



Oleh SEMENENKO<sup>1</sup>, Polina TOLOK<sup>2</sup>, Maryna POTETIUIEVA<sup>3</sup>, Stanislav PETRENKO<sup>4</sup>,  
Mariia YARMOLCHYK<sup>5</sup>

## Attracting finance and investment in small and medium-sized enterprises in the context of a “green” and defense economy and using alternative energy sources

**ABSTRACT:** The relevance of the subject stated in the framework of this research is the significant importance of the issues of attracting investment funds for the development of small and medium-sized enterprises (SMEs) in Kazakhstan in the context of the need to find optimal opportunities for the development of “green” and defense energy using alternative energy sources. The main purpose of this research is to explore methods of SME financing and project analysis of enterprises’ activities

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✉ Corresponding Author: Oleh Semenenko; e-mail: [oleh\\_seme@ukr.net](mailto:oleh_seme@ukr.net)

<sup>1</sup> Department of Economic Analysis of Measures for the Development of the Armed Forces of Ukraine, Central Research Institute of the Armed Forces of Ukraine, Ukraine; ORCID iD: 0000-0001-6477-3414; e-mail: [oleh\\_seme@ukr.net](mailto:oleh_seme@ukr.net)

<sup>2</sup> The National Defence University of Ukraine named after Ivan Cherniakhovskiy, Ukraine; ORCID iD: 0000-0002-2481-8152; e-mail: [Tolok\\_Polina@hotmail.com](mailto:Tolok_Polina@hotmail.com)

<sup>3</sup> Department of Economical and Financial Support, The National Defence University of Ukraine named after Ivan Cherniakhovskiy, Ukraine; ORCID iD: 0000-0002-0611-9200; e-mail: [M.Potetiueva@outlook.com](mailto:M.Potetiueva@outlook.com)

<sup>4</sup> Faculty of Military Training, National Aviation University, Ukraine; ORCID iD: 0009-0003-0999-8049; e-mail: [petrenko\\_stan@meta.ua](mailto:petrenko_stan@meta.ua)

<sup>5</sup> Faculty of Military Training, National Aviation University, Ukraine; ORCID iD: 0000-0001-9917-0189; e-mail: [riia\\_yarmolchik@hotmail.com](mailto:riia_yarmolchik@hotmail.com)



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in the field of alternative energy applications. The methodological approach of this research work is based on the applied research of general principles of attracting financing and investment in SMEs in the context of “green” and defence economy and alternative energy. The results of this research illustrate the need for a qualitative financial analysis of SMEs to attract finance and investment. The financial performance of the enterprise during the accounting period is expressed by compiling a count of the movement of its fixed assets and assets. The classification of financial flows by type of activity makes it possible to determine the main receipts and expenditures during the accounting period. It was established that the efficiency of economic activity within the framework of an individual enterprise should be calculated before the start of the business and after the completion of the project, to develop the most reliable picture of the movement of financial investment funds. The practical significance of the obtained results lies in the possibility of their use in establishing models of business projects that meet the modern requirements of “green” and defense energy using renewable energy sources.

KEYWORDS: renewable energy, sustainable development, economic model, balance sheet, accounting verification

## Introduction

The problematics of this research work is the need to explore the optimal methods of attracting investment in the activities of small and medium-sized enterprises (SMEs) of the Republic of Kazakhstan. In addition, it considers the activities of modern enterprises in the context of the “green” and defense economy, with an assessment of the prospects for using alternative energy sources and modeling business projects using unit economy techniques. SMEs are somewhat larger compared to companies that represent one of the self-employment options of their owners. In addition to that, SMEs, as a rule, are not registered on the stock exchange, and the number of their owners is strictly limited. Moreover, most often, these owners are relatives. Since SMEs have a large number of enterprises of different forms of ownership in different countries, this sector plays a significant role in their economies. The small size of SMEs provides them with considerable flexibility and speed of innovation compared to larger enterprises (Financing of small and... 2023).

Kulmaganbetova et al. (2019, 2020) considered the issues of utilizing the innovative potential of SMEs in joint scientific research. According to the group of researchers, in all developed countries, small and medium-sized enterprises (SMEs) are the most powerful engine of innovative development of the economy. Scientists note that SMEs, as a rule, are the most powerful generators of innovative solutions in various areas of economic and social life. In turn, Abdygaparova et al. (2017), in joint scientific research of key trends in the development of alternative energy in Kazakhstan, draws attention to the fact that today’s developed countries pay great attention to the development of alternative energy as one of the key innovative components of providing the needs of SMEs. According to scientists, Kazakhstan is significantly lagging behind the world leaders in the field of electricity generation by using alternative ways of production.

In a research work designed to explore the role of alternative energy sources in solving the problems of the energy sector of Kazakhstan, Sabitov (2015) notes that the current state of energy systems has a significant impact on various aspects of life in any state. In addition, the author draws attention to the fact that using alternative energy sources is one of the effective options for solving problems in the energy sector related to the satisfaction of the population and industrial enterprises with energy supplied permanently. In the scientific research of practical methods of overcoming financial barriers to doing business, Prieger (2023) notes that the issues of attracting investment in the activities of SMEs became significantly relevant during the COVID-19 coronavirus pandemic, when 22% of small businesses in the US alone closed, which is more than 3 million businesses. In the author's opinion, SME financing should be conducted considering the real needs of enterprises and the current trends of transition to using alternative energy sources in their activities. Čehajić and Košak (2022) in joint research on some problematic aspects of bank financing of SMEs draw attention to the fact that access to finance and its cost play a key role in SMEs, considering the dependence of this type of enterprise on sources of financing. In addition, the assessment of the prospects of financing these enterprises in changing economic conditions and the final effect of investment financial operations is an important component both for practical activities in the business environment and in terms of theoretical discussions (Assylkhanova et al. 2017; Sargsyan et al. 2023).

