CHAPTER II

A REVIEW OF RELATED LITERATURE
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2.1: Focussing the issue

This chapter takes in its broad sweep a survey of available literature in the area of depreciation accounting. The review is intended to provide a background to the study that follows. Accordingly, this review is not intended to be exhaustive and comprehensive — exhaustive, in covering every work in the field; and comprehensive, in dealing with the studies examined in considerable depth.

Depreciation accounting is as old as the business system, if not older. It has, however, been mostly treated as a topic for Accounting theory. As a result, complete and independent texts on the subject are not too many. At the same time, being a topic of vital concern to on-going business, the topic has received considerable attention from experts and researchers in business journals and professional conventions, particularly in periods of inflation and business cycles. There are also found some doctoral research studies in this field. The emphasis of this review is, therefore, on perceptive articles and academic research outputs.

As far as possible the review has been presented in chronological order, though at times conceptual contents have made it difficult to follow it strictly.
This chapter, however, comprises two parts — part I dealing with the literature worked upon in other countries and part II with the works done in Bangladesh.

2.2: Literature in other countries

The term 'depreciation' owes its origin to the Latin words *de*(meaning down) and *pretium* (meaning price); and in every day uses, simply means a decline in value.¹ Be that as it may, for the time being, the historical development of the concept may be traced back to 1588 A.D.² Over the long period, the connotation of the term has varied considerably. It was expressed as "loss by decay" in the late sixteenth century (1588) and "lost by use" in the late seventeenth century (1690) and, as part of estimated product cost in later years.³ The concept of depreciation was not, however, explicitly treated in business literature till 1800.⁴

In his excellent article on "What they say about depreciation?" Hatfield chronicled the development of the concept. He referred to A.C.Littleton who had called attention to the first specific


³Ibid.


exposition of depreciation accounting by Inglis in his text book published in 1861. Hatfield also referred to the work (on depreciation accounts) by Monteage, published in 1675. Again, Hatfield adverted to Littleton’s reference of proforma accounts (showing depreciation) to the text book by Mellis, published in 1588. According to Penndorf, as referred to by Hatfield, texts by Francesco di Marco da Prato showed depreciation allowance going way back to 1408. Hatfield further gave reference to Vitruvius who, in his work on architecture, long before 1408, had enunciated the rule of valuing a masonry wall of 80 years’ life expectancy by deducting every year from its cost one-eightieth thereof, adverting to the straight-line method of depreciation. Lastly, on reviewing the statements of many scholars, Hatfield gave his own views in the article:

(1) the fact of depreciation was admitted almost universally and almost all agreed that while booking depreciation, the debit would represent a cost or expense on account of consumption of service value;

(2) in regard to the credit entry for "allowance or provision for depreciation", expressions made by many scholars and academics seemed to him to be inconsistent with agreed underlying meaning of the debit entry for depreciation. Many such scholars ascribed to it, for instance, (a) cash or fund on hand, (b) possession of other equivalent assets, (c) future contingency, (d) part of profit, (e) reservation, (f) liability etc. And in the light of these epithets applied to the credit entry for "allowance or provision
for depreciation", he (Hatfield) concluded by saying that all this seemed to be contradictory with the thesis that depreciation was the loss in value due chiefly to wear and tear.

So far about the ancient thoughts on depreciation, Following the World War II there was renewed interest in this traditional topic of depreciation. Perhaps this was partly due to lack of proper maintenance of fixed assets of world economies and partly due to inflationary forces since then. To turn then to the literature of the years from 'thirties to 'fifties.

Perry Mason's work on "Depreciation and the Financing of Replacements", published in 1933 was, indeed, a good contribution to the existing literature. After reviewing the opinions of both for and against regarding depreciation as a source of financing replacements, the author commented that the financing of replacement was an important problem in the financial administration of business enterprises but it was quite distinct from the problem of accounting for depreciation.

DR Scott's work on "Defining and Accounting for Depreciation", published in 1945, was another landmark in the growth of literature in the field. He stated his views on the controversial issues imbedded in depreciation accounting. At the definitional level, he spoke of depreciation as "loss of value" and "exhaustion of

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7This "DR" stands for his father's initials (David Roland).

8DR Scott, "Defining and Accounting for Depreciation", The Accounting Review, Vol. XX, No. 3 (July 1945), pp. 308-15, passim.
usefulness of assets. Of the various methods for computing depreciation then in use (namely, diminishing balance method, sinking fund method, unit cost method etc.) he emphasized that these allocation methods had no close relation to value-change of an asset and for that matter, did not measure its exhaustion accurately. He complained that all these methods of depreciation simply dealt with estimated "cost" and followed some vague notions of "systemic" approach in practice, without being sure if cost, albeit historical cost, were the proper basis for it. However, while making strictures on cost basis, Scott did not face up to the "Current Value" theory. He, therefore, offered no prescription of his own.

Charles W. Smith's article on "What Concept of Depreciation for Fixed Assets is Most Useful Today?" in the early '50s was another landmark presentation. To C.W. Smith, investment in plant was the investment in the future services or products. Depreciation, therefore, would occur as these services would be yielded up; depreciation was thus concerned with cost of service or product; it was neither "wear and tear", nor "decay" nor "obsolescence". The issue was one of retiring the plant or any fixed asset. Of the methods of depreciation (such as, straight-line, sinking fund, diminishing-balance, unit-of-production etc.) the author thought that the unit-of-production was the soundest method and would square

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completely with the theory of matching costs against revenues. It is interesting to note that he considered the task to be cost assignment, more than anything else. He was firmly of the view that there was no reasonable way of determining the value of machinery and equipment, and as such, the use of index numbers to arrive at value would be only a ready and rough calculation, suffering from all the infirmities of the reproduction cost estimates. Again, the author seemed to shy away from any prescriptive suggestion.

