ISSN 0798 1015

REVISTA ESPACIOS

HOME Revista ESPACIOS ÍNDICES A LOS AUTORES

EDUCACIÓN • EDUCAÇÃO • EDUCATION Vol. 39 (# 02) Year 2018. Page 11

Innovation impact analysis model in the education system (on the example of regional innovative projects)

Modelo de análisis del impacto de las innovaciones en el sistema educativo (tomando como ejemplo los proyectos innovadores en las regiones del país)

Pavel A. SERGOMANOV 1; Natalya P. SHILOVA 2; Alfiya R. MASALIMOVA 3

Received: 16/12/2017 • Approved: 20/12/2017

Contents

ABSTRACT:

This paper elaborates an innovation impact model based on the analysis of the design of innovative projects' competitions ("single customers" (linearity) - "partnerships" (complexity)), and innovative projects' objectives in relation to changes in education features ("conforming" - "transforming"). It presents expert criticism of the innovation impact analysis model and innovation classifications in the process of approbation of the model, indicating the imperfection of the model in terms of considering the "power" of the impact of innovative projects on education features.

Keywords: innovation impact, education system, analysis, model, regional projects.

RESUMEN:

En este artículo está elaborado un modelo del impacto de las innovaciones basado en el análisis de las construcciones de competiciones de proyectos innovadores ("monocliente" (linealidad) - "colaboración" (complejidad)) y de los objetivos de proyectos innovadores con respecto al cambio de las características sistémicas de la educación ("conformando" – "transformando"). El artículo expone una crítica experta del modelo del impacto que tienen las innovaciones y clasificaciónes de las innovaciones en el proceso de la aprobación revelando la deficencia del modelo a la hora de considerar el "grado" del impacto de los proyectos innovadores en las características sistémicas de la educación.

Palabras clave: impacto de las innovaciones, sistema de educación, análisis, modelo, proyectos regionales

1. Introduction

1.1. Significance of the study

Given constant changes in the education system, analysis of innovations is essential for effective management activities. To tackle the issues of innovation management, it is important to define a common language to describe processes of changes and their divergences from the innovation processes. Addressing management issues, such as determining validity of innovations, separating the immediate innovation results from its effects and developing consistent management strategies, will help to build modernization strategies, innovation contests, and to determine their priorities and objectives at different management levels (Slobodchikov, 2008).

1.2. Distinctive features of innovations and changes in the education system

To understand the basis of analysis and describe the impact of innovations on the education system, it is essential to define the difference between *changes of the education system (its features)* and *innovations* in the education system. Both changes and innovations in the education system, we believe, do not transform the basic relations of the participants in the field of education, but change the way they relate due to the influence of innovations, primarily through their scaling, understanding of their impact on the system and use of such impact (effects).

Changes and innovations in the education system, therefore, do not affect basic relations, but foster their disturbed equilibrium (balance) in a new manner and in the new environment of their viability, for example, when the volume of vital resources drops. From this point of view, innovative movements in Russia in the 1990s and 2000s ensured modernization of educational practices overall as well as their features, and allowed overcoming the gap between new challenges of the post-perestroika society and the existing education system (education features). Changes and innovations in the education system did not affect basic public relations, but transformed the ways of functioning and features of the education system through new solutions in legislation, the content and methods of education, educational infrastructure (conditions), etc. It is no coincidence, the basic document of the 2000s was the "Concept of modernization of Russian education for the period up to 2010," adopted in 2001 (RF Government Executive Orders, 2017), which defined both structural and technological changes, as well as the focus and boundaries of innovation. This concept enhanced the effects (impact) of innovation and, through their dissemination, transformed education features, including those reflected in the legislation on education.

In the meantime, the activity associated with changing the education system itself (education features) was legislatively regulated by law, through description of the procedures for implementation of experimental and innovative activities in education. Thus, the objective of experimental and innovative activities in the Russian education is to ensure modernization of the education system (education features), including the main focus of socio-economic development in the Russian Federation, and implementation of priority areas of state policy of the Russian Federation in the field of education. The procedure and conditions for conducting experiments are determined by the Government of the Russian Federation, and the conditions for the implementation of innovative activity in education – by the rules for the innovation infrastructure functioning (Federal Law on "Education in the Russian Federation" of 29.12.2012 №273-FL (latest revision), 2017).

Further on, innovative activity is aimed at improving academic, educational, methodological, organizational, legal, financial and economic, professional, logistical support of the education

system and is effected through implementation of innovative projects and programs by educational organizations as well as other organizations acting in the field of education including associations thereof (Federal Law on "Education in the Russian Federation" of 29.12.2012 №273-FL (latest revision), 2017). When implementing an innovative project, the rights and best interests of the participants of educational relations should be ensured; the level and quality of education offered and received by the participants, should not be lower than the requirements established by the federal state educational standard, federal state requirements, educational standard. This means that innovations are not supposed to worsen the conditions of the participants of educational relations, but should secure their rights and best interests (basic social relations).

Different participants of relations in the field of education, participants in educational relations defined by terms of educational legislation in Russia (Federal Law on "Education in the Russian Federation" of 29.12.2012 №273-FL (latest revision), 2017) define the agenda for the education system modernization: from discussing and defining issues of updating didactic units to developing infrastructural and IT solutions. In particular, modern educational science and practices try to set up the goals of modern school in terms of the "Skills of the 21st century" and other target constructs (Higher School of Economics. National Research University, 2017). The core of these goals, such as "4K Skills" (communication, cooperation, critical thinking, collaboration), "Soft skills", new literacy ("digital age literacy") and many others are being actively discussed.

These and other innovations we consider a *potential* change, a possible "start" and at the same time the core of future systemic changes. In order for innovation to become a change, we need to consider not only its content and outcomes, but also its effects, its impact on the education system. In this respect, innovation management should consider its explicit or concealed objectives in relation to education features, and design potential changes in the education system: without them, innovation becomes a "self-activity", a "project in itself" with no input to the overall process of changes. Therefore, the initiation and implementation of innovation should be considered as a potential change, while innovation impact on the education system should be viewed as an element of an integral managerial design of changes with the help of innovation, a full two-stage life cycle of innovation: from the implementation of an innovation project to its dissemination (scaling) and support of its effects (impact).

Development of new work methods and their extensive use in the education system can be called a *change*. However, before achieving its distinctive "finalized" form, the change goes through a trial period, "adapting" to existing circumstances and resources, or transforming them up to certain point, beyond which it is recognized as a new work method in the education system. Actually, this trial period of changes we can call an *innovation*.

Thus, it is essential to distinguish between the processes of changes and innovation processes and to understand their interrelation, in order to build consistent education management strategies. Innovations only lead to changes of education features, when:

- Innovation management considers their two-stage structure and difference in managing innovations and managing their dissemination (managing changes and effects),

- Innovation initiation and its support (innovation contests) include objectives of changing education features,

- Analysis of innovation impact on education features is used to develop and adjust consistent strategies for changing the education system.

1.3. Research questions

Thus, the main questions (issues) of the study are as follows:

- To what extent can the proposed model for analyzing innovation impact on education features be used for developing and implementing managerial decisions in the region?

- What are the imperfections of this model from the point of view of experts and expert organizations involved in preparation and adoption of managerial decisions in the region?

- How can the quantitative effect of innovation impact on education features be presented?

- How are the types of innovations (effect) sorted, and what is the "landscape of innovation impact"?

1.4. Objectives of the study

The purpose of this paper was to develop and implement expert approbation of an innovation analysis model (primarily in the field of school education), and to present the landscape of innovation impact using as an example analysis of innovative projects' impact on education features, implemented through open competitions in four regions of the Russian Federation. The tasks to attain this goal are as follows:

1) Distinction between innovation processes and processes of changes in education features (system);

2) Description of a two-stage lifecycle of innovations, considering their impact on education features and description of differences in specifics of innovation and changes (innovation impact) in accordance with the stages of innovation lifecycle;

3) Description of attributes of changes (innovation impact) and classification of innovation impacts;

4) Collection of data about winning innovation projects in educational contests, and analysis of their impact from the point of view of prevailing type of innovation affecting education features;

5) Expert discussion of the proposed model for analyzing the impact of innovation on education features.

2. Literature Review

It is important to note that different innovation models and classifications of are most often based on their own contents, composition cycles, specific aspects of innovation processes, for example, on competencies of the leader, support of activities or other various criteria (Voronina, Molchanova & Abrameshin, 2004; Pashkus, 2007; Jakovlev & Zhukova, 2012; Koroleva, Khavenson & Andreeva, 2017; Kuzovlev & Khmorenkova, 2016; Olefir, 2009; Sidenko, 2017). Of particular interest are the descriptions of the school as a whole "innovative educational complex" (Malinin, 2011) In this paper we explore *not the contents, but the very purpose of innovation* in terms of its impact on systemic, institutional elements of education - norms, rules and regulations, operation modes and basic technological and infrastructural solutions (for example: format and setup of classes, knowledge and information transfer technologies, educational solutions, training programs, ways of learning, etc.). In this respect, the contents of innovation can be completely different. However, understanding the nature of innovation impact on education features is essential for our purposes. Authors of innovations (innovation groups) cannot always in advance substantiate their own goals as *the goals of changing education features*. Therefore, it is vital to build the impact analysis model to analyze the innovation impact and to develop management strategies, a methodology for analyzing impact, conduct its approbation, create the innovation classification with respect to their impact on education features, describing and explaining the impact of innovation.

Some studies are considered links between meta-characteristics of schools, important for understanding what is happening: social status, nationality, school atmosphere, school management strategies and classroom management strategies, organizational context, involvement in change (Fredriks, Blumenfeld & Paris, 2004; Sirin, 2005; Tapa et al., 2013; Kraft, Marinell & Yee, 2016; Corpershuk et al., 2016). These studies open up great possibilities for changes in the education system, but can not be considered in the framework of this article.

The agenda for the changes and content of the issues touched upon in them is a more delicate and profound circle of issues.

