Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 03, June, 2025
Website: usajournals.org

MECHANISMS FOR ASSESSING RISKS AND MINIMIZING THEIR IMPACT IN INVESTMENT PROCESS MANAGEMENT (AKFA ALUMINUM COMPANY IN EXPERIENCE)

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Abstract:
This dissertation is devoted to the analysis and improvement of mechanisms for assessing and minimizing risks in the process of investment management, with a specific focus on the industrial sector. The research is based on the case study of Akfa Aluminum, one of Uzbekistan's leading industrial enterprises.
The main goal of the study is to develop effective models and tools for risk assessment in investment processes and to propose mechanisms that reduce their negative impact on industrial performance. The dissertation outlines theoretical foundations of investment risks, classifies different types of risks, and evaluates their specific characteristics in the context of Uzbekistan's industrial economy.
The research also includes practical models such as risk maps and scenario analysis developed using Excel-based tools, providing a practical framework for decision-makers in the industrial investment sphere. As a result, the study offers strategic recommendations to improve the investment risk management system , contributing to the sustainable development of enterprises like Akfa Aluminum.
The results of this research can be used by industrial companies, investors, and policymakers to enhance investment efficiency and ensure risk resilience in long-term strategic planning.

Modern American Journal of Engineering, Technology, and Innovation
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Keywords: Investment process, Investment risk, Risk management, investment strategy, KPI-based decision-making, scenario analysis , risk map and visual dashboard

Scientific and Practical Relevance

The investment process is the main factor of progress and development in the activity of any economic entity. But in the effective management of this process, there is a high probability that various risks will occur, and their identification, evaluation and minimization require a systematic approach.

Especially in technical and technological industrial enterprises, investment risks are multifaceted and highly influential. In such enterprises:

- large amounts of material investments,
- bad technological decisions,
- interruptions in the supply of raw materials,
- exchange rate fluctuations and
- external economic factors

can negatively affect the efficiency of the investment process. Therefore, it is urgent to develop a mechanism for identifying investment risks, comprehensively evaluating them and reducing their impact.

By analyzing the investment activities of a large private industrial enterprise such as **Akfa Aluminum,** the practical aspects of this issue will be studied in depth. Based on this experience , it will be possible to propose practical models and mechanisms for managing investment risks in a developing economy .

Also, the scientific relevance of the topic is:

- This issue has not yet been sufficiently scientifically studied in Uzbekistan;
- existing approaches rely mainly on general theoretical concepts;
- There is little specific risk analysis in the technical industry.

Research Object and Subject

Research Object

The process of investment activity in large enterprises operating in the technical industry of Uzbekistan. In particular, the practice of organizing and managing the investment process on the example of the **Akfa Aluminum enterprise.**

Modern American Journal of Engineering, Technology, and Innovation
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Subject of Research

Risks encountered in the management of the investment process:

- assessment,
- to analyze,
- determine their impact on economic efficiency,
- and the process of forming mechanisms and tools to minimize these risks.

Theoretical and Practical Significance of Research

Theoretical significance:

1. The results of the research enrich the existing theories in the field of risk assessment and their management in the investment process.
2. New approaches and definitions are proposed for the classification, assessment, and analysis of investment risks .
3. Analytical results obtained based on methods such as SWOT, PESTEL, Risk Matrix, and Scenario Analysis make a scientific contribution to the theory of investment management.

Practical Significance

1. The risk assessment model and KPI-based decision-making tools developed in the case of Akfa Aluminum can be practically applied in investment projects.
2. Scenario analyses, risk maps, and visual dashboards based on Excel allow for the effective organization of risk management systems in enterprises.
3. The results of the study can serve as a model for other large enterprises in the technical industry of Uzbekistan.
4. The recommendations presented are important for investment strategy, corporate governance and ensuring financial stability.

The Level of Study of the Topic

The issues of assessing and effectively managing risks in investment activities have been of particular interest to the global scientific community and practitioners in recent years. In particular, research on improving risk management mechanisms and tools in industrial enterprises is gaining importance.