Then coming to 1954, the researcher came across a Masters thesis on "Depreciation of Fixed Assets in Accountancy and Economics" by G.T. Webb. This work examined the existing theory and practice during the period 1948-54, regarding depreciation accounting of fixed assets in the private trading concerns in Australia. Two-thirds of the companies concerned were following the reducing-balance method, as against one-third using the straight-line method. And the same rates of depreciation were allowed for taxation purposes, regardless of the type of method (straight-line or reducing-balance) used. Accounts provided for depreciation were not looked upon by accountants and businessmen as being for the purpose of replacing plant, but rather for the purpose of recovering the initial expenditure on plant. Approximately, 10 per cent of the manufacturing companies included in

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the study disposed of their plants when they were fully depreciated and replaced them by new ones. The rest 90 per cent retained their plants even after they were fully depreciated in accounts. The differing views of accountants and economists on depreciation were also considered in the study.

The paper on "Depreciation policy under Changing Price Levels", published in 1954, was one of the important outgrowths of the research endeavour of Edgar O. Edwards. The author expressed his deep concern that if the depreciation charge did not reflect rising prices, total cost would be understated, profit would be overstated and tax would be levied, in part, on "real capital" rather than on "real profit". Viewing the matter thus, he suggested use of both current cost and adjustable historical cost for depreciation purposes. He regarded them as essentially complementary rather than competitive. In any case, he gave a direct blow to historical cost basis of accounting for depreciation.

In the year 1955, to the stock of Literature was added Goldberg's article on "Depreciation in published company Reports". He studied the treatment of depreciation and fixed assets of 78 trading companies in Australia on the basis of their published annual reports covering a period of 9 years from 1945 to 1953. He found that depreciation would not mean the same thing to all


management: This was so even in terminology. He came across the inter-changeable use of such terms as 'depreciation', 'Depreciation reserve', and 'depreciation provision', in the reports. Further, he found while some companies consistently charged depreciation and others did not, and some making disclosure practice and others not doing so. Again, some companies were found to regard an annual depreciation charge as a means of providing for the replacement of the asset while others using it for cost allocation only.

In England in 1957 appeared Sidney Davidson's contribution in the form of an article of "Depreciation, Income-Taxes and Growth". He highlighted the origin and chequered the developments of depreciation in Tax Laws. The customs and Inland Revenue Act of 1878 permitted, for the first time, depreciation deductions for machinery, almost 35 years after the enactment of the first temporary Income-Tax Law in 1842. He also referred to E.R.A. Seligman as saying that earlier recognition to depreciation dated back to 1853, when the Income-Tax Law of the Confederate States of America allowed navigating companies a 10 per cent annual deduction for wear and tear of ships. Davidson further stated that there was a substantial shift to accelerated depreciation methods in order to foster faster economic growth. He also made out a plausible case for the view that accelerated depreciation for tax purposes would encourage investment.

The Research Report published in 1958 by the U.S. National Association of Accountants on "Current Practice in Accounting for Depreciation" was an important landmark towards the end of '50s. Fifty-five companies participated in the study by supplying information about their depreciation practices. The study gave emphasis upon purposes served by depreciation and how well these purposes were achieved by various depreciation practices. Prior to 1954, all but three of the fifty-five companies participating in the study used the straight-line method both for accounting and tax purposes. Of the remaining three companies, one used the declining-balance method and the other two output unit method. But the Revenue Code of 1954 led most of these companies to review their depreciation methods for income tax purposes. Consequently out of fifty-five companies, forty-nine opted for declining charge method (that is, either sum-of-the-years-digits method or declining-balance method) for both tax and accounting purposes. Five companies chose declining charge methods solely for tax purposes and straight-line or output unit method for accounting purposes. The remaining one company selected straight-line method for tax purpose and declining-balance method for the purpose of accounting. About one-third of the companies under study restated depreciation charges in terms of the current price level and used this information for various managerial purposes. In the remaining two-thirds of the companies, actual depreciation practice remained firmly anchored to historical costs. The study

further brought out dominant influence of income tax consider-
atations on depreciation practices.

Moving on to 'sixties, when the literature in the field
grew up in number.

The contribution of W. Arthur Lewis on "Depreciation and
Obsolescence as Factors in Costing," published in 1961 was also
very important. He defined depreciation and identified deprecia-
tion and obsolescence as factors in costing. According to him,
depreciation "measures the extent of which the value of the asset
has deteriorated although it is being kept in a good state of
repair", and "obsolescence is that loss in value which is due to
the competition of new inventions". In the second section of his
study he stated that depreciation should be measured for
(1) computing tax liability, (2) valuation of assets, (3) calculat-
ing net profit and (4) fixing product price. In the third
section, his discussion was concerned with the depreciation concept
which sprang from the desire to maintain capital intact. And in
the fourth section, he talked about depreciation as being user
cost. "It is a sort of differential cost: the difference which is
made to total cost by changes in the level of output."

Edgar O. Edwards in his paper, "Depreciation and the Main-
tenance of Real Capital", published in 1961, dealt primarily with

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15 W. Arthur Lewis, "Depreciation and Obsolescence as
Factors in Costing", ed. J.L. Neij, Depreciation and Replacement
Policy (Amsterdam: North-Holland Publishing Company, 1961),
pp. 15-45, passim.