The standard phases of innovation "life cycle" in competitions mechanisms are (Jakovlev & Zhukova, 2012): the "start" of the process, namely generation of an innovative idea; shaping this idea into a project, as well as completing relevant project documentation (organization of an innovative project); implementation of an innovative project; analysis and evaluation of the outcomes (immediate planned results of the project); analysis and assessment of an innovative project effects, including in different languages (Tolstikh, Shkarupeta & Shishkin, 2017).

Innovation impact analysis, therefore, is focused on the final phase - the phase of their dissemination, scaling, impact. It is important to emphasize, that this final phase of innovation goes beyond its actual limits, beyond the limits of innovation itself, and should be assessed based on other criteria determined by innovation customers. Surely, other people or organizations can consider it a helpful or disruptive factor in their activities.

Innovation customers publish their objectives for the changes, and, thus, criteria for assessing innovation impact in open tender documentation – they publish what the competition is ultimately organized for. Financial and legal mechanisms for supporting innovations winning in the competition, determine ways of accountability and reporting of innovation groups in part of innovation outcomes; but this accountability and reporting look completely different when we discuss innovation effects, their impact. Indeed, the innovation group should not be held accountable for the effects, dissemination and impact of innovation in exact same way as for direct planned project outcomes. This in fact creates the *study objective* – how to understand innovation effects and impact on education features, and how and on what grounds to develop recommendations for managing innovations?

For example, the purposes of technological modernization of the general education (and consequently competitions dedicated to this issue) imply changes in teaching technologies with the help of modern information and communication solutions (Chesovskaya, 2015). Thus, the "inverted class" (see, for example, (Now that you've thought about your learning environment, it's time to consider the content, 2009) is an example of changes of education features – of a basic organizational unit (lesson) and technology of learning. Traditionally, the teacher "delivers" new material, then encourages learning in classroom and then and controls learning. In an "inverted classroom" the teacher encourages students to first learn new material on their own, in order to debate/discuss it in classroom, and then to make sure the material is learned. In this case, not just the lesson, but also technologies of teaching change: the very goals and logic of it. Online training could also serve as a similar example (Ivanova, 2014, Kraft, Marinell & Yee, 2016). These examples offer both a solution to systemic problems of education (old-fashioned teaching technologies), and illustrate the need for building new management schemes. Indeed, if the "inverted class" enters the school system, it will require new teaching qualifications, new approaches to control learning new knowledge and skills, as well as new technical conditions for implementation. Consequently, these new approaches, qualifications, etc. in fact, are themselves the issues of managing effects, rather than issues of innovation and innovation groups. There are other examples, see (Kuzovlev & Khmorenkova, 2016; Olefir, 2009; Sidenko, 2017).

Education science and educational practices cannot yet provide an accurate method for assessing the innovation potential from the point of view of its impact on the education system as a whole; however, it is known that education has its own features as environment for spreading innovations (Pashkus, 2007; Jakovlev & Zhukova, 2012; Koroleva, Khavenson & Andreeva, 2017; Schumpeter, 1961; Puzanov, 2012; Gorelova, & Stepanov, 2013; Volkov, 2015; Volkov, 2016). It is also known that enhancing innovations has a beneficial impact on dynamics and balance of the education system, even if specific impact of certain innovation on the changes cannot be proven. Consequently, the paper proposes the innovation impact analysis model, a classification of innovation from the point of view of its impact (effect), and quantitative characteristics of innovative projects' impact as well as features of allocation

(landscape) of the impact itself.

Generally, the innovation theory in modern sense of the word emerged only in the beginning of the twentieth century, when a French sociologist G. Tarde, and then an Austrian economist J. Schumpeter (1961) suggested a hypothesis that considered scientific and technical inventions as the main driving force of social progress, including specifics of innovation dissemination, and their use (Puzanov, 2012).

Obviously, social, cultural, geographical (territorial), economic and other factors affect the intensity of innovation use and dissemination, and are the conditions for its dissemination. However, the requirements and "demands" for innovations, which are usually organized through competitive procedures that detect and promote innovations, are equally important (Koroleva, Khavenson & Andreeva, 2017; Sirin, 2005).

Accumulated experience of innovation analysis and its social "behavior" allows presenting a very productive classification of models for innovation dissemination. K. Puzanov (2012) offers a critical analysis of modern models for innovation dissemination, reducing their classification to three types: linear, diffusive and dimensional. These types describe both dissemination features, as well as innovation impact features.

It is understandable that there have been attempts to create explanatory models corresponding to the modern conditions for innovation dissemination (Sidorkin & Mark, 2017; Gayadeen & Scott, 2014; Kenneth, Yong & Kathryn, 2004; See & Hwa, 2002; Kuzovlev & Khmorenkova, 2016; Tolstikh, Shkarupeta & Shishkin, 2017), etc. These models emphasize nonlinear, diffusive nature as basic property of innovation and its dissemination, as their main feature on the one hand, and describe requirements to modern conditions and environments of innovation impact (effects) management on the other hand.

Transfer of information through the Internet and digitalization of economies have dramatically reduced the impact of geographical borders, and at the same time created a special environment for innovation dissemination and management of its effects. Thus, the significance of analyzing innovation impact on social progress has been only growing over time and alongside technology development. These are complex processes, discussed not only in education, but also in modern urbanization (The “Creative City”), the genesis of the ”creative class”, and the ”network society” (Landry, 2011; Richard, 2005; Edgar, 2004).

Despite this, linear, "industrial" models of innovation dissemination in education are common for most modification programs in education. They affect structural and dynamic features of the education system by its own format, which "chops off" the notion of "diffusion", nonlinearity of innovation, its dissemination and impact.

For example, a "revolutionary" method of teaching visually impaired children to read, can be effective only in special boarding school conditions where it was invented, and transferring it to mass inclusive schools will require additional material, human and organizational resources and conditions, for example, digital environment. These conditions may or may not be created, which depends on management strategies aimed at disseminating them and using their effects. This example illustrates the issue of innovation scaling; the issue of its effect can be solved to a limited extent, or even not at all under certain circumstances. Therefore, innovation customers should design systems and algorithms for innovation management, keeping in mind the fact that they will face issues of the innovation impact, scaling and impact management, and overall, its complexity and diffusive nature.

In reality, competitive admissions of innovative projects oftentimes include measures for innovation scaling (dissemination) into the structure of contests, however, as a rule, they do not take into account the two-stage structure of innovation (implementation of an innovative project and dissemination of its effects) and, thus, differences in management, without providing a smooth transition to non-linear, complex forms of management.

Diffusive (non-linear) approaches and models differ from linear ones both by the approach itself and by the organization of the innovation dissemination process. Usually, diffusive models of

innovation dissemination (management of innovation effects) have network-based and sustained structure. It is important to emphasize that the most important element of dissemination in diffusive models is *knowledge* about innovation, and its basic channel is communication, rather than organization and administration (Puzanov, 2012; Tolstikh, Shkarupeta & Shishkin, 2017).

It should be noted, that in the literature among the reasons of innovation impact are the following:

- Innovation impact depends not just on its features, but also on features of social environment, as well as on agents of change promoting certain innovations (Rogers) (from: (Puzanov, 2012);

- Subsequent success of innovation is based on its own features like comparative advantage over analogues; compatibility with existing practices; usability, how easy it is to test innovation, and its visibility (Rogers) (from: (Puzanov, 2012);

- Human capital of the team: educational background of the team members and their experience (Sidorkin & Mark, 2017);

- Social capital of the team: the size of the team, availability of mentors and opportunities to use expert support, participation in various events;

- Entrepreneurial approach to project implementation (Puzanov, 2012; Sidorkin & Mark, 2017).

2.1. Foreign sources review

In the studies dedicated to transformation of public and in particular school systems through innovation, two approaches are explicitly considered: “natural” and “activity” approaches.

The “natural” approach presents school systems as a naturally changing object that needs to be observed and explored, highlighting external and internal causes of its transformation: security issues, staff turnover, material resources of schools, qualifications of academic and managerial staff, internal and external rules and regulations, etc. This approach has its advantages for understanding and developing management strategies. Thus, processing large amounts of data can convincingly show the factors, which have greater impact on educational achievements of students: teachers’ salaries or qualifications, school regulations or teachers’ high expectations for students.

The “activity” approach focuses on the fact that critical influence is exerted by developed policies and strategies rather than "natural" trends of transformation. In particular, innovation contests are based on the idea that they enable the education system to adapt effectively to changing socio-economic, scientific and technological processes.

It is difficult to imagine that when actually developing strategies, preference will be given to either approach. In fact, studying “natural” trends, as well as policies, contexts and chances of innovation dissemination is equally important for changing the education system. At the same time, it should be noted that strategies for changing school systems usually use a universal measure of justification: educational achievements of students. Probably for this reason, the study of changes of education features should be interpreted in this context.

Diffusion of innovation theory (DOI) (Gayadeen & Scott, 2014; Karch et al., 2016; See & Hwa, 2002) is one of the most common theories to explain sources and the nature of changes in society. Further on, significant influence of state policies and funding on innovation dissemination (impact) as well as on public changes is discussed, and in this regard, the deficiencies of the theory of diffusion of innovation theory (DIF) are pointed out, which does not take into account the policies and funding of various actors (Gayadeen & Scott, 2014).

Criticism of studies on innovation impact includes discussions about shifting attention to successful (affecting) innovations and ignoring less successful ones. From this point of view, it is noted that researchers don’t quite accurately describe the processes of innovation diffusion if

they do not take into account “preferences” of researchers to study successful innovations (Karch et al., 2016).

In addition, discussions about dissemination of the best educational practices include studying traditional dissemination tools, such as changing the perception of innovation value through communication, as well as social capital factors for dissemination of new educational practices in the education system. Communication changes perception of innovation value and thus, it disseminates through a change in perception. However, the role of organization's social capital is no less important. In particular, social pressure as a manifestation of social capital exerts no less influence on innovation diffusion than communication mechanisms that change perception (Kenneth, Yong & Kathryn, 2004).

