

The Use of Quantitative Business Models as an Aid for Financial Management by Entrepreneurs to Surmount Nigeria`s Economic Challenges

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Abstract

This investigation is concerned with the use of quantitative business models as an aid for financial management by entrepreneurs to surmount Nigeria`s economic challenges. The investigation used causal comparative or ex-post-facto research design. This research design seeks to find out that which is associated with certain occurrence, conditions, and outcomes types of behavior by analysis of the past events, or already existing records. The name ex-post-facto is based on the fact that the data used for this study were already in existence. It is worthy to know that some of the data were formulated/ modernized by the researchers to suit the reasons for the finding. It was discovered that quantitative business models like price-earnings ratio, dividend-discount-model, discount-cash-flow-model, Pie in 3-D, price-to-cash-flow-ratio, cost-benefit-analysis, breaking-even-analysis, statistics analysis of feasibility study, gross-domestic-product (GDP), and contribution margin (marginal income) etc., were used as an aid for financial management in the areas of investments decision-making to clients, financial projection of potential future performance of firms, determining stock valuation of companies in the same industries, to know sales rate/investment areas and expected returns of private and public firms. The necessities of a combination of quantitative and qualitative as well as strategic alliance among professionals of the tools users for better result were also given maximum attention in this study. Among other things it was recommended that firms and entrepreneurs should use quantitative models as aids or tools for financial management to achieve success.

Keywords: *Quantitative business models, financial management, entrepreneur, surmount, economic challenge*

Introduction

It is difficult to see/know entrepreneurs of organizations achieving positive performance and growth without proper finance management, be it profit or non-profit making organization.

An entrepreneur is an individual who is willing and able to take minimal or calculated business risks with the aim of maximizing profit (Okenwa, 2005). Entrepreneurs are people who put in their money, effort, and time into doing business so as to satisfy human needs and make money than they have invested. Entrepreneurship is the willingness and ability to seek out investment opportunities, establish and run an enterprise. While financial management is the planning, organizing, directing and controlling the financial activities such as procurement and utilization of funds of an enterprise (Management study guide, 2017). It also means applying the general principles of management to financial resources of the enterprise. The scope and elements of financial management include investment decision making in fixed assets called capital budgeting, current assets in form of working capital. It also involves financial decisions, dividend decisions etc. According to Kalyan city life (2017) financial management means to collect finance for the company at a low cost and to use the collected finance to earn maximum profits, therefore, financial management means to plan and control the finance of the company. The task of financial management by top management of firms is a huge one that requires quantitative business model(s) as an aid, such as, price-earning-ratio, dividend discount model, cost and quantity curves, learning and experience curves, charts, graphs, contribution margin (marginal income), linear programming, economic order quantity, cost benefit analysis, breaking-even-analysis, price-to-cash-flow-ratio, etc., to analyze the economy and markets for proper investments and returns. According to Lokoja (2016) since the sudden crash of the crude oil price which is the main source of revenue for Nigerian government, the country has continued to witness several economic challenges such as inflation, job losses, paucity of funds, high cost of living, forex scarcity, unemployment, among other things, with a strong divided opinions among economists and financial experts on whether the country's economy has gone into recession or is facing temporary challenges.

Statement of the problem

In the past and present, many organizations (firms) including individuals, have depend on qualitative models (analysis) as an aid for financial management, that deals with intangible, inexact concerns that belongs to social and experiential realm rather than mathematical ones. They had depend on thing: like management expertise, industry circle, management experience, positive association (Brand perception), trust-worthiness, customers satisfaction, competitive advantage (e.g. technology) cultural shifts, reputation etc., which are difficult to maintain, quantify, evaluate and capture with numerical inputs. Because of the above difficulties, there is need of using quantitative business models that focuses on numbers that one can see and are exact like balance sheets, profit-margin-ratio, debt ratio, price-earning-ratio, dividend-discount ratio model, price-to-cash-flow-ratio-model etc., as an aid in financial management. Combinations of both quantitative and qualitative models, strategic alliance among professionals are also other difficulties of this investigation that deserved attention in managing finance.

Purpose of the study

The under stated are the purpose of this study

1. To investigate how quantitative business models aid in financial management
2. Survey the benefits of the use of quantitative business models as an aide in financial management
3. Study the challenges faced with the use of quantitative business models as an aide in financial management.
4. To investigate the need for a combination of both quantitative and qualitative models as an aide for financial management.

5. Examine the need for strategic alliance among quantitative and qualitative analysts to achieve a better result
6. Examine the relationship between quantitative and qualitative business models

Research questions

The below research questions were posed to guide this study

1. Does quantitative business models aid in financial management?
2. What are the benefit(s) of using quantitative business models as an aid in financial management?
3. What are the challenge(s) faced in using quantitative business models as an aid in financial management?
4. What are the needs of combining quantitative and qualitative business models as an aid for financial management?
5. Is there also the need for strategic alliance among quantitative and qualitative analysts to achieving better result?
6. What is the relationship between quantitative and qualitative business models as an aide for financial management?

