Innovators from Within and from Without the Education System

5

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5.1 Introduction

The term "innovator" has many synonyms such as inventor, creator, visionary, pioneer and others. This terminology has been applied in the business sphere for a longer period than in education. One of the earliest descriptions of innovations and innovators was offered by Schumpeter (1949). According to Shumpeter, innovation is a special process initiated by an innovator, an individual entrepreneur who supplies the market with unique commercial ideas based on a new approach to using already known resources, search for new sales markets, destruction of obsolete mechanisms (reorganization) and so forth.

Rogers (1962) developed a more complex model in which the innovator plays a special role. According to Rogers, being an innovator means (1) being able to control financial resources in order to minimize possible losses that result from loss-making innovations, (2) understanding and applying complex technical knowledge, (3) being able to cope with a high degree of uncertainty about innovations and (4) being willing to accept the occasional setback when an innovative idea does not find resonance with the community or is not as effective as expected. Both these fundamental theories allow that an innovator may, but not need, be an "inventor" of the product or the process he or she introduces.

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The important difference between the adaptors who desire to do things *better* and innovators who seek to do things *differently* is fundamental to Kirton's (1976) adaption–innovation theory. According to Kirton, the innovator has the following characteristics: being undisciplined, approaching tasks from unsuspected angles, treating accepted means with little regard in pursuit of goals, being capable of detailed tasks only in short bursts, providing the dynamics to bring about periodic revolutionary change and having low self-doubt when generating ideas (cited by Stum 2009). He contrasts the inventions produced by the independent innovator and the independent entrepreneur with large business enterprises' inventions. Speaking about differences between inventive entrepreneurs and incremental innovators, Baumol (2004) highlights three key features: first, contributions to economic growth; second, the educational levels; and, third, the nature of the educational process itself. After reviewing the biographies of the most celebrated innovators such as Watt, Whitney, Fulton, Morse, Edison and Wright brothers, Baumol demonstrated that in a surprising share of these cases, the most remarkable part is the absence of rigorous technical training and, in many other cases, little education at all.

The question that arises here is whether these characteristics can be applied to innovators in education. The educational system is different from the business world in the sense of accessing external people. It is hard to imagine teachers or instructors without formal education or school or other educational institution acting without licence. While it is possible in extracurricular education, there is no systematic basis for these activities. Formal education keeps such initiatives at a distance, which has led to a situation in which we know more about actors "inside" education, those who accept and implement innovation within the educational system, than about those who act from "outside" the system. According to Fullan (1993), Marsh and Huberman (1984) and Rudduck (1991), the key role during the innovation implementation stage belongs to the system entities and the system leaders, i.e. the innovators, who are ready to accept innovation by adapting and improving to meet their vision. Teachers who act as agents of innovation play an essential role in implementing innovative pedagogical practices (Krajciket al. 2008; Urhahne et al. 2010). According to Webb and Cox (2004), teachers' personal knowledge, beliefs and values influence the process of diffusion. This means that, as key agents in the diffusion process, teachers can stand against the innovation unless they buy into them despite external pressure. However, there are innovators around the education system who are trying to penetrate the system: innovators from without. Those include grassroots innovations and actors operating in this field. Based on the concept of innovation and challenges of innovative projects in the field of education that the Organisation for Economic Co-operation and Development (OECD) has developed, Koroleva and Khavenson (2015) have formulated the following concept of "innovator in education":

> These are actors, who generate and promote their own ideas or adopt innovations. The actors are open to new experiences and are ready to take risks. They take the initiative and apply imagination and creativity. The innovator's activity in education is aimed at improving the results and effectiveness of education, equalizing access to quality education, and improving the administration of the education system in accordance with the actual needs of modern society. (p. 343)

In order to increase the volume and quality of innovation in education and improve the system, we need to know who these people are and what motivates them to conduct innovative activities, which environment they need to be more innovative and what kind of support they require. This chapter describes the contemporary innovator in education "from within and from without" using their socio-demographic status, values and motivation.

