Actual problems of attracting funding for scientific and educational activities

Elena Viacheslavovna Lyapuntsova1*, Julia Mikhailovna Belozerova2, Vita Vladimirovna Vlasova1

1 Bauman Moscow State Technical University, Department of Innovative Entrepreneurship, Moscow, Russia
2 Film and Television Institute (GITR), Department of Production Skills, Moscow, Russian Federation

Abstract. The article aims to analyze the changing role of higher education teachers both in general and in the context of their necessity and ability to participate in fund raising for scientific and educational activities. Using methods of analysis and systematization, the authors examined the role of a teacher in the light of the concept of sustainable development goals developed by the UN General Assembly. Namely, we consider its impact on achieving at least three goals that can also be achieved via raising additional funding to the scientific and educational spheres. The most relevant sources of such additional funding were identified and studied in detail from the authors’ point of view: crowdfunding, targeted capital (endowment fund), and the Russian Science Foundation (RSF). The essence, features, advantages, and relevance of each funding method were studied. As a result of the research, the importance of the participation of higher education teachers in attracting additional funding to higher education institutions was emphasized, and the need for them to acquire new competencies was identified. Based on this, we developed a structure for a professional development course. The course is aimed at increasing the level of awareness of teachers about funding opportunities and mastering tools for fund raising

Keywords: the role of a higher education teacher, fundraising, sustainable development, crowdfunding, endowment, eternal capital, Russian Science Foundation, new teacher competencies, advanced training

1 Introduction

The current economic, social, and political challenges inevitably lead to a global transformation of higher education leading to a change in the role of the teacher and the need to get new competencies in various fields. Higher education institutions are becoming more than just educational organizations. They are becoming the platforms connecting students and employers, developers of new ideas and their potential buyers, scientific technological startups and large industrial enterprises. A higher education teacher, in turn,

* Corresponding author: lev86@bmstu.ru
often becomes a communicator between all these stakeholders. Thus, in addition to the crucial function of transmitting knowledge in a particular field, it is also important for the teacher to possess a set of basic competencies in the areas of financing scientific and educational activities, intellectual property, mentoring, and digital technologies.

The authors attempt to analyze the role of a higher education teacher in attracting funding to the scientific and educational sphere, as well as the necessary skills and competencies required for that. The study aims is to evaluate the role of the higher education teacher within the concept of sustainable development, its role in achieving sustainable development goals, to study the most relevant sources of additional funding for scientific and educational activities, and to develop a training course structure for teachers in the field of fund raising. Most research on trends in changing the role of the higher education teacher is devoted to the need for them to acquire competencies in communication, leadership, digital technologies, and new teaching methods. Currently, the issue of raising additional funding for the implementation of new approaches to education remains largely unnoticed.

2 Materials and Methods

We analyzed the topic based on an interdisciplinary approach. This work also applies structural-systemic analysis, synthesis methods for developing a concept, and modeling methods for developing the structure of a professional development course. Tabular and graphical methods were used to present the research results.

3 Results

The significance of the role of a higher education teacher is also particularly evident in achieving sustainable development goals. A modern higher education teacher is an important figure in achieving at least three goals, namely:

- Goal 4: Quality education;
- Goal 8: Decent work and economic growth;
- Goal 9: Industry, innovation and infrastructure [1].

A teacher directly influences the Goal 4 tasks, which involves providing comprehensive and equitable quality education and promoting lifelong learning opportunities [2]. Increasing the number of young and adult people with in-demand skills who are able to get a good job and engage in entrepreneurial activities is a direct result of the teacher’s work. In addition, the teacher acts as a motivator and mentor. To fulfill such a role, the teacher needs to implement a practice-oriented approach to training, which is often realized by involving partners from the business sphere in the educational process. In this case, motivation for students becomes not only gaining experience while working on a real case, but also the financial component for the applicable result created under the guidance of a mentor. In other words, improving the quality of education based on the application of a practice-oriented approach can be achieved by attracting additional funding from business partners.

