

*The object of this study is the dominant forms of investment capital and their convergence according to the stages of development of socio-economic systems. Any evolution has certain stages. The development of socio-economic systems is no exception. All processes and phenomena in the world, including development, occur cyclically and are interconnected with the stages of natural, social, and economic processes. According to the theory of economic cycles, such phenomena as the development of the socio-economic system, its crisis and innovations have a close relationship. Industrial revolutions became a vivid example of changes in the socio-economic development of complex systems. One of the main sources of financing for each stage of the industrial revolution is investment capital, which can be part of industrial, private, financial, banking, or intellectual capital. Depending on the signs of social relations, social system, etc. can take their forms.*

*Each of the stages of the industrial revolution is preceded by appropriate conditions that are associated with certain historical conditions at a specific moment in time. Considering the dominant forms of investment capital according to the stages of the industrial revolution, the reasons for their change should be noted. The process of convergence of investment capital is considered here.*

*One of the indicators that characterizes the efficiency of investment capital is its mobility or immobility. A number of macroeconomic factors affect the mobility of investment capital.*

*Considering the world structure of direct foreign investments, the main directions of their utilization have been indicated. The model of the convergence of the dominant forms of investment capital in the logistics system is presented in accordance with the stage of the industrial revolution and the features that accompany it*

*Keywords: capital convergence, investment capital, industrial revolution, capital mobility, system development*

Received date 06.12.2023

Accepted date 08.02.2024

Published date 28.02.2024

**How to Cite:** Prokhorova, V., Mushnykova, S., Zaitseva, A., Gavrysh, O. (2024). Convergence of dominant forms of investment capital in the development of socio-economic systems. *Eastern-European Journal of Enterprise Technologies*, 1 (13 (127)), 122–130. doi: <https://doi.org/10.15587/1729-4061.2024.299127>

UDC 330.341

DOI: 10.15587/1729-4061.2024.299127

# CONVERGENCE OF DOMINANT FORMS OF INVESTMENT CAPITAL IN THE DEVELOPMENT OF SOCIO-ECONOMIC SYSTEMS

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## 1. Introduction

Depending on the social system, social relations are in constant motion and affect the socio-economic development of a separate business entity, a separate country, and the world economy as a whole as complex system. Antagonism between the versts of society reveals differences in relations between different social groups, which, in turn, leads to crisis phenomena in society. Specifically, crises, as noted by the classics of economic thought, are a starting point, a point of bifurcation, an impetus for development through the implementation of innovative measures in any field of socio-economic relations.

Each of the industrial revolutions arose on the wave of radical innovations and caused the introduction of innovative measures. These are interconnected processes that are the driving force behind the structural modernization of the

world economic system. They enrich it with qualitatively new technical and technological and innovative components. And although the social demand for this kind of radical innovation appears mainly in periods of socio-economic crises, the life cycle of each industrial revolution continues as long as its qualities are preserved.

A necessary condition for the emergence and evolution of market relations is the accumulation and redistribution of capital, which is accompanied by the investment of funds in various sectors of the economy. However, the current conditions of the development of both the world and domestic economies, which are caused by the influence of the global financial crisis, require a study of the peculiarities of the movement and redistribution of resources.

The active implementation of innovative technologies in various domains of economic relations requires the involvement of significant amounts of capital, which predetermines

the construction of systems and mechanisms for the redistribution of investment resources. But under the conditions of Industry 4.0, investment capital is not only financial and bank investments. Human, intellectual capital plays a significant role in the development of socio-economic systems, in the implementation of innovations and the latest technologies under modern conditions. Individuals with a certain list of knowledge, skills, and competencies come to the fore. Under such conditions, the invested capital is under the influence of powerful transformational processes that change scientific approaches to determining its essence and characteristics, the ways of capital movement change. One of these scientific approaches is the determination of the movement of dominant forms of capital through the logistics system.

Therefore, research into convergence of the dominant forms of investment capital in terms of the development of socio-economic systems, under modern business conditions and in the future, is quite relevant.

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## 2. Literature review and problem statement

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A thorough study of the evolution of the development of industrial revolutions, their causes and consequences is reported in works [1, 2]. Having analyzed a large number of primary sources, the author of [1] summarized the main characteristics of each of the periods of industrial revolutions, and clearly determined their duration. The features of each of the industrial revolutions were the emergence and implementation of the latest technologies, techniques, etc. in one or another branch of industry. Moreover, as noted in study [2], implementations take place in the wake of socio-economic crises, under the influence of many factors. But, as the studies by many scientists confirm, the duration of each of the periods of the industrial revolution is quite conditional, as are the concepts of "industrial revolution" and "period of industrial revolution".