According to Greitens (2023), a loan for sustainability investments in SMEs presently leads to a deterioration of the Green Asset Ratio introduced with the EU taxonomy of a bank. Therefore, banks should be allowed to give "green loans" approved by the supervision, based on credible transition plans of the SMEs, without needing to fulfill all capital market-oriented framework requirements. This would help to finance the transformation in a more decentralized and individual manner. Also, the Organisation for Economic Co-operation and Development (OECD) (2023) decided that access to finance is critical to enable SMEs and entrepreneurs to start up, invest, grow, and respond to shocks. SMEs were hit hard during the COVID-19 crisis due to weaker liquidity buffers. Many came out of the crisis with higher levels of debt. Macroeconomic developments in 2022 and 2023, notably sluggish growth, inflation, and higher interest rates, have weighed again on both debt and non-debt financing for SMEs. Governments must continue to enable the diversification of financing instruments, including by leveraging financial technologies.

In turn, the 2023 Financing for Sustainable Development Report (United Nations 2023) puts forth policy recommendations to address the finance divide and to scale up sustainable financing and investment, particularly in the most vulnerable countries. Three key messages emerge from this year's report: illicit financial flows, domestic and international private business and finance, and international development cooperation. Ng et al. (2023) discussed that Financing constraints are a more pressing issue among SMEs in emerging markets. That research has focused on the nexus of financing constraints and supply chain finance, with a particular focus on China. Studies have explored the causes of financing difficulties of Chinese SMEs, the role of supply chain finance in revitalizing inventory and promoting the integration of industry and finance, and research on easing the financing constraints of SMEs from the perspective of supply chain finance.

The main purpose of this research is to assess the prospects of investment injections in SMEs of the Republic of Kazakhstan when modeling business projects in the conditions of business digitization.

## 1. Materials and methods

The methodological approach in the research work was based on the applied research of key aspects of attracting financing for SME projects in the Republic of Kazakhstan. The research was conducted on the scale of activities of the enterprises of this sector in the country in general. The theoretical foundation of this research is the results of analysis of several studies by Kazakh and foreign scientists (China, Thailand, Poland, Germany, Netherlands, Spain), designed to explore a wide range of problematic aspects of investment in SMEs and the modeling of business projects within the concept of alternative energy. Applied research on the main aspects of attracting financing and investment in the activities of SMEs in Kazakhstan involved a combination of analytical research on the basics of financing business projects in the SME sector using the mathematical modeling of these business projects. In turn, mathematical modeling involves the construction of a theoretical model of the classification of financial flows of the enterprise of the sector under consideration. This method included the construction of block diagrams of the elements of the balance sheet of the enterprise and its profit and loss statement. In addition, the general principles of financial analysis were assessed, considering its main stages and expected outcomes. In the context of SME finance attraction, the sequence of building a financial plan for an individual enterprise is defined. The individual sections of this plan are presented.

Application of the method of analyzing key aspects of investment financing of business projects implied legal regulations examination of the legislation of the Republic of Kazakhstan in this area. The data on preferences in the sphere of attracting investment funds in the activities of SMEs were obtained. In addition, the application of the above research method allowed the evaluation of the actual ratio of assets and liabilities of enterprises of the Republic of Kazakhstan in given periods. The research was conducted from 2020 to 2023. As a basis, statistical data from the Asian Development Bank, UNCTAD, and the National Bank of the Republic of Kazakhstan were analyzed. It allowed the sequence of financial analysis of SMEs and their main results to be determined, based on which the expediency of further attraction of investments and financing in the activities of the enterprises of the sector under consideration is established.

The main criteria used in the analysis include:

- ◆ financial performance indicators – current liquidity ratio, inventory turnover, accounts receivable turnover, accounts payable turnover, operating cycle, financial cycle, working capital needs, equity working capital, autonomy coefficient, etc. These are calculated based on balance sheet and income statement data,

- ◆ profitability indicators – gross margin, net profit margin, EBITDA, EBIT, debt/EBITDA ratio, etc.,
- ◆ energy use and intensity – total energy consumption, energy intensity of GDP, volume of energy use, etc.
- ◆ The industries represented appear to be broad and not limited to any specific sector. The analysis covers SMEs in Kazakhstan across various sectors, looking at their financial performance, profitability, energy use, and ability to attract financing. Key sectors include alternative energy, green economy, hydrocarbon energy, heat and electricity.

The presented combination of scientific research methods allowed us to determine the key aspects of alternative energy development in the Republic of Kazakhstan in terms of targeted investment for the implementation of projects in this area. In turn, this allowed the establishment of a statistical relationship between the volume of energy consumption through using alternative energy sources in the country and their energy intensity, considering the growth of the population in the country and its need for energy supply.

