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The Impact of the Digital Economy on Investment Portfolio Management in the Stock Market

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ABSTRACT

Digitalization in the stock market and the use of innovative data processing and analysis technologies have led to the emergence of new approaches to the formation of investment portfolios of different types of investors. The purpose of the article was to identify modern approaches to the formation of investment portfolios of different types of investors (retail, professional) in the context of the development of new technological sectors. It is proposed to consider an investment portfolio as a set of financial assets owned by an investor for a certain period of time and with a certain level of profitability depending on the level of risks taken. It is determined that the use of digital solutions in the formation of an investment portfolio contributes to a more rational approach to the selection of assets, reduces transaction costs for the acquisition of assets and increases the level of diversification of acquired financial assets. Under the influence of the digitalization of the economy and the emergence of new technological companies and startups, investors apply a dynamic approach to the formation of a highly diversified investment portfolio, combining in it the assets of exchange-traded investment funds, shares of companies from high-tech sectors and alternative assets (cryptocurrencies). A high level of prevalence of passive investment strategies through exchange-traded funds, an increase in the level of investment in shares of technology companies in new sectors of the economy, and a tendency to invest in high-risk and high-yield digital assets were revealed. It was found that digitalization and data analytics on digital platforms allow the development of personalized investment solutions using the recommendations of robo-advisors. The latter allows for a more balanced approach to investment based on rational, well-founded decisions made on the basis of data analytics. It was found that the use of algorithmic trading is a common phenomenon, which provides high liquidity in the stock market and minimizes risks for professional investors.

KEYWORDS

digital economy, stock market, investment portfolio, dynamic investing, investment portfolio diversification, risk, return.

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Вплив цифрової економіки на менеджмент інвестиційного портфеля на фондовому ринку

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СТАТТЯ

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АНОТАЦІЯ

Цифровізація на фондовому ринку та використання інноваційних технологій обробки й аналізу даних призвели до появи нових підходів у формуванні інвестиційних портфелів різних типів інвесторів. Мета статті полягала у визначенні сучасних підходів до формування інвестиційних портфелів різних типів інвесторів (роздрібних, професійних) в контексті розвитку нових технологічних секторів. Запропоновано розглядати інвестиційний портфель як сукупність фінансових активів, які перебувають у власності інвестора на визначений період часу та з певним рівнем прибутковості залежно від рівня прийнятих ризиків. Визначено, що використання цифрових рішень при формуванні інвестиційного портфеля сприяє більш раціональному підходу до вибору активів, знижує транзакційні витрати на придбання активів та підвищує рівень диверсифікації придбаних фінансових активів. Під впливом цифровізації економіки та появи нових технологічних компаній, стартапів інвестори застосовують динамічний підхід до формування високо диверсифікованого інвестиційного портфелю, поєднуючи у ньому активи біржових інвестиційних фондів, акції компаній із високотехнологічних секторів та альтернативні активи (криптовалюти). Виявлено високий рівень поширеності пасивних стратегій інвестування через біржові інвестиційні фонди, збільшення рівня інвестування в акції технологічних компаній у нових секторах економіки, тенденцію до інвестування у високоризикові та високодохідні цифрові активи. Встановлено, що цифровізація та аналітика даних на цифрових платформах дозволяють розробляти персоналізовані інвестиційні рішення із застосуванням рекомендацій робо-консультантів. Останнє дозволяє застосовувати більш збалансований підхід до інвестування на основі раціональних обґрунтованих рішень, прийнятих на основі аналітики даних. Встановлено, що поширеним явищем є використання алгоритмічної торгівлі, що забезпечує високу ліквідність на фондовому ринку та мінімізує ризики для професійних інвесторів.

КЛЮЧОВІ СЛОВА

цифрова економіка, фондовий ринок, інвестиційний портфель, динамічне інвестування, диверсифікація інвестиційного портфеля, ризикованість, дохідність.

1. Introduction

Industry 4.0 has led to the development of new technology companies and high-tech sectors of the economy, which has affected capital markets and changes in their structure. The rapid spread of digital technologies has fundamentally changed financial markets and transformed the way investors receive information, methods of assessing risks and making investment decisions [20]. Professional and retail investors are interested in diversifying their investment portfolio and are ready to invest in high-yield financial instruments even in a highly turbulent, uncertain and changing geopolitical and economic environment. This is due to the fact that investing in securities of technology developers and suppliers ensures reliability, stable growth in the value of the portfolio and its profitability. In this regard, investors go beyond traditional approaches to choosing investment portfolios and develop the most modern, highly diversified strategies that meet the changing conditions in the stock market.