Implementation of every innovation is impossible without financial support, investments, investment capital. Issues related to forms, types of investment capital, types of financial flows are widely studied by various scientists and researchers not only in domestic but also in foreign practice [3]. In studies [4, 5] attention is focused on determining the goal, the value of financial resources, their purpose, obtaining income from the effective use of possible financial flows, etc. But at each stage of the industrial revolution, due to many factors, including social political, there are specific conditions and forms of placement of investment capital. Such issues have not been addressed by scientists.

Recently, the convergence of various processes, such as mergers, unifications, etc., has been widely considered among scientists. Thus, in study [6], attention is focused on the convergence of innovative educational technologies as the basis of a human-centered economy. In work [7], convergence is noted as a phenomenon of socio-economic development. While providing general concepts, principles of the convergence process of the development of socio-economic systems, the study does not specify individual aspects of their activity.

Using the example of Poland through the process of convergence, the economic model of Ukraine is proposed in [8]. It can be seen that all these works have different orientations, starting with a general theoretical economic orientation, continuing with specific conditions and direc-

tions of development of socio-economic systems. Scientists are interested not only in the issue of financial support for innovative projects but also in the allocation of dominant forms of investment capital under different economic conditions. Under various conditions, issues of insufficient use of one of the forms of investment capital arise. Therefore, the authors consider the convergence of dominant forms of investment capital at various stages of the development of socio-economic systems.

Logistics, as a process of optimizing the solution of certain management decisions, is engaged in by scientists from all over the world. Their research concerns the search for optimal ways of transporting goods, the best directions for making management decisions, etc., but within the limits of one enterprise, a set of enterprises, a separate region. In general, logistics can be perceived as a universal science [9]. Within the scope of this study, logistics is used as a process capable of optimizing the movement of dominant forms of investment capital between various market subjects within a certain stage of development of the socio-economic system. While the introduction of innovations at a separate stage of the industrial revolution should be considered as a logistics system [4, 5], which has certain subjects, objects, the movement of investment capital in its individual forms is a logistics subsystem.

From the review of the literature, it appears that the issue of combining such provisions as determining the dominant forms of investment capital according to the stage of the industrial revolution through the process of convergence can be defined as unresolved. Also, consideration of the movement of dominant forms of investment capital within a certain stage of development of the socio-economic system as a logistics subsystem remains one of the issues.

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## 3. The aim and objectives of the study

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The purpose of our study is a theoretical generalization of the process of convergence of dominant forms of investment capital according to the stages of development of socio-economic systems. This will make it possible to determine the main direction of the development of the socio-economic system.

To achieve the goal, the following tasks were set:

- to determine the stages of development of socio-economic systems, their main features and changes in dominant forms of investment capital;
- on the basis of statistical information, to analyze the goals and directions of the movement of investment capital, personal direct foreign investments;
- to propose a model of convergence of dominant forms of investment capital.

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## 4. The study materials and methods

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The object of our study is the dominant forms of investment capital and their convergence according to the stages of development of socio-economic systems.

The hypothesis of the study assumes the possibility of generalizing the basis of the change of the dominant forms of investment capital with the justification of the model of their convergence according to the stages of development of socio-economic systems.

The study of the stages of development of socio-economic systems and their main features is possible through the use of methods of theoretical generalization, comparison, and logical-structural analysis.

When substantiating the convergence of the dominant forms of investment capital and their changes according to the stages of development of socio-economic systems, the methods of historicism, comparison, synthesis, and theoretical generalization are involved.

Given the use of mathematical methods, methods of theoretical generalization, analysis of actual data, a characteristic is provided with the selection of features, advantages, and disadvantages of the use of the indicator of the mobility of investment capital, the goals and directions of the movement of investment capital are analyzed.

As a process of convergence, a combination of different forms of investment capital, a model of the convergence of their dominant forms is built and substantiated owing to the methods of comparison, synthesis, theoretical generalization, etc.

## 5. Results of research into the process of convergence of dominant forms of investment capital

### 5.1. Results of investigating the stages of development of socio-economic systems and changes in dominant forms of investment capital

All processes and phenomena in the world, including development, occur cyclically and are interconnected with the stages of natural, social, and economic processes [1, 7, 10, 11]. According to the theory of economic cycles, such phenomena as the development of the socio-economic system, its crisis and innovations are closely interrelated. Research areas are expanding within the framework of proving different orientation, duration, objectivity, and subjectivity of economic cycles and under the influence of crises on revolutionary transformations of all levels of the economy. Industrial revolutions became a vivid example of changes in the socio-economic development of complex systems. The relative conventionality of the use of the in-

terpretation of the “industrial revolution” and the periods of their implementation makes it possible to determine the dominant forms of capital, owing to which a specific period took place (Table 1).