5.2 The Study

In 2014 and 2015, two rounds of Russian national competition for Innovations in Education were conducted in order to explore existing grassroots innovative projects. The analysis of participants suggests the existence of a large group of innovators outside the educational system ready to offer ideas for improving the education system. In addition to the competition's application form, participants were asked to take part in an additional voluntary survey. In the first year, 577 teams of innovators submitted the applications for the competition, and 304 of them responded to the questionnaire. The second round of competition yielded 678 applications from individuals and teams. We collected 437 responses to the survey. This study sought to identify the main characteristics of contemporary innovators in education, their distinctive social and professional features as well as their value orientations and motivation.

In the first wave of the survey, we focused on *value orientations* of innovators in education. We measured values using Schwartz's approach (Schwartz and Bilsky 1987). Value profiles of innovators obtained from the study were compared with those of Russian population as a whole, as constituted in the results of the European Social Survey 2012 (ESS). According to Schwartz and Bilsky (1987), a value is an individual's perception of a desired goal. This value determines the motives and mindset of the person when dealing with a number of situations in life, and it determines the person's attitude to many aspects of life (Schwartz and Bilsky 1987). The theory of values identifies ten core values:

1. Self-direction—independence of thoughts and actions. Main characteristics: creativity, freedom, choosing own goals and propensity for innovation.
2. Stimulation—a feeling of enthusiasm and eagerness, novelty and challenge in life.
3. Hedonism—looking for pleasurable experiences, sensuality and enjoying life.

4. Achievement—desire for personal success and demonstration of one's own competence in social norms, obtaining social approval.
5. Power—the desire to achieve social status, prestige, control and dominance over people or resources. Both the values of power and achievement are focused on how the individual is assessed by society, though achievement is the desire to demonstrate status that has been earned by one's own successful activities, and power is the desire to consolidate one's dominant position in the social hierarchy.
6. Security—preference for security, harmony and stability in social and personal life.
7. Conformity—self-restraint in one's actions and voicing one's own opinion, avoidance of violations of social norms.
8. Tradition—respect for traditions and agreements as well as adoption of ideas and rules from existing culture or religion. Conformity and tradition are values that are close in terms of behavioural motives. However, they differ in terms of their scale: the value of tradition motivates people to behave consistently with the dominant religion or social order, whereas conformity is the willingness to adapt to people frequently encountered in daily life.
9. Benevolence—the maintenance of the well-being of a person's loved ones. People who wish to show benevolence and conformity are motivated to engage in cooperative and supportive behaviour, but benevolence in particular helps a person internalize these motives, while conformity promotes such behaviour largely due to a desire to avoid negative consequences.
10. Universalism—understanding, appreciation, tolerance and protection of all people and nature. Universalism is close to benevolence, but it focuses on larger society and world, but benevolence has in-group focus (Schwartz 2012; Schwartz and Bilsky 1987).

Societies' values tend to be linked with their development and characteristics (Inglehart and Baker 2000; Schwartz and Sagie 2000; Schwartz and Bardi 2001). Values are also related to many characteristics important to innovators (Kasof et al. 2007; Gorgievski et al. 2011). Considering creativity as a feature inherent to innovators, we also rely on Kasof et al.'s creative behaviour, which is promoted primarily by the self-direction value type and to a lesser extent by the stimulation and universalism and is inhibited primarily by the tradition, conformity and security value types.

Analysis of small business owners' success criteria and its correlation with the values of an individual show that entrepreneurs, who define innovativeness as success criteria, have self-enhancing value orientations (power and achievement). Softer success criteria such as having satisfied stakeholders and good work–life balances were guided by self-transcendent value orientations (Benevolence and Universalism). As for relation of personal characteristics (values of the individual) and motivation for strivings and endeavours, please see Schwartz and Bilsky (1987), Sheldon and Elliot (1998, 1999), Sheldon and Houser–Marko (2001) and Koestner et al. (2002).

