

# “Economic policy to support lifelong learning system development & SDG4 achievement: Bibliometric analysis”

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# ECONOMIC POLICY TO SUPPORT LIFELONG LEARNING SYSTEM DEVELOPMENT & SDG4 ACHIEVEMENT: BIBLIOMETRIC ANALYSIS

## Abstract

In order to set economic policy goals, it is important to understand the difference between adult education and lifelong learning, and how much research on SDG 4 combines lifelong learning and economic policy. The purpose of the article is to determine the main directions for justifying the lifelong learning system development, including for achieving sustainable development goal 4 (SDG 4). Based on scientific research data from the Scopus database using the VOSviewer software, this article analyzed the theoretical foundations for substantiating the temporal and geographical interrelationships of the categorical-conceptual system of such terms as "SDG 4", "adult education", "lifelong learning" and "economic". This made it possible to identify the main trends in scientific research and cluster directions of international research on the relationship between adult education, lifelong learning and economic policy. The following trends were obtained: adult education as a driver of economic development; as a social phenomenon and as a source of innovation. The following clusters were identified: adult education as a part of life-long education; adult education under the influence of physical and age-related changes; adult education as part of professional education; the learning process, which is not related to professional activity. As a result of the analysis, an insufficient level of attention among scientific studies devoted to adult education within the framework of SDG 4 was revealed. The article confirmed the need for economic policy to support the lifelong learning system, as well as the difference between the concepts of adult education and lifelong learning.

## Keywords

life-long learning, distance learning, education for sustainable development

## JEL Classification

A13, A29, J08, J24

## INTRODUCTION

Today, the development of the economy is already associated not only with goals in the market and entrepreneurship, but also in education. Within the framework of the Sustainable Development Goals, this goal is SDG 4. It aims to improve the quality of education and ensure equal learning opportunities for all, including children, youth and adults. And a properly constructed economic policy regarding life-long learning will help building a developing society and economy. But do scientists combine education and economic growth in their research?

Adult education plays an important role in the economic mechanism of the life-long learning system. Through life-long learning, people can not only meet their educational and professional needs, but also obtain qualifications that meet new standards, a rapidly changing professional and social environment.

Life expectancy, and with it careers, has become much longer. Average life expectancy increases by one to two years every decade. For example, according to statistical estimates, a Japanese born in 2007 will live until 2107 (Melnik et al., 2022). A generation with an average life expectancy of 100 years is already forming. This means that the period of active economic activity will exceed the usual 35-40 years of previous generations. Today's 40-year-olds will work until 70, today's 20-year-olds – until 80. The successive stages of life – education, work and retirement – will disappear.

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## 1. LITERATURE REVIEW

Adult education, also known as non-vocational or non-formal education, covers learning and training programs aimed at acquiring new knowledge, skills and qualifications after completing formal education.

In scientific studies, the topic of adult education and lifelong education was studied by Şavga (2022), Savga and Liviçhi (2021), Shvindina et al. (2020) and Yu (2023). The role of universities as providers of adult education and drivers for achieving Sustainable Development Goal 4 is discussed by Artyukhov et al. (2021), Liuta et al. (2021), Pudryk et al. (2023), Şavga and Liviçhi (2022).

Savga and Liviçhi (2021) emphasize the important role of a university environment with the necessary skills and resources, as well as experience in initial and continuing professional training programs in promoting lifelong learning and adding value to the opportunities offered.

The impact of adult education on economic indicators is described by Vorontsova et al. (2020), Volk et al. (2022), and Vidic (2022). They focus on the need for economic policy in the field of adult education, which introduces adult education into the functioning of the economic mechanism, since earlier adult education was not considered by scientists as an economic good.

Koibichuk et al. (2022) emphasize that adult education increases the competitiveness of workers. Adult education enables workers to update their skills and knowledge or acquire new knowledge, making them more competitive in the labor market. Improving the skills of adults contributes to employment, higher wages and career growth.

