

# Introduction of Internal Audit as an Innovative Tool for Improving the Economic Efficiency of Enterprises

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**Abstract:** The production of paint and varnish materials is one of the main sectors of the chemical industry, which is rapidly and dynamically developing in the context of innovative changes. Enterprises of the paint and varnish industry create new jobs using the latest technologies, including digital ones, which can be implemented on a powerful material and technical base. The study examines global trends in the development of paint and varnish industry enterprises and determines prospects for major manufacturers. In the article, the impact of the global economic crisis deepened by the COVID-19 pandemic on the production and consumption of paint and varnish materials is analysed. The pandemic has lowered prices for chemical products, reduced orders for the supply of paint and varnish materials, and considerably increased international competition between manufacturers. Moreover, the study estimates the volumes and substantiates the need for investment in the further technological development of paint and varnish industry enterprises to reduce the energy intensity of production, material consumption of products and ensure their high quality, affordable price, and environmental safety. An internal audit of fixed assets at paint and varnish industry enterprises revealed a substantial deviation in the cost of fixed assets in the financial statements (it can reach 10-14%). Timely and well-founded management decisions on the reproduction and modernisation of fixed assets will provide enterprises with the opportunity to use the latest technological support for the production of quality and environmentally friendly products, increase their economic efficiency and competitiveness.

**Keywords:** Environmental Safety; Paint and Varnish Industry; Technological Development; Fixed Assets.

**JEL Codes:** M42, L53

## 1. INTRODUCTION

The paint and varnish industry is one of the most promising branches of the chemical industry. Varnishes, paints, and other types of products are used in almost all areas of activity, construction, and everyday life. The demand for products is constantly growing. However, the slowdown in global economic development, compounded by the COVID-19 pandemic, has lowered product prices, reduced orders, led to the bankruptcy of individual industry enterprises, and intensified international competition. On the other hand, the pandemic has caused changes in people's lifestyles, purchases, and thinking. Thus, in the production of paint and varnish goods, a huge amount of chemicals and other harmful substances are used that negatively affect the environment and humans. Therefore, it is important for

modern consumers that all paint and varnish goods meet the declared international standards and requirements for environmental safety.

For the production of high-quality, unique, and environmentally friendly chemical products, industry enterprises need the latest technologies. The development and use of low-waste production of paint and varnish materials, anti-corrosion paint coatings, as well as coatings with special properties (for sea vessels, aviation, space, etc.), require notable capital investments and strong material and technical base. Internal audit of fixed assets of enterprises allows identifying the efficiency of their use, the need for timely reproduction and modernisation. The introduction of an internal environmental audit will reduce the negative impact of enterprises' activities on the environment and promote the production of environmentally friendly paint and varnish goods. In addition, the issues related to improving the internal audit of fixed assets at enterprises of the paint and varnish industry require a detailed and

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comprehensive study, which conditioned conducting research in the framework of the outlined issues.

In modern economic conditions, the importance of rational resource use, prevention of defects in the production at enterprises of the paint and varnish industry is increasing. The above is achieved with efficient use of fixed assets, implementation of an internal control system, an audit of the availability, movement, and availability of fixed assets at the enterprise. According to research results, the researchers consider the introduction of an internal control system in order to prevent defects in production, which would make it possible to produce high-quality goods on modernised, energy-saving fixed assets. It is shown that the issues related to improving the accounting of fixed assets are widely considered in various studies. In particular, researchers study the influence of the level of liquidity and solvency of a company, its size, intensity of use of the material and technical base on the increase in the economic value of a business and the decision to revalue fixed assets (Solikhah, Asrori & Budiyo, 2020). Notably, the assessment of the company's value occupies an impactful place in the system of cost-oriented management, which is why the effective use of fixed assets is the key to the successful functioning of the enterprise.

In turn, in the context of an innovative economy, the issues of accounting for fixed assets in 3D format (Dos, Don'ts, and Details) become particularly relevant. In particular, researchers emphasise that fixed assets are capitalised, which is why companies should adopt a capitalisation policy, setting a threshold for them in value terms. Accordingly, the assets built by a business entity must include all components of costs, including material costs, labour, general production costs, etc. (Costanza-Chock *et al.*, 2022; Vokshi & Xhemajli, 2022). Additional costs incurred, which increase the service potential of a non-current asset, should also be capitalised as they form the valuation of such an asset in the Balance Sheet (Statement of Financial Position) and the Notes to the Annual Financial Statements.