One of the key mechanisms of successful innovation dissemination is the mechanism of “binding” competition and cooperation, their reciprocity in the overall changing process: horizontal cooperation of organizations is necessary when they compete for financial and other resources serving as a mechanism to improve the process of change (Mintrom, 2001).

A study of information diffusion and communication technologies (ICT) in Singapore schools, showed that autonomy of schools in application of ICT promotes their dissemination to a much greater extent than the traditional idea that diffusion (dissemination) of innovations can be arranged hierarchically: from top to bottom, from the center to the “periphery” (See & Hwa, 2002).

One of the clear examples of the benefits from exploring reasons behind improving academic performance for management strategies is a study showing the impact of the quality of teachers' cooperation on students’ academic results in mathematics and reading. This conclusion can serve as a basis for recommendations on enhancing innovations in the field of improving the quality of teachers' cooperation in schools in order to improve educational outcomes (Ronfeldt et al., 2015).

Thus, on the one hand the study of the innovation impact on education features proves or does not prove the potential for change in the deployed innovation processes (“natural” approach), and on the other hand, it serves as an analytical tool for detecting innovation effects (impact) on education features in the framework of creating management strategies.

---

3. Methodological Framework

The following methods were used to study this issue: collection of information on innovation contests (a total of 24 contests) and winning projects of these competitions from 2014 to 2017; classification of contest structures (linear ("single customer") - non-linear "partnerships"); classification of innovation projects in terms of their impact (effects) ("conforming" - "transforming"); approbation (expert analysis) of the proposed original model of innovation impact analysis and their classification; statistical processing of data on projects and statistical processing of estimates (assigning attributes of contest structures and attributes of innovation impact to innovation projects (their goals in relation to changing education features)). These study methods and approbation (expert analysis) of the innovation impact analysis model allowed identifying the shortcomings of the innovation impact analysis model and presenting the landscapes of changes in the education system within the framework of retrospective cross-sections, and formulating the prospects for development of the innovation impact analysis model.

3.1. Collection of information on innovation contests and winning projects

Collection of information on innovation contests (a total of 24 contests) and winning projects of these competitions from 2014 to 2017 was performed in educational organizations located on the territory of four selected regions (retrospective cross-sections conducted in September,

2017 for the period from 2014 to 2017).

In order to choose the regions for analysis of innovation contests, monitoring reports on modernization of the education systems in the regions were analyzed. As a result of the analysis, 10 regions were selected that showed innovation activity on modernization of the education systems higher than the national average and had the potential for impact assessment (the presence of experts and expert organizations involved in innovation management in the regions). Two regions showing outstanding results for relative uniformity of the sampling were excluded from the list. Thereafter, 10 experts and high-level managers were asked to rank the regions according to the level of their innovation activity. As a result, the list included 5 regions, one of which was eliminated for objective reasons in the process of approbation (expert analysis).

In four regions, experts collected information about innovation contests held from 2014 to 2017 (September) from their own databases, as well as from open sources. In total, information on 24 contests was collected (data on organizers of contests, contest objectives and projects' evaluation criteria, timing and phases of contests, the status (federal, regional, local levels), and contest stages. Each region entered the winning projects and information about them into the online form. Lists of projects and information about them were incorporated into a general list, which contained following information: the name of the project and the name of the winning organization; objectives of the project; key outcomes of the project; duration of the project; funding amount. Thus, the information about 113 winning projects of various innovation competitions was gathered.

3.2. Classification of contest structures

Our proposal for classification of contest structures is based on the idea of linearity or non-linearity of contest structures, as well as on characteristics of innovation impact on education features - conformal impact (i.e. innovation does not affect education features) or transforming impact (when innovation explicitly or implicitly claims to change education features).

On the one hand, we can define "single customers" as innovation customers of linear type that implements a linear model within the framework of direct management logic, for example, certain agency. Structures of this type of contests implement linear logic of innovation identification and dissemination. For example, a municipal contest for redevelopment of a yard will not be able to implement the objectives of general education (agency tasks). And on the other hand, an agency contest will not be able to implement the tasks of local municipal government. But at the same time, they are equally able to influence innovation implementation projects via explicit or implicit restrictions: it's impossible to teach math lessons in a yard of a residential building (the requirements of the license will not allow it), while in school it's impossible to rearrange a math class according to local municipal requirements.

On the other hand, the combination of different "single customers" creates a more sophisticated form – "partnerships", in which all customers need to develop a common solution, a common non-linear complex logic and method for identifying and disseminating innovation. Foundation where shareholders are both state and private structures can serve as an example.

Unlike "single customers", partnerships have the opportunity to manage administration of more challenging projects, projects with "overlapping" functions, taking into account diffusive nature of innovation. But for implementation of a partnership scheme, the contest structure needs to fit in a legal framework in order to form a consistent space (system of axes) for innovation implementation.

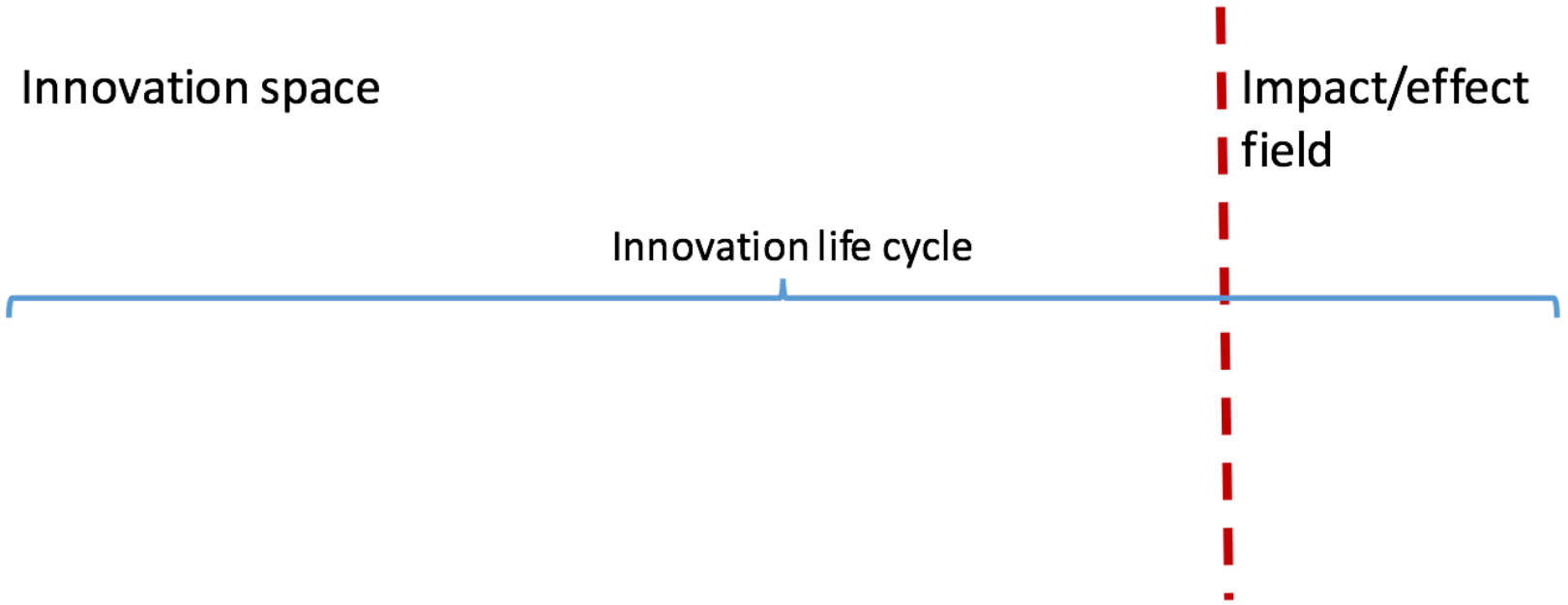
3.3. Classification of innovation projects in terms of their impact (effects). Innovation impact model

The process of changing education features can be pictured as transition of innovation from its own field (the field of innovation) to an external field - the field of impact, or the field of effect.

Picturing the innovation impact model and classification like this, we can assess the actual innovation effects, and its impact on the education system: Innovation space, Innovation life cycle, Impact/effect field (Figure 1).

Creation > Organization > Implementation > Evaluation > Analysis and evaluation of outcomes > Analysis and assessment of impact