16 Edgar O. Edwards, "Depreciation and the Maintenance of
the financial aspect of the depreciation problem. He attempted
to explore very incisively about:

Several concepts of replacement in terms of their economic
significance and their relevance to the determination
of depreciation charges under a variety of circumstances
including stationary conditions, growth, price and price
level movements and changes in demand and technology.

Walker's "Depreciation Problems and Taxation", published
in 1961, was also a related work in the field. The author argued
that capital costs were just as much a cost of production as
current costs and that depreciation charges which were the means
by which capital cost to be distributed among specific accounting
periods ought to be recognized as a cost of production for tax
purposes. He gave consideration to the effects of capital cost
and the allocation of capital expenditure (to particular account-
ing periods) on investment decisions. He explained the extent
to which the various forms of accelerated depreciation would
effect the level of investment. The author also suggested that
the firms should be given more or less complete freedom as to the
manner in which they would depreciate their assets for income-tax
purposes.

A valuable work on "Concepts of Depreciation" by Louis
Goldberg was an addition to the existing literature in 1962.
Goldberg, in his study, made an endeavour to sort out some of the

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main concepts of depreciation. He brought into focus four concepts of depreciation as (a) fall in price, (b) physical deterioration, (c) fall in value and (d) allocation of cost.

In the article on "Depreciation — To Measure Income or To Provide Funds for Replacement?" published in 1962, Carman G. Blough pointed out: "depreciation provides no funds. Funds come from the revenues of the business, and the charge for depreciation neither increases nor decreases the amount available to purchase a new equipment." Of course, if there remained revenues to offset the depreciation, an amount equal to the amount of depreciation for tax purposes would be left entirely to the business. Even such amounts would not be available for replacement unless the funds received as revenue were, in some way, set aside for the purpose. Making charge to income and setting up reserves for depreciation would give no assurance of funds for replacement. Conversely, funds set aside for replacement would be available for that purpose whether charges were made for depreciation or not. Here the author emphasized that funding for re-investment was an independent purposive act.

Another work with exactly the same title by Paul Grady was published in 1962. This work also carried the same view. The author stated clearly that depreciation in itself would not provide

19 Carman G. Blough, "Depreciation — To Measure Income or To Provide Funds for Replacement?", eds. ibid., pp. 307-316, passim.

20 Paul Grady, "Depreciation — To Measure Income or To Provide Funds for Replacement?", eds. ibid., pp. 317-323, passim.
a flow of funds to take care of property replacements. The flow of funds would come from the gross sales or revenues which a company would receive for its products or services. The funds would come forth on the basis of the liquidity of the business at the time of asset replacement, regardless of whether any charge had been made for depreciation. The charge for depreciation or property exhaustion was, however, necessary for proper measurement of income. He was emphatic on giving recognition to economic depreciation, without which income would be overstated and "dangerous erosion in productivity" would follow.

O.N. Kapoor's article on "The Concept of Depreciation" published in 1964 was another related work in the field. His work bore testimony to the antiquity of depreciation. He even referred to some early American charters for corporations requiring that a charge for wear and tear be deducted from earnings before the computation of surplus available for dividend. The author also referred to Perry Mason's book, "Illustration of the early treatment of Depreciation", published as early as 1675. He further showed that the term 'depreciation' was first used in Britain in 1908 and in America in the following year. Like Goldberg, incidentally, he dwelt upon four concepts of depreciation, but differently: (1) amortized cost, (2) impaired serviceableness, (3) differences in value between an existing old asset and a hypothetical new asset (taken as a basis of valuation) and (4) decrease in value.

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In 1964, Deshmond Goch in his article on "Depreciation — All Things to All Men", lamented the inability of the accounting world to reconcile the opposing viewpoints of the "original cost" and "replacement cost". But what did he have to contribute? He gave emphasis on three concepts of depreciation: (1) 'Loss of value', (2) 'amortization of cost', and (3) 'provision for replacement to maintain capital intact'. He regarded the third one as a matter-of-fact concern of the nature and purpose of depreciation.

One important research work in the field was a doctoral thesis of the year 1964 on "A Critical Examination of a Current Cost Basis for Fixed Assets and Depreciation" by William Gary Shenkir. Based on the debate on the effects of price changes on financial reporting, the study identified three lines of thought: (1) historical cost, (2) adjusted historical cost and (3) current cost. His study, however, focused its main thrust on the third one and tested the usefulness of financial statements reporting fixed assets and depreciation at current cost. To test this, he used the results of his interviews with 10 financial analysts connected with institutional investors. The author concluded that Current Cost Accounting was not an acceptable method in solving the problem of financial reporting in the setting of changing prices because this method, according to him, had mainly three weaknesses: (1) lack of objectivity, (ii) lack of compara-

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bility and lack of usefulness.

O.N.Kapoor, in his another article on "Some Methods of Depreciation and Their Impact on Business Decisions", published in 1965, made a good discussion on three depreciation methods, namely, (1) straight-line, (2) reducing-balance and (3) sum-of-the-years-digits and analysed their impact on business decision by giving a comparative statement of results under different depreciation methods.

K.Venkata Rao is another author who in his article on "Depreciation Methods", published in 1966, dwelt upon (1) straight-line method, (2) output method, (3) production hour method, (4) diminishing-balance method and (5) revaluation method and their merits and demerits.