Among other reasons, today there is generally accepted empirical evidence that the main cause of rising inequality is a change in the structure

of labor demand. Demand has shifted from unskilled and semi-skilled workers to highly skilled (and highly paid) workers. As Safarov et al. (2022) write, these changes in demand outpaced changes in supply in the same direction. Changes in demand are often driven by skill-based innovations, where products are produced more efficiently using a greater proportion of skilled and unskilled labor than before. Thus, the replacement of skilled labor occurs across sectors rather than primarily reflecting the decline of less skilled sectors. To a large extent, these technological changes are due to the spread of information and communication technologies and are not limited only to the services sector (Safarov et al., 2022).

Many studies are devoted to financial literacy, which is part of SDG 4, such as Widiyanto et al. (2022), Muhsin et al. (2023), and Msomi and Nzama (2022). Scientific studies are devoted to the role of financial education as a need for adults.

Surmanidze et al. (2022) note that a relatively low level of financial literacy was indicated; students do not understand that they need to increase their financial education and skills, which makes the current situation even more dramatic.

Bibliometric analysis on the subject of the relationship between adult education and economic indicators was carried out also by Koibichuk et al. (2022) and Strielkowski et al. (2022). It was found that the researchers focus on funding educational innovation of business companies, and financial regulation was targeted on topics such as tax, monetary, budget, and investment instruments.

Considering that adult education develops a person, the consequence of such education is to support innovation and economic growth. Educated adults play an important role in the creation and diffusion of innovation for sustainable development of a country. They can contribute to productivity and

entrepreneurship development by bringing new ideas, technologies and practices to various sectors of the economy (Nohut & Balaban, 2022).

Also, adult education provides opportunities for retraining people who have lost their jobs or need to change their career path. In this way, they can adapt to changes in the labor market and fill vacancies in areas where the demand for labor is increasing (Oliinyk et al., 2020).

One of the few, Melnyk et al. (2021) consider adult education as a part of achieving SDG 4 and write that adult education is also a factor supporting personal development, which is part of SDG 4. It contributes to personal development, self-realization and development of creative potential. This can have a positive impact on people’s motivation, job satisfaction and overall well-being, as well as influence the economic productivity of society.

As Mujtaba and Meyer (2022) note, adult education can be a tool for social integration and reducing inequality on the way to achieve SDG 4. It contributes to the development of the human capital of society as a whole, providing opportunities for people from different social groups and strata of the population to get an education and improve living conditions (Mujtaba & Meyer, 2022).

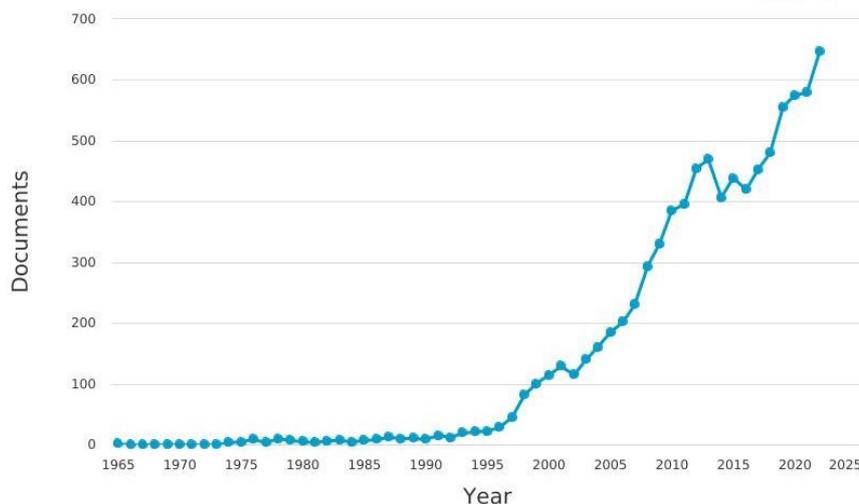
The purpose of the article is to determine the main directions for justifying the lifelong learning system development, including for achieving the goal of sustainable development 4 (SDG 4).