Modern American Journal of Engineering, Technology, and Innovation
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The works of the following foreign scientists are particularly important in the assessment and minimization of investment risks:

- H. Markovits - as the founder of the theory of balance between risk and income in the formation of an investment portfolio;
- W. Sharpe analyzed the relationship between risk and valuation through the capital asset pricing model (CAPM);
- D. Tobin, J. Sein, P. Druker - widely covered the issues of risk classification, strategic management and risk assessment in investment processes.

Within the CIS Countries

- S.G. Veselov, A.D. Sheremet, I.T. Balabanov, V.V. Specialists like Kovalyov paid special attention to risk analysis and management methods in investment activity.
- Also, Russian researchers - Yu.N. Osipov, L.N. Krasavina, A.N. Asaul and others - have proposed theoretical and practical approaches to classifying and minimizing economic risks in investment activities.

In Uzbekistan, a number of scientific studies have been conducted on this issue. In particular:

- Scientists such as Yu.Norqabilov, A.Sultanov, Sh.Rakhmonov, B.Saidov developed practical recommendations on issues of investment policy formation, risk assessment and their effective management.
- M. Khoshimov and S. Sattarov paid attention to the role of risk management in increasing the efficiency of investment activities in the industrial sector.

At the same time, an analysis of existing scientific works shows that there is a lack of research on the specific analysis of investment risks in the industrial sector, the development of mechanisms for their identification and minimization. The lack of a clear scientific and theoretical basis for the assessment and effective management of risks, especially in the case of large private industrial enterprises such as Akfa Aluminum , further increases the relevance of this issue.

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Main part

The essence of the concept of risk in investment activity

The investment process is the activity of directing capital into real or financial assets with the aim of obtaining long- and medium-term benefits. The main characteristic of this process is the presence of uncertainty and risk .

Investment risk is the possibility of not achieving the expected return on an investment, incurring losses, or losing part of your capital. These risks arise from various sources and factors and directly affect investment performance.

Risk is the opposite of inevitable; it cannot be avoided, it can only be managed , reduced , or insured against .

Therefore, the correct classification of risks and the accurate assessment of each one according to the source, probability and impact is one of the main tasks of research .

Risk is a constant companion in investment activities. Therefore, it is necessary not only to eliminate it after it occurs, but also to identify, assess, reduce and control it in advance . This process is called "risk management".

Risk management is the activity of recognizing, analyzing, assessing, and taking measures to influence risks in the investment process.

Analysis of Akfa Aluminum's activities and investment projects

Akfa Aluminum is a large manufacturing enterprise operating in the technical and technological industry in Uzbekistan, which produces aluminum profiles, facade systems, and metal structural elements for construction and industry . The company was founded in 2010 and is part of the Akfa Group .

Production Activities

- Total Workforce: **2500+**
- Annual production capacity: more than 60,000 tons of aluminum products
- Export geography: Europe, Turkey, Russia, Kazakhstan, etc
- Technology: German, Italian and Chinese technologies are used

Areas of Investment Activity

Akfa Aluminum has been implementing several strategic investment projects in recent years , including:

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 03, June, 2025
Website: usajournals.org

1. **Automation of Production**
- **Purpose:** to reduce the human factor, to improve quality
- **Capital:** $12 million
- **Result:** automated CNC machines, intelligent control systems

2. **Introduction of ecological and "green" technologies**
- **Purpose:** reduce waste, save energy
- **Capital:** $5 million
- **The result:** recycling lines, solar panels

3. **Development of export infrastructure**
- **Purpose:** increase competitiveness in foreign markets
- **Capital:** $7 million
- **Result:** certification, logistics centers, international marketing

4. **Production of innovative products**
- **Purpose:** to produce products with high added value
- **Capital:** $3.5 million
- **The result:** individual profile developments for facade and interior systems

Management instruments used in the investment process:
- **KPI Dashboard:** monitoring investment performance
- **Excel-based modeling:** What-if and Scenario analyses
- **PESTEL and SWOT analyses:** strategic analysis in decision-making

Investment dynamics (2020–2024)

Year	Investment volume ($ million)	Directions
2020	9.8	Automation, energy system
2021	11.5	Project modernization
2022	17.3	Export infrastructure
2023	22.1	Green technologies, new lines
2024 (projected)	26.4	Market diversification and innovation

The investment process in Akfa Aluminum's operations is based on medium and long-term strategic plans. based on Enterprise innovative solutions , technological modernization , and has chosen environmental sustainability as a priority. This creates the ability to manage investment risks and ensure efficiency despite the existence of them .

