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# ECONOMIC CATEGORIES OF "AMORTIZATION" AND "DEPRECIATION": THE HISTORY OF ACCOUNTING CONCEPT FORMATION AND DEVELOPMENT

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**Abstract.** The article deals with the formation and development evolution of the accounting concept of amortization and depreciation of fixed and intangible assets. The methodological sense of the amortization and depreciation accrual processes and the resulting methods of their reflection in the accounting system in the context of historically formulated accounting theories and individual concepts are analysed. An estimation of historical experience through the representation of amortization and deterioration as objects of accounting in interrelation with their economic content is carried out. The level of accounting methods' validity for calculating and displaying amortization charges and the amount of depreciation of fixed assets in the context of their consideration from the position of capital, fund, reserve and regulatory item are analysed. The possibilities of applying separate historically formulated ideas for developing an improved concept of accounting amortization adequate for the modern economy are set forth. *The aim of the article* is a historiographic analysis of the principal approaches and methodological foundations of accounting conventions of amortization, depreciation, and devaluation of economic entities assets and appropriateness assessment using individual developments in modern theory and practice. *The subject of the article* is the study of content and nature of amortization and depreciation of fixed assets as general economic categories and accounting objects. *Methods of studying* the theoretical and methodological basis are the dialectical method of cognition of conceptual processes of "depreciation" and "amortization", analysis and synthesis, induction and deduction, comparison, an abstract and logical method of modelling. *The practical significance of the work is that* historical experience, important and necessary in modern conditions, can be adapted by incrusting several ideas of the past. *Value/originality*. To develop and adapt accounting concept of amortization to the current conditions, it is advisable to turn to the ideas and conceptual approaches developed in previous historical periods. In particular, it may be considered advisable to use the conceptual framework of E. Schmalenbach, who proposes the creation of a transit account "Reserve for inflation" to account for deviations of the revalued value when placed on the balance of an object. The urgency and, obviously, the advisability of introducing such a "false" object is argued at once by several factors – the real existence of inflationary processes in the modern economy and dynamics of their continuation to the observational period is evident; devaluation of the purchasing power of the accumulated amortization resource; the rapid pace of technological progress does not allow talking about the reproduction of fixed capital by the method of "acquiring an analogue".

**Key words:** accounting, fixed assets, amortization, depreciation, devaluation, concept, accounts, reserve, regulatory, accrual methods, renovation, fund, balance generalization.

**JEL Classification:** B10, B41, M41

## 1. Introduction

In the theoretical and applied economics, the issues of the monetary value of objects, phenomena or processes that cannot be measured, weighed, and finally, objectively evaluated, have always been and remain the most problematic and controversial. Throughout the entire historical period of economic science, depreciation and amortization of fixed (long-term) assets of economic entities of any type belonged to such objects up till now. In the modern general economic sense, amortization is usually understood as the process of gradual transfer of the fixed assets value (transferring it to the costs of production or circulation) as they depreciate and this value is used in the processes of fixed capital reproduction. So, the economic science (in any case, the domestic one), and furthermore,

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mostly adheres to the position that the amortization sources have a purely designated purpose and are sent to reproduction processes that, to some extent, retain fixed capital at the achieved level.

The formalization of economic categories ("the amount of accumulated amortization (depreciation)", "amortization fund (capital)", "depreciation of fixed assets") at all historical stages of economic science has been carried out in the accounting system and finds expression in specific accounting facilities and reporting items. The issue of amortization and depreciation calculating has been problematic and ambiguous throughout the history of accounting. In the coordinates of various scientific schools, accounting theories, own views and considerations, scholars in the field of accounting science tried differently to solve clearly the problematic issues that arose in the processes managing practice of the fixed assets (fixed capital) reproduction of the enterprise. With the technological development and the acquisition of the non-material component importance in the economic potential of modern economic entities, the problem of calculating the depreciation and amortization of fixed capital and reflecting them in the accounting system was further strengthened by updating research studies in the direction of developing and justifying an accounting concept of amortization and depreciation of non-economic resources of a modern enterprise.