One of the main sources of financing for each stage of the industrial revolution is investment capital, which partially or fully transfers its value to the value of the finished product (work, service). Investment capital can be a part of industrial, private, financial, banking, or intellectual capital. Depending on the signs of social relations, the social system, and other factors, it can take their forms. The form of investment capital also takes the form of loan capital, which is provided for use for a specified period at a specified interest rate.

Considering the dominant forms of investment capital according to the stages of the industrial revolution, the reasons for their change should be noted. Each of the stages of the industrial revolution is preceded by appropriate conditions, which are associated with certain historical conditions, conditions of the socio-political system, antagonisms between the versts of society at a specific moment in time.

The main causes of innovation and the birth of industry led to the first industrial revolution. This period is characterized by a feudal social and political system, the absence of bank capital, and a small level of loan capital. In these conditions, private capital became the dominant form of investment capital, which led to the accumulation of material resources and monetary resources among the owners of industrial enterprises.

The second industrial revolution takes place in the wake of a political crisis against the background of the collapse of empires and the emergence of nation states. With the change of the political system, new sectors of national economies are also formed. Radical industrial, technological, and technical changes were marked by structural changes in the dominant form of investment capital towards an increase in the share of industrial capital. Due to the low level of competition, the increase in value at this time occurs mainly due to operational processes, which leads to limitations of prospective development.

Table 1

Distribution of dominant forms of investment capital in accordance with the stages of development of socio-economic systems

Period	Industrial revolution	Signs of the industrial revolution	The dominant form of investment capital	Characteristic causes of occurrence
The second half of the 18 <sup>th</sup> and the first half of the 19 <sup>th</sup> centuries	The first industrial revolution or Industry 1.0	The birth of industry in England, and later throughout Europe; innovations in industry; displacement of English peasants from the lands	Private capital	Accumulation of material resources and funds from the owners of industrial enterprises; simple playback
The end of the 19 <sup>th</sup> – the first half of the 20 <sup>th</sup> century	The second industrial revolution or Industry 2.0	Radical structural changes in the energy and material-resource base of the industrial economy; formation of qualitatively new sectors of the national economies of countries	Change in the structure of investment capital towards industrial capital	Low level of competition; operational processes of value addition; limited prospective development
The second half of the 20 <sup>th</sup> – the beginning of the 21 <sup>st</sup> century	The third industrial revolution or Industry 3.0	Active industrialization, spread of electronic and information technologies; space research; automated control systems	Convergence of industrial, financial, and banking capital	Material-, energy- and capital-intensive industrial production; advanced playback
The first quarter of the 21 <sup>st</sup> century.	The fourth industrial revolution or Industry 4.0	Signs of post-industrialization with the rejection of traditional industrial technologies; spread of electronic technologies and management tools; the first signs of neo technologies with the spread and rapid development of artificial intelligence	Convergence of intellectual, financial, and banking capital	The value of intellectual capital through the acquisition of knowledge, skills, and competencies comes to the fore

The rapid breakthrough of industrialization and the formation of civil society created the conditions for the emergence of the third industrial revolution. The introduction of material-, energy- and capital-intensive industrial production should not be limited to the use of only industrial investment capital. Development and expanded reproduction require the involvement of both financial and banking investment capital. Achieving one goal, namely ensuring the sustainable and safe development of industry on mutually beneficial terms, should be the construction of a dominant form through the convergence (merger, convergence, combination) of industrial, financial and banking investment capital.

In the post-industrial society, the characteristic features of which are characteristic of the fourth industrial revolution, knowledge-intensive, resource-saving and information technologies, so-called “high technologies”, are gaining the greatest development. A person with appropriate qualifications becomes the main resource. Only by improving the quality of education, increasing investment capital in a person, and increasing the consumption of educational services, investments in human health, etc., it is possible to achieve a personality that meets all the specified requirements. Qualification of workers becomes the main means of production. The value of intellectual capital through the acquisition of knowledge, skills, and competencies comes to the fore. Due to the convergence of intellectual, financial, and banking investment capital, it is possible to achieve the specified goal.

Thus, the convergence of investment capital can be defined as the process of convergence, interpenetration and, sometimes, integration of cash flows with a positive effect from its use [6, 12, 13, 14].

The main advantages of converged solutions include:

- broad opportunities for investment capital mobility;
- increasing the efficiency of the use of forms of investment capital through their integration;
- maximum use of opportunities of each form of investment capital in achieving a single goal;
- implementation of an economically efficient logistic model of capital movement with increased profits and lower cost.

