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Introducing the Technical Obsolescence Standard for Fixed Assets in Economic Feasibility Studies and Project Evaluation

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ABSTRACT: This study focused on the concept of extinction and its two conflicted terms. It was found that studies attribute extinction to two main reasons. The first is the deterioration of the fixed asset (machines, devices and equipment) while the second reason is the technical obsolescence that affects the fixed asset. The study found that there was a confusion and conflict between the two concepts. Where, extinction depends on the expected chronological lifespan of the fixed asset, which is different from the term technical obsolescence, since the obsolescence may be faster than the extinction of the fixed asset. However, although fixed asset still well working, efficient, and not passing its temporal life, may technically become obsolete, but it has not exhausted its temporal life. It was shown in this study that separating the two terms is of significant benefits for consultants and feasibility studies and project evaluation for achieving a better evaluation and pre-estimation

KEYWORDS: obsolescence, feasibility studies, project evaluation.

Introduction and Brief Literature Review

Technical obsolescence refers to the state of a fixed asset or technology that has become obsolete or no longer useful due to the development of technology. This can happen when there is a type of buildings, machines, tools, or cars with new technology that perform the same functions, but in a more efficient and effective way (Ahmad et al, 2005). Technical obsolescence can also affect a wide range of fixed asset functions such as production quality, production volume, fixed asset age, and sometimes even

the customer's needs and desires (Boucekkine et al., 2009). Several factors can contribute to technical obsolescence:

1. Progress in technology: The acceleration of technology development and improvement makes technologies obsolete, even new ones or unused ones. The fact that the latter lagged behind due to its inability to keep pace with new developments. 2. Changes in industry standards: New industry standards or regulations can make fixed assets and their technologies outdated that do not meet the controls of the new standards. 3. Changes in consumer preferences: Consumer preferences that are changing rapidly can lead to the obsolescence of some manufacturing methods and technologies.

Therefore, technical obsolescence can have a significant impact on companies and investors, as it can lead to creating additional pressure and generating a need to replace machinery, equipment and machinery as they have become outdated (Jereb, 2017). Although new technology is expensive, it is still a powerful driver for innovation and modernization. So it is important for companies to regularly evaluate their fixed assets and decide if they are still useful, or if they should be replaced with newer and more advanced assets. On the other hand, this criterion must be taken into account in the preparation of future economic feasibility studies. Companies and investors can apply a number of strategies in managing the technical obsolescence of fixed assets, including:

1. Regularly Evaluate Fixed Assets: This is done to determine if they are still useful and relevant. It can also help identify assets that may be at risk of becoming obsolete and allow the business to plan for their replacement.

2. Invest in new technology: This can help prevent technical obsolescence by ensuring that the business has access to the latest and most advanced assets.

3. Upgrading existing assets: Upgrading existing assets helps to extend the useful life of assets and delays the need for replacement.

4. Getting rid of obsolete assets: This helps the company avoid costs associated with maintenance and repair.

5. Creating a new parallel estimate of extinctions, based on the design of a mathematical equation that enables the preparer of the feasibility study to take into account the continuous technical change, so that the feasibility is more effective and close to reality, especially in projects that rely heavily on modern technology.

Through the proactive management of the technical obsolescence of fixed assets, companies and investors can reduce their burdens in the future, and on the other hand, prepare and properly prepare for such burdens in economic viability, and ensure that the necessary resources are allocated to work effectively (Del Giudice et al., 2016). Webster's New International Dictionary III defines fixed asset obsolescence as: A factor included in depreciation that covers a decline in the value of an asset due to new and better machinery or processes, changes in demand, design or craftsmanship, and other technical or legal changes, but not physical depreciation in the valuation of machinery and equipment (webster, 2002).

By reviewing the literature that deals with the concept of extinction, it seems that writers attribute extinction to two main reasons. The first is the deterioration of the fixed asset, especially machines, devices and equipment. The second reason is the technical obsolescence that affects the fixed asset, and this causes confusion and conflict between the two concepts. Since extinction depends on the expected chronological lifespan of the fixed asset, regardless of technical development, and this contradicts the term technical obsolescence, since the obsolescence may be faster than the extinction of the fixed asset.

That is to say, the fixed asset, although it is still working well without problems, may technically become obsolete, but it has not exhausted its temporal life and become depreciated. Therefore, consultants who work in the field of feasibility studies and project evaluation will benefit from separating the two terms by achieving a better evaluation or estimate and obtaining more accurate results.

Hypothesis

The research assumes that the two concepts can be separated from each other and a new mathematical formula can be built to calculate technical obsolescence in isolation from extinctions. Here, the amounts calculated from technical obsolescence are completely different in characteristics from those resulting from extinctions, as they are cash expenses, and their calculation can be retroactive.