## 2. Results

According to the Resolution of the Government of the Republic of Kazakhstan “On some issues of the implementation of state support for investments” (2016), all business projects related in one way or another to the generation, transportation, storage, and distribution of electricity obtained from all possible types of sources (including alternative “green” and defense energy sources) are among the priority activities related to the attraction of investment funds. According to another normative act – Law of the Republic of Kazakhstan No. 373-II “On investments” (2003), business entities, including SMEs, that use alternative energy sources in their activities are legally entitled to the following investment preferences:

- ◆ exemption from customs duties when importing imported equipment, spare parts, raw materials, and supplies for a period not exceeding five years from the date of putting fixed assets into operation,
- ◆ exemption from value-added tax on import trade transactions involving raw materials and supplies,
- ◆ provision of state grants in amounts not exceeding 30% of investment in fixed assets,
- ◆ reduction of corporate income tax on profits at 100% for 10 years or complete renewal of the alternative energy sources used within three years,
- ◆ provision of a zero-land tax rate for the entire period of the investment agreement implementation,
- ◆ providing investment subsidies of up to 30% of the cost of construction and installation works and equipment purchase costs.

To attract targeted financing for SMEs, it is necessary to conduct a financial analysis of the real state of these enterprises, with the provision of all necessary reporting on the results. Financial analysis includes the following mandatory stages:

- ◆ collection of necessary information on the financial activity of the enterprise,
- ◆ assessing the validity of the information collected,
- ◆ processing of this information.

The results of the financial analysis are:

1. Opinion on the prospects of financing the project, considering the possible financial and any other risks involved in the project.
2. Development of the deal structure. Preparation of a specific offer for a selected product or set of products for a specific client with specified terms and conditions.
3. Preparation of terms and conditions of the transaction with the client, such as amounts of investment funds, terms of financing, interest rate, property to be pledged as collateral, the possibility of deferral of payments and permissible terms of delays, and other obligations of the parties.

Business process modeling involves the preparation of the balance sheet of an enterprise to differentiate between its assets, liabilities and equity. The balance sheet of a company belonging to a particular SME segment is a record of the specific state of the business as of a given date. The balance sheet items of a business in any SME sector follow one after the other in liquidity order. Figure 1 presents a block diagram of the balance sheet of an SME.

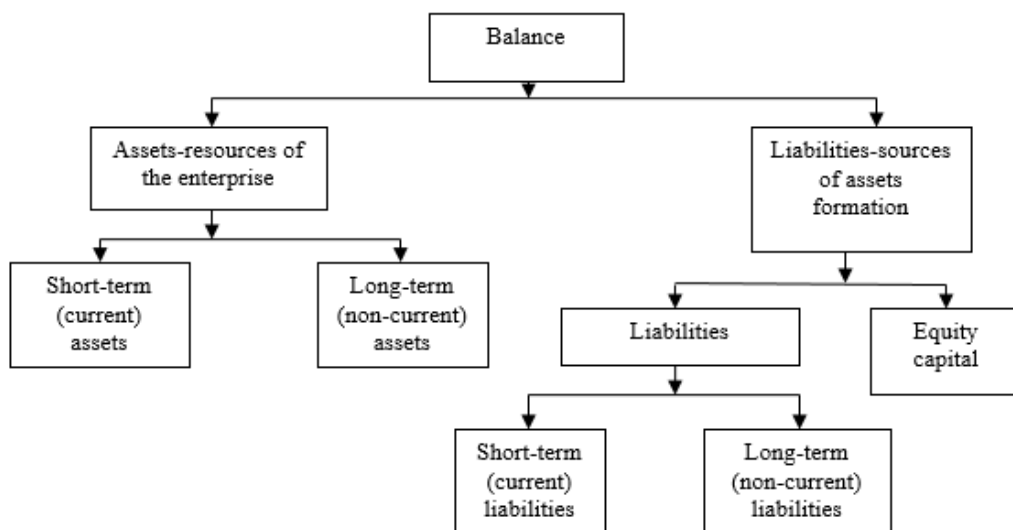


Fig. 1. Block diagram of the elements of the balance sheet of an enterprise

Source: compiled by the authors

Rys. 1. Schemat blokowy elementów bilansu przedsiębiorstwa

The profit and loss statement of a company characterizes the financial results of its activities during the reporting period. This report includes information on the company's revenues, loss and financial results achieved during the financial period. The profit statement reflects the final profitability of the SME. It is prepared using the accrual method of accounting. Figure 2 presents a block diagram of the profit and loss statement of an SME.

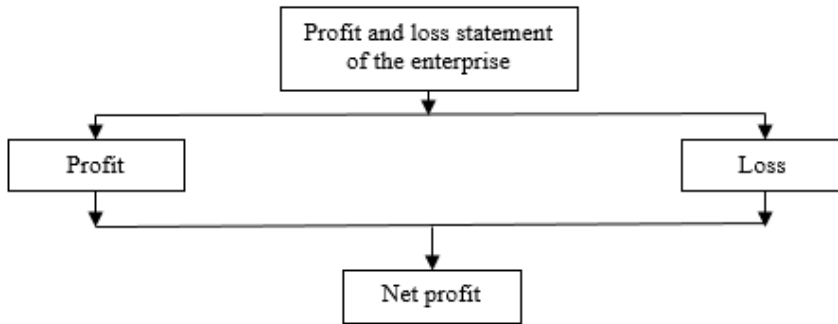


Fig. 2. Block diagram of the profit and loss statement of the enterprise  
Source: compiled by the authors

Rys. 2. Schemat blokowy rachunku zysków i strat przedsiębiorstwa

The statement of cash flows of an SME is a report on the sources of funds and the progress of their intended use in the specified reporting period. Essentially, the statement of cash flows of an enterprise is a classification of cash flows by different types of activities. This kind of report is prepared using the cash flow method and is organized using the direct or indirect method. Table 1 presents data on the classification of financial flows by certain types of activities.

