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METHODICAL ASPECTS OF ANALYSIS AND RISK MANAGEMENT OF AN INSURANCE COMPANY

The object of research is the risks of the insurance company. The paper is devoted to the study of the risks of the insurance company, which generate threats to the level of its solvency. The general state of economic development in general and the insurance market in particular determine the operating conditions of any insurer. The insurance company's ability to regulate such conditions is limited, but the formation of a stable state of the internal environment creates opportunities to adapt to threats from the external environment. Timely detection of potential risks in the activities of the insurer, provision of reserves to cover possible losses related to risks, enable companies to overcome the consequences of risks with minimal losses. The methodical basis for evaluating potential risks in the insurance company's activities is strategic analysis methods, such as PEST and SWOT analysis. Their results give an idea of the state of threats in the external environment and the potential opportunities of the insurer's internal reserves. The methods of economic-mathematical modeling and forecasting make it possible to assess the current state of the company and investigate its behavior under the influence of external and internal factors. The basis of the forecast model of risk analysis of an insurance company is formed by the coefficient of risk of loss of solvency, calculated according to the key parameters of the assessment of its financial condition. The reliability of the forecast of the possible risk of loss of the insurer's solvency is ensured by constructing a trend line and forming a forecast sheet in the MS Excel software environment. The forecast sheet forms the probabilities of the values of the indicators with a distinction between optimistic and pessimistic levels of the forecast. Using the trend line and finding the value of the coefficient of determination (R^2), the probability of realizing the forecast of growth or reduction in the value of each individual parameter of the model is determined. The practical significance of the obtained results lies in the possibility of increasing the efficiency of the use of available resources and reserves in the process of risk management. The proposed methodical approach can be used to assess the impact of risks in the insurer's activities, which will increase the accuracy of the obtained results.

Keywords: *insurance company risks, PEST analysis, SWOT analysis, forecasting, insolvency risk factor.*

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1. Introduction

Risk management is a critically important aspect of any insurance company's operations, as it helps ensure the company's stability and reliability in the face of unforeseen events. This process includes a number of strategies and procedures aimed at reducing the impact of negative events on the company's financial condition, which requires:

– conducting an analysis of potential threats to the company, determining the probability of their occurrence and the amount of possible losses;
– taking measures to prevent negative events, as well as planning actions in case of their occurrence;
– distribution of risks between different types of insurance and geographical areas, the implementation of sufficient reserve of funds to cover possible losses related to risks is not an exception.

In modern conditions, increased risks and comprehensive manifestation of crisis phenomena in the economic and social life of Ukraine increase the urgency of ensuring the stability of the functioning of any economic entity, insurance companies are no exception.

The relevance of the chosen topic is indicated by a sufficient number of scientists who have devoted their work to issues of risk management in the activities of insurance companies.

Methods of analyzing the impact of risks on the income of an insurance company are considered in [1]. The authors of this work reveal in sufficient detail the essence of the value measure of risk (VaR), expected losses (EL), the method of dynamic financial analysis (DFA) and asset management (ALM). The application of the value measure of risk (VaR) method has been tested and described in detail for risk management by occupational life insurance companies [2]. Despite the significant scientific achievements of the authors, their works reproduce the impact of risks that

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arise as a result of the investment activities of insurers. Adhering to the requirements for the use of methods of cost and dynamic financial analysis, it is proposed to include methods of strategic analysis in the risk analysis, which in the future allows to outline the influence of external factors on the activities of the insurer.

The application of strategic analysis methods substantiates the results of the work [3]. The authors proposed the PEST analysis method in the context of assessing problems and prospects for the development of the insurance market. Let's consider it expedient to carry out this type of analysis by each insurer in order to determine the threats to the activity from the cells of the external environment. In the future, the results of the PEST analysis become the basis for the formation of the company's SWOT analysis matrix, where potential risk management opportunities are determined.

A significant contribution to the development of methods of strategic analysis, economic-mathematical modeling and forecasting in the analysis of financial-institutional aspects of the activity of insurance companies in the conditions of manifestation of risk phenomena was presented by the authors of the paper [4]. The idea of a systematic approach to the study of the basic principles of the general insurance market development strategy can be used to form a system of risk management methods for an individual insurer.

The process of analyzing the state of development of the insurance market as an indicator of the occurrence of risks in papers [5–7] is considered the first stage of risk management of an insurance company. In the future, the system of risk management methods of the insurance company is justified by the general possibilities of financing the current activities of the insurer, both at the expense of internal and external sources. At the theoretical level, the insurance company's risk management methods are highlighted without presenting the applied nature of their application depending on the level of risk and the strategic prospects of the insurer's development. The analysis of scientific sources showed that the issues of developing effective methods of management and risk assessment in the conditions of the occurrence of crisis phenomena remain insufficiently resolved.