### 5.2. Analysis of goals and directions of movement of investment capital according to the stages of development of socio-economic systems

One of the indicators that characterizes the efficiency of investment capital is its mobility or immobility. The level of investment capital is determined by the need for physical capital (fixed assets, software, people, etc.). Therefore, most often, investment capital represents

financial and/or short-term banking capital as a movement of cash flows or other liquid assets. The economic etiology of the mobility of investment capital as a socio-economic process with the definition of factors influencing it can be represented schematically (Fig. 1).

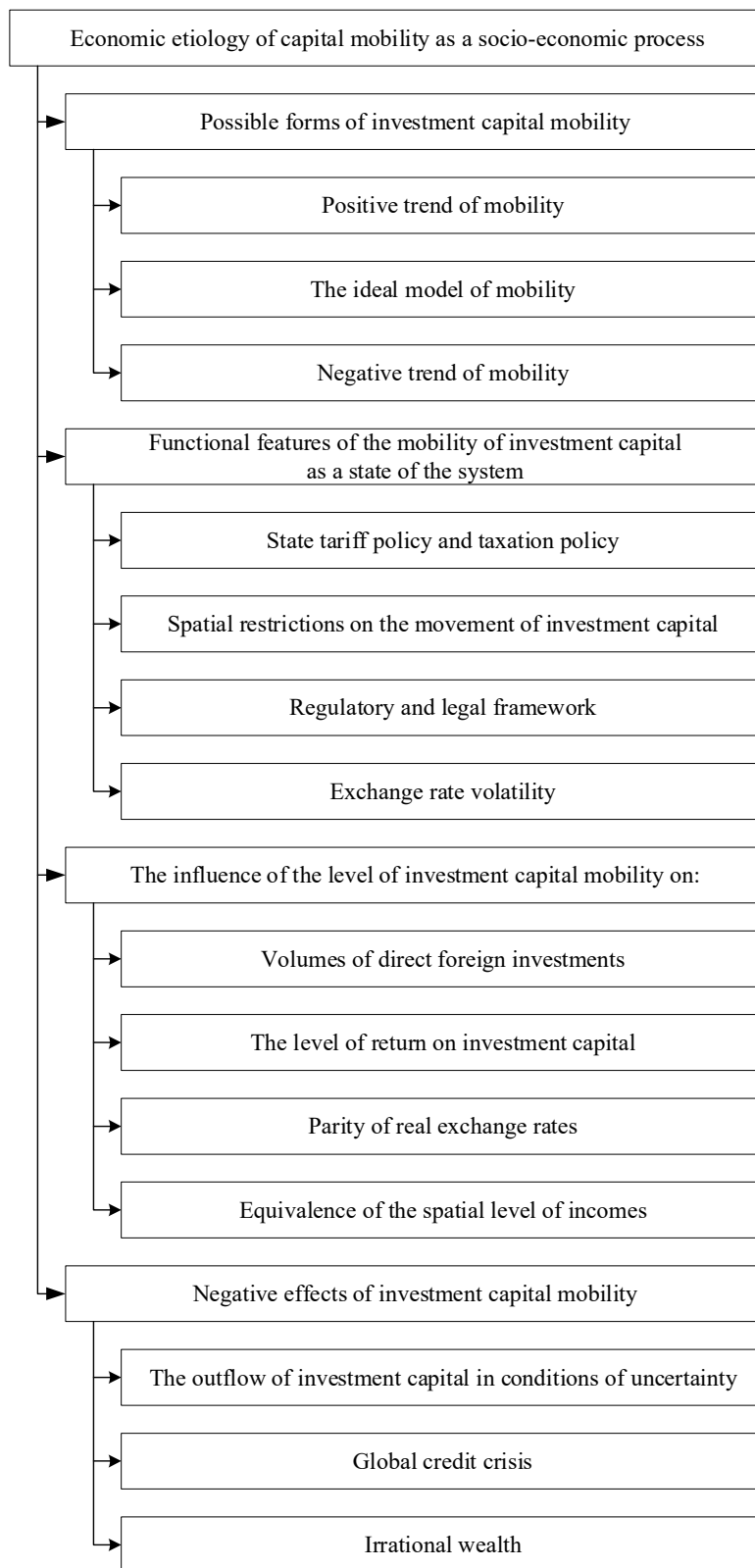


Fig. 1. Economic etiology of the origin of investment capital mobility as a socio-economic process

The origin of the mobility of investment capital as a socio-economic process can be considered in several aspects.

From the point of view of possible forms of the state of mobility of investment capital, the following are considered:

- a positive trend of mobility, as a high level of activity regarding the movement and change of location of investment capital in the socio-economic environment;
- an ideal model of mobility, the implementation of which does not require any costs under the conditions of any change in the location of investment capital in a spatially dynamic socio-economic environment;
- the negative trend of investment capital mobility implies significant financial and logistical costs.

