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# TECHNOLOGICAL THEORY OF MONEY AND THE SCIENCE OF MONEY IN THE CONDITIONS OF THE 9TH TECHNOLOGICAL ORDER

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## ABSTRACT

The subject of the article is the technological theory of money as a methodological basis for the development of the global monetary system; the object of the article is the monetary system in the conditions of the 9th technological order; the purpose of the article is to reduce risks in the development of the global monetary system during the ninth technological order; to achieve this goal, the following tasks are solved: historical analysis of the development of forms and types of money; development of the technological theory of money; description of the monetary innovation multiplier and its significance in the monetary system; the scientific methods of this article are: historical and system analysis; theory of technological orders; theory of money; heuristic synthesis; comparative analysis; scientific novelty consists in the formation of the technological theory of money as the methodological basis of the post-industrial monetary system.

**Keywords:** Theory, Money, Technological Order, Equivalent, Monetary Relations, Bank Multiplier, Innovative Multiplier, Monetary System, Cryptocurrencies, Regulation

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## 1. INTRODUCTION

The relevance of the article is determined by the fact that during the formation of the 9th technological order, profound changes occur in the structure of the global monetary system. In order to reduce the risk of such changes, it is necessary to have a methodological basis for building global and national monetary systems. Such a methodological basis for building a national monetary system can only be an adequate theory of money, the science of money.

In the 21st century, the practice, in particular, of the synthesis of cryptocurrencies indicates that the period of "constructing monetary systems" based on the development of technologies is coming. The category of "post-industrial money" in this article is proposed to include types of money that are closely related to the use of information technology and digitalization technologies. Based on this feature, it is proposed to include in the category of "post-industrial money": digital and electronic money and cryptocurrencies, other.

The hypothesis of this article is the statement that the development of the technological theory of money and the science of money can: create a methodological basis for designing a post-industrial monetary system; reduce the risks of developing a post-industrial monetary system.

The purpose of the article is to reduce risks in the development of the global monetary system during the ninth technological order.

To achieve this goal, the following tasks are being solved:

- historical analysis of the development of forms and types of money.
- development of the technological theory of money.
- description of the methodological provisions of the science of money.
- description of the multiplier of monetary innovations and its significance in the monetary system.

The object of the article is the monetary system in the conditions of the 9th technological order.

The subject of the article is the technological theory of money and the science of money as a methodological basis for the development of the global monetary system.

Scientists pay attention to the complex nature of money, which mediates human relations Finance (2001), At the same time, it is recognized that the peculiarity of money is that it acts as a universal commodity equivalent Money (2000), Theories of money solve a number of key problems that are important for the functioning of the monetary system. Such tasks include the following tasks: definition of the concept of money; study of the role of money and the monetary system in the national economy; properties and essence of the monetary system; influence of forms and types of money on various types of monetary relations; the possibility and nature of inflation; the essence of the monetary multiplier and others Keynes (1993), Golichenko (2003), Burlachkov (2003), Keynes (1999),Markus (2011), Bewley (1980). Research is important for the scientific justification of monetary reforms Keynes (1993), Researchers note the great importance of monetary theory for the economy Golichenko (2003), At the same time, theoretical developments in the field of money theory are actively conducted in developed countries Keynes (1999), It should be borne in mind that money theories play an important role in the formation of various types of monetary relations: credit; finance; international monetary and credit relations; settlements and others Shmyreva et al. (2002),

The comparison of historical facts from the field of money development with the course of scientific and technological development of society suggests the existence of a relationship between these two processes. On this basis, it was concluded that a technological theory of money can be formulated in post-industrial conditions Glushchenko (2009),

During the global crisis, there is a decrease in the stability of the existing monetary system. Therefore, the 11th President of the World Bank proposed in November 2010 to partially return to the gold standard Parmi (2010). As a result of increased demand, the price of gold began to rise. By July 2011, gold was worth about $1,900 per troy ounce (31.4 grams). Experts began to make a forecast about the further growth of gold prices. Experts assessed the situation on the gold market as preceding the crisis. It was known that the partial use of any theory contradicts the methodology of science. Therefore, a study was conducted on the consequences of the proposal for a partial return to the gold standard in the works Glushchenko (2012), Parmi (2010), Glushchenko (2012). After the publication of the results of these studies, the price of gold began to decline. This study showed a high risk of attempts to reform without the necessary scientific justification. The proposal to partially return to the gold standard was not implemented. This situation has shown the importance of developing a post-industrial theory of money as a basis for designing and evaluating the effectiveness of innovations in the monetary system.

Since innovations become permanent in a post-industrial society, it is important to investigate the impact of innovations on the monetary system. Two aspects of this kind of research can be distinguished: the impact of innovations in the economy on the monetary system; the impact of innovations in the monetary system on this system itself. It was proved that innovations in the economy affect the monetary policy of the state Glushchenko (2016), Golichenko (2003), Glushchenko (2016). It was noted that innovations in the economy create an "innovative money multiplier". This innovative multiplier in the economy balances the bank money multiplier. At the same time, it is the ratio of the innovative money multiplier and the bank money multiplier that determines the level of inflation in the country's economy (within the framework of the structural theory of inflation) Glushchenko (2016),

The analysis showed that the development of technologies (bank cards, ATMs, etc.) affects the functioning of the banking system Glushchenko (2007), Additional opportunities in the study of history for forecasting the development of the monetary system are associated with the formation of the theory of technological orders. Within the framework of this theory, it was proved that progress in the monetary system can be associated with the content of a new technological order Glushchenko (2021),.

In general, the results of a study of literary sources on the subject of the article show that innovations in the monetary system and monetary policy should be based on a developed theory of money. The lack of a developed theory of post-industrial money creates additional risks in the economy. This showed the proposal to partially return to the gold standard Parmi (2010). At the same time, in 2022, there is an acute discussion on the development of the cryptocurrency market and state regulation of the cryptocurrency market. It is obvious that a correct solution to these issues can only be worked out based on the results of the synthesis of a new theory of money. This further confirms the relevance of this article.

## 2. METHOD

Designing a monetary system (or elements of such a system) we will call the purposeful process of determining the image of the future of such a system. The risks of the development of the monetary system will be called the possibility of negative deviations in this process. At the same time, the risks of the development of the monetary system can generate "cascading" risks in the economy. For example, a ban on the circulation of cryptocurrencies can have a positive impact on the economy. Or will such a ban have a negative impact on the economy?

Historical and logical methods of studying the monetary system are possible. Within the framework of the historical analysis of the monetary system, it is possible to link the evolution of money with the scientific and technological progress of society within the framework of the theory of technological orders. The technological order is understood as a systematic unification of such elements of it: technologies of social production; socio-industrial relations (institutions) in society; forms of doing business; international monetary relations; management methods and others Glushchenko (2021),.

The system analysis carried out showed the evolution of states and monetary relations during the change of technological orders. Such a system analysis is given in Table 1.

