THE DEPRECIATED REPLACEMENT COST – REPRESENTATION OF FAIR VALUE IN ACCOUNTING. TENDENCIES AND PERSPECTIVES IN THE ROMANIAN ACCOUNTING PRACTICE

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The Romanian accounting system has gone through a radical reform in the last years, but the preoccupations for improving and developing Romanian accounting still continue. In order to preserve the general objective of rendering available to financial managers and analysts a common internationally agreed framework for drawing up and presenting financial statements, accounting professionals have the duty to contribute to the elaboration of accounting policies capable to transform accounting in an essential leadership instrument. Under these circumstances, there is the attempt to identify a dialogue form between accounting norms and policies, between the freedom to choose accounting procedures and the obligation to provide users with credible relevant information. The present work aims to make a thorough analysis of fair value adjustment – version of the depreciated replacement cost – which is specific to specialized corporal immobilized assets seldom commercialized on the market, by starting from the approaches and concepts existing in specialized literature, while afterwards it will carry out a comparative study between normative provisions and the concrete reality of Romanian accounting practice. Aware that fair value adjustment represents the profession of assessment experts, the presents work aims to present the potential models for quantifying fair value, which is an useful information basis for accounting professionals who have one more instrument at their disposal, for effectively and practically applying IRFS norms.
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I. Introduction

Currently, national destinies are strongly influenced by the forces of the world global competition [1], so that the decisions of management, investment and of financial nature have international implications. Since most of these decisions are based on accounting information, it is necessary a good knowledge of national and international accounting norms, so that business can go well. Thus, it can be witnessed a transformation of the accounting system, which has to insure to information users – investors/shareholders, creditors, a.s.o. – clear, credible and internationally comparable sources, so that their decisions are based on strong grounds. In the past, at a global level, there were two opposed accounting traditions: the Anglo-Saxon one, which is in the interest of investors and has the main objective of comparing financial performances, and the continental one, which is controlled by the state and oriented towards all the partners of an entity – fiscal administration, creditors, employees, owners, a.s.o. While the continental system agrees with the measurement at a historical cost, the Anglo-Saxon one proposes the adoption of fair value. For those specialized immobilized assets, such as the

equipments seldom commercialized on a market, of which too little information is known, fair value is estimated by measuring the **depreciated replacement cost.** The approach based on cost is founded on the statement that a prudent and informed purchaser would pay for an asset at most the purchasing and the production cost of a replacer with the same use; it is all about the current amount of money necessary for building up or buying a new substitute with the same use. If the immobilized asset is not new, from the gross current cost shall be deducted all the depreciation forms which had been attributed to it by the assessment date. In its simplest form, the cost method can be represented in the following way:

Gross cost – Depreciation = Value (called net replacement cost)

According to Valuation Standards, the starting point in adjusting value through the approach based on cost is either *the gross reproduction cost*, or the *gross replacement cost*, or a combination between the two.

Given that the reproduction cost is the current cost involved with reproducing an identical copy of an asset, by using the same materials or similar ones, and since market conditions contribute to analyses over some similar but not identical assets, we agree with the international regulator who opted for the adjustment replacement cost. When it comes to the approach based on cost, the assessment expert compares the immobilized asset with another one which may replace it.

II. Research methodology – presentation of methods

The most used method for determining the replacement cost for assets such as specialized equipments is the **device method;** at the same time, for the similar installations and equipments, of various dimensions, it is used when it come to the valuation of net replacement cost also the **method cost-capacity.**

II.1 The device method, also known as the **summing up method,** involves "breaking" the analyzed immobilized asset in components and valuating the cost of all its individual components, so that the sum of the components will reflect the *new cost* of the whole. The components cost involves not only *direct costs*, represented by those expenses related to materials, employees and by those ordinary expenses corresponding to the purchasing and installing of the asset, in order to bring it to the estate of functional use, but also by *indirect costs* normally required by the purchasing and installing of an asset, which are not generally included in the invoice issued by the seller.