In his paper on "Depreciation and Replacement in Modern Management Thinking", published in 1966, B.S. Rathor looked upon depreciation as a technique of conserving funds in an organisation for the replacement of depreciated assets.


Charles J. Gaa in his article in 1966 on "Depreciation — The Good Provider?" clearly viewed depreciation simply as an accounting process of amortizing the cost of an asset over the years of its life span. According to him, "depreciation cannot be both a source and use of funds — as a matter of fact it is neither". The accounting for depreciation was a matter entirely separate from that of making a decision regarding the replacement of property. He, therefore, emphasised that depreciation, in fact, would not provide funds for replacement.

Next comes W.A. Paton's work on "Significance of Depreciation Accounting — With Special Reference to Plant Replacement" published in 1966. According to him, distinguishing depreciation from other items of cost and regarding it as a source of financing replacement was nothing but an offspring of sloppy thinking. Depreciation was "an actual, explicit cost" — "not a phoney, assumed or hypothetical charge" — nor "an optional cost, a border-line cost, a take-it-or-leave-it charge". He seriously objected to many people's belief that the process of depreciation accounting — accruing depreciation would automatically provide funds, and that all that was necessary to obtain more money was to accrue more depreciation and that he considered it a completely mistaken view. Funds would be provided by the delivery of products to customers.


28 W.A. Paton, "Significance of Depreciation Accounting — With Special Reference to Plant Replacement", eds. ibid., pp. 271–284, passim.
at a price, not by accounting. To clinch his point, he asserted that it was day-dreaming to imagine that the receipts from customers would increase or decrease automatically with the increase or decrease of depreciation charge. Further, the author never discounted the importance of replacement cost during inflation. Rather, he argued that "current replacement cost is important in planning property utilization, in making departmental comparisons, in pricing policies, in determining insurable value, in setting up maintenance standards in deciding when to retire and so on." He clearly stressed the desirability of restating the cost of plant by giving effect to inflation factor and charging depreciation on the restated cost. Finally, he asserted:

no formula of computation — including the use of specific replacement cost as a depreciation base can assure receipts of funds adequate to cover cost of replacing capacity when the date of retirement rolls around.

Coming to 1967, the researcher found an important contribution by Young and Peirson on "Depreciation — Future Services Basis". In this article, they advocated discounted cash-flow technique for the charging of depreciation. According to them, this method required that the estimated future net services of the asset, including the scrap value, be discounted to their present value at the end of each accounting period. The depreciation charge for any year, under this method, was simply the difference between the present value of the future net services.

at the beginning and end of that year of the asset's life. This
method obviously took into account the interest factor or time
value of money invested; and at the same time, it included inflation
and changing value of money in its calculus.

In the All India Commerce Conference in Madras in December
1951, S. Sengupta presented a paper on "Depreciation in Account-
ing" which was published in 1968. Beginning with P. D. Leake's
conceptualization of depreciation as 'the estimated value of the
exhaustion of productive capital outlay', he identified the
problem of depreciation "as the problem of allocation of an expense
already spent as between what is already realized out of it and
what is expected to be realized in future". That is, he talked
about the allocation of cost between past and future services
of an asset. According to the author, none of the depreciation
methods usually in operation would serve the purpose of an
"exact measurement" of depreciation. He took pains to explain
that the problem might arise because of two reasons: (1) changes
in the purchasing power of money and (2) difficulty in rightly
estimating the working life of fixed assets. He gave refreshing
emphasis on the second one. Following up, he put reliance on
the science of probability and the construction of life table for
each type of asset on the basis of past experience. In this
connection, he suggested Makeham's Law (that is, a law of mortality
for human beings) for the construction of the life table of fixed
assets.

30 S. Sengupta, "Depreciation in Accounting", Accounting
Theories (3rd ed.; Calcutta: Calcutta Text Book Society, 1968),
pp. 90-97, passim.
Another advanced research work was Shinkichi Minemura's "Depreciation Accounting and Economic Analysis", published in 1968. This was an endeavour to elucidate the economic analysis of depreciation in a continuous enterprise from the standpoint of income accounting. Accordingly, he examined depreciation from the perspective of "recovery of capital" and "prospective rate of return" concepts in his study. The author believed that "the problem of depreciation is usually considered from an economic and financial point of view, as fixed assets are often related to a long-term prospective rate of return". A large part of the work was devoted to the discussions on the "provision of renewal funds" and "the adoption of the prospective rate of return concept in depreciation accounting". The theories (expounded by some leading accountants of the world) which were important in their relationship of the economic aspect of depreciation to the basic principle of income accounting were also dealt with in the study.


32 Capital recovery signifies commonly the excess of capital recovered over the amount of capital invested in goods and services. For reference see ibid., p.1.

33 The prospective rate of return as related to depreciable assets is the rate at which the present value of a profit stream tends to equate with the depreciable cost. This rate is sometimes referred to as the internal rate of interest or the internal rate of discount. This rate is computed by dividing the total estimated annual profits after depreciation by the total year-beginning unabsorbed costs during the life... the unabsorbed cost in this case means the remainder of the depreciable cost after the deduction of the accumulated depreciation charges computed by the use of the rate. For reference, see ibid., pp.73-74.
to a great extent. He recommended restatement of fixed assets on the basis of replacement cost. He also felt that individual (specific) price indices rather than general price indices should be used for the determination of replacement cost. To highlight his conclusions, he gave a number of common examples of calculations regarding various depreciation policies and tried to make an objective comparison of them by using many mathematical formulations.