**Table 1 System analysis of monetary and credit relations in the process of changing technological orders**

| п/п | Properties of technological orders (structures) /Number, names technological orders, time period | World order, socio-economic formation | Type of money; international monetary system |
|---|---|---|---|
| -1 | -2 | -5 | -6 |
| | "1st" technological order; a time period from 5500 BC to 2000 BC.; the invention of the sail; | communal-tribal system; communities; principalities; slavery; kingdoms | direct exchange of goods between their producers |
| | "2nd" technological order; time period 2000 BC – 9th century AD, horse traction; | communal and tribal system; slavery; feudalism; communities; principalities; kingdoms | Individual goods (grain, cattle, furs) are equivalent; money changers and usurers |
| | "3rd" technological order; Time period 9th century-1770; Windmill, a water mill; | feudalism; principalities; kingdoms; land empires | money changers and usurers; receipts and bills of exchange; monasteries as repositories of gold; Gold as a universal equivalent; |
| | "4th" technological order; Time period 1770-1830; Textile machines; | monarchies; maritime empires; capitalism; | National gold currencies; paper money; central and commercial banks; stock exchanges; securities |
| | "5th" technological order; Time period 1830-1880; steam engine; | land and sea empires; monarchies; capitalism; | full-fledged (gold) money; paper money; Paris international monetary System, |
| | "6th" technological order. Time period 1880-1930; internal combustion engine and electric motor; | Capitalism; imperialism; nation-states; republics | three international currency blocks; credit money; Genoese gold-motto system; |
| | The " 7th " technological order; Time period 1930-1970; nuclear reactor, electronic computers; | States, military-political blocs of States, a bipolar world; the United Nations (UN) | the international Breton-Wood currency system, credit money; gold and mottos, |
| | The " 8th " technological order; Time period 1970-2010; microelectronics and microprocessors; | Globalization; States; trade and economic blocks of states; military and political blocks of states; Global unipolar world, Post-industrial society | Special Drawing Rights (SDR, SDRs); Society for Worldwide Interbank Financial Telecommunications (SWIFT); demonetization of gold; the Jamaican International Monetary System; electronic and digital money; |
| | 9th technological order; Time period 2010-2040; nanotechnology, nanotechnology, information technology, digitalization, resource conservation; | Post-industrial society; The process of decentralization of the global unipolar world; States; trade and economic blocks of states; | international cryptocurrency system; global trading systems. Cryptocurrencies (virtual, technological money); |

Source: developed by the author

Several classifications of money can be proposed:

- according to the ratio of the nominal and actual value of the monetary unit, full-fledged and symbolic money is allocated.
- according to the physical carrier (form of existence), metal, paper, plastic (electronic), digital money can be allocated.
- by the nature, form, and degree of value assurance of the nominal value of money, one can distinguish: full-fledged money (secured by the value of the metal from which they are made); nominal money (secured by legislation, the will of the state); credit money (universal commodity of contractual obligations); cryptocurrencies are secured by performing a certain set of computing operations.
- according to the specifics (technologies) of use in settlements, cash, non-cash (exist in the form of records on bank accounts), account money (used in clearing) money; electronic money (used for remote modification of records on accounts); cryptocurrencies (exist in the form of records using blockchain technology), etc. can be allocated.

At the beginning of 2022, there is no consensus about the nature and essence of money. It is customary to distinguish two directions in determining the essence of money. Proponents of the value approach base their idea of the essence of money "on the theory of value." Proponents of this theory of money define money as a commodity. With this approach, money reflects social relations. It is noted that the "value" theory of money is the main one. This is due to the fact that this theory, based on historical experience, logically proves the nature and origin of money Finance (2001). At the same time, the value theory is based on studies of the process of development of the monetary form of value Finance (2001),.

Proponents of the nominalist theory of money believe that money is a tool, an object accepted for some reason. There are two such reasons: firstly, the general agreement of people; secondly, money is imposed by the state Finance (2001). Experts believe that "Money is not a technical means of circulation. They reflect deep social relations" Finance (2001). The essence of money is that they:

Firstly, they have the property of universal, direct exchangeability for various goods.

Secondly, they represent the crystallization of exchange value.

Thirdly, they are the embodiment of the universal working time of associated producers Finance (2001).

Fourth, they are able to express the usefulness (use value) of goods (with a marketing approach in pricing).

It is believed that the essence of money is manifested in their functions Finance (2001), Money (2000). These functions reflect the possibilities and features of using money Money (2000). Money performs a number of functions: measures of value; means of circulation; means of payment; means of accumulation; world money. It is noted that the functions of money can be performed only with the participation of people.

The role of money consists in the possibility of achieving certain results as a result of their use Money (2000).

It is noted that foreign authors often do not consider such functions of money as a means of payment and world money Finance (2001).

Types of money have changed historically. The first money was metal. Then paper and credit money appeared. Further: "... electronic money appeared as a kind of credit money, they were replaced by credit and debit cards. Recently, "plastic money" has been created with a built–in microprocessor - a "chip"…The latest invention is digital money. Speaking of digital money, they mean calculations using the Internet. and in the case of their implementation, they allow you to make purchases without leaving home" Finance (2001).

It is noted that: "Metal money obeys the following law of circulation: when metal (full-value) money is moved from the sphere of circulation to treasures and vice versa, the amount of full-value money in circulation spontaneously adapts to the needs of commodity and payment turnover and equals the amount of money needed for circulation" Finance (2001). Therefore, inflation does not occur when using full-fledged money (during the gold standard period). Later, the state authorities begin to issue symbolic paper money with a forced exchange rate to cover the budget deficit.

There is a well-known opinion: "Paper money directly arises from the function of money as a means of circulation" Finance (2001). "The essence of paper money (treasury notes) is that these are banknotes issued to cover the budget deficit, usually not exchanged for metal, but having a forced exchange rate. Consequently, the peculiarity of paper money is that being deprived of an independent value, they are supplied by the state with a forced exchange rate, therefore they acquire a representative value in circulation and act as a purchasing and payment means" Finance (2001).

Credit money is considered as a "universal commodity of contractual obligations" when making large transactions Finance (2001).

"Credit money belongs to the highest sphere of the socio-economic process and is governed by very special laws. They have passed the following stages of development: promissory note; banknote; check; electronic money; credit and debit cards... A banknote can be described as a bill for a banker…At the same time, the specific law of circulation of banknotes exchanged for gold consists in the fact that the number of banknotes actually in circulation is equal to the amount of gold needed for circulation. In this case, each banknote is a representative of the amount of gold indicated in it. In the absence of free exchange of banknotes for gold, there is a similarity of such money with paper money. The mechanism of circulation of banknotes is reduced to the mechanism of circulation of paper money. This does not mean that credit money in modern society is finally turning into paper money, however, they do not have the same reliability as before" Finance (2001).

It is impossible to agree with the statement that allegedly "Paper money directly arises from the function of money as a means of circulation Finance (2001). This is due to the fact that money can be used as a means of circulation only when they are able to act (to a certain extent) simultaneously as a measure of value (i.e., if they can be used to buy the results of the work of another subject of socio-economic relations).

It seems that the opinion quoted above reflects an out-of-system (or pre-system) approach to money and money circulation. Within the framework of a systematic approach, all the functions of money should be considered in their systemic unity. A systematic approach requires that all the functions of money be carried out by the money supply at the same time.

In its development, credit money has passed a number of stages: a bill; a banknote; a check; electronic money (credit and debit cards); digital money (money on the Internet).

Electronic money (in plastic bank cards):

Firstly, they exist in the form of conjugate states of electro-mechanical devices (bank debit or credit card; ATM, computing server of a commercial bank).

Secondly, when dealing with such money, some of the operations are performed through the ATM interface by the bank's client - the owner of the bank card (inserts the card; enters the PIN code; determines the nature of the operation; the amount of money used, etc.), and not by a bank employee.

Thirdly, electronic money is a type of non-cash money, transactions with which and the conversion of which into cash are possible outside the premises of the bank, for example, in ATMs.

Fourth, electronic money is as close as possible to the bank's client geographically (in accordance with the ATM placement scheme).

Fifthly, electronic money provides a round-the-clock opportunity to perform transactions with them (and not during the bank's working hours), which reduces the time limit on their use (this increases their liquidity, reduces the motive of liquidity preference for the account holder - client).

