

DEPRECIATION METHODS: IN SEARCH OF BEST METHOD

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Abstract

Depreciation, a non-cash item in financial reports seeks to measure the cost of an asset due to usage or passage away of time. Over the years, scholars and practitioners have identified many methods of calculating depreciation with no suggestion on the best method to use. This paper attempts to search for the best depreciation method. The method that will enable the firm to effectively and efficiently meet its objectives, that is the method that can lead to the quickest recovery of the large part of the money invested in an asset as well as having the highest present value is accepted to be the best method. At the end of the analysis, the reducing- balance method meets the set criteria above and hence, it is recommended as the best method.

Introduction

On no subject in human endeavor has there been so much said, written and so much controversy as the subject of depreciation. Depreciation is of interest to and has been discussed by economists, engineers, and lawyers and importantly by accountants. To an economist, depreciation is the decrease in market value; to an engineer depreciation is the decrease in physical deterioration of fixed assets (building, machinery or equipment). The legal profession is concerned with depreciation in connection with the rate setting process for companies operating in regulated industries and in multitude of other valuation problems and an accountant sees depreciation as the cost recognized for using depreciable assets (Nelson, 1977; Aigbokhaevbolo, 2001).

In general, according to Golberg (1962), the term depreciation is susceptible to four different meanings:

(a) A fall in price, (b) physical deterioration (c) a fall in value and (d) an allocation of fixed asset cost (Glauter and Bunderdown, 1976).

The main objective of depreciation is to match the costs of asset with the revenues that result from the utilization in the enterprise and are used to reduce the balance sheet book value of the firm's fixed assets. The practice of treating depreciation as an allocation of costs present has a number of theoretical problems, the most serious theoretical problem is selecting the method of calculating depreciation.

Accounting standards, both at international and local levels, recognize several methods of calculating depreciation but organizations are free to use any methods provided they are consistent with the method. As SAS, 9 (1990) posits it "the method which is chosen for calculating- a depreciable assets may be based on the usage contribution or the passage of time, usually, the nature of the asset determines the appropriate method to use"

This freedom to choose any depreciation method has led to indiscriminate charge of depreciation to profit and loss and balance sheet by organizations across the world. For example, some organizations use two methods in one annual report; see Gold-Zack (1990) of Germany and Nifco Inc (2001) of Japan Annual Reports and Statements of Accounts. Some organizations use one method in the group and other method subsidiaries (see Yamaha Corporation (2001) of Japan Annual Reports and Statements of Accounts).

From investigation, most firms across the globe use straight-line method because of its simplicity but few organizations use reducing balancing method (see AIFUL Inc (2001) of Japan.) All these varying methods have resulted in different results in operating profit which consequently led to differences in return on capital employed, return on asset, profit sharing, wages, bonus and commission.

The result figures of these variables are useful guides to further decisions. Right choice of depreciation methods helps to produce sound figure and allocation of resources, thus promoting a healthy economy. On the other hand, wrong choice of depreciation methods may likewise distort decisions, thus, inadequate depreciation allowance can contribute to company's failure.

For these and other reasons, using the best method is imperative. The primary aim of this paper is to search the best depreciation method. In particular, the paper will be discuss the concept and depreciation methods, determining the best method by comparing the three most popular methods

on a present value basis. The method with the highest present value will be deemed to be the method. This will however, act as a lesson to the users and prepares of accounting.

2 Operational Definition of Terms

Definitions of Depreciation

Depreciation is the process of allocating the historical cost of a fixed asset less any forecast residual value in its estimated useful life. The annual depreciation expense, which does not involve a moment of cash, is a notional charge to the profit (David, Lan, Stronghton and Barry, 1996).

According to America Institute of Certified accountant (AICP) (1953) depreciation is a system of accounting which aims to distribute the cost of tangible capital assets less salvage (if any), over the estimated useful life of the Unit.... in a systematic and rational manner. It is a process of allocation not of valuation (Glutier and Bunderdown, 1976).

Depreciation represents an estimate of the portion of the historical cost or revalued amount of a fixed asset chargeable to operators during an accounting period. In determining depreciation, cognizance is usually taken of the wear and tear of an asset resulting from use, effusion of time or obsolescence detected by changes in technology and market value (SAS, 9 1990).

All these definitions can be summarized, that depreciation is the cost recognized for using depreciation assets in a specific period of time.

Depreciable Assets Are

- (a) Assets, which are expected to be in use in more than one accounting period.
- (b) Have a limited economic life
- (c) Held for administrative and in ordinary course of business.