2. Literature Review

With the penetration of technologies into spheres and sectors of the economy and their active use in investment activities, scientists focus on the following main areas of research. The first direction highlights the diversification of the investment portfolio through the acquisition of cryptocurrencies (Ethereum, Bitcoin), which in most cases leads to an increase in profitability and a decrease in portfolio volatility and provides higher profitability compared to a traditional portfolio [7; 10; 13; 15; 18]. The trends towards inclusion in the investment portfolio of crypto assets are due to a significant increase in their market capitalization, their high average returns, and their low correlation with other assets [13; 8]. This combination of traditional financial instruments and digital instruments allows you to form an optimal portfolio of investments with high profitability and distribute risks [7]. At the same time, such tactics often lead to mistakes and losses in case of unreasonable investment in high-risk assets [19].

The studies consider different approaches to investment portfolio management: purposeful capital management is an investment paradigm for the maximum achievement of financial goals within a certain period of time, within which a dynamic approach is applied to the formation of an investment portfolio according to goals and financial priorities [9; 11; 21]; the traditional paradigm of wealth management, which consists in dividing investors into categories of risk appetite with a static universal portfolio of investments [3]. Targeted capital management is also considered in the work of Das and other scientists [4], which offer an algorithm for dynamic programming of the investment portfolio and answer questions about investment directions by goals and financial priorities.

A dynamic approach allows you to optimize the set of financial assets that are planned to be purchased on the stock market, and is often used to diversify the investment portfolio. On the other hand, the statistical approach to investment capital management takes into account an acceptable level of riskiness, but does not allow for significant diversification of the investment portfolio due to the level of acceptable risk.

The development of the paradigm of purposeful wealth management began with Harry Markowitz's work on allocating an investor's capital by assets to achieve the goal of maximizing profitability or minimizing risk [9; 11]. This ensures the optimization of the investment portfolio, but in today's highly volatile investment environment, it is not possible to simultaneously achieve two goals of ensuring high returns with minimal risk due to the high risks of investing in digital assets or other instruments. In addition, in the task of optimizing Harry Markowitz's investment portfolio, the volatility of the asset was calculated as a measure of risk [21]. However, the assets of technology companies or digital assets are characterized by a high level of volatility, which requires the use of stochastic volatility (Value-at-Risk (VaR) as an estimate of potential loss [5].

Another area of research focuses on studying the consequences of digitalization for the stock market, such as the growth of international investment and diversification of investments by geographical location, the weakening of the connection between the securities market and the real economy, the strengthening of the speculative component in securities pricing, the growth of the number of retail and private investors and the ways of investing them [1; 14].

3. Problem Statement

The digitalization of the economy and the stock market has led to the active use of new technologies in investment activities, which has greatly simplified the processes of issuance, circulation, and exchange of securities and other types of assets. In addition, analysts and investors use new estimates to measure the volatility of financial instruments in the context of the development of the technological sector of the economy.

The article is aimed at studying modern approaches to the formation of an investment portfolio in the context of the development of new technology companies and sectors, which led to a greater level of portfolio diversification and a change in investment directions.

4. Methods and Materials

The article uses the structural-logical method of analysis to identify the main directions of the influence of the digital economy on the formation of an investment portfolio depending on the type of investors. The comparison method made it possible to substantiate the differences between traditional and statistical and dynamic approaches to asset management in the stock market in the context of the development of the digital economy, according to the following criteria: type of investor, investment portfolio, methods of analysis, risk and return assessment.

5. Results and Discussion

The digital economy is defined as a set of new types of economic activity and products related to the production, distribution, and consumption of information and communication technologies (ICT), which cause the emergence of more complex economic and financial relations between business entities.

New technologies used by different types of investors greatly facilitate access to information and the speed of its transfer, providing access to securities at lower prices or with a lower level of risk [1]. The use of digital services increases the interest of retail investors in various types of financial assets. At the same time, technology also causes a negative impact on investment behavior, such as increased investment biases and increased turnover.