Based on the idea that values convert into specific reasons for creating the project, the next step of this research was formulated: study innovators' motivation, focusing on a particular situation (producing innovation), rather than on values disposition in general. In 2015, this study of innovators' motivation was conducted with 437 responses. Our motivation scale was the adopted Russian version of one used in Panel Study of Entrepreneurial Dynamics (PSED) and others (Germak and Robinson 2014; "Panel Study of Entrepreneurial Dynamics" 2016).

5.3 Education, Occupation and Project Sphere

As indicated in Fig. 5.1, the survey respondents included 63% females and 47% males (which also reflects gender bias in the Russian educational system). All participants displayed a high level of education: 58% of respondents had completed tertiary education and one third of them held PhD degrees. More than a third of them were working in schools; 20%[1] were teachers and 10% represented school management. 52% indicated working in higher education institutions, 39% of them taught and conducted research and 13% of respondents worked in managerial positions. 14% were extracurricular education teachers. Few percentages of participants reported having been educated in vocational education institutions (8% of them identified as instructors and managers). The percentage of respondents having their own business was 15%, and people who reported working in organizations not related to education (15%) also participated in the study. 18% of respondents worked only in this innovation project.[2] At the same time, half of participants (53%) reported some experience participating in competitions and contests in the field of innovation in education.

According to our analysis (Fig. 5.2), the most popular spheres where innovative projects are created and implemented are secondary schools, innovations in extra-curricular activities as well as in vocational and higher education. Bearing in mind that very few people in our sample are from vocational education institutions, we conclude that people from other spheres are ready to participate in innovative projects and actually willing to create an innovative environment. In comparison with other spheres, relatively small number of projects appears to be implemented within family as well as preschool education.

[1]The total in occupation question exceeds 100% because respondents had options to choose more than one answer. Working on full-time and part-time positions in different places is quite usual in Russian educational sphere.

[2]We described here the characteristics of 2015 sample. In 2014 the results were similar; hence we do not provide it here to save space.