Quantitative model or analysis

This is the collection of mathematical and statistical methods used in the solution of managerial and decision-making problems, also called operation research (OR), and management science (Wikianswers, 2017)

It is a business or financial analysis technique that seeks to understand behaviors by using complex mathematical and statistical model, measurement research, by assigning a numerical value to variables, (All business, 2016). Quantitative analysis try to replicate reality mathematically, graphical, statically etc. Quantitative methods model(s) is a collection of mathematical and statistical methods used in solution of managerial and decision-making problems, also called Operational Research (OR), and management science. There are numerous tools (models) available such as linear programming (LP), learning curve (LC), PERT, and regression Analysis (RA) etc., Dictionary of accounting terms, (2016). Is also a collection, combination of mathematical and statistical methods or techniques used in solving managerial financial decision making problems. It is a tool used by management of organizations to analyses and predicts the market economy of the potential performances of organizations for investment returns despite the current stagflation of our Nigerian economy.

Meaning/objectives of model (s)

A model is a graphical, mathematical (symbolic), physical or verbal representation or simplified version of a concept, phenomenon, relationship, structure, system, or an aspect of real world. It is a way of using figures to represent or interpret, measure ideas or concepts instead of keeping the concept in words.

Objectives of models

1. To facilitate understanding
2. To aide in decisions making by simulating what if scenarios
3. To explain, control and predict events on the basis of past observations e.g. chart, graph, map, network diagram (are analogue model). Symbolic models are abstract e.g. mathematical equation, formula, financial statement, language etc.
4. Icon models are airplane, train etc.

Importance of quantitative model (s)

1. It helps in data collection, analysis and storage
2. It helps banks and insurance companies to develop their own specific risks models
3. It helps them to facilitate and understand the economic charge and regulatory landscape easily
4. Models frame work and software tools enhance performances of business e.g. excel spread sheet
5. It provides diagramming techniques to document business process for growth.
6. It enables business (firms) to predict future performances of the industries
7. It helps investors to know viable business necessary to be invested in
8. It creates chances for financial market practitioners, academics and research students to create their own “interest rate model” to price bond through existing models.

Quantitative research

This is the economic and / or market research in the areas directly related to mathematical data.

It is based exclusively on facts such as price-earning-ratios, gross domestic product growth and other data that are objectively measurable when recommending investment decisions to clients or brokers (Farlex, 2016). Quantitative research is based on the assumption that economic actors, being human beings, are susceptible (at risk) to acting on factors that may not directly correlate with facts. Quantitative research may look into management practices or brand recognition, when recommending investment decision to clients or brokers. Quantitative research is the same as quantitative model because; both deal with measurement of variables with figures.

Quantitative analysis

Quantitative analysis is economic, business or financial analysis that aims to understand or predict behavior or events through the use of mathematical measurements and calculations, statistical modeling and research (Investopedia, 2017). This is when securities analysis focuses on corporations financial data in order to project potential future performance. This methodology involves looking at profit-and-loss statements, sales and earning histories, and statistical state of the economy rather than more subjective to factors such as, management experience, employee’s attitudes, and brand recognition etc. While some people thought that quantitative analysis itself gives incomplete pictures of company’s prospect, advocates tend to believe that numbers tell the whole story.

The truth is, it is reasonably difficult for variables like management experience, employees’ attitudes, organizational policies and politics, government policies, and brand recognition etc. to be excluded neither used alone in the investment analysis if maximum success will be achieved. It is the opinion of the researchers that, both quantitative and qualitative business models should be combined and used as tools for investment analysis and financial management.

Economics and market, the ground for the application of quantitative models

Economics is the social science that deals with the production, distribution, and consumption of goods and services and with the theory and management of economies and economic system (The free dictionary, 2017). Economics is a social science concerned chiefly with the description and analysis of production, distribution, and consumption of goods and services (Merriam-webster, 2017). It is also the study of how people produce, trade and use goods and services. It is a totality of commercial activities. The economics look at how different factors

such as individuals, companies, and government interact with one another to maximize the fulfillment of their needs through the use of scarce (insufficient) resources. The economists also study supply and demand and the relationship between the two. There are several schools of thought within the economics; some are as stated and explained below:

1. The classical economists consider the resources of production as well as the role of invisible hands of the market like price, demand, supply, and government policies etc., as driver of the markets and economy.
2. The maxims consider exploitation of the labor by holders of the capital. To them, (the rich should get richer while the poor get poorer).
3. The Keynesianism emphasis on the role of demand as opposed by supply. When there is much demand, much supply should not be made so as to control the market for profit reason (creating artificial scarcity or hoarding)
4. The monetarisms promote the use of free-market and consider the role of money supply in the economic growth. To them, players of the economy should be allowed to participate freely, and with money supply, the economy will be active and vibrant. Just like what Nigerian economy suffered from 2015 till date, economic money scarcity. Folding of firms and dropping of workers (redundancy)

Market

Market is an actual or nominal place where forces of demand and supply operate, and where buyers and sellers interact directly or through intermediaries to trade goods, service, or contracts or instruments, for the money or barter (Business dictionary, 2017).

Market includes mechanisms or means for determining price of the traded item, communicating the price information, facilitating deals and transactions, and effecting distribution.

The market for a particular item is made up of existing and potential customers who need it and have the ability and willingness to pay for it. Market is a place or exchange mechanism which brings the buyers and sellers to contact.

Markets constitute the battle grounds of business and the use of business models. Corporate success in economy and marketing, identifying and exploiting positions of competitive advantage require effective application of appropriate strategies of production and marketing. This involves the use of business models as an aid to analyze the variables and factors at the battle grounds (economy and market) by financial managers/management (entrepreneurs). There are commodity markets, money market, forward market; industries market, stock exchange market etc. today so many persons do not go to the physical market ground. They prefer to engage in e-commerce (internet marketing) like e-banking, e-product, e-service, e-transport etc.

