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PECULIARITIES OF CRYPTOCURRENCY FUNCTIONING

The article points out the prevalence of cryptocurrencies in modern society and explores the peculiarities of their use. The systematization of literary sources, foreign experience and market data shows that there is a debate and certain differences in the understanding and interpretation of the essence of cryptocurrency, which affects its introduction into business activities and use by citizens both at the legislative level and by the financial system. The urgency of solving this problem lies in the fact that the state must respond quickly to changes in society and adapt to them, preventing negative consequences, first of all, for the state itself, as well as for ordinary citizens. The methodological basis of the study is the use of methods of analysis, synthesis, theoretical generalization, economic and statistical methods. The article identifies the main features of cryptocurrency as a phenomenon and ways of its use. The expediency of its introduction into legal circulation is substantiated. The negative aspects that harm the financial system of the state and the factors that help the latter to develop are highlighted. Foreign experience of regulating the use of cryptocurrency and its taxation is presented, which has a positive impact on the legal and financial spheres of state activity. Given the identified weaknesses and strengths of cryptocurrencies, the threats to the use of cryptocurrencies and further opportunities for it are formulated. The article examines the current state of development of the cryptocurrency market and compares it with the market of 2017: the price, market capitalization and percentage of the total market capitalization of cryptocurrencies are analyzed. The article lists possible investment activities related to cryptocurrency. The impact of cryptocurrencies on the environment is studied. The necessity of state intervention in regulating the circulation of cryptocurrencies is indicated, finding options for overcoming the consequences of the weaknesses of cryptocurrencies.

Keywords: *currency, cryptocurrency, financial instrument, taxation, investment.*

ОСОБЛИВОСТІ ФУНКЦІОНУВАННЯ КРИПТОВАЛЮТ

У статті вказано на поширеності криптовалют у сучасному суспільстві та досліджено особливості її використання. Систематизація літературних джерел, закордонного досвіду та даних ринку свідчить про дискусійність та певні розбіжності у розумінні та трактуванні сутності криптовалюти, що впливає на її впровадження в діяльність бізнесу та використання громадянами як на законодавчому рівні, так і з боку фінансової системи. Актуальність вирішення поставленої проблеми полягає у тому, що держава повинна швидко реагувати на зміни у суспільстві та пристосовуватись до них, запобігаючи виникненню негативних наслідків насамперед для самої держави, а також і для пересічних громадян. Методологічною основою здійсненого дослідження є використання методів аналізу, синтезу, теоретичного узагальнення, економіко-статистичний. У статті визначено головні особливості криптовалюти як явища, способи її використання. Обґрунтовано доцільність впровадження її у законний обіг. Виокремлено негативні аспекти, що завдають шкоди фінансовій системі держави, та чинники, які допомагають останній розвиватись. Наведено закордонний досвід врегулювання використання криптовалюти та її оподаткування, що позитивно впливає на правові та фінансові сфери діяльності держави. З огляду на

виокремлені слабкі та сильні сторони криптовалюти, сформульовано загрози використання криптовалют та подальші можливості щодо неї. У статті досліджено сучасний стан розвитку ринку криптовалют та здійснено порівняння з ринком 2017 року: проаналізовано вартість, ринкову капіталізацію та відсоток від загальної ринкової капіталізації криптовалют. Проаналізовані можливі види інвестиційної діяльності щодо криптовалюти. Досліджено вплив криптовалюти на навколишнє середовище. Вказано на необхідності втручання держави у врегулювання обігу криптовалют, знаходячи варіанти подолання наслідків слабких сторін криптовалюти.

Ключові слова: валюта, криптовалюта, фінансовий інструмент, оподаткування, інвестування.