The level of mobility of investment capital is constantly under the influence of state and international movement restrictions. Therefore, the functional features of the mobility of investment capital as a state of the system include such components as:

- state tariff policy and taxation policy, i.e., certain restrictions on the flow of investment capital due to the high level of taxes, which will hinder the inflow of capital;
- spatial restrictions on the movement of investment capital, which characterize the limitation of the inflow or outflow of investment capital between certain countries;
- thanks to separate legal acts, the governments of countries can set restrictions that lead to an increase in the cost of moving investment capital from one country to another;
- the volatility of the exchange rate is an indirect influencing factor. If a country has a volatile exchange rate, this can discourage capital inflows, as investors are concerned about exchange rate devaluation, which lowers investment returns.

On the other hand, the level of investment capital mobility is a factor influencing:

- volumes of direct foreign investments, which may change significantly. As the level of investment capital mobility increases, its inflows into the country and investment opportunities abroad increase;
- the level of profitability of investment capital. As a result of improved mobility of investment capital, it is easier to move financial capital to obtain higher returns and interest rates;
- parity of real exchange rates. The increase in the mobility of investment capital contributes to the reduction of the difference in real exchange rates;
- the equivalence of the spatial level of income is possible with ideal mobility of investment capital, which can encourage European firms to invest in developing countries with lower wage rates. It is this influx of investment capital that can help raise wages in developing countries.

Probable and negative effects of the mobility of investment capital, namely:

- the outflow of investment capital under conditions of uncertainty, which is associated with an increase in the risks of its placement, and may lead to the loss of jobs and an increase in the level of unemployment;
- global credit crisis. As evidenced by the world experience regarding the consequences of crises, cash flows of investment capital helped to ensure an increase in the level of liquidity and a decrease in the interest rates of bank capital. But as a result of the financial crisis, there was a “domino effect” with a chain of banks all over the world that became bankrupt;
- irrational wealth, the negative impact of which is directly related to the previous impact factor, namely, on the eve of the global financial crisis, there was an increase in credit volumes and an increase in global imbalances.

The Mandell-Fleming model is widely used to determine the level of investment capital mobility [15, 16]. The authors of the model mathematically substantiated the assessment not only of the state of mobility of investment capital but also of the state of openness of the economy of a small country to foreign direct investment. The model is based on three equations that characterize the equilibrium: of the commodity market (balance of investment savings) (1); between the demand and supply of money (2) and the country's balance of payments (3). The initial variable components of the model are:

- tax policy of the state with a change in fiscal factors in the direction of increase or decrease ( $T$ );
- elements of monetary policy, such as: price ( $P$ ), interest rate ( $r, r^*$ ), aggregate money supply ( $M$ );
- exchange rate system – fixed or floating:

$$Y = C(Y - T, r) + I(r) + G + CA(q, Y, Y^*), \tag{1}$$

$$C_g, CA_q, CA_y \geq 0,$$

$$\frac{M}{P} = L(Y, r), \tag{2}$$

$$L_y \geq 0, L_r \leq 0,$$

$$CA(q, Y, Y^*) + k(r - r^*) = 0, \tag{3}$$

$$0 \leq k \leq \infty,$$

where  $L$  – demand function for money;

$C_g, CA_g, CA_y$  – variable dependence of private capital on the interest rate and income, respectively;

$k$  – dependence of capital flows on the interest rate difference.

Thus, the consequences of macroeconomic policy depend on capital mobility:

- 1) if  $k=0$  – immobility of capital. This means that the difference in interest rates  $r-r^*$  does not affect the balance of the capital account. In other words, the economy is closed with respect to capital flows;
- 2) if  $k=\infty$  – ideal capital mobility, which is usually assumed for a small open economy, which does not affect the level of the world interest rate.

The difficulty of using the investment capital mobility model (1) to (3) is the need for a large amount of statistical information from different countries of the world. In a better way, a more accurate assessment of the definition of the mobility of investment capital, its evaluation criteria, the application of the model is appropriate when differentiating the countries of the world according to various characteristics, for example: GDP volumes; per capita; area,  $m^2$ ; the number of people, etc. Determination of the level of mobility of investment capital provides opportunities for effective use of forms of investment capital due to their convergence with maximum use of the capabilities of each form of investment capital. In the framework of this study, such a task was not set. But in further research, it is interesting to use this model to determine not only the mobility of the converged form of investment capital but also its modification to determine the level of convergence of investment capital.