Figure 1
Innovation impact model

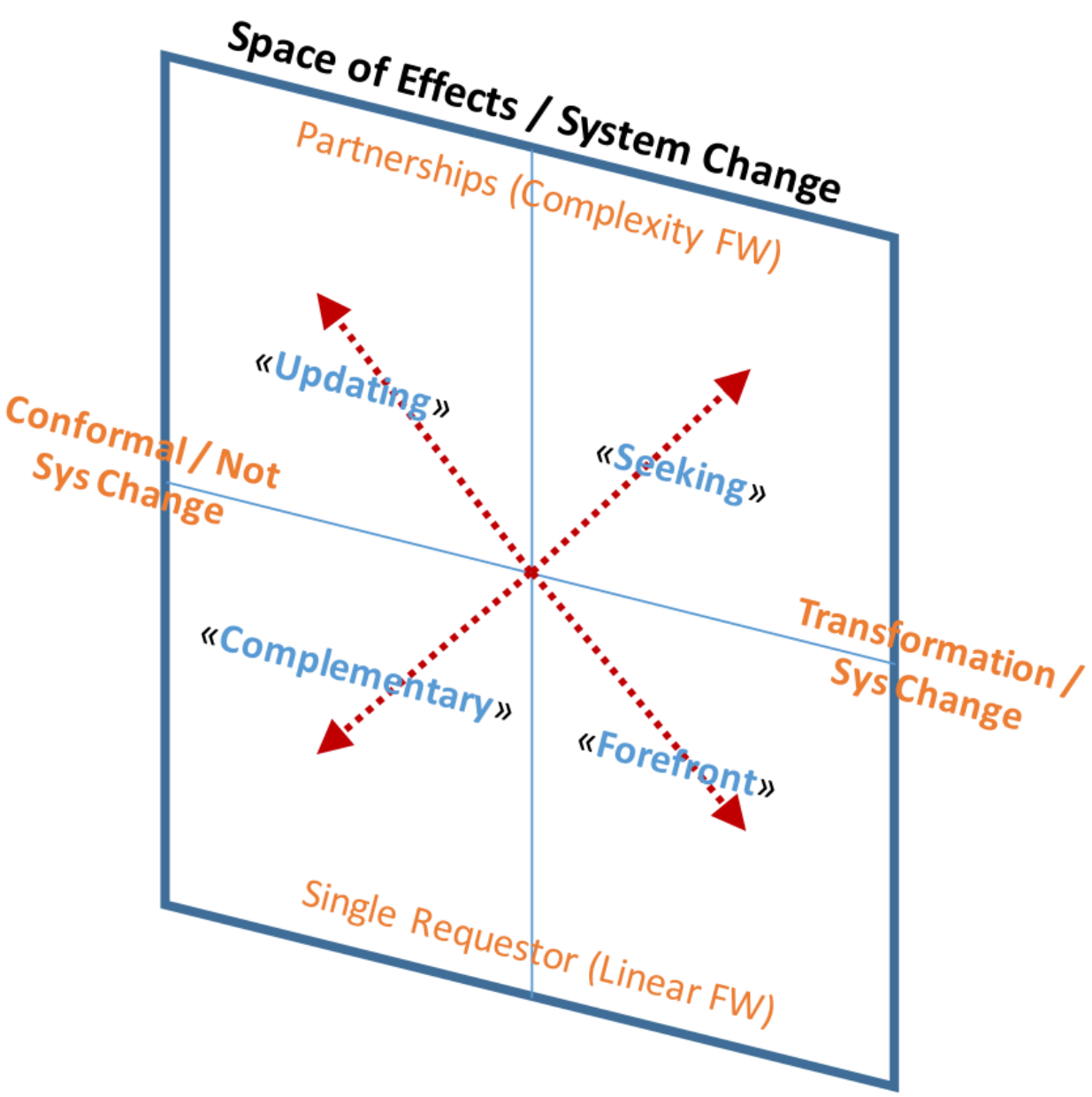


In addition, it is essential to understand to what extent innovation claims to change general rules and regulations, public institutions and the education system as a whole. It is possible to identify innovative ideas and innovative groups that *objectively do not intend* to cause institutional changes (changes of rules and regulations inside organizations as well as changes at different management levels of the education system) – "conforming" innovations and innovative (project) groups. On the other hand, it is possible to identify innovative ideas and groups where innovation logic objectively requires institutional changes (changes of rules and regulations inside organizations as well as changes at different management levels of the education system) – "transforming" innovations and innovation (project) groups.

3.4. Innovation impact field

Types of innovation impact on education features can be illustrated by combining two features: the type of customer (single customer or partnerships) and the type of innovation (conformal or transformative). In total, there are four types of impact, that we called "complementary", "updating", "advanced", "seeking", as presented in Figure 2.

Figure 2
Innovation impact field (field of innovation effects)



The field of innovation impact is described from the point of attribution of contest structures and innovation attributes, forming four quadrants on the surface; they are assigned to corresponding types of innovation impact, and in this respect - to the types of innovation projects: "complementary", "updating", "seeking", "advanced".

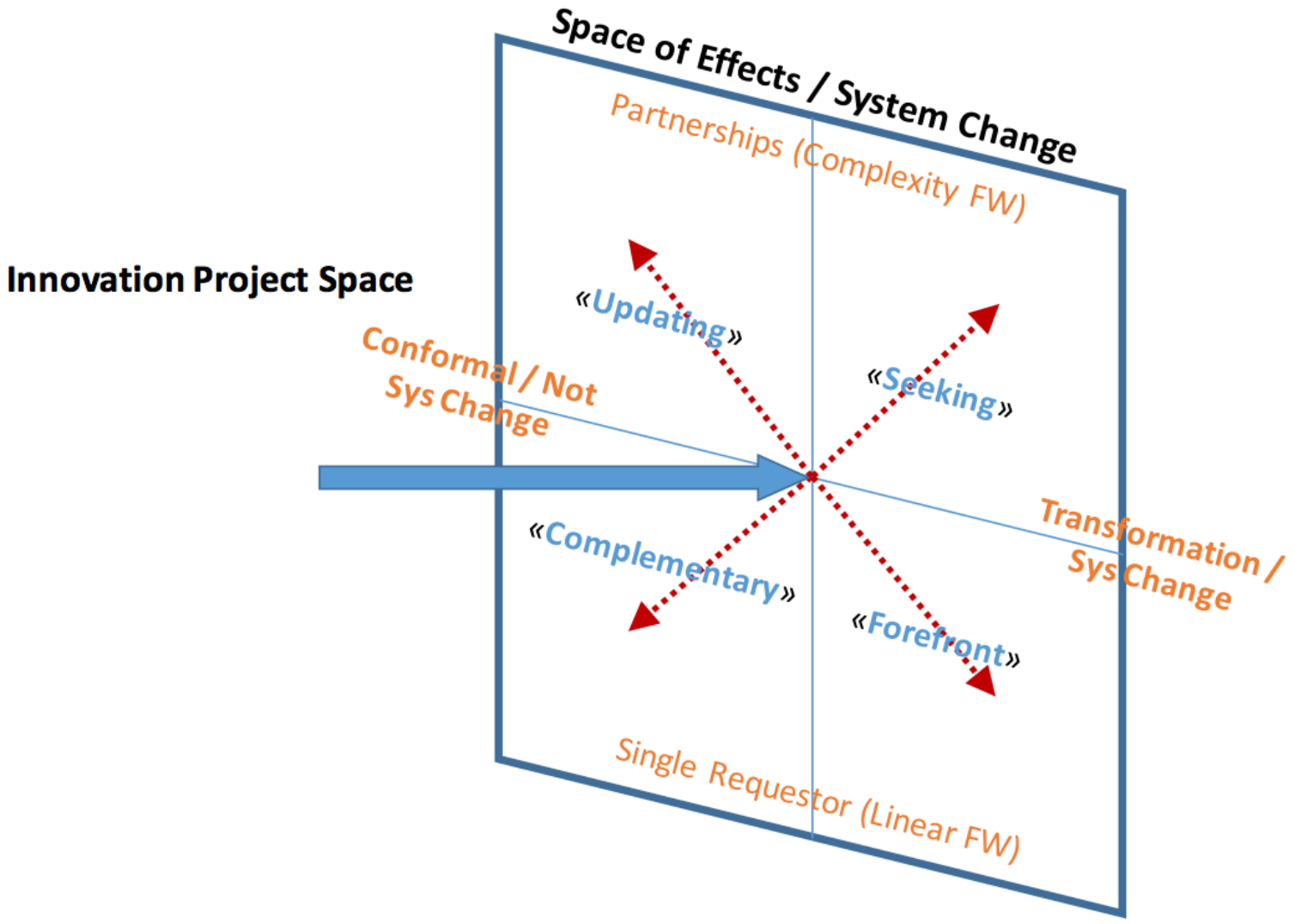
Thus, analyzing the processes of innovation dissemination, fostered within the framework of linear models for their identification, support (promotion) and dissemination, it is possible to distinguish four types of innovations, depending on customer characteristics and innovation features in relation to institutional changes: "complementary", "updating", "advanced" and "seeking". As has already been emphasized, this classification of innovations is based on different types of customers (linear and complex) and effects (conformal and transforming).

In fact, "complementary" innovations are initiated in a linear logic and don’t aim at institutional changes. "Updating" innovations are also initiated in a linear logic by a "single customer", but they contain existing rules and regulations as the subject of their project (changes), and claim to transform them. "Advanced" innovations are initiated by partnerships in complex non-linear logics and don’t aim at institutional changes, as if opening new functional areas of the existing education system. And finally, "seeking" innovations are initiated in complex, non-linear logics and are aiming at changing education features without affecting changes in basic social relations.

3.5. Innovation impact analysis model

In order to analyze the innovation impact, it is necessary to combine both figures - the innovation impact model and the "field of effect", the space of innovation impact, its overall composition, presented by four types of innovations, as shown in Figure 3.

Figure 3
Innovation impact analysis model



Let’s describe all characteristics of the model in greater detail: its goal, principles, tasks and functions.

The goal of the model is to describe the space of innovation impact on the education features in order to create a possibility for their analysis.

3.6. Principles of the model

1. Principle of integrity and transition. On the one hand, innovation is considered as integral unit within its life cycle, and on the other hand, the fundamental borderline of innovation is distinguished, which determines its transition to another field, the field of its impact.

2. Principle of the space set-up. The figure provides two fields of innovation: the field of innovation itself, from its origin to the outcomes, and the field of its effects - the impact on the education system. For the purposes of the study and development of further recommendations, separation of the fields when focusing on the field of effects is crucial: management process of innovation emergence and implementation refers to the field of project management as such; while the management of innovation diffusion and its impact (effect) refers to the area of change management of the education system itself.

3. The principle of focusing on the effect. Innovation analysis should incorporate the idea of its structure and dynamics. In this regard, we analyze not the innovation itself, but what it “does” to education features. Therefore, the model should be focused on the structure of the effect, the impact of innovation, and not on the innovation itself.

Model tasks. The model tackles the following issues:

- Separation of the innovation field from the field of its effect (impact);

- Description of the innovation field impact on education features;

- Spatial (visual) representation of the innovation effects (impact);

- Chance to present a quantitative allocation of the innovation impact.

Model functions:

- Descriptive function: illustrates the fields of innovation and its impact on education features,

- Explanatory function: explains state of affairs with the type and amount of innovation impact on education features,

- Advisory function: based on descriptions and explanations helps to develop recommendations for balancing the innovation impact on education features.

