Archives of Business Research – Vol. 9, No. 3
Publication Date: March, 03, 2021
DOI: 10.14738/abr.93.9841.
Kwadade-Cudjoe, F. (2021). It is Essentially Acknowledged that Discounted Cash Flows Should Always be Calculated by Management When Making Long-Term Investment Decisions. Why is this so? Archives of Business Research, 9(3). 84-98.

It is Essentially Acknowledged that Discounted Cash Flows Should Always be Calculated by Management When Making Long-Term Investment Decisions. Why is this so?

Dr. Francis Kwadade-Cudjoe
FBCS, FIMIS, PhD, MBA, BSc (Hons)
Senior Lecturer, Knutsford University College and
Adjunct Lecturer, GIMPA Business School, Accra, Ghana

ABSTRACT

Investment is sacrifices made now / future in anticipation of upcoming benefits. Long-term investment is the act of using money to acquire items, normally fixed assets, and is a pre-requisite for any modern organization to have them. Organizations are looking for capital to expand their frontiers to capture cheap labour for manufacturing their products, i.e. globalization. The struggle for survival of organizations, therefore hinge precariously on the ability of the enterprise to successfully invest in long-term debts, and managing the resource judiciously to thrive. However, banks and venture capitalists are not ready to contract loans to organizations not competitive. Moreover, the surge of covid-19 pandemic has made the situation dire, as there is no particular haven to fall on. In view of this, discounting the cash flows generated from business activities is perfectly right to accurately account for success of organizations. Non-discounting cash flows generated from business activities is not rigorous to properly account for success of organizations. In addition, the competitive strategy adopted by the organization is vital to enable management achieve its goals and objectives, and subsequently attain competitive advantage. Furthermore, it is paramount for the organization's competitive advantage so achieved to be sustainable.

Key Words: Management, investment, long-term investment, discounted cash flow and sustainable competitive advantage.

INTRODUCTION

Hornby (2001) defines investment as the process of acquiring an asset, which is purchased with the expectation that it would create income, or increase in value in the future. In addition, University of Leicester (2002) defines investment as any course of action that involves sacrifices now or in the near future in anticipation of future benefits. Furthermore, investments are fixed assets if the company intends to hold on to them for a long time as distinct from current assets, which are only held for a short time, normally within one (1)

year, before being sold. Long-term investment, therefore is the act of using money to acquire items, such as plant, machinery, vehicle and building (tangible investments), and shares, R&D and training schemes (intangible) in anticipation of future benefits (Bureau of Economic Analysis, 2018; University of Leicester, 2001).

Long-term investment decisions may be categorized into two (2) groups. These are:

- replacement investment – undertaken to make good the wear and tear due to deterioration of equipment use. This is different, but closely related to depreciation, an annual provision for the replacement of the property, and
- new investment in fixed assets – this has two (2) dimensions. These are:
    - a firm may want to expand sales of existing products by investing in additional capacity equipment to support the planned sales increase, and
    - new equipment / technology may be undertaken to accompany a major strategic venture to develop a new product to generate increase in sales (Black, Hashimzade & Myles, 2009; University of Leicester, 2002).

METHODS FOR EVALUATING LONG-TERM INVESTMENT PROJECTS

There are two (2) methods for evaluating projects financed by long-term investments. These are:

- discounting, and
- non-discounting.

Discounting

It is the process of determining the present value of a payment or a stream of payments that is to be received in the future. Furthermore, it is the application of the exchange rate between money received now and money to be received in the future (Chen, 2020b; University of Leicester, 2002).

Discounted Cash Flow (DCF) is a valuation method used to estimate the value of an investment based on its future cash flows. DCF analysis attempts to figure out the value of an investment today, based on projections of how much money would be generated in the future. It is therefore, the total present values of money to be received from a project in the future. It reflects one of the most fundamental concepts in finance – the time value of money (Chen, 2020c; University of Leicester, 2002). The two (2) applications normally used are:

- net present value, and
- internal rate of return.

