should be reduced by more than 20% (from 1,115 to 887) from 2010 (100%) to 2020 (79.6%) according to forecasts, this number is expected to increase (from 73 to 74) in Ural Federal District. However, a significant reduction in the number of universities took place in 2013 and 2014 (from 73 to 67), but after that, it started growing. Now there are already 70 institutions, and by 2020, this number will increase by 4 [2, с. 185, 184].

As for the size of educational communities (students and teachers), the situation is as follows: the number of teaching staff members in Russian state and municipal institutions of higher education will decline by 21.2% from 2010 (100%) to 2020 (78.8%). In absolute terms, forecasts suggest a decrease from 325.1 thousand teachers in 2010 to 256.2 thousand in 2020. The situation in Ural Federal District is slightly different: in 2010 there were 28.1 thousand university teachers. In 2020, the forecasts predict this number to decline to 27.2 thousand [2, p. 178, 181].

Speaking about student numbers, it should be noted that in 2010 Russian universities had 5857.4 thousand students (100%); in 2020, as forecasts suggest, there will be 4372.5 thousand (74.6%), which means the number will decrease by more than a quarter. In Ural Federal District, the number of students will decrease from 508.2 thousand (100%) in 2010 to 442.8 thousand (87%) in 2020, by 13% [2, p. 165, 167]. Thus, the dynamics of Russian higher education institutions numbers and their communities’ size show a marked downward trend, whereas the situation in Ural Federal District looks more optimistic.

The need to shift to a non-linear model of higher education is caused by the non-linear dynamics of socio-economic processes taking place in the region, one of the preconditions being the increasing uncertainty of the region’s socio-economic development.

Urals Federal District (UFD) is one of the most economically developed regions of Russia. In 2016, the value of the most important indicators of its socio-economic development exceeds the average. In terms of gross regional product and industrial output, fixed assets and retail trade turnover, capital
investment and financial flows into the country’s budget, UFD has consistently been the second or third among all federal districts of the Russian Federation\(^2\).

The district is one of the most urbanized territories (80% of its population live in urban areas), with high living standards (second only to the Central District in terms of income per capita); 55% of the working population have a university degree or secondary vocational education (third to the Central and North-West districts).

Yet, the annual reports on the implementation of the Ural Federal District socio-economic development strategy and expert assessment of risks and threats show, firstly, the negative dynamics of some indicators and the instability of the others; secondly, the increasingly uneven development of the region subjects; third, the increase in the number of risks (financial, manufacturing, human, environmental) associated with both the internal situation and the external environment. Despite the fact that the overall performance of the region’s economy looks relatively positive against the background of other RF subjects’ indicators, the prospects for its stability and improvement are uncertain. This uncertainty is generated by the lowering oil and gas prices, the dependence of the region on the oil industry, insufficient diversification or innovative development of the regional economy.

The situation of economic uncertainty in the region sends an unstable signal to the labour market and, consequently, to educational communities, determining the non-linear strategies for their behaviour in the education system (choice of profession, training duration and forms, the vector and the intensity of academic mobility). The region’s education system is currently unable to face this challenge, since it is not oriented towards the non-linear interdependence of economy and education. Meanwhile, for the territories’ and their economies’ self-development, the most important socio-economic development objective of the region \([3\), modernization of higher education is one of the urgent problems.

The non-linear dynamics are manifested in the imbalances in the region’s social and economic development; the following imbalances can be identified in the Urals:

1. The region’s industrial potential does not meet its demographic potential, which the region has not been able to overcome in the past 10 years, despite some stabilisation due to migration growth (which stopped during the last year) and a small natural increase.
2. The mismatch between the pace of the innovative economy sectors development in the Urals and the opportunities for providing these sectors with innovative staff.
3. The mismatch between the investment needs of the region, its investment attractiveness and the declining activity of actual and potential investors, both international and domestic. The investment attractiveness of the region is strongly influenced by the human capital provided by the regional system of higher education.

The lack of close interaction between the economy and the region’s higher education system at the level of individual higher education institutions and enterprises necessitates the shift to the non-linear model of higher education. This interaction allows creating conditions for the solution of specific problems in specific companies, specific university departments, and specific individuals' problems. The attempts have been made to build such interaction between individual universities and industry: the Ural Mining and Metallurgical Company’s Technical University and the Ural Federal University’s Graduate School of Engineering are the two successful examples that serve as a prototype for the non-linear model of higher education.