Achieving tasks of Goal 8 [3], which is related to promoting inclusive and sustainable economic growth, full and productive employment, and decent work for all, is directly related to carrying out innovative activities in scientific and educational organizations, as it allows for increased productivity in the economy and contributes to the development of micro, small and medium-sized enterprises. Thus, the significance of university startups is increasing, as well as ensuring their accessibility to financial instruments, which also partially falls on the shoulders of the teacher.
The Goal 9 related to creating sustainable infrastructure, promoting inclusive and sustainable industrialization and innovation, is also directly related to the task of activating scientific activities, increasing expenditures on private and public R&D, which in turn is also related to the competencies of the professorial and teaching staff (PTS) in attracting funding.

This article proposes to analyze the main sources of additional funding for scientific and educational activities from the authors’ point of view, as well as conceptually propose a structure for a professional development course, the target audience of which is the PTS of scientific and educational organizations, and the goal is to acquire the relevant skills.

3.1. Crowdfunding

Private fundraising is one of the most popular ways of obtaining funding. Crowdfunding is a way of raising funds from the general public for a specific project. Recently, it has become popular in Russia as a way of financing various projects, including scientific research [5].

In Russia, crowdfunding for scientific research in Russia can be used, for example, to finance experimental research, purchase expensive equipment, pay for investigators’ trips to conferences, and so on. A big advantage of crowdfunding is that this method of fundraising is usually aimed at the mass market and potential investors, which increases the chances of attracting them.

There are several crowdfunding platforms where one can create a campaign to finance scientific research in Russia. Their list can be found on the Internet. For example, Zelenka, Planeta.ru, or Boomstarter. In particular, the Zelenka platform has already received an award for the best social project from the Russian Business Council and has repeatedly helped finance scientific research [6].

Overall, crowdfunding for financing scientific research in Russia is an alternative and effective way of obtaining additional funds for socially useful and scientific research projects. It can be used not only to obtain funding but also to promote and disseminate the project in society. Table 1 lists the Russia’s most renowned crowdfunding platforms.

<table>
<thead>
<tr>
<th>Name</th>
<th>Country</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Planeta.ru</td>
<td>Russia</td>
<td>The platform helps bring creative ideas to life, support charitable projects, and invest in startups. A project receives the funds if it manages to raise more than 50% of the declared amount. When transferring funds, the service charges a commission of 10-15% of the collection amount.</td>
</tr>
<tr>
<td>Boomstarter.ru</td>
<td>Russia</td>
<td>The platform was created to support projects in the fields of art and education, sports, and tourism. The service offers two types of fundraising (without a limit on the amount and without time restrictions), and five tariff plans. The investment seeker must pay for placing the project on the site, and no commission is charged for transferring funds to the account.</td>
</tr>
<tr>
<td>Kroogi.com</td>
<td>Russia</td>
<td>The site distributes digitized music, literary, and artistic works on a &quot;Pay as much as you want&quot; principle. Authors upload content to the platform, and users can download it after registration and payment. A commission of 15% is</td>
</tr>
</tbody>
</table>
charged from the incoming payments.

Source: Compiled by the authors

For example, 1,324,716 people are registered on the Planeta.ru resource, 376,359 rewards have already been paid, 623 projects have been launched. In total, over the entire history of the project, 1,925,014,841 rubles have been collected.

There are other crowdfunding platforms that can be used to raise funds for science:
- Myplaneta is a platform that helps implement social projects and ideas related to ecology and the environment.
- StartUpRussia is a startup platform where one can find investors and get funding to implement your ideas.
- Kickstarter is a popular global crowdfunding platform that can also be used in Russia.
- Indiegogo is another international crowdfunding platform where one can raise funds for various projects.
- Boomfunding is a platform that helps raise funds for charitable projects and social initiatives.
- Crowdfunder.ru is a crowdfunding platform where one can find investors and sponsors to implement your ideas and projects.

As in most countries, crowdfunding platforms in Russia are mainly focused on projects in the field of culture, art, technology and the social sphere. Scientific projects, as a rule, do not attract so much attention and do not receive the necessary support [7].

However, there are several platforms specializing in scientific projects, for example, ScienceStart (https://sciencesstart.ru/) and SciMantra (https://scimantra.org/). They provide a platform for funding and promoting scientific research, help scientists and innovators find sponsors and investors to implement their projects.