E-commerce

E-commerce is the purchase and sale of goods and/or services via electronic channels such as the internet (Business new daily, 2017). Electronic commerce is the term for any type of business, or commercial transaction, which involves the transfer of information across the internet (Network solutions, 2017). It covers a range of different types of business, from consumer based retail sites, through auction, or music sites, to business exchanges trading goods and services between corporations. Investor words (2017) posited that e-commerce is the buying and selling of products and services by businesses and consumers through an electronic medium, without using any paper document.

It is the use of information technology to plan, process and execute the buying and selling, and the distribution of goods and service as well as those things that aid commercial activities like banking, transport, insurance, communication, trade etc.

Types of quantitative business models, explanation and application

Price-earning-ratio

Price-earnings-ratio is the price of a security per share at a given time divided by its annual earnings per share.

Usually, the earnings trailing 12 months but, some analysts use other forms like 3 months, or 6 months. The P/E ratio is a way to help determine a security's stock valuation that is, the fair value of a stock in a perfect market. It is also a measure of expected but not realized growth. Companies are expected to announce higher earnings.

Price-earnings-ratio is the ratio for valuing a company that measures its current share price in relative to its per-share-earnings. Price-earnings-ratio can be calculated with the formula and illustration stated below:

Price-Earnings-Ratio = $\frac{\text{market value price per share}}{\text{Earnings per share}}$

Supposing BEK PLC is currently trading at ₦50 per share and its earnings over last 12 months was ₦15 per share. The P/E ratio for the stock (security) could be as 50/15, or ₦3.33. You take the current stock price of the BEC Plc. and divide by its earnings per share (EPS). The current stock price (value) = ₦50, Earnings per share = ₦15, Price-Earnings-Ratio = ₦3.33. A trailing P/E (per earnings) occurs when ratio earnings per share is based on previous period. A leading P/E ratio occurs when the EPS (earnings per share) calculated is based on future predicted numbers. A justified P/E ratio is calculated by using dividend discount analysis or dividend discount model.

As company's earnings per share rise, so does its market value per share rises. A company with high P/E ratio usually indicates positive future performance and investors are willing to pay more for the company shares and vice versa.

Price earnings ratio is always useful when companies are in the same industry, since this calculation ratio is based on earnings per share calculation. Management (entrepreneurs) can easily manipulate it with specific technique and make wise decision to investors (financial managers).

The price earnings ratio shows what the market (buyer) is willing to pay for stock based on its current earnings. (See the case of BEK PLC above). Investors often use this ratio to evaluate what stocks fair market value should be by predicting future earnings per share. Companies with higher earnings are usually expected to issue higher dividends or have appreciating stock in future. P/E ratio helps investors' analyze show much they should pay for stock based on the current earnings. This is why the price earnings ratio is often called the price multiple or earnings multiple.

Investors use this ratio to decide what multiple of earnings a share worth. That is, how many times earnings they are willing to pay. Take for a granted that:

Price Earnings Ratio = $\frac{\text{market value price per share}}{\text{Earnings per share}}$

Stock currently trading (price) is = ₦100 per share

Its earnings per share for the year are #5 = $\frac{100}{50} = ₦20$

As you can see, the ratio is ₦20; this means that investors are willing to pay ₦20 for every earnings. Meaning that, the stock ₦20 trading is multiple.

Limitations of P/E ratio for investment

1. You cannot compare stocks of different companies of different industries since it is based on price-earnings per share of companies of the same industry on banking and

telecommunications.

2. Valuation and growth rate of companies usually differ between sectors due to money earnings with time.
3. P/E ratio depends on the formula of calculating P/E itself. If no accurate market value of share estimate/inputs, investors may have problem to invest appropriately.

Price-to-cash-flow-ratio

This is used to evaluate the price of a company's stock as compared to the amount of cash flow it generates (Investment answer, 2017). It is an investment valuation ratio used by investors to evaluate the attractiveness of investing in a company's shares (Ready ratio, 2017).

It is also the ratio of stocks price to its cash-flow-per-share. The price-to-cash-flow-ratio is an indicator of stock valuation. Although there is no single figure indicator as an optimal price-to-cash-flow ratio, in the low single digits it may indicate that the stock is undervalued, while a higher ratio may suggest potentials (Overvaluation). Take into account a stock's operating-cash-flow like depreciation and amortization (paying back or paying off) to net income. It is usually useful for valuing stocks that have positive cash flow. It is calculated as price-to-

$$\text{cash-flow} = \frac{\text{shareprice}}{\text{cash-flow-per-share}}$$

For instance, if the stock price for two companies is ₦25 per share and one company has a cash flow of ₦5 per share ($25/5 = \text{₦}5$), and the other company has a cash flow of ₦10 per share ($25/10 = \text{₦}2.5$), so if everything is equal, the company with higher cash flow (lower ratio) (P/CF=2.5) has the better value.

A higher P/CF ratio indicated that the specific firm is trading at a higher price but is not generating enough cash flows to support the multiple. Buyers sometimes go for such stocks because of prestige. Smaller price ratios are preferred because; it means that the firm is generating ample cash flow that is yet to be considered in the current share price.

Price-to-cash-flow-Ratio is not commonly used as an indicator when valuing company. However, it is a very useful metric; investors are interested in cash generation ability of a business. The lower ratio indicates a "cheaper" valuation, while a higher ratio indicates an "expensive" stock. The ratio is useful for investors to know if a company is cash flow positive but not profitable. See another illustration below. Company making a loss of ₦5, 000 but produced an operating cash-flow-cash of ₦100 after adjusting for its non-cash expenses like depreciation and amortization. The company has a share price of ₦10 and 100,000 shares outstanding.