Net Present Value

Net Present Value (NPV) – all future cash flows discounted at the rate reflecting the return required by the investor, added together to yield the gross present value (GPV), less the investment expenditure required to undertake the project (Kenton, 2020b).

Internal Rate of Return

Internal Rate of Return (IRR) – the rate of discount at which the NPV equals zero. The IRR is the highest rate of discount at which the project is viable, thereby specifying the maximum cost of finance the firm can afford before the project ceases to be viable (Chen, 2020b; Chen, 2020c; Kenton, 2020b; University of Leicester, 2002).

In addition to the above-mentioned is the third application, ***Profitability Index (PI)***, which could also be used. The *PI* is the sum of discounted cash flows divided by the initial investment. The ratio should be greater than 1 for the project to be viable (University of Leicester, 2002).

Non-discounting

Non-discounting on the other hand, does not discount cash flows, and therefore, is seldom used for evaluating projects. It includes applications such as:

- payback,
- average rate of return (ARR),
- net asset value (NAV), and
- price-earning ratio (PER).

Payback

The cash flows or money generated from investment without considering the time value of money (University of Leicester, 2002).

Average Rate of Return (ARR)

The average annual amount of cash flow generated over the life of an investment. It is a formula used to make capital budgeting decisions, and reflects the percentage rate of return expected on an investment / asset, compared to the initial investment's cost. The ARR formula divides an asset's average revenue by the company's initial investment to derive the ratio or return that one may expect over the lifetime of the asset or related project. The average rate of return is the same as the accounting rate of return. Unfortunately, the ARR does not consider the time value of money / cash flows, which can be an integral part of maintaining a business (Murphy, 2020; University of Leicester, 2002; Corporate Finance Institute, n.d.).

Net Asset Value (NAV)

The total value of an entity's assets minus the total value of its liabilities. It represents the per share / unit price of the fund on a specific date or time. It is commonly used to identify potential investment opportunities within mutual funds, exchange-traded-fund or closed-end fund (Chen, 2020a).

Price-Earning Ratio (PER)

It measures the current share price relative to its per-share earnings / earning per-share (EPS). It can be used to compare a company against its own historical record or to compare aggregate markets against one another and over time. It is sometimes known as the price multiple or the earnings multiple (Hayes, 2020).

URL: http://dx.doi.org/10.14738/abr.93.9841.

The last two (2) applications are mostly used for appraising / valuing unquoted companies. Furthermore, there may be the need to compute the required return on investment using these other methods:

- dividend valuation model (DVM),
- capital asset pricing model (CAPM), and
- weighted average cost of capital (WACC).

Dividend Valuation Model (DVM)

The basic premise behind the dividend valuation model is that the value of a stock today is the present value of all future dividends. It can be applied whether or not the company currently pays dividend. This can be related to fundamental factors that drive the value of a company's equity, including the return on equity and the dividend payout (Drake, n.d.).

Capital Asset Pricing Model (CAPM)

No matter how much you diversify your investments, there would always exist some level of risk; so investors normally seek a rate of return that would compensate for the anticipated risk. CAPM describes the relationship between systematic risk and expected return for assets of particular stocks. It is widely used in finance for pricing risky securities and generating expected returns for assets given the risk of those assets and cost of capital (Kenton, 2020a; McClure, 2020).

Weighted Average Cost of Capital (WACC)

It is the average after-tax cost of a company's various capital sources, including common stock, preferred stock, bonds and any other long-term debt. In reality, it is the average rate a company expects to pay to finance its assets. Organizations normally run their business from capital raised through various sources, including listing their shares on the stock exchange (equity), issuing interest-paying bonds or taking commercial loans (debt) – (Shobhit, 2019).

It should be noted that these computations are affected by the gearing (debt-equity ratio), risks and the environment of the firm.