A payment system that works with virtual money; not to be confused with Internet banking. Internet banking is an additional service provided by the bank to its client to facilitate account management using the Internet.

The motive for the integration of monetary relations into the technology of life of the population can be traced in the fact of the creation and development of digital money. Virtual (digital) money is used outside the banking system to make fast and relatively secure payments between numerous users, which can be both individuals and organizations.

From a legal point of view, digital money can be considered as an oral agreement between the client and the organizers of the payment system.

It can be said that electronic and digital money arose as a result of banks' attempts to bring the monetary system and its functioning technologies closer to the technologies of the functioning of the economy and the technologies of human life. This can be seen as an additional argument in favor of recognizing the truth of the technological essence and the theory of money. All this creates the need for a theoretical understanding of the nature, essence of money within the framework of scientific theory, makes the development of the technological theory of money relevant.

In the process of analyzing the essence of money, it is necessary to distinguish between theories of the origin of money and theories of money.

Theories of the origin of money represent a scientific view of how money arose in the process of the historical development of the economy and social relations. The theory of money is a concept (general view) of how money functions in a particular society and economy. Currently, two theories (concepts) of the origin of money are being considered: rationalistic and evolutionary.

The rationalist concept considers the origin of money as a social contract - an agreement between people who have become convinced that special tools are needed for the movement of values in exchange turnover. The evolutionary concept is that money appeared as a result of an evolutionary process that, contrary to the will of people, led to the separation of individual goods from their total mass, which subsequently took a special place in the process of exchanging goods. The idea of comparability of goods has found legislative embodiment in ancient and medieval societies. One of the dogmas of Roman law states that the emperor determines the value of money.

Two factors, namely the shortage of precious metals and the desire to reduce the cost of the production of goods, led to the emergence of symbolic money. Currently, symbolic (paper, credit) money has replaced full-fledged money. In symbolic money, their own value does not coincide with their nominal value. The functioning of symbolic money serves as a certain confirmation of the rationalistic concept. However, some experts believe that the contract is a shaky basis for such an important economic category as a commodity. At the same time, it is recognized that trust in symbolic money is an important foundation of the monetary system. At the same time, the entire history of the origin of money serves as a confirmation of the evolutionary theory of money.

The main feature that brings universal equivalents closer to money is expressed in the following. Universal equivalents (gold and silver) equally serve both for direct consumption and as a tool for measuring value and circulation.

Exchange is the movement of goods from one manufacturer to another, assuming equivalence, commensurability of goods of different appearance, quality, shape, purpose. Such a joint measurement required the creation of a single assessment framework for all goods. Such a basis is the cost of the goods. The value of a commodity is the social labor expended in the process of producing a commodity and embodied in that commodity.

Exchange value is defined as the ability of a commodity to exchange for other goods in certain proportions. To do this, you need to provide a quantitative comparison of the products. The goods in exchange must have value for the producer and consumer value for the buyer. These properties of a commodity act as a unity of opposites: unity, since they are inherent in one commodity, and opposition, since the same commodity for one person cannot be both a use value and a value.

The use value of a commodity is defined as the ability of a commodity to satisfy any human needs. The use value (along with the cost of creating a product) can be the basis for determining the price of a product.

At the beginning of the 21st century, several theories of money are known. The theory of money or monetary theory is a theory that explores the impact of money on the economic system. Historically, there are seven main theories of money. The metal theory of money proceeds from the fact that the purchasing power of a monetary unit is determined by the metal from which the coin is made. The nominalist theory of money postulates that the purchasing power of a monetary unit is determined by its nominal value, that is, the amount indicated on a coin or banknote. This theory was based on the following two propositions: money is created by the state and the value of money is determined by its face value. The main mistake of nominalists is the position of this theory that the value of money is determined by the state. And this means denying the theory of labor value and the commodity nature of money.

Modern supporters of nominalism began to look for the definition of the value of money not in the decrees of the state, but in the sphere of market relations by subjectively assessing their "utility", purchasing power. As a result, quantitative theory took the leading position in the theories of money. This theory of money states that the purchasing power of a monetary unit and the price level are determined by the amount of money in circulation and the speed of their turnover. The main function of money is considered to be the function of the medium of circulation. The basic equation of this theory looks like this:

$$C = S / V$$

Where: C is the amount of money, S is the sum of the prices of goods, V is the speed of money circulation.

The disadvantage of the quantitative theory of money is that the functions of money as a measure of value, means of payment, means of accumulation and world money are ignored.

Gradually, the quantitative theory of money transformed into the monetarist concept of modern economic theory.

Monetarism is an economic theory according to which the money supply in circulation plays a decisive role in the stabilization and development of the market economy. The founder of monetarism is M. Friedman. Monetarism emerged in the 50s. The peak of the theoretical developments of monetarism was the concept of stabilization of the American economy and the well-known "Reaganomics", the implementation of which helped the United States to weaken inflation and strengthen the dollar.

The Keynesian theory of money considers the essence of money and its impact on production. It was proposed by the English economist J. M. Keynes (1883-1946) in the late 1920s-early 1930s. According to this theory, the rate of circulation of money in the movement of income is considered as a variable that changes together with changes in income, the rate of interest and other parameters of the economy. J.M. Keynes called his theory of money demand the theory of liquidity preference. His ideas were widely spread and actively used in practice (for example, by the Presidents of the United States F. Roosevelt and J. Kennedy). Positive in the theory of J. M. Keynes can be considered that he connected the functioning of money with social and economic systems.

The functional theory of money considers the purchasing power of money as a result of its circulation, or functioning. The functional theory of money justifies the insignificance of their metallic content for money due to the performance of their functions in the sphere of circulation. The disadvantage of this theory is that it covers the sphere of circulation.

The state theory of money asserts that it is the state that not only creates money, but also prescribes to them the power of payment. Interpreting the purely legal nature of money, the State theory of Money denies any significance for the payment power of money of its metallic content, arguing that paper money is as good as metal.

The crisis of 2008 exposed the shortcomings of the existing monetary system. In this regard, the proposal of the President of the World Bank is known to partially return to the gold standard in the field of monetary circulation Parmi (2010). A systematic analysis of the proposal for a partial return to the gold standard showed the following:

1) the return of gold to the monetary system is contrary to international monetary law (decisions of the Jamaican Monetary Conference, which announced the demonetization of gold - the refusal of gold to serve any useful purpose in the monetary system).
2) the post-industrial monetary system should be based on one scientific theory (the theory of value, nominalist, or technologically instrumental theory of money), and not on a partial theory.

3) an attempt to mechanically combine two fundamentally different theories into one partial theory leads to the appearance of an internally contradictory, and consequently (as is known from philosophy) and scientifically untenable theory.
4) a partial return to the gold standard will inevitably lead to the devaluation (in an appropriate proportion) of key currencies, which will undoubtedly cause a shock to the global monetary system.
5) in practice, in 2010, gold makes up an insignificant part of the gold and foreign exchange reserves of the leading countries, therefore, an attempt to increase the share of gold in reserves will lead to a further catastrophic increase in gold prices and will end with a shock to the financial markets (gold bubble) and the world monetary system.
6) an attempt to increase the share of gold in the composition of the countries' gold and foreign exchange reserves will require financing of gold purchases, which will negatively affect the state of the countries' budgets.
7) commercial banks, following the example of central banks, will start buying gold, which will reduce the free reserves of commercial banks and their ability to lend to economic recovery after the crisis Parmi (2010), Glushchenko (2012).
8) the proposal to partially return to the gold standard contradicts the trend in the development of the world monetary system, which is presented in table No. 1 of this article.
9) the proposal to partially return to the gold standard contradicts the Copernicus-Gresham law, which states that: "The worst money displaces the best from circulation."