Given the numerous historical developments and inventions in the field of the amortization and depreciation theory, the developed methods, procedural and conceptual principles of reflecting these objects in various accounting models, many scholars believe that it is reasonable to implement the accounting concept of amortization and depreciation with the use of separate basic principles, substantiated at different historical periods of accounting science development: "to improve the operations accounting on the amortization charging of fixed assets at the modern stage, one should take into account the experience and achievements of past generations, use the results of searches of predecessors, and use the knowledge and skills acquired by them" (Shchyrska, 2013), it is advisable to conduct in-depth studies of the economic essence of the accounting concept of amortization in its historical development (Kulikova, 2015).

The abovementioned updates the direction of scientific research on historical developments in content, conceptual and methodological foundations and methods for recording depreciation and amortization of fixed capital of economic entities, the disclosure of results in public financial reporting, combining the possibilities of their real solution by referring to the developments in this area in different historical periods.

## 2. Analysis of modern studies of economic categories of "amortization" and "depreciation"

The historiographical analysis shows that the reflection in amortization and depreciation accounting of fixed assets was recognized as imperfect both by scientists of past historical periods and by modern scientists. At the same time, some modern problems of amortization and depreciation accounting are directly connected with the construction depravity of the conceptual and methodological foundations of past developments. In particular, P. Khomyn notes that as a result of a mistake in the past and up to the present time, "amortization of fixed assets is mixed with the depreciation of these funds, and its formation is based on two diametrically opposed approaches, combined into an elective unity: reserve + regulator" (Khomyn, Pyrih, 2007). The group of scientists considers past developments as insufficiently deeply investigated, in particular, on the allocation of accounting procedures for the devaluation of assets and their amortization. For example, A. Andreenkova notes that "the practice of calculating amortization and (or) devaluation of assets during the formation of a double-entry bookkeeping, when the main elements of modern accounting were born, and there was an understanding of the need to reflect results of amortization (devaluation) of assets in the accounting, at the moment it is not sufficiently investigated" (Andreenkova, 2016).

The discrepancy between the amortization (depreciation) and the loss of capital over 100 years ago was highlighted by the Lviv scholar in the field of accounting P. Tsompa: "The difference between the initial value and the value after one year shall be written off (amortized), which is econometrically nothing but a reduction in property and capital ... during amortization, this second economic action is completely absent" (Tsompa, 2001). A few similar positions are held by modern scientists. For example, I. Yaremko considers amortization as a reversion of capital property, pointing out that for the two-channel method of amortization of fixed assets, an illusion is created about the formation of an amortization fund as a new source (capital) for their reproduction (Yaremko, 2005).

Despite the fact that the view on the amortization and depreciation as reserve, regulatory or stock (accumulation of target capital) objects has a long history, it has not been solved up to date. The conclusion made in previous historical periods by well-known scholars in the field of accounting is relevant both for past accounting systems and for modern accounting theory expressions "depreciation" and "amortization fund" (depreciation provision) are confusing for both who read the financial statements and the accountants themselves (Mathews, Perera, 1999).

The unresolved part of the general problem concerns insufficiently researched ideas and conceptual bases of accounting concepts of amortization and depreciation of fixed assets formulated in the past, and the lack of subject analysis regarding the possibility of their use in modern developments.

## 3. The concepts of amortization and depreciation in historical retrospect

Historically, the practical application of procedures for calculating amortization and depreciation of fixed assets in various accounting systems, as well as the content itself (economic matter) of the accounting concepts of "amortization" and "depreciation" was also ambiguous. In the history of accounting amortization, researchers not only have different views on the time of its introduction into accounting practice but in many cases shifting such two accounting procedures – property devaluation reflexing and its amortization (depreciation), one introduces a greater uncertainty of this accounting procedure. Such a position on accounting amortization can be found both in the works of authors on the history of accounting of 19-20 centuries and in the studies of modern scientists. Accentuation of this fact comes from the purpose of this article, that is, the study of past ideas and fundamentals of accounting amortization reflexion to justify the possibility and appropriateness of their use in modern developments. In modern international standardization, there are also two standards – IAS 16 "Property, Plant and Equipment", which presents the concepts of amortization and discloses the mechanisms for its accrual and IAS 36 "Impairment of Assets", which describes the corresponding process of changing the book value of an object.