The information about the cost and reference materials, necessary for adjusting the replacement cost, will make up a data basis rendered available to the specialized assessor and should contain: catalogues of producers and dealers, price lists and equipment specifications; specification manuals of manufacturers; price lists of manufacturers; price lists of sellers; published price guide books a.s.o. The materials may be obtained from: producers and sellers; dealers of new and used materials; exhibitions and show rooms; published price guide books, invoices from customers; newspapers; auctions; older files and registers; universities; public libraries; computer data bases; internet; by telephone, letter or personal contact; various free publications related to equipments such as Yellow book, local newspapers or news publications within the field. In particular circumstances, for instance when an equipment is produced abroad and the local dealer cannot be found, it is preferable to contact the technology or the maintenance department of the customer, since customers have to buy spare parts from somewhere. When the information cannot be obtained in this way, then it shall be contacted the consulate of the country where the equipment was produced. It results from here the need for a data basis at the disposal of the assessor, complete and permanently updated, which can be a working instrument for founding and upholding a relevant and credible assessment of value.

After establishing the gross replacement cost, the specialized assessor shall deduct *all the depreciation forms* attributable to the asset, in order to measure **the net replacement cost**. For mobile goods, there are involved all the wear and tear forms: physical, functional, economical. Depreciation represents the

loss of value from various reasons, including factors of a *physical and functional type, of exploitation and economical depreciation.*

Wear and tear represents the loss of value or usability of an asset, caused by use, deterioration, exposure to various atmospheric agents, overuse and other similar factors. When an inspection is carried out for classifying an asset, it is necessary to pay a great attention to the latter's physical state. As a technique of quantifying wear and tear, it can be reminded the analysis *age/life span*.

If speaking about the concepts which can be used during the analysis, there can be reminded: *chronological age; effective age; normal useful life span; useful life span left; physical life span; physical life span left; economical life span; economical life span left.*

In relation to the indicators presented, from a strictly conceptual point of view, the wear and tear degree can be calculated by using of the following formulas:

$$\mathrm{WT}_f(\%) = \frac{Vcron}{DVF}100;\ \mathrm{WT}_f(\%) = \frac{VEf}{DVUN}100;\ \mathrm{WT}_f(\%) = \frac{VEf}{VEf + DVUR}100.$$

Functional depreciation represents the loss of value or usability of an asset, caused by inefficiencies or non adequacies in the quality of the asset, when the latter is compared with a replacement asset which is more efficient and/or less expensive and produced with modern technology. In other words, the loss of value is caused by conditions inherent to the asset, so that the excess of capacity represents a potential form of functional depreciation. The quantification of functional depreciation is based on at least two ways:

- the first one is represented by *the difference between the gross reproduction cost and the gross replacement cost*, being used for measuring functional depreciation caused by the *costs of excess capital*;
- the second one is the consequence of the functioning of some assets such as machines and equipments with exploitation expenses which are bigger than their modern substitutes and is also known as technological depreciation, its measurement being provided by *the absolute annual measure of surplus exploitation expenses of an asset, updated at an adequate rate during the useful life span left* (penalty for functional depreciation from exploitation).

Economic depreciation, also called external depreciation, represents the loss of value or of the full usability of an asset, caused by factors which are external to it, such as: the increased cost of raw materials, labour force or utilities (but without the corresponding increase of the selling price of the product); the low demand registered for the product in question; increasing competition; environmental law, a.s.o.

Among the ways of estimating economical depreciation, there can be found:

- *disutility method* (expressed in percents);
- *the method of updating/capitalizing additional expenses caused by external factors*, which is similarly applied in the case of the calculi relative to the measurement of functional depreciation from exploitation.

Example no. 1: The object of the analysis is a plane YR PMS, type AN 2, fabricated in 1998 in Ukraine and purchased again by the Romanian company SC ARIPI AURII SA. According to the owner's statements, it results that the plane AN2 is used only for irrigations and fertilizations in agriculture, there being carried out in time all the periodical revisions; it can be noticed at the same time that a capital reparation of the plane has not been yet carried out. There is known about the plane the following information: AN 2; developed for agricultural works; the technical condition of the plane requires capital reparations at the cell, airscrew, envelopes.