## 2. METHODS

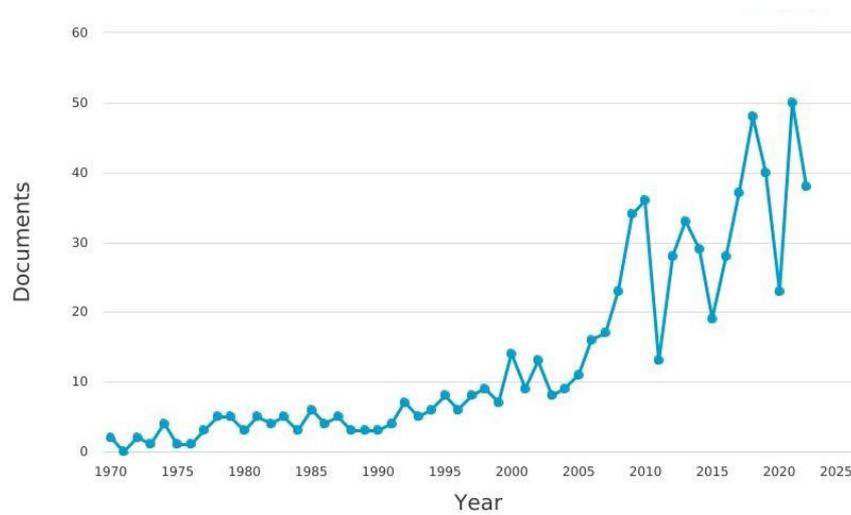
Quantitative data on publications from the Scopus database, as well as analytical and graphic materials from there, were used for bibliometric analysis. The operator “AND” was applied between the keywords. To visualize the results, the VOSviewer software was used. Keywords such as “SDG 4”, “sustainable development goal 4” and “adult education”, “lifelong learning”, “economic” were taken for quantitative and qualitative analysis in the publications. The number of articles to the combinations with “SDG 4” was about 300, where the bibliographic analysis in the Scopus database showed that 7,970 scientific studies were separately found under the keyword “adult education”, and 13,515 scientific works were found under the keyword “lifelong learning. For the visual research, using the VOSviewer software, a group of scientific studies was selected based on the keywords “lifelong learning” and “education”, namely 8,848 scientific works at the time of this study.

## 3. RESULTS AND DISCUSSION

Adult education as a resource in social development to ensure the SDG4 has not yet been sufficiently mastered by the national economy, underestimation of its potential at the regional and national levels can hold back economic development.



**Figure 1.** Dynamics of the number of scientific papers for the keywords “lifelong learning” and “education”



**Figure 2.** Dynamics of the number of scientific papers for the keywords “adult education” and “economic”

Continuing the research, it was hypothesized that adult education is a component of the economic mechanism of the lifelong education system and committed to SDG 4.

Figure 1 shows that the first mentions of lifelong learning and education were already in 1965, and the growth began in 1995, and the increasing trends in the number of scientific works in this field continue to this day.

Since the research is also based on the economic aspect of adult education, the trends in scientific studies of the Scopus database were checked using the keywords “adult education” and “economic”. On the graph it can be seen, that the growth trends also began in the 1990s, a sharp jump was observed between 2000 and 2005, and growth is observed even today. This speaks of research that

combined not only adult education from a pedagogical and organizational point of view, but also from an economic point of view (Figure 2).

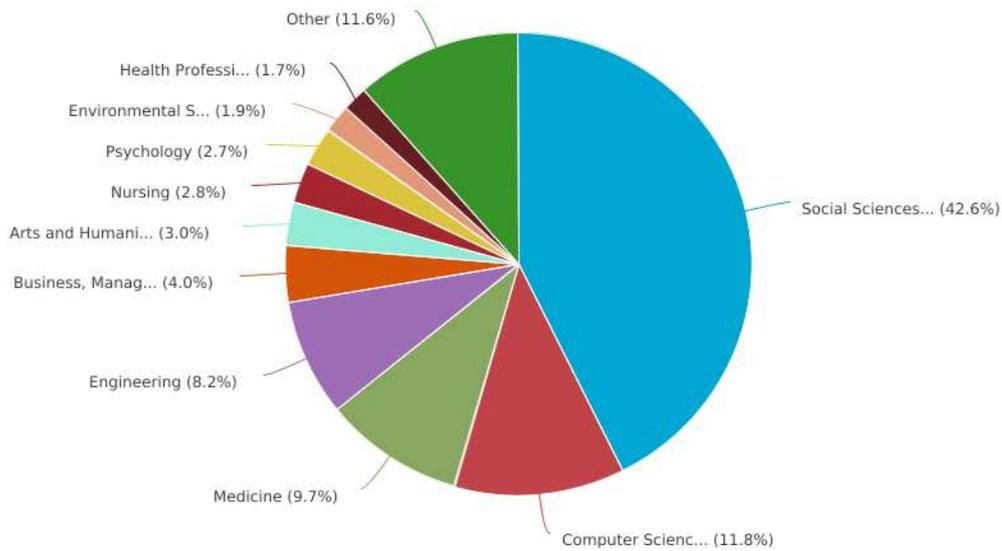
For the analysis of scientific research within the framework of sustainable development goal 4, the study was conducted on the Scopus database using the keywords presented in Table 1. The study was divided into two vectors, as the results differ by keywords and combinations: “SDG 4” and “sustainable development goal 4”.