General statement of the problem and its connection with important scientific and practical tasks. In the 21st century, cryptocurrencies began to be actively used, and transactions with them have become very common indeed. Today, it is freely purchased and disposed of by individuals every day, and training courses on how to earn cryptocurrency are being developed on a massive scale. For example, the Spendabit search engine has 5 million products available in hundreds of stores for bitcoin. The Coin ATM Radar website offers the addresses of ATMs in 79 countries where Bitcoins can be exchanged for cash. Some business entities accept cryptocurrencies to pay for goods and services. Even Ukrainian banks: PrivatBank and Monobank provide an opportunity to exchange cryptocurrency for hryvnia or hryvnia for cryptocurrency. However, at the same time, cryptocurrencies are an under-researched phenomenon that lacks a unified approach to understanding. In view of this, governments, legislatures, central banks, and tax authorities of different countries often express different, if not contradictory, opinions and decisions on the financial and legal aspects of cryptocurrency use. In some countries, it is prohibited, in some countries there is an unresolved gap in the cryptocurrency regulations (Ukraine is one of them), and in others, its status, the procedure for transactions with it, taxation, etc. are clearly defined. However, the world is always changing and developing, and therefore requires research and response to such changes. The use of cryptocurrencies is now closely linked to the economy, and therefore, in order to prevent a negative impact on the state's financial system, all the risks and benefits of legal cryptocurrency circulation in society should be investigated.

Analysis of recent studies that have begun to resolve the problem. The works of many domestic and foreign scientists are devoted to the study of certain aspects of cryptocurrency: R. Cohen, A. Grinspans, E. Mak, D.S. Vakhrushev, O.V. Zheleznov, O.P. Demidov, O.V. Kvitka, D.E. Kozenkov, V.O. Riadinska, Y.G. Momot, L.M. Logoyda and others. However, despite the large amount of already available scientific materials, cryptocurrency remains an unexplored phenomenon.

Objectives of the article. The purpose of the article is to study the risks and benefits of cryptocurrency circulation for the financial system of the state.

Presentation of the main material of the study with a full justification of the obtained scientific results. Given the widespread use of cryptocurrencies in the field of payment for goods and services and bank exchanges, it can be argued that cryptocurrencies have functions inherent in money. The European Court of Justice also drew attention to this in paragraph 52 of the judgment in the case of David Hedqvist v. Skatteverket (Swedish Tax Authority) (<https://eur-lex.europa.eu/legal-content/EN/TXT/%20PDF/?uri=CELEX:62014CJ0264>). The court noted that Bitcoin has no other purpose than to be a means of payment and ruled that transactions with Bitcoin and other virtual currencies in the European Union should not be subject to value added tax. This court decision equates virtual currencies with traditional currencies.

As for foreign experience, Japan adopted the Payment Services Act in 2017, which recognized cryptocurrency as a legal tender that can perform the functions of currency (Nekit K.H., 2021). Germany legalized cryptocurrencies as «personal money» back in 2013, which is now perceived as a financial instrument in accordance with the German Banking Act.

However, even though cryptocurrencies are already a common means of payment for goods and services, they are characterized by significant volatility. For example, if we compare the value of 1 Bitcoin from 2011 to 2023 (Fig. 1 (developed according to the source (<https://coinmarketcap.com/currencies/bitcoin/>) as of January of each year)), we can see that the rate rises and then falls sharply. In addition, the price of cryptocurrencies changes every second, and the difference in price can be hundreds of dollars during the day, regardless of political or financial reasons. The exchange rate fluctuates unpredictably only due to supply and demand. There are no tools to influence the price of cryptocurrencies, which can negatively affect the financial system of the state. Thus, the price of 1 Bitcoin in November 2021 was more than \$60,000, and in January 2022 - more than \$46,000, and as of now - more than \$29,000.