Despite the fact that amortization as an economic category acquired a certain practical application and formalization as early as the sixteenth century, it has been the most controversial and ambiguous in the categorical apparatus throughout the entire historical period and up to the present. Throughout the history of the accounting system development, there were different views among scientists and scientific schools on the economic content of amortization and depreciation of fixed assets, this caused ambiguous approaches to the construction of accounting methods, the provision of economic content used for such purposes accounts – reserve, stock, intended in accounting to display accumulated funds for the purpose of replacing fixed assets (amortization) and regulatory, used to obtain their objective value on a certain date. The ambiguity of these accounting objects was not only local in a separate accounting system, but it was this diametrically opposite understanding of amortization that was one of the distinctive interpretations of modern accounting theory by two world-famous schools institutionalist – as a reserve, personalistic – as a regulator (Sokolov, 1999). The identification of two terms "depreciation" and "amortization" in view of content and economic essence, their combination methodically in one account led to an even greater imbalance in their recognition and reflection as objects in the accounting system, increased the ambiguity in the representation of these objects by public reporting indicators.

In the historical field of research on the accounting science formation and development, there are more or less unambiguous positions, on which the amortization sources are associated with a certain type of accounting in Florentine firms. However, it is believed that these were only separate attempts to "build in" such accounting procedures without a specific methodology in accounting: "researchers at the school of accounting historians of Professor Cutter are absolutely sure that the accrual of amortization (in preserved books) was first carried out in the company of F. Danini in Barcelona in 1399, where amortization was accrued by a linear method" (Andreenkova, 2016). However, there is no single-valued and universally recognized position of scientists when exactly a specific method for calculating amortization and depreciation emerged. Mostly it is considered that for the first time the procedure for calculating amortization in accounting starts with the work of Marcus Vitruvius Pollio, in which, as many well-known scholars in the field of accounting history recognize, the concept of "amortization" was first introduced. Later (after several centuries) developments in the field of amortization are associated with the description of the English economist J. Melissa (1588). The existing methodology came from the fact that the cost of the purchased inventory should be written off in equal parts to the detriment (covered by income), providing for an accounting entry – the debit of the "Profits and losses" account and the credit of the "Inventory" account.

In fact, the described procedure concerns the accrual and recording of impairment of property. Such a disposition is also given in the book by J. Savary (1622-1690) "On the Perfect Merchant", where the interpretation of the inventory accounting contains arguments on the content of amortization, which is associated with the devaluation of property. J. Meyr (1757) formulated the theoretical justification for amortization as a reduction in the value of assets in revaluations in the most complete form. According to this theory, the evaluation of fixed assets at the beginning of the period (initial purchase price, estimated value in subsequent periods (revaluation, devaluation), as well as expenses for all types of repairs) was displayed in the debit of the inventory account, and on the credit – the valuation of fixed assets at the end of the period, obtained by inventory. The calculated amount of "difference in the consumer (residual) value of fixed assets" was established on a subjective basis of the inventory process.

In Fig. 1 and 2, there is the content of accounting procedures aimed at direct and amortization fixed property devaluation.

Amortization as a process of systematic writing-off lost value in the operation of fixed assets in the production process and, accordingly, in one way or another, the accrued amount of amortization in the accounting system was in the 17th century. Literary sources provide information on the use of the straight line amortization method at the Carron Ironworks Plant in 1769 and at the Boulton and Walt plants in 1790: "the initial value of fixed assets was written off based on amortization rates for all types of fixed assets of 8% and for buildings – 5%" (Butynets, 1991). The Industrial Revolution created conditions, in which "merchant accounting" and the input-expenditure accounting system became inadequate to objectively reflect the main results of the organization's activities (income, expenses, and profits). Dynamic processes of capital assets accumulation to ensure factory production and entrepreneurial activity put forward the need for the methodological formalization of their depreciation, where amortization was one of the main conceptual problems of accounting.

The order of amortization accrual became the most stable at the end of the 18 century when amortization required the accumulation of funds to cover the devaluation of expensive assets. At this stage of accounting, amortization development was associated with the transfer of the main property value to the newly created product, and depreciation was interpreted from the standpoint of reducing the consumer value of an object (physical and moral depreciation). In particular, Mathews pointed out that the term "depreciation" was first introduced into practice as an abbreviated version of the concept of "diminution of value by reason of wear and tear" (Mathews, Perera, 1999).