As Table 1 shows, studies devoted to Sustainable Development Goal 4 say little about lifelong learning, although the formulation of Sustainable Development Goal 4 is aimed at adult education as well. And in practice, it turns out that issues of formal, university, school education are investigated, but not adult education. On average, this is

**Table 1.** Number of scientific publications by keywords

Source: Scopus database.

Keyword combination	Number of publications	Keyword combination	Number of publications
“Sustainable development goal 4”	194	“SDG 4”	382
“Sustainable development goal 4” AND “lifelong learning”	45	“SDG 4” AND “lifelong learning”	38
“Sustainable development goal 4” AND “adult”	16	“SDG 4” AND “adult”	23
“Sustainable development goal 4” AND “adult education”	4	“SDG 4” AND “adult education”	6
“Sustainable development goal 4” AND “adult learning”	2	“SDG 4” AND “adult learning”	2
“Sustainable development goal 4” AND “economic”	27	“SDG 4” AND “economic”	94
“Sustainable development goal 4” AND “economic” AND “lifelong learning”	8	“SDG 4” AND “economic” AND “lifelong learning”	10



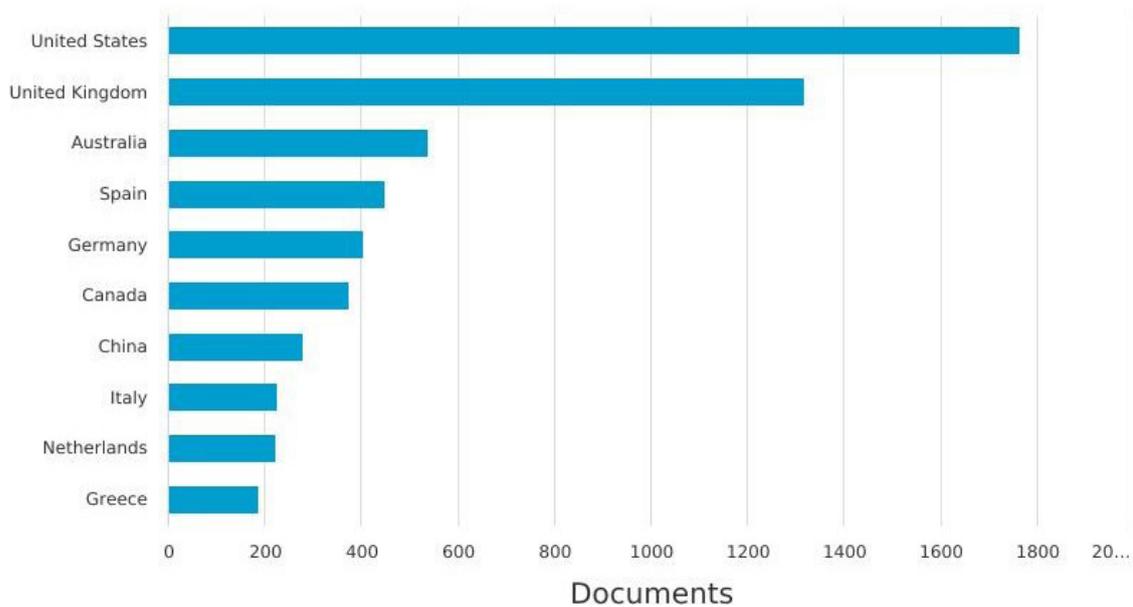
**Figure 3.** Spheres of publications on the topic of lifelong learning

one fifth of studies. And if we talk about research that combines economics and adult education, then the number is quite small (Table 1).