Attracting finance in Kazakhstan's SMEs is inextricably connected with the need to develop a financial plan for an individual enterprise in this sector. A typical plan of this kind includes the following sections:

1. Short-term assets.
2. Long-term assets.
3. Short-term liabilities.
4. Long-term liabilities.
5. Capitals and reserves.
6. Profit.
7. Loss.
8. Production accounts.

Table 2 presents data on the ratio of assets and liabilities of the enterprises of the Republic of Kazakhstan from 2020 to 2022.

TABLE 1. Classification of financial flows by type of activity

TABELA 1. Klasyfikacja przepływów finansowych ze względu na rodzaj działalności

Type of activity	Profit	Loss
Operational	Proceeds from the sale of goods and providing services. Receipts of rent transfers for granting rights, commissions, and other remunerations. Proceeds from payments on insurance liabilities and reimbursement of successful lawsuits	Payments in arrears to suppliers of goods and services. Payroll payments to the employees of the company. Payments of taxes other than those related to investing or financing activities. Payments to repay obligations under loans received.
Investment	Proceeds from the sale of fixed assets, non-current assets (tangible and intangible). Proceeds from the sale of shares in other entities, including interests in joint venture projects. Proceeds from repayment of loans to third parties.	Payments on account of acquisition of fixed assets, tangible and intangible assets and assets not included in turnover. Payments to purchase shares or debt instruments of other entities, including interests in joint ventures. Payments on account of credit services provided to third parties.
Financial	Proceeds from the issue of shares or other equity instruments. Proceeds from the issue of bonds, mortgage loans, promissory notes, including using auxiliary financial instruments.	Payments to owners of shares of other companies upon their redemption or repurchase. Payments towards repayment of loan commitments made. Payments to the lessor in repayment of finance lease obligations incurred.

Source: compiled by the authors.

TABLE 2. Ratio of assets and liabilities of enterprises of Kazakhstan in the periods under consideration [thousand tenge]

TABELA 2. Wskaźnik aktywów i pasywów przedsiębiorstw Kazachstanu w analizowanych okresach [tys. tenge]

Assets	2020	2021	2022
Section 1. Short-term assets			
Cash	15,707	16,964	18,321
Short-term receivables	160,260	173,081	187,127
Stocks	66,403	71,715	77,452
Current tax archives	10,773	11,635	12,566
Other short-term assets	1,702	1,839	1,986
Total: short-term assets	254,845	275,234	297,452
Section 2. Long-term assets			
Fixed assets	69	69	69
Total: long-term assets	69	69	69
Balance	254,914	275,303	297,521



Section 3. Short-term liabilities			
Short-term financial liabilities	232,702	244,337	256,554
Tax liabilities	193	203	213
Liabilities for other constituent and voluntary payments	98	103	108
Short-term accounts payable	101,041	106,093	111,398
Total: short-term liabilities	334,034	350,736	368,273
Section 4. Long-term liabilities			
Long-term financial liabilities	0	0	0
Long-term accounts payable	0	0	0
Other long-term liabilities	0	0	0
Total: long-term liabilities	0	0	0
Section 5. Capital and reserves			
Authorized capital	220	242	266
Retained profit (uncovered loss)	14,944	16,438	18,082
Total: capital and reserves	15,164	16,680	18,348
Balance	349,198	367,416	386,621

Source: compiled by the authors based on Asian Development Bank (2022).

The period from 2020 to 2022 was marked by significant global events that impacted Kazakhstan's businesses. The COVID-19 pandemic disrupted supply chains and finances, the post-COVID recovery led to shifts in assets and liabilities, and the Russian-Ukrainian conflict added geopolitical uncertainty. Analyzing the financial structures of Kazakhstani enterprises during this period is crucial for understanding their response to these challenges.

Table 3 summarizes the financial statement data for the 2020–2022 profit and loss of the companies in the Republic of Kazakhstan.

TABLE 3. Financial statement of profit and loss of enterprises of Kazakhstan for the period examined [thousand tenge]

TABELA 3. Sprawozdanie finansowe z zysków i strat przedsiębiorstw Kazachstanu za badany okres [tys. tenge]

Profit and loss statement	2020	2021	2022
Profit from sales of products and services	1,563,668	1,720,034	1,892,038
Cost of sales and services rendered	1,497,950	1,647,745	1,812,519
Gross margin	65,718	72,289	79,519
Financing profit	0	0	0
Other profit	81,013	85,063	89,317

Loss on sales of products and rendering of services	10,827	11,585	12,396
Administrative loss	25,588	27,379	29,296
Amortization loss	0	0	0
Financing loss	14,317	15,033	15,785
Other loss	81,338	87,032	93,124
Share of profit (loss) of equity-accounted entities	0	0	0
Profit (loss) before taxation	16,661	26,371	38,234
Corporate profit tax loss (CIT)	3,332	5,274	7,647
Total profit (loss) for the entire period	13,329	21,097	30,587

Source: compiled by the authors based on UNCTAD (2023).

Table 4 presents the balance sheet for 2023.

TABLE 4. Balance sheet statement for 2023

TABELA 4. Sprawozdanie bilansowe za rok 2023

ITEM	Balance
Assets	
Cash and cash equivalents	18,532,013
Securities included at fair price through profit and loss	2,685,434
Accounts receivable	28,738,575
Loans (microcredits) measured at amortized cost	870,256,167
Investment property	483,275
Reserves	559,942
Long-term assets (disposal groups) for sale	0
Fixed assets	18,726,345
Current tax claim	6,524,508
Other assets	18,934,545
Total	1,068,658,280
Liabilities	
Attracted deposits	0
Issued debt securities	117,895,858
Received loans	599,444,071
Reserves	2,510,468
Delayed tax liabilities	409,035
Settlements to intermediaries for insurance (reinsurance) activities	0
Other liabilities	15,852,311
Total	781,282,746

Own capital	
Authorized capital	93,141,467
Premiums (additional paid-in capital)	10,982,505
Withdrawn capital	0
Reserve capital	1,757,134
Other reserves	926,357
Total capital	287,375,534

Note: apart from the values given in the Table, other parameters Assets, Liabilities and Own capital are given in the original, but the value of Total is given according to the general characteristic, including the values not indicated in this Table.

