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VALUATION MODELLINGOF IMPAIRMENT OF NONMONETARY ASSETSIN BUSINESS MANAGEMENT: ANANALYTICAL PROPOSAL FOR IAS 36

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ABSTRACT

This article addresses the assets valuation process using animpairment model, as proposed by IAS 36 (IASB). As a management practice, the impairment required by IAS 36, adopted in Brazil by the Brazilian Federal Council of Accounting (BFCA or CFC, acronym in Portuguese), poses challenges to accounting operators to projecting and discounting cash flow, measuring value in use and realizable value. This article discusses the results of a theoretical study about models for calculating impairment; and its research problem is concerned with analytically modelling impairment tests for nonmonetary assets. The aim is to analyze the measurement criteria in the initial recognition and to propose a calculation model, as well as to evaluate the objective evidences of performance loss. The methodology is analytical and descriptive and the results are conclusive in the proposition of methods to calculate the impairment of nonmonetary assets. The contributions of this study are relevant and consistent with the prescriptive accounting theory and differ from previous research as they focus on the application of an analytical methodology to support objective evidences.

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INTRODUCTION

This article presents a valuation modelfor the impairment (recoverable amount) of nonmonetary assets in compliance with the International Accounting Standard IAS 36, edited by the International Accounting Standard Board (IASB). The estimated recoverable amount, resulting from the discounted cash flow or from the value in use or realizable value, is one of the challenges of the practices required by accounting standards to measure the performance of an asset in generating future economic benefits. This difficulty arises from the risks aggregated to the discount rate and to the macroeconomic uncertainties present in the projection of results, as assessed by OGHOGHOMEH and AKANI (2016). In productive entities, nonmonetary assets carry, on the left side of the balance, operational risk, and thus must be submitted to impairment testing so that there is enough indication that an asset is not valued at no more than its fair value. Discounted cash flow or value in use depends on the projected value of the asset's economic benefits and on the discount rate, which are both chosen by the firm.

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Due to great diversity of circumstances, including the standard's subjectivity, as approached by RIEDL (2002), this choice can be seen as discretionary for some types of earnings management. If there is earnings management, the credibility of the information present in financial statements might be questioned as a result of the benefit/sacrifice of shareholders and the benefit/sacrifice of other users. Even if the discretionary option of projection instruments and discount of cash flows might represent a good choice for the firm, political and macroeconomic uncertainties may cause the recoverable amount to incorporate the risk of it not being captured and of jeopardizing the reasonableness of the valuation. For these reasons, while projecting the cash flow by valuing revenues and expenses, several scenarios must be taken into consideration, such as discontinuity risk, technological innovations, marketing strategies, economic political outlook, and others, which may have a negative effect on the economic performance of the underlying asset. The assessment of realizable value, on the other hand, depends on the usefulness of the asset and on the direct cost of sale, which, because of supply and demand, may indicate consumers' preference and reserve price in determining the selling price. In this regard, this article discusses the results of a theoretical study on

calculation models of impairment testing, with the main motivation of contributing to the accounting literature with respect to teaching-learning methodological aspects and to the practices of accounting operators in complying with IAS 36's requirements. Bearing this in mind and with the perspective of obtaining a reasonable measurement, the valuation of recoverable amounts is an adequate practice to signal the potential economic benefits of an asset's synergy. Such potential benefits show that an asset maximizes opportunities when its expected or recoverable amount exceeds the carrying amount; and the larger the positive difference between the recoverable amount and the carrying amount is, the greater the potential benefits associated with the asset are. The negative difference, on the other hand, reveals an entropy associated with the asset, signaling the sacrifice of opportunities that justify the requirement for applying impairment procedures.
With respect to the contribution to the teaching-learning process, the study presents a conceptual modelling that may be used for both types of assets: nonmonetary and monetary, even if this article addresses only the nonmonetary approach. For the nonmonetary type, the main suggestions of application are related to long lived assets, such as buildings, equipment, goodwill and intangible assets; as well as short-term assets, such as goods intended to sales.