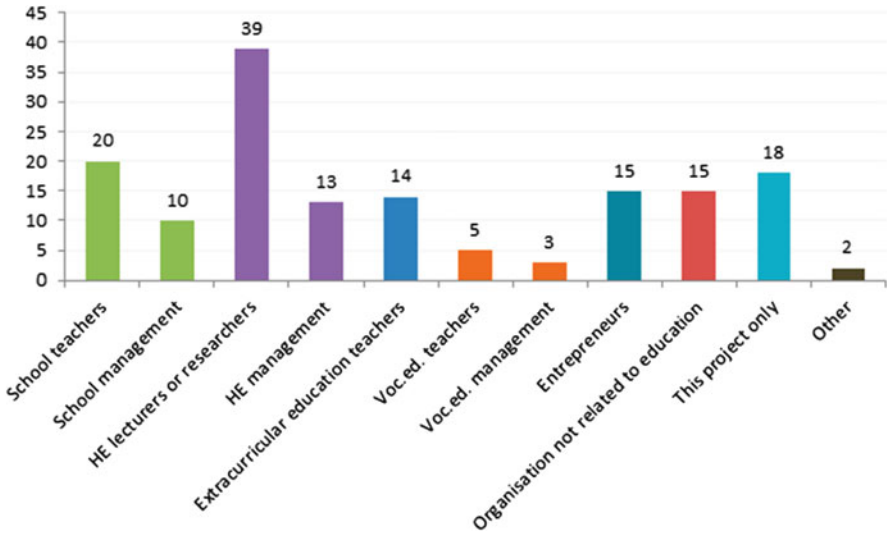

Fig. 5.1 Competition participants' occupations

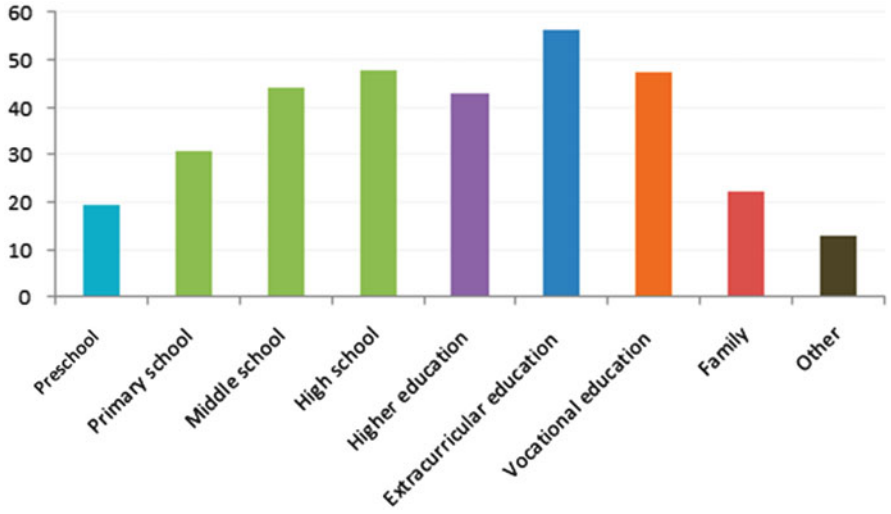

Fig. 5.2 Projects' sphere distribution

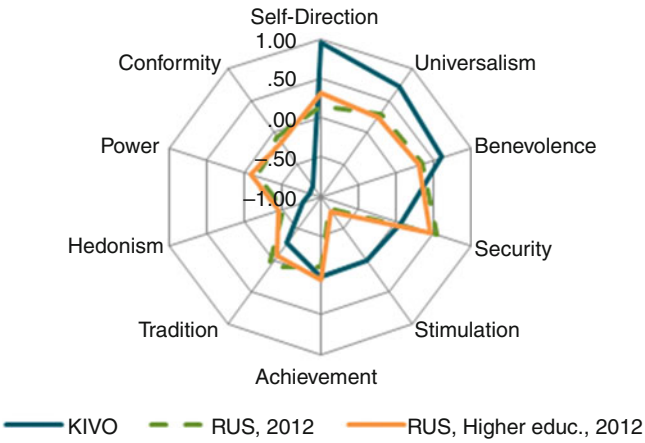

Fig. 5.3 Comparison of value orientations of competition participants and (KIVO) and Russian population (ESS)

5.4 Values

The value profile of participants in Competition for Innovation in Education is significantly different from Russia's population as a whole (Fig. 5.3)[3]. Values of self-direction, universalism and benevolence are the most prominent distinguishing traits. Across the Russian Federation's wide sample, the indicators for these values are also positive, although not as high. The high rate of self-direction, according to Schwartz, is attributed to the tendency of innovators to be independent in their actions and thoughts; they are not afraid of new approaches and are characterized by ingenuity and curiosity. The competition participants seek to control what happens, and they rely on their own skills and abilities. At the same time, the combination of self-direction and universalism provides even more independence in judgements, understanding and patience.

Universalism and benevolence are combined into a larger category of "attitudes that consider the needs of others" (Schwartz 2012, p. 8), meaning that innovators wish to direct their activities to improving the lives of others. A specific aspect of universalism includes positive attitudes aimed at a broad social group. It is a desire for peace and the promotion of general welfare. However, benevolence largely relates to a person's immediate environment: family members, colleagues and those with whom a person interacts regularly.

[3]Since contest participants have high level of education we compared them not only with the Russian population as a whole, but also with the group of Russian citizen with higher education. Figure 5.3 shows that the results are identical.