The largest share is scientific works in the field of social sciences, followed by the computer science sector, and the third place is occupied by the medicine sector (Figure 3).

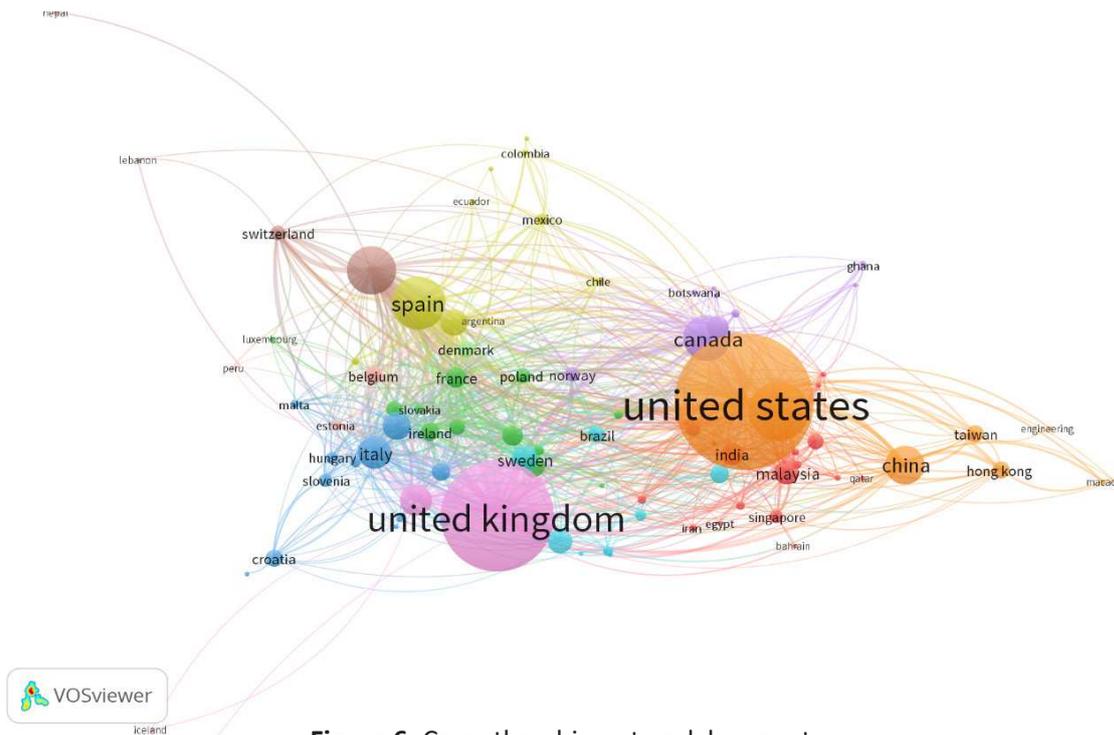
Among the countries that have published scientific research on this topic, the USA, Great Britain, and Australia are leading. Germany takes 5th place, while Greece closes the top ten (Figure 4).

Many companies and organizations in the USA actively invest in the professional development and education of their employees. Germany attaches great importance to vocational training for adults. The two-tier education system allows workers to combine vocational school education with on-the-job training programs to obtain professional qualifications. And in Greece, innovations are already being implemented (Nahla, 2023). An innovative project that offers working people the opportunity to obtain higher education in an online format is the Open University of Greece. It offers a wide range of courses in various disciplines, includ-



**Figure 4.** Top 10 countries by the number of publications on lifelong learning





**Figure 6.** Co-authorship network by country

The UK has the second largest number of co-author countries, while China has the third largest co-authorship network. The UK has a recognized Open University specializing in distance learning for adults. This university offers flexible learning opportunities through online courses, allowing adult students to learn in their own time and at their own pace. In Great Britain, the concept of “third-age universities”, specializing in education for pensioners and the elderly, is becoming more and more widespread. Such universities provide an opportunity for older people to continue their education, acquire new knowledge and develop their interests (Khushk et al., 2022).