To move on to the literature of the 'seventies, when the subject of depreciation began to attract in-depth and full-time research in academic institutions at the higher level.

An advanced research work available in the field in 1970 was a doctoral dissertation on "The Flow of Long-lived Assets Funds" by Mary Barbara Beeler. This study was not involved in techniques and procedures. It proceeded on the hypothesis of depreciation funds of long-lived assets, and tracing and analyzing their movements within the business. This thesis treated depreciation (and the accounting therefor) as a consideration of prime importance in maintaining the real capital. It recommended that the accumulated depreciation account balances, originating from the current periodic depreciation charges would be "funded" to the extent that they were covered by revenues.

Wolk's paper on "Current Value Depreciation: A Conceptual

Clarification, published in 1970, was a commendable attempt to clarify the concept of Current Value depreciation within the confines of the income measurement purposes such as (1) predicting future earnings, (2) indicating the increment in value of the firm's assets during the period, (3) indicating the amount of dividends that could be paid without breaching initial capital and (4) indicating management's efficiency in utilizing the assets at its disposal. The author, for the purpose of determining current value income, considered the user cost concept of depreciation to be the best measurement. To clarify the user cost concept of depreciation, he referred to three authors. User cost was the "loss in value of the asset which results from using it as distinct from keeping it idle." It could be measured by comparing market value of an asset at the end of a period with market value of the same asset if it had not been used during the period. The effect of obsolescence occurring during the period as a consequence of either a fall in demand for asset's services or the appearance of superior technology in the market should be included in both of these figures because they would be measured at the same point of time, that is, end of the period. So, the difference between these two figures would be clearly due to usage of the asset during the period.


Regarding Current Value depreciation, he referred to 'entry value' (replacement cost) and 'exit value' (re-sale value). He seemed to prefer the first one. He proposed that under a current value approach to income measurement, changes in 'entry value' of fixed assets should be classified by such causes as (1) change in general purchasing power of money, (2) change in specific demand for asset services, (3) change in value due to asset uses (user cost), and (4) technological obsolescence.

One important research work in the field was a doctoral thesis on "An Application of Economic Service Potential Method of Depreciation Accounting: A Theoretical Model" by Edet Robinson Iwok. The main purpose of this study was to propose a system of allocating assets' cost over the useful life of the assets according to the decline in their service potential which was considered the appropriate basis of allocation. This study maintained that an appropriate depreciation standard should achieve the objectives of (i) allocating cost for proper matching of it against revenue and (ii) evaluation of management decisions by calculating net activity receipts. Finally, the author proposed Discounted Cash Flow (DCF) technique as an appropriate approach to economic service potential method of depreciation accounting.

The article on "Depreciation — the incantation and the reality"\textsuperscript{38} by Charles W. Lamden and Dale L. Gerboth was an addition to the literature in 1972. It dealt with two surveys conducted (under the aegis of AICPA) as a part of a larger study on "Accounting for Depreciable Assets", published in 1975. The article indicated the extent to which various depreciation accounting alternatives to be used, the circumstances in which each alternative to be employed and the apparent motives for selecting an alternative.

The doctoral dissertation on "An Analysis of the Certainty Postulate of Depreciation Accounting"\textsuperscript{39} by Donald Dewey ne Martin was another significant work available in the area. The specific purposes of the dissertation were (1) to describe the deterministic parameters used in the traditional depreciation procedures, (2) to design depreciation procedures which would include 'uncertainty' often inherent in depreciation parameters, (3) to analyze the difference caused by non-inclusion of 'uncertainty' and (4) to supply information that would allow for the timely use of depreciation procedures including depreciation parameter 'uncertainty'.

Charles W. Lamden in collaboration with Robert E. Lamden


\textsuperscript{39} Donald Dewey ne Martin, \textit{An Analysis of the Certainty Postulate of Depreciation Accounting}, a Ph.D. dissertation of The University of Missouri-Columbia, 1972, Adapted from Dissertation Abstract International (Microfilmed or Xerographed), Vol.34, No.4 (October 1973), pp.1409-A - 1410-A.
attempt to analyze the various definitions of depreciation and to identify the appropriate perspectives in which the various definitions might be used.

Another work of Charles W. Lamden in collaboration with Dale L. Gerboth on "Depreciation" was the third article in a series based on two surveys, conducted (under the auspices of AICPA) as part of a study on "Accounting for Depreciable Assets". Published in winter 1973, it analysed the problems and procedures involved in the search for criteria for an allocation method in depreciation accounting.

Harold Lee Schlorff's doctoral dissertation on "The Reliability of depreciation" of the year 1973, was an advanced contribution to the literature in the field. This study was concerned with the selection of alternative methods for depreciation accounting. Various criteria such as, usefulness, relevance, objectivity, reliability etc. were examined. After examination, he found 'reliability' to be the best criterion for selecting one depreciation method over another. Out of four methods namely, (1) time adjusted, (2) proportional, (3) straight-line and (4) Sum-of-the-years digits studied in

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the thesis, he found the first one to be the most reliable and the last one the least reliable.

Ting-Wong Cheng's doctoral dissertation on "An Investigation of the Justification and Selection of Alternative Depreciation Methods" may be mentioned next. His study tried to determine whether significant differences in economic circumstances were present among firms using different depreciation methods; and whether choice of a particular depreciation method was motivated by factors other than economic circumstances. He concluded that the actual use of different depreciation methods was not based solely on economic circumstances. Based on this conclusion, the author suggested that the accounting profession should either recommend the use of only one depreciation method or set forth rules and criteria under which a particular depreciation method could be preferred over others.