Such values as security (rank 4), achievement (rank 6) and stimulation (rank 5) were not ranked highly by innovators (Fig. 5.3). However, the ranking of these values is much higher for the Russian population as a whole, for whom stimulation is ranked at the bottom (rank 10), achievement has an average score (rank 7) and security has the most priority (rank 1). These three value orientations and those described above are alleged to determine innovators' behaviour. The ranking of security value reflects the high demand across Russia for security and stability. For potential reformers and entrepreneurs in the field of education, security is also important, as it is for the rest of the country. With regard to achievement and stimulation, innovators are ready to work hard, they always try to find new tasks to perform and they believe that it is important to try a lot of different things in life. They are ready to take risks. It is important for these people to demonstrate their abilities and to be successful. They are interested in ensuring that their activity is respected for its merits by others. The innovators rely on the protection of others or to a lesser extent, the state, than Russians, in general; they perceive themselves to be prepared to meet difficulties and overcome them on their own.

Tradition (rank 7), hedonism (rank 8), conformity (rank 10) and power (rank 9) yielded the lowest scores for competition participants. That means their behaviour is not guided by a desire to please their loved ones and community. The innovators are not afraid to break existing rules and social norms. Also, they do not wish to obtain and retain power that is not based on their own achievements. This contradicts the Russian population's overall value profile. Russian society has traditionally been characterized as conservative. This is shown by the relatively high scores for the values of security, tradition and conformity: they come in first, fifth and sixth places, respectively. In the value hierarchy of competition participants, the value of tradition comes in seventh place, and the value of conformity comes in last.

5.5 Motivation

After conducting factor analysis on the motivation scale items, we discerned four latent factors that reflect different aspects of motivation: social, financial, status and innovative motives. All factors have good internal consistency and straightforward interpretation. The Russian sample deviated from the original set of factors, the main difference centring on a distinct disposition we called "innovative".

Social motivation (3 items, alpha 0.74): this type of motivation reflects a person's propensity to help others, improving existing rules or course of business. A start-up or innovation driven by a leader with high values of these factors would tend to be a social entrepreneurship. In terms of Schwartz's values theory, it could be paralleled with benevolence and universalism.

Status motivation (5 items, alpha 0.81): this kind of motivation is related to gaining status and seeking a challenge at the same time. So it is not only about being respected or famous, as it is associated with being awarded for one's achievements, worthy recognition. Individuals wish to be recognized, and they are ready to work

hard to get this recognition. This type of motivation can be *inherent* to both social and business innovation start-up. It is close to Schwartz's stimulation and achievement.

Financial motivation (4 items, alpha 0.85): this third factor relates to gaining financial stability and flexibility for personal life through the same. It may, for instance, be about launching a project for earning money, but it also has a component of being independent. In Schwartz's theory it is a combination of self-direction and power.

Innovative or personal fulfilment (4 items, alpha 0.65): the fourth type of motivation depicts a propensity for innovation. On the one hand, persons with this trait are driven by the will to create and bring their innovative ideas to life. On the other hand, it also reflects the importance attached to independence and self-direction. In accordance with Schwartz's theory, this factor is close to self-direction and stimulation simultaneously.

All four factors can be understood as latent qualities that characterize our respondents. Some descriptive statistics for these four traits are described in graphs below (Fig. 5.4). All means are highly positive, especially those of social (5.9, st. dev. 1.09) and innovative (5.7, st.dev. 1.04) motivations. Therefore, innovators tend to agree that these kinds of reasons were important for them when they invented an idea or launched an innovative project. The distributions in graphs (Fig. 5.4a–d) suggest that all respondents are highly motivated by social and innovative motives, and almost no participants had low scores on these scales.

Financial and status motivations also have high mean values (4.1, st.dev. 1.52 and 4.5, st.dev. 1.31, respectively). However, greater variation is shown in graph 5.4a, c. With regard to launching the project, innovators are less consistent on their financial and social status. In addition to the social orientation, it also may be the case that people inside the educational system create innovative ideas and do not treat their activity as something outside their usual workplace or as an external project. If we compare these findings with the previous year's results, we find the same ranking. Those motivational aspects appear to be driven by such values as benevolence and universalism; self-direction is highly important and specific for all innovators. Stimulation and achievement did not yield high absolute scores, but they were more inherent to innovators than to the Russian population, as a whole. This level of disposition appears to be sufficient to serve as the trigger of innovation activity.

