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E-Learning Financing Models in Russia for Sustainable Development

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Abstract: E-learning brings new dimensions to traditional education. This especially affects countries that, due to many factors, have historically been considered the "talent pool" for the world community. In this study, a model for financing e-education has been developed that is applicable to Russian realities. The model was built around the balance between demand (global politics, economics, and principles of sustainable development) and supply (sources of direct financing). As a result, a key challenge of improving the e-learning financing methodology and models, specifically the efficiency of government spending and private investing, demands the use of new approaches and mechanisms. To improve e-learning financing, a clear understanding of the applied purpose of public and private means is required. Responsibilities for the e-learning outcome of institutions that receive financing are linked to their status. An unclear understanding of these issues is more likely associated with the issue of transparency of financing than with inefficiency. The proposed model allows transforming the "standards" of financing both in the field of e-education and Russian education in general and presents a new vision of participants' interaction in the educational process, taking into account a set of restrictions and market features.

Keywords: e-learning; e-learning consumers; financing models; international education; sustainable development

1. Introduction

Presently, e-learning development is driven by advances in information technology (IT) and e-learning itself connects many students across the world, enabling them to experience education in any educational institution without leaving home. There are many e-learning management systems that ensure a complete educational process through modern Internet technologies [1–4].

E-learning for sustainable development is generally aimed at (1) promoting and improving the quality of continuous education; (2) ensuring the acquisition of knowledge, skills and values necessary to reach sustainability; and (3) redefining curricula to increase public awareness through a better understanding of sustainable development. Ways to redefine educational framework include rethinking, integration, reforming and greening of education [1,3–6].

The science of sustainable development is a separate research field that has capacities, scientific and technical skills, methodologies and competencies of its own. Yet, it associates knowledge with actions

towards the achievement of sustainability, encompassing principles that represent a new field of interest in education. Raising public awareness of environmental issues while increasing learning courses at the university and advanced information and communication technologies (ICTs) is crucial [7–9]. Strategy like this requires institutions to develop new competencies, reach flexibility, and engage in competition with other institutions. In this context, e-learning found itself a niche in continuous education. E-learning is teaching and learning process, according to an appropriate distance learning model that allows flexible learner-centered education and is based on ICTs [10,11]. It takes place in a virtual learning environment, also known as a learning platform, where multidirectional communication is possible. An e-learning system, which is independent of time and place, a self-regulatory learning process, and an interdisciplinary approach to teaching and learning are key factors in education for sustainable development [12,13].

Online education provides students with an educational alternative, allowing them to continue their education at their own pace, with a personal learning schedule, while having full-time jobs [3,14–17]. Flexibility, interaction, teacher presence, collaborative learning, and a great sense of community are very important categories in the online students' discourses. It should be noted that the presence of an online community is essential to online learning outcomes. The pedagogy of online learning allows students to more accurately perceive the effectiveness of their own learning, increasing teacher-student interaction and critical thinking [18–21]. It should be emphasized that teacher's experience and role as a mediator are crucial in the acquisition of knowledge, skills and competencies. In addition, online programs provide the same level of student performance as face-to-face courses, with comparable learning outcomes [22–26].

Competencies in sustainability are associated with acquired knowledge, skills and relationships that enable successful task performance and sustainability problem solving. Therefore, e-learning funding models for sustainable development need to be incorporated in the near future so that they may fully contribute to the integration of advanced technologies. Sustainable development means more than gaining additional knowledge. It is based on the concept of transformative social learning and is directed to empowerment. The key competencies in sustainable development are [27–32]:

- foresighted thinking;
- interdisciplinary work;
- cosmopolitan perception;
- intercultural understanding and cooperation;
- participatory skills;
- planning and implementation;
- empathy, compassion and solidarity;
- self-motivation and motivating others;
- distanced reflection on individual and cultural models.