The basic issues of improving the accounting of fixed assets of the company deserve special attention. The researcher interprets "accounting for fixed assets" as an understanding of how to properly account for the investments that the company owner makes in the business and what is considered capitalised value (Schwarz, 2020). Moreover, a special emphasis is placed on the revaluation of fixed assets since it makes it possible to reflect the fair market value of fixed assets or changes in their utility. This is relevant in the context of drastic changes in the cost of fixed assets in the market, it refers to both growth and decreases.

## 2. LITERATURE REVIEW

Vietnamese researchers cover and comprehensively examine the issues of improving the management accounting of fixed assets (Josh & Karyawati, 2022; Kzykeyeva, 2022). In particular, they address the inefficient management of using the material and technical base in industrial enterprises. The primary place among the issues is occupied by a poor level of documentary support for reflecting operations with fixed assets. Moreover, the use of incorrect depreciation methods for each type of fixed asset also has a negative impact on the

company's material and technical base management system. It is also emphasised that the vast majority of enterprises have not yet analysed the system of indicators for assessing the investment state, technical condition and efficiency of using the objects under study. Due to such trends, the improvement of the internal audit system for operations with fixed assets at large industrial enterprises is required.

Accordingly, the studies of leading American and Russian researchers on the issues of conducting an internal audit of the company's fixed assets should be considered. The researchers focus on the definition, functions, and stages of the company's internal audit procedure (Blaga, 2020). Special attention should be paid to the combination of theoretical and practical aspects of conducting a third-party audit of research objects with reference to the use of relevant documents by the auditor. A system of indicators for assessing the implementation of an innovative *new model* of internal audit needs to be developed (Rahayu & Rahayu, 2020). Internal auditors can use roles under the new model if they receive support in the form of management commitments. The new internal audit paradigm will be useful in providing confidence in achieving organisational goals and identifying the company's personnel as the main control source. For that purpose, researchers suggest using an effective policy regarding the procedures for updating the company's fixed assets and their management system (Holmes, 2020; Fridrich *et al.*, 2022). Moreover, the introduction of a reliable and objective definition of asset disposal in accounting procedures will contribute to building an effective system for monitoring their movement. After all, an effective asset management system requires the use of sufficient information about the items of property, plant and equipment that have been disposed of to link the disposed of items with the accounting records. Information that non-current assets should be capitalised also needs to be confirmed. Therefore, there is a need for an appropriate level of internal audit between programme offices regarding the movement of fixed assets; a necessity to document and notify relevant personnel of the company properly. This approach, in the authors' opinion, necessitates the improvement in the composition of the internal audit service at industrial enterprises.

The effectiveness of the internal audit service for business entities is determined by its fulfilment of the set purposes and objectives aimed at achieving the following results: preventing possible violations, reducing errors, exposing fraudulent schemes, reducing the cost of external audit and the cost of other types of audit. The performance of an internal auditor can affect the efficiency of an enterprise more than verification of an independent external auditor. The internal auditor is aware of the enterprise structure in more detail (Hwang, 2022; Christensen, 2022). In addition, in the authors' opinion, an effective internal audit allows comprehensively taking into account the specific features of the technological process and operation of paint and varnish industry enterprises.

However, there are issues related to a detailed and comprehensive study of improving the internal audit of fixed assets at paint and varnish industry enterprises that remained unresolved. The reason for this may be objective difficulties

associated with competition between chemical industries since it encourages enterprises to conduct accelerated depreciation of fixed assets. To overcome these difficulties, a methodology for the internal audit of fixed assets with elements of environmental audit may be developed. Such an approach will allow replacing outdated equipment with high-tech fixed assets for the chemical industry. All the above allows stating that it is advisable to develop a methodology for internal audit of the effectiveness of fixed assets, which will contribute to the performance of the strategic management functions related to the development of the material and technical base for the enterprises in the studied sector of the economy.

### 3. MATERIALS AND METHODS

The purpose of the study is to compile practical recommendations for improving internal audits to activate the search for new mechanisms and methods for managing the reproduction and modernisation of fixed assets of paint and varnish industry enterprises to increase their economic efficiency and competitiveness.

In order to achieve the stated purpose, the following tasks were set:

- to investigate the external and internal business environment of paint and varnish industry enterprises in order to determine the state of their technological and technical support;
- compile recommendations for the implementation of internal audit of fixed assets for paint and varnish industry enterprises;
- to test the proposed methodology on the example of a chemical industry enterprise.

The information base of the article is analytical reports of international organisations, statistical data, and expert forecasts. The article uses the studies of modern researchers on economics, accounting, and audit.

The study was conducted using the methods of systems analysis and synthesis, which made it possible to determine the issues and prospects for the development of the paint and varnish industry. The methods of observation and detailing were applied in the course of examining the current state of accounting and internal audit issues of fixed assets. In addition, statistical and reporting data of enterprises, grouping and comparison methods were used. Abstract-logical and economic-statistical methods made it possible to develop the information package of the internal audit system of fixed assets. The research also uses the following methods: theoretical generalisation, formalisation and analogies – for compiling proposals to conduct an internal audit of fixed assets at enterprises, tabular and graphical – for a visual representation of research results.