## 4. Problematic issues of approaches and methodological bases of amortization and depreciation concepts for fixed assets

Widely recognized and more or less clear formalization as an accounting category, depreciation received only in the 19 century under the onslaught of practice needs. During this period, mass railway construction began, which required large volumes of share capital. Since

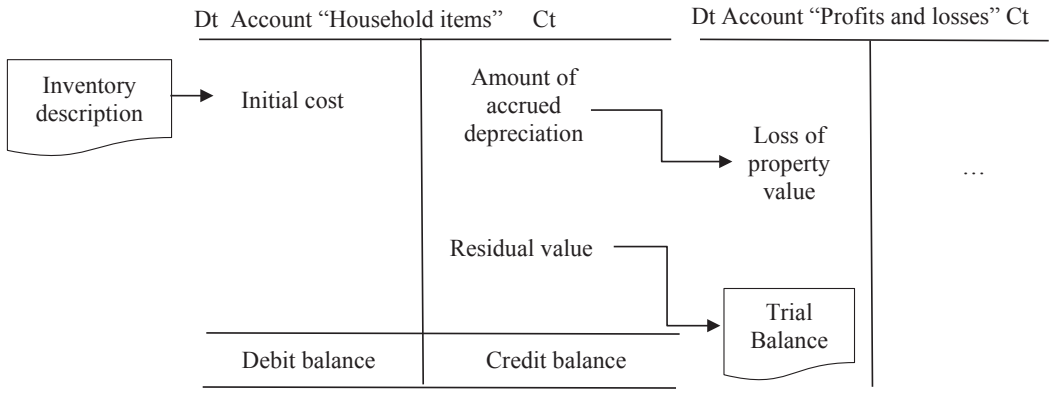


**Fig. 1. Procedure for amortization accounting**

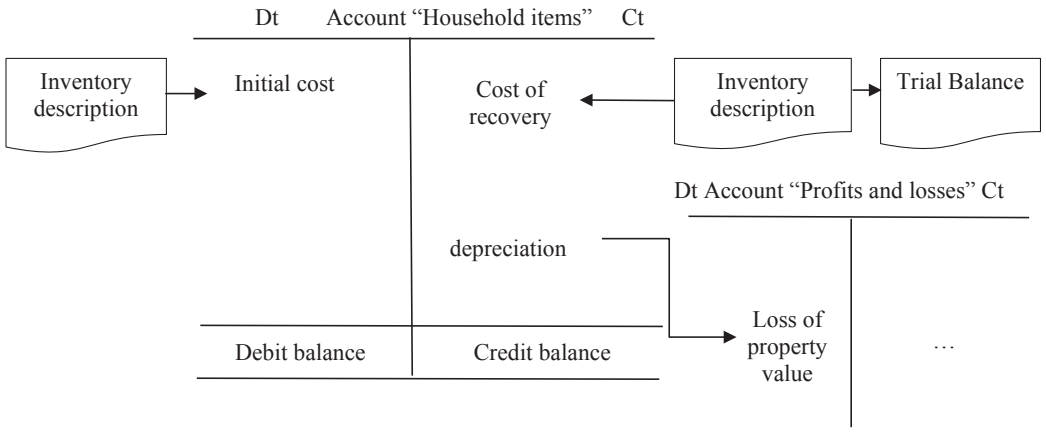


**Fig. 2. Procedure for devaluation accounting**

the costs at the initial stages of construction were recorded in the account at the time of their occurrence, significant amounts of pseudo-profits were formed in subsequent periods, since amortization was not accrued and, accordingly, did not become a composite aggregate expense. Despite the announced profit, shareholders demanded dividends, and the owners objectively considered it necessary to keep a part of the income (money sums), creating a so-called renovation fund (renovation). The practice of economic entities functioning on the basis of numerous founders (owners of the share capital) has put forward a new context of the reflecting accounting amortization process – equipotentially to link accumulated amortization (an amortization fund is formed) with the reduction of fixed capital through physical and moral depreciation of assets. Proceeding from such a disposition (depreciation of fixed capital = accumulated amortization fund), the consideration of the economic content of amortization was formed and developed – accounting method that informatively provided for managing the reproduction of fixed assets, while maintaining fixed capital at a constant level.

For this type of accounting purposes, B. Pendof proposed a way of reflecting depreciation charges in the amortization accounts other than depreciation: the debit of the "Expenses" account, the credit of the "Amortization" account. This method was considered more informative since for its use the indicator of accumulated depreciation (amortization fund – the amount of funds intended for simple reproduction of fixed assets) is formed. Important in this context was also the maintenance of an additional record (the debit of the account "Authorized capital", the credit of the account "Depreciation of fixed assets", which declaratively informed on changes in the structure of own capital, acted as a control indicator of the accounting statements on the level of the residual value of the existing fixed capital of the enterprise).