Being the recoverable amount and fair value the focus of the measurement of assets, the impairment test worksas an indicator of an asset reduction due to performance loss. The calculation of losses resulting from the test aims at promoting adjustments in the reduction of the asset value when there are indications that the carrying amount or book value is greater than the fair value or recoverable amount. If reduction is applied tomonetary assets, the calculation model is the value in use one (not discussed in this article). However, for both types, alternatively, the required realizable value must be tested. The book value must reflect the evaluation criteria recommended for each type of asset and, when the recoverable amount is lower, the result of these comparisonsis a reduction in equity. The demonstration of the calculations of fair value or recoverable amount must be documented and be part of the permanent archive of the asset to be later compared in subsequent evaluations. Ergo, the impairment test is shown to be adequate for application in nonmonetary and monetary (which is not covered in this article) assets. Economic benefit is expected from it, considering that, in general, there must not be any asset carried at more than its fair value or value in use. In this sense, regardless of the normative requirement to the application of impairment tests, should any loss of benefit occur, the adjustment procedure must be applied with respect to the asset value. Thus, as a general rule, the carrying amount of any goods or rights should be reduced to their expected value if this is lower and the exceeding amount must impact the equity directly or indirectly. Long lived, fast selling, nonmonetary assets are initially recognized for their cost value. Consequently, the criteria for estimating benefits might be a challenge for calculating the recoverable amount. Long lived assets, such asgoodwill and other intangible ones, may offer possibilities for result management, bearing in mind their peculiar subjectivity, as discussed by LHAOPADCHAN (2010) and CASTRO (2012). However, once these subjectivity attributes are overcome, the subsequent challenge is the choice of the right discount rate so that the estimated benefit value is reasonably trustworthy. The exploration of the impairment test by academic research is not quantitatively relevant yet, as ZANDONAI and BORBA (2009) show in the result of descriptive research using financial statements; and CASTRO (2012) with measurement methods. In the research that rendered this article, the references gathered approach the topic as a finalist result or in a tangentially descriptive way, with little being found concerning positive methodology, as seen in ABUGHAZALEH, AL-HARES and HADDAD, (2012). By trying to mitigate this shortfall, the research problem is concerned with analytically modelling, in a reasonably trustworthy way, impairment tests for nonmonetary assets. As a necessary condition to find grounds to answer the stated problem, the article aims at analyzing the measurement criteria for the initial recognition of nonmonetary assets; proposing models to calculate the recoverable amount; evaluating the required evidences for the application of tests, as well as proposing calculation models and adjustment of losses.

The research is justified by the contribution to the business literature of offering analytical models that may assist the teaching-learning process in the identification, calculation and analysis of the recoverable amount and adjustment of losses; and allow accounting researchers, operators and users to apply the Impairment test in a trustworthy, consistent and documented way. The fact that the impairment calculation procedure applicable to nonmonetary assets seeks the representation of fair valueis also relevant. Whether such representation is verifiable for any assethas been discussed. Concerning intangible assets, results of previous studies like RAMANNA (2007) and RAMANNA and ROSS (2012) show they are unverifiable. After this introduction, the research is structured as follows: theoretical discussion(2), presenting main findings and evidences of other research on the topic;criteria for themeasurement of assets in initial recognition(3), describing the research method applied, which is grounded in an analytical model; models of measurement to calculate the recoverable amount(4), focusing on the measurement of performance losscalculation; identification of objective evidences and calculation model of value of loss(5), describing models to signal impairment losses by using the present net value and comparing rates; final considerations (6), describing this article's contributions with respect to the models used; and references, which link the main contributions of previous research on the topic and support the considerations of the present study

THEORETICAL DISCUSSION

This section introduces and discusses the guidelines of the accounting standard, which regulate the valuation of the recoverable amount of assets, as well as the contributions of the literature on this topic.