Source: compiled by the authors based on the National Bank of the Republic of Kazakhstan (2023).

When conducting financial analyses, various management reports are used, in addition to an express method of checking financial information called “cross-checking”, which can be introduced. The foundation of this method is a set of specific questions and calculations for a particular subject or entire area of financial or non-financial information. Cross-checking financial analysis allows (Martinez-Cillero et al. 2023):

- ◆ avoid errors in the calculations made by the manager,
- ◆ determine deliberate deception on the part of the client,
- ◆ get a real substantive understanding of the business,
- ◆ assess all possible risks.

Table 5 presents the data for calculating the financial indicators of economic activity on the balance sheet.

TABLE 5. Calculation of financial performance indicators on the balance sheet

TABELA 5. Kalkulacja wskaźników efektywności finansowej w bilansie

Financial indicator	Calculation procedure	What it displays
Current liquidity coefficient	Current assets/Short-term liabilities	Reflects the company’s ability to repay current (short-term) liabilities at the expense of current assets only. The higher this indicator is, the better the solvency of the company.
Period of inventory turnover (TMP)	$\frac{\text{TMP}}{\text{Cost of sales}^*}$ Number of days in the time period considered	Indicates the average number of days during which the turnover of TMP occurs (from purchase to sale)
Cash debt turnover period (CD)	$\frac{\text{CD without VAT Revenue}^*}{\text{Number of days in the time period considered}}$	Indicates the average number of days for which payment is received from debtors
Accounts payable turnover period (AP)	$\frac{\text{AP excluding VAT}}{(\text{Cost}+\text{Expense})}$ Number of days in the time period considered	Indicates the average number of days in which payments to creditors are made
Operating cycle	TMP turnover periodic turnover period	Characterizes the total length of time that inventories and accounts receivable have been idle

Financial cycle	TMP turnover period+CD turnover period – AP turnover period	Period of full turnover of cash, investment in current assets, starting from payment for raw materials, materials and semi-finished products and ending with receipt of money for shipped products
Calculation of working capital needs	Total costs/Number of days in the time period considered * Financial cycle – Equity working capital	Indicates how much working capital is required to perform planned financial transactions.
Equity working capital	Current loss – Short-term liabilities	Indicates how much of current assets are financed by own funds. Its existence and size are one of the most important characteristics of financial stability.
Autonomy coefficient	Equity/Assets	Characterises the independence of the enterprise from borrowed funds and demonstrates the share of equity in the total value of all funds of the enterprise. The higher the value of this ratio, the more financially sustainable, stable and independent from external creditors the enterprise is.

Source: compiled by the authors.

Liquidity is the ability to circulate money. The turnover rate demonstrates the intensity of use (speed of turnover) of specific assets or liabilities. Turnover ratios are indicators of the enterprise's business activity. Table 6 presents the order of calculation of financial indicators on the profit and loss statement.

TABLE 6. Calculation of financial indicators on profit and loss statement

TABELA 6. Kalkulacja wskaźników finansowych do rachunku zysków i strat

Financial indicator	Calculation procedure	What it displays
Gross margin	Gross profit/Revenues* 100%	Demonstrates the share of gross profit in the sales volume of the company
Net profitability (return on sales/ operating profitability)	Gross profit/Revenues* 100%	Demonstrates the share of Net Profit in the enterprise's sales volume
EBITDA (earnings before interest, taxes, depreciation and amortization)	Net profit + CIT loss + Financing costs + Depreciation and amortization loss (other profit and loss are considered). Revenues – Cost of sales – General and administrative	Calculated in two ways (“bottom-up” and “top-down” depending on the specifics of the company's activities)
EBIT	Net profit CIT loss + Financing costs	–
Debt/EBITDA	A comparative measure of the ability to repay in full the entire amount of existing liabilities.	This ratio demonstrates the degree of solvency of the company
EBITDA/interest expense	A comparative measure of the ability to repay interest.	This ratio demonstrates the degree of solvency of the company

Source: compiled by the authors.

Access to finance has been a major issue for SME development in Kazakhstan. The distribution of enterprises by size is skewed toward small enterprises, which make up the majority of businesses in the country (Dosmagambet et al. 2019). Second-tier banks remain the main source of financing for SMEs. Still, due to the higher risks associated with SMEs, they have to borrow money at high interest rates that endanger their growth. The government has provided funds to provide affordable loans for SMEs in the manufacturing industry through commercial banks (Turkyilmaz et al. 2021). Key barriers to SMEs' access to finance in Kazakhstan include the inactivity of the banking sector, competition from Russian companies that are more established and have larger economies of scale, and high dependence on global oil prices. A study of the Kostanay region provides evidence that SMEs lack access to financing and market opportunities. In 2020, SMEs comprised 96.4% of all businesses in Kazakhstan, accounting for 38.6% of total employment and 31.6% of national GDP. The maximum rate on loans not exceeding KZT 7 million consists of the base rate of the National Bank of the Republic of Kazakhstan +8.5%, of which 6% is paid by the entrepreneur, and the difference is subsidized by the state (OECD 2022). Loan guarantees are also becoming popular in the financial market of Kazakhstan.