The peculiarity of the mobility of investment capital lies in its unrestricted movement within the borders of one country, as well as with an exit (inflow, outflow) to the

international level, other things being equal. Investment capital includes such forms as: foreign direct investment, short-term portfolio cash flows and bank settlements. Based on the results of the UN Conference on Trade and Development UNCTAD and the published report “On Global Investments 2023”, the main directions of formation and use of foreign direct investments were determined (Table 2) [17].

foreign investment is directed to the countries of the European Union, namely: 32 % in 1990, and 42 % in 2000. The share of foreign investment in the United States of America has remained unchanged for ten years, at the level of 23 %. In Great Britain, the volume of foreign investments in the global context decreased from 15 % in 1990 to 8 % in 2000, in the direction of increasing the share of the countries of the

European Union.

Table 2

Movement of foreign direct investment by years (1990–2022) by country

Direct foreign investment	1990	1995	2000	2005	2010	2015	2020	2022
Total in the world, million US dollars	204,888	345,143	1,356,685	954,073	1,393,014	2,056,416	961,983	1,294,731
United States of America	48,422	58,772	314,007	104,773	198,049	467,625	95,882	285,057
United Kingdom	30,461	23,590	115,304	182,928	58,200	39,186	58,237	14,093
including the European Union	65,099	110,995	564,990	297,515	334,958	630,323	115,623	-124,948
Germany	2,962	12,024	198,279	47,450	65,643	20,340	56,204	11,053
France	16,506	23,562	27,495	33,229	13,890	45,365	11,359	36,413
Netherlands	11,063	11,724	63,855	39,047	-7,184	175,988	-86,507	-67,340
Italy	6,345	4,817	13,375	23,291	9,178	19,635	-23,622	19,947
Sweden	1,971	14,448	23,433	11,516	97	5,235	21,514	45,963
Poland	88	3,658	9,445	8,203	12,796	15,271	15,195	29,462
Slovakia	93	2,587	2,720	3,110	1,770	106	2,404	2,905
Ukraine	0	267	595	7,808	6,495	-331	-36	848

As evidenced by the results given in Table 2, during the last thirty years, the total global volume of foreign direct investment fluctuated within constant limits. The lowest volume of foreign direct investment in the world was observed in 1990 (USD 204,888 million), the largest in 2015 (USD 2,056,416 million).

The movement of direct foreign investments by year and by country can be observed from Table 2, and the global structure of the distribution of direct foreign investments – Fig. 2–5.

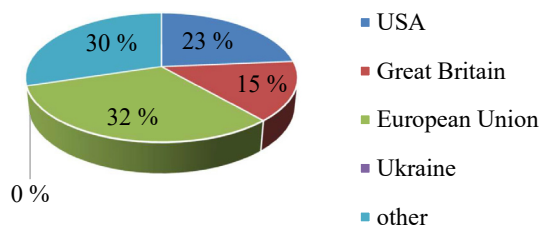


Fig. 2. World structure of foreign direct investment in 1990, % [17]

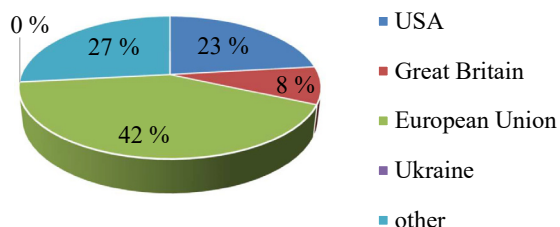


Fig. 3. World structure of foreign direct investment in 2000, % [17]

Using the example of four years during the last thirty years, it is possible to trace the change in the structure of direct foreign investment around the world. Based on the results of the analysis presented in Fig. 2–5, it can be seen that during the last decade of the 20<sup>th</sup> century, a greater share of

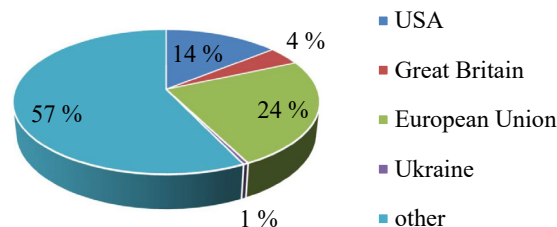


Fig. 4. World structure of foreign direct investment in 2010, % [17]

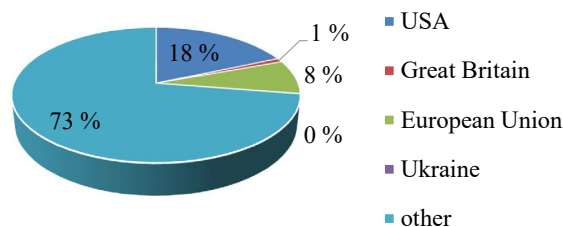


Fig. 5. Global structure of foreign direct investment in 2022, % [17]

Significant structural shifts in global foreign investments are aimed at countries of the world with population and economic growth rates ahead of the world average [18]. They account for about 50 % of energy consumption. UNCTAD identified eight sectors that are of key importance for the goals of sustainable development of socio-economic systems, namely [11]:

- transport infrastructure;
- telecommunications infrastructure;
- WASH (water supply, sanitation, and hygiene);
- mitigating the consequences of climate change;
- renewable energy sources and clean technologies;
- health care;
- education and diversity of ecosystems.