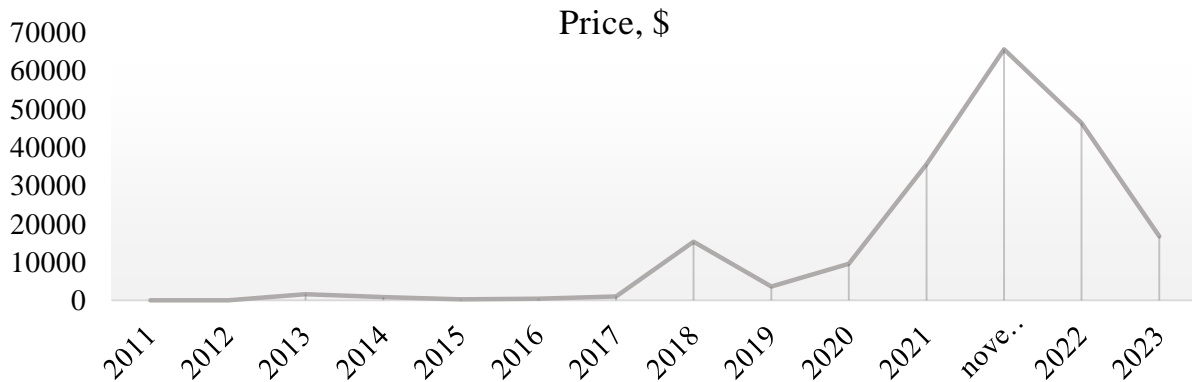


Fig. 1. Dynamics of the price of 1 Bitcoin from 2011 to 2023

In the 21st century, interest in cryptocurrencies as an investment tool is constantly growing. The more favorable the conditions for cryptocurrency circulation in a country, the more investors can be attracted, and this will have a positive impact on the state budget. It is also one of the activities that generates income for ordinary citizens and thus provides them with opportunities for a better life.

You can invest in the creation of cryptocurrency companies. For example, companies that will be engaged in mining (creating cryptocurrencies, maintaining cryptocurrency security, producing mining equipment, etc.) Such companies include MicroStrategy Incorporated, Robinhood Markets, and PayPal Holdings.

You can also invest in crypto funds that manage investors' funds so that they can make a profit on their own deposits. This type of investment is much more profitable than bank deposits in national currency. For example, Barry Silbert bought Bitcoin back in 2012, when the price per coin was only \$5-12. Today, he founded the largest investment company specializing in cryptocurrencies, Digital Currency Group, which manages more than \$50 billion and has 5 other subsidiaries, which are crypto exchanges, platforms for cryptocurrency trading, lending, and mining. Thus, the volatility of cryptocurrencies is even a positive phenomenon, as changes in the value of cryptocurrencies can bring very high profits.

However, it should be noted that cryptocurrencies have no value in and of themselves, they can disappear unpredictably, their value can be speculated, and they are unstable. As mentioned above, cryptocurrencies offer great opportunities for high profits. However, it has several significant drawbacks. Traditional national currency is backed by foreign exchange reserves, and tomorrow it will not disappear, its value will also be backed. If we turn to cryptocurrency, it is something intangible that is created artificially and has no backing. The cryptocurrency itself is mined through mining, which results in cryptocurrency transactions. If mining is stopped, the cryptocurrency will disappear, it will cease to exist as such.

In terms of cryptocurrency volatility, we will analyze the percentage of the total market capitalization of cryptocurrencies (Table 1 (developed according to the source)) (<https://coinmarketcap.com/charts/>).

Table 1. Dynamics of the total market capitalization of cryptocurrencies

Cryptocurrency	November 2013	February 2017	June 2017	January 2021	July 2023
Bitcoin (BTC)	96,33%	86,3%	39,17%	71,89%	48,09%
Ethereum (ETH)	0%	5,62%	27,47%	10,66%	19,05%
Tether USDt (USDT)	0%	0,12%	0,14%	2,55%	7,06%
Binance Coin (BNB)	0%	0%	0%	0,67%	3,15%
Ripple (XRP)	1,45%	0,98%	10,9%	1,21%	3,16%

Total market capitalization is the total value of all cryptocurrencies in circulation on the market. It can be determined by multiplying the amount of cryptocurrency in circulation by its corresponding current price. The higher the percentage of the total market capitalization of a particular cryptocurrency, the more stable it is. The total market capitalization allows investors to quickly assess the feasibility of investing in a particular cryptocurrency by comparing its total value with other cryptocurrencies, as a lower market capitalization means higher investment risks. Thus, observing in Table 1 the constant fluctuations in the percentage of the total market capitalization, it can be argued that the stability of cryptocurrencies is unstable and unpredictable.

It should also be noted that there is a constant creation of new cryptocurrencies that replace the old ones. Thus, let's compare the top 5 cryptocurrencies as of 2017 (Table 2) and 2023 (Table 3) (developed according to sources (Shirinian L.V., Rohanova H.O., 2018), (<https://coinmarketcap.com>)).