### 4. RESULTS AND DISCUSSION

The chemical industry is one of the main segments of the global industry. This is a polyelement production system that includes the synthesis of substances with certain properties based on mineral, organic, and other raw materials by its chemical processing. By manufacturing intermediate

consumption products (raw materials and semi-finished products) for all sectors of the economy, the modern chemical industry largely determines the level of their competitiveness, as well as the dynamics of development, the area innovation processes. On the other hand, a wide range of chemical products confirms their importance in the consumer market. In 2019, the total global revenue of the chemical industry was about 3.94 trillion USD. Chemical industry revenues reached a record level in 2014 – a total of 5.4 trillion USD worldwide (Fernández, 2021).

Europe is the third largest seller of chemical products in the world. In 2019, sales volumes by the European Union in value terms amounted to 543 billion euros. However, the share of European sales of chemical products on a global scale is gradually decreasing. For 1999–2019, the indicator decreased from 26.7% to 14.8% (The European chemical..., 2021).

The global chemical market has gradually shifted to Asian producers and China is now the world's largest consumer and producer of chemicals. At the end of 2019, its sales amounted to 1,488 billion euros, and the country's share in global income from the sale of chemical products was 40.6% (Fig. 1). According to experts' calculations, it is expected to grow to 48.6%. In 2009-2019 the growth of chemical production in China amounted to 9.3%, whereas, in the EU (EU27) countries to only 1.4%. For comparison: in Russia – 5.5%, South Korea – 3.0%, India – 2.5%, Japan – 1.5, the United States – 1.3, Brazil – 0.4% (The European chemical..., 2021).

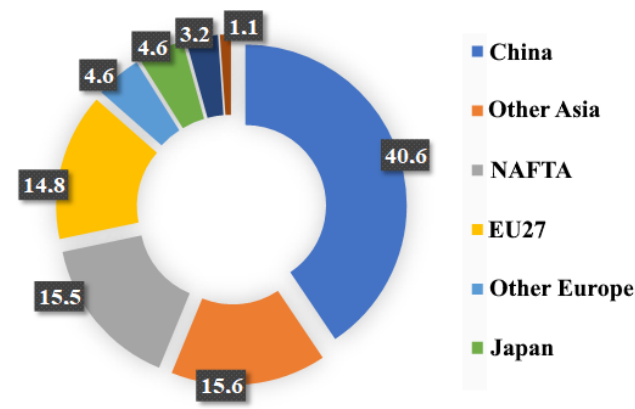
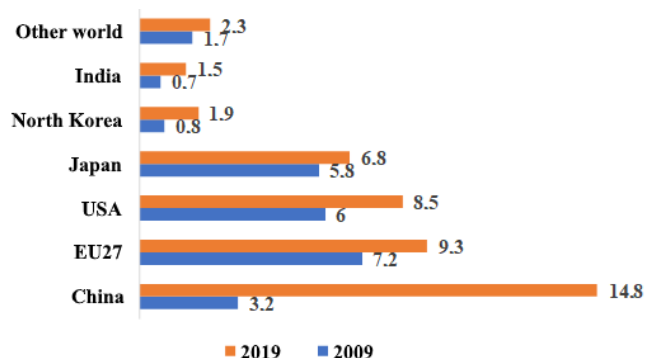


Fig. (1). Global sales of chemical products in 2019, %.

The global paint and varnish industry is one of the main sectors of the global chemical industry. The production of paint and varnish materials is constantly being improved through the introduction of new technologies and methods that allow bringing products to the world market; improving the quality of manufactured goods; increasing the competitiveness of the enterprise; developing unique types of goods. It is expected that by 2027 the industry worldwide will be estimated at about 232 billion USD. This is mainly due to the growth of demand in the construction industry, the growth of the ship, machine, and automobile industry, general industrial production, and the development of the aerospace industry. The Asia-Pacific region is the largest producer and consumer of paint and varnish products with a market value of approximately 77 billion USD (2019) (Fernández, 2021).