To calculate the company's price-to-cash-flow.

This will be $P/CF = (10/100) = 10$

Share price = ₦10

Cash flow per share = ₦100

The above means that, company has a price-to-cash-flow ratio of 10x. Note: The risks of using this ratio is that, the cash-flow of a firm may not be consistent or constant. If the cash flow fluctuates widely year to year, the ratio of a particular year might be useless, Value invest Asia, (2016).

Stock market

Stock market is the collection of markets and exchanges where the issuing and trading of equities (stocks of publicly held companies, bonds and other sorts of securities takes place, either through formal exchanges or over-the-counter markets (Investopedia, 2017). It also called equity market, the stock market is one of the most vital components of the free-market

economy, as it provides companies with access to capital in exchange for giving a slice of ownership. Stock market is where stocks and bonds are traded, meaning bought and sold (The MINT, 2017). It is also a market in which shares or stocks of publicly held companies are issued and traded either through exchange or over-the-counter markets. It is also called equity market.

When companies are profitable, stock market investors make money through dividends the companies pay out and by selling appreciated stocks at a profit called capital gain during the bull market and loss during the bear market. The stocks market can be divided into two. There are primary market and secondary market

The primary market is where new issues (stocks) are first sold through initial public offer. Institutional investors always purchase most of these shares from investment banks. All other trading goes on in the secondary market where participants including institutions and individuals invest through stock brokers. In Nigeria, stocks are bought and sold on the floor of Nigeria Stock Market Exchange.

Stock valuation

This is the process of calculating the fair market value of a stock by using predetermined formulas that factor in various economic indicators (Investor word, 2017).

In the financial market, stock valuation is the method of calculating theoretical values of companies and their stocks. The main use of stock's valuation is to predict future market price movement of stocks that are judged "undervalued" with respect to theoretical value which are bought while stocks are judged "overvalued" are sold in expectation that stocks undervalued will rise, while stocks overvalued will fall. The forces of demand and supply determine the supply of stocks as well as drive the market price.

Purposes of stock valuation

1. To determine the value of stock of a company which is gathered by series of data points.
2. Investors used stock valuation to compare stocks with another multiple stock to judge the value of their asset.
3. It is used to know if a particular investment is suitable.

Stock valuation method / factors to look out for

1. Fundamental analysis method

This method tries to assess whether a company's stock is undervalued or overvalued based on its business prospect. This is done through a tool called dividend discount model (DDM).

Dividend Discount Model (DDM)

This is a key valuation method used for dividend paying stocks, it is a model used for determining the value of a stock based on future dividend payments and discounting them to calculate a fair value for stock (Income investors, 2017)

This is a tool used by fundamental analysts to calculate what the market price of stocks should be. It also presents the value calculation based on stocks estimated future dividends. A stock is considered undervalued if the market price is less than its calculated amount or predicted amount.

The DDM calculates the "true" value of firm based on dividends of the company paid to shareholders. The reason for using this method to value a company is that, dividends represent the actual cash-flow-going to shareholders; as such, valuing the present value of cash flow should give you a value for how much the share should worth. So, the first thing to know or see is if the firm is paying dividend. It is not enough for the firm to pay dividend, the

payment should be stable and predictable. Take a look at Dolly PLC and see if the Dividend Discount Model of computation of stock variation would be appropriate for predictions.

Figure 1:

Year	2005	2006	2007	2008	2009	2010	2011	2012
Dividend per share	# 53	# 56	# 59	# 62	# 65	# 68	# 71	# 74
Earnings per share	# 64	# 68	# 72	# 74	# 78	# 83	#87	# 90

Source: Researchers

From the above table, the earnings per share of Dolly PLC were consistent and stable in growing at rate of about #4 and the dividends were also growing at #3. This means that the firm is consistent with its earnings, as such, it is stable and easy to predict its future using a Dividend Discount Model.

Discount-Cash-Flow-Model

This model uses firms discount cash flow to value the business. The benefit of this model is that, it can be used with wide range of firms that do not pay dividends. The discount cash flow model has several variations with commonly used two-stage.

1. The free-cash-flow which generally forecast five (5) to ten (10) years.
2. The terminal value which calculate to account for all the cash flow beyond the forecasted period. So, the first requirement in using this model is that, the firm should have a predictable free cash flow and free cash flow should be positive.

Because of the below figures computed, you will quickly find out that many small high growth firms and non-mature firms will be excluded due to large capital expenditure the companies will face, below is an example of Discount Cash Flow computation of stock.

Figure 2:

Year	2005	2006	2007	2008	2009	2010	2011	2012
Operation-cash-flow	₦789	₦146 2	₦890	₦256 5	₦510	₦670	₦660	₦410
Capital expenditure	₦995	₦113 2	₦125 6	₦223 5	₦154 6	₦120 0	₦157 2	₦120 0
Free-cash-flow	₦-206	₦330	₦-366	₦330	₦- 1036	₦-530	₦-912	₦-790

Source: Researchers

From the table above, the firm has produced increasing positive operation cash flow which was good. But, you can see high level of capital expenditure the firm was investing. Most of the result was showing negative cash flow in almost the eight (8) years.

As such, it will be difficult to predict the next five (5) to ten (10) years of that firm to invest and earn profit. So, to use Discount Cash Flow Model (DCF), the firm should have a stable or predictable free cash flow.