In 1975, the first accounting research monograph of AICPA on "Accounting for Depreciable Assets" by Charles W. Leidem in collaboration with others was published. This monograph was an expanded version of the previous three articles, namely, (1) "Depreciation—the incantation and the reality", (2) "Perspective on Depreciation" and (3) "Depreciation". This study

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made an attempt to develop criteria for evaluation of depreciation accounting, viewing depreciation as a process of cost allocation. While ignoring other aspects of depreciation, relative to valuation, current cost measurement and capital maintenance, the study recognized that a theory of depreciation that would better meet the needs of the business community might be developed if the objectives of financial statement were modified and the state of the art of measurement in accounting were improved. The objectives of the study were (1) determining the extent to which the various acceptable alternative methods of depreciation accounting should be used, (2) identifying the circumstances in which each alternative needs to be employed, (3) ascertaining the apparent motives for selecting alternatives, (4) appraising the importance and uses of information about depreciable assets and (5) eliciting the suggestions for the improvement of the procedures used in accounting for depreciable assets. Although the scope of this monograph was limited exclusively to "depreciation as a process of cost allocation", yet it provided a basis for significant improvements for depreciation accounting within the framework of present Generally Accepted Accounting Principles.

R.N. Goyale's Ph.D. thesis on "Depreciation Policies and Practices in Indian Industries" was also a significant study.

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The study attempted to seek out the answers to certain questions: (1) What basis of depreciation was followed by companies in India? (2) Did companies in India follow the same method/methods of depreciation for their books of accounts as well as for tax purposes? If not so, which methods of depreciation were preferred by companies and the reason therefor? (3) Did companies in India follow the rates of depreciation provision as were allowed under the Income-tax Rules for their equivalent straight-line rates or did they determine their own rates of depreciation for book purpose? (4) What was the impact of price level changes on depreciation provision? Did the companies in India make any adjustments in their depreciation provision so as to take care of price-level changes? If so, what type of adjustments were made in practice in India? For the purpose of this thesis six industries were selected: (1) Cement, (2) Paper and Hardboard, (3) Chemicals and Fertilizers, (4) Cotton Textiles, (5) Engineering, metals and Alloys (excluding steel) and (6) Iron and Steel. Questionnaires were mailed to 325 companies. But ultimately, the analysis of the empirical work was based on the responses of 70 companies. In addition, data from the studies on the finances of joint stock companies published by the Reserve Bank of India were used. The conclusions of his thesis had an important bearing on corporate depreciation policy as well as the Government's tax depreciation policy.

Debabrata Majumdar's doctoral thesis on "Replacement
Accounting for Fixed Assets\textsuperscript{46} was also an important contribution. He showed in his thesis how fixed assets' replacement was financed. He emphasized that the fund retained through provision for depreciation was invested in working capital. The conclusions he arrived at from several case studies were:

1. There was a greater tendency for depreciation provision to be invested internally.
2. There was no instance where depreciation provision was found to be invested externally.
3. The internal investments tended to be in current assets.
4. Cases of investments in fixed assets were not altogether unknown. But the study was not able to trace to what extent depreciation provisions were utilized for financing the replacement of fixed assets. Yet, the study appeared to be emphatic on the point that at least a part of replacement was financed with accumulated depreciation provision.
5. There were cases where fixed assets were purchased from other sources, such as, reserve, loan etc.

G.D.Roy's research study on "Anatomy of Depreciation"\textsuperscript{47} was really a substantial addition to the literature in this area. He construed that the process of charging depreciation as expense against revenue would automatically yield an equivalent fund when profit would not be inadequate. The study

\textsuperscript{46} Debabrata Majumdar, "Replacement Accounting for Fixed Assets", an unpublished Ph.D. thesis of Calcutta University, April 1977, pp.1-146, \textit{passim}.

sought to establish the measurement aspect through algebraic and other procedures. He dealt with depreciation methods at great length. It is interesting that he also dwelt upon 'human depreciation' and spoke of current labour cost as amortization of capital expenditure on human factor and found it analogous to depreciation of fixed assets. Thus, he endeavoured to broaden the conception of depreciation as a species of a large genus.

Another work in this field was "Role of Depreciation in Internal Financing" by P.C. Basu in the year 1979. He looked at depreciation as generator of funds. He said:

Depreciation involves conversion of fixed assets into current assets, just like fusion of ice into water and is a more substantial contributor of working capital than retained earnings.... Depreciation is a non-cash expenditure. Hence, increase of depreciation expenditure implies increase of working capital.

The quote represented the theme of his article.

The article on "Standardization of Depreciation Accounting" by J. Panda and P.K. Sahu, published in 1979, endeavoured to give a brief account of different concepts of depreciation accounting from the view points of corporate financial management and Income-Tax Laws. This article also examined the recommendations of International Accounting Standards on the subject and explored the possibility of their implementation in the depreciation accounting practices in India.

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To turn to the representative researches in the beginning of 'eighties, "The Methods of Depreciation"\textsuperscript{50} by G.D.Roy and Arun Kumar Basu should be mentioned. The authors discussed different methods of charging depreciation at great length and illustrated these different profiles and implications for management. All the methods were explained algebraically too.