The definition of valuation procedures of the recoverable amount is declared in item 1 of IAS 36 as follows:

> *"To prescribe the procedures that an entity applies to ensure that its assets are carried at no more than their recoverable amount. An asset is carried at more than its recoverable amount if its carrying amount exceeds the amount to be recovered through use or sale of the asset. If this is the case, the asset is described as impaired and the Standard requires the entity to recognise an impairment loss."*

From the normative text, one can identify the need to understand and demonstrate what the indications that assets are

being carried at a non-recoverable amount in the future are. Within this context, indication can be understood as a signthat something occurs to corroborate a premise or a previously declared, provided or assumed hypothesis. But indication that an asset might be carried at more than its fair value may be tested by using internal and external sources. Internal source is obtained from the own entity through the expectation of generation of benefit value of assets. External source, in turn, must be obtained from trade signals. So, according to the Standard, should be used both procedures to verifying if the impairment loss is presents. The best internal obtainable indication is the discounted cash flow, which shows that an asset is able to generate economic benefit value when its value in use is higher than its carrying amount. Similarly, the best recognized external indication is how much consumers would be willing to pay for the asset, based on market value or on the net realizable amount. In this sense, IAS 2 states the following clarifications:

"The cost of inventories may not be recoverable if the inventories are damaged, if they have become wholly or partially obsolete, or if their selling prices have declined. The cost of inventories may also not be recoverable if the estimated costs of completion or estimated costs to be incurred to make the sale have increased. The practice of writing inventories down below cost to net realisable value is consistent with the view that assets should not be carried in excess of amounts expected to be realised from their sale or use."

Literature has shown that Goodwill is a type of asset subject to impairment that is difficult to measure. The difficulty in the valuation of benefits arise because of the subjectivity of this type of asset and because result management may occur. CASTRO (2012) analyzes the practice of manipulating the measurement of Goodwill in Portugal. He presents an empirical model with probabilistic grounds to support his hypothesis, but he declares that, because the sample spans over a short period of time, the results are not robust, as the hypothesis of manipulation is confirmed for a variable, but not for another. He also shares the opinion that research on the topic is still insufficient. Sharing the subjectivity of IAS 36, OGHOGHOMEH and AKANI (2016) analyze the guidelines of this standard for the valuation of the assets' recoverable amount. This analysis focus on the aspects of specific risks of assets and of rates used for discounts, such as the rate of return demanded by investors, WACC, country-risk, exchange risk and risk of cash flow pricing. They conclude that the standard has been criticized for being rooted in requirements that are not very practical and which demand subjective judgment and estimates that most likely are unverifiable. Santos, DaniandKlanin (2014) analyze concentration of ownership and impairment loss on goodwill in listed Brazilian companies, using descriptive methodology with the support of descriptive statistics. They declare in their findings that they did not find evidences of concentration of ownership in the application of impairment to goodwill.

Laux and Leuz (2009) studied the financial crisis that has led to vigorous debates about the advantages and disadvantages of fair-value accounting, which has as biggest challenge the improvement of standardization. They highlight the importance of the debate about fair value and the concerns with historical cost. However, the analysis is descriptive and does not contribute to the quantitative model to obtain impairment calculation. Lhaopadchan (2010) analyzed the validity and reliability of standards when accounting for goodwill that has been acquired and shown in financial statements, considering a possibility of manipulation of the balance sheet for the self-benefit of the management. His findings report that the management interests seem to motivate the decisions to apply recoverability to goodwill. But his study is limited to these evidences and do not contribute to any calculation model. Zandonai and Borba (2009) declare that studies on recoverability of assets written in Portuguese and English are still of little importance quantitatively. The analysis of the references used in their research show that there are no demonstrations of quantitative modelling to obtain the fair value of assets. Da Silva, Marques and Santos (2009) analyze the application of impairment tests in P&D assets of oil companies. Nonetheless, this analysis is limited to descriptive techniques of accounting normalization, without showing the methodological requisites of quantitative analysis. Santos, Machado and Schmidt (2003) show the application of the test for long lived assets. They present a conceptual analysis and simulation results, yet they do not show the model that was used. Ramanna (2007) studied the evolution of SFAS 142, which relies on the unverifiability of fair-value valuations for accounting for acquired goodwill. He declares that he has found consistent evidence that SFAS was emitted in response to political pressure on the proposal of eliminating accounting fusion. However, the methodology presented does not encompass the calculation model of fair value through impairment.