The aim of research is to justify a comprehensive approach to the application of methods of analysis and risk management of the insurance company. A comprehensive analysis of the influence of internal and external environmental factors on the state of the insurer, taking into account the forecast parameters of key performance indicators, will provide an opportunity to increase the efficiency of the use of available resources and reserves in the process of risk management.

2. Materials and Methods

The object of research is the risks of the insurance company. The subject is methodological aspects of the analysis and risk management of an insurance company, which generate threats to the level of its solvency. The methodical basis for evaluating potential risks in the insurance company's activities is strategic analysis methods, such as PEST and SWOT analysis. The methods of economic-mathematical modeling and forecasting make it possible to assess the current state of the company and investigate its behavior under the influence of external and internal factors. The basis of the predictive model of risk analysis of an insurance company is formed by the coefficient of risk of loss of solvency, calculated according to the key parameters of the assessment of its financial condition, presented in the company's financial statements. The reliability of the forecast of the possible risk of loss of the insurer's solvency is ensured by constructing a trend line and forming a forecast sheet in the MS Excel software environment.

3. Results and Discussion

Risk management is an important component of insurance companies' activities, as they are exposed to various financial, market and operational risks. Some strategic risk management measures of an insurance company may include:

– systematic analysis of all possible risks;
– based on risk analysis, the company must develop a risk management strategy, which will include methods and tools for reducing, transferring or accepting risks;
– diversification of the portfolio of insurance products can help reduce the overall risk of the company, since a large number of risky objects can be compensated by less risky ones;
– insurance company can transfer part of its risk to reinsurers to reduce the financial burden in case of large insurance payouts;
– implementation of effective control and monitoring systems helps to identify potential risks and take timely measures for their management.

These and other strategic measures can help insurance companies effectively manage their risks and ensure stable and reliable operations in the market. In this context, the methods of SWOT and PEST analysis can be useful for increasing the effectiveness of risk management of an insurance company.

Based on the results of the SWOT analysis, the insurance company can determine its strengths, such as a high reputation, a well-built network of agents, high financial stability, etc. This will allow the company to identify its competitive advantages and use them to reduce risks. Identifying weaknesses will help the insurance company understand areas where risks may arise. For example, insufficient automation of processes, low marketing efficiency, etc. An opportunity analysis will help the company identify new markets, products or technologies that can help reduce risks and ensure growth. Identifying potential threats will help the insurance company to anticipate potential problems and take measures to manage them.

PEST analysis aimed at assessing the political environment will help an insurance company determine possible changes in legislation that may affect its activities and risks. Analysis of economic trends will help the company understand the impact of economic factors on its financial stability and risks. Taking social trends into account will allow the company to adapt its strategy to changes in consumer preferences and customer behavior. Evaluation of technological innovations will help the insurer to identify opportunities for improving processes and reducing risks.

Since the PEST analysis provides a basis for identifying threats in the external environment of the insurance company, it is performed before the construction of the SWOT analysis matrix, which will further contribute to the formation of a better management strategy of the insurer.

Having conducted a PEST analysis of the country's insurance market based on the generalization of research results [8–11], the political, economic, social and technological factors that provide opportunities and prospects for

the development of both individual insurance companies and the insurance market as a whole have been determined. Historically, it so happened that significant transformations in the regulation of the insurance market of Ukraine took place almost at the beginning of the war. Therefore, during the formation of the PEST-analysis matrix, those factors that restrained the growth of the potential of the insurance market were identified in principle, and those that are currently aimed at its revival were identified.

Among the potential opportunities for market development are opportunities to increase the confidence of the insured in this market. That is, the solvency requirements set by the NBU for insurance companies create confidence among clients in the insurance company's ability to fulfill its obligations in full, the culture of insurance increases, and the market for insurance products expands.

Insurers are integrating technology into business, online and offline channels. For some time, insurers have been implementing blockchain, artificial intelligence, Internet of Things, big data, augmented reality, cloud technologies, etc. technologies into their activities. Other insure tech companies serve as a vivid example of this. As a rule, they offer their services exclusively via the Internet. Today, insure tech is one of the largest global innovation ecosystems [11].

The purpose of the PEST analysis is to track (monitor) changes in the macro environment in four key areas and identify trends and events that are beyond the company's control, but affect strategic decision-making. The measurement of the influence of the specified factors was carried out expertly by representatives of PJSC Kraina IC (Kyiv, Ukraine). The results of the PEST analysis of the conditions of the insurer's operation under the influence of external factors are presented in Table 1.