These sectors are crucial to the achievement of the Sustainable Development Goals and are the most attrac-

tive for investment in terms of financing the Sustainable Development Goals. Thus, as of the end of 2022, 2,843 investment funds allocated 537 billion US dollars (30 % of their assets) to eight sectors compared to 26 % in 2021 [18]. Four sectors – health, renewable energy, agri-food systems, and WASH – remain the most financially attractive, accounting for 95 % of allocated assets. The largest sector for investment funds is health care, which covers infrastructure: health care, medical services, pharmaceuticals, and medical equipment. However, investments in sustainable infrastructure and education, two of the most important sectors in achieving the Sustainable Development Goals, remain woefully underfunded.

**5.3. Model of convergence of dominant forms of investment capital in the logistics system**

As discussed above, logistics systems are a system of managing material flows that unite enterprises and industrial organizations, as well as intermediary, trade, and transport organizations to achieve a common goal [4, 6, 12, 14, 19]. When it comes to the development of socio-economic systems, one of the main tasks is the introduction of innovations in the means of production, technology, management system, etc. The use of mixed financing of innovative implementations is a process of convergence. Depending on many factors, including socio-economic, political, etc., it is advisable to use several sources of investment capital financing due to their convergence.

The main goal of the convergence of investment capital is to obtain a positive effect from the use of cash flows based on the process of convergence, interpenetration, and integration of its movement.

Owing to the advantages of converged solutions, it becomes possible to use the mobility of investment capital due to the convergence of forms of investment capital in accordance with the stages of development of socio-economic systems [20, 21]. Separate advantages of converged solutions made it possible to schematically depict the model of convergence of dominant forms of investment capital in the logistics system (Fig. 6).

The characteristics of the fourth industrial revolution (Industry 4.0) are the signs of a post-industrial society, in which more than 50 % is occupied by the service sector, along with the period of industrialization, in which the sphere of production and industry occupies more than 50 %. Under these conditions, intellectual capital, which is related to the personal qualities of any person, acquires special importance. Therefore, it can be noted that under the conditions of Industry 4.0, the dominant forms of investment capital have become:

- intellectual capital, as the main form of investment capital;
- financial and banking capital, which to some extent are communication subsystems of the logistics system.

The use of the presented model contributes to increasing the efficiency of the use of forms of investment capital through their integration and maximum use of the capabilities of each

form of investment capital in achieving a single goal. The implementation of an economically efficient logistic model of capital movement with increased profits and lower cost provides an opportunity to reduce the risks associated with the movement and mobility of investment capital.

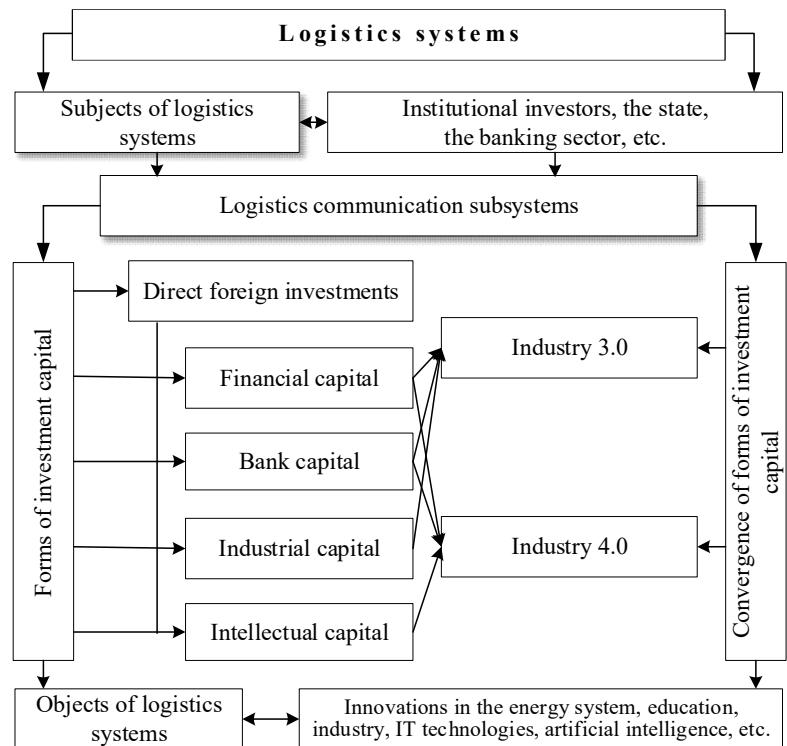


Fig. 6. Model of convergence of dominant forms of investment capital in the logistics system