SOURCES OF LONG TERM INVESTMENT AND THEIR IMPLICATIONS

There are many sources for long-term finance of investment. These include, among others:

- term loans / long term debts,
- debentures,
- equity,
- internally generated fund, and
- retained earnings.

Term Loans / Long Term Debts

These are long term borrowing, generally from banks or financial institutions for more than one year. They are mostly secured loans given by banks against strong collaterals provided by the company in the form of, example, land, building and machinery (Wallstreetmojo.com, 2020; University of Leicester, 2002).

Debentures

It is a type of bond or other debt instrument that is unsecured by collateral. It is a loan from the public by issuing debenture certificates under the common seal of the company. It can be engaged via public or private placement, and usually has a term greater than ten (10) years. Since debentures have no collateral backing, they must rely on the creditworthiness and reputation of the issuer for support. Both organizations and governments issue debentures to raise capital (Wallstreetmojo.com, 2020; Chen, 2020d).

Equity

Interest-free perpetual capital / money of the company raised from public / private via IPO, where shares of a company are purchased in the stock market (Wallstreetmojo.com, 2020).

Internally Generated Fund

This is a fund exclusively gathered from / within an entity, retention or reserves (University of Leicester, 2002).

Retained Earnings

These are profits that are being kept aside by the company over a period of time to meet the future capital needs of the company (Wallstreetmojo.com, 2020; University of Leicester, 2002).

Choosing the appropriate method of long-term finance has a strategic dimension and implications on the firm. If it is done wrongly, the company's future strategic options become limited, but when done rightly, the company's sustainable competitive advantage becomes enhanced (University of Leicester, 2002).

Deutsche Telecom and British Telecom (BT) are particular examples of organizations that chose large-scale borrowing to finance their strategic investments. They adopted this strategy, possibly because debt financing is less risky than equity finance due to less interest payment (fixed-rate), and secondly interest, as a business expense is paid before dividend. However, for a collapsing firm, debt financing becomes more risky, as the debt would have to be paid, but not for equity financing, where shareholders lose their shares (University of Leicester, 2002).

WHAT IS STRATEGIC FINANCIAL MANAGEMENT?

According to Kenton (2019), strategic financial management is the management of the financial component of an organization to attain its goals and objectives, and subsequently maximize shareholder value over time. Kenton (2019) adds that it is about creating profit for the business and ensuring an acceptable return on investment (ROI).

Furthermore, University of Leicester (2002) postulates that managers of organizations face the problem of achieving goals using the limited resources available. Organizations, therefore are engaged in strategic deploying of resources to optimal effect. As cash is the key resource in financial management, managers would like to utilize cash to achieve maximum benefits for the owners of the company.

URL: http://dx.doi.org/10.14738/abr.93.9841.

The three (3) key strategic decision-areas interesting to financial managers are:

- investment decision – what assets should the organization invest money in?
- financial decision – how best can the organization pay for what it has invested in? and
- dividend decision – how best can managers return value to owners after successfully managing the financial resource (University of Leicester, 2002).

Financial managers are, therefore responsible for the firm's operations, advising on the viable long-term investment options, which create value and drive the firm's demand for finance. They also search the financial markets for the supply of finance at the optimum cost and right time for the investment, and determine the best approach to effect payment for the investment (University of Leicester, 2002).

THE IMPORTANCE OF STRATEGIC FINANCIAL MANAGEMENT TO THE ORGANIZATION

Strategic investment decision by financial management drives the survival of every organization. Among other reasons, the strategic investment decision:

- involves substantial long-term commitments of capital, and
- shapes the organization's long-term strategic options (University of Leicester, 2002).

The activities of strategic financial management, therefore determine the competitive strategy and advantage of the organization, as the firm would have to strategize for survival through its long-term investment portfolio, using any of the generic strategies, as postulated by Michael Porter. These strategies are:

- cost leadership;
- differentiation;
- focus / niche; and
- cost leadership + differentiation (De Wit & Meyer, 2004).