Also, some universities and scientific organizations have their own crowdfunding programs to support their employees and projects. For example, Lomonosov Moscow State University launched its own crowdfunding platform - Crowdfunding Lab (https://crowdfunding.msu.ru/), where everyone can support scientific projects developed by university employees.

Thus, scientific projects can get support on specialized crowdfunding platforms, as well as on platforms created by scientific organizations and universities.

The advantages of crowdfunding for scientific research are the following:

1. Expanding the availability of funding: Crowdfunding allows projects to receive funding from a wide range of people, regardless of their location and professional ties. This can be especially helpful for young and emerging scientists who do not have access to traditional sources of funding.

2. Increasing Public Attention: Crowdfunding platforms can bring widespread public attention to research and projects that may be difficult to reach through traditional channels. This can positively influence public opinion and support for scientific research.

3. Flexibility and speed of obtaining funds: Crowdfunding platforms allow you to quickly receive additional funds for a project, which can be especially important in situations where a quick solution to a problem is needed or an unexpected chance for the development of a project appears.

4. Better communication: Crowdfunding campaigns can provide scientists with the opportunity to better communicate with society and receive feedback. Scientists can use this to improve their projects, taking into account the opinion of the general public.

5. New opportunities for creativity: Crowdfunding platforms can be a source of new ideas and approaches to research funding. New funding models, new approaches to communication and marketing may appear through the use of crowdfunding [8].
Although crowdfunding is an excellent way of funding science, it has a number of drawbacks:

1. The need for self-promotion. A person involved in crowdfunding must independently advertise his project, attract the attention of the audience, and study the mechanisms of crowdfunding platforms.

2. Risk of failure. Not all projects find their sponsors and receive sufficient funding for implementation. This may be due to the low quality of the project, lack of uniqueness and attractiveness.

3. Risks for sponsors. Sponsors may face the risk of losing their investment if the project is not completed or does not achieve the expected results.

4. Competition. Crowdfunding platforms are jam-packed with projects, making the competition for audience acquisition and funding quite tough.

5. Low credit score. Participating in crowdfunding can negatively affect the credit history of the investor, since it is believed that participation in this scheme may indicate poor creditworthiness [9].

Rewards for sponsors of scientific research on a crowdfunding platform may include different levels of project support, each of which provides for different types of rewards, such as mention in the gratitude lists, receiving a promo code for a product or service, personal letters from the project authors. Also, the reward can be in the form of receiving exclusive physical products that are under development or production, or the opportunity to participate in focus groups, online conferences or other events related to the project. Equally beneficial for sponsors can be access to research results before they are published publicly and participation in research itself, if this is relevant to the research topic. Sometimes a sponsor is motivated to invest by establishing business relationships with the authors of the project and the possibility of investing in the further development of the project, when crowdfunding turns into full-fledged participation in a scientific project. Sponsor rewards may vary depending on which crowdfunding platform is being used and what type of project is being funded.

What should a teacher know for effective crowdfunding to attract funding for science?

1. Project Goals and Objectives: One has to be clear about what you want to achieve, what research you want to do, and what results you expect to get.

2. Target Audience: One has to understand who might be interested in your project and what benefits you offer them by supporting your project.

3. Promotion: One has to develop an effective promotion strategy for your project in order to reach more people and get them interested in supporting your scientific work.

4. Budget calculation: One has to know how much money is needed to implement your project and what costs may arise.

5. Communication with donors and sponsors: One has to build good relationships with donors and sponsors, show them how their money is spent and what they can expect as a result of their support.

6. Rules to follow: Depending on the crowdfunding platform of choice, one will need to know and follow the rules of the campaign in order to avoid violations and comply with the requirements of the service provider.

7. Keeping Promises: Before launching a crowdfunding campaign, one must make sure that you will be able to fulfill all the work promised to you within the framework of the project, which will be known by the project implementation.

8. Support for selfless goals: crowdfunding is a movement, a kind of social enterprise, the choice of the field of scientific work should be in the direction of creating new knowledge and in the area of achieving the results people need.