Due to the existing problems in the level of distrust of potential consumers of insurance services, the lack of insurance culture creates grounds, according to the expert, to determine the factors in the stratum of society as the most influential on the further strategic development of the insurance market in Ukraine. In the second most important place, the conditions of the state of war, in which Ukraine is located, and which will outline the political factors in the activity of insurance companies are determined. The circumstances of the danger of the offline work of insurance companies and their employees during the war and the impossibility during the pandemic outlined the importance of the implementation of digital technologies in their activities and the predominance of this factor over economic ones.

Table 2 formed a matrix of SWOT analysis of the strategic development opportunities of PJSC Kraina IC in conditions of risk and uncertainty.

Reducing costs for development, acquisition and management of priority types of insurance, expansion of sales channels of insurance services and improvement of their efficiency, improvement of internal business processes, information technologies, training and motivation of employees will allow to expand channels of sales of insurance services and increase their efficiency. By demonstrating the company's strategic goals, the management manages to communicate the strategic direction of the company's development to the employees, establish a relationship between the strategy and their own motivation, and recreate personal career prospects related to the strategy. The organization of strategic management in insurance companies is an objective process for those who want to become a market leader and ensure effective management of business processes and profitability.

The main advantages of an insurance company, to which the principles of strategic management are applied, are the ability to ensure the purposefulness of the dynamics of the development of the entire insurance organization. Only planning allows the company to achieve its goals in the shortest possible time. Effective planning is facilitated by holding regular meetings, where brainstorming methods are used and the actions of all units of the organization related to the strategy are coordinated. They always have information about the state and changes in the internal and external environment of the company, are focused on achieving their goals, respond more clearly to changing trends, new opportunities and threats.

Table 1

PEST analysis of the conditions of the insurance market operation

	POLICY	Weight	Score	Score	ECONOMY	Weight	Score	Score
1	Martial law in Ukraine	0.60	5.00	3.00	Economic situation in the country	0.20	5.00	1.00
2	Changes in the legislation of Ukraine	0.10	3.00	0.30	Inflation rate	0.20	4.00	0.80
3	Changes in international and European legislation	0.04	2.00	0.08	Taxation in insurance	0.20	5.00	1.00
4	Controlling bodies	0.02	3.00	0.06	Currency exchange rate	0.20	3.00	0.60
5	Power politics/political stability	0.01	2.00	0.02	End user needs	0.20	4.00	0.80
6	State regulation of competition	0.02	3.00	0.06	–	–	–	–
7	Elections at all levels of government/political parties	0.01	3.00	0.03	–	–	–	–
8	Compulsory insurance	0.20	4.00	0.80	–	–	–	–
	Total	1.00	25.00	4.35	Total	1.00	21.00	4.20
	SOCIETY	Weight	Score	Score	TECHNOLOGY	Weight	Score	Score
1	Demography	0.30	5	1.50	Development of technologies	0.5	5	2.50
2	Structures of incomes and expenses of the population	0.30	5	1.50	Changes and adaptation of technologies	0.3	4	1.20
3	Advertising	0.20	4	0.80	Licensing of technologies	0.2	3	0.60
4	Opinions of consumers	0.20	5	1.00	–	–	–	0.00
	Total	1.00	19.00	4.80	Total	1.00	12.00	4.30

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Table 2

Matrix of SWOT analysis of the strategic development opportunities of an insurance company in conditions of risk and uncertainty

Strengths	Weaknesses
1. Positive business reputation. 2. Leading positions in the industry. 3. Extensive network of branches and representative offices. 4. High level of personnel qualification. 5. Availability of a balanced insurance portfolio. 6. Considerable long-term experience in the domestic insurance market. 7. Wide range of insurance services. 8. High level of customer trust. 9. Individual approach to each client	1. Significant impact of competition on the activities of PJSC Kraina IC. 2. Significant commercial costs. 3. Low level of implementation of the company's innovative technologies. 4. High share of non-current assets, which affects the low level of solvency reserve. 5. Low activity in the use of investment tools
Opportunities	**Threats**
1. Introduction of new types of insurance. 2. Attracting foreign investors. 3. Expansion of the client base. 4. Opportunity to become a leader in the field of insurance provision of services. 5. Dynamic development in the future. 6. Innovative development of insurance services. 7. Increasing the share of reinsurance while maintaining a low risk	1. Functioning of the country's insurance market in wartime conditions. 2. Activation of competition. 3. Distrust of the population in the insurance market as a whole. 4. Monopolization of market segments. 5. Unstable financial situation of clients (individuals and legal entities). 6. Admission of foreign companies to the Ukrainian insurance market

Note: formed by the author based on [12]

The presence of a large number of risks significantly complicates the functioning and development of PJSC Kraina IC. To justify the objective necessity of implementing risk management measures, it is advisable to use an economic-mathematical model for determining the degree of risk of the insurer losing its solvency.