An optimal e-learning funding model for sustainable development is a predicator of the generation of leaders. Such a model may enable the emergence of effective learning drivers for students of all ages and help move towards sustainable social models. For this reason, the study presents a model of optimal financing of online education, created in the view of the current situation in the Russian market and its immense demand for e-learning [33,34]. Even though the Russian market is characterized by insufficient development of corresponding infrastructure [35] and strong geopolitical and macroeconomic pressure (primarily by sanctions and embargoes) [36], Russia remains an integral part of the world community due to its large population and high level of HDI. Therefore, the formation of an effective mechanism for financing the Russian e-learning system is relevant not only as a local task. It is also crucial for the theoretical improvement of personnel's knowledge since it can affect the sustainability of the global economy's development [37].

2. Methods

2.1. Research Design

E-learning for sustainable development is closely linked to [38,39] sustainability in politics, planning and management; financing of courses and curricula; offline research; outreach and services; assessment and reporting. The emphasis is normally laid on the promotion of interdisciplinary thinking and analysis, which is the basis of sustainable development, by teaching more complex connections between economic, social and environmental concepts (Figure 1).

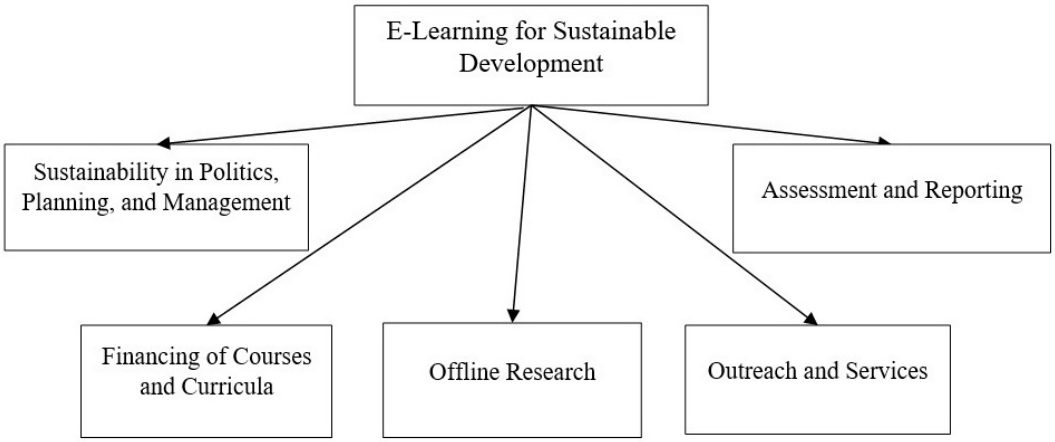

Figure 1. A graphical representation of e-learning for sustainable development and its dimensions, adapted from [39].

The pace and quality of e-learning for sustainable development are significantly influenced by administrative, technological, financial, and intellectual components as well as by efficiency assessment and control. The unequal access of country's inhabitants to the Internet is among challenges of educational strategy development. Progress in e-learning for sustainable development tends to slow down due to the relative high cost of broadband Internet services and infrastructure, causing the widening of the telecommunication gap between different cities and regions. It should be noted that the broadband Internet tariff policy is built around the broadband infrastructure, rather than financial strength of the regions, especially in Russia, where its enormous size causes the broadband infrastructure expenditures to grow. Therefore, the geographical location of the country is among the decisive factors influencing the infrastructure spending and, accordingly, the information product [40].

Telecommunication inequality between metropolitan and local (distant) consumers can be eliminated through rapid scaling with modern information technologies. Although broadband Internet tariffs in Russia are lower than those in Western Europe, some internal contradictions are exposed. For instance, the average Internet speed in Moscow and St. Petersburg is higher than in other cities of the country with the tariffs being lower. Therefore, it is critically important to take into account the objective economic situation, since it forms the mechanisms of interaction in the market. Today, it is customary to single out the main three models of interaction in the field of education financing that are based on the free market, social market and anti-market models [41] (Table 1).

Table 1. E-learning financing models, adapted from [41].