The banking system and government agencies were informed about these results of the system analysis. The proposal to partially return to the gold standard was practically not implemented.

At the time of publication of the results of these studies Parmi (2010), Glushchenko (2012), the price of gold was already about $ 1,900 per troy ounce. After the publication of the results of the study Parmi (2010), Glushchenko (2012), the price of gold fell to about $ 1,200 per troy ounce.

Taking into account the total weight of bank gold, the estimated economic effect of systemic studies of the monetary system in the works Parmi (2010), Glushchenko (2012) may amount to more than one trillion US dollars?

However, despite this, funding for the continuation of systemic studies of the monetary system has not been opened. No money was allocated for the development of the post-industrial theory of money. This increases the risks of the development of the monetary system in the period of the 9th technological order.

To study the possible directions of the development of the science of money, it is necessary to conduct a historical analysis. An analysis of the well-known theories of the origin of money and theories of money allows us to conclude that these theories arose and were applied in certain historical periods. The main task of the theories of money was to explain the essence of money and the mechanism of the influence of money on the economy. All the known theories described above have their advantages and disadvantages. These advantages and disadvantages determine the scope of the correct application of these theories. A systematic analysis of the content of the well-known theories of money is carried out in Table 2 of this article.

**Table 2 System analysis of money theories**

| № п/п | Characteristics of the monetary system/ Theories of money | The basis of the value of a monetary unit | The basis for the issue of money into circulation, possibility of inflation | Issuer, State regulation |
|---|---|---|---|---|
| 1 | The Metal theory of Money | The value of the metal enclosed in the coin | The needs of the economy, there is no inflation | State monopoly on the issue of money and regulation |
| 2 | Nominalist theory of money | the value of a monetary unit is set by the state | The issue of money is determined by the needs of the state budget, inflation is possible | State monopoly on the issue of money and regulation |
| 3 | quantitative theory of money | The ratio of the sum of the prices of goods and the amount of money, the speed of circulation | The needs of the economy and the state | State monopoly on the issue of money and regulation |
| 4 | monetarism | The volume of money supply in the economy | The needs of the economy | State monopoly on the issue of money and regulation |
| 5 | Keynesian Theory of Money | The value of money is determined by the demand for money: the speed of money circulation, income, interest | Money needs of the economy and social life | State monopoly on the issue of money and regulation |
| 6 | Functional theory of money | The efficiency of the functioning of money in circulation | The needs of the sphere of circulation | State monopoly on the issue of money and regulation |
| 7 | The State theory of money | Determined by the State | Determined by the State | State monopoly on the issue of money and regulation |
| 8 | Technological theory of money | It is determined by the demand for money and the supply of money | Determined by the private issuer, the rules of issue | Issuers are private companies, Lack of government regulation |

Source: developed by the author

In 2022, we can say that practice is overtaking theory in the development of the monetary system. This is evidenced, in particular, by the intensive development of cryptocurrencies since 2009.

Therefore, it can be stated that there is a need to develop a theory of money that is adequate to the realities of modern globalization and the level of technological development. There is also no science of money as a universal knowledge of the impact of money on the economy and social environment.

At the beginning of the 21st century, it can be argued that it is necessary to develop a post-industrial philosophy and theory of money. This is due to the following:

1) the globalization of markets has led to the emergence of qualitatively new phenomena (multipliers of globalization, etc.) Glushchenko (2009),
2) informatization has led to the emergence of new types of money (electronic, digital money, cryptocurrencies, etc.).
3) increasing the role of money and financial markets in the reproduction process.
4) the development of global monetary circulation, cryptocurrency markets require its own theoretical justification.

In the modern process of reproduction, the requirement of equivalence of exchange is probably critically often not fulfilled. This phenomenon has been called "price disparity". Price disparity can occur both in the relations of industries (industry- agriculture) and in other planes (for example, in financial transactions).

It is known from the theory of money that "compliance with the requirements of exchange equivalence involves measuring the value of goods based on the labor costs of their manufacture" Money (2000).

It should be added that within the framework of the marketing approach in pricing, it could be justified to measure the value of a product based on its usefulness, the productivity of goods in the process of reproduction, including the reproduction of the person himself.

The effect of the "bank multiplier" is known - an increase in funds from the banking system when funds pass through the banking system Money (2000). In the context of globalization of the world banking system, this mechanism is gaining more and more power.

It has been suggested that globalization generates the appearance and action of various kinds of political and socio-economic "multipliers of globalization" Glushchenko (2009). These "multipliers" are associated with an increase in the political, socio-economic impact of certain phenomena and actions due to the effect of a transnational scale. In the process of multiplication, weaker market participants will repeat the actions of strong market participants. In general management, this desire of the weak to imitate the actions of the strong has been called "the power of example." The strength of the example is the result of the attractiveness of the example of the stronger for the weaker Glushchenko (2012). These considerations justify the mechanism of the emergence and action of the multiplier of globalization in any field of activity in the conditions of accelerating globalization.

In certain situations, symbolic money may cease to be the equivalent of the labor of associated producers. At the same time, such symbolic money may lose its other functions: a means of payment, world money, etc. Glushchenko (2009).

Globalization has made the interbank loans market international Glushchenko (2007), This means that: firstly, the bank multiplier is being strengthened (due to the lengthening of payment and lending routes); secondly, the mechanism of regulation of the bank multiplier is becoming supranational. This can lead to an uncontrolled increase in the volume of money at certain points in the global banking system (compared to the volume of goods present). As already noted in the value theory of money, money is considered a "universal commodity equivalent" Money (2000). However, conducted earlier Glushchenko (2009) and in this paper, the analysis showed the following: taking into account the adopted Jamaican currency Agreements of 1976 on the demonetization of gold, it became finally obvious that from an international legal point of view, money is no longer a "universal commodity equivalent". At the same time, the work of associated producers contained in them differs greatly in volume and quality for different countries in a global world.

However, the new status of money in scientific, philosophical and theoretical terms is not defined, especially taking into account such factors as: the emergence of electronic money; the development of the global cryptocurrency market.

The emergence of new types of money (electronic, digital money, cryptocurrencies) exacerbates the well-known philosophical problem of the correlation of form and content in the theory of money. This philosophical problem (the relationship of form and content) in the context of information and intellectual banking and financial technologies gets a new sound. In full-fledged (gold) money, there was an unambiguous correspondence of form and content (volume-weight-the equivalent of labor spent on gold mining). However, this correspondence becomes less and less unambiguous with the advent of paper, credit, electronic and digital money. If we talk about cryptocurrencies, the process of their emission can be divorced from the real economic process.

In the conditions of post-industrial globalization, technology is playing an increasingly important role. In these conditions, the main principles of the development of monetary systems are to avoid a shortage of gold; to reduce the costs of money circulation; to improve the convenience of user service; the principle of maximum integration of money circulation technologies with the technologies of people and firms. This gives reason to say that at the beginning of the 21st century, money became a specific quantitative instrument (and at the same time, the result) of political and socio-economic technologies in the reproductive process. Let's call this approach a "technological approach" in the philosophy and theory of money Glushchenko (2009).

Within the framework of the technological concept, it is proposed to call post-industrial money a monetary instrument that performs the following functions in the reproduction process: measures of value, means of circulation; means of payment, means of accumulation; world money; the function of a means of redistribution of gross domestic product; the function of a measure of civil (property) responsibility of subjects of socio-economic relations with some indicators of the effectiveness and reliability of their functioning in the economy and social system.