Cost Leadership strategy

Cost leadership strategy is where a firm has acceptable / quality products, but below-average costs and commanding above-average prices to enable it earn above-average profits. The firm has a broad scope and serves many industry segments, and likely to operate in related industries, as the coverage is often important to its cost advantage. Simply put, it is where a firm produces acceptable products, but at a less production cost than competitors (De Wit & Meyer, 2004).

The sources are varied, and may include the pursuit of economies of scale, proprietary technology and preferential access to raw materials. This strategy makes the firm the lowest-cost producer within the industry. This can be possible if it would be an above-average performer in its industry, have quality and acceptable products relative to its competitors, and can command prices at or near the industry average (De Wit & Meyer, 2004).

Furthermore, in order to keep costs below those of rivals, management have to include features and services that buyers consider essential, example, a product offering that is accepted by buyers and pursuing cost reduction in a manner that does not destroy the attractiveness of the organization's product offerings (Thompson & Strickland, 2001).

Differentiation Strategy

Differentiation strategy is where a firm seeks to be unique in its industry along some dimensions widely valued by buyers, by selecting one or more attributes that many buyers perceive as important, and uniquely positioning itself to meet those needs. It can simply be referred to as, where a firm produces quality products that are unique, and with characteristics of the customers in mind.

To achieve differentiation, the uniqueness must be of value to the customer and be difficult to copy. Differentiation can be selected from the product itself, the delivery system, the marketing approach, creation of a strong brand or a broad range of other factors (De Wit & Meyer, 2004; Thompson & Strickland, 2001).

Differentiation is an attractive competitive approach whenever buyers' needs and preferences are too diverse to be fully satisfied by a standardized product or by sellers with identical capabilities. A successful differentiated firm is one which studies buyers' needs and behaviour cautiously to learn what buyers contemplate to be important, what they think has value, and what they are willing to pay for. Then the firm goes ahead to integrate these buyer-desired attributes into its product / service offering, which will set it visibly and distinctively apart from competitors (Thompson & Strickland, 2001).

An organization can achieve and sustain differentiation by being above-average performer in its industry, and if its price premium surpasses the extra costs incurred in being unique. It is therefore, necessary to always seek ways of differentiating that lead to a price premium greater than the cost of differentiating. It is imperative to note that an organization must truly or perceived to be unique at some activity within the production and delivery value chain, in order to command a premium price (De Wit & Meyer, 2004).

Niche / Focus Strategy

Niche / Focus strategy is where a firm chooses to concentrate its resources / strategy on a narrow, limited range or defined area of the industry for either a cost leadership or differentiation, dependent upon the desires of customers within that market. The niche / focuser does not possess an overall competitive strategy of the industry, as its products are targeted for only a limited range of segments. Cost focus would exploit the differences in cost behaviour in some segments, while differentiation focus exploits the special needs of buyers in certain segments (De Wit & Meyer, 2004; Thompson & Strickland, 2001).

The niche / focus strategy has two (2) variants; cost focus or differentiation focus. In cost focus, a firm seeks a cost advantage in its target segment, while in differentiation focus, the firm seeks differentiation in its target segment. Both variants of the niche / focus strategy rest on differences between a focuser's target segment and other segments in the industry. The target segment must either have buyers with unusual needs or there should be a

URL: http://dx.doi.org/10.14738/abr.93.9841.

production and delivery system different from that of other industry segment that best serves the target segment (De Wit & Meyer, 2004; Daft, 2003; Thompson & Strickland, 2001).

Cost leadership + Differentiation

This combines the strategies of Cost Leadership (a firm has acceptable / quality products, but below-average costs and commanding above-average prices to enable it earn above-average profits); and Differentiation (a firm seeks to be unique in its industry along some dimensions widely valued by buyers, by selecting one or more attributes that many buyers perceive as important, and uniquely positioning itself to meet those needs); to arrive at the strategy.