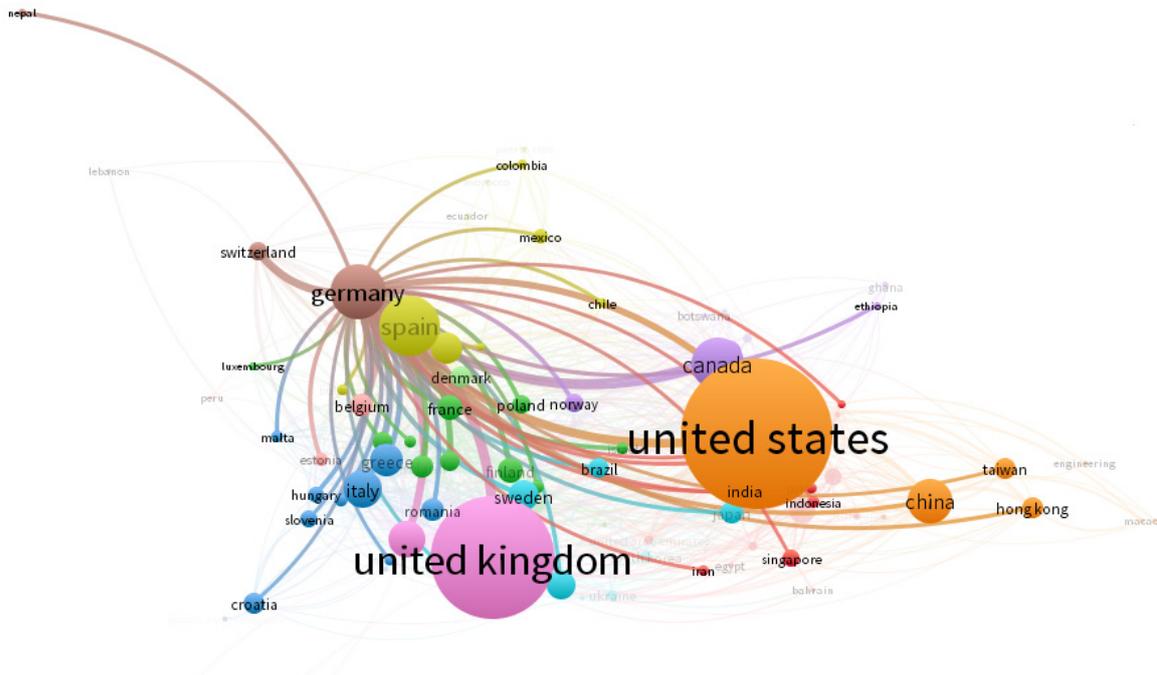
In Finland, education in public schools and universities is free regardless of age. Thus, all citizens have access to education. Finland offers a wide range of educational programs for adults, including vocational training, higher education and evening schools (Salisu, 2022). Many Finnish companies and organizations actively support professional training for their employees. This includes vocational training, courses and seminars aimed at improving skills and gaining qualifications. Finland has a large number of educational institutions offering adult education programs (Widagdo & Sa’diyah, 2023). This allows students to independently choose the educational institution and

program that best suits their needs. The Finnish government actively supports life-long learning by providing financial assistance and scholarships to adult learners. It encourages learning and skill development among all segments of the population. Finland actively uses modern technologies in the educational process: e-courses and distance learning allow students to study at a convenient time and in any place (Ievdokymov et al., 2020).

Among the countries with which Finnish authors have co-authored are authors from Germany, Canada, Australia, that is, we can say that the geography of the publications covers research from all over the world (Figure 7).

China’s life-long learning system includes a variety of educational programs that enable adults to acquire knowledge and skills throughout their lives. Thanks to the development of technology, distance learning is becoming increasingly popular in China, allowing adults to acquire education and skills through the Internet and electronic platforms (Kuznyetsova et al., 2022). This made it possible to study at a convenient time and in any place. One of the main characteristics of the Chinese adult education system is the emphasis on practical skills and the application of knowledge in real life and the professional field. The training





**Figure 9.** Germany co-authorship map

groups of adults and offer courses in general education, languages, computer technology, art and sports (Samoilikova et al., 2022).