Technological money represents certain quantitative (counting) units that act as a result (at the stage of issue) and a quantitative tool (at the stage of practical use) of technical, informational, socio-economic and other types of technologies. For example, bitcoins are issued during certain computing operations and technologies (mining). Then these bitcoins go into circulation. In circulation, bitcoins are used to perform the following functions: calculations; means of accumulation, world money and others. The technology of storage and circulation of the most popular cryptocurrency (bitcoin) is provided using blockchain information technologies.

The first publications on the technological theory of post-industrial money appeared in 2009 Glushchenko (2009). Probably, the publication and international distribution of books on the technological theory of money Glushchenko (2009) could stimulate the development of cryptocurrencies. Around this time, the cryptocurrency market, in particular, bitcoins, begins to develop. The distinctive features of cryptocurrencies are the following: issuers are private companies (not the state); the issue of cryptocurrencies is carried out by performing certain technological operations (mining); the cryptocurrency market is global in nature; the circulation of cryptocurrencies is regulated by the provisions of cryptocurrency exchanges (and not by state laws); no one is responsible for the stability of the cryptocurrency; the value of a monetary unit is determined by supply and demand; the essence of the cryptocurrency and the process of its circulation are constructed by the creators of this currency and more.

The analysis shows that one of the reasons for the high currency risks in the cryptocurrency market may be the lack of a direct link between the process of issuing (mining) cryptocurrencies and the needs of the economy?

The growth in the use of bitcoins is determined by the desire of individuals and legal entities to avoid state control, including state tax control.

Designing a post-industrial currency will be called the process of determining the image of the future of the cryptocurrency itself and the process of its circulation. The circulation of cryptocurrencies (along with the circulation of electronic and digital money) can be recognized as a distinctive part of the global post-industrial monetary system.

Cryptocurrencies are an example of purposeful innovations in the monetary system. Cryptocurrencies themselves and the cryptocurrency market were objects of purposeful design. It is known that the cryptocurrency market is characterized by quite high risks. At the same time, we can say that the growing popularity of cryptocurrencies is associated with another trend: the desire to increase the degree of freedom of subjects of social and economic life.

In this article, we will call an artificial object (cryptocurrency) created by a management entity or financial and economic activity, a monetary instrument. Then the cryptocurrency is used by these (or other) entities to influence the technological process or other control object. A distinctive feature of a monetary instrument should be recognized as its specific (distinctive) specificity. This specificity underlies how it is used in practice. This specificity of monetary instruments is manifested in various types of monetary relations (price, calculations, finance, etc.). The specifics of post-industrial money (electronic money, cryptocurrencies, etc.) as a tool used in socio-economic technologies as part of the reproduction process reflects their essence. As you know, the essence of everything, including money, is determined by the functions and roles that they perform.

The nature of money as a tool of technology reflects the concepts of "forms and types of money". Money as a tool of socio-economic technologies of the reproductive process can be metal, paper, plastic, digital, electronic, cryptocurrencies, etc.

The fundamental differences between the proposed and developed in this paper technological post-industrial definition of money from the well-known value and non-value (nominalism) approaches Finance (2001) to the definition of the essence of money are as follows Glushchenko (2009).

It is known that Aristotle came to the conclusion that simply equating all goods to one contradicts the true nature of things and is an artificial adaptation to meet the needs of society. This statement of Aristotle can form the basis of the assumption about the correctness of the technological approach in the field of money. Within the framework of the technological theory of money, they (money) are not considered as a commodity. At the same time, post-industrial money is involved in exchange (or other monetary relations) as a technological tool and a way to achieve the goals of certain types of monetary relations.

Within the framework of the technological post-industrial theory of money developed in this article, they (money) are considered in two ways: firstly, as a result of the use of money emission technologies in the reproduction process; secondly, money is considered as an instrument of influence of certain entities (banks, corporations, etc.) on the technological process and its individual elements in the economy and society.

As already noted in the theory of the value of money, it is known that "compliance with the requirements of equivalence of exchange involves measuring the value of goods based on the labor costs of their manufacture" Money (2000).

The use of post-industrial money as a tool for measuring the value of goods is not only economic, but also social in nature:

firstly, if, when assessing the use of full-fledged money, labor costs for their production are the key factor (gold as a price scale Finance (2001), then the costs of creating post-industrial money itself (for example, electronic money) as a tool are practically not taken into account in this procedure. At the same time, it is known that: "In modern conditions, the monetary unit of the Russian Federation - the ruble - does not have its own value and a fixed gold content" Money (2000).

secondly, with such a multifactorial assessment, not one economic factor is used - labor costs (for a commodity and its gold equivalent), but many socio-economic factors at the same time.

thirdly, post-industrial money should have the ability to meet certain needs of social and economic actors, for example, the need to transfer value to the territory of another state (a function of world money). The ability to meet the needs of economic entities brings money closer to the concept of "product", which combines goods and services.

Fourth, does the use of post-industrial money allow us to talk about the monetary system as part of the service sector? When using gold money, they spoke of banks as producers of "a special kind of commodity (money)." When using post-industrial money, we can talk about the monetary system as a segment of the service sector.

Post-industrial money and services are united by their immaterial nature.

Post-industrial money (in its technological, instrumental interpretation) participates in an expert (buyer-expert) multifactorial socio-economic procedure for measuring the value of goods. The measurement of the value of goods using post-industrial money is carried out on the basis of such concepts as: the effectiveness of goods; the need for goods; the need for goods; the availability of goods; the social standard of ownership of a set of goods. The seller (buyer) is an expert in the course of a multifactorial cost measurement procedure subjectively determines the degree of equivalence of the exchange of a certain amount of money for goods, evaluates the social justice of the purchase, the availability of goods, correlates the cost with the subsistence minimum, own labor costs to obtain the necessary amount of money, etc.

In 2022, post-industrial money is simultaneously considered as a tool of socio-economic management (within the framework of finance and credit) and as a product of the application of socio-economic technologies. Scientists note that "Currently, based on Aristotle's conclusion, many Western scientists do not delve into the study of the nature of money, define it as something mythical imposed by the authorities, do not offer new functions of money, consider only the applied nature of certain concepts" Finance (2001).

Within the framework of the post-industrial technological (instrumental) theory of money, in their definitions, money is considered as artificially created by man objects (tools). Money is issued in order to ensure the possibility of performing certain operations (settlements, financing investments, etc.) in the technologies of the reproduction process or in order to increase the efficiency of the operations of the technological process.

It is argued that in the 21st century, the effectiveness of money as an instrument of influence on the reproductive process (according to the technological theory of money) is directly and directly related to the quality of money performing its functions and is reflected in the roles of money.

The functions (from the word "perform") of money is what money allows you to perform when managing the reproductive process.

The proposal to recognize money as a means of redistribution of gross domestic product was made earlier on the basis of the need for their institutionalization in finance, recognition of their instrument of financial, budgetary relations.

Within the framework of the technological approach in the theory of the monetary approach, it is proposed to recognize the function of money as a measure of socio-economic responsibility and an instrument for ensuring this socio-economic and civil (property) responsibility Glushchenko (2012).

Recognition of the function of a measure of civil (property) responsibility for money is technologically necessary to ensure that money performs the function of a measure of value. At the same time, in order for money to perform the function of a measure of civil (property) responsibility, a certain level of quality of legislation (global and national) and the functioning of the legislative, law enforcement and judicial system is necessary. This is ensured by the systemic connection of monetary circulation with other spheres of the state Glushchenko (2012).