Model	Description	Aim
Free Market	Being in the market improves the quality of education owing to available mechanisms the market offers to control the education system. Among these are personnel training and mechanisms to accelerate the growth of profit of educational institutions. The government retains its control function but its role is reduced with the reduction of education spending.	Equal opportunities to all
Social Market	Partnership between the government and private companies stimulates intense and productive activity owing to increasing private investments and the reduction of governmental funding. This model promotes e-learning development through privatization.	Outreach towards middle class learners; Social tension relief;Social and education-related problem solving
Anti-Market	E-learning is financed from the government (i.e., tax revenue from non-educational organizations). This model suggests an increase of employees.	Education quality improvement via feedback analysis

The above models are designed for strategically important tasks of internal and external optimization and provide for cost reduction, efficient use of fixed assets, increase of enrollment, and the creation of a universal system for education financing and specialized educational institutions. In Russian realities, these models of interaction are not de facto presented in pure form, to be more precise, they are presented in a mixed form, moreover, they are heterogeneous by region. This is primarily due to the federal structure of the state, where each region determines its financial policy. The latter once again emphasizes the distinction and uniqueness of the research task.

(1) The purpose of the study, namely the development of an optimal e-learning funding model for sustainable development, can be achieved through the gradual accomplishment of the following procedures:

(2) Formation of the mechanism of resource efficiency of the organizational unit (educational institution). This procedure is considered to be the conceptual basis of the model.

(3) Identification of financing principles to achieve sustainable development. This procedure defines the practical application of the model.

(4) Synthesis of quantitative and qualitative data reflecting the conjuncture of the Russian e-learning market. This procedure adapts the model to be implemented in the online learning market of the Russian Federation.

(5) High-quality implementation of each procedure will allow creating a model for financing e-education for sustainable development in the Russian Federation.

Such a financing system embraces both private and public sources of finance and seeks to employ new forms of financial support. Apart from curriculum development and financing, institutions tend to explore pedagogical approaches to education and establish effective programs to ensure e-learning for sustainable development [42–44].

2.2. Data Analysis

In order to ensure that the developed model meets the Russian realities as much as possible, the following elements of the Russian learning environment should be clarified and analyzed:

(1) To what extent e-learning is widespread in Russia? How many academic programs does it cover? To what level of education do such programs belong? This information specifies the product for which the financing model will be developed.

(2) What is the e-learning market size in the Russian Federation? To what sectors and how are expenses allocated? This data forms an understanding of Russian financial institutions and mechanisms.

(3) Who are typical e-learners? What organizational units are implementing online education? This information will provide a better understanding of the range of study objects, features and needs of which will be taken into account in the developed model.

(3a) Key research objects (organizations) in the corporate sector.

(3b) Key research objects (organizations) in the public sector.

(1) By electronic support in education in this study, the authors mean educational Internet resources, mobile applications, computer games, and educational video content. All of these formats are also suitable for home education, but require adaptation to general educational programs. To achieve this, b2b solutions in the field of developing distance and online learning methods can be adapted, training videos, online content for developing competencies in sustainable development, as well as blended forms of training can serve this purpose.

At the beginning of the academic year 2017–2018, the Russian Federation implemented with electronic support 3097 bachelor's degree programs, 265 associate-level degree programs, and 1370 master's degree programs [45] (Figure 2). The latter was calculated as the current and historical number of students from official statistical information of the Ministry of Education of the Russian Federation. Private and state segments were taken into account (both on a federal level and by regions of the Russian Federation). Then, on the basis of the data obtained, students were divided by degrees.