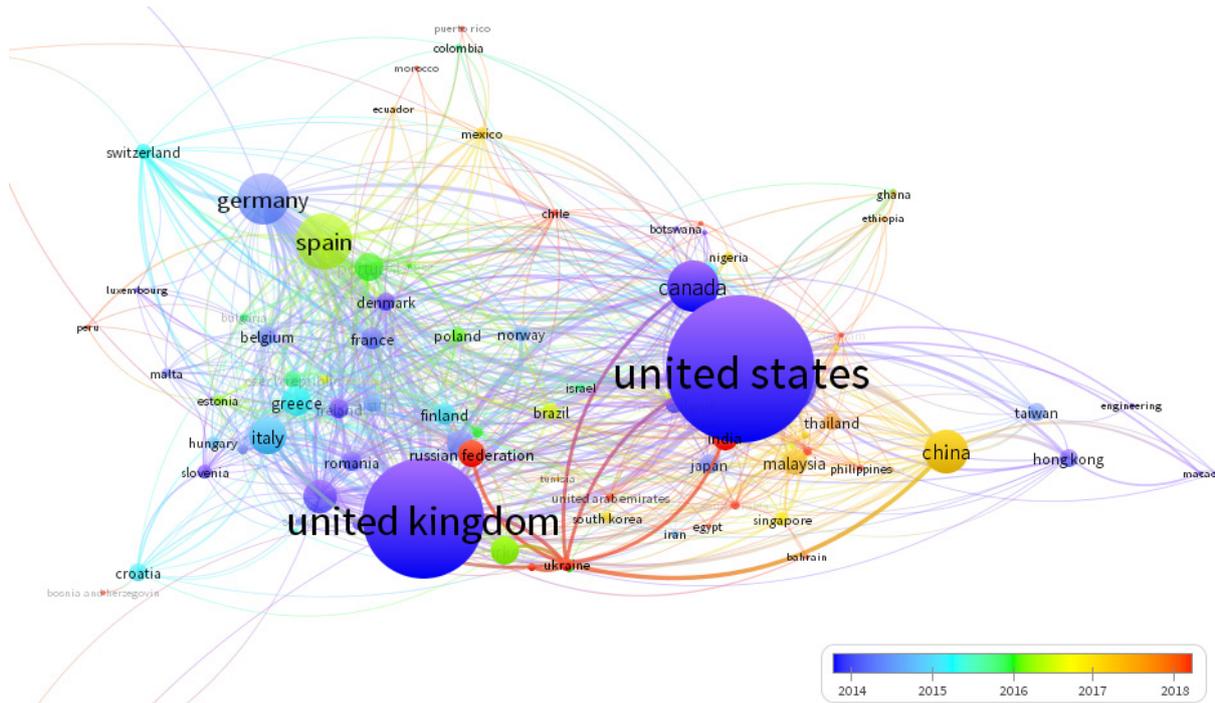
Poland also has active relations with other European countries, America and some Asian countries. The Polish government actively supports the adult education system through financial support and regulatory acts (Williams et al., 2023). This includes various scholarship programs and financial assistance for adult students who wish to continue their education. In Poland, there are higher education institutions for adults (Wyższe Szkoły Edukacji Dorosłych) specializing in adult education. These institutions offer a variety of curricula and courses tailored to the needs of adult learners (Kaya et al., 2023).

Romania’s partner countries also include European countries, as well as Asian countries and America, Malaysia. In Romania, there are special educational programs and projects aimed at adult education for vulnerable population groups such as the unemployed, the poor and migrants (Skrynnyk et al., 2022). These programs are designed to ensure equal opportunities for all groups and promote inclusion in the adult education system. Recognizing the importance of lifelong learning, Romania is actively working to develop and improve access to adult education, promoting

flexible and innovative forms of learning to meet the learning and development needs of different groups of adults (Stavrova, 2022).

For a detailed study, a chronological study of ties of co-authorship of Ukraine in a time section was carried out. As shown, Ukraine has a network of connections with America, Great Britain, China and other countries. The co-authorship with America and Great Britain was established before 2010, and co-authorship with countries such as China and India have been developing since 2018 (Figure 10).

Ukraine also committed itself to the development of lifelong education by signing the Association Agreement with the EU, and the concept of “adult education” was first introduced into the Basic Law on Education. However, to date, questions remain regarding the realization of the right of every adult to life-long learning, the availability of different adult education programs to meet the needs of all population groups, and the equality of adult education providers, especially with regard to access to funding from the state budget. In addition, there are no statistics on the number of people seeking adult education, the number of educational institutions offering adult education services, or the available training programs (Petrushenko et al., 2022).