The function of money to ensure the sovereignty of the country is proposed to be allocated due to the following reasons. Firstly, historically, the right to mint and print money was assigned to the state power and was considered as an attribute of state sovereignty. Secondly, when issuing money by the state, there is a "senrage". Seigniorage is the income from coinage and the issue of paper money. The seigniorage historically belonged to the seigneur (sovereign)- the state. Thirdly, as practice shows, the issue of money is actively used by governments to solve the tasks of the state ; Fourthly, governments are waging "currency wars" among themselves, which may be related to government attempts to artificially lower the exchange rate of the national currency to ensure the price competitiveness of their country's goods; Fifthly, the global spread of the currency as a reserve currency allows the government and the central bank to influence geopolitics, world trade and national economies of other countries.

To quantify the effectiveness of money in this function, we use the concept of a monetary base. The concept of "monetary base" includes cash (in circulation and cash registers of banks); funds in mandatory reserves of banks; balances on correspondent accounts of banks in the central bank of the country Money (2000).

It can be proposed to calculate the coefficient of monetary (currency) sovereignty (Fac) of the country. This coefficient will be calculated as follows:

$$K_i = MB_i / MB_t.$$

where: $MB_i$ is a part of the monetary base that is used internally.

The $MB_t$ is the total monetary base of a particular country.

At the same time, the coefficient of global influence ($K_{gi}$) of a certain national currency can be found by the formula:

$$K_{gi} = MB_{wm} / MB_t;$$

where: MBwm is the part of the monetary base that is used as world money.

The $MB_t$ is the total monetary base of a particular country.

The analysis shows that the function of the measure of value is important for post-industrial money. This is explained by the fact that a decrease in the efficiency (a decrease in the level of equivalence) of using money as a measure of value simultaneously reduces the efficiency of performing other functions by post-industrial money.

The laws of monetary circulation are statements describing stable logical connections in the process of functioning of money in the monetary system and monetary circulation. It is possible to write down such laws of technological (instrumental, post-industrial) theory of money:

1) the key function of money within the framework of the technological theory of money can be called the function of money as a measure of value (the equivalent of the labor of associated producers).
2) post-industrial money only in one case simultaneously performs two functions: measures of value and measures of civil property liability.
3) in all other cases (except for the case of paragraph 2), money simultaneously performs three functions: the first function is a measure of value; the second function is a measure of civil property liability; the third function of money is one of the remaining functions of money (medium of circulation, means of payment, world money). With this approach, only five combinations of functions (functional situations) can be distinguished in the process of using money.
4) a decrease in the efficiency of money performing the function of a measure of value necessarily leads to a decrease in the efficiency of money performing other functions (means of circulation, means of payment, world money; money as a tool for redistributing GDP, a tool for ensuring civil (property liability)).
5) A critical decrease in the function of the measure of value may lead to the rejection of the use of money as a means of circulation. In this case, business entities switch to direct exchanges, for example, barter transactions.
6) Money performs the function of a measure of value constantly and always. It should be noted that the opposite is stated with the cost approach. With the cost approach, it is stated that "the function of the measure of value of money in monetary circulation does not perform. They perform this function before entering into monetary circulation" Money (2000). However, the following can be objected to this: money that would not perform the function of a measure of value in the process of its circulation would not be in demand in monetary circulation. In this regard, the well-known property of absolute liquidity of money is another additional argument in favor of the fact that money always performs the function of a measure of value.
7) The effectiveness of money as an instrument of social and economic management is associated with the performance of money of all its functions in the systemic unity of these functions.
8) The post-industrial monetary system has two levels of hierarchy: the global level; the level of national monetary systems.
9) The post-industrial monetary system belongs to the category of a large system that is characterized by the following properties: a large number of

heterogeneous elements; hierarchy; emergence; multifunctionality; reliability, stability, durability, etc.

10) The management system (subject)t of the global monetary system has a distributed nature. The subject of the monetary system may include international organizations (International Monetary Fund, World Bank, etc.); international currency exchanges; national governments; central banks of states; commercial banks; corporations; legal entities and individuals.

11) When the function of a measure of value is lost (for example, in conditions of high inflation), money ceases to function as a means of accumulation. It is known that in conditions of inflation in financial management it is recommended to invest money in non-monetary assets (real estate, gold, works of art, etc.) as quickly as possible.

Similarly, in case of loss, for example, in conditions of high inflation, the functions of the measure of value of money cease to perform the function of world money - the exchange rate of money subject to inflation decreases, etc.

The roles of post-industrial money represent the positive (or negative) results of the use of money in the reproductive process. Indicators of reliability and efficiency of performing these functions by money with a technological approach are reflected, in particular, in the roles of money in the reproduction process, risks. The crisis of the national monetary system can lead to a decrease in the gross domestic product of the country by 25%.

The main roles of post-industrial money can be recognized as: ensuring and maintaining the continuity of the reproduction process and all types of its technologies (political, socio-economic, technical, etc.); ensuring the exchange of assets; ensuring the liquidity of assets involved in the reproduction process; reducing the cost of circulation of assets in the reproduction process; and more.

It is proposed to use a technological approach in reforming the national and global monetary system based on the technological theory of money Glushchenko (2009). This section of this article allows us to say that the possibility of a technological approach in the theory of money can be justified, in which money is considered as a technological tool for the implementation of social and economic relations.

Let us now consider post-industrial monetary relations and monetary turnover. As you know: "Money turnover is a process of continuous movement of money in cash and non-cash forms" Money (2000). Depending on the nature of the serviced relations, the monetary turnover can be divided into three parts: monetary settlement; monetary and monetary and financial turnover Money (2000).

Money turnover arises due to the fact that money is involved in various social and economic relations. In the context of these relationships, money manifests its functions and roles.

It is participation in certain types of social (finance) and economic (finance, credit, price, etc.) relations that determines the need of the economy and the social environment of the state for money, as well as the specifics of money turnover and money circulation.

The most economically and socially significant types of relations in the monetary sphere can be called: wages; prices; investments; finance; credit; insurance, etc. Different types of monetary relations are expressed in various economic forms:

1) the relations connected with the distribution of the monetary form of the value of the social product constitute the content of the category of finance.
2) the relations arising in the process of commodity circulation on the basis of systematically performed acts of purchase and sale take the form of calculations carried out with the help of money as a universal equivalent and price as a monetary expression of value.

In different types of monetary relations, different functions (or sets of functions) of money are realized in different proportions:

- when working with everyday goods in the retail market, the following functions of money are more often used: measures of value and means of circulation.
- when interacting with the budgets of individuals and legal entities, the functions of a measure of value, a means of payment, a tool for redistributing gross domestic product are used.
- when carrying out investment operations, such functions of money as measures of value and means of accumulation are used to a greater extent.
- when making international trade transactions, such functions of money as measures of value and world money, ensuring sovereignty, etc. are used to a greater extent.

When managing macroeconomic processes in the country by regulating the money supply, the functions of a measure of value and an instrument for ensuring the sovereignty of the state are used, etc.

These types of monetary relations determine the volume and specifics of monetary turnover and the monetary system.

## 3. DISCUSSION

It is known that the monetary system (including the global monetary system) must comply with the principles of the world economy. If these principles do not correspond, a crisis of the world monetary system periodically arises, culminating in its collapse and the creation of a new monetary system. 2, p. 256. Therefore, it is likely that a new world monetary system will emerge as a result of the 2008-2022 crisis. The formation of a new monetary system at the international level and a monetary system at the national level should have its own scientific basis. To create a scientific basis for global and national monetary systems, it is necessary to develop the science of money. The technological theory of money is one of the private scientific directions of the science of money. The structural element of the science of money is the philosophy of managing the monetary system.