**6. Discussion of research results regarding the process of convergence of dominant forms of investment capital**

According to the theory of economic cycles, such phenomena as the development of the socio-economic system, its crisis and innovations are closely interrelated. Industrial revolutions are a vivid example of changes in the socio-economic development of complex systems. Each of the stages of the industrial revolution has its own special characteristics (Table 1). One of the main sources of financing for each stage of the industrial revolution is investment capital. Investment capital can be a part of industrial, private, financial, banking, or intellectual capital. In contrast to [1], which summarizes only the features and stages of industrial revolutions, depending on the features of social relations, social structure, etc. can take their forms and provides opportunities to determine the dominant forms of capital.

The research has its limitations, which are related to the relative conventionality of the use of the “industrial revolution” interpretation, the periods of their implementation.

Most often, investment capital represents financial and/or short-term banking capital as a movement of cash flows or other liquid assets. One of the indicators that characterizes the efficiency of investment capital is its mobility or immobility. The economic etiology of the mobility of investment capital (Fig. 1) as a socio-economic process represents not only the formulation of goals and the movement of investment capital, but also characterizes the factors influencing it.

The Mandell-Fleming model (1) to (3) is widely used to determine the level of investment capital mobility. The level of mobility of investment capital is constantly under the influence of state and international movement restrictions. Therefore, the functional features of the mobility of investment capital as a state of the system include such components as:

- state tariff policy and taxation policy;
- spatial restrictions on the movement of investment capital;
- owing to separate legal acts, the governments of countries can set restrictions that lead to an increase in the cost of moving investment capital from one country to another;
- volatility of the exchange rate.

The difficulty of using model (1) to (3) is the need for a large amount of statistical information from different countries of the world.

Features of the fourth industrial revolution (Industry 4.0) are signs of a post-industrial society (Table 1, Fig. 6). Therefore, it can be noted that the dominant forms of investment capital are intellectual capital; financial and banking capital, which to some extent are communication subsystems of the logistics system. The use of the presented model helps increase the efficiency of the use of forms of investment capital through their integration and maximum use of the opportunities of each form of investment capital.

The disadvantage of this study is:

- sufficient generalization and theoretical character;
- unreasonableness of the level of mobility of investment capital.

This is primarily due to the limitations of the study. Calculations related to the determination of the level of mobility of investment capital, or the directions of its movement, require the availability of a significant sample of statistical data for many countries in order to obtain a real value of forecast expectations.

Despite some limitations and shortcomings of the study, in the future the prospects and directions of further use consist in determining not only the level of mobility of the converged form of investment capital but also its modification to directly determine the level of convergence of investment capital in terms of the development of socio-economic systems.

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## 7. Conclusions

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1. He characterized the main signs of the development of socio-economic systems due to recognized industrial revolutions that took place during the last three centuries and identified the stages of their development. In contrast to the existing generally accepted generalization of the signs

of industrial revolutions, the characteristics of their life cycle, the dominant forms of investment capital are proposed according to the stages of the industrial revolution with the reasons for their change. Each of the stages of the industrial revolution is preceded by appropriate conditions, which are associated with certain historical conditions, conditions of the socio-political system, antagonisms between the versts of society at a specific moment in time.

2. On the basis of global statistical information, the main goals of sustainable economic development and the direction of movement of investment capital have been determined. The distribution of foreign investment capital by countries of the world is determined. Eight sectors have been identified that significantly affect the achievement of sustainable development goals, namely: transport infrastructure; telecommunications infrastructure; WASH (water supply, sanitation, and hygiene); mitigating the consequences of climate change; renewable energy sources and clean technologies; health care; education and ecosystem diversity.

3. The model of convergence of dominant forms of investment capital has been proposed, which is a subsystem of the logistics system in the material flow management system that unites enterprises and industrial organizations, as well as intermediary, trade, and transport organizations to achieve a single goal. The use of the model helps increase the efficiency of the use of forms of investment capital through their integration and maximum use of the capabilities of each form of investment capital in achieving a single goal.

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### Conflicts of interest

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The authors declare that they have no conflicts of interest in relation to the current study, including financial, personal, authorship, or any other, that could affect the study and the results reported in this paper.

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### Funding

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The study was conducted without financial support.

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### Data availability

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The data will be provided upon reasonable request.

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### Use of artificial intelligence

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The authors confirm that they did not use artificial intelligence technologies when creating the current work.

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