Lapointe-Antunes, Cormier and Magnan (2006) investigate how to use the method of recognition and measurement on retroactive changes in accounting principles, especially if incentives and restrictions are associated with the magnitude of changes related to goodwill impairment in Canadian firms due to the revised standards of 2002. They concluded that the choices are only influenced by the incentive of maximizing recoverability losses when changes are expected. The study, though, does not present methods to calculate losses. Riedl (2002) analyzed the American accounting standard SFAS 121 concerning the recognition of long-lived assets impairment in relation to the lack of clarity in the characteristic of reported write-offs, as implementation requires subjective valuations. In the critics' analysis, including the Security Exchange Commission, the standard has not improved the disclosure of financial information. The research is quantitative only with respect to the analysis of standard's effects, without showing the model of loss calculation. Ramannaand Ross (2012) analyzed SFAS 142's requirement that managers estimate the current fair value of goodwill to determine write-offs by impairment. Usually, managers must estimate the use of goodwill based on cash flow, but its fair value is unverifiable as it depends in part on the management's future actions. The research is descriptive and quantitative but does not include methodologies of impairment calculations of fair-value. Fernandes, Rodrigues e Cunha (2010) analyzed the practice of impairment loss recognition in financial statements of 2008 of electric power, water and sanitation, oil and gas, telecommunication and air travel companies. Their findings show little adherence to performing the recoverability test. The research, however, does not comprise the calculation model. Carvalho, Costa and Oliveira (2010) analyzed conceptual aspects of the impairment test applicable to the public sector. They reached the conclusion that the assets controlled by the public sector, as well as their depreciation, must be accounted for before the application of recoverability tests. Abughazaleh,

Al-Hares e Haddad (2012) analyzed a sample of UK listed firms in 2005 and 2006 and offered a model of multivariate ordinary least squares regression to assess the effects of IAS 36's guidelines of IASB. Their findings suggest that there is a negative association between reported goodwill impairment losses and market value. They declare that the study provides evidence consistent with IASB's objectives but managers are more prone to use their accounting discretion to convey privately held information about the underlying performance of the companies. Lucena, Fernandes, De França and Caplleto (2009) analyze the adoption of assets recoverability by Brazilian banks through information available in explanatory notes. Their findings report that no evidence was found that banks had been applying the criteria provided by the regulator (BACEN) in their financial statements. The present value as a form of fair value calculation is applicable to impairment testing in a certain moment in time, such as in Copeland, Weston and Shastri (2005, p.8). It may be obtained through algebra manipulation: $w_o = y_0 + y_1(1+r)^{-1}$, where $w_o$is the expected value (present value) of the asset at the evaluation date; y_0 and y_1 are the cash flow at date zero and (subsequent) date 1; and r is the interest rate.

Criteria for the measurement of assets in initial recognition

The initial recognition of economic transactions with nonmonetary assets follows the general rule of cost value and fair value. For output values in the purchase of fixed assets or inventories of sales and transformation with full payment, the amount paid is equivalent to fair value. If the purchase is made in installments, the financial interest included in the price must be identified and purged to determine the fair value. For the input values of sales paid in installments, the procedure is similar to that of the purchase paid in installments: financial interest included in the price must be deduced from the amount to be received for the measurement of fair value. The following equation (1) models the procedures to measure the carrying amount of a nonmonetary asset in the initial recognition.