Other technologies, such as robo-advisors, have become tools for strategic allocation of investments and a more balanced approach to investing based on rational, informed decision-making with the exclusion of the human factor. This, in turn, led to a decrease in the rate of errors when investing. Robo-advisors are algorithm-based systems that digitize and automate investment advisory processes, covering the processes of recommending investment portfolio formation, portfolio rebalancing, risk diversification, and investment monitoring [12]. In a study of the German robo-advisory market in June 2024 for the formation of investment portfolios, it was found that a third of the portfolios developed by robo-advisors include investments in sustainable financial instruments [17]. The investment portfolios recommended by robo-advisors are quite complex and contain major equity and fixed ETFs, as well as increasingly REITs, commodities, cryptocurrencies, and alternative investments [17].

The development of the digital economy and the emergence of digital tools for investment management are shaping a new paradigm of investment, within which different approaches are applied to the choice of financial assets depending on the type of investor: balanced, dynamic or traditional conservative approach. The structure of the investment portfolio is also changing due to the combination of asset classes of different risk levels. Adding cryptocurrencies to an investment portfolio has become a common practice among investors looking to ensure high returns and are guided by market information when making decisions. New technologies have contributed to the adaptation of investment portfolios to rapid market changes, eliminating geographical obstacles for investors, providing them with new tools for wealth management.

The invention of digital currencies in 2008, the sharp increase in demand and prices for Bitcoin during 2017, led to significant transformations in the stock markets. The further development of digital assets has contributed to the development of a holistic digital currency market, which has allowed retail investors to generate significant returns despite high volatility and risk [1]. In addition, investments in digital currencies have significantly reduced high costs for financial intermediaries, sped up

transactions and documentation. Blockchain technologies used to create digital assets provide a transparent system for recording transaction data and increase the level of control over stock market transactions [2]. Blockchain technology has had a transformative impact on the stock market, as decentralized stock exchanges have emerged, which have greatly simplified access to capital markets [16]. In addition, it is assumed that blockchain will simplify the processes of tracking the movement of securities between different owners and reduce the risks of fraud.

Table 1. The impact of the digital economy on the formation of an investment portfolio in the stock market

Direction of influence	Content characteristics of the impact	Impact on the investment portfolio
Increasing the level of availability of information and the speed of its transmission in real time	Increase in information volumes due to the emergence of big data, investment management platforms	Informed rational investment decision-making based on data
Robo-consultants to automate decision-making processes and invest in securities	The use of robo-advisors for investment decision-making and algorithm-based trading for opening, closing trades	Increasing the level of liquidity in the stock market, minimizing risks for professional investors (pension funds, investment banks, hedge funds, etc.)
Reduced transaction costs when investing	Reduction of costs for the acquisition and sale of assets on the market due to the emergence of information and communication systems for trading	Increase in the frequency of financial transactions and increase in the level of liquidity in the stock market
Diversification of the investment portfolio	Expanding access to global and regional markets through the digitalization of the stock market	Increasing the level of diversification and reducing the risk of investing
Individual investment strategies depending on the type of investor (retail, professional, venture, corporate)	Formation of portfolios taking into account the specifics of the investor's activities	Alignment of the investment portfolio with the investor's risk profile
The emergence of new types of financial instruments	Digital financial instruments or digital assets: cryptocurrencies that are a means of portfolio diversification	Diversification or optimization of the portfolio to increase its level of profitability and risk distribution
Blockchain Technologies in Stock Markets	Using blockchain technology to create decentralized stock exchanges and digital currencies	Increasing the level of transparency and control over transactions, eliminating intermediaries, speeding up transactions and circulation of securities and other financial instruments

Source: Author's elaboration.

In the current conditions of the development of the digital economy and digitalization of financial markets, there is a tendency to increase investment in technology companies and sectors, in particular in companies producing software and operating systems, data storage products, and network products. As of May 24, 2026, the share of technology companies in the stock market was 30.38% by market capitalization. The market capitalization of companies included in the technology sector amounted to 24.531 trillion. USD. as of May 24, 2026. The annual profitability of financial instruments of companies in the technology sector amounted to 44.3% [6]. The second most important in the stock market is the financial services sector, which brings together banks, savings and loan institutions, credit unions, asset management companies, insurance companies, etc. The market share of this sector was 13.77% with a market capitalization of 11.116 trillion. USD. [6]. In addition, the sectors of production of consumer goods and the provision of communication services, the industrial sector and health care have a high level of investment attractiveness (Figure 1).