Factors to be look out for in the Fundamental Method

1. Experience of the company's management.
2. Overall outlook of the industry sector
3. Current and pipeline products/services of the company.
4. Balance sheet and income statement.

Technical analysis of Stock Valuation Method

This method relies on charts and patterns to predict the movement of a particular stock or market.

Factors to be look out for in the technical analysis include:

1. Volume of stock

The number of share trading is considered a signal of strength and weakness. For instance, if the stock prices increase on a strong volume, this means more significant on a strong volume than a price increase on the weak volume.

2. Advance/decline ratio

This measures the overall length and breadth of the market by comparing the number of issues that increase price against the number that decrease in price, e.g, demand, supply, price rate, government policy etc.

3. Support/resistance

This refers to the level where stock price comes under pressure. The support level is the “Bottom” line, while the “Resistance” level is the “Top”

Quantitative reasoning

This describes drawing conclusions and making predictions and decisions based on numbers and mathematical analysis, Demand media, (2016).

Cost-benefit-analysis

A cost benefit analysis is a common type of business decision making tool (model) that involves quantitative reasoning.

In a cost benefit analysis, managers/(entrepreneurs) decide the best course of action out of two or more possible alternatives course of action by attributing values to the expected benefit of different courses of action and comparing those values.

For instance, if a company is trying to decide whether to spend its money on launching a new product or spending more toward advertising current products, the company might conduct a cost-benefit-analysis to estimate how much profit it could be expecting from each course of action and then choose the option that is expected to produce more profit.

Break-even-analysis

Breaking-even analysis is a useful tool for determining at what point your company, or a new product or service, will be profitable (Business encyclopedia, 2017). It is a financial calculation used to determine the number of products or services you need to sell to at least cover your costs.

A break-even-analysis is also a quantitative inquiry into business to determine how many unit of certain product they must sell in order to break even. Breaking even means that a company covers all its cost but does not make profit. A company or an entrepreneur must at least meet the breaking even point to avoid losing business money.

Statistical analysis

This is an analysis of numerical data that draws conclusions from data. For instance, a company might collect data on whether customers who enter a store actually purchase. If the statistical analysis shows that only 30% of customer who entered a store purchased goods and that the majority of those who buy goods purchased certain product that was located behind other than products in the front shelves in the store, the business might decide to move that

popular product to the front in an effort to increase sales. The organization can generate codes for those buying and those not buying and later analysis the data including the products to ascertain the percentage rate of purchases by customers.

Feasibility study

Is an examination into whether a certain new business or product is actually capable of being carried out to achieve profitability. The feasibility study may involves quantitative analysis such as, determining whether a certain product has the potential to produce profit based on the expected cost of producing the product, marketing and the price the company expects to charge for the product; taking into consideration factors like competitions, technologies, funds, manpower, security, and government policy (taxes) etc.

Linear programming (LP)

This is a mathematical approach to the problems of allocating limited resources among competing activities in an optimal manner by entrepreneurs. The techniques is used to maximize revenue, contribution margin (CM), or profit function or minimize a cost function, subject to constraints, Allbusiness.com (2016).

Linear programming consists of two ingredients: objective function and constraints both of which are lined. In formulating the objective function and constraints in terms of these decisions making e.g. if a firm produces two (2) products of A and B. Both products require time in two processing department, assembling and finishing.

Mathematically, models for decision with a large number of alternatives. LP is typically used to either maximize profit or minimize costs in manufacturing process with varying level of inputs.

Contribution margin (CM)

This is the selling price minus the variable cost, is a measure of the ability of the company to cover variable costs with revenue, the amount left over, the contribution, covers fixed costs or is profit (Wilkinson, 2013). It is also the measurement of the profitability of a product.

It can also be seen as the difference between sales and the variables cost of products or services, also called (Marginal income).It is the amount of money available to cover fixed cost and generating profits. For instance, if sales are at ₦15, 000 and variable cost was ₦6, 100, contribution margin will be ₦8, 900 (₦15, 000 less ₦6, 000).

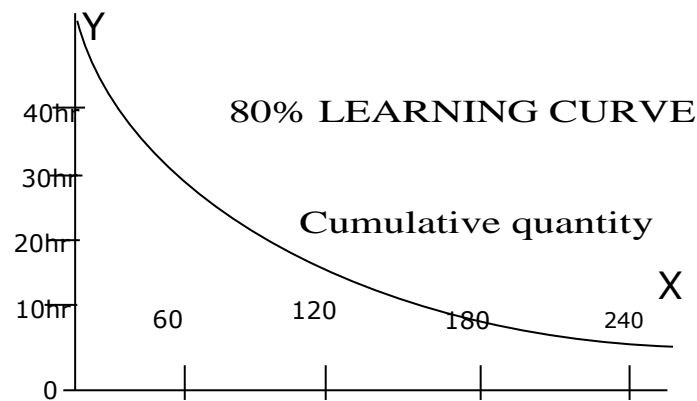
The contribution margin has many advantages,

(1) a company can sell an item below the normal selling price when idle capacity exist as long as there is a contribution margin since it will help to cover fixed costs or add to profit. CM calculation requires segregation of fixed and variable costs which is needed in break-even-analysis.