The main risks encountered in the investment process and their sources (on the example of Akfa Aluminum)

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 03, June, 2025
Website: usajournals.org

For the successful implementation of the investment process, it is very important to identify and assess risks in advance. Akfa Aluminum faces a number of internal and external risks within the framework of its investment projects .

Types of risks and their sources

No.	Type of risk	**Source**	Impact	Solution (management measure)
1	Financial risk	Exchange rate changes (imported equipment in Euro/dollars)	Increases investment value	Hedging, currency reserve accounts
2	Technological risk	Obsolescence of equipment, dependence on imports	Stoppage of production, decrease in quality	Modernization, localization
3	Market risk	Demand changes, competitors	Decrease in income, decrease in project return	Scenario analysis, diversification
4	Energy risk	Increase in electricity prices	Production costs will increase	Solar panels, energy saving equipment
5	Environmental hazard	Waste, dependence on natural resources	Fines, state control	Green technologies, processing line
6	Supply risk	Delays in the delivery of raw materials	Interruptions in answering the question	Contracts with local suppliers
7	Personnel risk	Unqualified young personnel, high turnover	Low quality of work	Personnel training, motivation programs
8	Legal and political risk	Changes in legislation, tax policy	Uncertainty in the investment process	Legal monitoring, external consultants

Using PESTEL analysis to assess risks

Akfa Aluminum also uses **PESTEL analysis** to strategically assess risks in the investment environment :

Factor	**Danger**
Political	Abolition of industrial benefits
Economic	Inflation and exchange rate uncertainty
Social	Lack of quality personnel in the labor market
Technological	Difficulties in adapting to new technologies
Environmental	Application of environmental standards
Legal	Changes in tax and licensing policies

Although the investment process at Akfa Aluminum is subject to various risks, they are managed correctly. Overall investment efficiency is ensured through classification, analysis and management . To minimize risks, the company uses

Modern American Journal of Engineering, Technology, and Innovation
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Volume 01, Issue 03, June, 2025
Website: usajournals.org

diversification , improved KPI monitoring , PESTEL analysis and uses scenario models .

Analysis of financial, production and external risks (in the example of Akfa Aluminum enterprise)

The main risks encountered in the Akfa Aluminum investment process can be divided into three broad categories: financial risks, production risks and external economic risks.

Financial analysis (2022–2024)

Index	2022	2023	2024 (projected)
Total investment	$17.3 million	$22.1 million	$26.4 million
Normalized NPV (3 years)	$3.5 million	$4.1 million	$5.0 million
IRR	16.8%	18.3%	19.6%
Payback	3.7 years	3.4 years	3.1 years

Production Risks

- Hardware lag
- Interruption in the supply of spare parts
- Deficiencies in operator skills

External Threats:

- Price changes in the world aluminum market
- Demand changes in the European and Russian market
- Traffic restrictions in neighboring countries

Financial risks, especially purchases (equipment, technology) that are subject to exchange rate fluctuations, are affecting investment returns. The company is addressing this through currency hedging , a balanced portfolio and is reducing through diversification .automates equipment , strengthens HR policy to reduce production risks and gradually transitioning to solar energy .

International Market Analysis:

Index	2022	2023	2024 (projected)
Aluminum price (ton/dollar)	$2,900	$2,480	$2,600
Export share (%)	32%	38%	46%
Demand index in the Russian and European markets	0.93	1.04	1.07

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External risks are mainly related to changes in the global market and export infrastructure. Akfa Aluminum considers this market diversification , export certification and is eliminating through improved logistics .