Table 5.1 reveals the strength of the relationship between those four traits.[4] The relationship between status and financial motivation is quite high (0.61) and stays high even when partial correlation controlling two other variables is computed. Financial motivation has a rather weak association with the innovative motivation (first order correlation is 0.38, but it drops seriously when controlling with status motivation: 0.12; still it is statistically significant). Both are related to status

[4]We computed Pearson correlation coefficients for assessing the relationship. We also checked for the robustness computing partial correlations. Robust correlations are in bold.

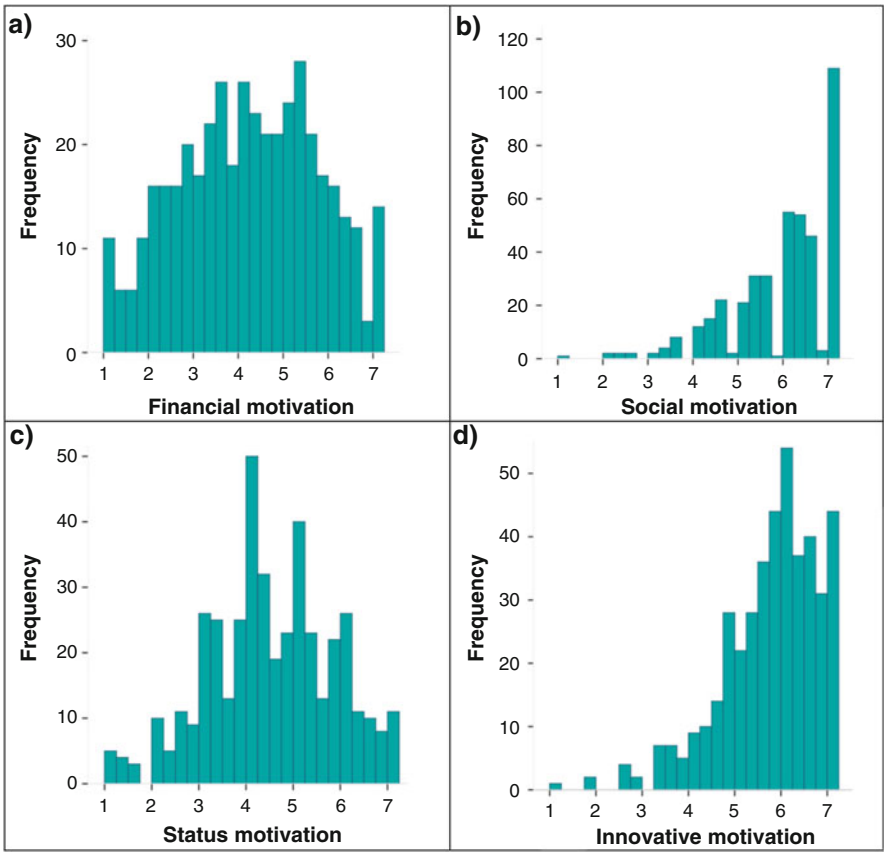

Fig. 5.4 Distribution of the four motivations—(**a**) financial, (**b**) social, (**c**) status and (**d**) innovative

motives. From this finding, we may conclude that they are correlated only through their own associations with the status motivation. Such are examples of different triggers for the project launching; they rarely dominate in one project or in one person at the same time. For those innovators who are motivated by financial rewards, the project unlikely would be pushed by innovative kind of reasons and vice versa.

As for relation between social and financial motivations, they initially have low value (0.17) and become statistically insignificant when controlling for other types of motivation. Innovative motivation suggests a robust, moderate association with both social and status motivations. Social and status motivations are also moderately correlated.