The main advantages of the paint and varnish sector in Europe include a favourable business environment and political stability, the level of which is notably higher compared to such production centres as China and India. Major European producing countries have better chemical infrastructure than Asia and Latin America, including transport, supply chain, logistics, and energy supply. The global competition index estimates major European producers, including Germany, the Netherlands, France, and other countries, between 4.8 and 6.2 (out of 7 points) in terms of infrastructure. Therewith, Asian producers such as India and China have ratings of 3.6 and 4.7, respectively (Overview of the chemical..., 2021). Europe is also characterised by the high quality of research institutions, a considerable share of companies' costs on research, and the availability of highly qualified specialists. EU companies annually spend about 1.6% of their investments in the chemical industry on research and development, while China – only 0.8%. Figure 2 shows the volume of investment by major chemical producers in research and development. A strong research and development base in Europe contributes to the creation of goods with higher added value.

The paint and varnish industry is one of the sectors of the chemical industry in Ukraine, the consumption of which is 300-400 thousand tons per year, that is, about 1 billion USD. One person accounts for 6-7 kg/year of paint and varnish goods (for comparison, in Western Europe they consume 14-17 kg/year per person). This figure covers Ukrainian and imported goods paint and varnish materials (Results of 10 years of work of AUVLP (2019)..., 2021). The greatest development of Ukrainian production of paint and varnish materials was observed in 2007 with the production of 330 thousand tons. Thereafter, there was a decline in production. In general, the chemical industry in Ukraine is characterised by low rates of development. The industry has an annual gross turnover of 4.6 billion USD, which is about 5% of all industrial production.



**Fig. (2).** The volume of investment by major chemical producers in research and development in 2009 and 2019.

The share of production of chemicals and chemical goods, which include paint and varnish materials, is 2.9%. In the vast majority of industrialised countries, the annual turnover of the chemical industry exceeds 8–10 billion USD, the average is in the range of 50 to 100 billion USD. The average range of the chemical industry's share in industrial production is from 8–9 to 18–20%. Notably, in Ukraine, as in the whole world, the economic state at enterprises was negatively affected by the global COVID-19 pandemic.

Since the beginning of 2020, chemical companies have experienced lower product prices, reduced orders, and an almost critical decline in energy prices. These factors combined have considerably increased international competition. In particular, Europe, as the largest importer of energy carriers, is temporarily in a favourable competitive environment for energy supplies. The US has lost its price advantage from selling shale gas, which has provided opportunities for other countries. There is a negative trend of bankrupt enterprises at a global scale, which is associated with an increase in the costs of enterprises and a decrease in sales markets for manufactured goods.

On the other hand, the pandemic has caused changes in people's way of life, purchases, and thinking. For example, demand for eco-friendly products has increased, as, after the pandemic, 79% of consumers preferred to choose products that are healthier and better for the environment. The impactful innovations in the industry include the development of new coatings such as nanocoats, hydrophilic (water-attracting) coatings, hydrophobic (water-repellent) coatings, and antimicrobial coatings. For instance, the American company Sherwin-Williams was the world's leading paint and coating company in 2020 with a revenue of 18 billion USD. Another American company, PPG Industries, was second in this ranking, with a revenue of 13.3 billion USD in 2020. In general, five of the world's top ten paint and coating companies are based in the United States (Fernández, 2021).

Thus, modern consumers of paint and varnish goods appreciate everything: from fast delivery, multi-channel purchase portals to technologically advanced and environmentally friendly goods (Eulerich & Eulerich, 2020). It is possible to reduce the energy intensity of production and improve the quality, range, and environmental safety of goods through the modernisation of technological production lines and the material and technical base in general. New technologies such as artificial intelligence, the Internet of things, augmented and virtual realities are beginning to provide solutions to increase consumer expectations, including reducing product prices and ensuring environmental safety. In Ukraine, investments in the paint and varnish materials production sector were received selectively and concentrated at large enterprises. Due to the small amount of investment, the industry's enterprises have a fairly weak material and technical base and use outdated technologies with considerable electricity consumption. Furthermore, Ukrainian enterprises of the paint and varnish industry are characterised by the notable depreciation of fixed assets, which exceeds 50% and gradually increases. For this purpose, it is suggested to introduce an internal monitoring system for effective technological support of the production of high-quality and environmentally friendly goods, an important subsystem of which is the internal audit of fixed assets (Elezi & Bamber, 2022).