The use of economic-mathematical risk management models of insurance companies should ensure an increase in the effectiveness of management decisions by providing up-to-date information about the state of the company, as well as about possible factors of crisis phenomena.

This is possible thanks to financial planning and forecasting, which allow to detect the first symptoms of a crisis and take the necessary measures. From this point of view, in order to increase the effectiveness of risk management, it is advisable to forecast indicators of anti-crisis activity based on simulation modeling.

It is determined that the most predictable indicators of an insurance company are the amount of capital, the value of current assets, general financial resources, taking into account the relationship between indicators and time. It is possible to forecast the amount of insurance reserves and payments, indicators of the forecast of net profit and the risk of the insurance company losing its solvency. The key risk management parameters of PJSC Kraina IC were highlighted:

– equity capital (EC);
– insurance reserves (IR);
– current assets (CA);
– capital (C);
– current liabilities (CL);
– net profit (NP);
– coefficient of risk of loss of solvency of $CRLS = (1 - -(CA - CL)/C))$.

The initial data of PJSC SC Kraina regarding economic-mathematical modeling are presented in Table 3.

According to Table 3, the value of the risk factor for the loss of solvency tends to increase. With further aggravation of the situation with changes in the structure of the formation and directions of capital use of the insurance company, it may lead to a change in the satisfactory level of solvency to the limit, with clear signs of the beginning of the crisis. So, let's simulate situations with forecast changes in the structure and dynamics of its assets and capital.

Forecasting of each individual indicator, which characterizes the scope of the insurance company's activities, will be carried out using the construction of a trend line and the formation of a forecast sheet in the MS Excel software environment. With the help of the forecast sheet, let's get the probabilities of the value of the forecast indicators, with a distinction between the optimistic and pessimistic levels of the forecast. With the help of the trend line and finding the coefficient of determination (R^2), let's establish the probability of realizing the forecast of growth or reduction of the value of the indicator. This approach will help to determine the threat of manifestation of financial risks that arise in the plane of sources of formation and directions of use of the insurance company and affect the level of its solvency.

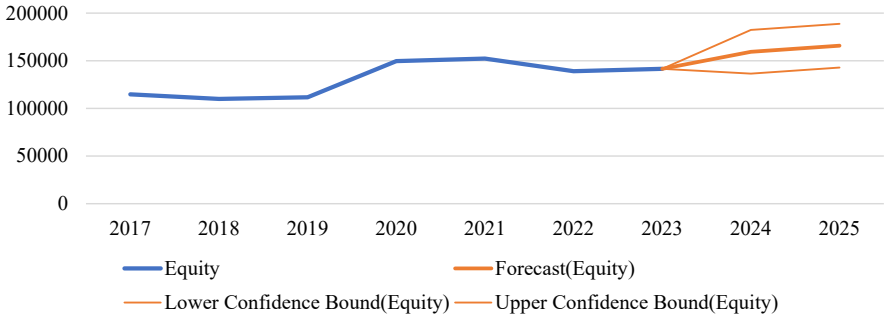
Fig. 1 presents the results of forecasting the amount of equity capital of PJSC Kraina IC.

Table 3

Initial data of PJSC Kraina IC for economic and mathematical modeling

Indicator	2017	2018	2019	2020	2021	2022	2023
Equity capital	114778	109957	111708	149604	152296	139098	141531
Insurance reserves	111374	106480	125316	137518	160965	148770	161020
Current assets	178648	160624	170801	149121	175175	160041	173550
Capital	239426	226836	249185	312050	336905	320776	331533
Non-current assets	60778	66212	78384	162929	161730	160735	144451
Current liabilities	12675	9859	11603	16740	23644	29260	28982
Net profit	1289	2368	468	12095	811	–5067	2980
Coefficient of risk of loss of solvency	0.31	0.34	0.36	0.58	0.55	0.59	0.56

Note: formed by the author based on [12]



Time interval	Equity	Forecast (Equity)	Lower Confidence Bound (Equity)	Upper Confidence Bound (Equity)
2017	114778	–	–	–
2018	109957	–	–	–
2019	111708	–	–	–
2020	149604	–	–	–
2021	152296	–	–	–
2022	139098	–	–	–
2023	141531	141531	141531.00	141531.00
2024	–	159448.876	136501.63	182396.13
2025	–	165827.8351	142880.48	188775.19