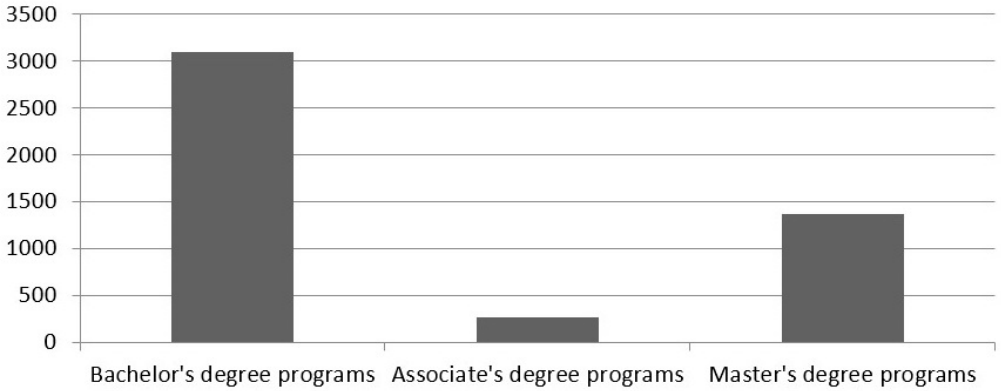

Figure 2. The number of distance education programs, adapted from [45].

From the chart above, distance education programs make up 33% of total higher education programs with a 12.6% share of bachelor's degree, an 8.2% share of associate-level degree programs, and a 9.5% portion of master's degree programs [45] (Figure 3), which was calculated taking into account the shares of distance and full-time programs in this segment of the education market. Such an analysis was made possible thanks to information obtained from the largest sites and aggregators of educational programs in higher and secondary vocational education.

Figure 3. The percentage distribution of distance education programs in higher education (2017–2018 academic year), adapted from [45].

(2) E-learning expenses in Russia are projected to reach 52.8 billion rubles in 2021 whereas individual budgets are going to vary between segments of education [46] (Figure 4). Multiplying the size of the average check and the number of students, the authors got the estimated indicators of the volume of the online learning market.

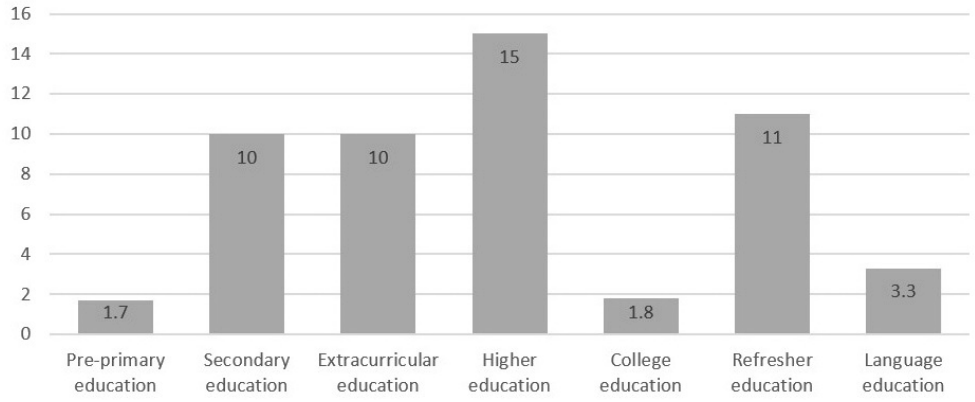

Figure 4. E-learning expenditures by education Ssegment in Russia (2021 forecast), adapted from [46].

(3) E-learners are representatives of corporate and educational organizations as well as individual learners [44,47] (Figure 5). The total audience of the market of continuing professional education (CPE) includes the adult population of the Russian Federation aged 25–64 years. Data on the cohort size and population forecast were obtained from Russian Federal State Statistics Service (Rosstat) for the period from 2009 to 2019. In the calculations of the target audience, that is, the adult population who received additional professional education in 2019, the authors used the data of a survey conducted by the National Research University "Higher School of Economics" (HSE) as part of the project "Monitoring the economics of education". The population forecast up to 2021 and the share of the target audience from the entire population aged 25–64 years were compiled taking into account the official forecast of the Rosstat demography and the HSE data on CPE audience growth dynamics.