Specification	U/m	Cell	Motor	Airscrew
Fabrication date		1998	1997	1995
No. of functioning hours since the plane was put in use (Vef)	Hz	2.000	847	4.500
Hours of flight remaining by the time the plane is out of use	Hz	14.000	5.353	3.500
Total hours of flight (DVUN)	Hz	16.000	6.200	8.000

In order to estimate the fair, market value of the plane at 31.03.2010, the society resorts to the services of a specialized assessor. Taking into account that the type of the plane assessed is no longer fabricated in the present, and that the types of planes fabricated are different from the type of plane assessed, both from the point of view of the construction and from the point of view of the technical-functional characteristics, it will be used the method based on for assessing fair value. The main elements of the plane – cell, motor and airscrew – are used according to different rules, so that in estimating the degree of wear and tear the starting point will be the percent value of each component, that is: 75% for the cell, 20% for the motor, 5% for the airscrew. At the same time, in order to calculate functional depreciation, it is also necessary to know the reproduction cost estimated by the assessor, which is, on the basis of the information available, of 168.000 €.

In order to determine the replacement value of the plane, it has been used *the method based on gross replacement cost*, the value of the plane being determined by diminishing the updated value (again), according to the formula:

$V_{ap} = [V_o x(1-U_f)]x(1-U_m)$ (1) where:

V_{ap} - updated value, calculated by updating the entrance value,

U_f - wear and tear,

U_m - obsolescence generated by functional non adequacy.

It is first adjusted the measure of the wear and tear, according to the formula:

$U_f = \frac{\sum_{i=1}^{n} u_i v_i}{\sum v_i}$, where u_i = physical depreciation of the component *i* calculated with the help of the formula:

$$u_i\ (\%) = \frac{VEf}{VEf + DVUR}100$$

v_i = percent value of the component in respect to the total value.

It is determined the wear and tear on groups of components, such as it follows:

$U_c = \frac{2.000}{16.000} = 12{,}50\ \%$; $U_m = \frac{847}{6.200} = 13{,}66\ \%$; $U_e = \frac{4.500}{8.000} = 56{,}25\ \%$.

The wear and tear for the whole plane will be:

$$U_f = \frac{(U_c x75 + U_m x20 + U_e x5)}{100} = 14{,}92\ \%$$

The obsolescence which underlines the depreciation of the plane as a consequence of technical progress, both from the perspective of the cost reduction and from the perspective of new types of planes fabricated, is expressed by means of the relation:

$U_m = 1 - \frac{C_0}{C_1}$, where

C_0 = initial cost of the plane, C_1 = reproduction cost.

The initial cost of the plane estimated in € is of 155.000 u.m.; for such types of assets, the wear and tear is generally between 1 and 10%.

$$U_m = 1 - \frac{155.000}{168.000} = 7{,}7\ \%$$

The determination of the value of the plane – net replacement cost, is made by replacing the data in the following formula (1):

V_{ap} =[155.000 x (1- 14,92%)] (1 – 7,7%)= 131.874 x (1- 7,7%) = 121.720 €

II.2 The method cost-capacity is used for measuring the net replacement cost for similar installations and equipments, of various dimensions, precisely for pointing out the reality according to which the costs of similar installations or of equipment parts of different dimensions vary exponentially, according to dimension. Below it is presented an example of how the net replacement cost is calculated according to such method.

Example no. 2: In order to determine the replacement cost on the basis of the *method cost-capacity*, let us consider the following information about a manufacturing installation: date of the net replacement cost measurement – 31.03.2010; date when the installation is put into function – 31.03.2004; total estimated life span – 20 years; capital repair carried out in March 2006 has reestablished 80% of the normal life span; the production capacity projected is of 16.000 t/year; the current and future capacity exploitation is of 15.000 t/year; the exploitation expenses for fuels bigger than a modern substitute, with 12 tones of gas-oil at year, at a price of 5.000 lei/t; the quota of income tax is of 16%; the selling price of a modern installation substitute of 19.000 t/year is of 2.100.000 lei; the exponent factor is 0,7; the updating rate is of 13%.