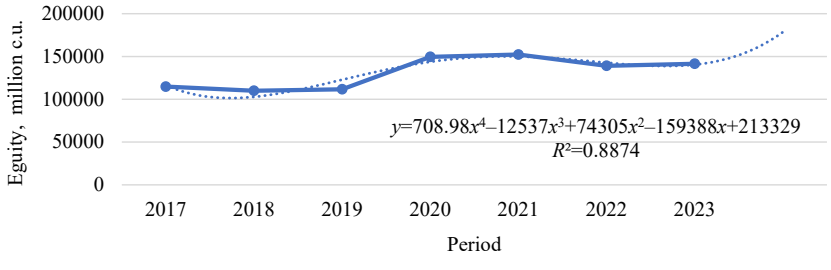


Fig. 1. Results of forecasting the amount of equity capital of PJSC Kraina IC (built by the author on the basis of [12])

According to the results of the forecast, it is possible to hypothesize that with a probability of 11 % (the difference between the realization of the forecast of the growth of own income of 89 % according to the value of the coefficient of determination) the risk of reducing the equity capital of PJSC Kraina IC may appear. Then, the average level of the forecast value of equity will be 177,347.7 thousand c.u. (13651.63·0.11+182396.13·0.89). This approach to forecasting gives a more reasonable and reliable value of the forecast, and also allows to identify the degree of occurrence of risk events in changes in the formation and use of financial resources of the insurance company.

Predictive values for all key indicators of the insurance company's activity are constructed by similarity. Based on the results of the forecast, it is possible to predict with high probability the growth of insurance reserves in the forecast period to the level of 192,136.26 thousand c.u.

The results of forecasting key performance indicators of PJSC Kraina IC are summarized in Table 4.

Thus, it was possible to predict the increase in the risk of loss of solvency of PJSC Kraina IC due to compliance with the established capital structure and the growing risk of a reduction in the value of current assets. As it was established earlier, the structure of the company's assets is a hindrance to the activity of the insurance company, so it is necessary to reduce the share of non-current assets by means of proposed reorganization measures of inefficiently working departments, presented in the strategic measures of the insurer's development.

The practical significance of the obtained results lies in the possibility of increasing the efficiency of the use of available resources and reserves in the process of risk management. The proposed methodological approach can be used to assess the impact of risks in the insurer's activities, which will increase the accuracy of the results obtained.

Table 4

Results of forecasting key performance indicators of PJSC Kraina IC

Indicator	Probability of obtaining a lower than average value	Probability of obtaining is above average	Predictive value of the indicator	Risk level
Own capital	11 %	89 %	177347.7	low
Insurance reserves	4 %	96 %	192136.26	low
Current assets	66 %	34 %	155077.64	low
Capital	2 %	98 %	413104.19	low
Non-current assets	6 %	94 %	234207.1	low
Current liabilities	10 %	90 %	38178.8	low
Coefficient of risk of loss of solvency	0.72			

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4. Conclusions

Based on the results of using a comprehensive approach to the analysis of potential risks of influence on the insurance company's activities, both from the external and internal environment, an analytical basis for determining the strategic directions of the insurer's development is formed. Such strategic methods of analysis as PEST and SWOT give an idea of the state of threats in the external environment and outline the potential opportunities of the insurer's internal reserves. Methods of economic and mathematical modeling and forecasting allow to assess the current state of the company and investigate its behavior under the influence of external and internal factors. On the basis of historical data, the probability of occurrence of certain events is calculated, and scenarios of their impact on the company's financial condition are developed. The basis of the predictive model of the insurance company's risk analysis is formed by the solvency risk factor, calculated according to the key parameters for assessing its financial condition. The reliability of the forecast of the possible risk of loss of the insurer's solvency is ensured by constructing a trend line and forming a forecast sheet in the MS Excel software environment. The forecast sheet forms the probabilities of the values of the indicators with a distinction between optimistic and pessimistic levels of the forecast. Using the trend line and finding the value of the coefficient of determination (R^2), the probability of forecast realization of growth or reduction of the value of each individual parameter of the model is determined. Forecasting tools substantiate strategic decision-making and ensure the company's financial stability.

Conflict of interest

The authors declares that they have no conflict of interest in relation to this study, including financial, personal, author-ship or other, which could affect the study and its results presented in this article.

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Data availability

The manuscript has no associated data.

Use of artificial intelligence

The authors confirm that they did not use artificial intelligence technologies when creating the presented work.

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