---

4. Materials and Methods

According to the above-mentioned studies, analysis of the innovation impact (effects) on education features was conducted.

In this paper, we were interested in assessing the effect within the framework of the proposed model, rather than the reasons for innovation dissemination. It is fair to assume that innovation management that results in certain changes should focus both on the content of innovation (as decided by experts during the contest and we do not elaborate on it here) and on its impact. Innovation impact (effect) became the subject of analysis and focus of data collection within the framework of our study. Analysis of the innovation impact covered both types of impact (types of innovation) as well as their scope.

Therefore, we believe that each innovation project to certain extent possessed some characteristics that proved its potential for influencing modernization of the education system.

The idea of analytical method in this study was reduced to the search for reliable and verifiable data on regional innovation contests, as well as to the attempt to systematize the effects and their detection through verifiable high-level expert assessments carried out by experts and expert organizations of the four selected regions according to the proposed innovation impact analysis model.

4.1. Data collection mechanism. Features of the sampling

There are two basic ways to evaluate an initiative and decide on its further elaboration (implementation): to conduct an expert assessment and reveal statistical patterns. Expert assessment is an assessment based on the expert’s knowledge and experience and his analysis of available information. This approach has a number of limitations. First, expert assessments inevitably contain a systematic error. This phenomenon is well documented and described in detail in the literature (Crowley & Zentall, 2013). Secondly, experts can be personally interested in promoting certain initiatives. Thirdly, involving experts in assessing a large number of applications becomes a very expensive endeavor. There were no attempts to overcome the first limitation. The second limitation was overcome in the study by the lack of objective context of interest (no decisions or comparisons were made following the results of the expert evaluation - the examination was conducted solely for generalized research purposes and the experts knew about it), as well as by controlling objective information from open sources (experts also knew about random control of accuracy of provided information and estimates). Finally, the third limitation was overcome by sufficient time and resources provided to experts for their work.

Statistical method implies that any conclusion is made on empirically obtained data and established relationships between them (Crowley & Zentall, 2013). A number of studies indicate that the forecasting capacity of statistic estimate is not inferior to expert estimate, and in most cases even surpasses it (Crowley & Zentall, 2013). Studies analyzing the success factors of innovations (and educational innovations in particular), contain general recommendations and do not always offer systems of unambiguous indicators that would allow (using only statistical assessment) to predict whether a particular innovation will "work" or not. Thus, it will be fair to

say that it is impossible to provide analytical proof of the success (the presence of effect) for a specific innovation in advance.

It should be noted that when integrating statistical assessment method and the expert one, the forecasting capacity of the analysis is increased, and the best assessment method may be the combination of statistical and expert approaches. It is especially true for assessment of an innovative project at two key stages: the initiation (conception of idea) and the effect (project's impact on the education system), when sufficient statistical information has not yet been accumulated.

Thus, we tried to take advantage of the expert and statistical methods, combining them as described below.

As a result of consultations with regional educational authorities, a number of expert organizations and experts were selected; they assessed innovations assigning them to a particular type. To achieve uniformity in apprehension of the classification criteria for innovations (attributes of innovation projects), a number of meetings were held, in which participants developed a general understanding of assessment and criteria for attribution innovations to a particular type. The experts got acquainted with the presented model and the classification of innovations; they discussed relevant examples and classification criteria. The second part of the experts' work included testing the innovation impact analysis model (expert analysis), and collecting comments on the completeness level of the innovation impact analysis model.

In each region, a list of innovation projects (from 2014 to 2017) was made; they were available for assessment in accordance with contest documentation (information on the winners of contests at different levels, including "non-system" contests held by non-governmental organizations) for the period from 2014 to 2017. Thus, we received information about a specific composition of innovation projects deployed on the territory of the selected federal subjects of the Russian Federation and funded by sources of various levels (federal, regional, local, "non-system" (extra-departmental) sources). One more limitation for representativeness of the study should be noted: expert organizations and experts reported that they did not have systematic information on "non-system" innovation contests, only fragmentary information was available, which was included in the monitoring (collection of information on projects and organizations implementing them) and assessment.

The evaluation covered 24 innovation contests and 113 innovative projects. The amount of project funding ranged from 100 thousand rubles to 30 million rubles per project. Duration of funding varied from six months to three years per project. When analyzing the impact of innovation, projects lasting more than a year were taken into account each year. More than 90% of the funded projects were annual. Mention should be made of the special features in selection of experts and expert organizations, as well as of the education management system in the Russian Federation; these factors have an impact on selection of competitions and projects: the vast majority (95% of the sample) of innovative projects presented in the sampling refer to the field of general education (schools and kindergartens). Therefore, two features of the sampling limit hypotheses development about innovation impact: focus on the segment of general education (schools and kindergartens) and insufficient recording of "non-system" funding of innovation projects.

4.2. Impact (effect) assessment

As already noted, the impact assessment of an innovative project can be considered in terms of degree of conformance for a certain innovative idea and its impact on the education system, so the conformal and transforming types are singled out. Assessment of the conformance degree gives us a clue on how far customers and innovation groups are willing to go in order to change, transform and modernize the education system.

This readiness per se should be considered as a result of influence of objective interests and

various consensuses, but it cannot explain the emergence of customers (contests) of a partnership type. Probably, this type of customers (contest) emerges in a state of exhaustion of linear logics of initiation and support of innovations. At the same time, evidence of innovation diffusion as its stronger feature, not disclosed in "linear" schemes, can serve for "linear" customers (contests) as a clear basis for complicating the forms of contest management: to assess the innovation impact (influence) while analyzing and managing a project, it is necessary to focus not on the results proposed by innovation group, but on the expected effects of the innovation project's influence in the broader framework of the impact of innovation on existing patterns and system features of education.

While assessing the data that represent types of customers and types of innovations presented in the dynamics, it is possible to assess the extent to which the analysis and management system is sensitive to the basic feature of innovation – diffuseness, and the extent to which the management "adapts" to this feature, using more complex (partnership) forms of innovation management.

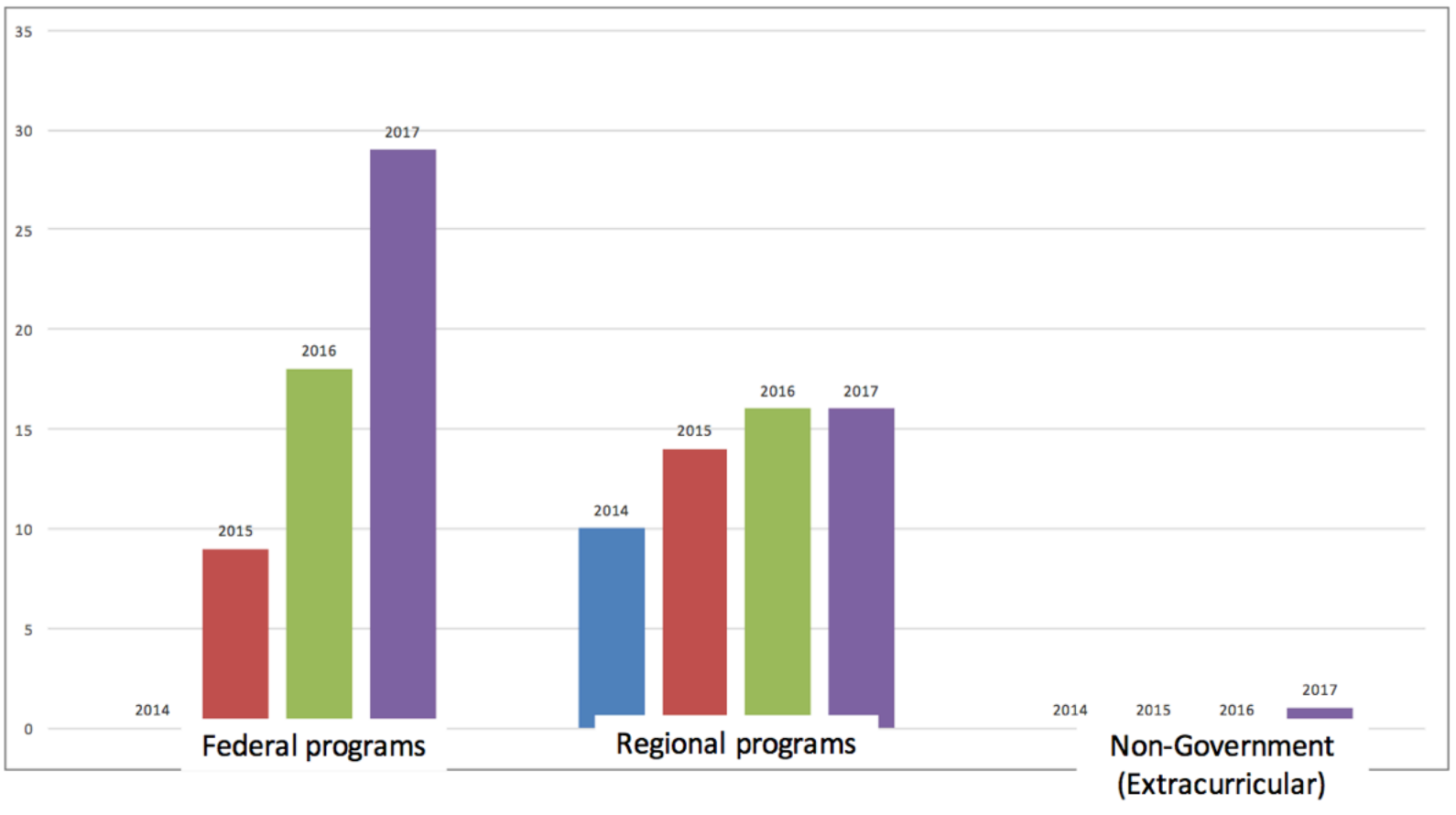
---

5. Findings

The following sums up generalized results for four selected regions in dynamics, arranged by the years, according to the level of contests (federal, regional, non-program (non-system)). This kind of focus and the dynamics make it possible to suggest the extent of penetration of the appropriate level policies into the processes of modernization of the education systems in the regions. It is important to understand from the point of the impact of regulation of modernization processes from the appropriate management level. Certainly, the sampling features per se did not allow for comprehensive representation of the non-system influence on modernization, but even in these circumstances such influence is evident and waiting for its more accurate confirmation or refutation (Figure 4).

