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## **THE ANALYSIS OF APPROCHES AND METHODS FOR THE VALUATION OF MACHINERY AND EQUIPMENT**

Effective organization of valuation of machines and equipment, improvement of activities of valuation organizations, as well as improvement of quality and improvement of valuation using international experience is important in the process of socio-economic development. This is due to the fact that machinery and equipment represent a huge combination of material values as part of the country's national wealth. This article provides a comparative analysis of valuation approaches and techniques and the strengths and weaknesses of valuation approaches.

**Key words:** machinery and equipment valuation, valuation process, valuation activity, valuation approaches, valuation methods.

## **MASHINA VA USKUNALAR QIYMATINI BAHOLASHNING YONDASHUV VA USULLARI TAHLILI**

Ijmoiy-iqtisodiy rivojlanish jarayonida mashina va uskunalarning bozor qiymatini baholashni samarali tashkil etish, baholovchi tashkilotlar faoliyatini takomillashtirish, shuningdek, xalqaro tajribadan foydalangan holda baholash sifatini oshirish va takomillashtirish muhim o'rin egallaydi. Chunki, mashinalar va uskunarlar mamlakatning milliy boyligining tarkibiy qismi bo'lgan moddiy boyliklarning ulkan uyg'unligini anglatadi. Ular asosiy vositalarning muhim elementidir. Ushbu maqolada baholash yondashuv va metodlarining taqqoslama tahlili va baholash yondashuvlarining kuchli va kuchsiz tomonlari o'rganilgan.

**Tayanch so'z va iboralar:** mashina va uskunalarni baholash, baholash jarayoni, baholash faoliyati, baholash yondashuvlari, baholash usullari.

## **АНАЛИЗ ПОДХОДОВ И МЕТОДОВ ОЦЕНКИ СТОИМОСТИ МАШИН И ОБОРУДОВАНИЯ**

Эффективная организация оценки машин и оборудования, совершенствование деятельности оценочных организаций, а также повышение качества и улучшение оценки с использованием международного опыта имеют важное значение в процессе социально-экономического развития. Это связано с тем, что машины и оборудование представляют собой огромную совокупность материальных ценностей в составе национального богатства страны. Они являются важным элементом основных средств. В данной статье приводится сравнительный анализ оценочных подходов и методов, а также сильных и слабых сторон оценочных подходов.

**Ключевые слова:** оценка машин и оборудования, процесс оценки, оценочные подходы, методы оценки.

## **Introduction**

The transition of our country to the market economy has resulted in the formation of various property systems and the expansion of their property forms in the economy and the emergence of a class of proprietors. The emergence of various forms of ownership has led to the concepts such as real estate, movable property, state property, and community property. Under current condition, in the market economy, property can be sold, purchased, mortgaged, leased and, as a matter of economic relations. In this case, there is a need to determine the price and value of property. Therefore, the valuation of activities such as determining the market value of the property, its fair value valuation, the formation and development of the property valuation is very important. Provision of systemic reforms in the democratization and modernization of the country, primarily in industry and agriculture, the development of private property, entrepreneurship and small business, will be aimed at one of the most important priority of the socio-economic development program of the country for 2017-2021[1]. The need for valuation of property is rising as a result of improving the living standards and welfare of the population, as well as the growth of real savings. This situation leads to the rapid development of the property objects as collateral for the purchase, sale, lease and loan obtaining. It should be noted that in our country in the socio-economic system that existed until 1991, there was no need to evaluate machinery and equipment and tangible and intangible assets. Because, in a centralized economy, all enterprises and organizations in the country, the tangible and intangible assets of production are in the public domain, such as selling, purchasing, leasing, at fixed rates determined by the state. One of the most important problems of that time is that the methodological base of the assessment in the republic has not sufficiently formed.

Nowadays, various methodological approaches to valuation of machinery and equipment are used in developed countries of the world. For example, in the practice of UK property valuation there are five approaches: comparison, investment, profit, residue, and contractor. In the US practice, there are generally three methodology: cost, sales comparison, and income. In Uzbekistan, as well as in the US practice, these three approaches are used.