At the first stage of internal audit, the external business environment of the enterprise, as well as the internal organisational structure of the enterprise, are evaluated in order to determine the composition of the group for conducting an internal audit. Having considered the typical organisational structures of paint and varnish industry

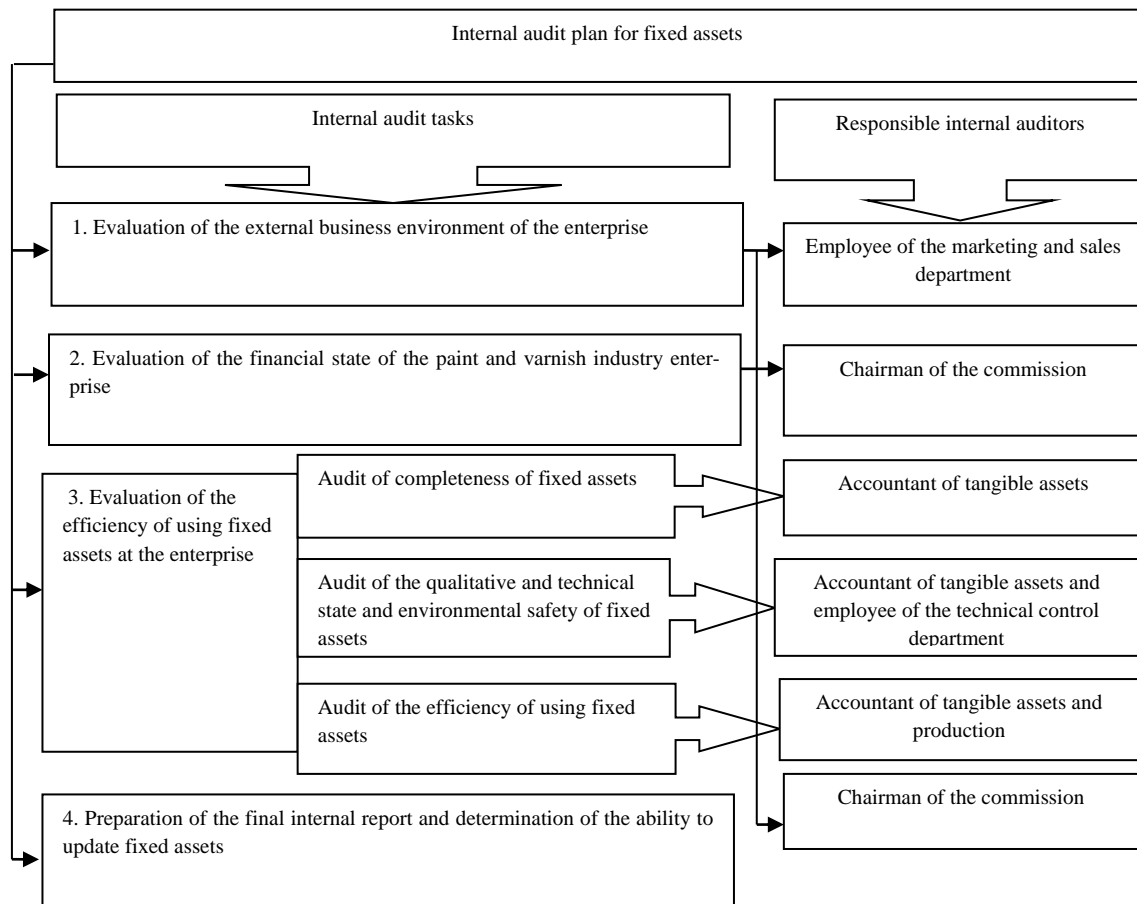


Fig. (3). Stages of internal audit of fixed assets at the paint and varnish materials enterprise.

enterprises, it is worth creating a group of 5 internal auditors to distribute tasks between them (Fig. 3) aimed at implementing the key programme of internal audit of the efficiency of using fixed assets recommended for the enterprise.

Namely such employees:

- 1) employee of the marketing and sales department;
- 2) employee of the technical and environmental control department;
- 3) accountant of the production sector;

4) accountant of the tangible assets sector;

5) chairman of the commission: deputy general director for accounting, finance, and statistics.

At the second stage, the financial state, liquidity indicators, solvency and profitability of the enterprise are evaluated based on the financial statements.

At the third stage, the efficiency of using fixed assets is evaluated in accordance with the developed programme of internal audit of efficiency of use for paint and varnish industry enterprises (Table 1).

Table 1. The Programme of Internal Audit of the Efficiency of the Using Fixed Assets Recommended for Enterprises of the Paint and Varnish Industry.

Purpose	Criteria	Audit Procedures	Methods	Audit Evidence	Index of the Working Paper	Inspection Period	Performer
I Audit of the completeness of fixed assets							
It is required to assure that the active part of fixed assets changes positively over time	D, A	Checking changes in the active part of fixed assets over time	Arithmetic, analysis, and documentary inspection	Financial statements of the enterprise, accounting data	AAFA-1 AAFA-2 AAFA-8	2-3 days	Accountant of tangible assets