But this process is not systemic, it is implemented by the initiative of only the “big players” and mainly at the level of large-scale industrial production. In our opinion, the move towards key players’ (education, business, government) interaction and cooperation is itself a positive development. However, when it becomes massive, typical, and similar in form and content for everyone, it is a characteristic of a linear model of higher education. It is defined by “strong”, visible elements; and small, “invisible” players (both universities and educational communities and market and economy actors) are little involved in the interaction and relationships, and are poorly integrated with each other and into the overall process of change. Yet, the potential of “small players” that build weak latent connections in the system of higher education is a very important resource for its modernisation in the region. Involving this resource in the problematic situation as a part of the non-linear model of higher education seems reasonable and relevant.

Theoretical framework for the study

The study of the non-linear model of higher education can be based on resource dependence theory, according to which organizations and systems, on the one hand, depend on their environment, on the other, are capable to influence the environment where they operate [4]. R. Freeman’s theory of interested parties (stakeholders), which represents the organisation through a set of entities interested in its activities and its development through taking into account their interests and requirements, can be used to analyse the transformation of the higher education system focused on a single stakeholder (state) into a system with a variety of stakeholders (government, science, business, family, students) [5].

Institutional diversity in higher education has been actively discussed by a number of foreign authors [6]. These researchers share a common attitude to diversity in the higher education system as its healthy attribute that expands the choices available to students of the trajectories for their development.

The basis for the study of transformation processes occurring in higher education is the theory of dependence on previous development (Path Dependence Theory) [7]. According to P. David, “dependence on prior development is a sequence of economic changes in which distant past events, random events rather than systematic patterns, influence the possible outcome” [7, p. 10].

A special aspect of research are the effects of globalisation through pervasive marketisation of education and the domination of the knowledge economy ideology [8]. More and more researchers focus on studying the ability of individual states to use global benchmarks in national interests [9] and on the transformation of national education systems [10].

The research interests of G. Dvorkin’s group include theoretical and practical issues of gender, ethnic, and racial interactions, multicultural issues and the impact of globalisation on education [11]. The group headed by A. Antikainen studies the changes of higher education in the framework of the Scandinavian model of the state, the various aspects of adult education in the institutional and socio-cultural dimensions [11].

Russian research teams also attempt to address the issues related to the transformation of the higher education system, focusing on its structural policy directions and objectives. I. D. Frumin examines the problems of education quality [12]. D.L. Constantinovsky explores social inequality and differentiation in education, the role of education in social mobility and in social structure [13]. G.A. Klyucharev studies the role of continuing education in the system of higher and postgraduate education [14]. I.V. Abankina looked at changes in the basic conceptual approaches to the economics of education during the transition to expanding resources (information and communication, intellectual, educational, symbolic, and brand resources) [15].

The scientific literature review shows a lack of coherent theoretical and empirical studies of non-linear processes and phenomena in the sphere of education which would fully reflect the possibilities of creating and implementing the non-linear model of higher education in Russia in the context of economic and social uncertainty.

Methodology

To develop the concept of the non-linear model of the region’s higher education, it is reasonable to use an interdisciplinary methodology that includes a set of general methodological and interdisciplinary approaches related to the theoretical and methodological potential of theoretical sociology, educational sociology, economic sociology, management theory, regional economics and others.

The systemic, institutional and group (community) approaches are used as general methodological principles. The systemic approach allows studying higher education as an autonomous structural and integral unity on the one hand, and as an element of a larger social system of education, on the other. In this approach, research focuses on the organizational structures and content elements of the non-linear model of higher education, their functionality and efficiency in the Russian educational system as a whole.

The institutional approach allows concentrating the theoretical analysis of higher education on its consideration as an element of social relations system that interacts with its other elements, as well as paying attention to identifying its connections with other subsystems of education, with the state, the economy, industry, business, science, culture and other social institutions, systems and subsystems. This approach to higher education aims to study it as a certain stable and dynamic form of social organisation in the field of education and professional training.
The group approach involves analysing different levels, types and kinds of interaction between social communities organised in a certain way to achieve the innovative aims and objectives of higher education. It is also aimed at studying the non-linear behaviour strategies of educational communities in the context of social life differentiation and complication manifested in its gaining multi-level parameters and non-linear characteristics.

The methodological interdisciplinary potential allows conceptualising the phenomenon of the non-linearity of the higher education system, showing its connection with non-linear strategies of social communities directly or indirectly involved in the educational sphere.

The methodological tools used to study higher education make it possible to reveal the dialectic of interaction, the mutual influence of higher education and other sub-systems (economic, political, social, cultural and scientific) within the region as a system. The applied research instruments offer the prospect of analysing the degree of satisfaction of the interacting subjects of the higher education system, various social communities, either directly included in the system or indirectly connected with it. Within this interdisciplinary approach of particular interest are the issues of continuous, open and distance education, both in terms of people’s personal interest in its development and public recognition of the importance of this problem.