Table 2. Formation of an investment portfolio depending on the type of investors, in terms of the scale of activity and the level of risk accepted

Investor Type	Key trends	Nature of changes in the portfolio	Main drivers
Type of investor by scale of activity			
Retail investors	Democratization of access to the stock market	Increasing the share of ETFs, technology stocks, and digital assets in the investment portfolio	Mobile apps, digital banks, fintech companies, low technical and financial barriers to entry
Institutional investors	Institutionalizing Trading in New Digital Assets	Adding venture investments, private equity, ESG assets to the investment portfolio	Long-term profitability, risk diversification and investment stability
Corporate investors	Integration of investment activities into the corporate strategy of the enterprise	Formation of diversified portfolios that include traditional and innovative financial instruments to raise capital	Optimization of attracting financial resources, attracting capital to invest in new technologies
Professional traders	Algorithmic trading for investing and building an investment portfolio	Formation of short-term investment strategies	Algorithms for automating trading (concluding deals to buy and sell assets), artificial intelligence technologies to detect trends, big data for making investment decisions
Type of investor by risk level			
Conservative investors	Partial adaptation to digitalization	Cautious approach to buying shares of high-tech companies due to focus on ETFs	A balanced approach to the choice of financial assets to ensure stability and minimize risks, the tendency to purchase government bonds or investments in deposits
Moderate	Orientation and combination of different types of financial assets with different levels of risk	A balanced approach to the acquisition of financial assets, including shares of technology companies and funds	The use of analytical platforms for decision-making, the trend towards an optimal reward-risk ratio
Aggressive (risky) investors	Focus on high-yield assets	Tendency to increase the share of investments in shares of technology companies, crypto assets	Driven by high profitability motives despite volatility

Source: Developed by the authors.

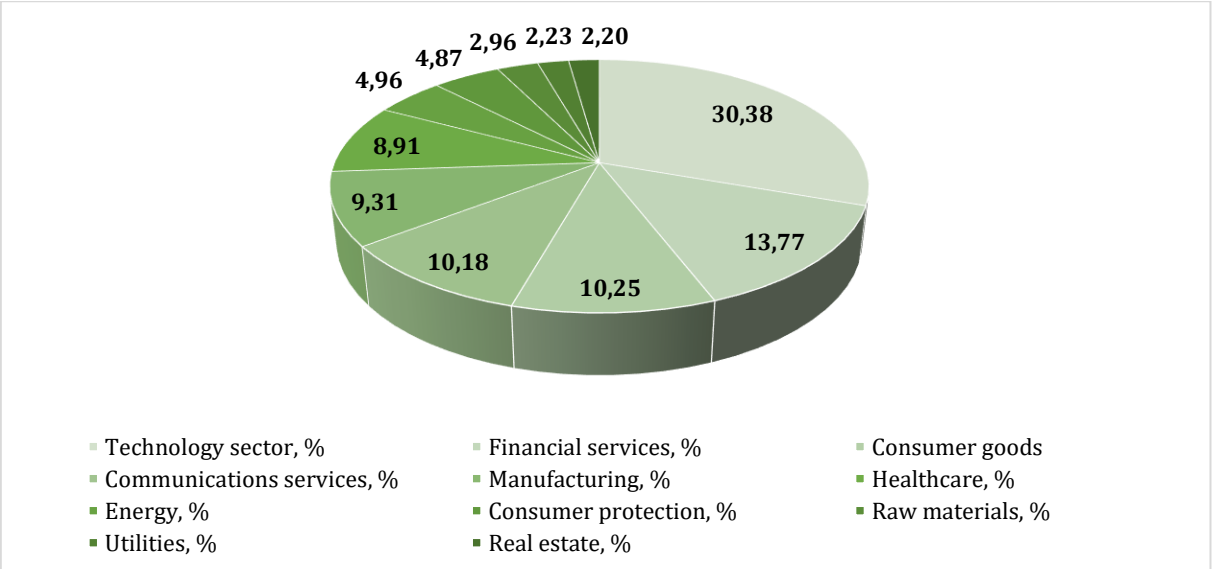

Figure 1. Structure of the investment market by main sectors by their market share, calculated based on the market capitalization of companies included in each sector, % (as of 15 February 2026)

Source: Built by the authors based on data [6].