II Audit of the qualitative and technical state and environmental safety of fixed assets							
It is required to assure in proper technical state and suitability of the use of fixed assets	A, D, F	Checking the technical state of the FA: depreciation coefficient and suitability	Comparison, arithmetic, analysis, documentary inspection	Financial statements of the company, accounting data	AAFA-3 AAFA-4 AAFA-8	2-3 days	Accountant of tangible assets
It is required to assure that fixed assets are environmentally safe	A, B, E	Checking environmental indicators (toxicity, vibration, radioactivity, noise)	Comparison, analysis, and synthesis	Environmental expertise reports	AAFA-9	2-3 days	Employee of the technical and environmental control department
It is required to check the indicators of the intensity (dynamics) of movement of fixed assets	G, F, D	Checking the movement indicators of fixed assets: disposal and renewal coefficients, comparing data with regulatory and industry average values	Arithmetic, comparison, analysis, documentary inspection	Financial statements of the enterprise, analytical and synthetic accounting data, regulatory indicators, industry indicators	AAFA-5 AAFA-8	2-3 days	Accountant of tangible assets
III Audit of the efficiency of using fixed assets							
It is required to assure that the company uses fixed assets efficiently	D, F	Checking the utilisation coefficients of fixed assets (fund return, fund intensity, and profitability of fixed assets) and comparing them with regulatory and industry-average ones.	Arithmetic, comparison, analysis, documentary inspection	Financial statements of the enterprise, accounting data	AAFA-6 AAFA-7 AAFA-8	2-3 days	Accountant of tangible assets

**Table 2. Fragment of the Working Paper Checking the Actual Availability of Fixed Assets AAFA-1.**

No. s/n	Corporation	Name Fixed Asset	Inventory Number	According to the Company Data		According to the Audit Data		Deviations
				Amount	Cost, UAH	Amount	Cost, UAH	
1	1	industrial machine	145892	5	5891210	5	5891210	not detected
2	3	computer	145841	3	75820	3	75820	not detected
3	5	mixer	285601	1	78562	1	78462	detected

The internal audit programme, in accordance with a certain task to evaluate the qualitative and technical state, requires checking the environmental safety of fixed assets based on reports of environmental expertise. In other words, it is recommended to involve third parties in the internal audit, namely an employee of the environmental control

department. Testing of the internal audit methodology on the efficiency of using fixed assets at the paint and varnish industry enterprise was conducted with a selective method. It is suggested that the group of auditors summarise the audit data in the proposed working paper for the internal audit of fixed assets (Table 2-7).

**Table 3. Fragment of a Working Paper Verifying the Correctness of Use Period of Fixed Assets AAFA-2.**

Date of Adopting Act	Inventory Number	Act Number	Name of the Fixed Asset	Initial Cost, UAH.	Use period, Years		Deviations
					According to the Company Data	According to the Auditor Data	
25.02.2020	457778	89	sorting machine	89455	10	10	not detected
27.03.2020	475141	105	printer	12300	5	5	not detected
13.01.2021	498556	142	machine C1	25623	5	15	detected

**Table 4. Fragment of a Working Paper Verifying the Correctness of the Depreciation of Fixed Assets AAFA-3.**

Date of Commissioning	Inventory Number	Adopting Act Number	Names of the Main Assets	Initial Cost, UAH	Month from which Depreciation Begins Based on the Data		Deviations
					Enterprises	Auditor	
1.10.2015	457785	96	mechanical crane	789562	december	december	not detected
25.12.2016	452212	102	minibus	110000	january	may	detected
23.05.2018	481121	125	air conditioning	28200	june	june	not detected

**Table 5. Fragment of a Working Paper Verifying the Correctness of the Determination and Completeness of the Reflection in the Accounting of the Depreciable Value of Received Fixed Assets AAFA-5.**

Date of Adopting Act	Inventory Number	Act Number	Name of the Fixed Asset	The Amortised Cost, c.u.						Deviations
				According to the Company Data			According to the Audit Data			
				Cost of Fixed Assets	Shipping Cost	Installation Cost	Cost of Fixed Assets	Shipping Cost	Installation Cost	
5.02.2019	454861	88	crane	78956	8000	1000	78956	8000	1000	not detected
17.12.2019	4588985	41	engine	5320	250	350	5320	250	350	not detected
29.03.2020	458991	36	VC machine	19620	1500	500	19620	1348	285	A deviation of 267 c.u. was detected.

**Table 6. Fragment of a Working Paper Checking the Correspondence of Accounts for Fixed Assets of AAFA-6.**

Operation Content	Inventory Number	According to the Company Data			According to the Auditor Data			Deviation and Correction
		Debit	Credit	Amount, Thousand c.u.	Debit	Credit	Amount, Thousand c.u.	
The machine was put into operation and its initial cost was 21620,	458991	Fixed assets	Capital investment	21.620	Fixed assets	Capital investment	21.253	Detected (267 c.u. deviation)
Depreciation of the machine has been accrued	458991	Production costs	Depreciation	1.662	Production costs	Depreciation	1.625	Deviation (37 c.u.)
The amount of machine depreciation has been debited	458991	Depreciation	Fixed assets	1.662	Depreciation	Fixed assets	1.625	Deviation (37 c.u.)