In accounting practice, there were always two close, but at the same time, distinct from the economic content terms "depreciation" and "amortization" of fixed assets. The dominant postulates of depicting depreciation and amortization of fixed assets in the accounting and reporting methodology are based on the idea of the French scientist J. Dumarchey, who justified the amortization by the regulatory rather than the reserve and, therefore, amortization should be equal to the amount of depreciation. Despite the various methodological approaches (the kind of accrual on the accounts of amortization and depreciation, the synthesized combination of these objects in the accounting system), the amounts of accrued amortization and depreciation have always been determined to be the same.

In the works of scientists, "justification of differences in the economic content of amortization of fixed assets – as a reserve for their replacement and their depreciation as a regulator of their value on the relevant date" is presented (Khomyn, Pyrih, 2007). In particular, R. Weizmann (1870-1936), positioned the amortization account with the adjustment to the account "Fixed assets", and E. Sievers (1852-1917), as opposed to this, argued that with respect to amortization it was a new fund and because such an account is a stock, reflecting one of the sources of its own funds.

On the assets amortization and its identification with the amortization fund, the well-known scientist G. Hetfil wrote: "Only the sick imagination of people can recognize the amortization as of the fund". Opposite to this, the institutionalists considered the amortization account of the fund: amortization is a part of the non-taxable income, which is the amortization fund. The German scientist J. Chenaux-Repond also adhered to the position that amortization cannot be a tool for the return of funds: "It is not at all clear how the source of money is generated from the value of fixed assets that is reduced as a result of its exploitation, which, moreover, must act as a source of renovation" (Chenaux-Repond, 1924). A similar view was also followed by A. Römer – "it is not known how reserves are created through depreciation, as it is a loss of property" (Römer, 1923).

Scientists of the French accounting school attributed the economic compatibility of this type of accrual and accounting of the accumulated fund of fixed assets reproduction to the number of discussion questions, arguing that technological progress and inflation deprive amortization as an economic concept of any meaning: "amortization is an instrument of fiscal (tax) policy, and this policy affects the terms of their service, not the fixed assets exploitation conditions" (Vyhovska, 2006). This argument was confirmed by the practical activities of subjects, first of all in terms of the capital reproduction at the same level in the inflation conditions. This aspect of the theoretical and methodological amortization foundations has received the greatest number of developments within the German accounting school, when there was a high inflation in this state (1914–1918), which practice showed the lack of theoretical developments content on the use of adopted amortization methods in the accounting system from the point of view of the amortization fund formation as a source of acquiring new capital assets.

To overcome this problem, the accounting practice, in parallel with the theoretical developments, in various ways, solved such problems. For example, the Association of German Engineering Plants (Verein Deutscher Maschinenbau-Anstalten) has developed a practical guide to calculating amortization – the "Guidelines for balancing and amortization calculation in the engineering industry under the conditions of inflation" ("Leitsätze für Bilanzierung und Abschreibungen im Maschinenbau unter Berücksichtigung der Geldentwertung"). These principles, in particular,

provided for equalizing entries in liabilities to reduce the devaluation level of the enterprise, establishing amortization through the costs of equipment renewal in the amount necessary at the time of fixed assets object restoration. Undoubtedly, such a compulsorily arbitrary practical technique caused a number of theoretical objections; in particular, that fact can be guided by the future replacement cost because it is almost impossible even approximately.

Under inflationary conditions, development acquisition conditions by the replacement processes of some production means with other results of technological progress, the balance informativity problematics as for objectivity of the residual value of fixed assets, sources of fixed assets reproduction, the reliability of the calculated amounts of amortization charges as a part of expenses, a real loss of consumer value have appeared. It was in the German school for inflation conditions that the interpretation of the importance of depreciation for both theory and practice was established; it became obvious that amortization as a regulating balance sheet item is suitable for functioning only during periods of money purchasing power stability and must cease to function in that capacity when non-productive changes in value are effective (Eremenko, 2013).

The study of these problems in German accounting (early 20 century). The notion of the difference between the balance amortization (die bilanzielle Abschreibung) and the calculation amortization (die kalkulatorische Abschreibung) was formulated. The purpose of balance amortization is the preservation of amortization equivalents (derives from German Abschreibungsgegenwerte and means "earned amortization", that is, the money returned by the market as a part of sales proceeds), whereas the purpose of calculation amortization – the cost estimate in the production (management) accounting.