An organization can only achieve competitive advantage when it adopts a generic strategy in the industry or market it operates in, and is able to sell more than competitors. An organization attains strategic advantage when its generic strategy has achieved competitive advantage.

Competitive advantage is therefore, defined as a search for a favourable competitive position in an industry that aims to establish a profitable and sustainable position against the environmental forces that intensify industry competition. This implies that strategically, the organization is looking for a better position to be competitively superior to competitors, and attain strategic advantage (De Wit & Meyer, 2004; Daft, 2003).

However, sustained competitive advantage, which would enable the organization to be sustainable and profitable in addition to having competitive advantage, is the result of an enduring value differential between the products / services from the organization and those of its competitors in the minds of consumers (Daft, 2003).

Achieving sustainable competitive advantage therefore depends on:

- the ability of the organization to protect its innovation from copying by rivals through legal restrictions, e.g. patents;
- protecting products / services from being copied, e.g. through copyright and trademark;
- branding the organization, e.g. through effective brand names;
- having a wider access to the market, e.g. globalization; and
- sustaining the competitive advantage so achieved.

The investment decisions of the company thus become the most important of all decisions an organization makes. The dynamics of the macro-environmental forces / demographics - political, environmental, socio-cultural, technological, economical and legal elements - need to be grappled, in making these decisions (Daft, 2003; Kotler, 2003). Furthermore, the strategic financial decisions of raising finance for the investment, and accounting appropriately the generated-funds to know the benefits accruing to the organization, are vital for the sustainable competitive advantage of the organization.

Consequently, financial managers need to calculate the true value of returns (flows) expected from the investment they undertake to make sure the project is viable before management decides or otherwise to invest in the project. Discounted Cash Flow (DCF), which calculates the true value of money, becomes handy, and as such the best method to use for the calculation. This makes the calculation of the DCF very essential when an organization wants to make a long-term investment. In addition, the adoption of a good competitive strategy to attain sustained competitive advantage by the organization is very vital for the management of the organization.

PROBLEMS OF NON-DISCOUNTING METHOD

Two (2) applications of the non-discounting methods would be used to highlight the problems associated with this method. These are:

- payback, and
- average rate of return (ARR)

Payback

This involves calculating how quickly the cash to be generated by the proposed project would recover the initial outlay. If the time-recovery period is within or equal to a stipulated time period, the project is acceptable. It is simple to use and understandable, and useful for quick screening of projects.

However, payback is disadvantageous to use, as it:

- does not discount cash flows over the payback period,
- uses arbitrary-chosen payback period (unrelated to any required rate of return),
- neglects the cost of finance, leading to rejecting worthwhile and rather accepting more risky projects, and
- does not measure profitability (liquidity) – the time taken to recover capital (University of Leicester, 2002).

Average Rate of Return (ARR)

ARR is the ratio of expected accounting profits generated by the project and its capital requirements, multiplied by 100 to give a percentage value. Accounting profit is the cash flow figure less the depreciation charge. Mathematically, it is represented as:
Accounting Profit = Cash Flow - Depreciation
Hence ARR = (average accounting profit / capital employed) x 100.

The ARR is based on the Return on Investment (ROI) concept and percentage terms which are familiar to most business people, and the impact of the project on the P&L and Balance Sheet can be projected, leading to the incorporation of the ARR computations into the budgeting process.

Nevertheless, the ARR is disadvantageous to use, because it:

- uses accounting profits (lower than cash-flows), making it likely to understate project profitability,
- ignores the timing of returns,

URL: http://dx.doi.org/10.14738/abr.93.9841.

- is imprecise, as the terms 'profit' and 'capital employed' can be defined in many ways, leading to manipulative accounting, and
- uses often arbitrary selected target return (based on past performance), bearing little relationship to the cost of capital (Murphy, 2020; University of Leicester, 2002; Corporate Finance Institute, n.d.).