Taking into account the audit results, Table 5 revealed deviations in the initial cost of the production shop machine under inventory number 458991, in the amount of 267 c.u., it is recommended to check the accuracy of accounting operations, the results are summarised in Table 6.

According to the documents, the liquidation value of the machine is determined in the amount of 5,000 c.u., with a use period of 10 years. In accordance with the order on accounting policy, the company uses a straight-line method of calculating depreciation.

The next stage of verification is to reflect information about fixed assets in the financial reporting forms. Table 7 shows the fragment of a working paper checking the balance sheet.

As a result of checking the summarised information in the reporting form, deviations in the estimate of the book value of fixed assets by 162 thousand c.u. or 13.9% were detected. This was due to the distortion of the amount of accrued depreciation on fixed assets, a deviation of more than 10% can be considered substantial. It is recommended that management personnel make appropriate decisions on updating and upgrading fixed assets and make changes to the balance sheet. The study suggests summarising the analytical inspection of indicators of state, movement, and efficiency of use in the working paper shown in Table 8, based on the data of ALC "Chernivets'kyi Khimichnyy Zavod".

**Table 7. Fragment of a Working Paper Checking the Correctness of Drawing up the AAFA-7 Balance Sheet.**

Indicator	According to the Company Data, Thousand c.u.	According to the Auditor Data, Thousand c.u.	Deviations and Corrections, Thousand c.u.	Deviation, %
Fixed assets at their residual value (including items: - : VC machine No. 458991 - .....) <b>Total</b>	19.958...11630	19.625...10010	(1)...-1620	-13,9
Initial cost (including by item: - : VC machine No. 458991 - .....) <b>Total</b>	21.62 ...21440	21.25...21470	(1)...30	0.13
Depreciation (including by objects: - : VC machine No. 458991 - .....) <b>Total</b>	1.662 ...9810	1.625...11460	-0.037...1620	13.9

**Table 8. Working paper on the Assessment of the State, Movement, and Efficiency of the Use of Fixed Assets of AAFA-8.**

No. s/n	Indicators	At the End of the Year				Absolute increase			
		2016	2017	2018	2019	2017 2016	2018 2017	2019 2018	2019 2017
1. Coefficient analysis of the technical state of fixed assets									
1.1.	Depreciation coefficient	0.595	0.643	0.666	0.667	0.048	0.023	0.001	0.072
1.2.	Suitability coefficient	0.405	0.357	0.334	0.333	-0.048	-0.023	-0.001	-0.072
2. Coefficient analysis of the movement of fixed assets									
2.1	Fixed asset renewal coefficient	0.015	0.018	0.032	0.061	0.003	0.014	0.029	0.046
2.2	Coefficient of disposal of fixed assets	0.001	0.001	0.013	0.011	0	0.012	-0.002	0.01
2.3	Fixed asset growth coefficient	0.018	0.017	0.019	0.050	-0.001	0.002	0.031	0.04
3. Coefficient analysis of the efficiency of using fixed assets									
3.1	Fund return	1.69	1.75	2.37	3.27	0.06	0.618	0.901	1.58
3.2.	Fund return of the active part of fixed assets	9.02	9.13	11.99	15.43	0.11	2.857	3.472	6.41
3.3.	Fund intensity	0.52	0.56	0.42	0.30	0.04	-0.148	-0.116	0.22

For conducting an internal environmental audit, it is recommended to use the developed form in Table 9, index of the document AAFA-9.

The proposed working paper on internal environmental audit is completed by the environmental inspector. The specialist should express an opinion on the environmental safety of fixed assets that are in operation or are being put into operation at an enterprise of the paint and varnish industry. At the fourth stage of internal audit, according to the developed methodology, the final internal report is prepared and the ability to update fixed assets of chemical industry enterprises is determined. Taking into account the results of analytical, arithmetic, and documentary inspections, it is suggested for auditors to evaluate the state and efficiency of

using fixed assets. Evaluation should be performed according to the following quality criteria: A – Availability; B – credibility; C – rights and obligations; D – completeness; E – measurement; F – cost evaluation and G – presentation and disclosure. Quality criteria for fixed assets are defined in the proposed programme (Table 1).