Figure 4

Dynamics of support level for innovative projects (only contest winners, 113 projects)

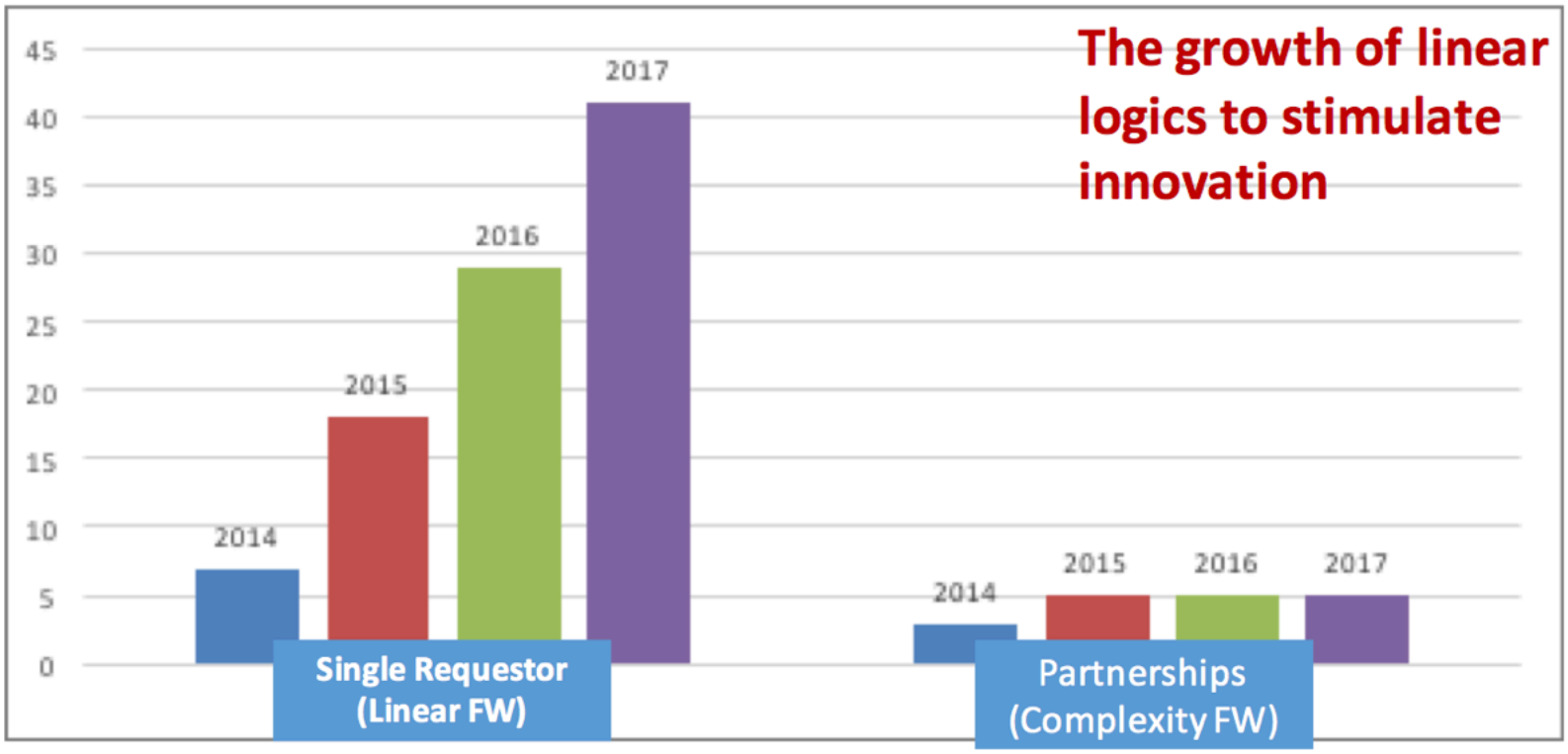


Based on the findings, we can discuss a significant increase in support for innovative projects on both regional and federal levels, as well as the emergence of extra-curricular (non-system) competitions under review of regional experts and expert organizations. These emerging trends imply the increased attention to innovation in education, and in particular the attention on the

federal level. At the same time, it is worth noting the relatively "even" stable support of innovations on the regional level. Let us emphasize once again, that we are talking only about funded projects. The analysis does not take into account efforts of innovative groups, which implement their projects without special additional funding, and some projects that have not been included in our analysis due to specifics of the observation carried out by the experts and expert organizations.

The system of contests allows encouraging innovative ideas and groups, but the nature of contests' influence and the nature of innovation management need to be clarified. To do this, we give the following series of data (Figure 5).

Figure 5
Dynamics of customer types (113 projects)

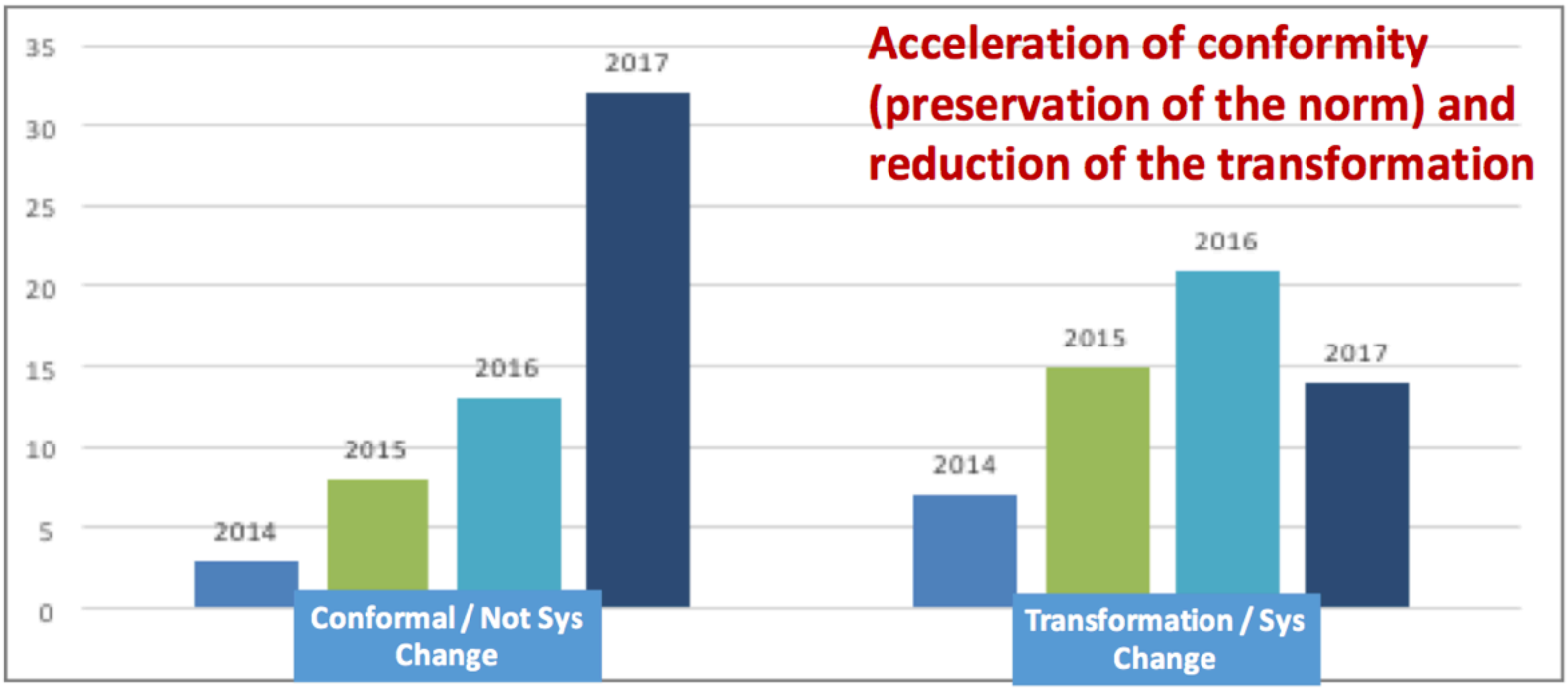


As mentioned before, the basic unrevealed feature of innovation, diffusion is most likely better "managed" within the framework of partnerships. This statement corresponds to the logic of the system transformation from linear schemes that usually support innovation effects in an institutional logic, to partnership schemes that support more complex impact (effects), assessed and "captured" in a wider public frame.

For example, creation of additional places for children in kindergartens allows getting both direct institutional impact (a place) as well as employment mother - the impact not captured directly by the institutional framework. The impact noticed and evaluated as changes in the mother's lifestyle, only in the field of employment. In this case, the causality between the provision of a place and a job placement is non-linear (mother can stay at home), but availability of a place creates a basic condition for influencing mother's employment, and changing her way of life. Such a condition can serve as an example of complexity of the innovative impact and its nonlinear (diffusive) nature.

Figure 5 shows an increase in the number of projects within the first type of contests, initiated by a single customer. Contests initiated by partnerships constitute a visible but insignificant part that has steadily decreased over the past few years against the backdrop of contests initiated by a single customer and reached about 17% in 2017 ("starting" from nearly 50% in 2014). This is obviously dominance of linear contests against the backdrop of non-linear, oriented to search for other logic of initiating innovations. This may mean strengthening the overall stimulation of innovation in the education system amidst an apparent search for more complex forms that are focused on the diffusive nature of innovation. Perhaps this reflects the general transformation trend of institutions, which support innovation in education, as well as nonspecific reaction to an increase in its complexity and diversity.