Analysis of KPI and investment performance indicators

(in the case of Akfa Aluminum enterprise)

KPI (Key Performance Indicators) are key indicators for measuring the effectiveness of an enterprise's activities. These indicators are of great importance in determining how well investment projects are performing and whether they are achieving their goals.

Analysis of Key KPI Indicators

KPI name	Unit of measurement	2022	2023	2024 (projected)
ROI (Return on Investment)	%	11.2	12.4	14.2
NPV (Net Present Value)	thousand $	3,200	4,100	5,000
IRR (Internal Rate of Interest)	%	16.8	18.3	19.6
Payback Period	year	3.7	3.4	3.1
OEE (Overall Equipment Effectiveness)	%	74	79	85
Energy saving	kW/ton	650	590	540
Export share	%	32	38	46
Waste reduction	%	-12	-15	-22
Worker strength turnover rate	%	18	14	12

Conclusions from KPI Analysis

- **ROI and IRR** indicators are growing at a high rate, which confirms the economic efficiency of investment projects.
- **The Payback Period** is decreasing year by year — the payback period for projects is getting shorter.
- **OEE and energy efficiency** indicators show the effectiveness of technology modernization.
- **the share of exports** means that the strategy of entering foreign markets is correctly oriented.
- **The reduction of waste and energy consumption** shows the results of "green investments".

Using KPI Dashboards

Akfa Aluminum has implemented a KPI Dashboard project to monitor investment performance. It includes:

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- Monthly and quarterly KPIs are presented in visual charts;
- NPV and IRR progress graphs;
- OEE and Payback dynamics are monitored.

This method allows management to make quick and informed decisions.

At Akfa Aluminum, the effectiveness of investment processes is regularly assessed through KPI indicators, and economic, technological and environmental benefits are recorded depending on the results of each project. This serves to ensure operational efficiency while managing investment risks.

Akfa Aluminum shows that the main risks in the investment process are financial, production, and external economic**.** are risks. But with the right strategic approach, risk analysis and the introduction of modern management tools, these risks can be reduced and investment efficiency can be increased.

According to the results of the study, when the risk management system in the investment process is implemented actively, automatically and visually , the efficiency and stability of the enterprise increases. The mechanisms developed on the example of the Akfa Aluminum industry can serve as a model for application in other industries.

Akfa Aluminum is gradually improving its risk assessment and management system**.** Modern models (SWOT, Risk Map, Scenario Analysis), automated KPI Dashboards, and strategic management decisions are being used to ensure a safe and effective investment process.

Conclusions And Suggestions

Key Findings

1. The investment process is associated with various risks and uncertainties, the identification, assessment, and effective management of which has a significant impact on the overall performance of the enterprise.
2. **Akfa Aluminum** , it was found that the risks in the investment process are mainly related to financial, production, supply, and external market factors.
3. During the analysis, Excel-based scenario models, KPI Dashboards**,** and **risk maps** enabled accurate risk assessment and visual analysis.
4. KPIs (NPV, IRR, ROI, EBITDA, etc.) have proven to be important criteria in planning and monitoring investment projects.

Modern American Journal of Engineering, Technology, and Innovation
ISSN(E): 3067-7939
Volume 01, Issue 03, June, 2025
Website: usajournals.org

5. It was shown that a systematic, automated and visual approach is necessary to improve the effectiveness of risk management in the investment process.

Practical Recommendations

6. Establishing a risk assessment and monitoring system in production and investment activities - that is, sorting and analyzing risks on a quarterly basis.
7. Introducing the practice of evaluating investment projects in different conditions through scenario models (optimistic, realistic, pessimistic).
8. an automated Dashboard based on KPIs and actively use it in making management decisions.
9. Integrating diversification, insurance, and risk-sharing mechanisms into the investment process in order to reduce risks.
10. Extensive use of mathematical models and information technology to predict investment risks.
11. a specialized risk management team to minimize the impact of risks and connect this group to a continuous reporting system.

Develop and regularly analyze risk preparedness plans (what-if scenarios) in investment activities

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Volume 01, Issue 03, June, 2025
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