From the viewpoint of sociological and economic approach, the higher education system is regarded as one of the most important socio-economic resources for the development of the society, region, social communities and individuals. The essence of this approach can be defined through dialectical interaction between the economy and higher education:

a) how the region’s economy influences higher education, including it in its financial and economic relations;

b) what the cost-effectiveness of higher education in the region is;

c) how higher education affects the development of the industry and economy of individual regions and society in general.

The socio-economic approach implies identifying the real opportunities of the free market of educational services, the extent of its effectiveness, the need for both the state intervention in the economy of higher education at the level of individual regions and the implementation of institutional measures for the development of public-private partnership in this sphere. This need is satisfied through channeling certain state resources into the realization of educational programmes. Thus, the purpose of socio-economic approach is to show reasonable opportunities and rational proportions for developing the non-linear model of higher education, a combination of the free market of educational services and the mechanisms of state regulation of the higher education system in the interests of consumers of these services.

The demarcation line between methodological approaches is conventional, which allows implementing a unique interdisciplinary research strategy that integrates the breadth and depth of the philosophical, sociological, and pedagogical approaches to the study of higher education with more accurate estimates, the predictive and design potential of socio-economic and management approaches.

The concept of the non-linear model of higher education

What is a non-linear model of higher education? No attempts to conceptualise it can be found in scientific literature. However, a significant part of the intellectual elite feels the need to create, develop and introduce it in the social system. The dissatisfaction with the existing (linear) model of higher education is constantly increasing. There is no satisfaction with the quality of education, with low efficiency of its interaction with the economy, science, culture and the resulting effect on them. A considerable proportion of students have no interest in the knowledge obtained, the competencies developed or any research activity. The need for higher education is replaced by the need to obtain a diploma in higher education. Traditional higher education, albeit with a number of innovations, continues to make its way along the familiar linear track and has a vague idea of what it means to move away from it to the non-linear model of development.

The latter is a different, unconventional, and, therefore, an innovative way of development for higher education which can significantly change its nature and direction (vector) and its role in the society, social communities and individuals, can transform it from a formal life dominant into a really attractive activity, if not for everyone at once, then for a large part of educational communities.
Non-linearity is increasingly asserting itself as the dominant way of organising social reality, despite the fact that elements of non-linear social and economic processes were observed in the past. It gets not only its particular interpretation, but also evaluation — positive or negative — depending on its impact on the society development and its prospects. The problems of higher education transition to its non-linear model with a new level of complexity, new resources, based on the principles of alternatives and mobility, on changing the functions of higher education in the conditions of economic and social uncertainty, are generated in this specific context.

The economic uncertainty manifests itself in the uneven acceleration of economic and social processes, the often unexpected nature of their development, the absence of stable economic and social systems, their fragmentation, polystructurality, fluidity, virtualisation, and asynchrony. The indefinite character of the various social subsystems, including higher education, results in imbalance and unpredictability during its transition to a new quality, in a highly likely mismatch between its modernisation paths and the development of the economy, labour market, science, culture, social sphere and their management systems. The explicit nature of some of these imbalances and the latent existence of the others makes building a new, non-linear model of higher education extremely relevant and timely.

The analysis of higher education practices and expert interviews\(^3\) allows comparing the linear and non-linear models of higher education (see Table 1).

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Linear higher education model</th>
<th>Non-linear higher education model</th>
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<tr>
<td>University management style.</td>
<td>Strict, authoritarian management system that does not allow freedom and variation in the operation of higher education institutions.</td>
<td>Changes in the nature of university management resulting from rejecting authoritarian principles.</td>
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<td>Opportunity to participate in managing the university.</td>
<td>The transformation of universities administration into a self-sufficient management structure, with full academic and administrative power concentrated in its hands.</td>
<td>Extensive involvement of academic community representatives and students in the management system.</td>
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<td>The interaction between universities and external subjects.</td>
<td>The absence of close interaction between higher education and the environment, first of all, with the economy.</td>
<td>Transition to a new type of relationship between universities and various economic and social actors that become social partners.</td>
</tr>
<tr>
<td>The degree of academic mobility.</td>
<td>The absence of students' and faculty academic mobility as a really mass phenomenon.</td>
<td>The development of various forms of students' and faculty academic mobility, especially within the region (inter-university mobility).</td>
</tr>
<tr>
<td>Opportunity for educational communities to influence the choice of the university development path.</td>
<td>Suppressing democracy and dissent on the choice of options for the development of educational institutions.</td>
<td>Ample opportunities for the educational organisations' staff to influence the choice of their development options.</td>
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<tr>
<td>The degree of interaction between educational communities.</td>
<td>Low level of interaction between educational communities in higher education, especially research and teaching community, students and managers.</td>
<td>Active cooperation between educational communities, including collaboration based on the selection of students during their interaction with teachers in individual educational trajectories.</td>
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The creation of the non-linear model of higher education in the region, in our view, must be associated with a considerable enhancement of horizontal connections and interactions between specific educational organisations and their structures in various spheres of university life. We cannot say that nothing has been done in this respect: there are contractual relations of creative collaboration.