The following steps are carried out:

a) determining the replacement cost on the basis of cost-capacity method:

$\frac{C_2}{C_1} = \left(\frac{Q_2}{Q_1}\right)^X$, where

C_2 - not known replacement cost of the asset undergoing valuation;

C_1 - known replacement cost of capacity Q_1; Q_2 - capacity of the asset undergoing valuation;

X - exponent factor, which expresses the fact, acknowledged through detailed analyses, that not all cost elements of an asset vary directly proportional with their dimension.

$$\frac{C_2}{C_1} = \left(\frac{16.000}{19.000}\right)^{0,7}; C_2 = 2.100.000\ (0{,}8421)^{0,7} = 21 \text{ x } 0{,}88665 = 1.861.965 \text{ lei}$$

b) determination of the wear and tear by taking into account the following parameters:

- total life span estimated – 20 years;
- reestablished life span, capital reparation – 20 years x 80% = 16 years;
- number of years from the capital reparation – 4 years;
- useful life spam left (DVUR) – 16 years - 4 years = 12 years.
- effective age (Vef) – 20 years - 12 years = 8 years.

$U_f = \frac{VEf}{VEf + DVUR} 100 = \frac{8}{20} 100 = 40\%$. The wear and tear is 1.861.965 x 40% = 744.786

c) determination of functional depreciation:

- surplus exploitation expenses 12 tones x 5.000 lei/t = 60.000 lei/year
- net surplus exploitation expenses 60.000 (1 – 0,16) = 50.400 lei/year
- the updating factor is of 5,9176
- net updated surplus exploitation expenses 50.400 x 5,9176 = 298.247 lei

d) determination of economical depreciation

$$D_e = \left[1 - \left(\frac{15.000}{16.000}\right)^{0,7}\right] 100 = \left[(1 - 0,9375)^{0,7}\right] 100 = (1 - 0,95582) \times 100 = 4,42\%$$

The replacement cost is established as it follows:

Gross replacement cost	1.861.965 lei
Wear and tear	744.786 lei
Functional depreciation	298.247 lei
Cost after physical, functional depreciation	818.932 lei
Economical depreciation (4,42%)	36.197 lei
Replacement cost	782.735 lei

III. Results of the research

Our attempt of presenting the working steps for measuring fair value have had the objective of realizing the possibility of applying these concepts also by accounting professionals, and not only by assessment experts. The main results, and respectively, limitations emerging from the research carried out, are:

- although international norms make no reference to the way fair value is measured when there is not enough information on the market about its estimation, by means of the adjustment techniques previously presented and used by valuation standards, it can be measured such an aggregate;
- the concepts and adjusting techniques applied are familiar to accounting professionals from Romanian entities;
- and, although it is possible for accounting professionals to show opposition to adjusting and applying the analyzed instruments, which constitute the profession of assessment experts, still, any future expert will also resort to and use the techniques presented, also due to his role in an entity.

IV. Conclusions

The detailed presentation of the methods for adjusting the depreciated replacement cost – together with the concrete examples offered, constitutes an additional working instrument rendered available to accounting professionals, who therefore have one more element for applying the provisions of the IRFS norms. Although they are borrowed from valuation, such norms can be applied also by other professionals than the assessment experts, by observing the working stages already mentioned. Adjusting fair value in the form of the depreciated replacement cost will no longer represent in the future only the profession of assessment experts. Although the latter are the main persons to have at their disposal a mix of information which they afterwards submit to adjustment for estimating fair value, we anticipate a greater openness of accounting professionals towards putting in practice IRFS norms. This is also a result of the fact that Romanian entities, under the current circumstances of deep economical crisis, will no longer afford to resort, whenever they have to establish fair values for patrimonial elements, to external assessment experts, not to mention that is also less probable for them to constitute a distinct valuation department which involves considerable costs. There are nonetheless some limitations such as: the lack of motivation of accounting professionals to measure fair value, also as a result of fiscal limitations restraining the practices agreed by international norms. We consider that

Romanian entities will manage to line up with international accounting practices in measuring fair values, even if they will have to overcome some limitations and constraints.

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