WHY THE DISCOUNTING CASH FLOW METHOD SHOULD BE USED WHEN MAKING LONG-TERM INVESTMENT

The problems listed at 6.1 and 6.2 above apply to all the other non-discounting methods, but the DCF method eliminates them, making the DCF popular for evaluating long-term investment decisions. The DCF applications are the;

- Net Present Value (NPV),
- Internal Rare Return (IRR), and
- Profitability Index (PI).

See 2.1 under Discounting, for the description of the above three (3) applications.

These applications remedy all the problems associated with the non-discounting method, and they give the benefits / advantages of:

- focusing on cash flows and considering all the cash flows over the expected lifetime of the project, which are not easily distorted by accounting manipulation,
- using the investor's required return as the basis for assessing the value of those cash flows, and
- most importantly, recognizing that £1 received today is worth more than the same £1 received next year – allowing time value of money (Chen, 2020b; Chen, 2020c; Kenton, 2020b; University of Leicester, 2002).

Consequently, calculating the DCF is essential when a company is making a long-term investment.

COMPUTATION SHOWING THE IMPORTANCE OF DCF WHEN MAKING LONG-TERM INVESTMENT

Data from Chocolate Manufacturing Company Ltd (CMCL), an arbitrary company in Ghana, would be used to compute the Payback and ARR – non-discounting, and NPV and IRR – discounting, of the company's investment.

From the 2019 Annual Accounts of the CMCL, a long-term loan of GHS114,436,000.00 was borrowed from the Bank of Ghana for the expansion of the production capacity from 45,000 metric-tonnes to 80,000 metric tonnes. This therefore, implies a debt of GHS114.44m (approximate).

Assumptions on Notes of the Accounts indicate that the:

i. debt would be repayable over the next five (5) years in equal monthly instalments after one-year moratorium.

ii. annual depreciation on the Tangible Fixed Assets of CMCL for the year = GHS12,130,000.00.
iii. end-year cash flows would be the same (implying annuity) of GHS40.00m, with a 15% rate of return.

The tables and the calculations below illustrate the repayment arrangement.

Table 1 – Annual Cash Flows of CMCL

Year	Cash Flow (GHSm)
0	114.44
1	40.00
2	40.00
3	40.00
4	40.00
5	40.00

Non-Discounting methods

The methods of Payback and Average Rate of Return would be used for illustrating the non-discounting approach.

Payback

Payback is when the cumulative amount of the cash flows equals or more than the investment GHS114.44m. From the above table, payback is given from the calculation:

Formula for Payback = $CF_1 + CF_2 + CF_3$ ……..

Payback = 40.00 + 40.00 + 40.00, i.e. GHS120.00m. Since GHS120.00m is more than GHS114.44m, therefore **Payback = 3 years**

This implies that for the data from CMCL and the assumptions given, the investment of GHS114.44m, would **be paid-back by the 3rd year.**

Average Rate of Return (ARR)

ARR is the ratio of expected accounting profits generated by the project and its capital requirements, multiplied by 100 to give a percentage value. Accounting profit is the cash flow figure less the depreciation charge.

Formula for ARR = (Accounting profits/Capital employed) x 100

Accounting profits = Cash flow – Depreciation

Average cash flow = GHS40.00m.

From the assumptions on the Accounts, the annual depreciation on the Tangible Fixed Assets of CMCL for the year = GHS12,130,000.00, which approximates to GHS12.13m.

Therefore, accounting profits = 40.00 – 12.13 = GHS27.87m, giving the ARR as:

ARR = (27.87/114.44) x 100

ARR = 24.35%

This implies that for the data from CMCL and the assumptions given, the investment of GHS114.44m would require **average rate of return of 24.35%.**

URL: http://dx.doi.org/10.14738/abr.93.9841.

Discounting methods

The methods of Net Present Value and Internal Rate of Return would be used for illustrating the discounting approach.