Reasons For Depreciation

- (a) To determine the value of an asset used
- (b) To determine the book value of an asset
- (c) To form an opinion "True and fair" views of the organization
- (d) To know what to enjoy as Capital Allowances
- (e) To know when an asset would be replaced
- (f) To know how much to set aside for the replacement of an asset

(See Aigbokhaevbolo, 2001; SAS 9, 1990)

Accounting For Depreciation

In final account, depreciation is charged to profit and loss account before ascertaining the operating profit or loss it is also deducted from historical cost of the asset in balance sheet plus accumulated depreciation (the sum of depreciation charged on an asset since acquisition) to get the book value of the asset.

For tax purposes, depreciation is not an allowable item in Nigeria. It is added back to operating profit. In lieu of depreciation, the Companies Income Tax Act 1979 (OTA, 1979) grants capital allowances on qualifying expenditure, which may be deducted from adjusted profits to arrive at taxable profit (Ani, Abudulahi, Popoola and IJche, 1989).

Causes of Depreciation

Causes of depreciation mean the variables for depreciation. It can be summarized as follows:

- (a) Wear and tear due to usage
- (b) Obsolescence due to change in technology.
- (c) Passage of time.
- (d) Physical factor: erosion, dampness, evaporation etc.

Depreciation Methods

Depreciation Methods means various techniques that can be used to estimate depreciation expense. Some of the methods are as follows:

- (a) Based on the passage of time are:
 - i. Straight line

Depreciation Methods: In Search Of Best Method

ii. Decreasing charge (Accelerated)

- i. Sum -of- the- years digits
- ii. Reducing- balance
- iii. Annuity and sinking fund

(b) Based on usage or output

- i. Service hour
- ii. Productive output (see SAS 9.)

From relevant literature, experience and observation the most popular depreciation methods are:

- i. Straight- line
- ii. Sum -of- the- years digits
- iii. Reducing balance

For the purpose of this paper the popular methods need brief elaborations.

(i) The Straight-Line Method: This is the oldest depreciation method. It is the method whereby a fixed percentage of the original cost of the assets is written off each year so as to reduce the cost of the assets to a nil at the end of its life, where the asset has a residual value, that is scrap value, scrap value is deducted from the cost and divided among the expected useful life of the assets i.e. Annual provision for depreciation==

Cost less Residual value

No of year (period)

Features

It is the simplest method to use and easy to understand as compared to other methods but does not recognize time value of the asset. The method provides for uniform periodic charges to depreciation expense over the life of the asset.

(ii) The Reducing- Balance Method (RBM) Same as DOUBLE- DECLINING BALANCE method: Under this method a fixed percentage rate is applied on the reducing value of the asset in order to ascertain the amount to be written off in the a given period of time.

The depreciation rate can be obtained from the use of the formula:

$$\text{Depreciation rate} = 1 - n \sqrt[n]{\frac{\text{salvage rate}}{\text{Cost}}}$$

Features

The early year are charged with the highest amount for depreciation.

The asset is never completely written off so some charges are charged to revenue every year.

It assumes that assets lose efficiency as if get older and charge for depreciation should decrease accordingly.

The Sum- of- the- Years Digits (SYD)

The depreciation applies a constant depreciation base. Under this method a decreasing rate is applied and constant depreciation base is written off. 'flic depreciation rate consist of the fraction whose numerator is the sum of the year's digit. The sum of the year's digit may be obtained by formula:

$$\frac{N}{(N+1)/2}$$

where "N" is the number of the estimated useful in years.

In a clearer expression

$$Dt = \frac{N+1-t(C-S)}{\sum_{j=1}^N j}$$

where Dt = Depreciation in period t

C = Cost of the asset S estimated salvage value of the asset N : estimated life of the asset in years

T = the year of life of the asset (i.e 1 in the first year and n in the last year)

= the sum of the digits from 1 to n = n (n-1)/2 (Nelson 1977).

The Features

The features of the SYD are similar to that of RBM hence they are frequently referred as accelerated depreciation methods.

Determining the Best Depreciation Method.

As stated earlier, the best depreciation method means the method that help to meet the objectives of the organization. Among other things, the objective of a firm is to add to the value of the firm, therefore our best depreciation method in the method that would add to value of the firm. However, it will be impossible to state the best method unless the methods are compared with one another.

In this paper, using a hypothetical case we compared the three most commonly used methods on a present value basis by discounting all annual depreciation charges. This is shown on **fig 3.1** below.