Unfortunately, there are no accurate statistics on the use of crowdfunding by university teachers to raise funding. Some teachers may use this method to fund their own research or
projects. However, grants, investments and donations from sponsors are more common methods of funding university projects.

3.2. Endowments

Endowment funds of higher education institutions is another way to attract additional funding. Endowment is the funds belonging to the founding fund, which is created and replenished through donations from legal entities and individuals.

According to Federal Law No. 275-FZ “On the procedure for the formation and use of endowment capital of non-profit organizations”, adopted in 2007, endowment capital (CC) is “a part of the property of a non-profit organization formed through donations, transferred to trust management of a management company to generate income used to finance the statutory activities of non-profit organizations” [10].

The main difference between endowment capital is that the funds themselves are not used. The target capital is transferred to the trust management of the management company, which, in turn, uses it with the help of various banking instruments. It is the profit from such operations that the fund spends strictly in accordance with the statutory goals.

Despite the period of crisis caused by the COVID-19 pandemic, the demand for endowments has increased markedly. The growth was so pronounced that 2021 was a record year in the modern history of Russia in terms of the number of endowment funds (Fig. 1). Much more often this topic began to be covered at various events and venues. A community has been formed to a sufficient extent that contributes to the development of the endowment culture in Russia. The creation of the National Endowment Association (NAE) in 2020 is a direct confirmation of this fact. NAE brings together the expert community and leading participants in order to actively develop the endowment industry. The association was created through an agreement between 11 large endowment funds of Russian universities: the European University at St. Petersburg (EUSPh), the Far Eastern Federal University (FEFU), the Moscow State Pedagogical University (MGPU), the Moscow State Institute of International Relations of the Ministry of Foreign Affairs of the Russian Federation (MGIMO), the Foundation for the Development of Social and Economic Sciences and Education (ForSENO), the Moscow Higher School of Social and Economic Sciences (MVSHSEN) and others.

![Graph showing number of active endowment funds in Russia (as of December 2021)](https://www.irof.ru/)

Almost half of all endowment funds in Russia are university endowments. More than half of the funds as a whole are in the field of education. Some of these funds have several endowments aimed at achieving goals in several areas of activity at once (for example, 10 in the fund of the Higher School of Economics (NRU HSE), 12 in the Moscow Institute of Physics and Technology, 14 in the Ural Federal University named after B. N. Yeltsin).
Basically, the founders of funds in education are the alumni. Among state universities, MGIMO (1.7 billion rubles), NRU HSE (1.2 billion rubles) and St. Petersburg State University (1.1 billion rubles) are leading in terms of endowments. The largest endowments were created at private universities and research centers - the Skolkovo Institute of Science and Technology (Skoltech) (4.8 billion rubles) and EUSP (2.1 billion rubles). In 2021, more than 10 endowment funds of higher educational institutions were formed: at the Rostov State University of Economics, Saratov State Agrarian University, North-Western State Medical University, I. I. Mechnikov (St. Petersburg), Kabardino-Balkarian State University. H. M. Berbekova (Nalchik), Ufa State Petroleum Technological University, Moscow Regional Technological University. A. A. Leonova (Korolev), Omsk State University of Communications, Russian State University. A. N. Kosygin (Moscow), the Moscow Art Theater School-Studio (Moscow), the Institute of Business and Design (Moscow), South Ural Federal University, and also in the Trade Union Organization of Students of Petrozavodsk State University [12].

In light of the fact that since 2021 universities have been developing within the framework of the Priority 2030 program, which was created to ensure the contribution of the resources of higher education institutions to the achievement of the national development goals of the Russian Federation, to increase the scientific and educational potential of universities, as well as to ensure their participation in social-economic development of regions [13], university endowments are becoming an even more relevant source of additional funding, allowing universities to solve a number of important issues that stand in the way of the above goals.