However, in the framework of this paradigm, there were also controversial provisions. In particular, E. Schigut (1920) emphasizes the impossibility of renovating fixed assets in conditions of rising prices, if money devaluation is not taken into account in amortization. In contrast, another scientist G. Peiseler (Peiseler G. Zeitgemäße Betriebswirtschaft, 1921) argued that the amount of amortization cannot be adjusted or changed, since for a certain time the reserves change (increase) their value. These and similar judgments have generated uncertainty in the formulation of this type of amortization accounting concept.

## 5. Evaluation of amortization and depreciation in the modern conceptual and methodological basis of accounting

In the modern conceptual and methodological basis of accounting, the process of including amortization charges on fixed assets in the expenses composition is regulated, but after standard calculations, the entire amount of such deductions is equated to profits. In fact, the traditional target determined source of fixed assets composition reproduction was replaced by a synthesized source-profit. At the same time, the actual depreciation on the amortization amount reduces the book value of fixed assets, violates the disclosure capital logic not only as a self-increasing cost but also "confuses" the information about a real change in the share capital. The problem is considerably aggravated in the conditions of unprofitable activity of an enterprise when the amortization deductions "are" in the "retained earnings", that is, they are presented in the balance in the section "Own capital".

This form of hidden reduction of fixed capital is disclosed by domestic scientists because of the loss in the accounting methodology of the target content of this process (Yaremko, 2010). The interdependence of reverse flows of fixed capital and the reduction of the share capital of enterprises in this work are disclosed in detail as shown in Fig. 3, which is typical for domestic enterprises in general.

In the modern accounting concept of amortization, the problem of amortization of intangible assets is separated. It should be noted that throughout the historical period, until recently, the amortization (depreciation) accounting on intangible assets was not carried out. It was assumed that this type of assets does

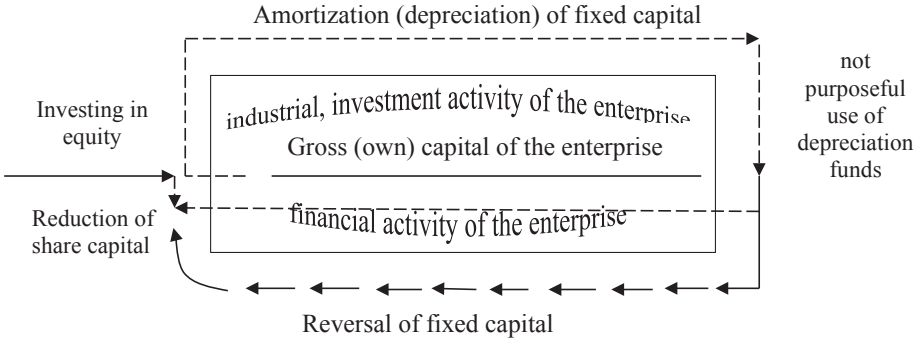


**Fig. 3. The interdependence of the value of the share capital with the target direction of sources**

not lose its consumer properties during the period of its use. This view is somewhat justified, especially when this type of asset is viewed in the simplified classification coordinates for accounting purposes (asset recognition principles). Determining usable life expectancy of intangible assets requires an individual approach since some of the assets in this asset group are subject to moral depreciation, which requires their replacement. A part of the intangible assets of such a value loss is not affected and, therefore, the question generally arises as to economic matter – why to amortize an asset (determine its depreciation) that brings additional cash flows and, without requiring additional costs, itself acquires greater productive power as an economic resource (trademark, brand, business reputation). The issue of book value is important (based on the expenditure principles of acquiring assets completely distort the original value), which requires a significantly different assessment and accounting.

The issue is deepened when intangible assets in the accounting system need to be viewed in a wider spectrum, through their projection – the accumulation of productive economic resources (energy of the trade mark, trademark, business reputation, technology, including management etc.). On the one hand, as an important economic resource of a modern enterprise, this intangible component of equity capital should be made public in the public financial statements (balance sheet), that is, be put on balance. On the other hand, in modern business practices, the problem is not only their valuation, but it is difficult to determine results of the application of such assets. Another extremely complicated issue and extremely important moment for amortization calculating for assets of this type is the problem of determining the usable life expectancy of various objects.