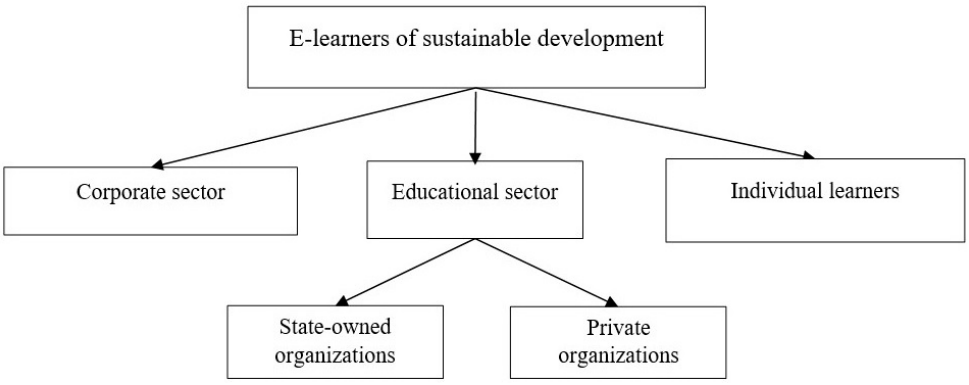

Figure 5. Categories of e-learners, adapted from [44].

(3a) According to the materials of the HSE study "Monitoring the economics of education" (2016), the following largest Russian companies take advantage of e-learning:

- Uralsib (financial corporation);
- Vimpelcom (second-largest cellphone company);
- Sibneft (oil producer);
- Severstal (mining company);
- Nornickel (mining and smelting company);
- Sberbank (banking services company);
- AvtoVAZ (automobile manufacturer).

These companies' e-learning covers employee orientation training, critical incident management training, team building, information systems and software products training, international standards

training, as well as bookkeeping, accounting, and auditing training. Individual learners make use of all resources on the Internet, especially free lectures, training videos, and webinars. The use of e-learning is free of restrictions specific to conventional education, whereas the effectiveness of the method being used depends on the industry to which the e-learning course is linked. In the corporate sector, the distribution of e-learning applications across industries is not even, as evidenced by Figure 6, created using the adapted data from [45].

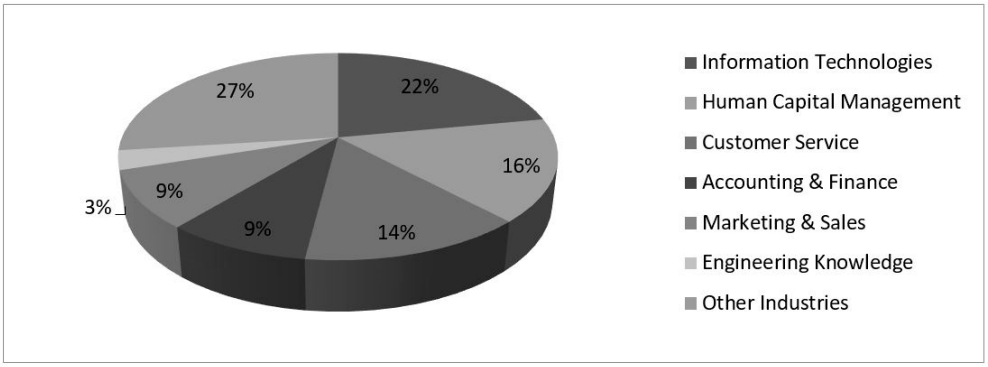

Figure 6. E-learning applications across industries.

Companies in the e-learning market, apart from education service providers, are companies that generate e-learning software and participate in the development of educational materials and courses. This differentiation is conditional, since most modern companies offer e-learning in a comprehensive manner.