![Endowment funds per industries](https://www.irof.ru/)

**Fig. 2.** Endowment funds per industries

Source: [https://www.irof.ru/](https://www.irof.ru/)

The indisputable advantage of endowments is that donations are not spent on any specific project immediately, but are a source of income generation and can become a source of funding for various projects over a long period of time. The formation of endowment capital makes it possible to ensure the partial independence of non-profit organizations from one-time donations, other voluntary irregular receipts, grants and state funding by obtaining a guaranteed annual income from the management of endowment capital. Donations to endowment are also an indicator of trust in a non-profit organization, as they show confidence that this non-profit organization will adhere to the declared principles and results of its activities.

A certain disadvantage of endowment funds is some difficulty in raising funds, since philanthropists often prefer to donate to shorter-term projects.
3.3. Russian Science Foundation

The Russian Science Foundation (RSF) is organized to provide financial and organizational support for fundamental and exploratory scientific research, experimental design and technological work, experimental design development, scientific personnel training, and development of scientific teams that occupy leading positions in a particular field of science [14]. It is important to emphasize that one of the goals of the RSF is scientific personnel training.

The goals of the RSF are the following: development of scientific teams capable of taking on the leading roles in science.

The activity of the RSF is based on the Federal Law of the Russian Federation of November 2, 2013, No. 291-FZ "On the Russian Science Foundation and Amendments to Certain Legislative Acts of the Russian Federation" (hereinafter - the Law on the RSF) and decisions of the Board of Trustees of the RSF. The RSF's activities are aimed at implementing the most important documents and decrees of the President of the Russian Federation. The RSF finances fundamental and exploratory scientific research in the main nine fields of knowledge: 01 - Mathematics, Informatics and System Sciences; 02 - Physics and Space Sciences; 03 - Chemistry and Materials Science; 04 - Biology and Life Sciences; 05 - Fundamental Research for Medicine; 06 - Agricultural Sciences; 07 - Earth Sciences; 08 - Humanities and Social Sciences; 09 - Engineering Sciences. It is important to note that projects are given funds on a competitive basis. The competitive selection of fundamental and exploratory scientific projects is aimed at solving specific tasks and problems of socio-economic development of the country and society. However, the results of the projects should have a global level and make a significant contribution to solving key problems of these thematic areas and scientific priorities.

Since 2015, the RSF has been conducting expertise on submissions for the President of the Russian Federation's award in science and innovation for young scientists and the State Prize of the Russian Federation in science and technology [18]. Starting from 2021, the RSF provides material and technical as well as financial support for the activities of the advisory group on scientific and technological development [19].

The mission of the RSF is to identify the most promising and ambitious scientific and technological projects, the most effective and productive scientists capable of rallying a team of like-minded individuals, implementing ambitious technological solutions, and nurturing a new generation of Russian researchers who conduct research and development at the highest global level. There are significant mechanisms for supporting researchers. Figure 3 shows the funding figures for RSF scientific projects. Tables 2 and 3 provide information on the values and main principles of the RSF's activities. The figures and information can be found on the Grant Support Information Aggregator portal [21].
Fig 3. RSF funding volumes
Source: https://funds.riep.ru/

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Creativity and initiative</td>
<td>Unleashing the potential of Russian researchers, searching for promising ideas and technologies.</td>
</tr>
<tr>
<td>World-class research and development</td>
<td>Relevance, relevance and novelty for the Russian economy and society.</td>
</tr>
<tr>
<td>Opportunities for becoming</td>
<td>Involvement of young researchers, formation of scientific teams.</td>
</tr>
<tr>
<td>Engagement in science</td>
<td>Young researchers, innovative approaches, competencies.</td>
</tr>
<tr>
<td>Feedback and interaction</td>
<td>Integration of the scientific community and cooperation with the real sector of the economy.</td>
</tr>
</tbody>
</table>

Source: Compiled by the authors based on [20]

Table 3. Main principles of RSF activity

<table>
<thead>
<tr>
<th>#</th>
<th>RSF principles</th>
<th>Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Publicity and openness</td>
<td>Interaction with Russian and international organizations, research teams and scientists to achieve the goals of the RSF and realize its mission.</td>
</tr>
<tr>
<td>2.</td>
<td>Competence</td>
<td>Distribution of grants based on the opinions of highly qualified and competent experts.</td>
</tr>
<tr>
<td>3.</td>
<td>Compliance with the public interest</td>
<td>A tool for the implementation of state policy in the field of science and technological development.</td>
</tr>
</tbody>
</table>


| 4. | Independence | The decision is made by the RSF and the Board of Trustees, they exercise the rights granted to non-profit organizations. |
| 5. | Policy in the field of rights to the results of intellectual activity | The rights to the results of intellectual activity created during the implementation of programs and projects funded by the Russian Science Foundation belong to the executors of these programs and projects. The Russian Federation may use the results of intellectual activity for state needs. |