SMEs are the backbone of many economies, and understanding the financing landscape in different countries is crucial for entrepreneurs, investors, and policymakers. The countries examined in Table 7 include Kazakhstan, China, the United States, the United Kingdom, France, and India. Each of these nations offers a unique environment for SME financing, shaped by factors such as access to funding, regulatory conditions, government support, and prevailing economic circumstances. This comparative analysis aims to provide valuable insights into the opportunities and challenges SMEs face in these diverse economic contexts, helping stakeholders make informed decisions regarding investment, expansion, and policy formulation.

In Kazakhstan, SMEs encounter obstacles in accessing financing primarily due to high interest rates, which can impede their growth and development. However, the government has implemented supportive measures during the COVID-19 pandemic, unifying the borrower rate at 6% through the "Business Road map 2025" program, and the National Bank of Kazakhstan's reduction of the base rate from 9.25% to 9% in September 2021 may potentially reduce borrowing costs (Yu et al. 2021). Inflation poses additional challenges for SMEs by increasing raw material costs and decreasing consumer purchasing power, with Kazakhstan experiencing a 7.4% inflation rate in 2020 (Gulamov and Khassenbekov 2020). The government has responded with measures to control inflation, including adjustments to the refinancing rate and government spending.

Regarding tax policies, the government defines SMEs as enterprises with fewer than 250 employees and an annual turnover of less than KZT 2.5 billion, aiming to enhance their contribution to employment and GDP. Kazakhstan's tax system, characterized by a flat 10% income tax rate and a 12% value-added tax rate, is relatively straightforward (Kurmanov et al. 2016). Furthermore, the government has introduced tax incentives, such as reducing the corporate income tax rate to 15% for SMEs investing in priority sectors. In summary, Kazakhstan's SMEs grapple with financing challenges and potential inflation impacts, but government interventions and tax incentives seek to bolster their growth and contribution to the economy, all within the framework of a relatively simple tax system.

TABLE 7. Comparative analysis of SME financing prospects in selected countries

TABELA 7. Analiza porównawcza perspektyw finansowania MŚP w wybranych krajach

Country	Aspect			
	access to financing	regulatory environment	government support	economic conditions
Kazakhstan	Improving access with government support and tailored loans	Positive changes with simplified registration and tax procedures	Support programs, credit guarantees, and grants	Influenced by local and global economic factors
China	Well-developed ecosystem with various options	Efforts to reduce regulatory barriers	Subsidized loans, tax breaks, and incentives	Strong economic growth
USA	Diverse options, including bank loans, venture capital, and crowdfunding	Relatively business-friendly with a focus on entrepreneurship	Small Business Administration (SBA) assistance	Stable economy with opportunities
UK	Diverse sources including bank loans, equity financing, and government programs	Known for ease of doing business	Grants, tax incentives, and export support	Stable economy with diverse markets
France	Mix of financing options, including bank loans and venture capital	Work in progress with some regulatory burdens	Numerous government programs for grants and support	Stable economy with export potential
India	Improving access with government initiatives and specialized lenders	Efforts to improve ease of doing business	Credit guarantee schemes and technology support	Economic growth and market opportunities

Source: compiled by the authors based on Fouejieu et al. (2020).

In terms of attracting SME finance, the degree of development of alternative energy in Kazakhstan as one of the components of the green and defense economy is of great significance. In this context, it is necessary to highlight the main economic factors of alternative energy development in the country, which include (Cheng et al. 2023):

1. High level of energy capacity of hydrocarbon energy sources application.
2. Increasing needs for heat and electricity savings.
3. High volatility of world energy prices (oil, gas, coal).

The high energy intensity of using hydrogen and hydrocarbon energy sources in industry is characterized by a high level of total energy intensity (Kuznetsov et al. 2003). In particular, 63.2–72.1% for the period 2013–2017, an increase in the energy intensity of gross domestic product (GDP) in this period from 0.177 to 0.206 t.u.t. (tonnes of fuel equivalent, the cost of 1 tonne is USD 1000 at 2015 prices). The volume of energy consumption in Kazakhstan for the period 2000–2018 is characterized by positive growth dynamics from 39 to 103 TWh, with an increase in population from 14866 to 18396 over the period and an increase in GDP from 2,599.9 to 61,820 billion tenge (Zhunussova et al. 2020).

Kazakhstan's alternative energy sector was governed by a legislative framework aimed at promoting renewable energy development. The Renewable Energy Law of 2009 laid the foundation for this sector, providing the necessary legal framework (Mouraviev 2021). Feed-in tariffs (FiTs) were implemented to guarantee fixed prices for electricity generated from renewable sources, incentivizing investment and growth. Competitive auctions were introduced to allocate renewable energy projects transparently, promoting cost competitiveness. Various incentives, including tax exemptions and customs privileges, were offered to attract investors. Solar energy saw substantial growth, thanks to Kazakhstan's abundant sunlight, with large-scale solar farms becoming common. Wind energy also gained traction, particularly in wind-rich regions like the Caspian Sea coast (Mouraviev 2021). Hydropower was upgraded and expanded, and efforts to explore geothermal and biomass energy sources were underway. Energy efficiency initiatives complemented renewable energy development, and international cooperation was evident through partnerships with organizations like the UNDP and IRENA.