(3b) The educational sector includes state-owned and private educational organizations including companies that provide educational services. It should be noted that e-learning in this sector penetrates all fields to one extent or another. Today, Russia has several state institutions that offer online education in any field. These institutions are:

- Russian State University for the Humanities;
- International Academy of Business and Financial Management;
- Moscow Witte University;
- Moscow State University of Geodesy and Cartography;
- Moscow Socio-Economic Institute;
- Moscow Power Engineering Institute;
- Moscow International University;
- Moscow Institute of Business and Design;
- Russian University of Cooperation;
- International Banking Institute;
- D.F. Ustinova Baltic State Technical University;
- Ufa State Oil Technical University;
- Omsk Law Academy;
- G.I. Nevelsky Maritime State University.

Presently, online business education in Russia is a popular industry, represented by the following organizations:

- The Distance Learning Center, Academy of National Economy under the Government of the Russian Federation;
- Moscow Business School;
- International Institute of Management 'LINK';

- Moscow State University of Economics, Statistics and Informatics [44,47].

The practical value of the developed model and its further implementation are primarily oriented toward state-owned and private educational organizations (mentioned above research objects).

3. Results

Based on the research findings, several models have been developed that characterize the financing of e-learning for sustainable development, applicable to modern Russian market conditions. The first financing model is the 4E framework encompassing dimensions of effectiveness, efficiency, economy, and equity. Effectiveness dimension assesses the quality of an educational institution's work (provision of e-learning services) by evaluating the fulfillment of educational goals. Efficiency assesses profitability and how efficiently the available resources are employed. The use of the 4E financing framework to e-learning for sustainable development ensures fairness of performance appraisal and reflects the market orientation of the business (Figure 7).

Figure 7. The 4Es of e-learning financing for sustainable development, developed by the authors.

For e-learning to solve the problem of sustainability, the focus needs to be on the following aspects:

- financing the learning process to achieve relevant core competencies;
- financing education for sustainable development with the purpose of socialization;
- financing individual training for personal growth.

The focus of education on life situations, real and practical problems, and real experience is also a determining factor in achieving sustainability (Figure 8).

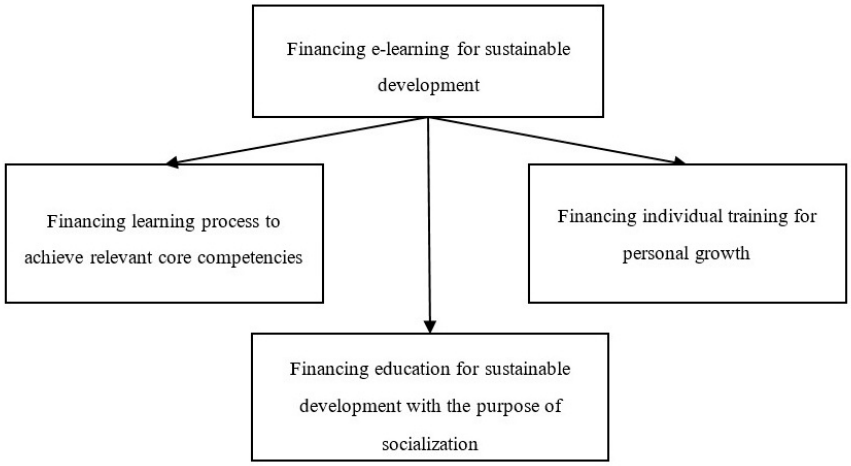

Figure 8. The principles of e-learning financing for sustainable development, developed by the authors.

A dual-system approach, together with the assessment of prerequisites for e-learning financing, represents an integrated financing model. Unlike typical models, this framework operates with the mechanism of interaction between supply and demand and hence, enables a balance between the

quantity of e-learning products and services to offer and the quantity of e-learning products and services that learners desire. The balance between supply and demand corresponds to a module of e-learning cost generation.

E-learning is undoubtedly in demand, owing to sustainability efforts across the global economy. The economic effectiveness of e-learning refers to the total spending on its provision. As each single component of demand rises, e-learning increases. For instance, if the Internet service tariff drops, then the demand and consumption of Internet services will grow. E-learning service consumers encourage supply in the market.