Source: Compiled by the authors based on [20]

3.3.1. Priority activities of the RSF

The RSF works according to the priority areas of the Fund approved by the Board of Trustees. This includes conducting fundamental and exploratory scientific research by small individual scientific groups. As part of this direction, starting from 2024, the RSF will finance scientific projects of small individual scientific groups (teams of 2 to 4 researchers) up to 1.5 million rubles per year, with project duration of up to 2 years. The goal of the program is to promote the formation of an advanced sector of fundamental and exploratory research in the Russian Federation that enjoys global recognition, to implement strategic initiatives of the President of the Russian Federation in the field of science and technology, and to develop the personnel potential of Russian science [20].

3.3.2. Tasks of the Program

It is important not only to conduct research at a global level, but also to educate a new generation of Russian scientists and specialists. The main tasks are the following:

- Organizational and financial support for conducting experimental, design and technological work, experimental design developments to ensure the implementation of the strategic initiatives of the President of the Russian Federation in the scientific and technological sphere.
- Development of mechanisms that provide access for Russian scientists to scientific infrastructure facilities, stimulation of interaction between science and the real sector of the economy.
- Ensuring qualified and objective expertise of applications submitted to the Fund's competitions, expertise of reports and monitoring of the implementation of projects supported by the Fund.
- Development of international scientific cooperation, integration of Russian fundamental science into the global scientific space.

4 Discussion

Based on the information analyzed, we concluded that it is necessary for a teacher to develop the skills necessary to attract additional sources of funding for their scientific research and other activities within the framework of educational activities. To do this, first of all, it is necessary to raise teachers’ awareness of the funding opportunities that are available to them in educational organizations, scientific support programs, funds and grants, provide teachers with practical knowledge and tools for evaluating the effectiveness of funded research projects, develop the ability of teachers to write effective project proposals, which can be successfully considered and accepted. All this can become the
goals of an advanced training course for teachers offered by the authors. The main modules of the program are the following:

- Various funding sources and their specifics.
- The main stages of preparation of project applications and requirements for them.
- Methods and techniques for the effective attraction of funding for scientific research.
- Evaluation and monitoring of funded projects in various areas of scientific research.

The course of additional vocational training (hereinafter referred to as AVT) for teachers on attracting research funding is a training program designed to improve the teachers’ skills in the formation and submission of applications for funding for scientific research.

The course can be held both offline and online. It can be delivered on the basis of large educational institutions, research centers and research institutes.

5 Conclusion

The authors analyzed the changing role of higher education teachers, including the role within the framework of sustainable development goals. The influence of the teacher’s role was found to affect at least three out of seventeen goals, namely the goals of achieving quality education, decent work and economic growth, as well as promoting industrialization, innovation, and infrastructure development. The impact on all three goals is also related to the possibility of attracting additional financial resources, which in turn associated with the teachers’ possession of relevant skills.

We studied in detail the most relevant sources of such additional funding: crowdfunding, endowment funds, and the Russian Science Foundation (RSF). The essence, features, advantages, and relevance of each funding method were examined. As a result of the study, the importance of the participation of higher education teachers in attracting additional funding to higher education institutions was emphasized. Also, we justified the need for teachers to get new competencies. Based on this, we proposed the structure of a training course. The course is aimed at increasing the level of awareness of teachers about funding opportunities and mastering tools that allow them to attract additional funds. The proposed structure can become an effective basis for a full-fledged qualification improvement course for teachers, lasting at least 36 hours.

References

11. ANO "Institute for the Reform of Public Finance" (IROF), https://www.irof.ru/, 04/07/2023
13. Ministry of Science and Higher Education. minobrnauki.gov.ru, 05/07/2023