Types of obsolescence

The obsolescence of fixed assets is divided into three types:

1- Technical obsolescence: It is caused by a change in the design and building materials of the plant and machinery being evaluated, and modern, advanced equipment is of improved efficiency. Technical obsolescence may also result from the advancement of new technologies that cause changes in the rate of production or a reduction in operational costs (Radu, 2013).

2- Functional obsolescence: It is the loss in the value of machinery, equipment, and buildings due to not meeting the requirements of the most efficient and least costly alternatives in functional obsolescence. Equipment evaluators typically consider functional obsolescence when a technical development has occurred in the assets. This occurs when a machine in operation loses its maximum capacity due to a reduced level of parts, a design flaw, or an error in the location of the manufacturing plant, compared to its newer alternatives (Boucekkine et al., 2009).

3- Economic obsolescence: Economic obsolescence may include the loss of the value of an asset due to external factors such as changes in laws or regulations, the rise in the cost of materials (raw or labor), a change in the ability to finance, or changes in the industry (Radu, 2013). These economic obsolescence factors may affect the value of a machine or piece of equipment. This is due to external factors specific to the factory and its equipment, or it may be due to a change in legislation affecting taxes or customs duties and other controls.

Depreciation is the cost of using a fixed asset distributed over the periods of its useful life. Long-term assets, except for land, are used in any economic unit for a limited number of years. Therefore, the cost of each asset is distributed as an expense over the years in which that asset is used (Radu, 2013). Depreciation, as an accounting term, does not mean a decrease in the market value of an asset over a certain period. Still, it means distributing the asset's cost and converting it into expenses in the periods that benefit from the services of that asset. This means that accounting losses are considered non-cash expenses. The cause of extinction is physical annihilation (Makov and Fitzpatrick, 2021). According to Nechaev & Rasputina (2020), Assets are exposed to decay even with different maintenance methods and the adoption of new maintenance systems that may lead to an increase in the useful life of the asset. Obsolescence is different from technical obsolescence (Obsolescence), which means that the original has become outdated (Liapis and Kantianis, 2015). A computer, for example, may be outdated even though it may be in excellent condition. Computer obsolescence in this case results when a new generation of computers appears that has a higher degree of efficiency in performance. Therefore, as a result, technical obsolescence is considered a cash expense, unlike obsolescence.

Methodology

The study used the new law for calculating the technical obsolescence of fixed assets where:

Technical obsolescence premium = (the value of the latest technology for the fixed asset - the current value of the fixed asset) / (the period between the emergence of the first and last technology)

Fixed extinction premium = (Cost of a fixed asset - Depreciation value) / (Expired life of fixed asset)

To improve the study hypothesis, an example was used to explain the difference between the extinction and technical obsolescence.

Example: Al-Aqsa Contracting Company has one (1) iPhone mobile device. The purchase cost of the device is (600) dollars, the estimated market value for it is (75) dollars, the expected life of the device is (3) years, the scrap value is 15 dollars, the value of modern technology for the same mobile device. iPhone 14 is $1,000. What is required is to calculate the technical obsolescence premium for the mobile phone and its obsolescence premium.

Results

In the results part, the study depends on the example solution where:

Technical obsolescence premium for the first version of the iPhone = (the value of the latest technology for the fixed asset - the current value of the fixed asset) / (the time period between the emergence of the first and last technology)

Technical obsolescence premium = (1,000 - 75) / (2007-2022)

Technical obsolescence premium = (925) / (15)

Technical obsolescence premium = $61.66 annually

The technical obsolescence premium is calculated retroactively according to a timetable provided that it does not cause a negative impact on profits and is deducted from net profits to compensate for technology, and it is considered a cash expense.

Fixed extinction premium for the first version of the iPhone = (Cost of the fixed asset – Depreciation value) \ (The expected life of the fixed asset)

Fixed extinction premium = (600 – 15)\(3)

Fixed extinction premium = $195

The fixed extinction premium is calculated annually until the end of the life of the fixed asset, and it is considered a non-cash expense.

Conclusion

The terms obsolescence and technical obsolescence are two completely different terms, each with its own characteristics. It is preferable not to combine them, but to calculate each separately. The reason is the fundamental differences in the characteristics and method of calculation, and this has financial and accounting implications, especially in large companies or companies that use technology more than others. Separating the terms obsolescence and technical obsolescence of fixed assets will be reflected in the performance of projects in both evaluation and economic feasibility cases. Obsolescence will be included in the income statement as a cash expense, while obsolescence remains a non-cash expense. Here the need for financial allocation to compensate for the lack or obsolescence of technology emerges, which is the most important and urgent due to competition and customer satisfaction.

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