The article on "Depreciation: Theory and Uses"\textsuperscript{51} published in 1981, was also an important addition to the literature. K. Mukerji and S. Sengupta, the authors of the article interpreted the concepts of depreciation in such terms as, (1) diminution of value, (2) allocation of cost, (3) expiration of cost, (4) expiration of capital outlay and (5) diminution of asset's life. According to them, there was no difference between the second, third and fourth concepts of depreciation. So far as the first concept is concerned, this according to them, did not find much favour in the accounting profession. The reason they felt might be that 'value' was a controversial term and its computation was based upon estimates and appraisals and as such, very subjective. As to the fifth concept, their belief was that in this case, cost proportional to the expired life of the asset should be charged against revenue and, therefore, they thought that the concepts of 'allocation' and of 'expiration of life' basically converge. They did not believe that depreciation...


charged against revenue would ensure the availability of funds. They argued that there would not be any fund in the business "if a separate fund and its counterpart investment accounts are not grafted into the system". Finally, they discussed (1) the factors determining the amount of depreciation, (2) the conventional methods of charging depreciation, such as, straight-line, reducing-balance etc. and (3) some formulae based on integral calculus for calculation of depreciation.

In summing up this lengthy survey, a few observations may be made:

(1) The focus was mainly on the last three decades, particularly in terms of published articles in professional journals and advanced researches in academic institutions.

(2) Different articles and/or researches were very specialised, interpretative of a particular aspect or practice of depreciation in business.

(3) In the late 'sixties and early 'seventies, the researches brought up the controversial issue of how, when, and to what extent, making provision for depreciation would also ensure source of funds for replacement of plant and machinery. Due to rising inflation and technological impact, it was but natural that the problem of funds for replacement of an economy's capital should loom large. Even in advanced countries, the problem of capital formation has become a matter of national concern. This study will try to provide some input in this area,
particularly by drawing on the experience of industries in Bangladesh.

(4) In the late 'sixties and early 'seventies, the accounting world became very concerned about inflation, inflation accounting and for that matter, depreciation accounting. In early 'eighties, the concern increased further. Studies and researches already started increasing in these areas.

(5) It will be evident from the review that the research studies prior to 'fifties, were hardly dealt with. The justification is four-fold. One, in the earlier chapter, in dealing with the nature and concept of depreciation, some of the available materials of the period were dwelt upon. Two, literature of this period was traditional in scope and probably became an integral part of any standard text book in Accounting. Three, literature of this period was not that much available to the researcher. Four, while undertaking the review, the researcher was particularly concerned in examining later developments. Hence, the weightage of these later years in the foregoing review.

(6) This review would have been too lengthy if it were to cover many more articles and research studies. The choice of materials reviewed was more or less of subjective judgement of the researcher. However, to add a few more, the following references deserve to be mentioned:

(a) L.H. Klaassen et.al., "The Theory of Depreciation and


56 Russell M.


(7) It is interesting that though much had been written on depreciation accounting in the articles and researches reviewed in the foregoing, there was hardly any reference to 'interest' factor for time value of money. This is obviously important for the practical businessmen in view of prevailing high rate of interest on money in every economy. Only one/two articles and a doctoral dissertation were found to grapple with

\textsuperscript{59} Susanta Kumar Basu, "Depreciation Issues and Controversies and Its Role in Indian Industry", an unpublished dissertation of "Fellow in Management" Degree, Indian Institute of Management, Calcutta, 1975, pp. 1-132.\textsuperscript{60}

\textsuperscript{60} V.V. Desai, "Depreciation Policy", The Management Accountant, The Institute of Cost and Works Accountants of India, Calcutta (November 1975), pp. 725 ff.\textsuperscript{61}

\textsuperscript{61} S.L. Meyers, "A Proposal for Coping with the Allocation Problem", Journal of Accountancy (April 1976), pp. 52-56.\textsuperscript{62}

\textsuperscript{62} K.V. Peasnell, "The CCA Depreciation Problem — An Analysis and Proposal", Abacus (December 1977), pp. 123-140.\textsuperscript{63}

\textsuperscript{63} E.V. Mani, "Depreciation: A Critical Outlook at the Concepts", The Management Accountant, The Institute of Cost and Works Accountants of India, Calcutta (July 1979), pp. 672 ff.\textsuperscript{64}

interest cost of investment in plant and machinery.

(8) Since the mid-seventies the researches have been concerned with the issue of depreciation accounting per se, especially in the context of developing economies. In the section on Bangladesh, this new concern will be evident.

2.3: Literature in Bangladesh

M. Habibullah's article on "Depreciation —An Instrument of Economic Growth", was published in June 1968 in the erstwhile East Pakistan (now Bangladesh). The author stated that a number of countries were using accelerated depreciation as an instrument of (1) encouraging purchase of new assets as well as replacement of obsolete equipment and (2) compensating business firms for higher replacement costs due to inflation. He added that accelerated depreciation would permit rapid write-offs, reduce taxable income and current income-tax liability and thus, would act as a tax-free fund to a financial administrator. All these would permit rapid economic growth, expansion and modernization in a developing country. The author considered the need for such incentives to mobilise domestic resources and facilitating a higher rate of capital formation.

Another article, by M.A. Mondal on "The Problem of

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Accelerated Depreciation in the Measurement of Profit was published in 1968. He wrote on depreciation to highlight the problem of profit measurement. He said:

the tax incentive in the form of accelerated depreciation is probably the greatest single contributory factor in explaining the difference between accounting and taxable profits and, therefore, creates the major controversy in the measurement of what constitutes distributable profit.