This is due to the fact that depreciation of individual fixed assets occurs in different ways due to production conditions, individual for each enterprise and the

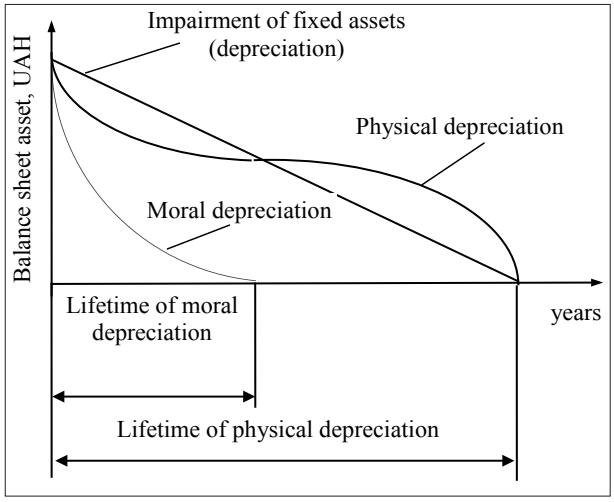


**Fig. 4. Differences between depreciation and amortization**

impact of moral depreciation. Disagreements between depreciation and amortization are presented in Fig. 4 "when determining the amount of depreciation, it is suggested to use the integral depreciation coefficient, including physical, moral, and economic depreciation of various fixed assets" (Yaremko, 2010).

For a more objective evaluation of depreciation, it is necessary to establish standard methods for determining the degree and nature of physical, moral, and economic depreciation of various elements of fixed assets. When determining the amount of depreciation, it is proposed to use the integral depreciation coefficient, which includes all three types of depreciation: physical, moral, and economic:

$$K = Kph \times Km \times Ke,$$

where K is the integral depreciation coefficient; Kph – a factor of physical depreciation; Ke – coefficient of economic depreciation; Km is the coefficient of moral depreciation.

The economic content of the integral coefficient K is that it is an indicator of the final usefulness of the fixed asset.

## 6. Conclusions

The currently used concept of amortization (depreciation) accounting objectively leads to information difficulties in determining the objective residual value of fixed assets, the comparability of this cost with the size of the announced own (shareholder) capital, the establishment of a real monetary base for the reproduction processes management of irreversible capital of modern companies in tracking the movement of amortization resources from their occurrence to financial results as a result of many factors, including use of alternative methods for amortization calculating, a synthetic combination of depreciation and amortization in one object.

Technological progress, rapid replacement of production and other economic resources with new (other) more productive before the moments of total amortization and physical material depreciation, the uncertainty of the concept of "depreciation and amortization of intangible assets" poses an acute theoretical and applied need for the formation of a new, adequate to economic conditions, accounting concept of amortization. The basic problem, in our opinion, is connected with the differentiation of depreciation and amortization.

To develop and adapt to the current conditions of the amortization accounting concept, it is expedient, in the author's opinion, to turn to ideas and conceptual approaches of developments made in previous historical periods. In particular, it may be considered advisable to use the conceptual framework of E. Schmalenbach, who proposes the creation of a transit account "Reserve for inflation" to account for revalued

cost deviations when placed on the balance of an object. The urgency and, obviously, the advisability of introducing such a "fake" object is argued at once by several factors – the real existence of inflationary processes in the modern economy and the dynamics of their continuation to the observational period is evident; devaluation of the purchasing power of the accumulated amortization resource; the rapid pace of technological progress does not allow talking about the reproduction of fixed capital by the method of "acquiring an analogue".

The idea put in the accounting concept of amortization in the 19 century as of considering amortization as a special liability – amortization capital (fund), can have absolutely positive embodiment in modern practice. It is generally recognized that the mechanism of the amortization effect is imperfect, including because of the lack of information of a growing nature about the accumulated amortization resource. This in many cases entails the use of such funds by companies not for their intended purpose, that is, amortization deductions targeted in meaning are directed to other needs. This automatically (outside the information field) weakens the share capital. The devaluation of the productive power of the accumulated depreciation resource (loss of purchasing power) occurs even under the condition of its targeted use – under the influence of inflation. The solution to this problem can be overcome by keeping amortization funds in bank accounts at a certain percentage. Thus, historical experience is important and necessary in modern conditions. It can be adapted by incrusting several ideas of the past.

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