## **Literature Review**

Establishment and development of valuation activity in Uzbekistan is carried out simultaneously with creation and improvement of its legal and regulatory framework. A number of regulatory documents have been adopted in Uzbekistan for the organization and development of valuation activity. Among them are the Laws of the Republic of Uzbekistan, Decrees and Resolutions of the President of the Republic of Uzbekistan, Decrees of the Cabinet of Ministers of the Republic of Uzbekistan. For example: The Law of the Republic of Uzbekistan “On valuation activity” on August 19, 1999 [2], Decree of the Cabinet of Ministers of the Republic of Uzbekistan “On the licensing of valuation activity” on May 8, 2003[3], and National standard of property valuation of the Republic of Uzbekistan. “On valuation of machinery and equipment” on May 15, 2017[4].

There are many scientists to research and learn valuation approaches and

methods of machinery and equipment around the world.

The American Society of Appraisers (ASA) in its Principles of Appraisal Practice and Code of Ethics(1994) has broadened the definition of appraisal to include any of the four operations listed[5]:

1. Determination of the value of property
2. Estimation of the cost of:
  - a. Production of a new property;
  - b. Replacement of an existing property by purchase or production of an equivalent property;
  - c. Reproduction of an existing property by purchase or production of an identical property.
3. Determination of the nonmonetary benefits or characteristics that contribute to value (the rendering of judgments as to age, remaining life, condition, quality or authenticity of physical property)
4. Forecast of the earning power of property

In other words, an appraisal is an unbiased opinion of value or other physical attributes of identified property.

In accordance with H.K. Michael's opinion, equipment and machinery valuation is a multi-disciplinary subject involving law, engineering, statistics, economics, insurance, industrial process, environment and planning. In addition, it is a complex process which requires multi-disciplinary approach. In setting up of any project or economic activity whose key objective is adding value, the basic starting point is valuation of equipment and machinery [6].

According to M. Babayev and E. Ibadov, "Valuations are widely used for the purpose of financial reporting"[7].

According to research, "Valuation is the act or process of estimating value or an estimate of value".

While there are many reasons for evaluating machinery and equipment, the most common question is the determination of collateral value for lenders. Banks and other lending institutions will accept machinery and equipment as collateral for loans, commercial loans and lines of credit. The use of machinery and equipment as security for personal property can increase the ability of a borrower to obtain permission to receive a loan. Many lenders require valuation as a prerequisite for loan approval. Assessment, in addition to assessing the business, helps to establish the ability of the business (cash flow) to make payments on the loan[8].

According to Sheu, 1998, machines and equipment are usually used by the manufacturers to reproduce profit. These assets involve huge investments and have relatively longer useful life. To stand competitive and to earn profit in the market the manufacturers should equipped with innovative machines and equipment. The existing machines and equipment should be replaced at random intervals to remain competitive [9].

### **Analysis and results**

Machinery and equipment is an important part of an asset-intensive business, but is generally less important for high-tech enterprises, where the bulk of the cost

is in intangible assets. However, there is more disagreement about the real value of such items. When evaluating machinery and equipment, it is important to indicate exactly what value is being used. When valuing real estate, personal property or businesses, the importance and definition of value to each of these disciplines is different. As with real estate and business valuations, machinery and equipment are evaluated in terms of cost, sales comparison, and income. Value is almost exclusively derived through the cost and comparison approaches with the income approach being rarely used.

There are three particular approaches when considering the appropriate methodology suitable for compliance with the market value or market value based valuation in the world.

**The cost approach** is based upon the assumption that a purchaser would pay no more for an asset than the cost of creating a substitute with the identical utility of the subject asset being valued. This value usually establishes the upper limit of value. Once the replacement cost is established, the condition needs to be accounted for by applying accrued depreciation. As with real property, the depreciation considered is physical curable, physical incurable, functional & economic depreciation.

**The sales comparison approach** relies on the assumption that the value of the businesses' assets can be obtained based upon transactions of similar items selling in the secondary or used market. This is easy to see in concept but difficult in reality. Usually the comparable prices of equipment need to be adjusted for differences such as age, condition and capacity of the assets, model, location, date and type of sale (retail sale, auction sale, asking prices, etc.). Also, if valuing the business under a continued use, then the value associated with the cost of assembly or installing the assets needs to be adjusted.

**The income approach** breaks down the earning capacity of the business assets under investigation. This approach is rarely utilized for individual pieces and is more applicable when analyzing a production line or for a plant which produces a set product.