Learning curve

This a chart line representing the efficiency gained from experience. Basically, it is a curve describing the relationship between the consecutive numbers of units produces (X-axis) and the time per produces (Y-axis). This curve is based on the statistical finding that as the cumulative output doubles, the cumulative average labor input time required per unit will be reduced by some constant percentage ranging between 10% and 40% because of mastery. This means that firms should continue to train their staff to spend fewer hours for more output. The curve usually is designed to complement. For instance, if the rate of reduction is 20%, the curve is referred to as an 80% learning curve. It can also be applied in the classroom management courses or subjects like keyboarding, stenography, ICT etc.

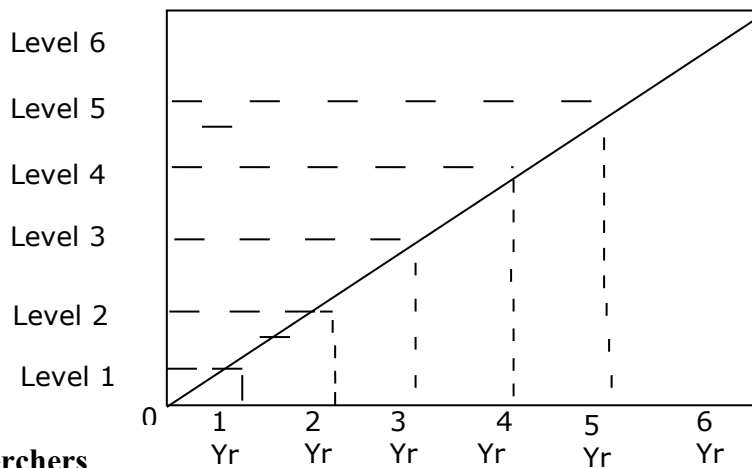
Figure 3:



LEARNING CURVE (SINGLE SUBJECT), Source: Researchers

Learning curve is a graphical representation of the increase of learning (vertical axis) with experience (horizontal axis)

Figure 4:



Source: Reserchers

Experience

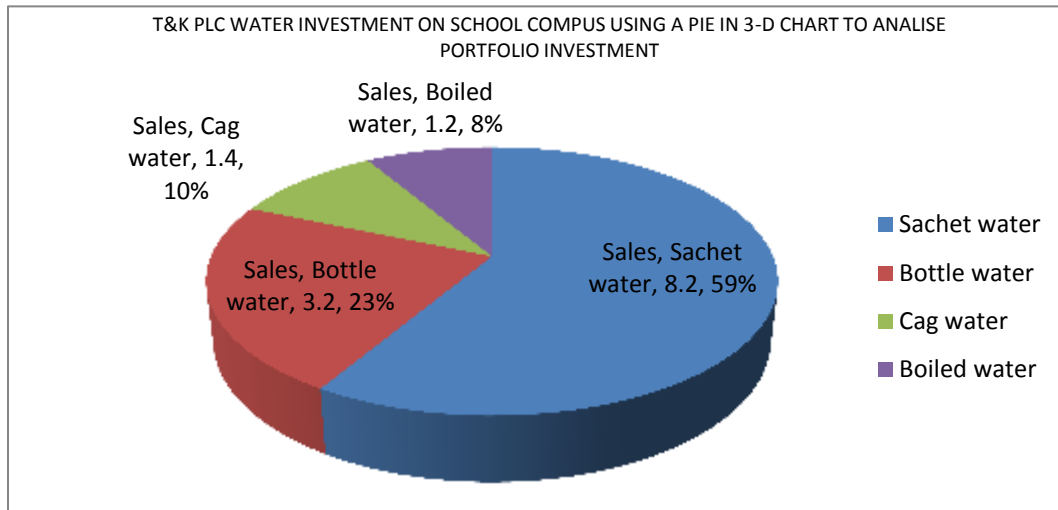
This learning curve is for single subject, showing how learning improves with experience. A learning curve average over many trials is smooth, and can be expressed as a mathematical function. The term learning curve is used in two main ways.

1. Where the same task is repeated in series of trial.
2. Where body of the knowledge is learned over time. The first person to describe the learning curve was Hermann Ebbinghaus in 1885 in the field of psychology – include it in reference

Comparing portfolio investment using Pie in 3-D chart in school campus

The pie in 3-D chart is used to analysis how portfolio investment of a company faired in the market. It also shows areas to improve/ invest through market research.

Figure 5:



Source: Researchers

PERT

PERT chart is a project management tool used to schedule, organize, and coordinate tasks within a project (Search software quality, 2017).

PERT means Program Evaluation and Review Technique. It is a method for project planning by analyzing the time required for each step. It is also a schedule method originally designed to plan a manufacturing project or a keyboarding studio by employing a network of interrelated activities, coordinating optimum cost and time criteria. PERT emphasizes on the relationship between the time each activity takes, the cost associated with each phase, and the resulting time and cost for the anticipated completion of the entire project. PERT is an integrated project management system. The vital PERT formula is:

T = expected completion time

A = optimistic estimate

M = most likely estimate

B = pessimistic estimate

Applying numbers to the PERT

A = (optimistic time) = 7 weeks

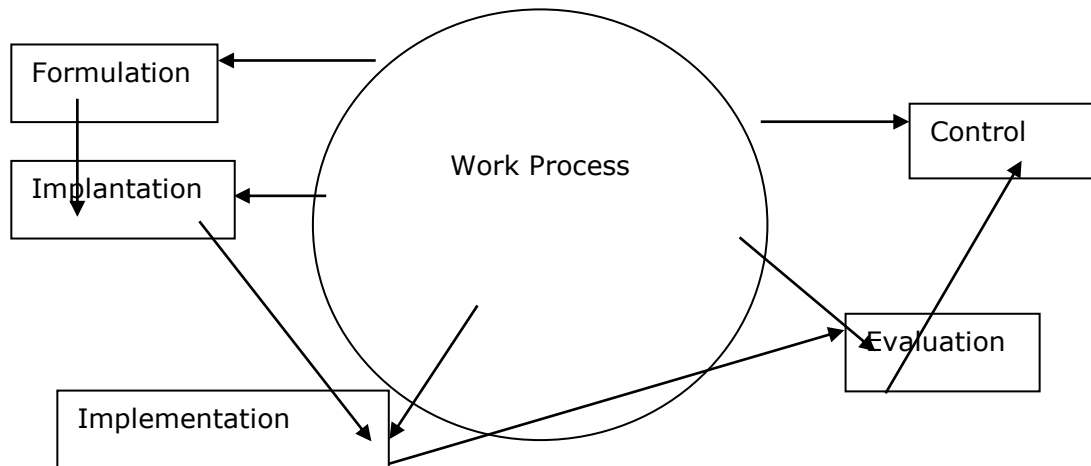
M = (most likely time) = 11 weeks

B = (pessimistic time) = 15 weeks or

T = (expected completion of time)

The difference between the CPM and PERT is that, PERT is mainly used where the time required for completion of each activity involved cannot be accurately defined nor are the resources for the activity really available. This technique is based on probability of completing each activity in or on time. PERT is good for research and development projects and investigation design etc.

Figure 7:
PERT 5- STAGE WORK PROCESS



Source: Researchers

Characteristics of constructing a project of pert or CPM

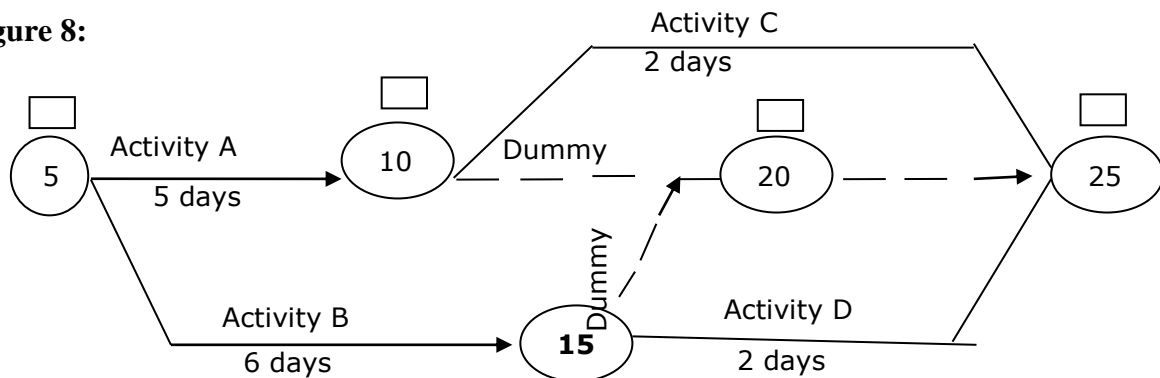
1. The project must consist of well-defined collection of jobs or activities which when completed will make the end of the project.
2. The jobs must be such that they can be started or stopped independently of each other within a given sequence e.g. laying a foundation of building project or roofing.
3. The jobs are ordered that is, they must be performed in a technological sequence e.g the foundation of a wall must be completed before the wall must be built.
4. The CPM network gives management information for taking decisions and focusing its attention to essential operations.

Critical Path Method (CPM)

This is the step-by-step project management technique for process planning that defines critical and non-critical tasks with the goal of preventing time frame problem and process bottlenecks. It is a technique used for construction based on knowledge and experience of the past projects for predicting accurately the time required for various activities during the execution of the project. Hierarchy of construction is well defined and time of completion of the same project is defined.

Critical Path Method (CPM) is used where activities of the project are SMART. That is Specific, Measurable Achievable, Realistic and Time-bound. See the below example of CPM specimen of building an ICT studio.

Figure 8:



Source: Researchers

Financial management

Financial management refers to the efficient and effective management of money (funds) in such a manner as to accomplish the objectives of an organization. It is a specialized function directly associated with the top management. Financial management mainly applies to an organization or company's financial strategy, while, personal finance or financial life management refers to individual's strategy, Wikipedia, (2016). Financial management includes how to raise capital and how to allocate capital i.e., capital budgeting.

Not only how to allocate the short term resources like, current liabilities, it is also how to deal with dividend policies of the shareholders, Business dictionary, (2016).

Financial management also involves the planning, directing, monitoring, organizing, and controlling of the monetary resources of the organization. Efficient and effective financial management come through the use of quantitative models like price-to-earning-ratio, quantity curve, chart, graphs, contribution margin (marginal income), linear programming, economic order quantity, cost-benefit-analysis break-even-analysis model., dividend discount model, price-to-cash-flow-ratio, dividend- cash-flow-model, stock valuation, technical analysis of stock valuation method and contribution margin etc., as an aid in financial management.

The basic of financial management

Financial management is more than keeping account records. It is an essential part of organizational management and cannot be seen as a separate task to be left to the finance staff or treasurer alone. Financial management involves planning, organizing, controlling, and monitoring financial resources in order to achieve organizational objectives. Effective financial management can only be achieved when you have a sound organizational plan. A plan in this context means, having a set objectives as agreed, developed and evaluated policies, strategies, tactics and actions to achieve these objectives. A sound financial management will include long-term strategic plan and short operational plan. These financial planning should be part of the organization's on-going planning process, with the use of qualitative models mentioned above as an aid for financial management.