Thus, taking into account the opinion of internal auditors highlighted in the final report, management personnel can decide on the possibility of gradual reproduction of fixed assets at the tested enterprise. It can be clearly stated that there is no industrially developed country with an advanced chemical industry that is not financed from various sources. Namely: corporate, state, funds from universities or scientific institutions, including R&D, and technological base for the



Table 9. Working Paper on Internal Audit of Environmental Indicators of Fixed Assets AAFA-9.

Environmental Indicators of Fixed Assets	Toxic Substances		Radioactive Substances		Noises		Vibration	
	Maximum Permissible Concentration	Deviation from the Maximum Permissible Concentration	Maximum permissible Radiation Level	Deviation from the Maximum Permissible Radiation Level	Maximum Permissible Decibel Level	Deviation from the Maximum Permissible Decibel Level	Maximum Permissible Level (Hz)	Deviation from the Maximum Permissible Level (Hz)
Sulfur dioxide (SO <sub>2</sub> )	0.01mg/1(g/m <sup>3</sup> )	Not detected	X	X	X	X	X	X
Nitric oxide (N <sub>m</sub> O <sub>n</sub> )	.....	Not detected	X	X	X	X	X	X
Hydrogen sulfide (N <sub>2</sub> S)	0.01g/m <sup>3</sup>	Not detected	X	X	X	X	X	X
Carbon monoxide (CO)	0.03 g/m <sup>3</sup>	Not detected	X	X	X	X	X	X
Ammonia (NH <sub>3</sub> )	0.02 g/m <sup>3</sup>	Not detected	X	X	X	X	X	X
Mercury (Hg)	10 g/m <sup>3</sup>	Not detected	X	X	X	X	X	X
Olefins and paraffins	0,3 mg/1	Not detected	X	X	X	X	X	X
Aromatic compounds	.....	Not detected	X	X	X	X	X	X
Phenol and its compounds	0,005 g/m <sup>3</sup>	Not detected	X	X	X	X	X	X
Nitro-, Amino derivatives R-NO <sub>2</sub> R-NH <sub>2</sub>	0.01....0.3 g/m <sup>3</sup>	Not detected	X	X	X	X	X	X
Radium – 226	X	X	3*10 <sup>-15</sup>	Not detected	X	X	X	X
Radon – 222	X	X	1*10 <sup>-11</sup>	Not detected	X	X	X	X
Radium – 105	X	X	5*10 <sup>-11</sup>	Not detected	X	X	X	X
Thorium – 234	X	X	3*10 <sup>-12</sup>	Not detected	X	X	X	X
Noise level (dB)	X	X	X	X	20...30 dB	Not detected	X	X
Vibration level (Hz)	X	X	X	X	X	X	1Hz	Not detected

development of the national chemical industry. Currently, industrial investments in the chemical industry are exclusively based on modern high-tech innovative developments. Most industrialised countries have established and implemented strategies (or programmes) for the development of the chemical industry. Joint strategic accents: specialisation, innovation, biotechnology, digitalisation, the safety of chemical production and chemical products.

The volume of investments in fixed assets decreased by 23% compared to the previous year, foreign direct investment was almost reset to zero, and income reinvestment was carried out in small amounts. All this creates an insufficient

financial and investment base for the further development of the chemical industry. 10.2.2. Therewith, some enterprises of the chemical industry despite unfavourable financial and economic conditions in 2020, provided stable, capital investments in the modernisation of chemical production. For most industrialised countries, considerable amounts of investment in fixed assets in the chemical industry and, especially, in R & D are characteristic, which are commonly in annual terms close to or greater than the main investments. Based on the results of the study, it can be noted that the introduction of an internal audit system for fixed assets performs a strategic function of sustainable development of the enterprise. The developed methodology is a solid basis

for making well-founded management decisions. Further research and improvements are required to control the legality of the availability, accounting, operation, and disposal of fixed assets from the enterprise.

## 5. CONCLUSIONS

The study of the state of the external and internal business environment of paint and varnish industry enterprises has revealed that the driving force for the reproduction of fixed assets at chemical production enterprises is, first of all, competition between chemical industries. Since it encourages enterprises to conduct accelerated depreciation of fixed assets to accumulate financial resources for subsequent investment in the purchase of more recent, progressive equipment or other improvements.

A methodology for internal audit of the efficiency of using fixed assets at the enterprise has been developed, which will allow timely updating and using fixed assets at the enterprise effectively. The proposed approaches provide an appropriate level of control, contribute to the performance of management functions for the development of the material and technical base of paint and varnish industry enterprises.

The internal audit methodology is harmonised and tested with the elements of environmental audit, which will allow replacing outdated equipment with high-tech and innovative fixed assets, as it is relevant for chemical industry enterprises. The suggested methodology can be used to substantiate the strategy of developing the material and technical base, production, marketing, investment, financial, personnel, and other functional strategies of the enterprise.

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