Table 2. Analysis of the cryptocurrency market in 2017

Cryptocurrency	Year of creation	Price, \$	Market Cap, million \$
Bitcoin (BTC)	2009	5989	99 640
Ethereum (ETH)	2015	304	29 011
Ripple (XRP)	2012	0,21	8 112
Litecoin (LTC)	2011	60,8	3 250
Dash (DASH)	2014	250	2 206

Table 3 Analysis of the cryptocurrency market in 2023

Cryptocurrency	Year of creation	Price, \$	Market Cap, million \$
Bitcoin (BTC)	2009	29 478,45	573 037
Ethereum (ETH)	2015	1 858,36	225 232
Tether USDt (USDT)	2014	0,9995	83 865
Binance Coin (BNB)	2017	245,12	37 720
Ripple (XRP)	2012	0,6944	36 591

Over the past 6 years, only BTC and ETH have not lost their positions, increasing their price and market capitalization, which characterizes them as the most stable cryptocurrencies. XRP, although it also increased its price and market capitalization, moved from 3rd to 5th place. USDT and BNB have also become widespread cryptocurrencies, replacing LTC and DASH. Comparing the current positions of these two cryptocurrencies, it should be noted that the price of 1 LTC is \$86.48, the market capitalization is \$861 million, which is currently 11th among

cryptocurrencies, and the price of 1 DASH is \$32.08, the market capitalization is \$60 million, which is currently 92nd among cryptocurrencies. Thus, it should be noted that the cryptocurrency market is very volatile. Every day, a new cryptocurrency can appear that will become more profitable, and investing in cryptocurrencies that will depreciate will become a burden for investors. Therefore, using cryptocurrencies in your business is very risky.

It should also be borne in mind that the use of cryptocurrencies is subject to hacker attacks. For example, in October 2022, the Binance crypto exchange was hacked and about \$100 million in Binance Coin was stolen. Thus, investors bear high risks when investing in cryptocurrencies. This lack of confidence in the security of cryptocurrencies will have a negative impact on the financial system.

The following examples can also be cited as examples of instability and speculation. For example, in 2017, the price of the Monaco cryptocurrency rose by 695% because of its developers' promise to link the cryptocurrency to the Visa payment system. However, there was no agreement on such a relationship at the time. We can also recall how the price of cryptocurrency turned out to be dependent on Elon Musk's tweets. In 2021, Elon Musk wrote the hashtag «#bitcoin» in his Twitter profile description, after which the price of Bitcoin immediately increased by 20%. In the same year, he announced that Tesla would not accept payment for electric cars in Bitcoin due to the unecological way of obtaining cryptocurrency, which caused the price of Bitcoin to drop by 17%. In 2022, Elon Musk wrote the word «dojo» in response to a comment from a Twitter user, which caused the price of cryptocurrency to rise by more than 500% in half an hour. In fact, there are many such examples, not only in relation to Bitcoin, and Elon Musk himself has even started to manipulate the price of cryptocurrencies in this way. Yes, it can be noted that traditional currency also tends to depreciate under the influence of inflation, but the change in its value is a few percent and is preceded by relevant significant circumstances. Cryptocurrencies, on the other hand, can change their price dozens or even hundreds of times a day.

Attention should be paid to the state's interest in the use of cryptocurrencies, as this immediately raises the issue of taxation of such an object and activities related to it. This is another area of taxation to fill the state budget.

According to Opendatabot's analysis of the declarations filed by public officials in Ukraine in 2020, 652 people own 46,351 cryptocurrencies (<https://opendatabot.ua/analytics/bitcoin-2021>). As of April 5, 2021, this amounted to 75 billion hryvnias. However, no taxes have been paid on this property, as there is no such obligation in the Tax Code of Ukraine. In addition, the question arises as to how many ordinary citizens who are not required to file such declarations conduct cryptocurrency transactions and do not pay taxes due to the lack of regulation.

If we look at the foreign experience of Japan and Germany, which have already been mentioned as having legalized cryptocurrencies as means of payment, in Japan, cryptocurrency income is defined as other income or business income, and therefore is subject to income or capital gains tax. The tax rate ranges from 5 to 45%, depending on the personal income tax. In addition, there is also a municipal tax (10%) that is added to any tax rate. In Germany, profits from the sale of cryptocurrencies are subject to income tax at a rate of 45% if they are sold within 12 months of their purchase (<https://www.oecd.org/tax/tax-policy/taxing-virtual-currencies-an-overview-of-tax-treatments-and-emerging-tax-policy-issues.pdf>).