In the context of the growth of the share of the technology sector in the stock market in terms of the capitalization of technology companies, investors and analysts are applying new risk assessment measures. In particular, traditional estimates of volatility based on standard deviation, variation in expected returns, fade into the background [21] or are based on stochastic volatility (Value-at-Risk (VaR) of expected loss [5]. Instead, β coefficients are used as measures to assess the volatility of asset returns relative to the profitability of the market (index). This risk assessment measure allows you to assess the volatility of an asset's return, taking into account the phases of the economic cycle, which minimizes the impact of short-term fluctuations in the market. At the same time, β ratios are calculated using monthly data for five years to determine the long-term risk of a stock:

$$\beta = \frac{Cov(R_a, R_m)}{Var(R_m)},$$

where *Ra* is return on the asset; *Rm* is market (index) return, at $\beta = 1$ – the return of the asset is equal to and increases synchronously with the market return, $\beta > 1$ – the return of the asset is higher than the market return, respectively, the higher level of risk of investing in the asset, the investor chooses an aggressive investment strategy with a high degree of risk and profit, $\beta < 1$ – the return of the asset is lower than the market return, the investor chooses a defensive investment strategy.

The use of the β ratio by investors and analysts is associated with the growth of the technology sector and the high share of technology companies in the stock market in terms of their capitalization and trading volumes. For technology companies, the value of the calculated β ratios exceeds 1, and in some cases – 2 (for example, for Cipher Digital Inc. – 3.03, for NVIDIA Corporation – 2.34, for the holding company Credo Technology Group Holding Ltd. – 2.72). High volatility NVIDIA stock returns are driven by investment expectations for the future growth of this company in the face of growing demand for the software it produces. In the case of Cipher Digital Inc. and Credo Technology Group Holding Ltd., the high volatility of stock returns, compared to market returns, is due to the high level of speculation in trading their shares and small capitalization. The highly speculative nature of trading is due to the functioning of Cipher Digital Inc. and Credo Technology Group Holding Ltd in markets related to the crypto asset market, which is highly volatile. Therefore, Cipher Digital Inc., together with its subsidiaries, develops and operates industrial data centers for Bitcoin mining and high-performance computing (HPC) hosting in the United States. Credo Technology Group Holding Ltd offers high-speed solutions for connecting optical and electrical Ethernet, as well as PCIe applications in the United States, Taiwan, mainland China, Hong Kong and abroad.