The author thought that accelerated depreciation would simply cause shifting of tax-burden from earlier periods to subsequent periods, that is, only a "tax deferral" (also known as "tax allocation") as recognized by The Institute of Chartered Accountants in England and Wales. There was a great deal of controversy as to whether a liability would exist for deferred taxes. He felt that there would be no tax saving but only deferment of tax charge. Although he did not consider deferred tax a liability, at the minimum, he regarded it as a contingent liability which should be treated as a deferred liability.

In 1977-78, Ranajit Kumar Dey and Kazi Ahmed Nabi made a study on "Depreciation Practices in a few selected Industries", This study was limited to eleven industrial units (belonging to


67 Tax deferral means the creation of a tax liability to the extent of reduction of current taxes caused by higher depreciation deduction for tax purposes in the earlier periods of an asset's life.

nationalized sector) of Bangladesh. The industries included in the study were: (1) Paper, (2) Rayon and chemicals, (3) tobacco, (4) textiles, (5) resin complex, (6) Jute, (7) steel and (8) oil refinery. The data were collected by interviewing the executives on the basis of a questionnaire. Their findings were: (1) about 35 per cent of the studied units maintained incomplete records of assets; (2) about 90 per cent of them used straight-line and reducing-balance methods; only one unit used depreciation-fund method but it did not invest the depreciation amount outside the business; (3) the taxation policy of Bangladesh played a dominant role in fixing depreciation rates for different assets; (4) good forecast of effective life of fixed assets was seldom done, although some of the enterprises consulted the values and engineers while estimating the span of life of fixed assets; (5) the effect of changing prices was not given any consideration in accounts, though since 1975 partial consideration has been given to the factor, especially on the basis of devaluation of currency in that year; a few concerns also consistently followed revaluation method for loose tools; (6) the scrap value of the assets was determined by putting them up to auction, and/or on the evaluation of engineers.

M.A. Mondal's research study of 1979 on "Depreciation Policy in Jute Industry (Khulna Region)" was an important addition to the literature in the field. His study was concerned

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69M.A. Mondal, "Depreciation Policy in Jute Industry (Khulna Region)", an unpublished research study, sponsored by The University Grants Commission of Bangladesh, Dacca (July 1979), pp.1-34, passim.
with the depreciation policy of jute mills in the Khulna region of Bangladesh. Sixteen jute mills, all in the public sector, were studied. The findings of the study were briefly as follows:

(1) In the jute industry, plant and machinery constituted the major item of fixed assets; in older jute mills, the originally installed plant and machinery had already been fully written off but were still in use, but there was no accumulated fund in the enterprises to replace them.

(2) Prior to nationalisation of jute industry in 1972, different mills used to use different depreciation rates. But after nationalisation, the Bangladesh Jute Mills Corporation presiding over all the public sector jute mills introduced uniform depreciation rates which were lower than previous rates. The individual jute mills did not know how the rates were determined.

(3) Depreciation charge varied widely from one mill to another. It was lower in older mills in comparison with new ones. The extent of devaluation adjustment which varied from mill to mill was another factor causing variation in depreciation charge from one mill to another.

(4) All the studied mills were losing concerns and financial benefits of accumulated depreciation were not available to them; and some of them had already applied for Annual Development Plan (ADP) funds.
(5) All the units used fixed instalment method of depreciation for all types of fixed assets.

(6) The mills under study did not charge depreciation in the books of accounts in 1973-74 under the instructions of Bangladesh Jute Mills Corporation (BJMC).

(7) No studied mill invested the depreciation amount outside the business.

(8) There was acute shortage of working capital in the mills (rather unusual) in spite of their large accumulated depreciation.

The article by Md. Shahid and A.Z.M. Anisur Rahman on "Current Replacement Cost Depreciation — An Appraisal" was another contribution in the realm of depreciation accounting in Bangladesh. The authors brought into focus how the traditional approach of charging depreciation on the basis of historical cost presented fallacious income statements showing inflated profit and thus, it failed to preserve the real capital as represented by its operating capacity. They suggested charging of depreciation on replacement cost basis to save the industries of Bangladesh "from the impending scarcity of capital". Straight-line and reducing-balance methods were mostly used, not being adequate for the situation. The study further stated that

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Philips (Bangladesh) Ltd. was the only concern which charged depreciation on the basis of replacement cost. Depreciation rates used for financial reporting and income-tax purposes were different.

Another latest article, published in October-December 1981, on "Revaluation of Fixed Assets" by Asheq Razaur Rahman was interesting —dealing with the problem of fixed assets revaluation vis-a-vis inflation. He observed:

Since most of the fixed assets of the sector corporations have been procured before 1971, their book values are considerably lesser than their replacement value; in some cases, as low as one-tenth of the replacement value. This means that the depreciation for such assets is being stated at one-tenth of what it actually should have been stated as most corporations use the straight-line method or the declining-balance method.

The author emphasized that apart from other problems and anomalies, the erosion of capital because of no inflationary effect given to while charging depreciation, was one of the major factors causing a continuous shortage of funds in public sector corporations of Bangladesh. He suggested the accountants to give serious consideration to the sharply increasing replacement value of fixed assets for proper reporting of operations and for assessing the growth postures of the industrial concerns.

To sum up: Bangladesh is an infant country, and as such no comprehensive study of the nature, scope and philosophy of depreciation accounting — theoretical or empirical — has been attempted so far. However, caught in the malestrom of inflation and pangs of economic growth, the problem is assuming vital proportion. Against this challenging background, what is needed is a comprehensive and many-sided approach to the problems of depreciation accounting in Bangladesh that may draw on the theory to provide a logical focus for policy-makers in this developing nation.