Measurement model of nonmonetary assets in the initial recognition

This model prices the carrying amount of the underlying asset, be it a long-lived or a fast-traded one, for the initial recognition. The result of the equation (1) is the cost value that is equivalent to its fair value.

$$VC_{anm,t} = Pr_c - (T_{rc} - F_c - \gamma_c - I_c - O_c + i_c) \quad \ldots\ldots\ldots (1)$$

Where $VC_{anm,t}$is the carrying amount or book value of the nonmonetary asset in the initial recognition; Pr_c is the purchase price; T_{rc} is the recoverable tax of the purchase; F_c is the purchase shipping; γ_c is the cost of loading and unloading as well as cost of customs of the purchase; I_c is the transportation insurance of the purchase; O_c are other costs; i_c is the financing interest of the purchase in installments; $t$is the moment of evaluation. A nonmonetary asset may have fixed or variable unitary value. In an economy where there is no price stability, a fast-traded asset (sales and transformation inventory) evaluated by the method of average cost has a variable unitary value, since price alterations in new purchases impose changes in the unitary cost. However, if the asset is evaluated by methods of specific cost, last in-first out (LIFO) and first in-first out (FIFO), the unitary value is constant for every acquisition lot kept in the inventory. If the asset is long-lived, the unitary value is variable, since the depreciation process is acknowledged, except for assets that do not admit such process.

Models of measurement to calculate the recoverable amount

From a pragmatic point of view, the use of the impairment method comes down to the monetary translation of an asset to its expected value when the value is lower than its carrying amount (CA). The expected value is the amount obtained through the following methods: realizable value (RV), which is calculated according to market value for nonmonetary assets and financial assets; value in use (VU), which is obtained according to the projected cash flow of nonmonetary assets, discounted to the evaluation date.

Theoretical model of evaluation by realizable value

Realizable value is equivalent to the amount that the market would pay for the asset being measured, deducting the estimated expenses for its sale. For an asset priced by active market, such as stocks, the amount the market would pay for a unit or a lot must be obtained. For an asset that is not priced, specialized publications (newspapers, journals, websites) must be researched or even evaluation reports in the terms defined by specific accounting regulation must be sought. Obtaining the market value of a nonmonetary asset, where there is no active market, may not be a simplistic procedure. For a fast-traded asset with sales inventory, for instance, market value could be obtained by the observation of the pricing of a unit of a homogenous product. For a long-lived asset, this value could be obtained by researching the price of an asset with the same characteristics, including location, finishing, conservation, functionality and tradition, among others, but it may happen that such an asset might not be available for sale. In this case, it could be valid to approach competitors to get indicators of how much they would be willing to pay for the asset. Market value still must be carefully researched when it concerns an asset characterized by specific cost, like in the case of buildings and other similar ones, in which its sole characteristics are not enough. For these kinds of goods, evaluation must be unique, considering all attributes inherent to the specificity of the underlying object of evaluation. After these conditions for obtaining market value have been met, realizable value could be calculated as equation below (3) shows.

$$RV_{jt} = (1-\beta)MV_{jt} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3)$$

Where *RV* is the net income to be recovered with the sale of an asset unit; *MV* is the value the market would pay for an asset unit; $\beta$is the estimated cost necessary for the sale of an asset unit; j is the asset; and t is the period of time when the transaction happens. This model can be used for financial assets like stocks, and fast-traded and long-lived nonmonetary assets, as both types have market value as reference value. Equation (3) can be operationalized as example 1 shows.

Example 1:

Considering an estimatedcostof sales of10% of market value, the following empirical model of realizable value applies:

$$RV_{jt} = (1 - 0{,}10)MV_{jt}$$

Table 1. Model of projected cash flow for the 5 years following year zero (t=0)

Cash flow	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
$\sum_{t=0}^{5} PR_{j,t+n}$	$PR_{j,t}$	$PR_{j,t+1}$	$PR_{j,t+2}$	$PR_{j,t+3}$	$PR_{j,t+4}$	$PR_{j,t+5}$
$-\sum_{t=0}^{5} PE_{j,t+n}$	$PE_{j,t}$	$PE_{j,t+1}$	$PE_{j,t+2}$	$PE_{j,t+3}$	$PE_{j,t+4}$	$PE_{j,t+5}$
$=\sum_{t=0}^{5} CF_{j,t+n}$	$CF_{j,t}$	$CF_{j,t+1}$	$CF_{j,t+2}$	$CF_{j,t+3}$	$CF_{j,t+4}$	$CF_{j,t+5}$