Figure 6
Dynamics of the nature of innovation impact on changes in the education system (113 projects).



Data presented in Figure 6 illustrate the dominance of conformal projects that emerged in 2017 (more than 2/3 of all sampling projects), and which do not focus on system changes and institutional changes, changes in norms and rules, and modernization of the education system. Along with their increase, we witness a decline in support for transforming innovations. In previous periods, this ratio was exactly the opposite: nearly 2/3 of the sample projects were attributed by experts to transforming type. If before the dominant share of projects constituted innovations, focused specifically on modernization processes, on changing education features, now it is replaced by a reverse relationship: we see less critical, more complimentary innovations.

Explanation for this data can be derived from the change in the general course of education system reflected in certain trends, and from a discussion on possible ineffectiveness of managing the diffusive nature of system innovations and the success of linear control schemes as opposed to nonlinear ones. Perhaps, this is a matter of contest structure or changes in the structure of partnerships.

For a slightly more detailed description of the "field of effects", let us consider distribution of innovative projects according to the types of innovations described above: "complementary", "updating", "advanced", "seeking."

Figure 7
Distribution of innovative projects by types (113 projects)

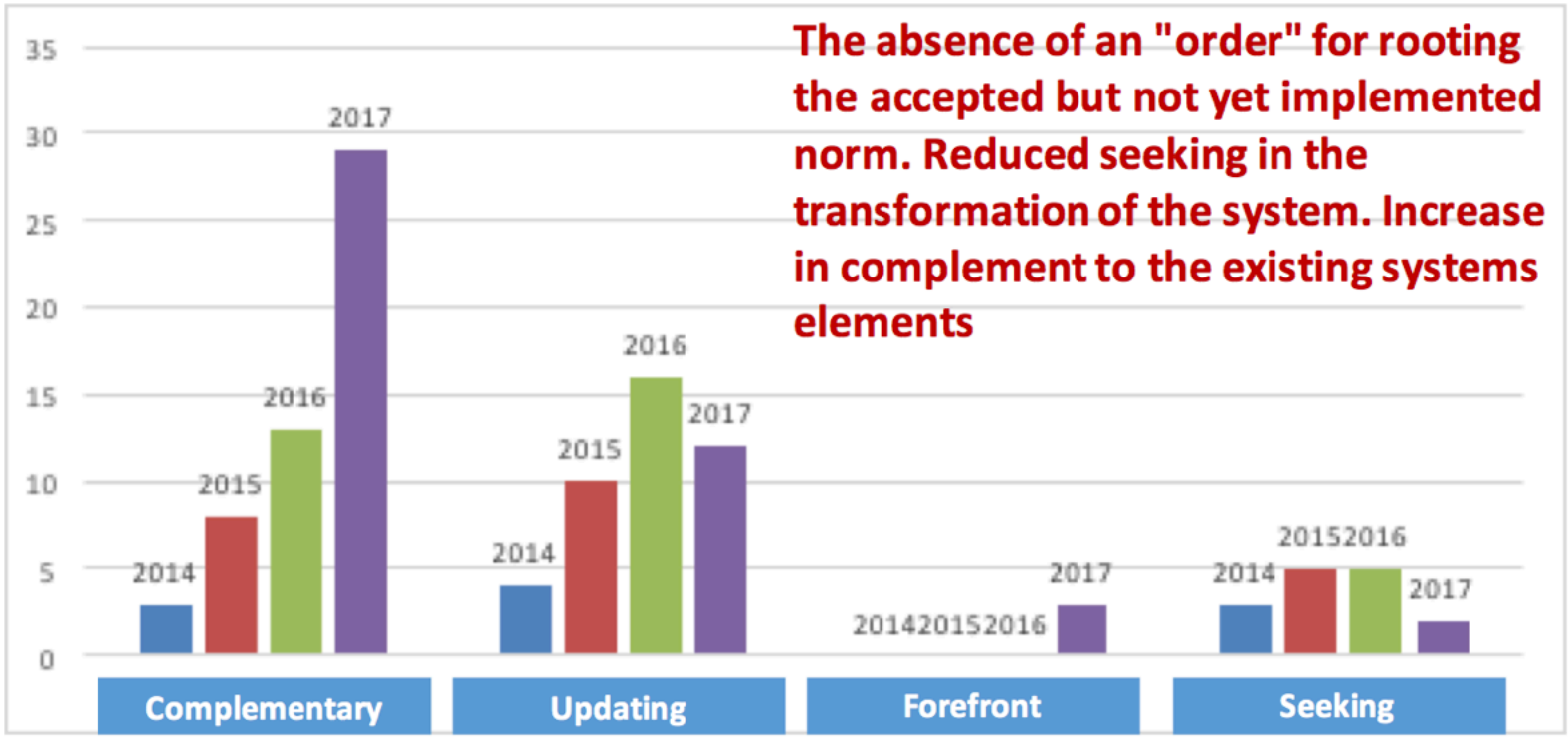


Figure 7 offers a more differentiated picture that reflects the entire field of innovation projects depending on the type of customer (single customer or partnership), and on the nature of innovation impact on the system (conformal or transformative). The diagram shows that the proportions of "complementary" and "updating" innovations were quite steadfast until 2017. In 2017, there was a structural shift: almost 70% of all innovations created in linear logic and in fact offering "cosmetic" changes are overall avoiding the question of transforming the system even in conditions when the system itself stimulates it. The number of "advanced" innovations that give answers to transformation questions is almost ceased, that may illustrate the withdrawal of customers from this field and exhausting of the agenda. The number of "seeking" innovations turns out to be consistently low, which can mean low requirements for registration of system problems in education, or low potential of innovation groups which are able to implement such complex and risky projects.

5.1. Approbation (expert analysis) of the innovation impact analysis model

The next phase of work - approbation of the model (expert analysis) – was conducted in a format of discussing completeness or imperfections of the model for the purposes of elaborating change management strategies, and it showed the following. Discussion revealed the main deficit of the innovation impact analysis model: the lack of indicators of the "power" of impact (the amount of time, material, financial and other resources involved) of an innovative project on education features. Thus, most experts noted that it is important to consider timing of impact in order to make more accurate evaluation of investments to the project and its effects: some projects have impact despite very small resources and duration, while others require long-term support and considerable resources. On the other hand, experts consider the impact of funding innovation projects as an ambiguous influence parameter. This point generally confirms the findings of M. S. Gayadeen & Ph.W. Scott (2014) and M. Mintrom (2001) about the need to discuss additional influencing factors, such as access to funding and competition and cooperation relations in the processes of changes. At the same time, experts noted that during the contest structure phase it is difficult and sometimes simply impossible to detail the necessary scope of investment without information on the necessary "power" of the influencing factors. Therefore, many contests recommend their applicants to indicate all the attracted resources along with the requested ones, and try to describe the development of horizontal interaction and cooperation of innovative projects and groups.

6. Discussions

It should be reminded, that "complementary" innovations in terms of the scale of effect (innovation impact on the system) represent "cosmetic" improvements and do not affect any system features either by the intention of the contest organizers, or by their content. "Updating" innovations constitutes a type of change that, on the one hand, is legitimized by a "single customer" in a format of innovation contest aimed at system changes created in linear logic with disregard to its diffusive nature. "Advanced" innovations can be considered innovations that are involved in nonlinear complex transformation logics with system problems that everyone is aware of. For example, using a network format for implementation of educational programs (simultaneous pursuit of one educational program by several partner organizations) is adopted by the legislation on education and is aimed at “unpacking” archaic "tunnel" ways of implementing educational programs. Obviously, innovations within the framework of solving this problem should be obvious to both partnerships and single customers, but probably better solved by partnerships. "Seeking" innovations represent the most complex format of change in classification and should form the front of system questions and solutions.

Thus, in order to develop strategies for changing education features, we can take into account the amount of influences of one type or another, regulate them and implement appropriate change management methods through management of innovation contests.

It is clear that a large share of "seeking" innovations can tell us about the crisis of established institutional norms and the active search for new ones. A large share of "complementary" innovations can on the contrary tell us about the sustainability of the adopted norms. A high concentration of "updating" innovations may indicate that the need to change education features has grown, but the linear logic of their changes exists in the framework of the same ideas that back in the day led to establishment of these norms. An insignificant share of "advanced" innovations may be indicative of a lack of attention to creation of new norms and regulations for new opportunities to make changes in education features.

In this respect, it is possible to describe the landscape of innovation impact shown in **Figure 7** as permanent, and yet with its own emerging trends. Throughout four years the regions surveyed in the study showed the increase of the number of conformal innovations ("complementary" and "updating" types). In particular, there is a clear trend towards an increase in "complementary" innovations. In general, the share of conforming innovations is much higher than the share of transforming innovations ("seeking" and "advanced") in the backdrop of an increase of conformal and relatively low but stable number of transforming innovations. Thus, we can state that according to analytical data, a conservative policy in respect to system changes is being strengthened. Moreover, in 2017 the demand for changes in system features is on the wane.

Therefore, based on the analysis of innovation impact on system features, we obtain data on the scale and type of innovative projects’ impact that can serve as the basis for developing a strategy for managing changes on the territory.

At the same time, approbation of the model (expert analysis) shows prospects for its development, namely it can serve for keeping record of the "power" of innovation impact features. Further on, to develop criteria and tools for accounting the impact features, additional activities are needed: development of assessment and record keeping tools, and approbation of the improved innovation impact analysis model.

7. Conclusions

Application of the innovation analysis model and obtained data allows us to represent impact landscape of innovative projects on education features. The language of description and terminology used in the innovation impact analysis model turns out to be heuristic for experts

and expert organizations involved in developing strategies for managing changes in education features of general education in the region, despite their incompleteness.