According to the aforementioned results, two groups of innovators can be assumed. The first is more business oriented, and second one suggests a social entrepreneur profile. Herewith, social motivation is inherent to both groups, but for

Table 5.1 Correlation between different aspects of motivation

	Social	Innovative	Status
Financial	0.17 (0.001)	0.38 (0.00)	**0.6 (0.00)**
Social		**0.36 (0.00)**	**0.29 (0.00)**
Innovative			**0.5 (0.00)**

the first one, it pairs with financial motives, whereas for the second, it stands as unique trigger for an innovative project. Status motivation is built-in in social and business groups as well. So for them motivation contains a challenge and a wish to be awarded.

5.6 Examples of Different Motivation in Innovation: Key Cases

Three brief descriptions of innovative projects from the competition illustrate the distinct motives that triggered them. An example of *symbiosis of business and social motivation* is the *Moscow through the Engineer's Eye* project (MTEE), an educational project which aims to promote the history of Moscow's architecture and structural engineering in Russia and beyond among children and adults. The project includes several kinds of activities: tours, lectures and workshops for children and their parents. The project team organizes architectural tours, as well as lectures about the history of structural engineering. The tours are available in Russian and English. Part of the project promotes famous Russian engineers and the history of their home cities among Moscovites and the citizens of Saint Petersburg. An important part of the project is DIY, in which tutors organize children workshops that promote the creation of different structures like Da Vinci Bridge or Shukhov Tower. During this workshop, children go through the various steps of project design, from studying theory—through modelling to construction of a huge structure. Workshops also include introducing new approaches to product design like 3D printing and laser cutting. MTEE is a commercial project. Profit is generated by selling tickets to tours, lectures and workshops. The project has a broad network of partners including public and private schools and festivals. However, MTEE is always eager to participate in collaborative projects with universities or charity foundations seeking to help children understand the world around them also to attract them to the STEM professions.

A typical *socially motivated enterprise* is lifestyle (Obraz zhizni)—a group that helps students from orphanages learn skills needed for independent life. Lifestyle is a sustainable social enterprise. The main idea of the project is to provide a safe environment for young people to explore and experiment with diverse ways of living through communication with a people who represent a diverse range of professions by means of excursions and workshops. According to the lifestyle philosophy, people should choose not only their place of work but also their lifestyle because that choice is not a one-time decision but a lifelong process. The project is implemented by creating urban camps. The programmes last from 2 to 7 days and take place in hostels in the very centre of the city. The target audience of

the programme includes adolescents from 13 to 18 years old both from families and orphanages. Programmes for an underserved audience are conducted in collaboration with a charitable foundation and are adapted specifically to participants. Organizers do not profit from the project. These are two different types of programmes. In the first case, participation is covered by parents or the participants themselves, and these funds are used to pay participation for orphans. In the second case, they use profits from commercial programmes as well as for fundraising.

An example of a *business-oriented project* is Knowledgeville (Znanika), an online service for K-12 education. The project mission is to provide courses, Olympiads and competitions for students online. The website includes math, informatics (computational thinking) and Russian language contests. The math club and online lessons from Knowledgeville help teachers provide e-learning in the classroom. Services for families facilitate parental involvement in the educational process and improve student achievements. Finally, the project allows Generation Z to study in a setting familiar to modern children, to communicate on social networks and to compete online. Innovative technologies unite traditional handwritten classwork with innovative media. The project brings together teachers and tutors who have worked with talented children for decades. Knowledgeville employs a freemium-based model, and service is generally provided free of charge, but money (premium) is charged for proprietary features, functionality or virtual goods. Over the last year, the company has grown by more than 5.5 times, reached 500 thousands registrations.