Advantages of good financial management using quantitative models

1. It makes effective and efficient use of resources
2. It leads to achieving the objectives and fulfill commitment to stakeholders.
3. It makes management to become more accountable to shareholders
4. It brings respect and confidence of investors, partners and beneficiaries
5. They gain advantage in competition for increasing infrequent resources
6. It prepare for a long-term financial sustainability.
7. It makes organizations to have broad knowledge of the kind of investment they want to go in.

In financial management system, which model is the best?

There is no model of financial management system that suits all organization because, factors like organizational policies, politics, human resources, finance, government policies, time, technology, demand and supply etc., are some of the major factors influencing the activities and performance of organizations and are applied differently to different firms.

However, the following are some guiding principles for financial management systems:

- (1) Consistency
- (2) Accountability
- (3) Transparency

(4) Integrity

(5) Financial Stewardship

Organizations must take good care of the financial resources that have been made available to it

Qualitative and quantitative business models (analysis) in contrasts

Qualitative business model is securities analysis that uses subjective judgment based on unquantifiable information such as management expertise, industry circle, strength of research and development, and labor relation. Quantitative business model contrasts with qualitative business model (analysis), which focuses on numbers that you can see on reports such “balance sheet”, Investopedia (2016). However, the above two techniques (models) will often be used together in order to examine company’s operation and evaluate its potential for investment opportunity. Furthermore, quantitative analysis uses exact input such as profit-margin, debt ratio, earning-multiples and the like. These can be plugged into a computerized model to yield an exact result, such as the “fair value” of stock or forecast for earnings growth. Although human being, write program that crunches (difficult) these numbers that involves a bit subjective judgment. Qualitative model (analysis), on the other hand deals with intangible, inexact concerns that belong to the social and experiential realm rather than the mathematical one. Quantitative model depends on the kind of intelligence that machine (currently) lack, since things like positive association with brand recognition, management trustworthiness, customer satisfaction, competitive advantage and cultural shifts are difficult to capture with numerical inputs.

Elements of quantitative business model (Analysis)

Educational and professional background

1. An investor might start by getting to know a company’s management.

These include their educational and professional backgrounds. One of the most important factors will be their experience in the industry. More abstractly, do they have a record of hard work for prudent decision marking?

2. Are they better knowing or being related to the right people?

3. Their reputations are also key. Are they respected by their colleagues and peers in the industry and beyond?

4. What is their relationship with business partners? Is it worthy of exploring since they have direct impact on operations?

5. How do employees view the firm and management? Are they satisfied and motivated? Or do they resent (hate) their bosses? The rate of employees (turnover) result can indicate employees’ loyalty or lack to the firm.

6. What is the work place culture?

7. How do their professionalisms/educational background translate into their financial performance?

The truth is, the answers to the above questions are difficult to get. Five hundred (500) CEOs are not known for sitting down the same way with small-time investors for chat or showing them round the corporate headquarters the same way and time. Since customers are the only group more important to the company’s success than management and employees, customers are the sources of revenue, company place customer’s interest before stakeholders for better long-time investment.

To gain their loyalty in financial management, both quantitative and qualitative models should be employed for success.

Key questions to be considered during financial planning management

1. Are we satisfied with our budgeting process and other financial planning?
2. What objectives is our financial management system desired to meet or are the objectives clear in practice?
3. What are our key principles for financial management?
4. How do staffs respond to the system? Do people use the principles? Is it a “live” tool? Or workable tool?
5. Does our financial management system enable effective decision-making when allocating resources? What quantitative and qualitative models can we use to aid our financial management to achieve success?

Finding of the study

It was discovered that quantitative models were an aid in financial management to firms. It was also noted that quantitative model, quantitative research, quantitative analysis and quantitative reasoning mean same, and that investment analysis may be incomplete and incomprehensive if qualitative variables are also not operationalized with absolute consideration during economic and market analysis for a successful financial management. The investigation also revealed that, there is absolute need for strategic alliance among analysts of quantitative and qualitative.

Implication of the Study

The under stated are the implications of this study to

1. Firms (entrepreneurs) have to use quantitative models as an aid for financial management
2. Firms have to also use both quantitative and qualitative models as an aid to analyze the economy/markets for a successful financial as well as employ the services of the professionals.
3. Quantitative and Qualitative Professionals. There is need for strategic alliance in the service delivery. No person knows all, two good heads are better than one. Forming alliance will ease the job for success.

Conclusion

Quantitative business models are actually an aid for financial management because of the economic and marketing benefits analysis for effective and efficient management of finance to achieve organizational objectives, although with challenges by entrepreneurs, however, a combination of both quantitative and qualitative seems to be the best for entrepreneurs of enterprises, as such the need for strategic alliance by both experts for a better financial management for organizational success.

Recommendation

1. Entrepreneurs and Organizations should use quantitative models as an aid for their financial analysis/ management
2. There is need for entrepreneurs to employ the service(s) professionals in financial management
3. The use of quantitative models as an aid for financial management should not be seen as the duty of the financial office or department alone by entrepreneurs, rather a team work of the management.
4. There is need for a combination of quantitative and qualitative models as an aid for financial management.
5. There is need for strategic alliance among the quantitative and qualitative analysts for a better result

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