**Table 1.**

**Strengths and Weaknesses of valuation approaches [9]**

<b>Approaches</b>	<b>Strengths</b>	<b>Weaknesses</b>
<b>Cost</b>	1) Good for special purpose assets. 2) Good for new assets. 3) Good for isolation of different items of depreciation	1) Sometimes economic obsolescence can be overstated. 2) Depreciation estimate is subjective. 3) Effective age is difficult to estimate; if a machine was rebuilt, then this complicates analysis; time consuming.
<b>Sales comparison</b>	1) Most reliable indicator for individual items with established markets. 2) More accurate measure of depreciation.	- Certain items have no comparable sales, and adjusting is subjective. - Sales data is oftentimes questionable and

		not detailed, and buyer and seller motivation is unknown.
<b>Income</b>	<ol style="list-style-type: none"> <li>1) Recognizes income contribution to a business.</li> <li>2) Most accurate measurement of total depreciation of all assets.</li> </ol>	<ol style="list-style-type: none"> <li>1) Poor method if specific assets need to be segregated.</li> <li>2) Rates of return are subjective and need to be combined with the business value.</li> </ol>

Table1 shows the strengths and weakness of all three approaches to value. The valuation organization has an opportunity of using the approaches in their valuation process. In other cases, the valuation organization should justify the possibility or impossibility and limitations of using any approach by presenting relevant evidence in the evaluation report. The total value of the valuation object is presented in the form of a single value, which is determined by coordinating the results of valuations obtained during valuation by different approaches. Moreover, the valuation report contains the professional opinion of the valuation organizations and is a documentary confirmation of the work carried out to determine the value of the valuation object.

**Table 2**

**Methods of valuation approaches [10]**

<b>Approaches</b>	<b>Methods</b>
<b>Cost</b>	Depending on the information contained within the cost approach, one of the following methods is used: exchange method; method of calculation of related object cost; elemental calculation method; 4) method of value indexing.
<b>Sales comparison</b>	The sales comparison approach to the evaluation of machinery and equipment is made using the following methods: 1) direct comparison of sales; 2) statistical analysis methods.
<b>Income</b>	The income approach is used only in the case of valuation of machines and equipment that are the sole object of an assessment and using one of the following methods: the method of direct capital profits; residual method; with the same efficient functional analogue method.

Analyzing approaches and methods of valuation, we have found that sometimes there are some mistakes in the selection and application of valuation approaches and methods.

Mistakes made when applying the costly approach:

- 1) inadequate choice of an analogue object (this may be due to both incorrect identification of the valuation object and the intent / interest of the appraiser / customer);

2) an unreasonable increase in the cost of reproduction by the amount of VAT or non-inclusion of VAT if the book value is used as a base according to accounting data.

Mistakes made when applying the income approach:

1) unreasonable application of the income approach to assessing the value of technological lines of equipment, the value of which is affected by intangible assets, real estate where the production line is established, and other factors that are not taken into account by the appraiser;

2) using the income approach almost always leads to overpricing of equipment costs. For example, when using the income approach, a “custom-made” assessment of obsolete equipment with a sufficiently long term of use may exceed the cost of similar new equipment offered on the market.

Mistakes made when applying the sales comparison approach:

1) inadequate selection of analogous objects (this may be due both to incorrect identification of the valuation object, and to the intent or interest of the appraiser / customer);

2) arithmetic errors, incorrect allocation of VAT.

### **Conclusion and proposals**

The study concludes that it is advisable to apply all the approaches or a combination of the approaches in the valuation of machinery and equipment to arrive at an unbiased opinion of value because each approach has its strong area of suitability. This fact is confirmed by the analysis demonstrated in the study.

Based on the research, the following suggestions and recommendations have been developed:

In Uzbekistan, due to the fact that the machinery and equipment valuation equipment system has not yet met the requirements of international standards in the market economy and the existing normative documents do not meet the requirements of the secondary market. That’s why, considering international experience and marketplace of machinery and equipment, it should be developed a methodological and normative framework for evaluating market value of machinery and equipment.

In order to further improve the valuation activity in our country, it is desirable to raise the qualifications of the valuation specialists to international standards and to encourage the activities of the evaluation bodies.

Because of the lack of literature in the Uzbek language on the market value of property, it is necessary to create modern literature. There is an opportunity to quickly increase the literacy of the population about the valuation of property.

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