5.7 Conclusion

Socio-demographic characteristics offer us the general picture of innovators in education. Most of the grassroots innovators have a high level of education, plus work at educational institutions at various levels, and a greater share comes from tertiary education and schools then from organizations not directly related to education. Nonetheless both groups are ready to propose and implement innovations in the field of education. It is important to mention that shares of project spheres and participants' occupations are not directly intersected. For example, there are few people from vocational education; however, this sphere was one of the most popular for project implementation. To better understand the innovators in education, we employed two-step approach. First, we studied the value orientations as it is one of the most crucial personal characteristics that determine person's behaviour. Second, we addressed specific environmental factors, studying the motives which drive person's willingness to create innovative project in the field of education and at the same time how closely those motives are tied to values.

Participants in the competition differ from the Russian population as a whole in their value priorities. Innovators are much more committed to the values of universalism, benevolence and self-direction in their actions and judgements than population of Russia as a whole. According to the results of a nationwide sample

taken across Russia, self-direction, benevolence and universalism are not the values that the population finds to be most significant. In addition, the values of tradition and conformity, which largely guide the lives of average Russians, are not significant for the innovators in the field of education. They are characterized by a willingness to help society's development, to make the lives of others better and also to be awarded for that. The innovators are open to new experiences and ready to take risks.

The study also showed that the four main motives that drive innovators are social, status, innovative/personal fulfilment and financial. They all connected with the broad values in Schwartz' values theory: social with benevolence and universalism, status with stimulation and achievement; financial is a combination of self-direction and power, and innovation reflects self-direction and stimulation simultaneously. Speaking about innovative motivation, its appearance as a distinct disposition is a unique result, which was not revealed in the previous studies of social and business entrepreneurs. Based on innovators' motivational orientations, we can identify groups of innovators with more pronounced business orientation, while social and innovative traits are inherent to all the participants.

5.8 Discussion

The results of this study suggest that there is a core of specialists inside the educational system who are ready not only to accept reforms "from above", but also to act as a "change agent" (Fullan 2007). They are independent in judgement and action, ready to meet difficulties and overcome them on their own. These characteristics differ from the majority of Russian population. Being inside the education system, they are familiar with the rules, understand localized needs and perceive existing gaps, all of which suggests that innovators from within can play a crucial role in system development. However, nowadays it appears as if the Russian education system is only oriented from the top to bottom and not vice versa. As far as support mechanisms are concerned, there is only monetary distribution, which is driven by a very narrow scope of initiatives predetermined by government; thus the potential activity of innovators that does not match governmental requests is undervalued. There is no environment to gather ideas and even hear the voices of these grassroots innovators.

Innovators in education exist not only within the system, but also from without. Many innovative projects represent spheres beyond the scope of formal education, for example three cases described above. One of them, "Moscow through the Engineer's Eye", has a broad network of partners including public and private schools but organizes activities independently. Excursions' content is not related to school programme. One possible explanation for this is that the existing curriculum is very traditional and covers only time-honoured topics; contemporary knowledge and skills are left behind, niche that is occupied by innovators from without. Realizing the importance of the twenty-first century skills, parents and students are ready to pay for any educational activities with contemporary and interesting

format and content. Another reason is that even if one is relevant to the traditional curriculum innovative idea, it is rather difficult to embed it into the existing educational system. Schools and universities are not ready to collaborate with external people; they see them as aliens. In such circumstances, innovators prefer to act from outside. Moreover, these boundaries affect innovators from within in the same way as innovators from without, encouraging them to contribute into the system from outside.

Innovators from both sides of education, guided by the needs of others, even if they represent business-oriented project, they always have a social mission. All projects submitted to the competition aim to develop the education system by making it more effective, available to a broader audience, more innovative in terms of teaching methods, more open to ICT and blended learning, etc. All innovators need support in their innovative activities, a sense that they are needed in education. Such supports not only assume monetary compensation, but also an environment in which they can create and develop their ideas at the early stages of the project. Creation of environment that nurtures the spread of grassroot innovations has intrinsic value for education. Deepening the process of education's opening up is a means to upgrade the educational system, and integrating into the system something extrinsic will lead the system to be renewed.

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