Thus, to facilitate the growth of small and medium-sized enterprises (SMEs) in Kazakhstan, particularly in the realm of alternative energy projects, several policy recommendations and regulatory changes are suggested. Firstly, streamlining regulations and reducing bureaucratic hurdles can create a more business-friendly environment for SMEs. Secondly, allocating public funds towards research and development (R&D) initiatives in the alternative energy sector can foster innovation and knowledge sharing. Thirdly, providing tax incentives, such as credits and exemptions, for SMEs engaging in renewable energy practices can encourage investment. Additionally, financial education and support programs can equip SMEs with financial acumen, and ongoing research should refine methodologies for assessing investments in alternative energy. These measures collectively aim to empower SMEs to play a pivotal role in Kazakhstan's sustainable development and economic growth.

## Discussion

Zhou et al. (2023) analyzed and developed a predictive model for the co-movement of innovative and conventional financial assets of SMEs based on using complex networks and attracting alternative energy sources. The researchers note that the co-movement of financial assets (FinTech-related stocks, green bonds, and cryptocurrency) establishes a prerequisite for extracting information about the network topology and predicting the final financial outcome. Establishing trading strategies based on predicting the mode of co-movement, and accounting for assets, liabilities, and resulting profits is a prerequisite to ensure efficient financing of SMEs' operations in the long-term time horizon. The opinion of the group of researchers correlates with the results obtained in this research, while the issues of developing strategies based on co-movement require further detailed research.

The research team of Schclarek et al. (2022) considered several general issues of SME financing in the context of assessing the level of financial risks in business operations. According to the scientists, financial risks in SME investment operations can be significantly reduced by establishing models for the implementation of business projects, considering the profitability of each unit of production, and the involvement of suppliers who are based in the regions where the goods are expected to be received and distributed. The authors' opinion regarding the reduction of financial risks in investment through the establishment of business models of implementation considering profitability fully corresponds to the results obtained in this research.

For his part, Dayani (2022), in research designed to explore the general principles of investment fund management, notes that modern equity funds invest in SMEs considering the size of their internal debt, while corporate bond funds do not make such an accounting and invest large amounts. In the author's opinion, when deciding to allocate funding to these enterprises, the management of funds considers the possible consequences of stimulating their internal debt, which is essential for enterprises on the verge of default. The conclusions of the researcher do not contradict the results of this research, therefore opening additional aspects of research in the field of investment funds.

Gao (2022) notes the significant importance of investment activities in establishing leverage on the activity of SMEs in the markets. According to the scientist, large amounts of investment funds injected into the activities of small businesses in developing countries may pose a significant threat to their survival prospects in the market. The author concluded that the invested financial resources may be dangerous to the healthy growth of enterprises conducting economic activities in an unstable macroeconomic environment and in the presence of several factors that determine financial vulnerability at the micro level. The results obtained by the scientist in the course of scientific research are consistent with the results of this research work, while the issues of ensuring the growth of enterprises by reducing the level of their vulnerability require further research.

A research team consisting of Andries et al. (2021) conducted collaborative research on the general principles of engaging technology-based enterprises with external actors in the search for viable market offers. The research established that modern SMEs can only attract investment in their operations if they fulfill the economic security conditions imposed on them, which include the requirement to overcome the cognitive resource constraints of the enterprise. It implies the development of proactive market identification, in which the enterprises try to convince potential investors of their investment attractiveness (Levchenko et al. 2023). The position expressed by scientists does not fundamentally contradict the results of this research work, but several aspects related to the prospects of overcoming resource cognitive limitations of the enterprise's activity provide additional prospects for research.

Holecek et al. (2022) discussed a global assessment of whether renewable energy can replace fossil fuels by 2050. The study found that a complete transition to renewable energy by 2050 is possible, but it requires significant changes in energy consumption patterns and the implementation of policies that promote renewable energy. The article also mentions a study that evaluated the impact of industrial restructuring on the spatial and temporal evolution of energy



consumption. According to D'Olier-Lees et al. (2023), the renewable energy sector is expected to grow significantly in the coming years, but some challenges need to be addressed. The transition to renewable energy will require significant investment, and the industry will need to navigate headwinds such as supply chain disruption, trade policy uncertainty, and interconnection delays (Alkaabi and King 2019; Dinzhos et al. 2020). However, the deployment of renewable energy technologies is expected to mitigate the economic impact of the energy crisis and reduce wholesale electricity prices (Marino et al. 2018; Fialko et al. 2022).

A group of scholars consisting of Wu et al. (2023) conducted academic research on the application of investment schemes in financing SMEs and the associated constraints. It is observed that investment constraints are frequently associated with government corruption, which increases the cost of business and uncertainty in business operations and significantly reduces the economic activity of SME sector enterprises (Kalinichenko et al. 2018). According to the researchers, the situation can be favorably resolved by introducing a system at the state level to track the targeted use of foreign investment allocated for the development of enterprises in these sectors. The results obtained by the scientists align with the results of this research, while the issues of state participation in ensuring the investment attractiveness of SMEs deserve a more detailed investigation.

The revised target set by the Renewable Energy Directive by the International Renewable Energy Agency (2023) requires that by 2030, 42.5–45.0 percent of energy supply should be generated from renewable energy sources, with the EU assuming that renewable sources will need to provide around 70 percent of electricity by 2040 to meet the overall renewable energy target. Current targets agreed to by the world's major economies under the Paris Agreement would require at least tripling the global energy transition investment (including all decarbonization) to more than USD 5 trillion each year between 2023 and 2050, well beyond what government balance sheets can handle alone. Investment in renewable generating assets is a key part of the transition, with an estimated annual investment of USD 1.4 trillion through 2050.