Where RV_{jt} is the realizable value of asset *j* in period of time *t;*VM_{jt} is the value the market would pay for asset *j* in the period of time *t*. The result of this function is compared to the carrying amount of the asset obtained in previous equation (1) and, if the carrying amount is higher, the difference should be multiplied by the number of items of the asset and be recognized in the result or in the equity, in accordance with accounting standards.

Theoretical model to estimate value in use (VU): Cash flow projection is the first step in the process of estimating value in use. It necessarily entails a better valuation of revenues and expenses for each period of an underlying asset's economic life. Such valuations must follow the prudential concept of a higher amount for expenses (passive) and lower amount for revenues (active), and the whole valuation must be done systematically, where revenues and expenses are related to the same period of valuation. Thus, the firm's first challenge regarding cash flow projection is to adopt a methodology that takes into consideration macroeconomic variables, like the business segment performance, governmental policies and competitors' strategies, among others. An overestimated (underestimated) projection of revenues (expenses) results in an overestimated (underestimated) projected cash flow and it produces a bias in value in use, jeopardizing the result of the comparison made with the carrying amount when testing the indication, no matter what discount rate was used. Table 1 down below shows a model of a cash flow projected for the 5 years following year zero (t=0), where the revenues and the expenses of each year are correlated in a systematic way. The projected cash flow must represent the best expectation of the underlying asset in the generation of economic benefits according to the business plan. From this plan value in use must be calculated by applying the arbitrated discount rate.

PR= projected revenues; PE= projected expenses; CF= projected cash flow; j= underlying asset; t is the period of time when CF is projected (t=0); n = 0,1,2,…,5

The second challenge in estimating VU is the adoption of an adequate discount rate, which can be either an internal rate of return (IRR) or a weighted average cost of capital (WACC), or even any other choice, depending on the business plan. Thus, the cash flow value discounted by any one of these rates is VU (second term of the right side of equation 4), which, if lower than the underlying asset's carrying amount, highlights the need of adjustments due to performance loss, otherwise there is no objective indication to apply a recoverability procedure.

$$0 = -(CA_{jt}) + E\left[\sum_{t=0}^{n} \frac{CF_{jt}}{(1+i)^t}\right] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4)$$

Where *CA* is the carrying amount; *CF* is the projected cash flow value; *j* is the asset; *i* is the discount rate; *t* is the period of time of generating cash flow. This indication, however, can also be obtainedby comparing the arbitrated rate for the asset's performance with the effective rate of return, which differs from the identity model represented in (4), where the test signalsindications of loss for any expected value lower than the carrying amount or a result lower than zero. In the comparisons of rates, the test shows that the asset does not generate economic benefit when the expected rate is lower than the arbitrated rate, or when the difference between the rates is lower than zero as shown in equation (5).

$$0 = -\delta_j + i_j, \qquad \forall\, i_j = \left[\sum_{t=0}^{n} \frac{CF_{j,t}}{(1+i)^t}\right].CA_{j,t} - 1,$$
$$t = (0,1,\ldots,n) \qquad \ldots\ldots\ldots\ldots\ldots (5)$$

where δ = arbitrated rate; i = expected rate; CF = cash flow; CA = carrying amount; j = underlying asset; t = period of time.

Identification of objective evidences and a calculation model of value of loss: The identification of objective evidences is obtained by the comparison of the carrying amount (CA) with any other of these methods: (a)realizable value (RV), (b) current value (CV), and (c) value in use (VU), recoverable amount (E).