The major sources of finance in e-learning for sustainable development in Russian realities are the local budget, extra-budgetary funds from paid educational services (e.g., tuition fees), and sponsorship. In general, financing policies influence the consumer decision making. The indicator in the center of the scheme (Figure 9) is a balance of supply and demand or the module of e-learning cost generation. Normally, market mechanisms redistribute funds that come from e-learners as part of payment for services. In case of shortage of e-learning service consumers or underfunding, e-learning providers seek to attract investment. In this case, consumers will make the maximum use of the offerings and continue to learn. Over time, the number of e-learners will increase. Once this happens, the e-learning providers will reduce their activity.

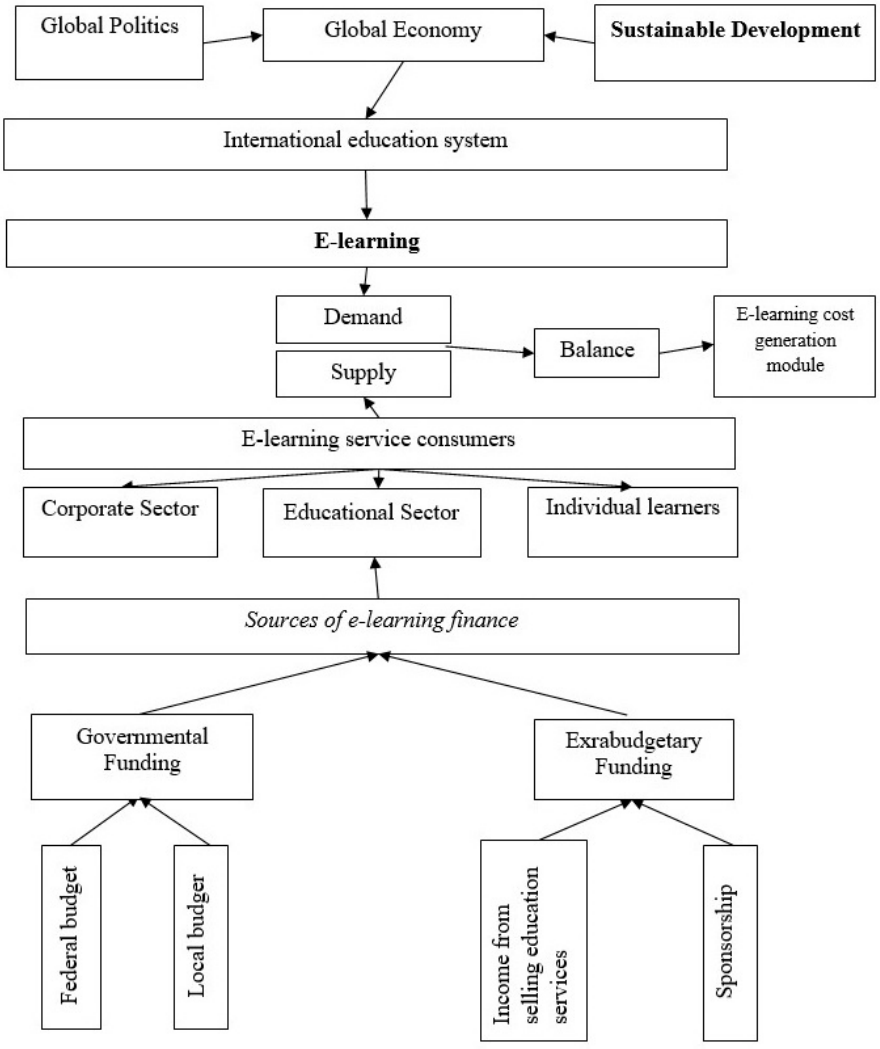

Figure 9. A comprehensive e-learning financing model for sustainable development, developed by the authors.