Agrawal et al. (2023) analyzed the adoption of green finance and green innovation for achieving circularity. The authors analyzed how sustainable green investment and green innovation can be used to achieve circularity, given that climate investments are emerging in global investor markets. A systematic review of emerging environmental markets by Byrareddy et al. (2023) was conducted to identify potential pathways to creating shared value for communities. The study found that there is huge potential for investments in the newly emerging environmental markets, such as the carbon market through carbon/greenhouse gas emissions (Lyubchik et al. 2015). In turn, Misztal and Kowalska (2023) studied the factors that influenced green entrepreneurship in the five emerging European Union markets from 2008 to 2020. The study conducted on five Eastern European countries, including Bulgaria, Croatia, Hungary, Poland, and Romania, shows that the determination coefficient is in the range of 0.621 (Romania, which means a weak fit to the model's data) to 0.962 (Poland, which means a perfect fit to the model's data). The influence of explanatory variables on the explained variable is mostly positive, except for the negative relationship between green entrepreneurship factors from the previous period in Bulgaria, Romania, and Hungary.

Thus, the discussion of the results obtained in this research, in the context of their analytical comparison with the results of scientific research of several scientists who have explored the issues of attracting finance in SMEs, demonstrated their fundamental coincidence in some key aspects. It is objective evidence of the scientific validity of the results of this research and the expediency of their further practical use in the investigation of various aspects of business process modeling and investment attraction in the activities of SMEs.

## Conclusions

This research delves into key aspects of obtaining finance for SMEs in Kazakhstan, particularly within the context of alternative energy projects. The main findings underscore the importance of several factors. Firstly, securing financing and investment for SMEs necessitates the development of a comprehensive financial plan encompassing assets, liabilities, revenues, costs, and projected profitability. Such financial reporting and analysis play a pivotal role in allowing investors to assess the viability of these businesses.

Furthermore, the extent of alternative energy adoption holds significant sway in attracting investments within Kazakhstan's SME sector. Legislative preferences offer tax incentives and investment opportunities for SMEs that harness alternative energy sources. The assessment of alternative energy projects entails a thorough examination of an enterprise's financial standing over time, accompanied by profitability estimations. Employing meticulous financial modeling and planning can facilitate the anticipation of efficiency levels, the prevention of potential issues, and the evaluation of ultimate outcomes.

To attract investments for SMEs operating in the realm of alternative energy within Kazakhstan's defense economy and energy sector, a comprehensive analysis encompassing revenues, costs, assets, liabilities, and financial sustainability is imperative. Robust financial scrutiny serves as the bedrock for the formulation of successful financing proposals. Moving forward, future research in SME finance should concentrate on crafting theoretical frameworks that align with Kazakhstan's economic landscape, particularly in the context of green and defense energy. Additional studies can expand upon methodologies for projecting and assessing investments in alternative energy.

In conclusion, meticulous financial planning, reporting, and analysis are indispensable skills for SMEs in Kazakhstan striving to secure financing, particularly for ventures in alternative energy. Employing a data-driven approach instills confidence among potential investors and guides the efficient allocation of resources. As Kazakhstan's SME and alternative energy sectors continue to evolve, financial acumen will remain an invaluable asset in navigating the changing landscape.

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Oleh SEMENENKO, Polina TOLOK, Maryna POTETIUIEVA, Stanislav PETRENKO,  
Mariia YARMOLCHYK

## Pozyskiwanie finansów i inwestycji w małych i średnich przedsiębiorstwach w kontekście „zielonej” i obronnej gospodarki oraz wykorzystania alternatywnych źródeł energii

### Streszczenie

Znaczenie tematu poruszonego w ramach niniejszego opracowania polega na ważnym znaczeniu kwestii przyciągania funduszy inwestycyjnych dla rozwoju małych i średnich przedsiębiorstw (MŚP) w Kazachstanie w kontekście potrzeby znalezienia optymalnych możliwości rozwoju „zielonej” i obronnej energii z wykorzystaniem alternatywnych źródeł energii. Głównym celem tego artykułu jest zbadanie metod finansowania MŚP i analiza projektów działalności przedsiębiorstw w dziedzinie alternatywnych zastosowań energii. Podejście metodologiczne tej pracy badawczej opiera się na badaniach stosowanych ogólnych zasad przyciągania finansowania i inwestycji w MŚP w kontekście „zielonej” i obronnej gospodarki oraz energii alternatywnej. Wyniki tych badań ilustrują potrzebę jakościowej analizy finansowej MŚP w celu przyciągnięcia finansowania i inwestycji.

Wyniki finansowe przedsiębiorstwa w okresie rozliczeniowym są wyrażane poprzez zestawienie ruchu jego środków trwałych i aktywów. Klasyfikacja przepływów finansowych według rodzaju działalności umożliwia określenie głównych wpływów i wydatków w okresie rozliczeniowym. Ustalono, że efektywność działalności gospodarczej w ramach indywidualnego przedsiębiorstwa powinna być obliczana przed rozpoczęciem działalności i po zakończeniu projektu, aby uzyskać najbardziej wiarygodny obraz przepływu finansowych środków inwestycyjnych. Praktyczne znaczenie uzyskanych wyników polega na możliwości ich wykorzystania w tworzeniu modeli projektów biznesowych, które spełniają współczesne wymagania „zielonej” i obronnej energii wykorzystującej odnawialne źródła energii.

SŁOWA KLUCZOWE: energia odnawialna, zrównoważony rozwój, model ekonomiczny, bilans, weryfikacja księgową