Net Present Value (NPV)

Net Present Value (NPV) is all future cash flows discounted at the rate reflecting the return required by the investor, added together to yield the gross present value (GPV), less the investment expenditure required to undertake the project.

The formula for NPV is giving as:

NPV = Sum[$CF_t/(1+r)^t$] – I_o where:

CF_t denotes each cash flow in each year t
r is the required rate of return, and
I_o is the initial investment expenditure.

Present value tables exist for the present value of a payment of £1 received in t years at r% (University of Leicester, 2002).

Table 2 – Present Value of a payment received in 5 years @ 15%

Year	Cash Flow (GHSb)	Discount Factor (@ 15%)	Present Value (GHSm)
0	114.44	1.00	(114.44)
1	40.00	0.87	34.80
2	40.00	0.76	30.40
3	40.00	0.66	26.40
4	40.00	0.57	22.80
5	40.00	0.50	20.00
			Total: 134.40

NPV = 134.40 – 114.44
NPV = 19.96

From the above table, NPV is given as GHS19.96m

This implies that for the data from CMCL and the assumptions given, as the NPV is positive (GHS19.96b), the return on the project exceeds the investment (cost of finance) of GHS114.44m, making the project worthwhile to undertake.

Internal Rate of Return (IRR)

Internal Rate of Return (IRR) is the rate of discount at which the NPV equals zero. IRR can be found by linear interpolation, trial and error, or by using the IRR function on a spreadsheet package – MS Excel (University of Leicester, 2002).

From the calculation for the NPV, the following facts are known:

- the point where NPV is zero, and
- the IRR > 15

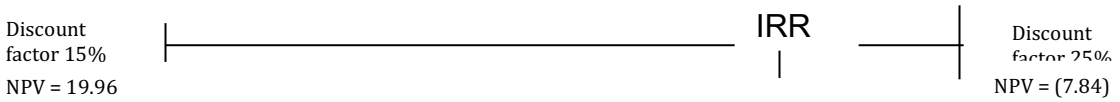
The IRR would be found using the linear interpolation approach. Let us calculate the NPV using the discount factor of 25%.

Table 3 - Present Value of a payment received in 5 years @ 25%

Year	Cash Flow (GHC b)	Discount Factor (@ 25%)	Present Value (GHSm)
0	114.44	1.00	(114.44)
1	40.00	0.80	32.00
2	40.00	0.64	25.60
3	40.00	0.51	20.40
4	40.00	0.41	16.40
5	40.00	0.33	13.20
		Total:	**107.60**

NPV = 107.60 –114.44 = (7.84)

The diagram below is used to illustrate the linear interpolation approach, using the values calculated for NPV @ discounts 15% and 25%.



IRR can therefore be given as:

IRR = 15 + [19.96/{19.96 – (7.84)}] x (25 – 15)
= 15 + {19.96/(19.96+7.84)} x 10
= 15 + (19.96/27.80) x 10
= 15 + (0.7180) x 10
= 15 + 7.2
= **22.20**

IRR is therefore 22.20%

This implies that for the data from CMCL and the assumptions given, the investment for the project of expansion of the production capacity from 45,000 metric tonnes to 80,000 metric tonnes would be accepted, as the **IRR is greater than cost of capital (22.2% > 15%).**

The results show that the payback and ARR are very simple to calculate, and do not involve the time value of money concept. However, the calculation for the NPV and IRR involve rigorous calculations, using the time value of money concept to arrive at the results. The DCF method, therefore appropriately evaluates the project for the sustainable competitive advantage of the firm, making it essential to calculate when making long-term investment.

CONCLUSIONS

Firms making long-term investment should always discount the expected cash flows to enable them know the true value of money generated.

Though the DCF methods should always be applied to cash flows generated from long-term projects, the IRR method of the DCF is not problem-free, as there are problems with mutually exclusive projects (NPV and IRR give different answers) and may generate

URL: http://dx.doi.org/10.14738/abr.93.9841.

multiple solutions (when there are multiple sign changes in the cash flow profile). IRR is useful when it is difficult to identify the correct discount rate to use (University of Leicester, 2002).