However, it should be emphasized that demand is much more unstable compared to supply; it can rapidly and unexpectedly change depending on the global market situation (incl. due to force majeure such as a pandemic) and it takes time to stabilize it. A significant impact on the supply-demand system is inflicted by macro factors, including geopolitical processes. Thus, both sides are at risk of global market instability.

4. Discussion

A distinctive feature of the study is that it uses a dual-system approach to assess and model the financing of e-learning for sustainable development. This approach enabled the acquisition of specific and accurate results. The works on the global e-learning trends, on the place of e-learning in the education system, and on the e-learners' role have been reviewed. The review has revealed that many analysts have recognized the importance of integrating sustainability topics with multiple teaching and learning methods. E-learning brings new dimensions to traditional education and increases students' motivation to study. Furthermore, e-learning can increase students' readiness to study if they are allowed to switch their social roles within the program, creating new ways to learn and solve environmental, economic, and social problems online [48–52]. Many analysts emphasize that successful online students should have a greater inclination to transfer knowledge to a new domain, a greater sense of community and communication, as well as greater knowledge and independence, leading to successful learning [53–57]. Unfortunately, the factor of financing (its sources and methods) was insufficiently studied, and thus, incorrect forecasts were generated and research vectors were shifted. Those analysts who explored the dimension of education finance emphasized the importance of choosing the appropriate sources and model of financing that could be efficiently integrated into the overall framework [58–62]. This opens new possibilities for further research in this field. The application of the dual-system approach is a rather novel practice that may be effective as part of international operational models of financing e-learning for sustainable development. The experience of establishing a framework for education financing may be found in the reviews of industry-specific markets and papers devoted to management modeling. However, no specific methods for e-learning financing have been found.

Education in Russia is financed primarily through the mechanism of inter-budget redistribution. In accordance with the Budget Code of the Russian Federation, it is possible to directly finance educational institutions exclusively from the budget of the level to which the direct founder of a particular educational institution belongs. This creates an imbalance at the level of the entire state and does not correspond to the relations of supply and demand. As a rule, the key problems associated with financing education in the Russian Federation are due to a budget deficit [63]. However, the problem often boils down to the budget's irrational use [64]. Today's budget financing mechanism is demonstrating its inefficiency and requires conceptual changes. However, transformations should concern not only the inclusion of the "private sector" in the financing model, but also state instruments' improvement, which requires political will. The following are among these politically dependent initiatives:

(1) when forming the budget for financing educational institutions, the features of the functioning of individual educational institutions, their material base, and territorial location should be taken into account [65];
(2) introducing a unified system for analysis of the use of budgetary and extra-budgetary funds by educational institutions [66];
(3) legalization of the provision of modern services that contribute to the development of human capital and are often outside the legal field due to the inertia of the bureaucratic legislative process [67].

5. Conclusions

The findings revealed dependence between the development of e-learning for sustainable development and the upward trend in the economic efficiency of education. The active private capital enables partial reduction of government spending, optimization and improvement of education management, as well as higher salaries. For learners, active private capital means lower costs of educational materials purchased. This creates a balance between supply and demand, which is critical in the context of the Russian market. Implementing in Russia the e-learning concept for sustainable development will allow enhancing key competencies of each learner, promoting personal growth, and organizing a learning process taking into account learners' personality types, their knowledge, time available for learning and, most importantly, their financial capabilities. Putting education to an electronic format does not mean downgrading its quality, since the incorporation of modern information technologies and software contributes to improvement and permits a rapid update of learning materials to meet modern requirements. It should be noted that effective digitalization of the education system requires higher Internet coverage and higher digital literacy of the population, while Russia has a heterogeneity of the regions concerning the latter. Thus, the electronic segment of education meets the general principle of lifelong education, which reinforces the sustainability aspect. An e-learning financing model proposed for Russian realities will allow all subjects of this process to develop in accordance with the requirements of the time and improve information technology. At the same time, comprehensive methodology for financing e-learning serves as a tool to improve the education system generally and incorporates the most important components of sustainable development of society.

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