Demonstration of objective evidence by the comparison of E and CV: To conduct this test, the recoverable amount (E) is compared with the carrying amount (CA) in order to get indication$(I_{j,t})$ of reduction of the carrying amount to the recoverable amount of asset *j* in period of time *t.*

$$I_{j,t} = |E_{j,t} - CA_{j,t}| \qquad \ldots\ldots\ldots\ldots\ldots\ldots (a)$$

$$I^{+}: E_{j,t} \geq CA_{j,t} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (b)$$

$$I^{-}: E_{j,t} < CA_{j,t} \qquad \ldots\ldots\ldots\ldots\ldots\ldots (c)$$

Where E_{jt} is the recoverable amount of asset *j* in period of time *t*; CA_{jt} is the book value of asset*j*in period of time *t*. Thus, if the calculated value in 5.1(a) satisfies 5.1(b), there is no indication of loss; otherwise, if it satisfies 5.1(c), there is indication that the reduction of the carrying amount to the recoverable amount is necessary for the recognition of the asset's performance loss.

Demonstration of objective indication of the comparison between arbitrated (δ) and effective rates (i): This model produces indication$(I_{j,t})$signs by comparing the rate required by the asset and the effective rate.

$$I_{it} = |\delta_{jt} - i_{jt}| \qquad (a)$$

$$I^{+}: \delta_{jt} \geq i_{jt} \qquad (b)$$

$$I^{-}: \delta_{jt} < i_{jt} \qquad (c)$$

where δ_{jt} is the arbitrated rate for the performance of asset*j*in the period of time*t*; $i_{jt}$is the effective rate of asset*j*in the period of time*t*, as calculated in equation (5). The interpretation of this model is equivalent to the one in 5.1.

Calculation of estimation of loss: When there is a signof objective indicationof loss, as 5.1(c) and 5.2(c) show, the adjustment value must be recognized, as calculated in equation (7).

$$IA_{jt} = \left|E_{jt} - CA_{jt}\right|q. \qquad \ldots\ldots\ldots\ldots\ldots\ldots (7)$$

Where *IA* is the impairment adjustment; *E* is the recoverable amount; *CA* is the carrying amount; *q* is the number of assets; *j* is the asset; *t* is the period of time.

According to the accounting standard, the adjustment value must be recognized against the result or the equity, reducing the value of the asset, preferably through reduction accounts, and what must be considered is the possibility to revert ***IA***'s value in future evaluations, when the circumstances that caused the loss be reverted. Under these circumstances, the adjustment value, which results from the evidence that the asset is carried at more than its recoverable amount, materializes the risk of the left side of the balance sheet, impacting directly or indirectly on the right side (equity) by the amount of loss that must be disclosed in an explanatory note.

Final Considerations

The article has brought into discussion the results of a theoretical study on calculation models for the impairment test, with the main motivation of contributing with the business literature regarding teaching-learning methodological aspects and with the practices conducted by accounting operators for complying with IAS 36 (International Accounting Standard) requirements. The article analyzed measurement criteria for the initial recognition of nonmonetary assets and proposed a calculation model to estimate the recoverable amount. The article's contributions, as an answer for the research problem, are built upon analytical models of carrying amount, value in use, realizable value, and upon the model of analysis to obtain objective indications. Such contributions suggest that all calculation methodology must be registered in order to meet the conceptual requirement of the asset value. In this sense, the research contributions are stated in sections 3, 4 and 5. Section 3 suggests the theoretical models of measurement in the initial recognition of nonmonetary assets. Section 4, in sequence, suggests the theoretical models of evaluation by the realizable value and value in use. The models of section 5 show the decision rules that signal the existence of objective indications. The model suggested as a contribution is relevant and consistent with the prescriptive theory of accounting, and contributes to the teaching-learning process in the topic of impairment; it may assist researchers in empirical studies, as well as accounting operators and users in understanding the risks and asset management. Because it concerns theoretical contributions, empirical research may test the validity of the models and suggest improvements so that that the field of accounting may count with an even more robust literature in the area of measurement of recoverable amount of assets to assist business management. The article's contributions differ from previous research because they emphasize the application of an analytical methodology to support objective indications that suggest performance loss of the underlying asset.

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