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\(^3\) Expert interviews were conducted in April-May 2016 (30 interviews). The experts were rectors and vice-rectors of UFD universities, directors of institutes and deans of faculties, heads of departments, reputed academics, professors, representatives of various stakeholder groups of these educational institutions.
between individual universities. But their effectiveness raises many questions, and real connections and interaction are hardly noticeable.

Within a non-linear model, higher education has the same objectives as traditional higher education: training professionals for various spheres of social life. However, there is a difference in the ways of training.

The non-linear model is aimed at building a new type of relationship between the system of higher education and the social partners using its results. These new relationships should predominantly be horizontal, since they are based on the idea of social partnership. Therefore, those who are traditionally considered consumers of universities’ educational services should be regarded as their social partners.

Consequently, the nature of mechanisms ensuring the relationship and interaction between higher education institutions and their social partners should change. These mechanisms are the regulators of the system of communication between higher education and the labour market in the region. They should be based on universities’ contractual relationships with their social partners, based on flexible training taking into account individual educational trajectories within the existing and appropriately changing educational programmes. Therefore, the non-linear model of higher education includes designing educational programmes which, on the one hand, are based on state educational standards, and, on the other hand, take into account the specific requirements of employers (university partners). In this respect, they may differ significantly from the existing programmes of mass training.

Hence, the need arises for a new type of interaction between educational communities of students and teachers, involving, in particular, the use of connections between their individual educational and professional paths. A new level of development and interaction between educational communities in the region’s universities should be based on the principles of openness, responsibility and mutual interest.

Unlike the linear model, the non-linear model of higher education means using a new resource base: it involves relying on a new type of knowledge (scientific and educational knowledge) and a new type of interdisciplinarity (a close relationship of higher education with the region’s institutions and new social practices). The non-linear model is based on new types of social capital — social partners’ trust and solidarity. The model’s important resources are social time, realised in temporal practices of the region’s higher education entities, and increased mobility, manifested in the orientation of higher education in the region towards forward-looking development paths, speed and timeliness of changes.

Conceptualising the non-linear model of higher education in the region also includes the following distinctive features:

— a high level of complexity of intra-system relationships, organisational processes, inter-institutional relations, developing both around the region’s higher education system and within it;
— providing alternatives by offering a wide choice of research and education programmes, individual educational and professional trajectories, and academic mobility options in every university in the region;
— the transformation of the region’s higher education into the driver of its socio-economic, cultural and scientific development.

Identifying the social and economic conditions for implementing the non-linear model of the region’s higher education is essential in order to:

1) develop ways and stages of the transition from the traditional to the non-linear model of higher education;
2) devise new development strategies for university educational communities aimed at turning them into cutting edge communities;
3) substantiate innovative managerial approaches to the implementation of the new higher education model;
4) devise the region’s strategy for higher education development within the frameworks of its non-linear model as a logical element of the Russian system of higher education;
5) determine the risks, barriers, vulnerabilities, side effects, and the latent effects of implementing the concept of the non-linear model of higher education.

Conclusion

The analysis of the existing model of higher education in the region demonstrates the relevance of the development of a new model, which can be defined as non-linear. Its main features are: the transition to a new type of relationship between universities and various social subjects that become their
social partners; individualisation and specialisation of educational processes; the change in the nature of relationships and interactions between educational communities; reliance on the new ways of using the wide range of economic, social and moral resources; continuous search for new mechanisms and educational programmes, connections with the external environment, and managerial solutions.

The creation of the non-linear model of higher education in the region is influenced by historical, economic, social and cultural factors. These reflect the specificities of Ural Federal District as one of the most advanced regions of the Russian Federation, not only in terms of its economy, social and cultural life, but also in terms of higher education. This fuels the continuous intensive search for innovative approaches to the modernisation of the region’s higher education, including its non-linear model. Moreover, this model does not contradict the modernisation processes taking place in Russia, but rather enhances them. The need for theoretical and empirical research is, therefore, essential.

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