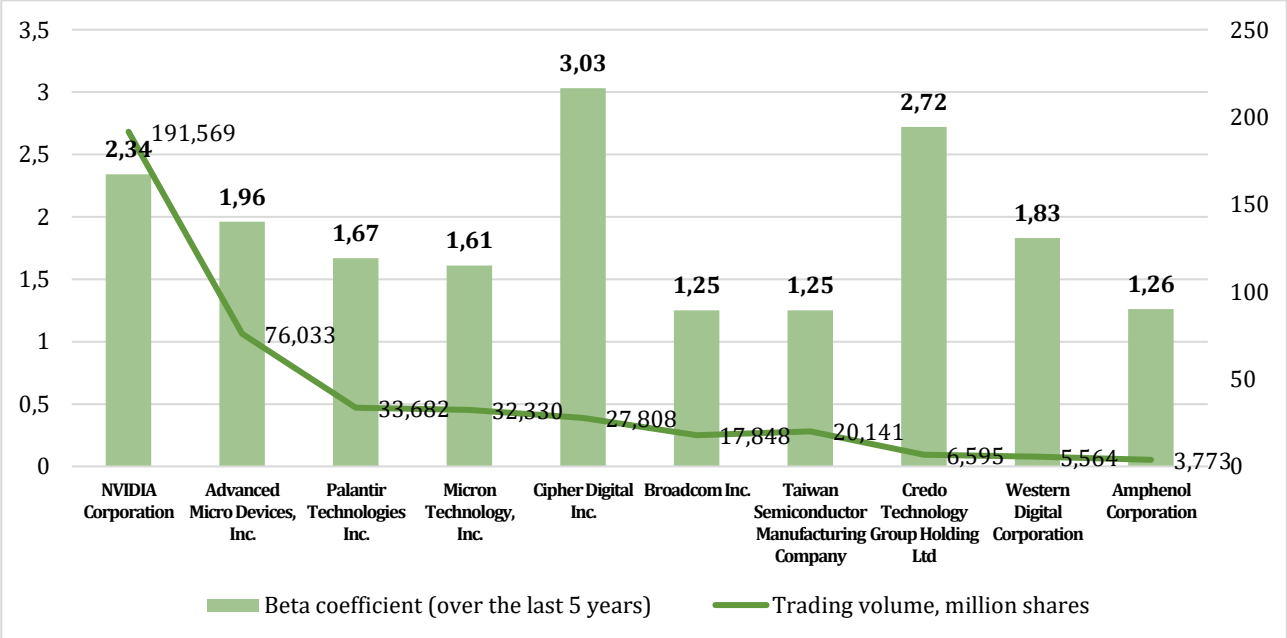

Figure 2. The β ratio for ten technology companies whose shares are traded on the stock market (as of 15 March 2026)

Source: Calculated by the author according to the data [6].

In addition to the β ratio as a measure of the asset's risk, investors and analysts use estimates of current and forecast (expected) profitability, adjusted for the growth rate of the asset's profitability. In the context of the digitalization of the stock market, the approach to the formation of an investment portfolio based on the fundamental indicators of enterprise growth is changing. This allows you to invest in the assets of enterprises with real value, rather than overvalued assets. In addition, investors take into account operating cash flows by estimating the ratio of the company's value to operating profit before taxes, interest and depreciation. Thus, the investment portfolio includes not just assets with a low level of risk, but also those assets that generate operating income for the enterprise.

Table 3. Comparison of traditional static and dynamic approaches to the formation of an investment portfolio in the stock market in the digital economy

Comparison criterion	Traditional static approach	Dynamic approach
Type of investors	By risk appetite categories	By type of investors (moderate, conservative, high-risk or retail, professional, venture)
Investment portfolio	A static universal portfolio of assets, which is formed taking into account the minimum level of risks and provides maximum profitability	A dynamic diversified portfolio of assets, which is formed taking into account the dynamics of asset profitability and the generation of operating cash flow by the company's assets
Methods of analysis	Technical and fundamental analysis	Taking into account macroeconomic, market, industry trends in technical and fundamental analysis
Risk and Return Assessments	Volatility based on standard deviation, variations in asset prices	Volatility based on asset price spreads and based on β coefficients to estimate changes in asset returns

Source: Author's elaboration.

Among the trends in the formation of an investment portfolio, it is worth highlighting a high level of diversification of various investment strategies depending on the type of investor and the level of risk perceived by them. New functions from stock market analytics (Yahoo Finance) form suggestions for investors to choose a strategy for investing in different types of funds: in conservative funds with a low level of risk and an average level of efficiency; in funds with stable growth, which offer high returns; in funds with a moderate level of growth and profitability; in mutual (joint) investment funds.

Along with this, new stock market analytics services allow you to form strategies for investing in companies that are steadily growing in terms of fundamental value indicators. Such companies include technology companies that show a stable profit increase of 25%, companies with aggressive growth strategies, or companies with great growth potential.

6. Conclusions

The digital economy has influenced the transformation of the stock market and led to an increase in the share of the technology sector in terms of market capitalization of technology companies. From the perspective of investors and analysts, the opportunities for diversifying the investment portfolio by combining investments in traditional assets and technology sector assets have significantly expanded. In addition, the development of the crypto asset market as a new type of digital financial asset allows you to increase the profitability of the investment portfolio and diversify investment risks.

As a result of the study, a change in approaches to the formation of investment portfolios by type of investors (retail, professional, venture, moderate, conservative, high-risk) has been identified. New technologies for analyzing data on trading in various types of assets allow you to form a highly diversified portfolio of assets, taking into account the dynamics of their profitability, profitability forecasts and the ability of assets to generate operating cash flow. It has been revealed that traditional methods of technical and fundamental analysis are complemented by macroeconomic, sectoral and market analysis, which allow to identify the influence of external factors on the profitability of the portfolio.

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