Definition of a two-stage structure of innovative project, and assignment of the corresponding fields and management types through description of differences in fields and landscapes, allows us to understand the innovation impact and separate the issues of managing the content of innovation projects, on the one hand, and issues of managing the effects (impact) of innovation projects, on the other hand. In addition, the issue of managing the diffusive complex and non-linear nature of innovation is reflected in the fact that partnerships as more complex organizational structures of innovation contests (customers) should be viewed as a special area of immediate development in managing changes in education features.

Thus, the innovation impact analysis model empowers the possibility of formulating hypotheses about more complex formats of innovation management that take into account their diffusive nature: whether an innovation project includes institutional changes or excludes them; the kind of changes that are expected by innovation contests (customers), contest organizers suggesting an appropriate project management logic, funding and reporting. We can also improve the possibilities of reviewing the innovation impact and its landscape for the education system as a whole: whether it reveals the dominance of a particular type of change, or particular type of influence of innovative projects, and the type of orders and customers determining it.

In the meantime, the innovation impact analysis model requires certain additions in part of keeping record of the power of innovation impact features. Record keeping of such features should be taken as the basis for improving the model.

The obtained findings indicate the direction of improving criteria and objectives of competitive selections of innovative projects as well as understanding the nature of the changes: conformal, complimentary or transforming. At the same time, great emphasis should be put on the value of developing consistent and explicitly articulated strategies for change management: enhancing transformational impact on education system features can pose a threat to stability. In this respect, the importance of understanding innovation impact landscapes to develop consistent regional educational strategies is only growing.

Acknowledgement

The work is performed according to the state contract dated August 2, 2016 No. 03.037.12.0041 for the project ”Expert and analytical support for the identification and dissemination of the most promising Russian innovations and developments in the education system”, implemented under activity 5.4 ”Innovation Support in the field of development and monitoring of the education system”, tasks 5 ”Formation of a demanded system for assessing the quality of education and educational outcomes” of the Federal Targeted Development Program extends to 2016-2020 years, at the Institute of Education of the National Research University ”Higher School of Economics”, Russia.

The work is performed according to the Russian Government Program of Competitive Growth of Kazan Federal University.

Bibliographic references

Chusovskaya, S.N. (2015). Innovative technologies in educational process and their impact on development of basic competencies. *Modern information technologies in education. Journal “Education and training: methods and practice”, 22,* 62-66.

Constitution of the Russian Federation (adopted by national referendum on December 12, 1993) Retrieved October 20, 2017 from: http://www.constitution.ru/10003000/10003000-4.htm

Crowley, P.H., & Zentall, T.L. (2013), Editors. Comparative Decision Making. Oxford: Oxford University Press.

Edgar, E. (2004). The Network Society: A Cross-Cultural Perspective. Cheltenham, UK; Northampton, MA: Edward Elgar Pub.

Federal Law on "Education in the Russian Federation" of 29.12.2012 №273-FL (latest revision). (2017). Retrieved October 13, 2017 from: http://www.consultant.ru/document/cons_doc_LAW_140174/

Fredricks, J.A., Blumenfeld, P.C., & Paris, A.H. (2004). School Engagement: Potential of the Concept, State of the Evidence. *Review of Educational Research, 74*(1), 59-109.

Gayadeen, M. S., & Scott, Ph. W. (2014) The Innovation of Community Policing and the COPS Office: Does Diffusion of Innovation Theory Hold in a Manipulated Environment? *International Journal of Police Science & Management*, *16* 228-242

Gorelova, G.G., & Stepanov, V.A. (2013). Innovative Technologies in Education and Social Management. *Multidisciplinary scientific journal "3i: intellect, idea, innovation", 2,* 35-39.

Higher School of Economics. National Research University (2017, October 13). Retrieved October 20, 2017 from: https://ioe.hse.ru/monitoring/4k/monitoring

Internet Portal for Students Research Activities (2007, January 28). Retrieved October 13, 2017 from http://www.researcher.ru/methodics/nauka/a_1xizkd.htm (V.I. Slobodchikov: Innovations in education: foundations and mission).

Ivanova, S.V. (2014). Relevant e-learning experience in schools in Canada. *Modern problems of science and education, 6*, Appendix "Pedagogical sciences", 2-7.

Jakovlev, B.P., & Zhukova, V.F. (2012). Management of innovative processes in an education system: competence and potential of the head. *Scientific Journal Modern problems of science and education, 2*, 3-11

Karch, A., Sean, N.-C.C., Neal, W.D., & Ann, O'M. (2016). Bowman& Policy Diffusion and the Pro-innovation Bias. *Political Research Quarterly, 69*, 83-95.

Kenneth, F.A., Yong, Zh., & Kathryn, B. (2004). Social Capital and the Diffusion of Innovations Within Organizations: The Case of Computer Technology in Schools, *Sociology of Education, 77,* 148-171.

Koroleva, D.O., Khavenson, T.E., & Andreeva, A.A. (2017) *The National Research University Higher School of Economics, Institute of Education*. Series Data of *Education, 5*(14), 4-1.

Korpershoek, H., Harms, T., de Boer, H., van Kuijk, M., & Doolaard, S. (2016). A Meta-Analysis of the Effects of Classroom Management Strategies and Classroom Management Programs on Students' Academic, Behavioral, Emotional, and Motivational Outcomes. *Review of Educational Research Volume, 86*(3), 643-680.

Kraft, M.A., Marinell, W.H., & Yee, D. Sh.-W. (2016). School Organizational Contexts, Teacher Turnover, and Student Achievement. *American Educational Research Journal, 53*(5), 1411-1449.

Kuzovlev, V.P., & Khmorenkova, V.O. (2016). Methods for managing innovation processes in educational organizations during transition to FSES, or why schools are abandoning development programs. Oryol State University transactions. *Edition: humanitarian and social sciences, 1*(70), 199-206.

Landry, Ch. (2011). The Creative City. Moscow: Klassika-XXI» Publishing House.

Malinin, V.A. (2011). School as an innovative educational complex. Innovations in education. *Newsletter of the Lobachevsky State University of Nizhny Novgorod, 5*, 19-21.

Mintrom, M. (2001). Policy Design for Local Innovation: The Effects of Competition in Public Schooling. *State Politics & Policy Quarterly,* 1(4), 343-363.

Now that you've thought about your learning environment, it's time to consider the content (2009). Flipped Learning. Teaching for the 21st century. October 20, 2017, from: http://jardo3.wixsite.com/flippedlearning/flip-content

Olefir, S.V. (2009). Modern school library in the context of the project draft "Our New School". Scientific support of the system of professional development. Publisher. *Modern School, 1,* 109-118.

Pashkus, N.A. (2007). Innovations in the system of education: concept, features, approaches to comparison. *Problems of Modern Economics 22*, 3-11.

Puzanov, K. (2012). Modern models of innovation dissemination: critical analysis. *Sociology of power, 6-7(1),* 82-99.

RF Government Executive Orders (2017, January) Retrieved October 20, 2017, from http://www.consultant.ru/cons/cgi/online.cgi?req=doc&base=EXP&n=242634#0

Richard, F. (2005). The Rise of The Creative Class: and How It's Transforming Work, Leisure, Community and Everyday Life. Moscow: "Klassika-XXI" Publishing house.

Ronfeldt, M., Farmer, S.O., McQueen K., & Grissom, J.A. (2015). Teacher Collaboration in Instructional Teams and Student Achievement. *American Educational Research Journal, 52*(3), 475-514.

Schumpeter, J.A. (1961 [1926]). The Theory of Economic Development, Cambridge (MA), Harvard University Press. English Translation of Theorie der wirtschaftlichen Entwicklung, 2-nd edition München und Leipzig, Duncker & Humblot. Harvard Economic Studies.

See, T.P., & Hwa, A.P. (2002). The Diffusion of Information Technology in Singapore Schools: a Process Framework. *New Media & Society,* 4(4), 457-478.

Sidenko, A.S. (2017). Specifics of managing innovative processes in educational organizations when introducing FSES. *Municipal education: innovations and experiment, 1,* 67-76.

Sidorkin, A.M., & Mark, K. (2017). Editors Warford. Reforms and Innovation in Education. Implications for the Quality of Human Capital. Zug, Switserland: Springer International Publishing AG.

Sirin, S.R. (2005). Socioeconomic Status and Academic Achievement: A Meta-Analytic Review of Research. *Review of Educational Research, 75*(3), 417-453.

Slobodchikov, V.I. (2008). Innovative Education: Introduction to the Problem. *Municipal Education: Innovation and Experiment, 6,* 12-15.

Thapa, A., Cohen, J., Guffey, Sh., & Higgins-D'Alessandro, A. (2013). A Review of School Climate Research. *Review of Educational Research, 83*(3), 357-385.

Tolstikh, E.O., Shkarupeta, E.V., & Shishkin, V.A. (2017). The effects of innovative changes influence on social and economic processes of the region development. *Journal of the Voronezh State University of Engineering Technology*, *79*(1-71), 367-373.

Volkov, V.N. (2015). Analysis of changes in school management practices (based on the contests of innovative products). *Bulletin of the Pushkin Leningrad State University, 3*(4),91-99.

Volkov, V.N. (2016). The issue of exploring changes in school education. *Bulletin of the Cherepovets State University, 3*(72), 75-81.

Voronina, T., Molchanova, O., & Abrameshin, A. (2004). Management of innovations in the field of education. *Higher education in Russia 6*, 2-12.

Yurchuk, O.A. (2015). Coaching teachers in innovative product development in the logic of humanitarian approach. *Pedagogical Review, 1*(7),65-72.

---

1. Center for Development of Leadership in Education of the Institute of Education, Higher School of Economics, Moscow, Russia. Contact e-mail: psergomanov@hse.ru

2. Center for Development of Leadership in Education of the Institute of Education, Higher School of Economics, Moscow, Russia

3. Institute of Psychology and Education, Kazan (Volga region) Federal University, Kazan, Russia

---

Vol. 39 (Nº 02) Year 2018

[Índice]