The philosophy of managing the monetary system is the most general knowledge (covering the essence, applicability, effectiveness, etc.) about objects, subjects, methods, methods, techniques, tools, and processes of managing money turnover and money circulation at the global and national levels. The science of money is a field of knowledge that systematically generalizes such types of knowledge: about the essence of money; the specifics of their functioning in various types of monetary relations; money turnover and circulation; the monetary system (global and national); methods and tools for regulating money circulation and turnover; methods and efficiency of the subjects of money circulation and circulation and other knowledge reflecting the specifics and nature of the impact of money on the social, economic, technological and environmental spheres of the state.

Briefly, the science of money is proposed to be called moneylogy (from the words "money" and "science- logos"), and in the interpretation in English from the same words, the science of money can be called moneylogy.

In the interests of the formation of the science of money (as part of economic theory or as a new scientific discipline), we formulate its object, subject, functions and roles as follows.

The object of the science of money (the field of activity investigated by this science): the essence of money; money turnover and money circulation; monetary system (global and national); methods and tools of management in the monetary system.

The subject of the science of money is part of the object under study - these are certain patterns of development and functioning of the monetary sphere of the economy and the social environment, reflecting the specifics of this science. The subject of the science of money can be recognized as: the essence of money; the conceptual apparatus of the monetary sphere; private theories of money (value, nominalistic, technological, etc.); methods of studying money turnover and money circulation; methods of legislative regulation of the rights and obligations of participants in monetary relations, and more. The science of money should develop as an integral system of theoretical and applied knowledge about the sphere of monetary relations and money turnover, the influence of money on the entire complex of processes of social production, the social sphere and such characteristics of life as efficiency, costs, risks, time of implementation of processes, etc.

At the same time, the theoretical part of the science of money should:

- to form fundamental knowledge about the essence of money and its manifestations in various types of monetary and commodity-money relations in various types of political, social, economic, technological, environmental activities.
- to develop the conceptual apparatus of this science and research methods, including logical and quantitative methods.

The applied part of the science of money should study: the problems of the functioning of modern money in various types of monetary and commodity-money relations; formulate, define and legislate the specifics of various technologies of monetary, commodity-money relations; be the basis of the organization of money turnover and circulation; develop methods and tools of monetary, commodity-money relations, money turnover and circulation; allow to assess the social and economic consequences of changes in the norms of monetary, commodity-money relations, money turnover and circulation; to form methods for assessing the effectiveness of monetary, commodity-money relations, money turnover and circulation; to establish criteria for the effectiveness of state regulation of monetary, commodity-money relations, money turnover and circulation, and more.

One of the basic concepts of the technological (instrumental) theory of money should be recognized as the concept of "technology of money circulation".

In this article, we will call the technology of monetary circulation (or turnover) a set of its elements: a monetary unit; methods of issuing money; methods of organizing and managing monetary circulation; qualification skills of participants in monetary circulation; technical means used in monetary circulation and others.

In the process of forming the science of money, it is necessary to take into account that the methodological analysis of the process of scientific cognition allowed us to isolate two types of research techniques: techniques inherent in human cognition as a whole (analysis, synthesis, induction, deduction, abstraction

and generalization); methods and techniques characteristic only of scientific cognition. The scientific method in the general theory of money (the science of money) is a system of principles and techniques by which objective knowledge of reality in this area is achieved.

The science of money developed in this article (the general theory of money) systematically covers all types of monetary and commodity-money relations in all spheres of human activity (political, social, economic, technological, environmental). This science covers the processes of managing all types of monetary relations and money turnover in these areas of activity.

Within the framework of the system-management approach, the object of studying the science of money (the general theory of money) is proposed to name the processes of political and socio-economic management in the field of monetary relations. The use of funds in management processes is regulated by law and business practices. In the process of social and economic management, monetary funds and cash flows can be considered simultaneously as objects and subjects of management in the social and economic spheres.

With a system-management approach, it is proposed to refer to the subject of the science of money such elements inherent in it:

1) specific methods and tools for studying the essence of money and the specifics of their impact on various spheres of human life.
2) special methods, methods, tools for determining and fixing at the global and national levels in legislation methods of managing monetary relations and money circulation in the process of human participation in socio-economic management.
3) changes in the efficiency, costs, and risks of political, social, economic, technological, environmental activities in national and global socio-economic systems generated by this impact of monetary relations and monetary turnover, etc.

The method of the science of money (general theory of money) combines the following areas: principles and techniques by which the removal of uncertainty is achieved, objective knowledge of the social and economic essence of money; methods and tools for using money in political, socio-economic, technological spheres of human life; methods of state and public control of money relations and money turnover management.

Historical and logical methods of cognition of a two-level monetary system are possible. The historical method is associated with the study of the development of objects and their properties in chronological order. This method, in particular, is presented in Table 1 of this article. The logical method of cognition is applicable to the analysis of both the chronological (historical) sequence of states, as well as the structure, cause-and-effect relationships of an object and/or process. This method is reflected, in particular, in Table 2 of this article.

The essence of the science of money is expressed in its functions and roles. The functions of the science of money are manifested in its actions, namely in the fact that this science (the general theory of money) performs in the political, social, economic, technological, ecological subsystems of the state.

The analysis shows that the following functions of the science of money and private theories of money (cost, nominalistic, technological, etc.) can be distinguished: philosophical support, legislative, methodological, cognitive, instrumental, prognostic, ideological (ideological and educational), preventive, socialization.

The function of philosophical justification in the science of money is to develop a philosophical (most general) view of the place, functions and role of money and monetary relations, monetary circulation in the destinies of modern civilization. Ideology in the science (private theories) about money is a system of views on the main goal of the science of money; the emergence and evolution of key concepts, stages of the development of science (private theories) about money; the power sources of money and the imperative of monetary relations; the influence of money on power in society; the methodology of power distribution in monetary relations and monetary circulation, etc.

The policy in the sphere of monetary relations and monetary circulation is based on the philosophy and ideology of monetary relations and monetary circulation. The policy in the sphere of monetary relations and monetary circulation is a system of state and public practical measures and impacts on the processes in the sphere of monetary relations and monetary circulation (on a global and national scale) occurring in the internal and external environment of the state, society, economy, social sphere.

The legislative function of the science of money (the general theory of money) consists in the theoretical justification and formulation of the norms of positive law. These norms are necessary for the effective functioning of the monetary sphere and various types of monetary relations, payment systems. In the legislative function of the science of money, it is necessary to include the charters of issuers of digital money and cryptocurrencies, currency exchanges.

The methodological function of the science (private theories) about money consists in the development of theoretical foundations and methodology for the study of the essence and social, economic, technological aspects of the implementation of various types of monetary relations, money turnover and money circulation.

The cognitive function of the science of money (private theories of money) covers the processes of accumulation, description, and study of the facts of reality. These facts are related to the following: the essence of various forms and types of money; the specifics of the use of money in various spheres of life; methods and tools for implementing various types of monetary relations; methods of building monetary systems (global and national) and others.

The instrumental (regulatory) function of the science (theories) about money has a practical character. It consists in developing practical recommendations for global governance bodies, public administration bodies, financial and credit organizations, commercial and non-profit organizations, citizens in the field of legality and efficiency, methods, tools for using money in the process of life and social production.

The prognostic function of the science (private theories) about money is to develop methods and assessments of the sufficiency and effectiveness of the use of funds within the global, national economy and the activities of social and economic entities.