**Figure 10.** Time map of co-authorship of Ukraine

Public institutions, especially sectoral ones, which would seem to be completely autonomous in determining the content of adult education and adult education programs, are forced to take into account national and international policy trends and the requirements of different categories of applicants. Public sector educational institutions receive budgetary funding only episodically, which may negatively affect the sustainability of their systems in the long term. On the other hand, public funding (mainly based on state and municipal procurement) is mainly given to industry providers such as postgraduate institutions and higher education centers (Kuzior et al., 2023). As a result, the state policy in the field of adult education in Ukraine is unbalanced, which leads to the almost natural formation of two separate systems of providing educational services – branch institutions and independent non-governmental organizations with unequal conditions of access to funding, especially from the state and local budgets.

Considering the results of the study, namely, that the topic of economic policy in the field of adult education has a low level of research, it is worth saying that economic policy of lifelong education includes various components that contribute to. Its main components are budget financing, market financing, regulation, infrastructure, and sup-

port programs. But the majority of scientists still consider economic policy as a need in the adult education system, and do not propose any specific actions in this direction.

Some countries already have a complete economic mechanism and economic policy to support adult education within the framework of the Sustainable Development Goals, namely SDG4. Such countries are flagships in adult education and they have the most publications, these are America, Germany, Great Britain. However, it is worth noting that the number of studies that include both economic policy, adult education, and SDG 4 is very small compared to studies that only include adult education. And such studies consider adult education more as a social phenomenon and analyze adult education exclusively from a pedagogical or organizational point of view, but not from an economic one. Only since 2010, scientists began to talk about the fact that adult education is an investment in human capital, that is, in the country's economy. Perhaps this is related to the technological leap and the fact that a person has to update his knowledge every 3-5 years in order to stay in the workplace and meet the needs of the labor market. This will require a large-scale program of (re)education of adults.

Strong incentives to invest in lifelong learning are not sufficient to encourage such investment if participants do not have access to financial resources. The search for financial resources requires considering the interdependencies between investments made at different stages of the life cycle, and also it requires the proper economic policy in this field. There are limitations to practical intervention. This is because the bulk of primary education is publicly funded, while the bulk of lifelong education is privately funded.

In general, investment in adult education is strategically important because it contributes to human capital development, social development and sus-

tainable economic progress. But there are various arguments against investing in adult education. This is what maybe stops the process of development of the lifelong learning system to achieve SDG4.

Adult education is a complex process and its outcomes can be uncertain or mixed. Some scientists argue that investment in adult education does not always produce immediate results or increase productivity. Some note that adult education should be the responsibility of the individual. They may believe that people should find their own resources and opportunities for further education, and not rely on the state or society.

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## CONCLUSION

The aim of this article was to analyze the main directions for justifying the lifelong learning system development, including for achieving the goal of sustainable development 4 (SDG 4).

In the process of the study, the following meaningful clusters were selected, which consider education from different angles and thus show the meaningful connection between the main studies in this field: adult education as part of life-long education; adult education under the influence of physical and age-related changes; adult education as part of professional education; the learning process, which is not related to professional activity.

Among studies on adult education and lifelong learning, only about 3% are related to sustainable development goal number 4. However, the number of studies is on the rise, which suggests that the sustainable development goals are becoming an increasingly traditional tool used by academics to evaluate effectiveness educational processes.

Among all scientific studies, only about 9% are dedicated to the economic justification of adult education, with most of them justifying the need for economic policy in the field of education more than proposing specific measures. But the researchers still mostly consider lifelong education as a social good.

Thus, it can be noted that the introduction of changes in economic policy to ensure SDG 4 requires additional research on this topic, which is still lacking. More attention should be devoted to the concept of adult education within the framework of Sustainable Development Goal 4, as it turns out that the Sustainable Development Goal 4 formulates education for youth and adults, and a bibliometric analysis in the Scopus database showed a large gap in research devoted to educating adults to ensure sustainable development goal 4.

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Writing – review & editing: Kateryna Onopriienko, Tetiana Vasylieva.

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