Year	Annual Depreciation Charge			Present Value Annual Charge			DISCOUNT FACTOR (a) 20%
	STRAIGHT LINE	DOUBLE DECLINING BALANCE	SUM OF YEAR DIGIT	STRAIGHT LINE	REDUCING BALANCE METHOD	SUM-OF YEARS DIGITS	
1	1050	2400	1,909	874.65	1999.2	1590.20	0.833
2	1050	1920	1718	728.7	1332.48	1192.29	0.694
3	1050	1536	1527	607.95	889.34	884.13	0.579
4	1050	1226	1336	506.1	592.38	643.95	0.482
5	1050	983	1145	422.1	395.17	460.29	0.402
6	1050	7X6	955	351.75	26.31	319.93	0.335
7	1050	629	764	292.95	175.49	213.16	0.279
X	1050	503	573	244.65	117.20	133.51	0.233
9	1050	403	382	203.7	78.18	74.11	0.194
10	1050	111	191	170.1	17.98	30.94	0.162
Accumulated Depreciation	10500	10500	10500	4402.65	5860.73	5542.51	
Salvage Value	1500	1500	1500	243	243	243	
Total	12,000	12,000	12,000	4645.65	6103.73	5785.51	

Table 3.1 Source: Hypothetical;

Table 3.1 shows the cost of the asset that is assumed to be \$412,000, depreciation charges are discounted on the assumption that the money will earn 20% for the company for 10 years and scrap value \$415000. The three methods result in the depreciation charges plus the salvage value equal to the cost of asset. Since the timing of depreciation charges depends on method there are differences in the depreciation charges as we can observe from the table the reducing balance method results in the greatest present value of \$46103.73 and this method demonstrates that a large portion of capital outlay on the asset are recovered at the earlier periods. Thus this method will assist in better performance measurement.

Conclusions and Recommendations

This paper examined depreciation and depreciation methods with a view to suggesting the best method. The paper compared the most commonly used of the accounting standard committees and boards mandatory methods: The straight line, reducing balance and sum of year digit on a present value basis by discounting all the depreciation charges over the useful life less residual value at 20% cost of capital.

From the hypothetical case, we found that reducing balancing method had the highest present

value and would add to the value of the firm. Also the method would enable the firm to recover the large part of the money in an asset.

For policy formulations, this paper recommends:

- (1) The reducing- balance method.
- (2) The accounting standard at both national and International levels should make it mandatory for firms to adhere to reducing balancing method. This policy will enhance comparison of performance among firms at local and international levels.
- (3) In the light, of the recommendations 1 and 2 above there is need for the accounting standard boards both at local and international levels to revisit accounting for depreciation.

References

- Aikgbokhaevbolo, O.M. (2002). *Principles of Accounting*, Benin-city: Ejodamen Publishers
- Agio, (2001). *Annual Report and Statements of Accounts*, Tokyo Japan
- Aiful Corporation, (2001). *Annual Report and Statements of Accounts* Tokyo Japan.
- Anao, A.R (1993). *Introduction to Financial Accounting* , Lagos : Longman Nigeria.
- Ani, A.A., Abudullahi, M.A. Popoola, M.A. and Uche, R.U. (1989). *Companies' Income Tax and Petroleum Profit Tax in Nigeria*, Ibadan: University Press, Ltd.
- Baxter, W.T. (1980). *Depreciating Assets: An Introduction*, London: Gee and Co Publishers Ltd.
- Cashill, P (1988). *Elements of Accounting*, England: Me Grew-Hill Book Company
- Cissel, R Cissel, II and Flaspohler (1973). *Mathematic of Finance*, Boston: Houghton Mifflin Company.
- Divid, L., Lan, M. and Barry, M. (1996). *The Complete A-7. Business Study Hand Book*, London: Holders and Stonghlon, Pic.
- Glauiter and Bunderdown (1976). *Accounting Theory and Practice* London: Pitman Publishing Ltd.
- Gold Zack Group, (1999). *Annual Report and Statements of Accounts* Germany.
- Nelson, C.L. (1973). Depreciation in Davidson, S. and Roman L.W. *Hand Book of Modern Dictionary*, New York: Me Grew-Hill Book Company. ,
- Nifo Inorcorporation, (2001). *Annual Report and Statements of Accounts*, Okolona Japan.
- Nigeria Accounting Standard Board (1990). *Accounting For Depreciation*, Lagos: Nigeria Accounting Standard Board.
- Peltry, .1. W., Keown, A.J., Scott, D.F. and Martin J.D. (1993). *Basic Financial Management* 6th ed., New Jersey: Prentice Hall Inc.
- Yamaha Corporation (2001). *Annual Report and Statements of Accounts*, Tokyo Japan.