NPV is the best available method because of its clear signal regarding wealth creation. However, the IRR remains popular with business people who often prefer to work in percentage terms (University of Leicester, 2002).

Practically, firms always use a combination of methods – payback is simple to use to screen / select projects and, NPV and IRR are used for a more rigorous appraisal. Though ARR is the least popular appraisal / evaluation method, but because of its effect on accounting measures of performance (P&L Account and Balance Sheet thereby contributing to the planning stage of budgeting for the firm), many firms give it a consideration and occasionally apply the method when evaluating projects (University of Leicester, 2002).

Reference:

Black, J., Hashimzade, N., & Myles, G. (2009). A dictionary of economics (3rd ed.). Oxford, England: Oxford University Press

Bureau of Economic Analysis (2018). Investment in Fixed Assets. Retrieved from https://www.bea.gov/learning-centre/w.....

Chen, J. (2020a). Net Asset Value – NAV. Retrieved from https://www.investopedia.com/terms/n/nav.asp

Chen, J. (2020b). Discounting. Retrieved from https://www.investopedia.com/term.

Chen, J. (2020c). Discounted Cash Flow – (DCF). Retrieved from https://www.investopedia.com/terms/d/dcf.asp

Chen, J. (2020d). What is Debentures? Retrieved from https://www.investopedia.com/term.

Corporate Finance Institute (n.d.). ARR - Accounting Rate of Return. Retrieved from https://corporatefinanceinstitute.com/resources/knowledge/accounting/arr-accounting-rate-of-return/.

Daft, R.L. (2003). Management (6th edition). USA: South-Western.

De Wit, B., & Meyer, R. (2004). Strategy: Process, Content, Context (3rd ed.). Italy: Thomson Learning.

Drake, P. P. (n.d.). Dividend Valuation Model. Retrieved from http://educ.jmu.edu/~drakepp/FIN362/resources/dvm.pdf.

Hayes, A. (2020). Price-to-Earnings Ratio – P/E Ratio. Retrieved from https://www.investopedia.com/terms/p/price-earningsratio.asp.

Hornby, A. S. (2001). Oxford advanced learner's dictionary (6th ed.). Oxford: Oxford University Press.

Kenton, W. (2019). What is Strategic Financial Management? Retrieved from https://www.investopedia.com/terms/s/strategic-financial-management.asp.

Kenton, W. (2020a). Capital Asset Pricing Model (CAPM). Retrieved from https://www.investopedia.com/terms/c/capm.asp

Kenton, W. (2020b). Net Present Value (NPV). Retrieved from https://www.investopedia.com.

Kotler, P. (2003). Marketing Management (11th edition). USA: Pearson Education, Inc.

McClure, B. (2020). Explaining the Capital Asset Pricing Model (CAPM). Retrieved from https://www.investopedia.com/articles/06/capm.asp.

Murphy, C. B. (2020). What is Accounting Rate of Return (ARR)? Retrieved from https://www.investopedia.com/terms/a/arr.asp.

Shobhit, S. (2019). What is the formula for weighted average cost of capital (WACC)? Retrieved from https://www.investopedia.com/ask/answers/063014/what-formula-calculating-weighted-average-cost-capital-wacc.asp.

Thompson, A. A. Jr., & Strickland, A. J. III. (2001). Crafting and Executing Strategy, (12th edition). NY: McGraw-Hill/Irwin.

University of Leicester (2002). 2608 Strategic Financial Management, (11th ed.). Cheltenham: Learning Resources.

University of Leicester (2001). 2601 Accounting for Managers, (12th ed.). Cheltenham: Learning Resources.

Wallstreetmojo.com (2020). Long Term Financing. Retrieved from https://www.investopedia.com/terms/n/npv.asp.

URL: http://dx.doi.org/10.14738/abr.93.9841.