The ideological (ideological and educational) function of the science of money can find expression: in the development, justification of certain legal, civic ideals and values that ensure understanding and recognition of the place of money and monetary relations in the process of human life, and more.

The preventive function of science (and private theories) about money is to study the risks of the monetary system. This function is aimed at avoiding crises in the monetary system.

The function of socialization in the science of money (theories of money) is to prepare knowledge about money, monetary relations, money turnover for their assimilation and practical use by all subjects of the economy and society.

The role of money science can be considered at several hierarchical levels. For global governance bodies (the World Bank and others), the role of money science is to increase the efficiency of managing the development of international monetary and credit relations.

For the state, the role of money science is to reduce geopolitical risk and ensure the development of monetary policy aimed at creating monetary macroeconomic conditions for sustainable political, social, and economic development. For subjects of social and economic activity, the role of money science is to reduce price, inflation, investment, currency risk and asset liquidity risk.

Structural elements of the science of money can be considered:

First, private theories of money: value, nominalist, state, functional, technological, and other theories of money.

Secondly, theories of known forms of monetary relations (price, investment, speculation, finance, credit, wages, insurance, etc.).

Thirdly, methods of constructing and evaluating the effectiveness of monetary systems, their compliance with social and economic conditions, and more.

Private theories of money have important theoretical and practical significance. Each of the particular theories of money defines the object of control in the monetary system. The theory of money is the basis for building monetary control systems on a global and national scale. Within the framework of each of the theories of money (nominalistic, value, etc.), there is its own object of monetary control. Within the framework of the metal theory of money, the quality and quantity of metal in coins are controlled. Within the framework of the nominalist theory of money, the correspondence of the amount of gold in the gold reserves of the state and the number of banknotes of this gold is controlled. Within the framework of the quantitative theory of money, the number of banknotes is controlled for their compliance with the quantity of goods. Within the framework of the technological theory of money, the object in the monetary control system is the functions and roles performed by money.

It is proposed to recognize such theoretical concepts and knowledge in this field as structural elements of the methodology of the science of money:

- methods and methods of determining the optimal amount of money in the economy and social environment in their systemic unity with the tasks of social production and social life.
- methods and forms of legislative consolidation of the essence and technologies of money circulation within the framework of various types of monetary relations.
- legally established methods, methods, and tools for managing money turnover and money circulation.
- methods of work of management and control of money turnover and money circulation in the country (organizational approach in the science of money).
- relations between subjects of various types of monetary relations arising in the course of their social and economic activities (institutional approach in the science of money).

- methods of state and public control of the work of monetary institutions in the economy, etc.

Structural elements of the legal foundations of the science of money are proposed to recognize: the philosophy of money; the philosophy of law; financial, insurance and banking legislation; charters of issuers of post-industrial money; charters of currency exchanges and credit institutions; legislation in the field of scientific and innovative activities, etc.

It is possible to formulate such laws of the science of money.

1) The main motives for the development of the monetary system can be called: reducing the costs of monetary circulation; increasing the level of convenience and safety of users; using the achievements of science and technology.
2) Money is a technological tool of socio-economic processes, in particular, technologies: asset exchanges between subjects of social and economic activity; accumulation of resources; transfer of value beyond the borders of the state and others.
3) The essence of money reflects its functions and the role of money in the process of social production and social relations.
4) Cheaper and more convenient money for consumers displaces more expensive and less convenient money
5) Consumers pay for the use of less expensive and more convenient money by increasing inflation and currency risks.
6) The currency and inflation risk of the national monetary system are determined by the ratio of the bank money multiplier and the innovative money multiplier in the national economy.
7) The monetary system can be interpreted as a sphere of services aimed at establishing equivalence and ensuring reliable and uninterrupted exchange of assets; accumulation of resources in monetary form; transfer of value beyond the borders of the state, and more.

The dominant direction of the development of the world and national monetary systems is to save money circulation costs while ensuring certain characteristics of money circulation (speed- payment terms; reliability of payments; safety of money, etc.).

The factors influencing the development of the modern monetary system include: the desire of states to increase the share of non-cash payments; the desire of banks to bring their services closer to customers (payment terminals; Internet banking); to reduce liquidity restrictions (to extend the client's access time to money on his account) and others.

At the same time, there is also a directly opposite trend: the desire to globalize transactions of economic entities and the social environment; the desire to minimize state control in the field of finance, and more. The intensive development of the cryptocurrency market can be considered an expression of the tendency to increase the degree of freedom of economic and social subjects.

As already noted, even Aristotle, talking about money, concluded that simply equating all goods to one contradicts the true nature of things. Aristotle believed that equating all goods to one is an artificial device that is used to meet the needs of society. This can be considered as an additional argument in favor of the technological theory of money, the interpretation of money as a tool for determining

the price of various goods within the framework of social and economic technologies.

In the sphere of monetary circulation, the Copernicus-Gresham law is known: "The worst money displaces the best from circulation." Within the framework of the technological theory of money, this law may sound like this: "Cheaper and more convenient money for consumers displaces more expensive and less convenient money." At the same time, currency and inflation risks become a kind of "payment" for cheaper and more convenient money for consumers. These risks are absent when using full-fledged money.

In the banking sector, the concept of a "bank multiplier" is well known. But there is no answer to the question: what balances the bank multiplier? In this article, the hypothesis is put forward that in the national economy, the bank multiplier is balanced by an innovative money multiplier. This assumption refers to the structural (but not monetarist) theory of inflation reduction.

Within the framework of the structural theory of inflation reduction, we will assume that the currency and inflation risk of the national monetary system are determined by the ratio of the bank money multiplier and the innovative money multiplier in the national economy.

As you know, the effect of the bank (deposit) multiplier arises as a result of the passage of money in the economy. The monetary innovation multiplier arises as a result of the use of technologies in the processing of raw materials. This multiplier describes the increase in the cost of products during their processing with the use of high technologies.

The impact of innovation activity on the monetary system was considered in works Glushchenko (2016),. Let's agree to call the excess of the cost of final products over the cost of raw materials and raw materials an innovative monetary multiplier. An example of the action of an innovative money multiplier: the cost of an automobile engine is about 30 times more than the cost of raw materials (aluminum) of the same weight.

If the bank multiplier (Mb) exceeds the innovative monetary multiplier (Mi) in the national economy, then inflation is observed, and inflationary and currency risk arises. If, on the contrary, the innovative money multiplier (Mi) exceeds the bank multiplier (Mb), then deflation can be observed, and the currency becomes solid – its exchange rate increases.

The materials of this article show the great importance of the risks of the monetary system for global and national economies. These risks can be reduced by further developing the science of money.

Global and national monetary authorities may be encouraged to open funding for further research in the field of money science.

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## 4. CONCLUSION

The article discusses the relevance of the development of the technological theory of money as a theoretical basis for the development of the post-industrial monetary system. The paper analyzes the development of the monetary system as a function of changing technological patterns. At the same time, the influence of the level of technological development on the monetary system is confirmed. The category of post-industrial money is proposed to include digital and electronic

money, cryptocurrencies. The methodological provisions of the technological theory of money and the science of money are formed in the work. It is shown that further development of the science of money will lead to a reduction in risks in the formation of a post-industrial monetary system.

The organization and financing of systemic research of the monetary system, the development of the science of money and the technological theory of money can be recognized as very relevant.

Subjects interested in the further development of the science of money and the technological theory of money may be invited to finance the process of further development of the science of money.

This can reduce the risks of global and national monetary systems in the period of post-industrial development and the formation of the 9th technological order in the economy and society.

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