Thus, there is currently no proper regulation of cryptocurrency transactions in Ukraine. However, you can find a tax consultation dated December 2, 2020, No. 4928/IPK/99-00-04-05-03-06, in which the State Tax Service considered an appeal regarding the taxation of income from the sale of cryptocurrency (<https://buhgalter911.com/normativnaya-baza/pisma/gpsu/list-dps-vid-1055827.html>). The State Tax Service determined that the income received by a

resident individual from the sale of cryptocurrency to another resident individual is included in the total monthly (annual) taxable income as other income with the appropriate taxation. If the income is paid by a non-resident, it is taxed on the same basis as foreign income. That is, in both cases, individuals must pay an 18% personal income tax and a 1.5% military levy. However, the costs of acquiring cryptocurrency are not considered, and therefore the tax is paid not on the difference between income and expenses, but on the entire amount received from the sale of cryptocurrency. In our opinion, this is unfair. The mechanism of taxation of cryptocurrency transactions for individual entrepreneurs and legal entities is also unclear, as there are no explanations from the State Tax Service on these issues.

However, one should not forget about the anonymity of cryptocurrencies. Anonymity means the impossibility of tracking the executors of a cryptocurrency transaction.

Cryptocurrencies are anonymous because they are decentralized. This means that there is no intermediary such as a bank, as in the example of a traditional national currency. When suspicious transactions occur on bank accounts, the bank asks for information that can confirm the legitimacy of the funds. This makes it possible to easily identify illegal activities and notify the relevant authorities. In the case of cryptocurrencies, transactions take place only between the sender and the recipient of the cryptocurrency to their personal wallets. Transactions take place from addresses encrypted with numbers and letters that do not allow identifying a specific transaction to any person.

Due to the absence of an intermediary (bank) in cryptocurrency transactions, it is impossible to seize cryptocurrency, suspend transactions with it, or cancel a payment. Thus, the state is unable to control financial flows, including across borders. In addition, the lack of control over cryptocurrencies simplifies the mechanism of trade in prohibited goods, such as weapons and drugs. This was also emphasized by Europol in its 2017 report «Organized Crime Threat Assessment on the Internet» (<https://www.europol.europa.eu/sites/default/files/documents/iocta2017.pdf>). Europol notes that transactions cannot be linked to a specific user/address; all coins used in a transaction are «hidden» by default, and transaction histories are kept private. That is why cryptocurrencies are very attractive for committing illegal acts, as they can easily finance terrorism, and it is impossible to trace individuals for prosecution.

It should also be noted that the use of a large amount of electricity required for mining is currently harmful to the environment. According to a study by Cambridge University researchers, as of August 2023, 139 terawatt-hours of electricity are consumed per year to create bitcoins, which is roughly equal to the electricity consumption of Pakistan (132,3), Ukraine (134,3), Malaysia (150,8), and Poland (158,2) (<https://ccaf.io/cbnsi/cbeci>). As of August 2023, bitcoin creation causes 70.4 million tons of carbon dioxide emissions, which is roughly equivalent to the emissions of New Zealand (72,6), Kenya (73,4), Cambodia (71,8), and Austria (69,8) (12).

However, more and more companies are recognizing the environmental impact of cryptocurrencies and trying to fulfill their ESG obligations. According to data published by CoinShares, more than 70% of the electricity used for the bitcoin network is currently derived from alternative energy sources. According to a 2020 study by The *Cambridge Centre for Alternative Finance* study, 39% of the total energy used to create bitcoin came from alternative energy sources in 2019 (28% in 2018). Moreover, 76% of miners use alternative energy sources as part of their energy mix (Apolline Blandin, Dr. Gina Pieters, Yue Wu, Thomas Eisermann, Anton Dek, Sean Taylor, Damaris Njoki, 2020). A significant increase in renewable energy has a positive impact on the environment and reduces the state's environmental obligations.

Based on the above, the following conclusions can be drawn in the form of a table (Fig. 2), which indicates the strengths, weaknesses, opportunities, and threats of using cryptocurrencies.

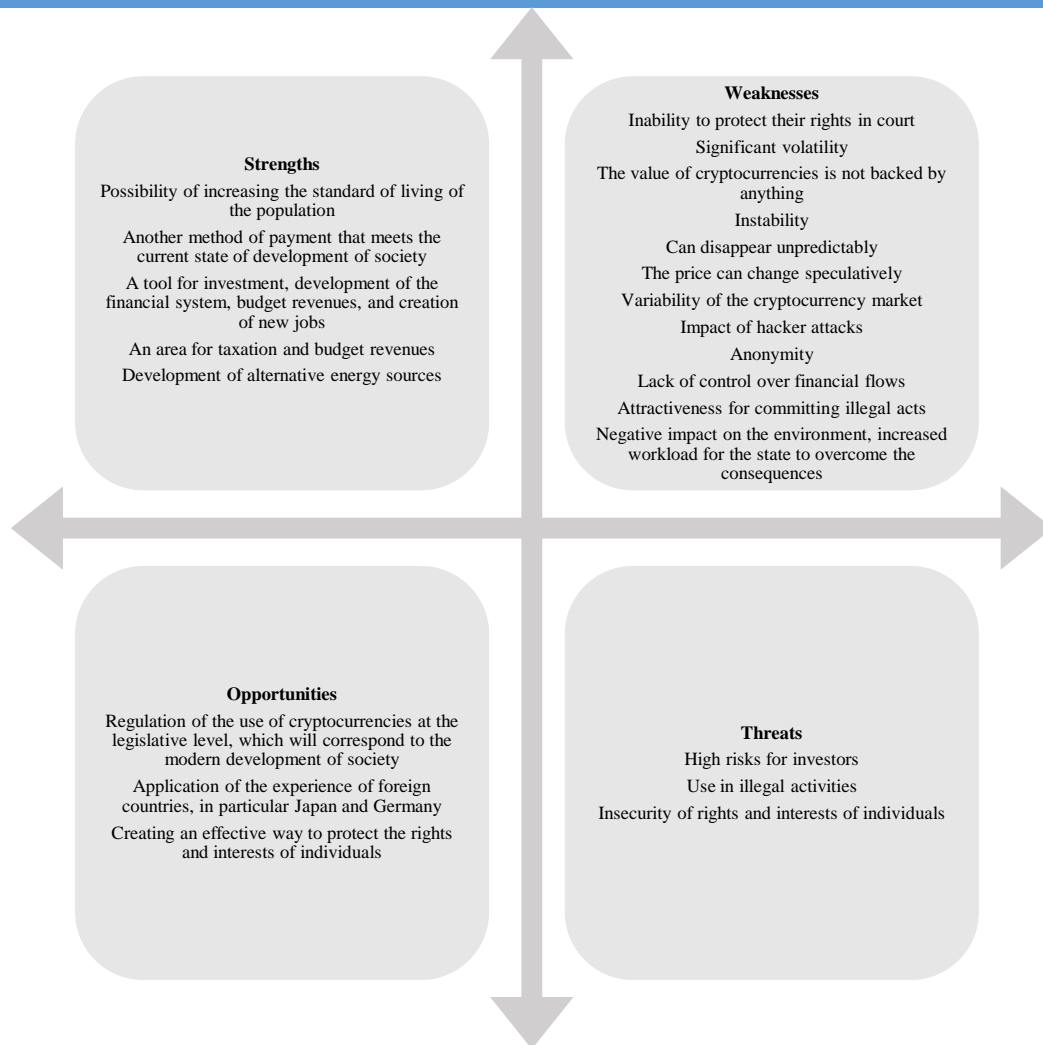


Fig. 2. SWOT analysis of the use of cryptocurrencies

Conclusions. Thus, the use of cryptocurrencies currently has more negative consequences for the financial system than positive ones. We can say that it is currently overvalued. Cryptocurrencies are unreliable, uncontrolled, and can easily disappear. Individuals bear a great risk by becoming its owner. In addition, if the cryptocurrency disappears, it will also be impossible to protect their rights. However, the onset of negative consequences can be prevented by state intervention in its regulation.

Author's contributions.

Conceptualization: Lesia Ishchuk, Viktoriia Ishchuk

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Purchase of funding: Lesia Ishchuk

Methodology: Lesia Ishchuk, Viktoriia Ishchuk

Project administration: Lesia Ishchuk

Writing: Lesia Ishchuk, Viktoriia Ishchuk

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